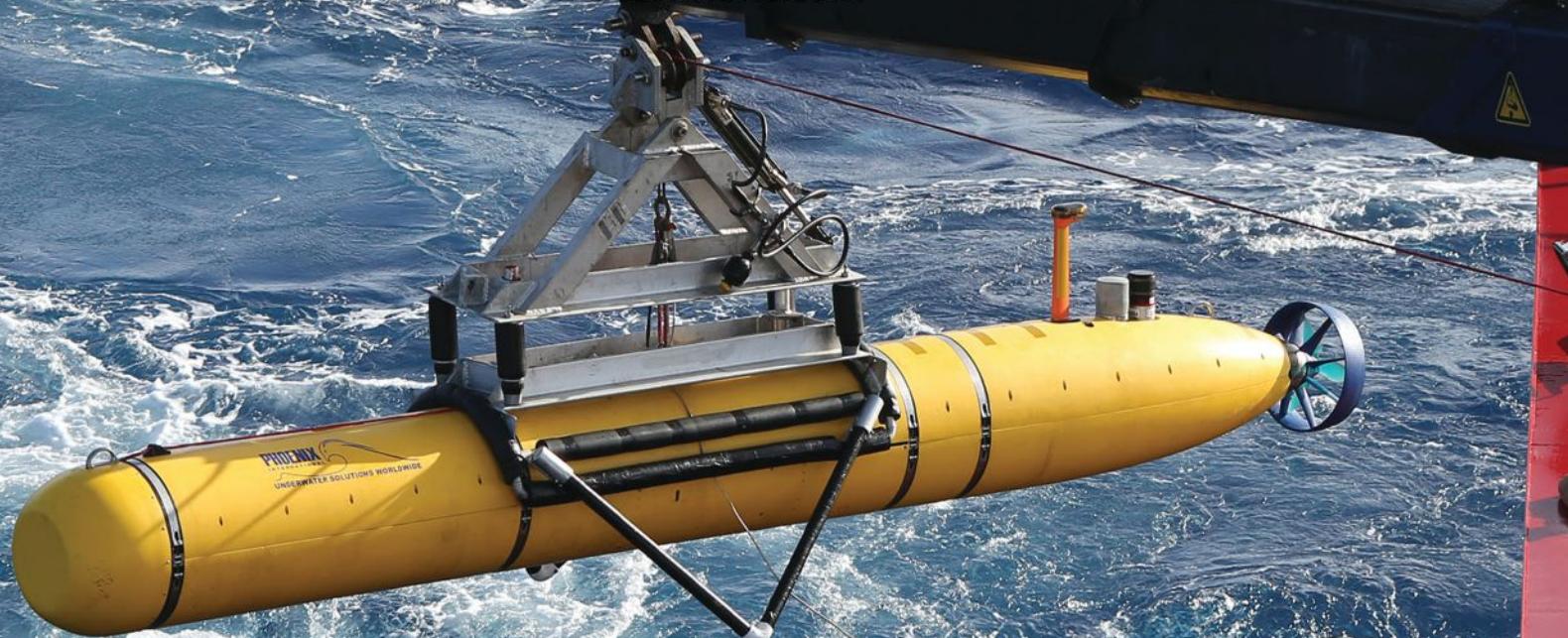


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**Addressing MDA Challenges
with USVs as a Sensor Network**

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Offshore Industry



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Phoenix deploying their 21 inch AUV Artemis during Phase 1 of the MH370 search. Photo credit: Phoenix International Holdings, Inc.

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Towed vs Autonomous Technology for Aircraft Search Operations

by Christopher S. Moore, Commercial Operations Manager/AUV Program Manager, Phoenix International Holdings, Inc.

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With over 70% of the Earth's surface covered by water, when an aircraft disaster occurs there is a good chance the wreckage will come to rest underwater. For aircraft equipped with Underwater Locator Beacons (ULBs), the moment of impact starts a 30-day battery. This short period mandates the rapid mobilization of search assets on regionally located Vessels of Opportunity (VOOs). When working globally in full ocean depths, there are limited deepwater search assets that can be rapidly mobilized to effectively conduct the search in a timely manner. While towed systems have traditionally served as the central tool for these operations, AUVs, because of their portability and adaptability to a VOO as well as their functionality in the water, have rapidly become a key part of aircraft search operations.

Underwater aircraft search technology typically involves the use of a hydrophone on a Towed Pinger Locator (TPL) to locate a ULB. This TPL is towed through the search area to detect the presence of the ULB's acoustic signal and, once detected, that signal is further defined by towing the hydrophone back and forth in a shrinking search pattern until the location of the signal source can no longer be reduced. Next, sonar assets are deployed to locate a debris field. Side Scan Sonar (SSS), and more frequently Synthetic Aperture Sonar (SAS), is used for this portion of the search. Once a potential debris field has been identified, optical assets are required to confirm the debris field as that of the missing aircraft. Typically, this is done using video cameras on a Remotely Operated Vehicle (ROV).

Traditional towed search assets, such as TPL or SSS, have advantages and disadvantages as deepwater search assets. Typical towing configurations (wire out to water depth ratios) are 2:1 or 3:1, depending on the ship's speed and range scale, in order to fly the fish at the desired altitude above bottom. When working in 6,000 m of water, it is not unusual to have 8,000 to 10,000 m of wire out. These systems require a large length of cable on a storage drum reeled through a traction winch whose combined weight can total 25 tons. These systems are difficult and expensive to ship and require precious time to mobilize onto a vessel and substantial deck space capable of withstanding a high level of loading. During towing operations, cable care and maintenance become critical to avoid tension-related problems that can attenuate the signal through the wire. Once a survey line is completed, the towing cable needs to be recovered to less than minimum water depth to allow the vessel to turn onto the next survey line without the towfish impacting the seafloor. When the vessel resumes the next line, the towfish is redeployed to survey depth and allowed to stabilize at speed before resuming data collection. In deepwater (6,000 m), these turns can take upward of 12 hours to complete.

The advantages of these towed search systems are that they allow for real-time monitoring of data and the ability to adjust settings to optimize data quality. Additionally, they can search for an extended duration because they have a shipboard power source. However, a key drawback associated with towed search systems is that in order to acoustically locate a ULB, conduct a sonar search for the wreckage, and optically verify a debris field as the missing aircraft, three separate systems (TPL, SSS, and an ROV) are required—as well as a large enough vessel to accommodate these systems. To address these and other issues associated with towed search operations, AUVs offer a viable alternative.

AUVs present a search methodology that is compact, flexible, and adaptable. The complete AUV system used in the initial search phase for missing Malaysian Airlines Flight 370 (MH370) system was mobilized from the U.S. East Coast to Perth, Australia in 2 days and onto a VOO in 1 day. This system totaled 10,000 lbs and was composed of 20 pieces, including acoustic and optical payloads; Lithium Ion polymer batteries; an overboard USBL system; and positioning, communication, and data processing equipment. This AUV was able to complete turns in 1.5 times its body length (or approximately 40 ft), resulting in minimal turn-time—especially when compared to the 12+ hour turn time associated with towed systems.

The addition of a hydrophone into an AUV payload enables the vehicle to record geo-referenced acoustic signal frequency and strength. Autonomy innovations in AUV backseat control architecture are continuing to enhance the flexibility and intelligence of these systems. This architecture enables real-time control of vehicle navigation based on sensor input. Integrating an array of hydrophones through a backseat driver into the navigational control of the vehicle enables the vehicle to hone in on a ULB signal source, minimizing search time.

In addition to detecting and localizing the ULB, the AUV is also capable of acoustically imaging the debris field and optically verifying the target aircraft within the debris field. In short, the AUV can perform all three aircraft search functions that are typically performed by three separate towed systems. That said, drawbacks associated with AUVs include limited sub-surface data transfer, reduced real-time adjustments to sensors, and AUV power source endurance limitations.

In response to aircraft disasters over water, investigators have various assets at their disposal, including towed search technology and AUVs. While towed systems remain a proven and reliable search tool, with the continuing advancements in autonomy, data storage and transfer, and battery technology, AUVs are rapidly becoming a reliable and key capability to aid in aircraft search operations.

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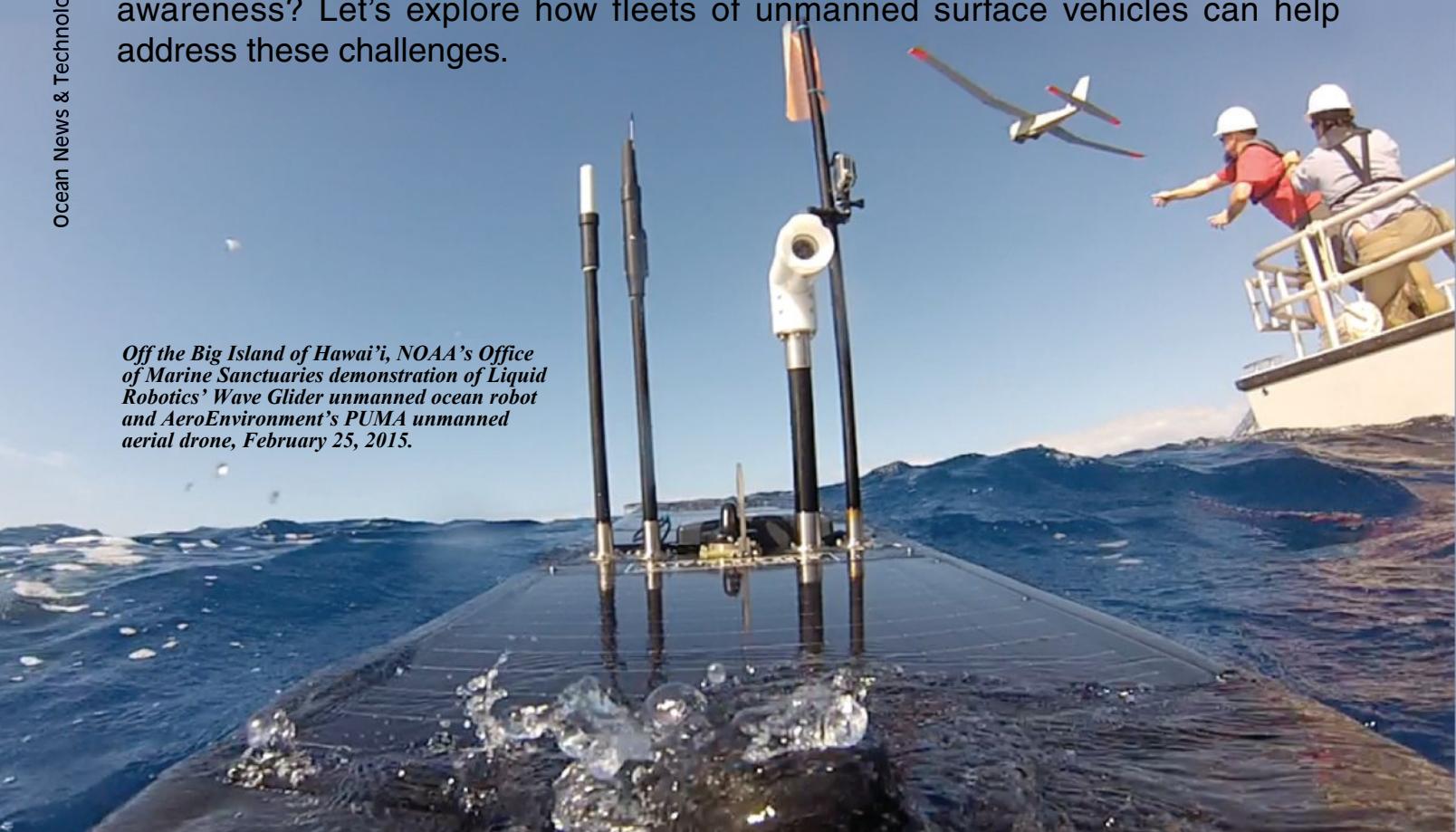
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Addressing MDA Challenges with USVs as a Sensor Network

By: Graham Hine
Senior Vice President, Product Management
Liquid Robotics, Inc.

Daily we hear of the increasing threats to the world's coastlines whether it's illegal drug or human trafficking, smuggling of natural resources and fish, and/or new acts of terrorism on critical infrastructures and shorelines. The world's navies, homeland defense organizations, and coast guards are tirelessly working to thwart these challenges, yet are doing so with limited resources (people, ships and patrol craft) due to reduced budgets. The costs are great if gaps in coastal protection allow illegal activities. For example, last year in Kenya, their entire country's tourism collapsed after a round of violence in a coastal region caused travel warnings for "possible attacks on maritime vessels in or near Kenya ports"¹. What's the solution to provide affordable coverage for global maritime domain awareness? Let's explore how fleets of unmanned surface vehicles can help address these challenges.

Off the Big Island of Hawai'i, NOAA's Office of Marine Sanctuaries demonstration of Liquid Robotics' Wave Glider unmanned ocean robot and AeroEnvironment's PUMA unmanned aerial drone, February 25, 2015.



Maritime Domain Awareness

The International Maritime Organization (IMO) defines Maritime Domain Awareness or MDA as "*the effective understanding of anything associated with the maritime domain that could impact the security, safety, economy, or environment.*" This spans securing borders, coastlines, and Exclusive Economic Zones on one hand and deterring exploitation of Marine Protected Areas (MPAs) on the other. The following gives a sense of scale of the global maritime operations (Frost & Sullivan, 2012):

- 110,000+ merchant vessels; 50,000+ in water or preparing to sail the sea on any given day;
- 45,000+ shipping companies and maritime businesses; and
- 225 maritime trading nations, dependent territories, and island states.

While the overall economic activity in the oceans have been steadily increasing over the years, the responsibility to protect this high activity from illegal threats lies in the hands of government and state entities with limited budgets. Here are some numbers that highlight how expensive these threats have become with time (Frost & Sullivan, 2012):

- Smuggling costs approximately €285 billion a year to the EU (import/ export tax revenues); and
- Piracy costs \$8 to 12 billion a year through insurance claims, ransoms, and other costs.

Therefore, primary MDA goals are to get a good understanding of vessels as potential threats to national security and economic activity, and to get information on specific threats as early and as far offshore as possible.

Challenges with Current Capabilities

Whether it is to secure borders or protect MPAs, the capabilities that are utilized today are very similar—patrol ships, fixed buoys, and surveillance assets (planes, drones, and satellites). Let us evaluate each of these.

Patrol Ships: Though these vessels can be equipped with sophisticated, long-range sensors for detection, it requires manned missions out on the sea, which are limited by weather. Moreover, with multiple uses of these assets, it is typically patrolling (on-station) for a small fraction of the time.

Fixed/Moored Buoys: Buoys are a great way to gather ocean data, but their fixed location and high profile makes them easy to avoid. In addition to limited functionality and almost no re-tasking capability, deployment and maintenance of these assets is expensive while only achieving 60% to 80% availability.

Surveillance Assets (planes and satellites): These assets provide wide area surveillance and cover a larger area when deployed. However, the at-station time is limited and severe weather or cloud cover restricts the ability to continue the surveillance mission.

Many countries are just not resourced to provide coverage over the vast expanses of the ocean despite the damage to their economy by overfishing, smuggling, or other unauthorized

activities. To achieve comprehensive MDA for all nations, the overarching limitation has been to gather affordable, persistent, pervasive, multi-sensor data for the detection, identification, and tracking of uncooperative maritime targets operating in territorial waters.

Autonomous Sensor Networks

One approach to address these gaps is to deploy sensor networks that augment our understanding of the activities going on in deep seas without sending manned assets for extended periods of patrolling, or worse, in dangerous environments. This isn't entirely new as sensors have been extensively used in different applications in defense, science, and commercial maritime industries attached to offshore fixed assets (rigs, buoys, and wind farms) or on-board moving assets (ships and aircrafts).

Figure 1 conceptually describes such a sensor ecosystem. Ideally, these sensors could be deployed on mobile platforms rather than fixed buoys for monitoring activities so that the

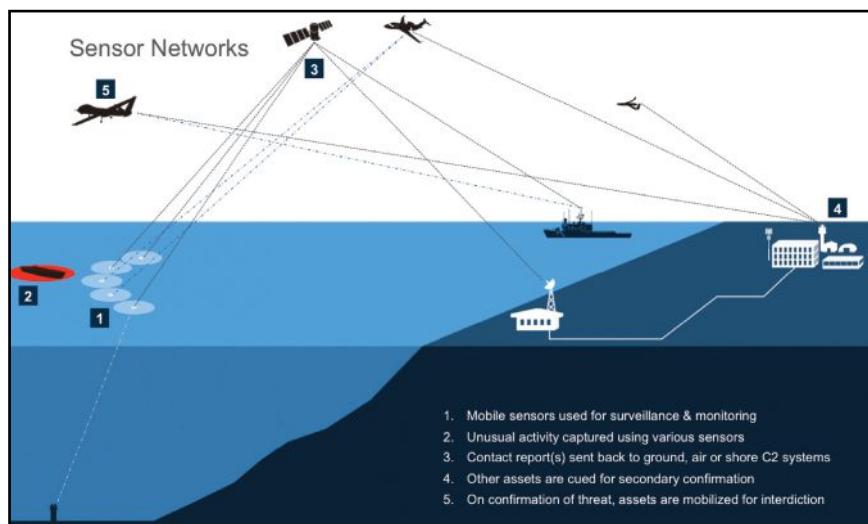


Figure 1. A conceptual diagram that describes how sensors can improve MDA and augment existing surveillance & security operations.

system is adaptable to changing behaviors and traffic patterns of uncooperative elements. Data on any unusual activity in the area can be sent back to shore in real-time and other assets can be sent out to further examine the situation. Depending on the intent and confirmation of the threat, interdiction assets can be mobilized.

The big question is whether such an autonomous, unmanned, mobile platform can be built with flexibility of sensor payloads to improve the current operations.

Answer: Unmanned Vehicles

For the past few decades, unmanned vehicles have been deployed serving both serious mission-critical tactical missions and leisure applications for DIY communities and robotics fans. Thanks to advancements in consumer electronics and demand, sensors have been driven to smaller size and lower costs. The combination of these two technologies has been fueling innovation at a phenomenal pace. Unmanned vehicles have also reached the oceans, opening doors to disrupting numerous applications that were otherwise considered impossible or cost prohibitive.

FEATURE STORY

The timing is right for taking new and/or traditional sensor packages such as cameras, electro-optical (EO), RADAR, Auto-Identification System (AIS), acoustics, Radio Frequency/Direction Finding (RF/DF), and integrating them on an autonomous platform. This would enable gathering of data for addressing MDA objectives.

One company helping to advance maritime domain awareness is Liquid Robotics. Through the innovation of the Wave Glider, the world's first wave-powered ocean robot or unmanned surface vehicle, these unmanned platforms can patrol vast stretches of coastlines, night/day, 24x7, through the most severe weather conditions while requiring no fuel or personnel. They can be deployed with sensor payloads to acoustically detect unknown vessels and communicate information in real time, providing a persistent tipping and queuing capability to high-value, manned assets for interdiction. With the unique capability of interoperating in real time with manned and unmanned assets from the seafloor to the space, the Wave Glider provides a new capability to help address the MDA security challenge.

Figure 2 describes four operational scenarios where groups of sensors such as a fleet of Wave Gliders can work in formations to meet different MDA objectives:

- MPA: Protecting wildlife from illegal fishing and environmental damage;
- Ports & Harbors: Monitoring areas for suspect traffic;
- Coasts & EEZs: Monitoring illegal traffic entering remote coastline areas; and
- Offshore assets: Building a surveillance zone around critical assets.

The deployment of Wave Glider fleet offers flexibility in both position and re-tasking capabilities connecting manned and unmanned assets to build an "information exchange" network.

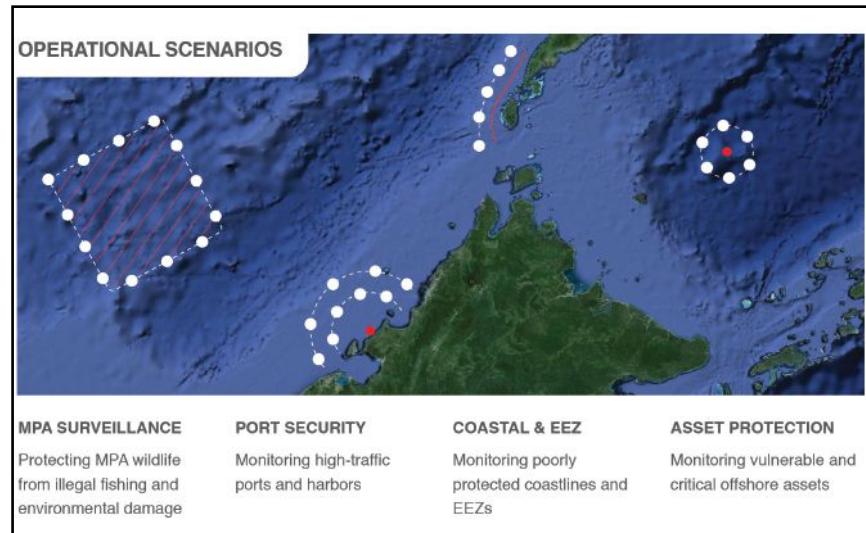


Figure 2. A list of MDA objectives and high-level operational scenarios where sensor networks (or Wave Glider fleets) can be deployed.

A recent example of a mission that connected manned and unmanned assets for real-time maritime domain awareness was done by NOAA's Office of National Marine Sanctuaries, Liquid Robotics, and AeroEnvironment (visit www.sanctuaries.noaa.gov/news/press/hawaii-uas/welcome.html). Together, they successfully demonstrated the use of two

unmanned systems, the Wave Glider from Liquid Robotics and the PUMA from AeroEnvironment, working in concert to identify an illegal surface vessel, verify its identity via aerial drone, and communicate to the command center. This is an excellent demonstration of how unmanned technology can work together to help alleviate the operational burdens of coastal patrol and surveillance.

Driving Value

A fleet of Unmanned Surface Vehicles (USVs) acts as an additional sensor data feed that can be integrated with existing surveillance infrastructure to improve maritime situational awareness. The Wave Glider's low-observable design and 100% energy independence (no fuel consumption) offers round-the-clock persistent surveillance.

This unmanned platform can host a variety of sensors to improve threat detections both in quality and timeliness. Also, its ability to re-configure formations or adjust to varying traffic patterns makes it a great choice for dynamic wide area coverage. Compared to running deep-sea manned missions for monitoring and patrol, such a system incurs lower surveillance costs. Not only does this positively impact operating costs, it also improves effectiveness of existing assets—vessels or aircrafts that are usually patrolling the area can now spend more time on secondary confirmation or focus on interdiction.

It is important to understand that neither traditional surveillance approaches nor unmanned platforms can fully address today's MDA needs. However, when the two are combined to operate effectively, it creates an important multiplier effect.

Peek into the Future

If one takes a walk down memory lane for Unmanned Aerial Vehicles (UAVs), one would understand the long, tedious development path that UAVs have been on to mature technology, improve operations, get to scale, and eventually cross the chasm to be a mainstream asset. Despite challenges along the way, it was the sheer commitment of defense agencies to drive those programs that could avoid putting trained personnel in harm's way.

For unmanned platforms in maritime applications one can expect a similar path of sensor innovation—operationalizing these assets and eventually get wider adoption to dramatically improve MDA around the world.

Pushing the Frontier

It is no surprise that it is very important for nations across the board to address gaps in MDA, some of which pose meaningful challenges. The recent developments in unmanned system technology holds great promise to extend the current maritime monitoring capabilities into deep and remote parts of the ocean. Hopefully, it builds a communication bridge between seafloor and space so that relevant, high-quality data can flow in a timely fashion to enable informed decisions and prevent potential threats to meet national economic and security goals.

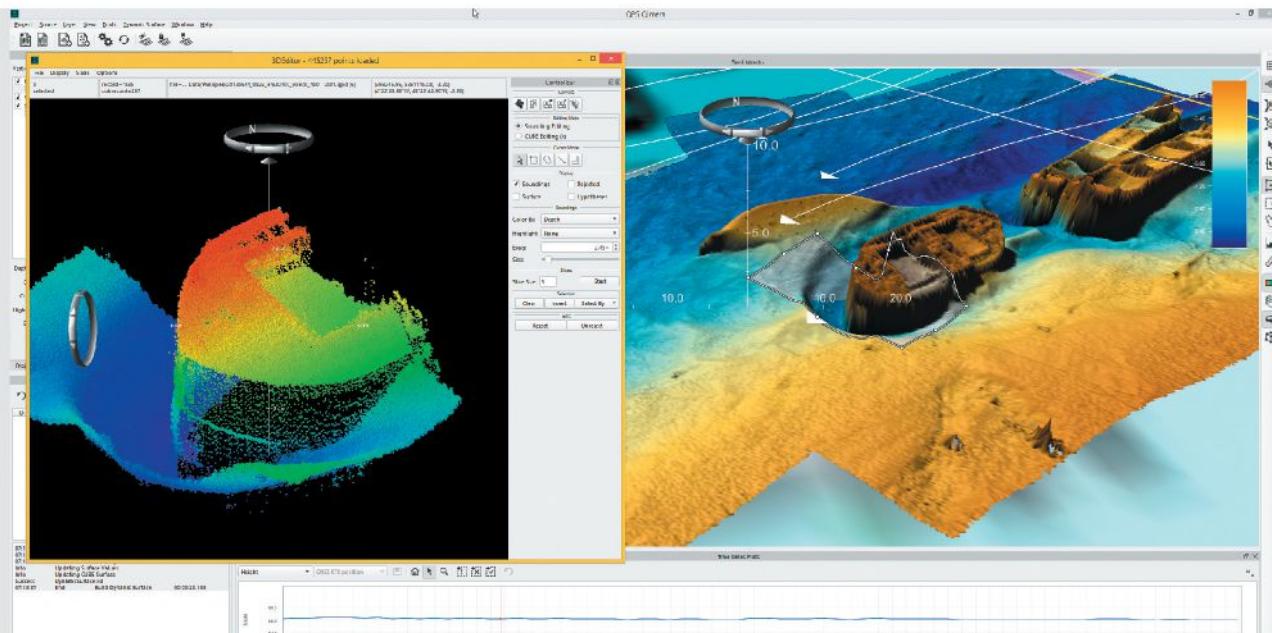
*1 - Reference: *NY Times*, February 23, 2015, *A Catch-22 in Kenya: Western Terrorism Alerts May Fuel Terrorism*.

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OCEAN INDUSTRY

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Japanese war bonnet wins UM Rosenstiel School's underwater photo Contest

More than 500 underwater images were submitted for the 2015 annual underwater photography contest hosted by the University of Miami (UM) Rosenstiel School of Marine and Atmospheric Science.

The "best overall" photograph was submitted under the Fish or Marine Animal Portrait category and was shot off Rudnaya Bay, Japan Sea. The photo by Audrey Shpatak is of a Japanese War Bonnet fish (*Chirolophis japonicas*).

A panel of experts, including photographer and UM lecturer Myron Wang, underwater photographer Nicole Wang and Rosenstiel School Research Assistant Professor Evan D'Alessandro judged the photos that came from 10 countries and 15 U.S. states.

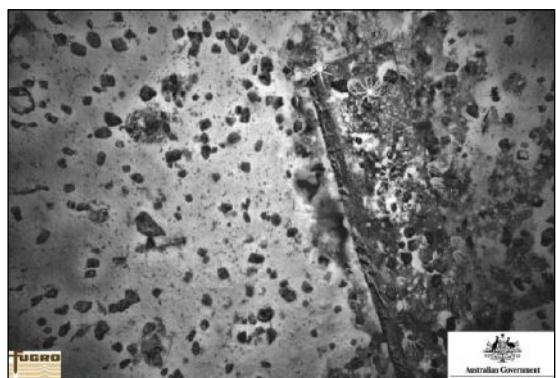
Awards were given in four categories: macro, fish or marine animal portrait, wide angle, and best overall submission. The School also recognized the best UM student photo, which was of a Great Hammerhead (*Sphyrna mokarran*), taken by Laura Rock in Bimini, Bahamas.



MH370 search discovers shipwreck

Fugro Equator's deep tow system detected a cluster of small sonar contacts in the southern part of the search area, 12 nmi to the east of the 7th arc. The sonar data was carefully analyzed and categorized as Class 2 – "of potential interest but unlikely to be related to MH370." It could not, however, be ruled out.

"We were cautious about this," said the ATSB's Peter Foley, director of the operational search for MH370. "There were characteristics of the contact that made it unlikely to be MH370, but there were also aspects that generated interest, multiple small bright reflections in a relatively small area of otherwise featureless seabed. All the sonar data we gather goes through a detailed analysis and an exhaustive review process to ascertain its quality, coverage and most importantly any sonar contacts of interest. The analysis starts with the mission crew on board the search vessels, data is then reviewed again ashore by sonar analysts at Fugro's office in Perth and then it is independently reviewed by the sonar experts in the ATSB's Operational Search team. The process is methodical, meticulous and it is designed to ensure that nothing is missed. In this case we planned to resurvey the contact in more detail when the opportunity arose."



Therefore Fugro Supporter was tasked to divert on its passage between two search areas and further investigate the contact. A high-resolution sonar scan was performed

Spanish and French industry win as excessive FAD limits agreed at IOTC Meeting in Busan, South Korea, the Indian Ocean Tuna Commission (IOTC) agreed to an unacceptably high limit on the use of fish aggregating devices (FADs), essentially maintaining the interest of the Spanish fishing industry. The IOTC agreed to allow 550 FADs per vessel. Which means that industry operators who use excessive numbers of FADs, mostly from Spain and France, are allowed to continue their FAD-dependent operations, and some fleets can even increase their use of destructive FADs and therefore the fishing capacity of any purse seine fleet in the region. In response to the agreement, Francois Chartier of Greenpeace France said, "This is further expansion of FAD use dressed up as FAD control, and is further evidence of the failure of the IOTC to manage this serious and rapidly growing problem. Worse still, it completely undermines the voluntary commitment made by the French fleet to limit their own FAD use." The agreement demonstrated that the European Union supported the interest of a handful of industrial companies from Spain supported by the French industry. "This is beyond unacceptable," said Lagi Toribau, Greenpeace spokesperson at the meeting. "This Commission has allowed FADs to expand uncontrolled for over a decade. The fact there has been absolutely no management framework in place for the use of FADs, makes it crucial that the market and consumers demand sustainably caught tuna that is FAD free and IUU free." Tuna fishing capacity continues to increase globally, and the construction of new purse seiners and the proliferation of FADs means a large increase in the efficiency of tuna fleets targeting tropical tunas, which puts tuna resources at an ever-increasing risk. Compounding the risk is an increasing level of IUU fishing, and the failure by countries fishing in the Indian Ocean to submit the data needed to assess stock status, which means science-based decisions at the IOTC are compromised and politics takes precedence. "The continued proliferation in FADs used by purse seine fleets is creating an environment in which free-school fishing, a cleaner fishing method, is becoming increasingly difficult. The agreement disadvantages all but the largest and most industrialized vessels, which will be best equipped to catch an excessive share of the world's tropical tuna catch, along with increasing amounts of juvenile tuna. This agreement shows the IOTC endorsing a drive to out-compete smaller and more sustainable operators."

using the AUV. The high-resolution data revealed a large number of sonar contacts lying very close to the seafloor, at a depth of around 3,900 m. The majority of the contacts were comparatively small—around the size of a cricket ball—interspersed with a few larger items, the biggest being box shaped and approximately 6 m in its longest dimension. The debris field appeared to be of man-made origin but once again it did not exhibit all the characteristics of a typical aircraft debris field.

An additional AUV low-altitude mission was then undertaken using the underwater camera to gather images of the field. Poor weather conditions, however, prevented the safe launching of the AUV for several days.

Analysis of the images this week revealed that the debris was indeed man-made, but indicated that it was actually the wreck of a ship. This wreck is previously uncharted and the imagery will be provided to expert marine archaeologists for possible identification.

For more information, visit www.atsb.gov.au.

XPRIZE announces finalists

XPRIZE, the global leader in incentivized prize competition, announced the five finalist teams competing for the \$2 million Wendy Schmidt Ocean Health XPRIZE, a global competition to create pH sensor technology that will accurately measure ocean acidification.

Beginning on May 14 in Honolulu, teams will board the R/V Kilo Moana, a research vessel owned by the U.S. Navy and operated through UNOLS by the University of Hawaii Marine Center, and embark on a week-long deep sea trial to assess ocean pH values throughout the water column at Station ALOHA, a 110 sq. mi region in the Pacific Ocean, located approximately 100 m off the northern shore of Oahu. During this 6-day period, sensors will be put through rigorous performance tests focused on stability and precision, while battling real-world pressure scenarios and depths of up to 3,000 m.

The five finalist teams representing four countries are:

- ANB Sensors (Cambridge, England), a team of scientists and researchers from the Schlumberger Gould Research Center with expertise

in lasers, chemistry, fluid mechanics and geophysics.

- HpHS (Yokosuka, Japan), a team of research scientists and engineers from the Kimoto Electric Co., Ltd. and JAMSTEC.

- Sunburst Sensors (Missoula, Montana, U.S.), a team of mechanical engineers from Sunburst Sensors, LLC, a company focused on the development of chemical sensors for marine and freshwater applications.

- Team Durafet (Plymouth, Minnesota, U.S.), a team of representatives from Sea-Bird Scientific, MBARI, Scripps Institution of Oceanography at the University of California, San Diego and Honeywell Aerospace Advanced Technology.

- Team XYLEM (Bergen, Norway/Beverly, Mass., U.S.), a team representing two Xylem companies, Aanderaa Data Instruments in Norway and YSI in the U.S., with extensive work in commercializing high performance and reliable optical chemical sensors used in oceanography.

For more information, visit www.oceanhealth.xprize.org.

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IMCA publishes guidelines for DP OSV safe operations

Reliable and robust methods of positioning are required for safe vessel operations in close proximity to offshore installations. Dynamic positioning (DP) is well-established as a primary method of vessel positioning in the diving, drilling, construction, accommodation and shuttle tanker sectors, and is especially suited to deep-water developments. As development and management of DP becomes more refined, increasingly logistics support vessels are becoming equipped with DP systems with increasing reliance being given to such systems. With this increased use in mind, the International Marine Contractors Association (IMCA) has published an updated edition of "International Guidelines for the Safe Operation of DP Offshore Supply Vessels." The 48-page guidelines fit into an existing framework of rules and guidance issued by various authorities and organisations. Efforts have been made to ensure compatibility with the existing documents wherever possible. The introduction section of the Guidelines looks at the basis for their production; their application; purpose and scope; and contains useful abbreviations and terms and definitions. Four other sections follow devoted to 'Existing Rules and Guidance'; 'Managing Risk in DP Operations – Competence'; 'Managing Risk in DP Operations – Operations'; and 'Managing Risk in DP Operations – Practical Applications.' The appendix contains a wealth of information on relevant publications; DP FMEA and annual trials; annual DP trials; DP capability plot; DP footprint plot; DP vessel-specific location checks document; sample DP watchkeeping handover checklist; DP incident reporting; and examples of both critical activity mode of operation (CAMO) and activity-specific operating guideline (ASOG).

U.N. finalizes Polar Shipping Code

The International Maritime Organization -- the U.N. agency charged with establishing global shipping standards -- adopted the environmental component of the Polar Code, a suite of mandatory measures governing Arctic and Antarctic shipping. This development follows the adoption of the safety portion of the Code in November 2014. The realization of a code for polar shipping has been a process long in the making, from an initial proposal in the 1990s, to IMO-sanctioned voluntary guidelines for Arctic shipping in 2002, to revisions in 2009 to include Antarctic shipping. By 2009, the U.S., Norway and Denmark believed that stronger provisions were needed in light of anticipated increases in polar shipping and requested that the IMO begin developing a mandatory code for the Polar regions. The environmental portion of the Polar Code will include some noteworthy elements, such as a ban on the operational discharge of oil and chemicals and enhanced standards associated with disposal of sewage and garbage into polar seas. Moreover, voyage planning provisions to safeguard marine mammals--already established in the safety portion of the Code--will provide additional conservation protection. These provisions will be the first species-specific measures that explicitly extend beyond whales and thus will also pertain to sea lions, seals and walrus.

Shipyards pump \$100 billion a year into the U.S. economy

Currently U.S. shipyards are experiencing dramatic growth as a result of the shale oil revolution, which has produced record levels of new vessel construction, orders and deliveries. With more than 300 facilities located in 27 states, and a supplier base in all 435 congressional districts, each direct job leads to almost three indirect jobs nationally. "The strength and value of the shipyard and repair industry is evident through the hundreds of thousands of Americans employed with family-wage jobs in all 50 states. By employing more than 500,000 Americans, our industry pumps \$100 billion into the U.S. economy each year," said Matthew Paxton, president of the Shipbuilders Council of America. America's national and economic security is strengthened by the Jones Act, a law that requires any vessel transporting goods or passengers between two points in the United States be U.S.-owned, U.S.-built and U.S.-crewed. Preserving the Merchant Marine is crucial to the strength of the U.S. shipbuilding industry, which relies on the Jones Act to preserve the jobs of thousands of Americans who possess the knowledge and skill sets necessary to maintain a robust shipyard industry.

UASC names world's most environmentally friendly ultra-large container vessel



United Arab Shipping Company (UASC) named the industry's most eco-efficient container vessel at Hyundai Samho Heavy Industries (HSI), Mokpo South Korea. M.V. Barzan is a part of the industry's first LNG-ready ultra-large container vessel fleet.

With a loading capacity of 18,800 TEU, the DNV GL classed vessel M.V. Barzan is first in a new class of leading ultra-large container vessels that will be the largest in UASC's fleet to date and will set new standards for fuel and energy efficiency, due to optimized vessel design and an array of propulsion and equipment efficiency technologies. Preliminary calculations indicate an Energy Efficiency Design Index value that is close to 50% below the 2025 limit set by IMO. UASC is working to establish a range of additional metrics and targets through which the efficiency of UASC's vessels can be managed to drive further reduction in carbon emissions across all UASC vessels. The M.V. Barzan has a CO₂ output per TEU that is more than 60% below a 13,500 TEU vessel delivered just 3 years ago.

"We understand that providing environmentally friendly transport solutions and recognizing environmental initiatives around the globe are no longer a choice; they are a necessity for both our organization and our customers," said Jørn Hinge, president and chief executive officer of UASC. "M.V. Barzan and the 18,800 TEU fleet will complement the 15,000 TEU fleet, being gradually delivered since November 2014 and operating on the Asia-Europe trades as part of the Ocean 3 services. There, Barzan will deliver the industry's lowest per-container levels of CO₂ output."

"We are increasingly servicing environmentally aware customers across the globe. We push the boundaries of eco-efficiency standards to ultimately ensure that our customers can achieve higher levels of environmental sustainability," Hinge added. "The M.V. Barzan is equipped with an eco-friendly system incorporating state-of-the-art technologies to meet the reinforced maritime regulations and provide UASC with a competitive advantage," said Mr. G. J. Ha, president and CEO of Hyundai Samho Heavy Industries. "I am certain this vessel will further promote UASC's and its alliance partner's business competitiveness, and our own reputation as Builders, thereby paving the way for a closer relationship between UASC and Hyundai Heavy Industries Group," he added.

UASC's 11 newbuild 15,000 TEU and 6 18,800 TEU vessels are scheduled to be fully delivered by 2016. This year, UASC will receive a total of 10 new vessels.

ABB turbochargers improve engine efficiency of world's largest container ships

ABB, the leading power and automation technology group, has designed turbochargers powering the largest ships in the world. First came the China Shipping Container Lines (CSCL) Globe with capacity of 19,100 TEU completing its maiden voyage in February 2015. This was followed by the Mediterranean Shipping Company (MSC) Oscar at 19,224 TEU. Both have engines incorporating ABB-designed turbochargers and are each the first of a series of vessels to launch in the coming months also featuring turbochargers designed by ABB.

The largest vessels of any type in service, the CSCL Globe and MSC Oscar, are the only container ships in operation with capacity of over 19,000 TEU. In addition to their design, which allows this record-breaking cargo capacity, they host the largest engines on any ship. This advanced engine technology, coupled with ABB high efficiency turbochargers improves engine efficiency, lowers fuel consumption and cuts emissions.

The turbochargers designed by ABB and fitted under license by Hyundai Heavy Industries (HHI) on both vessels have a very positive effect on fuel consumption, a key issue for such large ships that also face the challenge of lowering emissions.

Each ship is equipped with MAN diesel engines. The Globe is fitted with three ABB A185-L turbochargers, while The MSC Oscar features ABB 180-L turbochargers. In addition the auxiliary engines on both were designed by ABB, fitted under license by HHI. These two ships are also the first of a series that will feature the same engine and turbocharger configuration.

For more information, visit www.abb.com.

Rolls-Royce scales back Marine Business, lays off 600

Rolls-Royce has announced that they will accelerate cost reduction programs in their Marine business and reduce the number of employees by a further 600 by the end of this year in response to challenging market conditions.

The announcement follows an inter-

im management statement on 8 May in which Rolls-Royce confirmed that the year had started slowly and consequently a drive for further efficiencies was underway.

The Marine business employs around 6,000 people in 34 countries, and while the reductions will be global, around half will be in Norway, where the majority of employees and manufacturing facilities are located.

Mikael Makinen, Rolls-Royce, president marine, said, "We are transforming our marine business and while we are making good progress on cost, the effect of low oil prices means we have to continue to look for further efficiencies.

"It is never an easy decision to propose reductions in our workforce, but it is a sign of the challenging market in which we operate. We will work closely with employees and their representatives as we manage this change."

"The future prospects for the Marine business remain bright, and we are focused on maintaining our position as a technology leader, but we must drive further cost reduction today so that we are ready to grow tomorrow."



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The reductions announced are in addition to programmes already underway to consolidate manufacturing at several locations in the UK, USA, Norway, Sweden and South Korea.

For more information, visit www.rolls-royce.com.

Kongsberg keeps Australian Maritime College simulator facilities at the cutting edge

The Australian Maritime College (AMC) has opted to extend its long term simulator support program (LTSSP) with Kongsberg Maritime for a further 5 years. The LTSSP ensures that all Kongsberg Maritime simulators installed at AMC's sites in Launceston and Perth are up-to-date and operating optimally. Additionally, the LTSSP provides AMC the opportunity to upgrade to the new K-Sim Navigation technology platform.

AMC is one of the largest maritime training organizations in the Southern Hemisphere and is highly regarded for its work in Dynamic Positioning, ship handling and engineer training in addition to hydrodynamic research. Across its sites in Launceston and Perth, AMC provides a diverse training portfolio, using a combination of Kongsberg Maritime Ship's Bridge, Engine Room, DP and Ballast simulators. The LTSSP is structured to support these systems operationally and to incorporate planned expansion during the period of the contract.

"Our customers demand the best simulator systems available, and expect them to perform optimally with the latest developments and capabilities. Our LTSSP with Kongsberg Maritime helps us to achieve this," comments Dean Cook, chief executive officer, AMC Search. "Maritime simulation technology changes fast but the LTSSP ensures we can offer the most up-to-date technology as and when it is developed. The program means our partnership with Kongsberg Maritime is flexible, so we can work together to ensure the success of several development plans we have underway."

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



Wärtsilä and Carnival Corporation announce agreement to pilot technologies and systems to optimise operations

Wärtsilä, the marine industry's leading solutions and services provider, and Carnival Corporation & plc, the largest cruise company in the world, have partnered to optimize engine room operations aboard the company's fleet of 101 ships across its nine global brands.

Wärtsilä's solutions will be tested in pilot projects in which Wärtsilä's technologies and systems will be installed on several of Carnival Corporation's vessels. The technologies and systems include engine control and monitoring systems and safety and fuel efficiency packages as well as Wärtsilä's Asset Performance Optimisation Solution.

Wärtsilä's Asset Performance Optimization Solution maximizes vessel performance and ensures that systems are operating at their full capabilities, increasing predictability of maintenance needs and fuel management. The fuel engine package is designed to significantly contribute to reducing fuel consumption.

"Since last summer, teams from Carnival Corporation and Wärtsilä have met regularly to ensure that each of these solutions adds value to the company's fleet," said Bill Burke, chief maritime officer, Carnival Corporation. "Ultimately, our goal is to continuously improve our operations in order to accomplish our number-one priority—providing safe and comfortable voyages for our guests, along with a great vacation experience."

"We have focused on finding an agile and mutually beneficial way of cooperating and establishing a structure that drives performance in both organisations," said Tomas Hakala, vice president, services, Wärtsilä. "We believe this is the beginning of a close and fruitful relationship between Carnival Corporation and Wärtsilä. The valuable insights that we are gaining can also be further utilized with other product families and vessels."

For more information, visit www.wartsila.com.

Unique Group delivers first ever built-for-purpose daughter craft

Unique Group, one of the world's leading integrated turnkey subsea and offshore solution providers, has now delivered two new dive systems and a diving vessel worth around £5 million to global services provider, Vertech. The Hydracraft 1500 daughter craft ves-



sel, named the Vaila, is nearly 50 ft long and designed for air diving activity. The hull is designed to provide an enhanced stability, optimizing operational efficiency.

The Vaila is the first daughter craft that has been built for purpose, from concept through to design. Other vessels used for the same purposes have been conversions of existing craft. The daughter craft system is designed for conducting diving operations for underwater inspection in locations otherwise inaccessible by larger vessels.

The project was initiated when Vertech (under their previous identity, Global Diving) formed a new commercial diving entity. They approached Unique for surface diving systems and so the concept development for the Daughter Craft began in May 2014.

Talking about the project, Ray Hughes said, "Delivering the Daughter Craft to Vertech has been a magnificent achievement for Unique Group. We have worked closely with our client, ensuring the design and operations of the vessel are first class. It is essential that the craft and its associated equipment provide a safe and comfortable working environment for the divers and crew onboard. Unique Group's strength is in our continued ability to provide turnkey solutions tailored to suit our clients' requirements. The supply of the Daughter Craft and dive systems demonstrates the versatility and diversity of our energy sector capabilities."

The Vaila can hold a maximum of 10 people and will be based at a North-East port, with the ability to deploy anywhere around the world. It has its own single launch and recovery system, the Macgregor G150 Davit, which is the largest lifting davit manufactured by Macgregor to date.

For more information, visit www.uniquegroup.com.



HUGIN AUV

- versatility at its core

The Kongsberg Maritime HUGIN AUV System is renowned as the most successful and capable commercial AUV available today. It has seen operations with survey companies and navies around the world, covering more than 700,000 line kilometres of contracted commercial survey. HUGIN is a highly versatile vehicle used for diverse applications and Kongsberg Maritime's permanent Research and Development team is always working on new vehicle behaviours and capabilities to meet customer requirements.

New applications

A recent new application for HUGIN is pipeline survey. Today, external pipeline inspection is often performed with towed or Remotely Operated Vehicles (ROVs). However, Kongsberg Maritime has developed a solution for pipeline inspection using HUGIN. The primary advantage of using an AUV for this task is that it can operate at substantially higher speed – typically 4-5 knots, compared to 1-2 knots for a ROV. HUGIN can also operate without being followed closely by a large surface vessel and its stability means that it can effectively collect more advanced types of sensor data, such as Synthetic Aperture Sonar (SAS) range independent, high resolution imagery. One major strength with HUGIN is the advanced payload control system enabling simultaneous operation of all sensors. This enables HUGIN to collect imagery, bathymetry, still pictures and chemical sniffer data simultaneously while surveying 3-10 meters above the pipeline.

These capabilities extend from a joint project with the Norwegian Defence Research Establishment (FFI), where Kongsberg Maritime developed advanced algorithms for robust detection, tracking and following of underwater pipelines and cables using HUGIN. FFI leveraged 15 years of experience in sonar data analysis developed for other applications such as automated target recognition

(ATR) in mine countermeasure applications as part of the project and trackers have been developed for side scan or SAS imagery, and for bathymetry.

Protecting ships

When equipped with HISAS and automated target recognition software, the HUGIN system is perhaps the most capable AUV in the world and when configured this way, is a vital tool for naval mine hunting. During a single mission it can detect, process and classify mine-like objects in near real-time. This information is then fed into the mission controller to re-plan the route to collect photographs, thereby formally identifying the targets with no user input.

Many commercial operators demand an even more comprehensive sensor suite than military users. However, there are common elements required by both market segments, notably reliability, robustness and support, which Kongsberg Maritime continues to deliver; reflected in the recent testing of a new cNODE integrated subsea positioning and communication system on HUGIN. During the testing of this innovative new package in the deep waters outside the coast of Bali, Indonesia, and the Indian Ocean, HUGIN reached a record operational depth of 4449 metres (HUGIN is rated to 4500 metres).

Ongoing development

HUGIN 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 testing,

the new record water depth was achieved not only for the AUV, but also for the cNODE system. Throughout the deep water dives, cNODE provided a reliable and high quality data link to the AUV, enabling it to carry out its survey of a large seabed area.

This new positioning package is just one of the developments made for HUGIN over the past 20 years. In addition to developing for current market requirements, the HUGIN team at Kongsberg Maritime also works on future technology and capabilities that the market has not yet identified. The next generation of vehicles and applications is always being dreamt of, along with new levels of autonomy to take AUVs where they have never been before.



BOEM announces environmental study reports posted During the second quarter FY 2015

The Environmental Studies Program (ESP) announces the availability of six recently completed study reports that were posted online via the Environmental Studies Program Information System (EPSIS) from January to March 2015. The new postings relay findings from regional studies for Alaska, the Gulf of Mexico, the Pacific and Marine Minerals program activities in the Atlantic and Gulf. The reports and associated technical summaries can be accessed through EPSIS. Topics covered in the latest postings include:

- Alaska: An analysis of benthic communities on weathervane scallop beds in the Shelikof Strait, located south of the entrance to the Cook Inlet.
- Gulf of Mexico: A report recommending the use of several oil spill risk analysis models to improve the forecasting of risks to environmental resources, and accompanying data sets; a report assessing the impacts of the Deepwater Horizon oil spill on tourism in the Gulf of Mexico; and a report measuring county-level tourism and recreation in the Gulf of Mexico region.
- Pacific: A two-volume report characterizing both Outer Continental Shelf (OCS) geology and benthic habitat offshore near potential renewable energy sites in the Pacific Northwest.
- Marine Minerals Program: A literature synthesis and workshop report to promote understanding of the habitat value and function of shoal/ridge/trough complexes to fish and fisheries on the Atlantic and Gulf OCS.

BOEM's Environmental Studies Program (ESP) develops, funds, and manages rigorous scientific research to inform policy decisions regarding the development of energy and mineral resources on the OCS. ESPIS makes all completed ESP reports available on-line as full electronic pdf documents, including images and graphics. Technical summaries of more than 1,200 BOEM-sponsored environmental research projects, as well as full pdf documents of over 3,400 research reports, are available for online full text search.

NOAA announces long-term Gulf of Mexico ecosystem research priorities

As part of the final version of the science plan for the NOAA resources and ecosystems sustainability, tourist opportunities, and revived economies of the Gulf coast states (RESTORE) Act Science Program, NOAA has announced 10 long-term research priorities in the Gulf of Mexico, including how the Gulf's waters, natural resources, fisheries and coastal communities are all interconnected. NOAA's program supports research on the Gulf's long-term ecological sustainability and its fisheries. "Addressing the recommendations provided during the public comment period has resulted in a stronger science plan," said Becky Allee, Ph.D., lead author of the NOAA RESTORE Act Science Program. "We look forward to continued dialogue with those who care about the Gulf of Mexico, the impact this program can have on the region, and to working with the research and resource management communities to address the priorities captured in the plan."

Among the key research priorities identified in the plan are:

- Addressing the needs of fisheries and other natural resource managers with ready to use models, decision support tools, and new monitoring technologies;
- Focusing on developing a more complete understanding of how the waters of the Gulf of Mexico, its natural resources, including fisheries, and its coastal communities are connected;
- Seeking to improve the capacity to predict the impact of climate change and severe weather on the Gulf of Mexico and its natural resources; and
- Recognizing the importance of developing indicators for measuring the long-term status and health of the Gulf of Mexico ecosystem including fisheries.

Ocean currents impact methane consumption



Photo: Karen Hissmann, GEOMAR.

Offshore the Norwegian Svalbard archipelago, methane gas is seeping out of the seabed in several hundred meters depth. Luckily, bacteria are consuming a large proportion of the methane before it reaches the surface and is released to the atmosphere, where it acts as a greenhouse gas. An interdisciplinary study conducted by researchers at the University of Basel and the GEOMAR Helmholtz Centre for Ocean Research Kiel could now show that ocean currents can have a strong impact on methane removal. The renowned journal *Nature Geoscience* has published the study.

Large amounts of methane—whether as free gas or as solid gas hydrates—can be found in the seafloor along the ocean shores. When the hydrates dissolve or when the gas finds pathways in the seafloor to ascend, the methane can be released into the water and rise to the surface. Once emitted into the atmosphere, it acts as a very potent greenhouse gas 20 times stronger than carbon dioxide. Fortunately, marine bacteria exist that consume part of the methane before it reaches the water surface. Geomicrobiologists and oceanographers from Switzerland, Germany, Great Britain and the U.S. were able to show in an interdisciplinary study that ocean currents can have a strong impact on this bacterial methane removal. The international scientific journal *Nature Geoscience* has published the study.

The data was collected during an expedition in the summer of 2012 aboard the research vessel Maria S. Merian. At that time, the international research team was studying the methane seeps off the west coast of the Norwegian Svalbard archipelago. "Already then, we were able to see that the level of activity of the methane consuming bacteria changed drastically over very short time spans, while at the same time many oceanographic parameters such as water temperature and salinity also changed", explains Lea Steinle, first-author of the study and Ph.D. student at the University of Basel and the GEOMAR Helmholtz Centre for Ocean Research Kiel. For her Ph.D. thesis, Steinle studied where and how much methane is consumed in the ocean water column by bacteria.

In order to test if the fluctuations measured during the 4 weeks of the expedition were only random observations or based on typical and recurring processes, oceanographers of the GEOMAR later took a closer look at the region with a high resolution ocean model. "We were able to see that the

observed fluctuations of the oceanographic data and the activity level of the bacteria can be traced back to recurring shifts in the West Spitsbergen Current," says Prof. Dr. Arne Biastoch from the GEOMAR. The West Spitsbergen Current is a relatively warm, salty current that carries water from the Norwegian Sea to the Arctic Ocean. "It mostly runs very close to the coast. Shifts in the current strength are responsible for the meandering of the current. Then, in a matter of a few days, the current moves miles away from the coast," explains Professor Biastoch further.

If the current runs directly over the methane seeps near the coast or continues on the open sea, it impacts the methane filtration. "We were able to show that strength and variability of ocean currents control the prevalence of methanotrophic bacteria," says Lea Steinle, "therefore, large bacteria populations cannot develop in a strong current, which consequently leads to less methane consumption."

In order to verify if these results are only valid for Spitsbergen or are of global importance, the researchers stud-

ied in a second, global ocean model how ocean currents are varying in other regions of the world with methane seeps. "We saw that strong and fluctuating currents are often found above methane seeps," says Dr. Helge Niemann, biogeochemist at the University of Basel and one of the initiator of the study. His colleague Prof. Dr. Tina Treude, geomicrobiologist at the University of California Los Angeles adds: "This clearly shows that one-time or short-term measurements often only give us a snapshot of the whole situation." In the future, fluctuations of bacterial methane consumption caused by oceanographic parameters will have to be considered, both during field measurements as well as models.

For more information, visit www.geomar.de.

Nanomaterials in sunscreens and boats leave marine life vulnerable

Nanomaterials commonly used in sunscreens and boat-bottom paints are making sea urchin embryos more vulnerable to toxins, according to a study from the University of California,

Davis. The authors said this could pose a risk to coastal, marine and freshwater environments.

The study, published in the journal Environmental Science and Technology, is the first to show that the nanomaterials work as chemosensitizers. In cancer treatments, a chemosensitizer makes tumor cells more sensitive to the effects of chemotherapy.

Similarly, nanozinc and nanocopper made developing sea urchin embryos more sensitive to other chemicals, blocking transporters that would otherwise defend them by pumping toxins out of cells.

Nanozinc oxide is used as an additive in cosmetics such as sunscreens, toothpastes and beauty products. Nanocopper oxide is often used for electronics and technology, but also for antifouling paints, which prevent things like barnacles and mussels from attaching to boats.

"At low levels, both of these nanomaterials are nontoxic," said co-author Gary Cherr, professor and interim director of the UC Davis Bodega Marine Laboratory, and an affiliate of the UC

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Davis Coastal Marine Sciences Institute. "However, for sea urchins in sensitive life stages, they disrupt the main defense mechanism that would otherwise protect them from environmental toxins."

Nanomaterials are tiny chemical substances measured in nanometers, which are about 100,000 times smaller than the diameter of a human hair. Nano-sized particles can enter the body through the skin, ingestion, or inhalation. They are being rapidly introduced across the fields of electronics, medicine and technology, where they are being used to make energy efficient batteries, clean up oil spills, and fight cancer, among many other uses. However, relatively little is known about nanomaterials with respect to the environment and health.

This research is part of the University of California Center for the Environmental Implications of Nanotechnology and supported by the National Science Foundation and the Environmental Protection Agency.

"The hope is the science will try to stay abreast of the use of nanomaterials so there actually can be safe design," Cherr said. "The nanotechnology industry wants to come up with designs that are practical but still safe for the environment and human health. The UC center is trying to help fine-tune this."

The study's other authors include Bing Wu, Cristina Torres-Duarte and Bryan Cole, all from the UC Davis Bodega Marine Laboratory. Wu is also affiliated with Nanjing University.

For more information, visit www.ucdavis.edu.

Engineers hand cognitive control to underwater robots

For the last decade, scientists have deployed increasingly capable underwater robots to map and monitor pockets of the ocean to track the health of fisheries, and survey marine habitats and species. In general, such robots are effective at carrying out low-level tasks,

specifically assigned to them by human engineers—a tedious and time-consuming process for the engineers.

When deploying AUVs, much of an engineer's time is spent writing scripts, or low-level commands, in order to direct a robot to carry out a mission plan. Now a new programming approach developed by MIT engineers gives robots more "cognitive" capabilities, enabling humans to specify high-level goals, while a robot performs high-level decision-making to figure out how to achieve these goals.

For example, an engineer may give a robot a list of goal locations to explore, along with any time constraints, as well as physical directions, such as staying a certain distance above the seafloor. Using the system devised by the MIT team, the robot can then plan out a mission, choosing which locations to explore, in what order, within a given timeframe. If an unforeseen event prevents the robot from completing a task, it can choose to drop that task, or reconfigure the hardware to recover from a failure, on the fly.

In March, the team tested the autonomous mission-planning system during a research cruise off the western coast of Australia. Over three weeks, the MIT engineers, along with groups from Woods Hole Oceanographic Institution, the Australian Center for Field Robotics, the University of Rhode Island, and elsewhere, tested several classes of AUVs, and their ability to work cooperatively to map the ocean environment.

The MIT researchers tested their system on an autonomous underwater glider, and demonstrated that the robot was able to operate safely among a number of other autonomous vehicles, while receiving higher-level commands. The glider, using the system, was able to adapt its mission plan to avoid getting in the way of other vehicles, while still achieving its most important scientific objectives. If another vehicle was taking longer than expected to explore a particular area, the glider, using the MIT system, would reshuffle its priorities, and choose to stay in its current location longer, in order to avoid potential collisions.

This research was funded in part by Schmidt Ocean Institute. The underlying technology was supported in part by Boeing Co., the Keck Institute of Space Sciences, the Defense Advanced Research Projects Agency, and NASA.

For more information, visit www.newsoffice.mit.edu.

Coastal light pollution disturbs marine animals, new study shows

Marine ecosystems can be changed by night-time artificial lighting according to new research published in the Royal Society journal Biology Letters. The results indicate that light pollution from coastal communities, shipping and offshore infrastructure could be changing the composition of marine invertebrate communities.

Researchers from the Universities of Exeter and Bangor used a raft in the Menai Strait to monitor how artificial light at night affects the settlement of marine invertebrates into new habitats. Light is an important cue that guides the larvae of marine invertebrates as they search for suitable habitats to settle, grow and reproduce.

The researchers found that artificial light both suppressed and encouraged colonization by several species common to British coasts, including sea squirts and keel worms. These species are often referred to as fouling invertebrates as they adhere to human-made structures sometimes causing problems in marinas, dockyards and aquaculture facilities.

The results indicate that artificial light could encourage unwanted fouling in marinas and dockyards, but also alter the abundances of these species in the wider environment where they can provide important ecosystem services.

Coral larvae, for example, use light to identify optimum habitats to settle in and grow into reef building adult structures. As tropical waters tend to be clearer than UK waters artificial light can penetrate deeper and disrupt a wider range of organisms.

Dr. Tom Davies from the University of Exeter said: "We know that artificial light at night alters the behavior of many marine animals but this is the first study to show that it can disrupt the development of ecological communities in the marine environment. Further research is urgently needed to assess what level of light can be considered 'safe' so that legislation can be put in place to minimize future light pollution from new and existing developments."

Dr. Katherine Griffith, from the School of Ocean Sciences, added: "With urbanization on the increase, many coastal areas around the globe will become vulnerable to the effects of artificial light pollution. Therefore, further research on how artificial light may disrupt marine communities is vital if we are to mitigate these impacts."

For more information, visit www.exeter.ac.uk.





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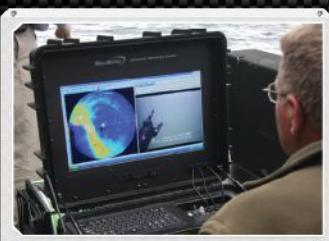
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ORPC Ireland established in County Donegal

The Donegal County Council and the Letterkenny Institute of Technology are delighted with the announcement that Ocean Renewable Power Company (ORPC) is setting up ORPC Ireland, LLC, in County Donegal at the Co-Lab Business Centre at Letterkenny Institute of Technology. "We look forward to working closely with ORPC Ireland to advance the marine renewable energy sector for Donegal and the North West region," said Seamus Neely, chief executive with Donegal County Council. "We are delighted that ORPC Ireland has located itself in Letterkenny, bringing vast knowledge and expertise of marine renewable energies to the county. ORPC Ireland will work in conjunction with the project partners and local communities to bring an injection of economic impetus to Donegal and the North West region." Located in the North West region of Ireland, County Donegal is home to Killybegs, the largest fishing port in Ireland, and boasts more mainland coastline than any other county in the country (1,134 km/705 mi). ORPC Ireland's new home is the Letterkenny Institute's business development center, known as "CoLab," located in the town of Letterkenny, the primary economic axis for North West Ireland. Because of its successful projects in Maine and Alaska U.S., ORPC is known for cultivating strong community and regional relationships through open dialogue and maximizing local and regional economic benefits, including jobs, local spending, increased tax revenues and educational opportunities. The company is also known for its leadership and innovation in regulatory compliance and environmental monitoring of its projects.

Registration is now open for the U.S. Department of Energy's Wave Energy Prize

The U.S. Department of Energy (DOE) announced that its latest prize competition is now underway, with a prize purse totaling more than \$2 million available for top ranking teams. In a keynote presentation during the joint opening session of the annual National Hydropower Association and International Marine Renewable Energy Conferences, DOE Office of Energy Efficiency and Renewable Energy Assistant Secretary Dr. Dave Danielson announced the Wave Energy Prize. The prize will encourage the development of game-changing wave energy conversion (WEC) devices that double the energy captured from ocean waves, which in turn will reduce the cost of wave energy, making it more competitive with traditional energy solutions. "Prize challenges are an effective way to spur innovation and solve tough problems by attracting untapped talent," said Dorgelo. "By reaching beyond existing communities of interest, prize challenges source out-of-discipline perspectives that can yield outstanding and novel solutions. This effort brings new perspectives to the table with minimal risk." The 20-month design-build-test competition will offer participants seed money and a chance to take part in two rounds of testing, the second being an opportunity for finalists to test their scaled WEC prototypes at the nation's most advanced wave-making facility, the Naval Surface Warfare Center's Maneuvering and Seakeeping (MASK) Basin at Carderock, Maryland, beginning in the summer of 2016. Registration for the Wave Energy Prize is scheduled to remain open until June 15. For more information or to register, visit www.waveenergyprize.org.

First power generated at Borkum Riffgrund 1 wind farm

Electricity has been generated and fed into the German grid for the first time at the offshore wind farm Borkum Riffgrund 1. With the initial batch, power from the first turbine is now being exported to the national grid. Trine Borum Bojsen, managing director of DONG Energy in Germany and responsible for Wind Power, said, "Borkum Riffgrund 1 is our first German wind farm and we're more than happy, that we've started to deliver CO₂-free power to the German grid. Once commissioned, the wind farm will supply the annual demand of 320,000 households per year." Borkum Riffgrund 1 is a joint venture project between DONG Energy which owns 50%, and the partners KIRKBI A/S and William Demant Invest A/S which together own 50%. John Hill, Program Director of Borkum Riffgrund 1, said, "The construction and good progress up to first power has been achieved thanks to a huge effort from the entire team and our contractors. Over the next months we will finalize the installation of all 78 turbines." Once all 78 turbines are in place, expected in 2015, the wind farm will be capable of generating up to 312 MW of green electricity.

Atlantis acquires MCT from Siemens



Atlantis Resources has reached agreement to acquire the entire issued share capital of the Bristol-based tidal business, Marine Current Turbines Limited (MCT), from Siemens AG in an all share deal. The acquisition is conditional upon certain conditions precedent being satisfied.

The deal consolidates two world leading tidal technologies—MCT and Atlantis—under the Atlantis turbine business and further establishes Atlantis as a global leader in tidal current power. The acquisition gives Atlantis a world-class, iconic British tidal turbine business including extensive seabed rights, existing projects, staff and intellectual property and creates one of the largest portfolios of tidal current power projects in the United Kingdom under the Atlantis power generation business.

Siemens will receive 9.99% of Atlantis Resources' enlarged issued share capital as sole consideration for the sale.

Other benefits of the acquisition include:

- Portfolio of six projects expanding the Company's footprint into Wales, Northern Ireland and Southern England.
- Additional potential project development capacity of 200 MW augmenting existing capacity to nearly 600 MW of project pipeline creating one of the largest tidal project portfolios in the United Kingdom.
- Increased project development portfolio in Scotland.
- Acquisition of MCT 1.2MW surface piercing tidal SeaGen system ("SeaGen S"), the world's first utility scale electricity generating tidal stream project with the longest track record of generation having now been operating for over 5 years in Northern Ireland generating approximately 10 gigawatt hours of electricity and selling that electricity into the grid.

• Acquisition will include MCT's extensive tidal turbine intellectual property portfolio and the designs for MCT's turbines, including its next generation 1 MW fully submerged SeaGen turbine (SeaGen U) and its 1 MW SeaGen system designed for floating deployment applications (SeaGen F).

• Considerable investment into R&D over more than 15 years along with transitioned experienced staff and turbine hardware and testing equipment offer further value to wider Atlantis business.

• Potential for some non-core project disposals and utilization of R&D and CAPEX grant income for acquired tidal projects to enhance Group balance sheet.

• Establishment of dedicated turbine assembly facility to be located at Global Energy's Nigg Energy Park in Ross-Shire, Scotland.

For more information, visit www.atlantisresourcesltd.com.

Deepwater Wind breaks ground on America's first offshore wind project

In a watershed moment for American clean energy development, Deepwater Wind broke ground on April 27 on America's first offshore wind project at Block Island, Rhode Island. This 30 MW wind farm will produce enough electricity to power all the homes and businesses on the island, replacing the diesel generators that the islanders previously relied on, while also sending power to the mainland through a newly installed undersea cable. The project, consisting of five wind turbines just off the island, will be complete in 2016.

The project was originally conceived in 2009 when Deepwater Wind signed a contract with National Grid to provide 30 MW of power to Rhode Island and is sited in Rhode Island state waters. In 2013, the project went through a round of hearings in Rhode Island where Sierra Club stood alongside labor allies like LiUNA and environmental stalwarts like Audobon and the National Wildlife Federation in rallying community members and Rhode Islanders to testify in favor of the project.

The Block Island Wind Farm project is just the beginning of a burgeoning offshore wind industry in the U.S. The Bureau of Ocean Energy Management has designated a wind management area off the coast of Rhode Island and Massachusetts that has the potential to generate as much as 9,000 MW of clean wind power, which, if fully harnessed, would power 700,000 homes and create 43,000 offshore wind-related jobs on the east coast by 2030.

For more information, visit www.sierraclub.org.

Bilfinger wins order for Nordergrnde offshore windpark

Bilfinger Marine & Offshore Systems has won an order at the new Nordergrnde offshore windpark for the installation of 19 steel foundations in the North Sea and for the transportation of 18 wind turbines to the installation site. The order from windpark developer and operator WPD in Bremen has a volume of approximately €30 million.

The Nordergrnde windpark will be built in the German North Sea 34 km west of Cuxhaven and will generate an output of about 110 MW. The wind turbines will be built on steel foundations that are up to 55 m long, so-called monopiles, that are driven into the seabed. Work will begin in spring 2016 and will be completed in fall 2016.

The unit that received the order is part of Offshore Systems, which Bilfinger recently put up for sale. The unit has cutting-edge expertise in the design, manufacture and installation of offshore foundations in the North Sea and Baltic Sea. A total of more than 630 foundations for wind turbines, metering masts and substations have been built to date and a volume of approximately €140 million is anticipated for 2015.

For more information, visit www.bilfinger.com.



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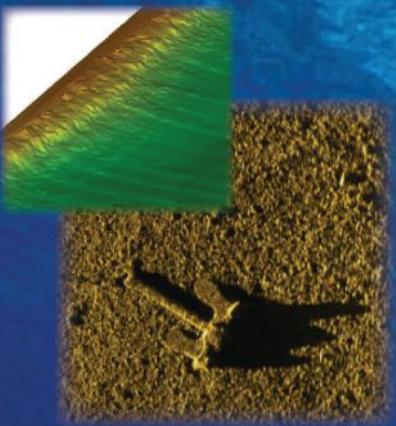
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RWE officially inaugurates Nordsee Ost

The Nordsee Ost wind farm was officially inaugurated on 11 May 2015. The inauguration was attended by the German Minister of Economics, Sigmar Gabriel, as well as Peter Terium, CEO of RWE AG, Hans Bünting, CEO of RWE Innogy, and Mel Kroon, CEO of Tennet.

With an installed capacity of 295 MW, Nordsee Ost is one of the largest wind farms off the German coast. It is located about 35 km north of Heligoland and covers approximately 24 sq. km, with water depths of up to 25 m. In total, 48 wind turbines will produce sufficient green power to supply the equivalent of about 320,000 households annually.

RWE invested more than one billion euros in the construction of the wind farm. In addition, the European Union contributed a total of 50 million euros to the realization of Nordsee Ost as one of the lighthouse projects in the field of renewable energies.

Construction was carried out from the base port in Bremerhaven. The foundations, tower segments, nacelles and rotor blades were stored, pre-assembled and loaded onto the installation vessels Victoria Mathias and Friedrich Ernestine at the Eurogate Container Terminal.

The individual components of the Nordsee Ost wind farm impress through their huge dimensions. With around 160 m from sea level to the tip of the blade, the wind turbines stand higher than Cologne Cathedral. Each nacelle has a weight of approximately 350 tons and the dimensions of a detached house. Each rotor blade is more than 60 m long and weighs 23 tons.

During construction, more than 60 km of underwater cable were laid. All 48 wind turbines and the substation have been linked by these so-called inter-array cables. The installation vessels covered around 137,000 nmi (250,000 km) during the installation of the foundations and turbines.

For the next 20 years, the Nordsee Ost wind farm will be operated and serviced by RWE's own operating station on the island of Heligoland. The control room will monitor the operation. We have built extra apartment blocks on the island to house our staff who will work in two-week shifts.

In June, RWE will inaugurate the British wind farm Gwynt y Môr which has an installed capacity of 576 MW and is situated off the Welsh coast. This wind farm has been built by RWE in cooperation with its partners, Siemens and the municipal utilities of Munich.

For more information, visit www.rwe.com.

EC authorizes Portuguese floating wind farm demonstration

The European Commission (EC) has found a Portuguese scheme aimed at promoting renewable energy technologies to be in line with EU state aid rules. The scheme will support demonstration projects producing renewable energy from the ocean (wave energy, tidal energy) and innovative offshore wind technologies. The Commission concluded in particular that the project would further EU energy and environmental objectives without unduly distorting competition in the Single Market.

The scheme will support demonstration projects for a total installed capacity of 50 MW, of which 25 MW have already been allocated to the so-called "Windfloat project." This project will test in real operating conditions floating offshore wind turbines. This concerns wind turbines mounted on a floating platform instead of columns fixed to the seabed as is the case with conventional offshore technology, which allows deploying the technology in deeper waters. For the remaining 25 MW capacity, project proposals can be submitted until the end of this year.

The aid will be granted for 25 years in the form of a feed-in-tariff to compensate for the higher costs of the new technologies. The project will also benefit from investment aid and funding from NER300—the EU support program for innovative low-carbon energy demonstration projects.

The Commission assessed the measures under its 2014 guidelines on State aid for environmental protection and energy. The Commission found that the projects contribute to increasing Portugal's share of renewable energy by developing new generation technologies. Moreover, the cost estimates for ocean energy technologies submitted by Portugal show that the maximum feed-in tariff available under the scheme is proportionate to the objective pursued. This will limit potential distortions of competition brought about by the state aid.

The Commission therefore concluded that both, the support scheme and the windfloat project were in line with its guidelines.

For more information, visit www.europa.eu.



Canadian government announces investments in tidal projects

The Honorable Peter MacKay, Minister of Justice and Attorney General of Canada, and Scott Armstrong, Member of Parliament for Cumberland-Colchester-Musquodoboit Valley, on behalf of the Honorable Greg Rickford, Canada's Minister of Natural Resources, announced investments totaling over \$8 million for two clean technology projects in Nova Scotia, which will support jobs, economic growth and the environment. The projects announced are benefiting from the Government of Canada's Economic Action Plan investment in Sustainable Development Technology Canada's (SDTC) SD Tech Fund.

OpenHydro Technology Canada will receive \$6,353,000 for the Bay of Fundy Tidal Stream Project. The project, which is situated at the FORCE facility in the Bay of Fundy, is composed of an array of turbines that will simulate the cost and performance of a commercial tidal farm in harsh conditions. The unique site has the potential to supply thousands of homes with clean and renewable power by harnessing its tidal energy.

At over 16 m, the Bay of Fundy has the highest tidal range in the world. This unique site has the potential to supply thousands of homes with clean and renewable energy. The conditions found in the Bay of Fundy are demonstrably harsher than other tidal sites around the world, representing a significant engineering challenge in developing technology to turn the flow of water into electricity in a cost-effective manner. OpenHydro will deploy a 4 MW array (two 2 MW turbines) at the FORCE facility in the Bay of Fundy, demonstrating the cost and performance of a commercial tidal farm. The project will validate the turbine spacing effects, control strategies, connectivity and cabling installation needed to deliver an operational tidal turbine array. Designed for the harsh conditions of the Bay of Fundy, each OpenHydro turbine is mounted on a subsea gravity base that is placed on the seabed. Each unit is expected to produce 2 MW at a cost of 14.7 cents per kWh by 2020.

For more information, visit www.sdtc.ca.

Amrumbank West offshore wind farm starts producing electricity

Two E.ON offshore wind farms are gradually coming online, further increasing the economic significance of the company's renewables business. Humber Gateway began exporting



power to the U.K. grid at the end of February. Now Amrumbank West, which is located in the German North Sea, has also started producing power. The power from the first of its 3.6 megawatt turbines flows to an offshore transformer and converter platform from which it is exported via a 85-km subsea cable, which comes ashore near Büsum, about 100 km northwest of Hamburg.

The installation of turbines is moving forward. Humber Gateway will be completed this summer, Amrumbank West this fall. The two farms will have an aggregate capacity of more than 500 megawatts. Both projects are on schedule. Amrumbank West recently achieved another important milestone with the installation of the last of the foundations for its 80 turbine towers. The service center on Helgoland island, from which the operation and maintenance of the wind farm is monitored and managed, has also been completed. The building provides 35 workstations, storage space and helicopter hangar nearby.

Eckhardt Rümmler, CEO of E.ON's Renewables unit, sees the successful progress as evidence of the company's offshore capabilities: "The simultaneous development of large-scale projects in the waters of different countries demonstrates our ability to meet substantial challenges and solidifies our position as a leading offshore wind company. The synergies and experience from the two projects will help us make this technology more economic."

E.ON, which has invested more than €9.5 billion in renewables since 2007, is the world's number three company in offshore wind power. Together, Amrumbank West and Humber Gateway wind farms will be able to supply about 470,000 households with green power and will displace 1.3 million metric tons of carbon dioxide annually.

For more information, visit www.eon.com.

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SAM Electronics Electrical Distribution Systems for Malaysian navy combat ships

Hamburg-based L-3 SAM Electronics has been awarded a turnkey contract to provide complete electrical distribution systems for six new Royal Malaysian Navy Littoral Combat Ships (LCS). The ships will be built at the Boustead Naval Shipyard in Lumut, Malaysia, with design authority supplied by DCNS of France. Deliveries are scheduled between 2017 and 2021. Under the contract L-3 SAM Electronics assumes responsibility for total project management, planning, engineering and on-site supervision for all cable work, including installation aboard the vessels. It will also coordinate and interface all relevant systems and sub-systems as part of a common electrical platform system. Advanced electrical systems incorporate a complete power distribution network inclusive of main, emergency and distribution switchboards in addition to shore supply equipment, converters and transformers. Also included are LED lighting systems, helicopter supply facilities and special systems such as Impressed Cathodic Corrosion Protection (ICCP) and Impressed Cathodic Anti-Fouling (ICAF) facilities. All systems are to be fully integrated as a composite part of the contracted scope of supplies. As part of the contract L-3 SAM Electronics will work closely with Malaysian industrial partners and local industry in addition to providing integrated logistics support, including full technical documentation, spare parts concepts and crew training. The contract itself is the second to be carried out for the Royal Malaysian Navy by L-3 SAM Electronics following earlier successful completion of similar work aboard its fleet of six Offshore Patrol Vessels (OPVs). It is one of a number of major turnkey undertakings already carried out by the company on behalf of other world navies with projects including provision of comparable support for the Federal German Navy's latest K130-class corvettes and F125 frigates.

Growing complacency could result in loss of life

The trend in maritime security is one of growing complacency, the chief operating officer of one of the UK's leading maritime security firms has warned. Speaking at the Global Shipping Trends and Trade Patterns conference in London, Gerry Northwood OBE from MAST said that there was growing complacency in terms of maritime security that could ultimately result in loss of life. He added, "The problem is that incidents of piracy are not infrequent, and I often see the under reporting and misreporting of incidents. All maritime crime is piracy; we should not hide behind the legal distinction of armed robbery in territorial waters and piracy on the high seas. To the mariner who has just seen his shipmate killed or has himself been maimed, held at knifepoint or just robbed of his possessions, it is all piracy." Northwood said that many companies seemed to be paring back on the quality and substance of their security provision, or simply close their eyes to the problem and play the odds. He added, "This comes at a time when there has never been so much knowledge and resource available to deal effectively with the threats facing seafarers. Enormous strides have been made since piracy became a big issue in the Indian Ocean in 2008. Cooperation between international bodies, governments and the shipping industry has had a positive impact in the main piracy hot spots of West Africa, SE Asia and the Indian Ocean. "However, with many recent incidents of piracy in SE Asia, the Gulf of Guinea, the Caribbean, and continued attempts in the Indian Ocean, combined with increased people trafficking out of Libya, and between Yemen and the Horn of Africa, we need to be watchful for other forms of opportunist criminality and terrorism occurring on the back of these activities." Northwood said: "Hulls and cargoes are insurable, but sailors' lives are not. They do not deserve to be shot at, taken hostage and tortured while going about their lawful business. Yet it still happens, and will continue to happen. In most cases it is avoidable, so we need to do what we can to protect them. "Maritime crime is a problem that needs engagement from all players—governments, law enforcement, the shipping industry and its associates which include the security industry."

ECA Group wins USV contracts



ECA Group announced that it recently won two export contracts valued at more than €10 million for unmanned surface vehicles (USVs). One customer exercised its option for two additional Inspector Mk2-type USVs after ordering two in early 2014, while in another deal, ECA Group, signed a contract of several million euros to supply two comprehensive systems for the identification and neutralization of underwater mines. These systems will be implemented on a partner's USVs. The latter will then deliver them to an Asian navy in 2016 and 2017.

This repeated success with USVs shows the high demand for drones in the areas of surface and underwater maritime patrol and intervention.

ECA Group provides its customers with both comprehensive USVs and sub-systems to be installed on their own platforms. ECA Group's USVs include a wide variety of transponders and specialized mission management software, which gives them great flexibility of use with operators working in complete safety:

- Inspector Mk1 is a 7-m long USV intended to tow targets for firearms training and to qualify artillery munitions and missiles.

- Inspector Mk2 is an 8.5-m long USV. Operated by a small team, remotely or completely autonomously, this platform can perform several missions in territorial and inland waters:

- Equipped with a sonar or multi-beam censor on its forearm, it provides excellent support for imaging and bathymetric operations in shallow water.

- Equipped with K-STER intervention robots and a system to launch them, it identifies and neutralizes mines and other underwater explosive devices while ensuring the highest level of safety for operators, kept at a distance.

- Equipped with radar and day/night cameras, it monitors the water surface, takes action on identified targets and assists search and rescue operations for vessels in danger.

Furthermore, over the next few months, the Group will demonstrate the ability to launch a captive version of the IT180 airborne drone (connected to the USV by cable) for long-distance radio relay and surveillance missions.

For more information, visit www.ecagroup.com.

Aegis destroyer John Finn (DDG 113) christened

Huntington Ingalls Industries' Ingalls Shipbuilding division christened the company's 29th Arleigh Burke-class (DDG 51) Aegis guided missile destroyer, John Finn (DDG 113), in front of nearly 1,000 guests.

DDG 113 is named John Finn after the first Medal of Honor recipient of World War II. Finn received the honor for machine-gunning Japanese warplanes for over two hours during the December 1941 attack on Pearl Harbor despite being shot in the foot and shoulder and suffering numerous shrapnel wounds. He retired as a lieutenant after 30 years of service and died at age 100 in 2010.

Laura Stavridis, wife of Adm. James Stavridis (U.S. Navy, Ret.) and DDG 113 ship sponsor, smashed a bottle of sparkling wine across the bow of the ship, officially christening DDG 113 as John Finn.

Ingalls has delivered 28 Arleigh Burke-class destroyers to the U.S. Navy. Destroyers currently under construction at Ingalls are John Finn (DDG 113), Ralph Johnson (DDG 114), Paul

Ignatius (DDG 117) and Delbert D. Black (DDG 119). Earlier this year, Ingalls received a contract modification funding the construction of the company's 33rd destroyer, DDG 121.

Arleigh Burke-class destroyers are highly capable, multi-mission ships that can conduct a variety of operations, from peacetime presence and crisis management to sea control and power projection, all in support of the United States' military strategy. They are capable of simultaneously fighting air, surface and subsurface threats. The ship contains myriad offensive and defensive weapons designed to support maritime defense needs well into the 21st century.

For more information, visit www.huntingtoningalls.com.

USCG Cutter James completes acceptance trials

The fifth of the U.S. Coast Guard's National Security Cutters (NSCs), James, successfully completed several days of rigorous acceptance trials to ensure the cutter meets its contractual requirements and is ready for delivery to the Coast Guard. The Coast Guard and the U.S. Navy's Board of Inspection and

Survey conducted the acceptance trials in Pascagoula, Mississippi, and at sea in the Gulf of Mexico.

Acceptance trials are the final significant milestone before the government takes ownership of a new cutter. Representatives from the Board of Inspection and Survey inspected all of James' systems, tested its shipboard equipment, examined the quality of the cutter's construction and evaluated its performance and compliance with the contractual specifications to identify any noteworthy deficiencies that need to be corrected prior to delivery.

The cutter is named for Capt. Joshua James, who is considered one of the most celebrated lifesavers in the world. His lifesaving career began at age 15 when he joined the Massachusetts Humane Society and ended with his death while on duty with the U.S. Life-Saving Service at age 75. James is credited with saving more than 600 lives during his time with the U.S. Life-Saving Service, which merged with the Revenue Cutter Service in 1915 to create the modern U.S. Coast Guard.

James is the fifth of eight planned National Security Cutters and the sec-

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ond to be home ported on the East Coast in Charleston. At 418 ft and 4,500 tons, the Legend-class NSC is the centerpiece of the Coast Guard fleet.

Ingalls has delivered four NSCs and has three more, including James, under construction. Earlier this year, a construction contract was awarded for an eighth NSC.

National Security Cutters, the flagships of the Coast Guard's cutter fleet, are designed to replace the 378-ft Hamilton-class high-endurance cutters, which entered service during the 1960s. NSCs are 418 ft long with a 54-ft beam and displace 4,500 tons with a full load. They have a top speed of 28 kts, a range of 12,000 mi, an endurance of 60 days and a crew of 120.

The Legend-class NSC is capable of meeting all maritime security mission needs required of the high-endurance cutter. The cutter includes an aft launch and recovery area for two rigid hull inflatable boats and a flight deck to accommodate a range of manned and unmanned rotary-wing aircraft. It is the largest and most technologically advanced class of cutter in the Coast Guard, with robust capabilities for mar-



itime homeland security, law enforcement, marine safety, environmental protection and national defense missions. The Legend class of cutters plays an important role in enhancing the Coast Guard's operational readiness, capacity and effectiveness at a time when the demand for their services has never been greater.

For more information, visit www.huntingtingalls.com.

INS Visakhapatnam launched

INS Visakhapatnam, the first ship of the Indian Navy's Project - 15B, Guided Missile Destroyer, was launched on 20 April at a ceremony at Mazagaon Dock Limited (MDL), Mumbai. In keeping with the nautical traditions, the ship was launched by Smt Minu Dhowan, wife of the Chief of the Naval Staff.

The four ships of Project 15B ships being built at MDL have been designed indigenously by the Directorate of Naval Design. With a displacement of 7,300 tons, each ship will be spanning 163 m in length and 17.4 m at the beam and will be propelled by four gas turbines to achieve speed in excess of 30 kts. The P15B destroyers incorporate new design concepts for improved survivability, sea keeping, stealth and maneuverability. Enhanced stealth features have been achieved through shaping of hull and use of radar transparent deck fittings which make these ships difficult to detect. These ships will be equipped to carry and operate two multiple role helicopters.

The ships are also packed with an array of state-of-the-art weapons and



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UK military contribution in Mediterranean rescues migrants

The Prime Minister David Cameron announced in April that Britain is sending HMS Bulwark, three Merlin MK 2 Helicopters and two civilian border patrol boats to deploy to the Mediterranean in light of recent tragedies involving ships carrying migrants from North Africa.

In May, HMS Bulwark conducted its largest tasking to date as part of the

coordinated response to the migrant crisis in the Mediterranean. On 13 May, the Royal Navy flagship was alerted to four craft in potential distress approximately 40 mi off the coast of Libya. Each 30-ft inflatable boat was reported to be carrying approximately 100 migrants, including a number of pregnant women and children.

Defence Secretary Michael Fallon, said, "HMS Bulwark and her crew have already proved an invaluable asset in assisting with the Mediterranean migrant crisis. Including today's events the Royal Navy will have rescued about 600 people since starting operations at the beginning of the month. The ship is providing medical assistance, food, water and dry clothes to those in need and will transfer them safely to land as soon as possible."

For more information, visit www.gov.uk.

USS Abraham Lincoln reaches RCOH milestone

Sailors assigned to the aircraft carrier USS Abraham Lincoln (CVN 72) and Newport News Shipbuilding's shipyard

workers reached another milestone during the current refueling and complex overhaul (RCOH) May 5, successfully reinstalling the ship's AN/SPS-48 primary air search radar antenna on Lincoln's island.

Sailors and shipyard workers teamed together to complete the 2-day installation, assembling the components the first day and lifting the radar to the island the following day.

"Installing the radar on time is one of the most important measures taken in the refueling and complex overhaul process," said Lt. Loudon Westgard, a division officer assigned to the combat systems department. "This was a major accomplishment, and the shipyard workers and sailors aboard Lincoln should be very proud of the progress they are making."

The AN/SPS-48 is a long-range, three-dimensional air search radar that allows for 360 degrees of coverage and the ability to detect the height of a target above the surface of the water. The radar system was deployed in the 1960s as the primary air search sensor for anti-



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aircraft warships and is the predecessor of the AEGIS system used currently on other Navy ships.

The SPS-48 antenna is now the second antenna to be installed on the Lincoln's island, which was enlarged during the overhaul. Over the next few months the Combat Systems Department along with Newport News Shipbuilding will continue to install additional antennas for navigational, communications and aircraft landing functions.

Lincoln arrived at Newport News in March 2013 to begin the RCOH process. During the carrier's RCOH, the shipyard refuels the ship's reactors, paints the ship's hull, modernizes systems and performs a complete recapitalization of the entire ship. This process produces a recapitalized carrier capable of supporting current and future warfare doctrine. Once the RCOH is complete, Lincoln will continue to operate in the U.S. Navy fleet for another 25 years.

For more information, visit www.navy.mil.

U.S. Deputy Secretary of Defense observes advanced weapons test

Deputy Secretary of Defense Bob Work, a former U.S. Marine, saw firsthand how the Department of Defense (DoD) is developing game-changing technology at the Potomac River Test Range, 30 April. A former artillery battery and battalion commander, Work loaded a hypervelocity projectile (HVP) into a 5-in., 62-caliber open mount gun at the test range.

Work visited the Naval Surface Warfare Center Dahlgren Division (NSWCDD) to thank service members and civilians and to observe the live fire of three guns: the 5-in., 62-caliber open mount test gun; the MK 45 Mod 4 gun system; and the electromagnetic railgun.

Work highlighted the Defense Innovation Initiative, a DoD-wide effort to sustain and advance America's mili-

tary dominance for the 21st century. Moreover, he emphasized the importance of investing in innovation, reforming the defense enterprise, and maintaining U.S. technological superiority.

During his visit, Work witnessed the first time an HVP was fired from the MK 45 Mod 4 gun system. The MK 45 Mod 4 gun system—the current gun system deployed on the Navy's newest ships—enhances naval surface fire support capabilities and provides fire mission flexibility for anti-surface and anti-air warfare.

The HVP—combined with the MK 45—will support various mission areas including naval surface fire support, has the capacity to expand to a variety of anti-air threats, anti-surface, and could expand the Navy's engagement options against current and emerging threats.

At the electromagnetic railgun facility, the deputy secretary of defense witnessed a shot in the commissioning series of the new repetitive-rate medium caliber electromagnetic railgun, sponsored by the Office of Naval Research.

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

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

The cost per engagement against specific threats is orders of magnitude less expensive than comparable missile engagements. The railgun projectile is being designed to enable the conservation of expensive missiles for use against more complex threats.

NSWCDD, a NAVSEA warfare center division, is a premier research and development center that serves as a specialty site for weapon system integration. The command's unique ability to rapidly introduce new technology into complex warfighting systems is based on its longstanding competencies in science and technology, research and development, and test and evaluation.

For more information, visit www.navy.mil.

Future USNS Brunswick (JHSV 6) launched

The Navy's newest joint high-speed vessel (JHSV 6), the future USNS Brunswick, was launched from the Austal USA Shipyard on May 19.

"This launch marks a major milestone for this ship as this is the first time it's entered the water, signifying its readiness to prepare for tests and trials and eventual delivery," said Capt. Henry Stevens, Strategic and theater sealift program manager, Program Executive Office, Ships. "This is a very busy time for the Navy and the shipbuilder as we continue to mark the major milestones that bring each ship closer to delivery and eventual in-service operations."

JHSV-6 is designed for the fast intra-theater transportation of troops, military vehicles and equipment. Capable of transporting 600 short tons 1,200 nmi at an average speed of 35 kts, the ship will provide U.S. forces with added mobility and flexibility. The JHSV design includes a flight deck for helicopter operations and an off-load ramp that allows for quick vehicular access to and from the ship as well as access to austere piers and quay walls. The vessel will operate in support of a wide range of operations including maneuver and sustainment, relief operations, flexible logistics support, or as the key enabler for rapid transport.

Since the start of 2015, the Navy has marked major milestones for both USNS Trenton (JHSV 5) and Brunswick. Trenton was christened in January and delivered to the Navy in April. Brunswick had her keel authenticated less than 6 months ago, was christened less than a week ago and is preparing for delivery before the end of the calendar year.

Brunswick will be owned and operated by the Navy's Military Sealift Command (MSC) and will be manned by a crew of 22 civil service mariners.

As one of the Defense Department's largest acquisition organizations, PEO Ships is responsible for executing the development and procurement of all destroyers, amphibious ships, special mission and support ships, and special warfare craft. Delivering high-quality war fighting assets—while balancing affordability and capability—is key to supporting the Navy's maritime strategy.

For more information, visit www.navy.mil.

High quality seabed surveys using hybrid AUVs and state of the art software

By: Jan Siesjö, SAAB Seaeye and Richard Hill, QPS

Introduction

The acquisition of QPS by Saab opened the possibility for closer integration between the Saab AUV platforms and the marine spatial data software solutions from QPS. This resulted in a joint 2014 project to demonstrate a high end survey system capable of very accurate combined sonar, multibeam bathymetry, video and subbottom profiling. The system is based on Saab's hovering AUV, capable of very stable autonomous close-up scanning of both structures and bottom features. The QPS data acquisition software ensures that all data is collected together with navigation data in an optimal way for precision and further processing. The result is merged data of high quality that is easily evaluated and exported.

Sabertooth

The Sabertooth hybrid AUV is based on technology coming out of the Saab Double Eagle and SAROV vehicles as well as components from the commercial ROV range. The result is a vehicle that is very quiet and stable with advanced autonomy. The Sabertooth is also extremely flexible in that it is able to operate in various modes such as Tethered mode, Acoustic modem mode and Autonomous mode.

Software tools for data acquisition and processing

QINSy is the data acquisition software package used in the hydrographic and marine geophysical industry for more than 20 years. Qimera is the new data processing package. Fledermaus is an industry standard for 4D data analysis and visualization of results and data management through close links to GIS systems.

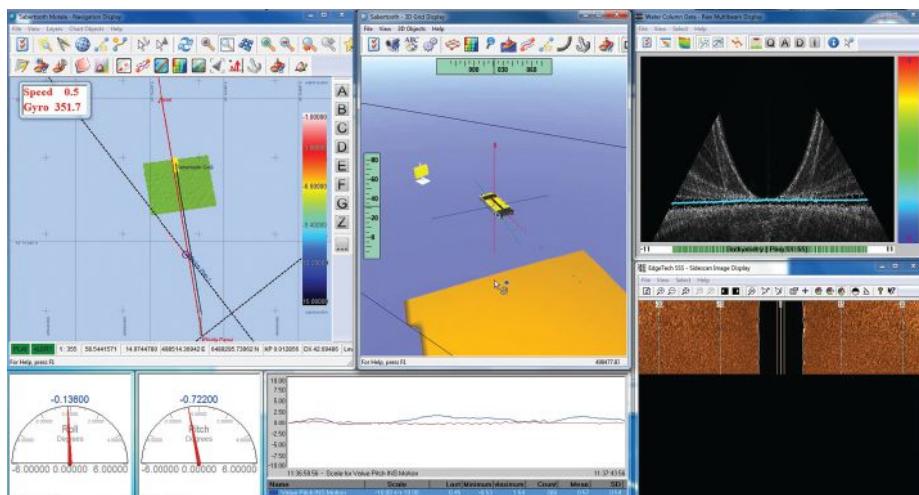
Integrated survey system

The following sensors were integrated for the trials:

- R2Sonic 2024 MBES (bathymetry, backscatter and water column)
- Edgetech 2200 combined SSS and SBP
- BlueView M900-2250 imaging sonar
- Tritech parametric SBP
- Phins III INS with RDI DVL
- AXIS industrial grade HD IP camera

Data workflow

QINSy is tightly coupled with the Sabertooth Control System (ICON) allowing the QINSy system to be remotely controlled according to the mission planning system, setting parameters and sensors for various parts of the mission. In addition, the Sabertooth behaviour based control system is able to use data processed in the QINSy system to enable tracking of bottom features such as pipelines.



QINSy real time display during trials.

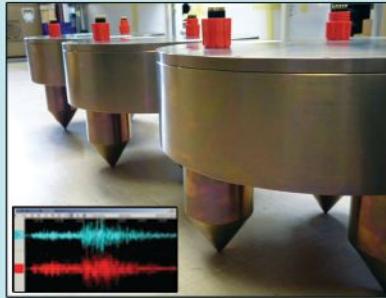
Qimera is the latest tool for MBES data processing, and has the ability to work with raw as well as processed MBES data. The post-processed trajectory of the Sabertooth can be quickly brought into Qimera to improve the overall accuracy of the data results.

Additionally, the Fledermaus Geocoder Toolbox is used to process the MBES backscatter data and deliver a seabed mosaic and to estimate sediment types.

Using the Fledermaus Midwater utility, the MBES water column data can be investigated for features on or above the seabed that have not been picked up by the seabed tracking algorithm of the MBES. Using the signal processing capabilities of FMMidwater it is possible to visualize and extract features such as natural and artificial gas seeps, or manmade objects like chains, ropes, or the top of the mast of a wreck.

After the data is processed it can be gathered together and visualized in an interactive 3D scene using Fledermaus, and it shows the different data deliverables generated from the different sensors on the hybrid AUV. The scene also integrates the AUV track, recorded digital video and still digital camera images and be played back creating a fully immersive 4D view.

Seafloor Communications Specialists



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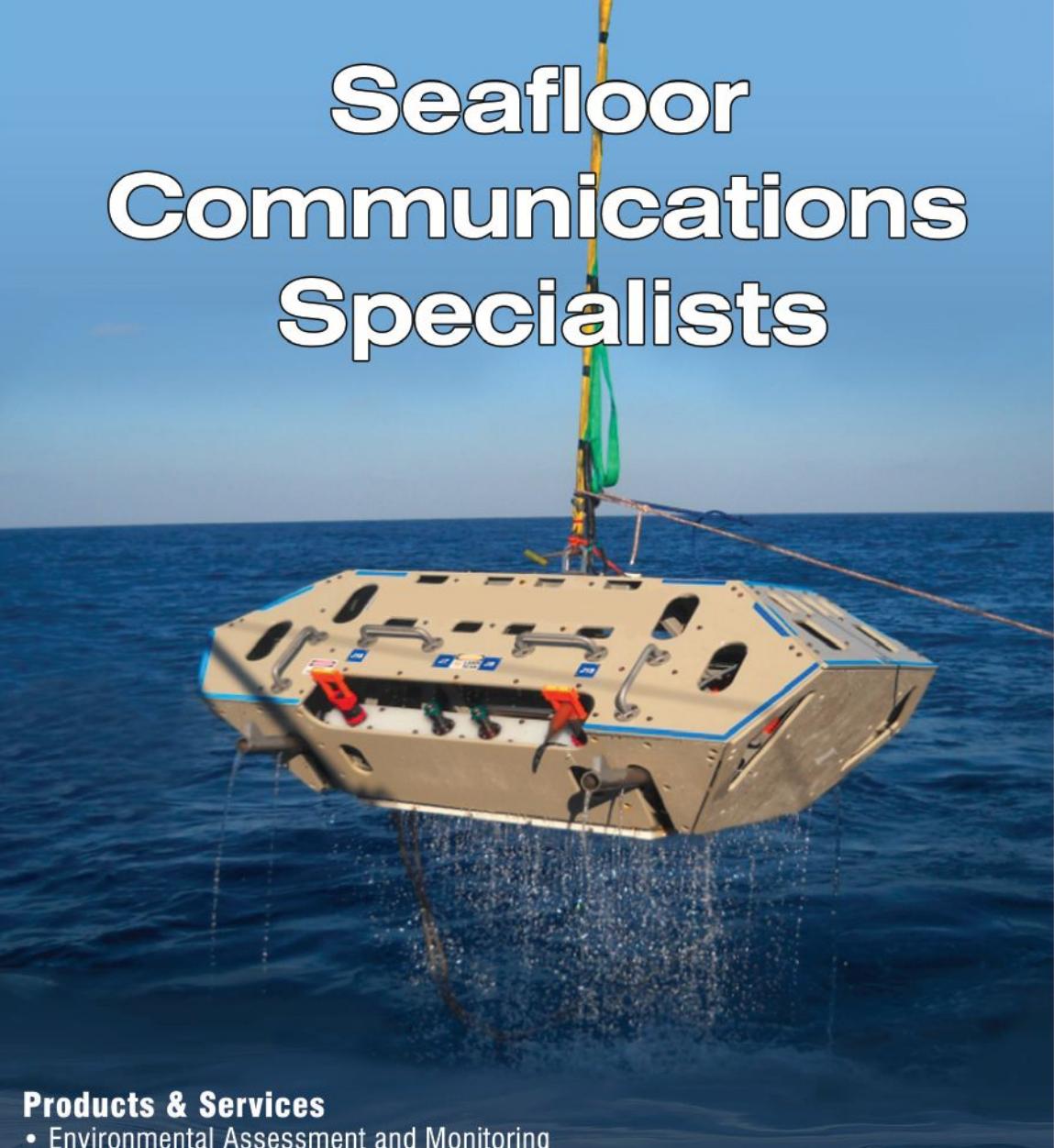
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CSnet offers end-to-end solutions providing global users a pre-engineered, expandable, portable system that can be deployed and redeployed anywhere – in water depths up to 3,000 meters. Meeting the needs for a wide range of spatial, power or bandwidth 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

Interior secretary signals 5-year offshore plan could be reduced

U.S. Interior Secretary Sally Jewell has indicated that the Obama administration's 5-year plan for offshore oil and gas leasing could include fewer lease sales and fewer offshore plays before it is finalized, despite an industry push for the plan to include more sales in additional offshore areas.

The plan, which Interior unveiled in January, calls for 14 potential lease sales in 8 of the 26 possible offshore planning areas from 2017 to 2022, including a possible sale off the U.S. East Coast. But the plan, to the frustration of the industry, does not include sales in the Pacific nor offshore Florida's coast and just three sales in federal waters offshore Alaska.

During an April news conference at the annual IHS CERAWeek conference in Houston, Jewell indicated the plan may change before it is proposed and finalized by 2016, but those changes would only be reductions in lease sales. Interior will not consider more sales than what it has already proposed, she said.

"There's two more bites at the apple here from what we've put out on the table as a proposed plan," Jewell said.

Jewell said the Interior did not include many of the offshore areas such as the Pacific Coast and much of the Atlantic, due to limited agency resources and opposition from states. In addition, it made "no sense" to include the eastern Gulf of Mexico in the plan since the area is under a congressional moratorium until 2022.

America seen joining largest oil exporters if export ban is lifted

The United States will become one of the world's largest oil exporters if domestic production continues to surge and policy makers lift a four-decade ban that keeps most crude from leaving the country, a government-sponsored study concludes.

America would be capable of sending as much as 2.4 mmbbl a day overseas in 2025, if federal policy makers were to eliminate restrictions on most crude exports, an analysis by Turner, Mason & Co. for the Energy Information Administration shows. That would make

the U.S. the fourth-largest oil exporter, behind Saudi Arabia, Russia and the United Arab Emirates, based on 2013 EIA data. The report assumes domestic output rises by 7.2 mmbbl a day from 2013.

The analysis is part of a series of studies the U.S. government is performing following a 71% surge in domestic oil production over the last 4 years. However, the report doesn't account for potential changes in domestic crude output and prices because of the lifting of the U.S. export ban, nor does it consider competition abroad.

Platform maintenance spending set to increase, report claims

Demand for offshore modifications, maintenance, and operations (MMO) services totaled \$95 billion last year for the world's 8,061 offshore platforms, according to analyst Douglas-Westwood.

DW expects spending in this sector to increase by 5.4% during 2015-2019, driven largely by aging infrastructure requiring maintenance and modification to sustain production levels.

The analyst predicts spending of \$426.1 billion over this period on MMO for fixed platforms and \$55.6 billion on MMO for floating platforms, despite an anticipated 12% decline in MMO expenditure in 2015.

This is due to some operators delaying major modifications by operators and cuts in MMO not associated directly with production.

More jobs on the chopping block as industry braces for next wave

Schlumberger Ltd., the world's largest oilfield services provider, will eliminate an additional 11,000 positions in a sign the industry will undergo another round of job cuts as a result of weak crude prices. The latest announced reductions bring the company's total to 20,000, making its workforce about 15% smaller than it was during the third quarter of 2014. Schlumberger had announced plans in January to eliminate 9,000 positions, in what was then the single largest cut in the industry. Energy producers who rely on service providers are estimated to cut spending \$114 billion this year, according to Cowen & Co. Worldwide, the industry had announced about 100,000 job cuts after Brent crude prices fell by half from a June high.

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Sakhalin-1 partners claim new drilling record at Chayvo field

Russia's Rosneft said the Sakhalin-1 Consortium has drilled the world's longest well to date at the Chayvo field offshore Sakhalin Island. The O-14 production well was drilled from the ice-reinforced Orlan drilling platform to the field's southeastern point. Its measured depth was 44,291 ft, with a horizontal reach of 39,478 ft.

Rosneft said that since 2003, the consortium has drilled 9 of the world's 10 longest-reach wells. A year ago, they established the previous record of 42,651 ft measured depth for Chayvo's Z-40 well, the company said.

Sakhalin-1 extended-reach drilling is among the fastest, the company added, due to the use of ExxonMobil's proprietary Fast Drill technology. This can be used to identify potential bottlenecks in the drilling process, enabling wells and completions to be optimized.

Chayvo, northeast of the Sakhalin shore, came onstream in 2005. It is one of three fields under development



Orlan drilling platform at the Chayvo field offshore Sakhalin Island.

in the Sakhalin-1 project: Chayvo, Odoptu and Arkutun-Dagi, which are situated at northeastern shelf of the Sakhalin Island.

Ultimate recoverable reserves of the project are 236 million tons of oil and 487 billion cubic meters of gas. The water depth around the Orlan platform is 49 ft. Production is sent to the Chayvo onshore processing facility.

Sakhalin-1 is the first large-scale offshore project carried out in the Russian Federation on PSA conditions (executed in 1996). Partners are Rosneft 20%; ExxonMobil 30%; SODECO 30%; and ONGC Videsh 20%.

OFFSHORE INDUSTRY HEADLINES

Research & Development • Environmental Assessment • Discovery

ExxonMobil warns that U.S. must act or miss out on LNG opportunity

The United States is at risk of losing economic opportunity and the ability to solidify its role as a global leader in energy production unless the government moves to approve liquefied natural gas (LNG) exports, said Rob Franklin, president of ExxonMobil Gas & Power Marketing Co.

"If policymakers don't revisit and redress some significant legal and regulatory problems...then the U.S. could be left behind during one of the great, historic developments in global energy and trade," Franklin said in a speech at the Johns Hopkins School of Advanced International Studies in Washington D.C.

Franklin said that the export of LNG should be treated no differently from other exports such as agricultural goods, automobiles and computer products.

"LNG exports can provide the spur to further increase America's natural gas production, providing all the attendant benefits that would generate," he said.

ExxonMobil has embarked on a \$10 billion project to convert the LNG regasification terminal at Golden Pass, Texas, into an LNG export terminal. In support of this effort, an application to export to non-Free Trade Agreement countries was submitted to federal officials more than 2 years ago, but no decision has been made. Permit applications for some two dozen other projects are also in the same state of bureaucratic limbo.

Global LNG demand is expected to triple between 2010 and 2040. To put this into perspective, it means that the amount of incremental gas needed to meet global demand by 2025 will be almost double the size of the entire U.S. gas market today. Most of the new demand for LNG will come from existing and emerging markets in the Asia Pacific as well as the Middle East.

Researchers predicting 'well below average' hurricane season in 2015

Gulf of Mexico oil and gas producers can look forward to a well below-average hurricane season for the Atlantic basin in 2015, Colorado State University researchers predict, citing the likely development of a moderate to strong El Niño event as well as anomalous cooling of the tropical and sub-tropical Atlantic.

The CSU Tropical Meteorology Project team is calling for seven named storms during the Atlantic hurricane season, which runs from June 1 to November 30. Of those, researchers expect three to become hurricanes and one to reach major hurricane strength (Saffir-Simpson category 3-4-5) with sustained winds of 111

mi per hour or greater. The team bases its forecasts on over 60 years of historical data that include Atlantic sea surface temperatures, sea level pressures, vertical wind shear levels (the change in wind direction and speed with height in the atmosphere), El Niño (warming of waters in the central and eastern tropical Pacific), and other factors.

So far, the 2015 season is exhibiting characteristics similar to the 1957, 1987, 1991, 1993, and 2014 hurricane seasons, all of which had below-normal



2014's Hurricane Gonzalo occurred during a below-average season. NASA image.

activity, said Phil Klotzbach, lead author of the report.

"The tropical Atlantic has anomalously cooled over the past several months, and the chances of a moderate to strong El Niño event this summer and fall appear to be quite high," Klotzbach said. "Historical data indicate fewer storms form in these conditions."

The team predicts that 2015 tropical cyclone activity will be about 45% of the average season. By comparison, 2014's tropical cyclone activity was about 75% of average. The CSU team will issue forecast updates on June 1 and again on July 1 and August 3.

This is the 32nd year that CSU researchers have issued the Atlantic basin season hurricane forecast. William Gray launched the report in 1984.

The CSU forecast is intended to provide a best estimate of activity to be experienced during the upcoming season, not an exact measure.

Klotzbach cautioned coastal residents to take the proper precautions. "It takes only one landfall event near you to make this an active season," he said.

U.S. proposes tough well-control regulation 5 years after oil spill

The Obama administration is proposing a major new regulation on offshore oil and gas drilling purportedly to try to prevent the kind of explosions that caused the catastrophic BP oil spill in the U.S. Gulf of Mexico.

The proposed rule, which is open for public comments, addresses the range of systems and equipment related to well control operations. The measures are designed to improve equipment reliability, building upon enhanced industry standards for blowout preventers and blowout prevention technologies. The rule also includes reforms in well design, well control, casing, cementing, real-time well monitoring and subsea containment.

The blowout preventer was a point of failure in the Deepwater Horizon event, but several other barriers failed as well. The cascade of multiple failures resulted in the loss of well control, an explosion and fire that killed 11 men, and a subsequent months-long spill.

The announcement of the Interior Department regulation evidently was timed to coincide with the 5-year anniversary of the disaster, which occurred on April 20, 2010.

"We worked to collect the best ideas on the prevention of well control incidents and blowouts to develop this proposed rule—including knowledge and skillsets from industry and equipment managers," said Assistant Secretary for Land and Minerals Management Janice Schneider. "This rule proposes both prescriptive and performance-based standards that are based on this extensive engagement and analysis."

The public may submit comments on the proposed regulations during a 60-day comment period that began April 15, when the proposed rule will be published in the Federal Register. Comments may be submitted via regulations.gov.

Benefits from Mexico's first shallow blocks licensing round limited

Revisions made to terms for shallow water areas in Mexico's first licensing round have enhanced the attractiveness of the production sharing agreement terms by improving the contractor's upside potential, but the benefits are said to be limited at higher prices when compared to fiscal regimes in the Americas.

According to GlobalData senior analyst Will Scargill, Mexico has yet to mitigate initial concerns regarding the adjustment based on pre-tax Internal Rate of Return (IRR), combined with royalty rates that are adjusted according to price; this leaves exploration and production companies (E&P) with little upside.

"The fact that royalties adjust to prices means the regime is relatively competitive in a low-price environment," he said. Mexico closed the first phase of bidding for 14 shallow water oil and gas blocks in March. Contracts will be awarded in July.

Oil, natural gas stocks outperform other assets in state pension funds

Returns on state pension funds from investments in oil and natural gas companies continue to provide strong earnings for public pension retirees, including America's teachers, firefighters and police officers, according to a Sonecon study released by the American Petroleum Institute (API). On average, \$1 invested in oil and natural gas stocks in 2005 was worth \$2.30 in 2013. By contrast, \$1 invested in all other assets over the same period was worth \$1.68.

"During good economic times—or challenging ones—oil and natural gas investments far outperformed other public pension holdings," said API Vice President of Regulatory and Economic Policy Kyle Isakower in a conference call with reporters.

"We already know that a healthy domestic oil and natural gas industry is good news for jobs and government revenue, and we now know that it also provides stability to the nest eggs that millions of Americans are counting on for a secure retirement."

While oil and natural gas stocks make up, on average, 4% of holdings in the top public pension funds, they accounted for, on average, 8% of the returns in these funds from 2005 to 2013, according to the Sonecon study. The owners of America's oil and natural gas companies are largely

retirees and middle class Americans saving for retirement, according to a separate Sonecon report.

A black and white portrait of Kyle Isakower, a man with short hair, wearing a suit and tie, smiling at the camera.

Kyle Isakower
class Americans saving for retirement, according to a separate Sonecon report.

"Millions of Americans with a 401k, mutual fund, or pension also rely on the income and capital growth these companies provide for their retirement," Isakower said. America's oil and natural gas companies are owned by tens of millions of Americans, according to a previous Sonecon study.

The report examines the top two public pension funds in 17 states, which collectively cover more than half (55%) of all workers in the United States who participate in state and local government pension plans. States analyzed in the recent report are California, Florida, Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New Mexico, New York, North Dakota, Ohio, Pennsylvania, South Carolina, and West Virginia.

API is the only national trade association representing all facets of the oil and natural gas industry.

Countries, oil companies agree to end routine flaring

Chief executives from major oil companies have joined together with senior government officials from several oil-producing countries to commit, for the first time, to ending the practice of routine gas flaring at oil production sites by 2030 at the latest.

The "Zero Routine Flaring by 2030" initiative, already endorsed by nine countries, 10 oil companies and six development institutions, was launched in mid-April by United Nations Secretary-General Ban Ki-moon and World Bank Group President Jim Yong Kim.

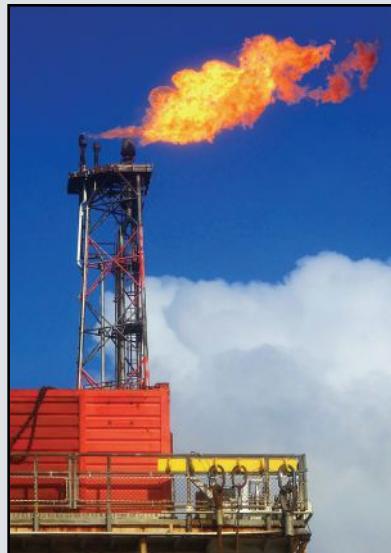
They were joined by Royal Dutch Shell Chairman Jorma Olliila; Statoil CEO Eldar Sætre; Norwegian Foreign Minister Børge Brende; Gabonese Minister of Petroleum Etienne Dieudonne Ngoubou; and several other senior government and corporate officials, and representatives of international development banks. The endorsers collectively represent more than 40% of global gas flaring.

Every year, around 140 Bcm of natural gas produced together with oil is wastefully burned or "flared" at thousands of oil fields around the world. This results in more than 300 million tons of CO₂ being emitted to the atmosphere, equivalent to emissions from approximately 77 million cars.

But currently, the gas is flared for a variety of technical, regulatory, and economic reasons, or because its use is not given high priority.

By endorsing the initiative, governments, oil companies and development institutions recognize that routine gas flaring is unsustainable from a resource management and environmental perspective and agree to cooperate to eliminate ongoing routine flaring as soon as possible and no later than 2030.

They will publicly report their flaring and progress towards the target on an annual basis. Furthermore, routine flaring will not take place in new oil fields developments. Governments will provide an operating environment conducive to investments and to the development of functioning energy markets.



Flaring gas from the BP-operated Ula platform in the North Sea.

New technology to help recover more from difficult Lower Tertiary

After more than 2 years of engineering work, Baker Hughes recently unveiled a new technology aimed at boosting the industry's ability to pull more oil and gas from the most technically challenging waters. The new system—dubbed Hammerhead—is the oilfield services company's answer to a problem that's been plaguing the industry as oil companies push into deeper and deeper territory.

The Lower Tertiary in the Gulf of Mexico, for example, holds vast amounts of hydrocarbons but the play has proved difficult to tap. Situated in water more than 10,000 ft deep, reservoirs can extend 6 mi below the seabed, where pressures and temperatures are intense. In addition, oil companies have to go to extremes to stimulate production of the tight, thick

subsea rock formations, making it immensely expensive to produce from the play. On average, deepwater Lower Tertiary wells yield only 6% of the total fossil fuel locked in the reservoir. Because the play holds so much oil and gas, boosting the recovery rate by a mere 1% can return nearly \$2 billion in revenue, based on \$50-per-barrel oil, according to Baker Hughes.

The Hammerhead system can push 5 million pounds of proppant into subsea wells. Proppant are small particles used to prop open the tiny fissures created during hydraulic fracturing and unleash oil and gas trapped in dense formations. That capability should allow the new technology to pull up to 30,000 bbl per day over the course of two decades. Baker Hughes is working with its customers to deploy the technology in the Lower Tertiary.

DeepOcean to install subsea facilities for Maria tie-in

Statoil has commissioned DeepOcean to handle riser-umbilical and cable installations for the Kristin and Heidrun platforms in the Norwegian Sea, in readiness for the subsea tieback of Wintershall's Maria development. The new construction vessel Edda Freya, due to join the DeepOcean fleet early next year, will perform the installations during summer 2016, supported by one of its light construction vessels. The company's duties comprise preparation of subsea infrastructure and installation of a dynamic control umbilical, a direct electrical heating cable and optional change-out of a production riser on the Kristin semi-submersible platform, and installation of a water injection riser on the Heidrun TLP.

OneSubsea providing equipment for Taurus Libra off Egypt

OneSubsea has received a multi-million dollar contract to supply subsea systems for BP's West Nile Delta Taurus Libra development offshore Egypt. The subsea systems scope of supply includes 10 large bore gas trees and related subsea equipment. First deliveries are expected in the first quarter of 2016. The Taurus Libra field is the first development in the West Nile Delta area and is being tied back to the existing West Delta Deep development. OneSubsea chief executive Mike Garding said, "this project is being executed on a fasttrack schedule, utilizing the standardized BP horizontal gas tree and control system that we jointly developed."

Bridon to supply FPSO mooring cables for Egina oil field

Samsung Heavy Industries has contracted Bridon to supply FPSO mooring cables for the Egina oil field offshore Nigeria. Bridon will supply 17 lengths of 118-mm, 4.65-in. sheathed spiral strand cable, with a minimum breaking load of 13,900 kN, a design life of 25 years and each complete reel weighing 185 metric tons (204 tons). The Egina oil field, located in 5,248 ft of water, is 93 mi off the coast of Nigeria. The development plan calls for 44 wells connected to a 1,082-ft long FPSO. The FPSO will hold 2.3 mmbbl which includes capacity for future developments in the area. First oil



One of Bridon's Egina reels.

is expected late in 2017. The plateau production is 200,000 bbl a day of oil. Total has a 24% interest and is partnered with NNPC, South Atlantic Petroleum of Nigeria, CNOOC Ltd., and Petrobras.

Fugro sets water depth record at 9,589 ft for seafloor drills

Fugro has set a new seafloor drill water depth record of 9,589 ft while completing a combined sampling and piezocene penetration testing (PCPT) borehole to 203 ft below the seafloor. Achieved using its Seafloor Drill I, the single deployment in the Walker Ridge area of the Gulf of Mexico exceeded the previous water depth mark for seabed-based drilling technology. Andrew Cooper, the Fugro project manager, was onboard the vessel for the record-breaking dive in early April 2015 and was pleased with the results. "The project team worked together to deliver a safe and productive operation while obtaining high quality data for our client," he explained. "Seafloor Drill I performed as expected in these water depths, and we are excited to pioneer the deeper depths demanded by the offshore oil and gas industry." Fugro also operates Seafloor Drill II which adds coiled tubing PCPT capability and automated handling of drill rods and tools during subsea operations.

GoM produces first oil at Delta House, discovery at Yeti

LLOG Exploration and its partners have launched production from the Delta House floating production system (FPS) in Mississippi Canyon Block 254, deepwater Gulf of Mexico. The group plans to continue ramping up production in the coming months by bringing eight wells online by the end of the year.

The Delta House FPS, situated in 4,500 ft of water, is designed to handle peak daily production of 100,000 bbl of oil and 240 mmcf of natural gas.

"First production at Delta House marks a significant milestone for LLOG," said Scott Guterman, LLOG Exploration president and chief executive officer.

He added: "Not only do we expect to double our production when all of the wells come online this year, but we are proud to achieve a cycle time of about 3 years from first discovery to first produc-

tion for an FPS development project which is among the best in the Gulf of Mexico."

Delta House is the second floating production system the company has brought online in 4 years, since its first FPS, Who Dat, began production in 2011. The company made the first Delta House discovery in 2012. LLOG is partnered with Blackstone Energy Partners, and its co-owners, the entities managed by Ridgewood Energy (which includes Riverstone designated ILX affiliates), Red Willow Offshore, LLC, Calypso Exploration, LLC, Deep Gulf Energy II, LLC, and Houston Energy.

Meanwhile, Statoil said it made an oil discovery in its Miocene Yeti prospect located in the U.S. Gulf.

The Yeti discovery was made in Walker Ridge Block 160, which is approximately 9 mi south of the Big Foot field and 7 mi from the Cascade field.

Yeti was drilled with the Maersk Developer drilling rig, a sixth-generation semi-submersible. Statoil reports that its drilling efficiency with Yeti was among the best of any well drilled in Walker Ridge, achieving a rate of about 400 ft per day. The rig has since moved to drill on Statoil's Thorvald prospect in the Mississippi Canyon Block 814.

"The Yeti discovery expands the proven subsalt Miocene play further south and west of the Big Foot field," said Jez Avery, Statoil's senior vice president, exploration for North America. "We are analyzing data to determine the size of the discovery in order to consider future appraisal options."

Statoil operates the Yeti field with a 50% interest. Partners Anadarko Petroleum holds a 37.5% stake and Samson, a 12.5% interest.



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IRClass completes survey of 'Ramya'.

IRClass signs off on Schlumberger stimulation vessel conversion

IRClass completed the survey and certification of Greatship Ramya during its conversion from an offshore supply to a well stimulation vessel for oilfield services company Schlumberger. The ship is currently working for an Indian oil company in the offshore sector.

Well stimulation vessels handle hazardous chemicals under very high pressures (close to 20,000 psi/1,379 bar) and supply/receive these fluids to and from offshore wells.

Classification requirements include compliance with IBC, IGC, and IMDG codes and various offshore standards, in addition to the SOLAS and MARPOL conventions. Due to the tight delivery timeline, Schlumberger opted to have conversion performed under single class status using IRClass.

The classification process involved plan approval and surveys during manufacturing, installation on board the vessel, test and trial of acid and various types of process tanks, pressure vessels, high-pressure piping systems, engines, generators, electrical installations, safety systems, process handling equipment, fluids separation, processing and burning through a specially constructed burner boom at the forward end of the vessel.

IRClass worked with various parties to accomplish plan approval with 270 drawings and physical surveys of all the equipment, installations and systems, the process took around 7 months.

LATC brings next generation Damen vessels to Nigerian offshore sector

Africa-focused proprietary investment firm L.A.T Cleveson (LATC) has signed an order with Damen Shipyards Group for the supply of two PSV 3300 platform supply vessels and two FCS 5009 fast supplier vessels. This landmark transaction will bring next generation Damen PSVs to the offshore industry of Nigeria and the Gulf of Guinea for the first time.

The purchase is being made by LATC

Marine Ltd, a subsidiary of L.A.T Cleveson, which has quickly established a positive reputation by providing state-of-the-art marine vessel supply and offshore operation support services to leading Oil & Gas operators in Nigeria.

The company's aim is to set new standards in the West African offshore oil sector through acquiring modern and technologically advanced assets to serve international and local clients operating in the region. Vessels servicing the offshore industry in the Gulf of Guinea, specifically Nigeria, typically are substantially older than those operating elsewhere in the world—until now.

The purchase has been financed by Fidelity Bank Plc, a progressive and reputable Nigerian bank, with a dynamic Transport & Shipping division poised to support value-adding projects and new efficiently run companies in the industry, in particular those with a strongly local content status.

FPSO Petrojarl I starts hull upgrade for work in Santos Basin off Brazil

The FPSO Petrojarl I has been transferred to Damen Shiprepair's (DSR) 1,007-ft long, 154-ft wide dry dock No. 8 for work on its hull. The vessel is undergoing upgrades for owner Teekay Petrojarl LLC for redeployment on the Atlanta heavy-oil field in the Santos basin offshore Brazil.

DSR is responsible for basic, detailed, construction and interface engineering; marine and process equipment procurement; fabrication; construction; corrosion protection-coating; transport and lifting operations; and integration, mechanical completion, performance testing and commissioning.

It is also undertaking upgrades and modifications related to a marine, hull, and life extension according to class; conversion of the process systems (separation train and produced water topsides) and integration; and ensuring Brazilian compliance. Frames is managing design and fabrication of the new topsides skids while Nevesbu is handling marine and topsides integration engineering.



The FPSO Petrojarl I.



'Olympic Bibby' subsea IRM vessel christened at Kleven Shipyard

Bibby Offshore has officially named its new inspection, repair, and maintenance light construction vessel the Olympic Bibby. The ceremony was at the Kleven Shipyard in Norway.

The Olympic Bibby is a NORSO compliant, 4,960-ton vessel. She is the seventh vessel built by Kleven Verft for Olympic since 2011.

Bibby Offshore has signed a charter agreement with Olympic Shipping for the newbuild. The agreement for the subsea support vessel is for a 3-year period, with options to extend for an additional 2 years.



Sinopacific delivers first new design AHTS to Femco Group

The Sinopacific Shipbuilding Group has delivered a newbuild SPA150 anchor handling tug supply vessel to Femco Group. This is the first-ever for the design and first in a series of four vessels contracted by Femco from Sinopacific.

SPA150, with 12,000-hp propulsion and 150-ton bollard pull, marks the first medium-size AHTS in the SP series, which is the in-house brand belonging to Sinopacific and designed by Shanghai Design Associates, the Sinopacific design team.

With an overall length of 236 ft, molded breadth of 56 ft and a 5,543-sq. ft cargo deck with 10 tons/sq. m uniform load, the vessel has a DP-2 system and is suitable for different kinds of offshore support work, including anchoring, tugging, external firefighting (Fi-Fi 2), oil pollutant recovery, as well as loading kinds of liquid and dry cargoes.

Teekay's first 'unit for maintenance and safety' vessel en route to Brazil

Arendal Spirit, the first of Teekay's so-called "unit for safety and maintenance" (UMS) accommodation vessels, was en route to Brazil aboard a COSCO heavy lift vessel.

Arendal Spirit features 500 beds in 248 cabins with en-suite bathrooms, windows, television, internet and telephone connections, lounge areas, a coffee shop, television and game room, fitness room, dining room, office areas, meeting-con-



Teekay's first UMS accommodation vessel.

ference room and cinema. Its design is based on Sevan Marine's unique cylindrical hull, providing several advantages compared to traditional accommodation vessels including high uptime, excellent motion characteristics (less seasickness), more deck space, better stability, and more storage space.

Arendal Spirit was expected to arrive in Brazil by the end of April to start a 3-year charter contract with Petrobras, with extensions. It is the first of three UMS vessels to be built by COSCO in China. The vessels were originally ordered by Logitel Offshore Holdings, which Teekay acquired in July 2014. Teekay's second UMS, the Stavanger Spirit, is currently under construction with delivery scheduled for the fourth quarter of 2015.

MacGregor to supply equipment for Petrobras AHTS vessels

MacGregor, part of Cargotec, has secured a contract with Brazilian shipowner and shipbuilder Grupo CBO to supply Triplex deck handling equipment and cranes for four customized

Havyard 843 anchor handling tug supply vessels (AHTS).

This Havyard design will be adapted to meet the requirements of Petrobras. Two vessels will be built at Grupo CBO's Estaleiro Aliança yard and two at the Estaleiro Oceana yard.

Under the contract with CBO, MacGregor will provide each vessel with two sets of Triplex shark jaws (H-700) and guide pins (S-200), one cargo rail crane (KNC-60), and one knuckle boom deck crane (KN-150).

Otto Marine delivers four newbuilds for PT Pertamina Trans Kontinental

Otto Marine Ltd. shipyard PT Batamec recently completed the construction of four new vessels for PT Pertamina Trans Kontinental (PTK). The delivery comprised two harbor tug units and two anchor handling tug supply vessels, the company said.

A delivery ceremony was held March 27, 2015 at the Batam, Indonesia shipyard. The two 3,000-bhp harbor tug units were named Patra Tunda 3151 and Patra Tunda 3152, and the two 5,150-bhp AHTS were named Transko Balihe and Transko Moloko. The total contract value is \$36.6 million, Otto Marine said.

"While the group strives to strengthen our position as a leading offshore supply vessel operator, our shipyard remains an integral part of the business portfolio. The shipyard continued to tap on the cabotage market in Indonesia, and take selective shipbuilding orders to enhance our revenue base," said Michael See, group chief executive officer.

Lewek Constellation heads to Gulf of Mexico to work for Noble Energy

EMAS AMC's flagship newbuild Lewek Constellation was on its way to the Gulf of Mexico after successfully completing its inaugural job in late 2014, a \$120-million project for VAALCO Gabon (Etame) Inc. offshore Gabon.

Lewek Constellation was to hit the Gulf to work for Noble Energy on the engineering, procurement, construction, and installation of subsea tieback projects in the Big Bend, Dantzler, and Gunflint developments.

The company's ultra-high-tension, deepwater, reel-lay and heavy-lift vessel was christened Lewek Constellation in March 2015.

This stands as the subsea construction vessel's inaugural deepwater pipelay project. The total scope includes more than 80 mi of pipe-in-pipe flowlines and more than 56 mi of umbilicals in water depths up to 7,200 ft.

EMAS AMC, the subsea division of



Lewek Constellation.

EMAS, announced the three contracts totaling \$300 million in April 2014, ultimately finalizing them in October 2014.

Tidewater USA orders Arctic class supply vessel from Tersan

Tidewater USA has contracted Turkish shipbuilder Tersan Shipyard for a new multi-purpose platform supply vessel, designed for arctic operations. The Tidewater subsidiary Norwegian Troms Offshore Supply Group will operate the vessel. The company also has an option for the yard to build three more vessels of a similar compact design with a high deadweight, to provide maximum cargo capacity.

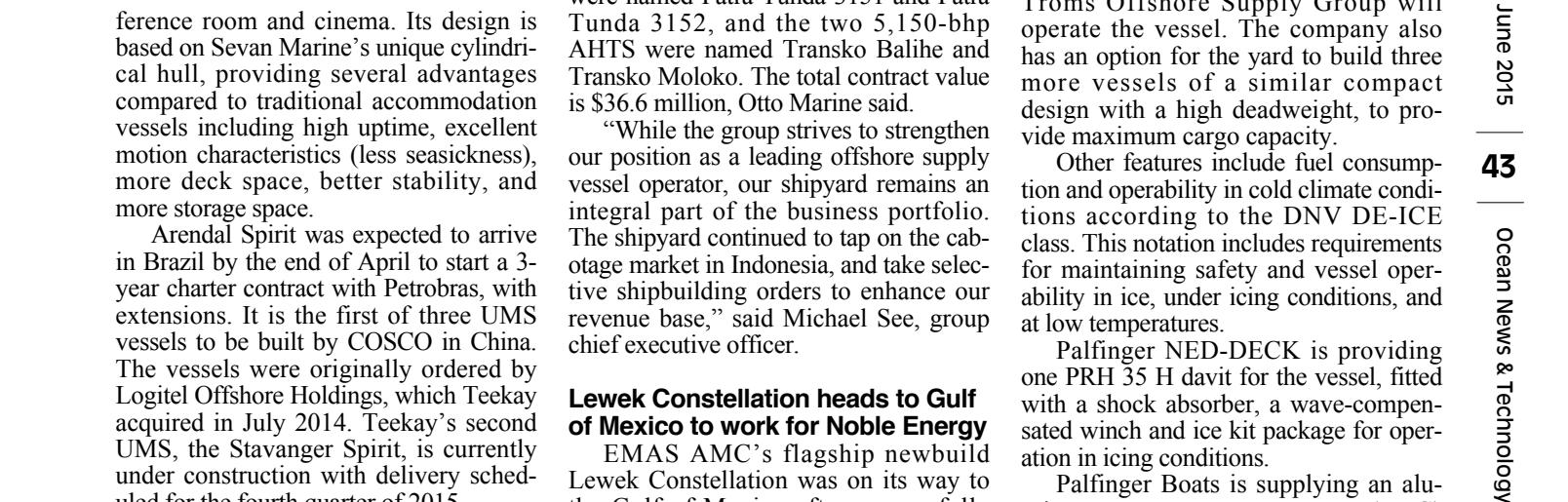
Other features include fuel consumption and operability in cold climate conditions according to the DNV DE-ICE class. This notation includes requirements for maintaining safety and vessel operability in ice, under icing conditions, and at low temperatures.

Palfinger NED-DECK is providing one PRH 35 H davit for the vessel, fitted with a shock absorber, a wave-compensated winch and ice kit package for operation in icing conditions.

Palfinger Boats is supplying an aluminum Fast Rescue Boat (FRC) equipped to carry 10 persons according to SOLAS regulations. The FRC also features two Steyr 190-hp coupled to Hamilton 213 water jets, ensuring a top speed above 40 knots.

Northern Offshore delays jack-up rig deliveries, allowing deferrals

Northern Offshore Ltd. has negotiated a 9-month delay in the deliveries of its high-specification jack-ups, Energy Engager and Energy Encounter, from a shipyard in China. The new delivery dates are December 2016 and June 2017, respectively. "This will allow us to defer approximately \$22 million in owner furnished equipment expenditures for these units from calendar year 2015 to 2016," said Gary Casswell, Northern Offshore's president and chief executive officer.



Kosmos scores 'significant' gas discovery at Tortue-1 off Mauritania

Kosmos Energy has made a significant gas discovery at its Tortue-1 development well in Block C-8, offshore Mauritania. The well was drilled to test the Tortue West prospect, which forms part of the Greater Tortue complex.

It was drilled to a 4,630 m depth, where it encountered 107 m of net hydrocarbon pay and a single gas pool in the primary Lower Cenomanian objective.

"Volumetrically, the Tortue-1 well has far exceeded our pre-drill expectations and has discovered a large-scale gas resource," said Andrew Inglis, Kosmos Energy's chief executive officer.

The company is planning to undertake an appraisal program to delineate the Tortue West discovery.

The Marsouin-1 exploration well, located in the central part of Block C-8, is expected to be drilled in the third quarter of 2015.

An exploration program is also being formulated to test other prospects in the Greater Tortue Complex, extending into the St. Louis Offshore Profond Block in Senegal, including the Tortue East and Tortue North prospects.

A 3D seismic survey acquired over Kosmos Energy's Senegal blocks in 2014 is being processed and interpreted to support the program.

Kosmos owns a 90% stake in the Tortue Prospect, with the remaining 10% held by Société Mauritanienne Des Hydrocarbures et de Patrimoine Minier.

Karoon, Pacific Rubiales encounter oil at Echidna-1 well in Santos Basin

Karoon Gas Australia and Pacific Rubiales Energy have confirmed a 213-m gross oil column in the Echidna-1 exploration well in the Santos Basin, Brazil. Physical oil samples recovered measure a 39.5-degree API oil gravity with a gas oil ratio (GOR) of 750 cf/bbl.

"Echidna adds incremental resource to Karoon's discovered Kangaroo oil field, which further supports Karoon's ambitions to develop an integrated production hub in the Santos Basin," Karoon managing director Robert Hosking said.

The partners have completed the wireline program of the well, including pressure measurements, reservoir fluids sampling and petrophysical logging.

The Echidna prospect is located in exploration Block S-M-1102, about 20

km northeast of Kangaroo oil discovery.

Karoon is the operator with a 65% interest in the block, while Pacific Rubiales holds the remaining 35% interest.

Drilling operations for the Echidna-1 well started on March 31, 2015 and the well reached the planned total depth of 2,379 m on April 12, 2015.

The Paleocene reservoir interval has a gross thickness of 75 m, with an average porosity of 25%, while the Maastrichtian reservoir interval has a gross thickness of 113 m, with an average porosity of 21%.

Santos makes deepwater oil find offshore Sabah, east Malaysia

Santos Ltd. has discovered oil in a deepwater wildcat offshore Sabah, east Malaysia. Further drilling is in planning, reported Reuters. Santos said the Bestari-1 exploration well hit 220 ft of high quality oil in depths ranging from 6,102 ft to 8,9865 ft below the sea. Deepwater Block R, where the Bestari-1 well was drilled, is close to other oil discoveries, including the Kikeh oil field. Partners in the block are operator JX Nippon Oil and Energy Corp., Japan's Inpex Corp., Malaysian state oil firm Petronas, and Santos.

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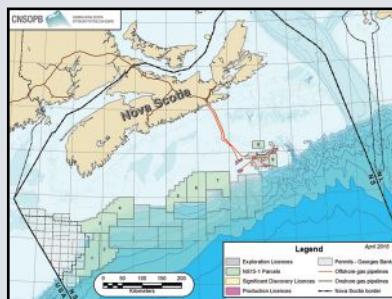
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Canada-Nova Scotia calls for offshore exploration tract bids

The Canada-Nova Scotia Offshore Petroleum Board (CNSOPB) has issued Call for Bids NS15-1 covering nine parcels on the central to western Scotian margin.

Four parcels are adjacent to recent Shell Canada Ltd. exploration licenses, with numerous potential salt-related, slope onlap, and carbonate bank traps. Three parcels are above under-explored synrift basins with presalt potential, landward of recent BP Canada Energy Group ULC exploration licenses. Two parcels are in the Sable sub-basin which has proven oil and gas. Deadline for bids is 29 October 2015.

The CNSOPB has conducted a geological and geophysical assessment of the parcels. Seismic and well data for the parcels are available, free of charge, in digital format from the Board's Data Management Center at www.cnsopbdmc.ca.



Petrobras confirms oil discovery in ultra-deep Brazilian waters

Petrobras has confirmed an ultra-deepwater light-oil find at well 3-BRSA-1296-SES in the Sergipe basin concession BM-SEAL-10. The well found two light oil intervals with 79 ft of total thickness. The well drilling reached a total depth of 19,882 ft.

The well, in 9,803 ft of water, is 58 mi off Aracaju and 6.2 mi from the discovery well. This is the third extension well in the Moita Bonita area discovered in August 2012, and is part of the Sergipe-Alagoas basin exploration project.

Petrobras holds 100% interest on the block and will proceed with the Discovery Evaluation Plan, according to

Brazil's Nacional Petroleum, Natural Gas and Biofuels Agency (ANP).

KrisEnergy finds oil at Rayrai-1 exploration well, Gulf of Thailand

KrisEnergy has discovered oil at the first exploration well in the Wassana oil field, Gulf of Thailand. The Rayrai-1 exploration well intersected around 50 ft of net oil-bearing sandstones after reaching a total depth of 6,382 ft. Once the Rayrai-1 well is plugged, the Key Gibraltar will start drilling up to 15 Wassana development wells.

The Key Gibraltar jack-up rig was used to drill the well, which is in the 4,696 km² G10/48 license, located in the southern section of the Pattani basin.

Located in 170 ft water depth, the well lies 2.25 km north of the Niramai oil discovery drilled in 2009.

"This is a very satisfactory result as Rayrai-1 confirms the northerly extension of the Niramai hydrocarbon accumulation," said Chris Gibson-Robinson, KrisEnergy's exploration and production director. "We will further investigate this area once we have completed development drilling at the Wassana field to the south."

KrisEnergy, the field operator, is developing the Wassana oil field using a mobile offshore production unit. Production at Wassana is due to start in the second half of 2015 and plateau at about 10,000 bbl of oil per day.

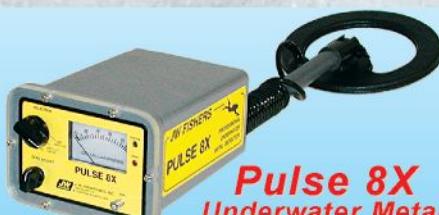


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The Kizomba B FPSO. Image: BP plc.

Kizomba phase 2 comes onstream offshore Angola

BP confirmed the start of oil production from the Kizomba Satellites phase 2 development in Block 15, offshore Angola. Operated by ExxonMobil, the deepwater project is expected to produce around 70,000 bbl of oil per day at peak.

"This is the first of BP's planned start-ups for 2015, and is another successful project from this prolific block," said Darryl Willis, BP's regional president, Angola. "We expect to follow this up later in the year with the Greater Plutonio phase 3 project in neighboring Block 18 which is operated by BP."

Kizomba Satellites phase 2 is a subsea infrastructure development of the Kakocha, Bavuca and Mondo South fields, tied back to the existing Kizomba B and Mondo floating production, storage and offloading (FPSO) vessels and is expected to recover around 190 mmbbl of oil.

The project scope includes subsea wells, FPSO topside modifications and installation of flowlines and subsea equipment. The development is located approximately 150 km off the coast of Angola in water depths of around 1,350 m.

Partners in Block 15 are BP (26.67%); ExxonMobil (40%); Eni (20%); and Statoil (13.33%). Sonangol is the concessionaire.

Eni begins oil production at Cinguvu offshore Angola

Eni has started production at the Cinguvu oil field in the West Hub development project, Block 15/06, offshore Angola. The development is located around 350 km northwest of Luanda and 130 km west of Soyo. The West Hub development project includes the Sangos, Cinguvu, Mpungi, Mpungi North and Vandumbu fields, in 1,000 m to 1,500 m water depth.

The wells are arranged in clusters and linked to the N'Goma floating production, storage and offloading (FPSO) vessel, which is capable of treating 100,000 bbl of oil per day. The Sangos and Cinguvu fields are producing around 60,000 bbl of oil per day.

Production is expected to increase to 100,000 bbl of oil per day in the fourth quarter of this year with the start-up of the third field, Mpungi. All three wells will be connected to the N'Goma FPSO.

Italy-based Eni won the bid round in 2006 and started drilling 24 exploration and appraisal wells in Block 15/06, where it discovered more than 3 Bbbl of oil in place, and 850 mmbbl of reserves.

Eni operates Block 15/06 with a 35% stake, with Sonangol EP as the concessionaire. Sonangol Pesquisa e Produção, SSI Fifteen and Falcon Oil Holding Angola own 35%, 25%, and 5%, stakes respectively.

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Lundin Petroleum turns on taps at Bertam field offshore Malaysia

Lundin Petroleum has produced first oil from the Bertam field offshore eastern Peninsular Malaysia. Currently, four wells are in service drilled from a wellhead platform linked to a spread-moored FPSO in 246 ft of water. The converted floater formerly operated offshore Tunisia.

The remaining wells will be drilled sequentially and put onstream later this year. By end-2015, the facilities should be operating at the plateau rate of 15,000 bbl per day.

Bertam is in Block PM307. Lundin has a 75% operating interest, in partnership with Petronas Carigali. Petronas approved the \$400-million development in September 2013.

During the fourth quarter of 2015, Lundin expects to start operations at the Edvard Grieg field in the central Norwegian North Sea, lifting its daily overall production to more than 75,000 boe.

Latest wells boost oil production from offshore Turkmenistan fields

First-quarter production from the Cheleken Contract Area (CCA) in the Turkmen sector of the Caspian Sea averaged 88,700 bbl of oil per day, up 23% from the corresponding period in 2014. This was due to new development wells with strong flow rates entering production, according to operator Dragon Oil.

Since early April output has exceeded 93,000 bbl per day, putting the company on track to meet its target of 100,000 bbl per day later this year.

Currently, the Neptune jack-up is side tracking the Dzheitune (Lam) C/184 well; the Elima jack-up is drilling the Dzheitune (Lam) B/202 well; and Land Rig 2 is side tracking the Dzhigalybeg (Zhdanov) A/102 well following an equipment failure downhole. The new-build Caspian Driller is expected to start operations in the CCA before mid-year.

Pateke-Tui Area tieback goes onstream offshore New Zealand

AWE has delivered first oil from the Pateke-4H development well in the PMP 38158 concession, 31 mi offshore Taranaki, New Zealand. The well is connected via a subsea tieback to the FPSO Umuroa serving the Tui Area oil fields.

Flow testing is under way to determine the optimal well settings. The well initially achieved an unstabilized flow rate of 34,000 bbl per day at 67% choke with a 48% water cut, in line with field modeling.

AWE plans to test various facility parameters, including choke settings, before establishing a much lower stabilized flow rate for long-term production.

Over time, oil output will likely decline as the water cut increases in the well. The project involved installation of 4,304 ft of flexible flowline, a gas lift umbilical and production manifold, integrated controls and ancillary equipment in water depths of about 407 ft.

Vaalco Energy starts production at Etame 12-H well offshore Gabon

Vaalco Energy has announced first production from development well Etame 12-H, offshore Gabon in Central Africa.

Drilled to a depth of 3,450 m, the well targets the recently discovered and untapped lower lobe of the Gamba reservoir. The well has been brought online at an approximate rate of 2,000 bbl of oil per day on a gross basis, with around 500 bbl per day net to Vaalco.

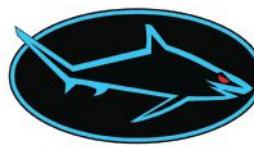
The Etame 12-H is an offset to the Etame 10-H well, which had commenced production in February 2015, at a rate of 3,000 bbl of oil per day. Etame 10-H was the first oil production from the recently commissioned Etame platform.

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Valemon field goes on stream in North Sea



Norwegian Petroleum and Energy Minister Tord Lien (second from left) at the opening of the Valemon field.

The Valemon gas and condensate field in the North Sea has been officially opened by Norway's Petroleum and Energy Minister Tord Lien. Located between Kvitebjørn and Gullfaks South, around 160 km west of Bergen, the gas and condensate field is expected to generate 192 mmbbl of recoverable oil reserves.

Once fully drilled, the field will have 10 production wells, and require an investment of \$3 billion. Valemon is the first new Bergen-operated platform since the Kvitebjørn gas and condensate field was put on stream about 10 years ago, Statoil has said.

The field is expected to reduce the development costs by using existing facilities at Kvitebjørn and Heimdal, along with existing pipelines. The condensate obtained from Valemon will be piped to Kvitebjørn for processing and then forwarded to Mongstad. The gas will be sent to Heimdal for processing and then transported to the market.

"The field does not only provide jobs and spinoffs in virtue of its own operation, Valemon is also extending the life of surrounding installations," said Arne Sigve Nylund, Statoil executive vice president for development and production in Norway.

The Valemon topside was constructed in South Korea in the first engineering, procurement and construction (EPC) contract awarded by Statoil to an Asian shipyard. The jacket and the living quarter have been constructed at two shipyards in the Netherlands. Up to 120 mechanical equipment packages have been delivered by Norwegian suppliers.

The Valemon license is held by operator Statoil Petroleum (53.77%), Petoro (30%), Centrica Resources (13%) and Norske Shell (3.23%).

Chevron plans offshore Australia decommissioning

Chevron is planning to decommission several installations offshore Australia following production declines at the Saladin, Cowle, Yammaderry, Crest, Roller, and Skate fields.

Beyond the onshore production plant, decommissioning should include platforms at Saladin and shallow-water monopods at Roller, Skate, Yammaderry, and Cowle. Subsea flowlines from the fields to the onshore installation are included in the decommissioning plans.

The company plans to use a jack-up and construction vessel with a crane for the offshore work and a workover rig for the task of plugging the wells. It is anticipated the work will begin

in 2016 and take about 12 months to complete the offshore work. Santos Ltd. and ExxonMobil Corp. are partners with Chevron in the developments. Efforts to sell the production systems were unsuccessful, leading to the decommissioning plans.

ADNOC looks to boost offshore oil production

Abu Dhabi National Oil Co. plans to invest more than \$25 billion to lift production from its offshore fields over the next 5 years, according to a Reuters report. Current output is around 2.8 mmbbl per day.

"We want to build capacity from production and the number of wells and infrastructure," said Qasem al-Kayoumi, manager of ADNOC's offshore division of the exploration and production directorate. ADNOC's current target is a sustained rate of 3.5 mmbbl per day, he explained.

In addition, al-Kayoumi said the company plans to allocate \$2.5 billion a year for offshore drilling activities, drilling around 160 wells annually over the next couple of years.

"It is a considerable increase," he acknowledged. "The number of rigs has built up considerably in offshore, it could be more than a 50% increase."

Current production from the ADMA-OPCO and ZADCO oil fields is 1.2 mmbbl per day and should rise to roughly 1.6 mmbbl per day in 2017-18, he added.

One of the main fields under development offshore Abu Dhabi is Upper Zakum. Here the plan is to increase production capacity to 750,000 bbl per day by 2017-18 and possibly to 1 mmbbl per day by 2024, Reuters reported.

Al-Kayoumi said ADMA-OPCO was preparing for the renewal of its offshore concession, due to expire in 2018.

Seaway to install Perla platforms offshore Venezuela

The Cardon IV joint venture of Eni and Repsol has contracted Seaway Heavy Lifting to install the gas production platforms for the Perla project offshore Venezuela. Water depth at the Perla field is 229 ft. The three platforms will export gas to the shore through a 30-in. pipeline making landfall near Punto Fijo.

Seaway Heavy Lifting's scope includes transportation of the platforms to the offshore location followed by installation and tie-in to various inter-field pipelines that have already been installed. Cardon IV S.A. is a joint operating company currently owned by Eni (50%) and Repsol (50%). Petróleos de Venezuela will have a 35% share in the operation of this block, including the Rafael Urdaneta gas project.

The crane vessel Stanislav Yudin will execute the lifting and installation work and will be outfitted with a saturation dive system to perform the tie-ins. In addition to the two supporting vessels, seven tug-barge spreads will be deployed to transport the platforms and subsea infrastructure from various ports in the Gulf of Mexico to the offshore site.

QGEP contracts McDermott for SURF on Atlanta system

McDermott International Inc. and a consortium partner have won the SURF engineering, product supply, and installation scope for the Atlanta early production system (EPS) in the Santos basin offshore Brazil by Brazilian exploration and production company Queiroz Galvão Exploração e Produção SA (QGEP).

The Atlanta EPS is Phase 1 of the Atlanta field development, located in 5,085 ft of water in Block BS-4 of the Santos basin. QGEP was expected to produce its first oil from the offshore Atlanta field in the first half of 2016.

McDermott will be responsible for the engineering and offshore installation of all subsea hardware, including flexible pipes, umbilicals, umbilical termination assemblies, subsea pump skids, suction piles, and associated equipment. McDermott's vessel NO102 will conduct on-site work.

NPD ups cost estimate for Johan Sverdrup Phase 1 development

The Norwegian government has submitted a proposition to the country's parliament (Storting) for the first-phase plan for development and operation (PDO) of the Johan Sverdrup field in the central Norwegian North Sea. This will be the largest development on the Norwegian shelf since the PDO was submitted for Oseberg in 1984. Total investments for the first phase, including the transport systems, are estimated at U.S.\$15.27 billion.

However, the Norwegian Petroleum Directorate's own cost estimate is around \$1.3 billion higher at current prices than the figure in the PDO, although within the uncertainty range of plus-minus 20% indicated in the development plan. This is mainly due to the fact that production will likely be delayed by 6 months.

Start-up is now scheduled for December 2019, and production could continue for around 50 years. With the development of further phases, the ultimate recovery of resources is estimated at 1.7 to 3 Bboe.

The volumes of oil and gas and the size of the field will require drilling of large numbers of wells, the Norwegian Petroleum Directorate pointed out.

Goliat FPSO starts final preparations for Barents

The Goliat cylindrical FPSO has arrived in Hammerfest, northern Norway, following a 63-day voyage from South Korea onboard the Dockwise Vanguard. According to operator Eni Norge, the platform now undergoes final preparations for first oil production later this summer from the Barents Sea.

Eni said this is the world's largest and most advanced cylindrical oil production platform, designed and constructed to adapt to the long winter nights and icing hazards encountered in the Barents Sea.

In the fjord outside Hammerfest, the deck of the transport vessel will be submerged to a depth of 33 ft, allowing the platform to be floated off into the sea.

Five tugboats will then take the 558-ft tall structure to Ersvika, southwest of Hammerfest. Work there will include inspections, tests, and checks of all systems and equipment. Eleven vessels will participate in the in-fjord work phase, which is expected to last between 2 and 3 weeks.

Once work has been completed at Ersvika, the platform will be towed roughly 49.7 mi. to the Goliat field location where it will first be connected to its 14 anchor lines. Next, the umbilicals and risers will be installed and the platform will then be connected to the electrical power cable from the mainland. Finally, the platform and subsea systems will be made ready for production.



Goliat floated onto Dockwise Vanguard.



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GMC designs Buoyant Tower for Energean's Prinos development

GMC Ltd. has completed the basic design of a self-installing Buoyant Tower for the Prinos field development for Energean Oil and Gas of Athens, Greece.

The design brief was two-fold to find a way to extend the life and utility of the existing Prinos infrastructure, and to find a cost-effective and flexible solution for the green field expansion of the existing Prinos facility.

The existing wellhead platforms (Prinos Alpha) was reanalyzed, and strengthened to accommodate drilling using the Energean newly acquired and commissioned Energean Force (formerly Glen Esk) tender assist drilling rig. The focus was on finding an efficient solution to extending the utility of the existing infrastructure. GMC delivered a design for the retrofit of the existing platform that was both efficient and leveraged the local supply chain and workforce to deliver the platform modifications.

For the greenfield solution, GMC developed a full field plan to connect the greenfield facilities to the existing offshore processing facility (Prinos Delta), including j-tube and riser retrofits.

The greatest contribution to the effi-



GMC designs Buoyant Tower for Prinos.

cency of the whole development project was a reconfigured and redesigned GMC Buoyant Tower that has been engineered to accommodate the unique challenges of the field location. Away from any oil and gas centers, the challenge was to develop an offshore facility design that could be fabricated locally and self-installed. The key benefit of the design was that it could be installed without the use of heavy lift vessels, and using only locally available marine assets.

"GMC has proven to be a true partner in helping us develop solutions that meet Energeans' unique challenges. GMC's unique approach to addressing technical and commercial constraints has helped in driving this project forward," said Mathios Rigas, Energean's chief executive officer.

Subsea well containment spill kit ready for global deployment

Oil Spill Response Ltd. (OSRL) and the Subsea Well Response Project (SWRP) have completed work on a containment toolkit that can be deployed to minimize the environmental impact of a subsea well incident. This follows their delivery of four subsea well capping stacks, designed to shut in an uncontrolled subsea well, during 2013-2014.

The new toolkit, designed to work alongside standard industry well test hardware (i.e., vessels, well test equipment, drilling riser, BOP, inner string, coil tubing unit), incorporates long-lead items said to be not readily available.

It includes a flowline end termination; side-entry flow spool with subsea test tree latch; diverless subsea connectors; coiled tubing termination head; chemical distribution assembly; deployment reels for flying leads; flexible jumpers-flowlines; topsides transfer pumps and coolers; hose end valves; and offloading hoses.

In cases where a well cannot be shut in, the containment system can be used to flow hydrocarbons from a subsea well to the surface for safe storage and disposal. The toolkit will be stored in strategic locations to facilitate timely response worldwide.

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Cameron unveils Letourneau Jaguar class self-elevating drilling jack-up

Cameron has introduced a new drilling unit to the market, the Letourneau Jaguar class self-elevating mobile offshore drilling unit. Utilizing the Letourneau 1000-kip elevating unit and the Letourneau storm LOK leg fixation system, the Jaguar is capable of operating in water depths up to 400 ft in harsh conditions or 500 ft in moderate waters.

The rig also has the capacity to drill ultra-high-pressure/high-temperatures wells to 40,000 ft with a hook load of 2.5 million pounds and setback capacity of 1,700 kips in quads, filling the market gap between the typical premium and ultra-large jack-ups, Cameron said.

Unique to Letourneau rig designs, the Jaguar only requires a leg fixation system in severe storm conditions. This design feature allows for approximately a half-day savings each time a rig is moved. Another unique feature of the Jaguar is the design of its spud can and leg well, which allows for pulling individual legs above the waterline, permitting classification society Special Periodic Survey inspection without dry docking, potentially saving weeks of downtime and hundreds of thousands of dollars.

Trelleborg's mobile production unit for flexible coating applications

Trelleborg's offshore operation has launched its brand new Mobile Production Unit (MPU), a portable coating facility that will enable onsite coating of thermal insulation, passive fire and corrosion protection, anywhere in the world.

The unit can be mobilized in a short time frame and sent straight to site to apply coatings such as Trelleborg's thermal insulation -- Vikotherm R2 and Firestop, a jet-fire resistant material. This increases project flexibility and reduces the costs and lead times associated with transporting parts to a specialist coating facility.

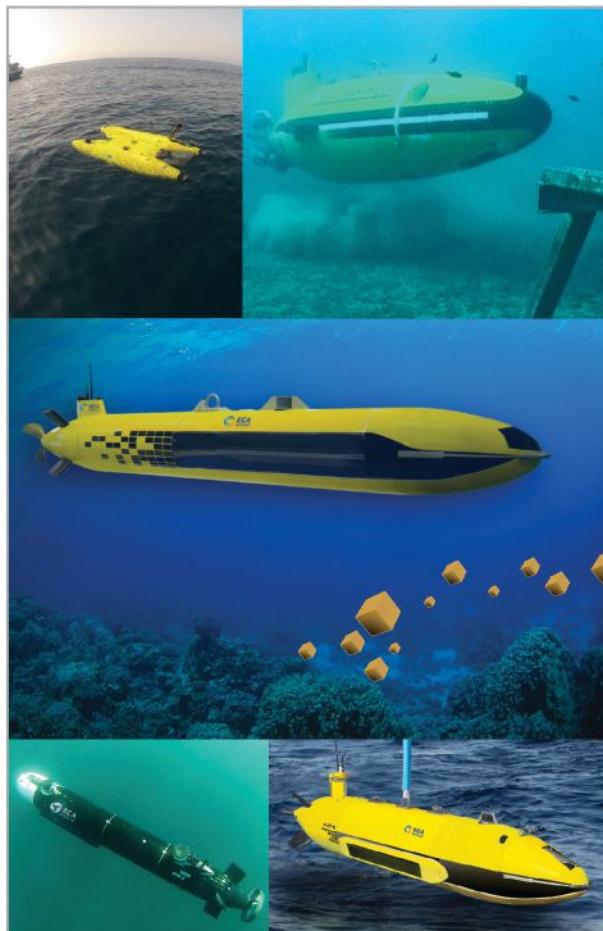
The MPU unit contains an extruder and a rotating spindle with the possibility for side extrusion of Vikotherm R2 directly to straight pipes of up to 12 m. The extruder is also used to produce 25-mm thick Vikotherm R2 profiles for coating of complex geometries such as bends, valves and flanges. In addition, there are a number of vulcanization containers for up to 20-m pipes or structures. Finally, the MPU concept includes a conventional coating machine for coating of straight pipes for passive fire and corrosion protection.

The high performance rubber-based



Trelleborg's mobile coatings unit.

composite applied by the unit--Vikotherm R2--insulates and protects jumpers, manifolds, risers, pipelines, flow lines, equipment and other subsea structures. Designed to last a minimum of 30 years, the material is maintenance-free, avoiding future replacements or rectifications. Vikotherm R2 is practically incompressible and resistant to both seawater and impact. It effectively withstands low and high temperatures and gives corrosion and mechanical protection. The MPU will provide advanced corrosion protection against all corrosive agents commonly encountered in the offshore.



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ECA Group, a leading company in underwater robotics since 40 years, has developed a full range of AUV's: from man-portable to long-range, including mid-size vehicles (less than 500kg); either mono-hull or twin hull. Every vehicle type in the portfolio is sea-proven. ECA Group's AUV's are designed to match the whole spectrum of underwater applications: from MCM, Hydrographic Survey, Underwater Inspection to Rapid Environmental Assessment (REA).



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Total E&P plans to triple power of its Pangea supercomputer

Total plans to triple the power of its Pangea supercomputer by 2016. The supercomputer is in Total Exploration & Production's Centre Scientifique et Technique Jean Féger R&D center in Pau, France.

"The upgrade currently under way will increase this computing power to 6.7 petaflops, the equivalent of 80,000 personal computers," explained Philippe



Total E&P's Pangea supercomputer.

Malzac, IT director for exploration & production at Total. "This will make it possible to apply increasingly complex algorithms to huge volumes of data."

Pangea is also a large-scale data storage tool: in 2016 it will have 27 petabytes of storage capacity. In 2008, Total added high-performance computing power to its Scientific and Technical Center.

The SGI Altix ICE+ computer from Silicon Graphics reaches 123 teraflops and the linked storage capacity will go to 1 petabyte. The machine is dedicated to seismic depth imaging processing and study of subsurface structures for better reservoir definition.

"In the last 5 years, Total's computing power has expanded seventeen-fold to keep pace with the major technical challenges facing the oil and gas industry," said Yves-Louis Darricarrère, president, Total exploration & production. "Not only are the fields to which we have access increasingly complex, but it is also vital to maximize the reserve recovery rate. Finally, the significant increase of drilling costs in recent years fully justifies investing in upgraded tools to accelerate decision-making."

Requiring 400 kW of electricity, the computer will emit sufficient heat to help warm the technical center.

GE introduces new nanofiltration membrane for offshore production

GE has introduced a new water treatment technology, seawater sulfate removal (SWSR) nanofiltration membrane, that removes sulfate from injection water in offshore oil production.

Launched for the upstream oil and gas market, the new SWSR membrane will reduce scale and corrosion in the injection well by eliminating sulfate, which can reduce oil recovery and plug the well.

Said to be an improvement of GE's DK series nanofiltration membrane, the new SWSR has three-layer membrane design and smooth surface due to which it is resistant to fouling. According to the company, the SWSR series minimizes operating pressures by providing a transmission of sodium chloride into the permeate water and offers a physical barrier for any suspended particles.

The particles include bacteria, pyrogens and colloids. The new membrane will help prevent strontium and barium sulfate scale in injection wells, while lessening well souring by reducing sulfate.

"On oil rigs, oil producers use injection water to flood the field and force oil to the producing wells, but if the water is of poor quality, it causes scale and corrosion that plugs and sours the field," said Yuvbir Singh, a GE power & water general manager. "GE's new seawater sulfate removal membranes provide excellent sulfate removal and have superior fouling-resistance."

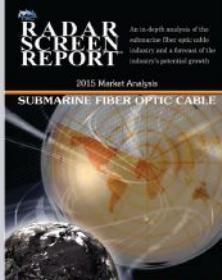
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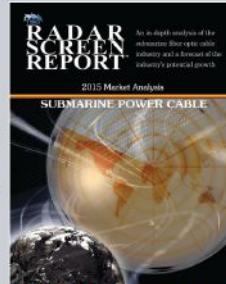
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INDUSTRY DEALS

UK government likely would oppose any takeover of BP: Financial Times

Britain's government has told BP Plc that it wants the company to remain a British oil and gas giant and it would oppose any takeover of the producer, the Financial Times reported.

The message follows the \$70 billion deal to acquire rival producer BG by oil major Royal Dutch Shell, which has sparked speculation of a larger wave of consolidation similar to the one at the end of 1990s during another oil price decline.

BP has sold \$50 billion worth of assets to pay off the damages caused by the massive Gulf of Mexico spill and could still face billions in additional claims. The perceived weakness has sparked speculation that a cash-rich company like ExxonMobil could attempt to acquire BP.

British officials have said the government would be "sceptical" about any takeover—even if it involves Royal Dutch Shell—because it wants the country to have two big global oil companies, the FT reported.

Officials acknowledge the government has few formal powers to block a bid, but a senior City figure briefed on government thinking, said making its opposition so clear may deter any foreign bidder from offering a bid, the FT reported. BP said it had no comment on the report. Representatives at 10 Downing Street declined immediate comment, according to a Reuters report.

MOL Group to acquire Ithaca firm as 'foray' into Norwegian market

Hungarian oil and gas firm MOL Group will buy Ithaca Petroleum Norge (IPN) from Ithaca Energy as a foray into the Norwegian market. IPN has a portfolio of 14 licenses in the North Sea area of the Norwegian Continental Shelf.

MOL will initially pay \$60 million to acquire IPN's assets. An additional \$30 million would be paid depending on exploration success from the existing licence portfolio. Subject to the approval of the Norwegian Ministry of Petroleum and Energy, the transaction is expected to be completed in the third quarter.

With estimated prospective resources of 600 mmboe, MOL expects the transaction to give it a good start in Norway. Three wells are due to be drilled by next year. And MOL plans to buy more assets and licenses in the country.

"Entering Norway as one of the most investor-friendly countries is an important milestone in our E&P Strategy," said

Alexander Dodds, MOL Group executive vice president for upstream.

"It enhances our positions in the lower-risk offshore North Sea area, where we are in the process of building a new production hub and know-how centre along the whole E&P value chain, that should serve as a solid basis to our long term goals in the region."

MOL currently has production operations in eight countries and exploration assets in 13. The Norwegian assets were acquired by Ithaca in 2013, with the purchase of Valiant Petroleum.

Petronas acquires Statoil's stake in Shah Deniz offshore Azerbaijan

Statoil has exited the BP-operated Shah Deniz project in the Caspian Sea offshore Azerbaijan, and has transferred its stake and a number of other assets to Petronas. The sale has now closed.

Statoil unloaded its 15.5% participating interest in the Shah Deniz production-sharing agreement; its 15.5% share in the South Caucasus Pipeline Co. (SCPC); its



BP-operated Shah Deniz project.

15.5% share in the SCPC holding company; and 12.4% share in the Azerbaijan Gas Supply Co. (AGSC).

The closure of the transaction follows the satisfaction of all conditions precedent, with an effective date of January 1, 2014. Following this transaction the State Oil Co. of Azerbaijan, SOCAR, was to assume operatorship of AGSC and commercial operatorship of SCPC as of May 1, 2015, which had both previously been held by Statoil.

BaSEC group to collaborate on Barents Sea exploration issues

Statoil, Eni Norge, Lundin Norway, OMV, and GDF SUEZ are collaborating to address operations tied to exploration in the Barents Sea. The Barents Sea Exploration Collaboration (BaSEC) will initially last for 3 years. The project will cover the Barents Sea, but with a special focus on the areas included in the 23rd licensing round.

The companies aim to find common solutions for operations in the rugged

Barents Sea, and through that contribute to high level of safety and emergency response. This will be through sharing of data, cost-effective solutions, more collaboration, and increased coordination.

The following working groups will be established: metocean and ice; environment and oil spill response; logistics and emergency preparedness; mobile drilling units; and health and working environment.

"Our goal is to increase coordination and develop cost-effective solutions for exploration in the Barents Sea in both the short and medium term. We will collaborate with authorities, industry organizations and other relevant institutions to deliver on this," said Irene Rummelhoff, Statoil senior vice president for exploration in Norway.

"We aim to be effective and address the concrete actions that need to be taken and share relevant solutions and data with both the authorities and the rest of the industry. It is in our common interest to have robust exploration activity in the Barents Sea."

BP sells stake in CATS business to Antin Infrastructure for \$486M

BP has agreed to sell its stake in the Central Area Transmission System (CATS) business in the UK North Sea for U.S.\$486 million to Antin Infrastructure Partners, which already owns a majority interest in the business. BP, currently the operator of CATS, is selling its 36.22% share in the business, in which Antin has a stake of 62.78%, ConocoPhillips 0.66% and Eni 0.34%.

A combination of pipeline and processing facilities, CATS transports and processes gas on behalf of most of the major gas producers in the North Sea.

The system includes a 404-km long pipeline between the Everest field and a gas terminal at Seal Sands, Teesside in England. The deal includes a payment of \$453 million on completion of the deal, and a deferred \$33 million, subject to post-closing adjustments.

"The North Sea is an important region for BP. Our strategy here is to focus our resources and investment to create an efficient, sustainable and competitive business which will contribute to UK energy security for many years to come," said Trevor Garlick BP North Sea regional president.

Upon completion of the deal, the around 60 BP staff are expected to transfer to the new employer with contractual terms and conditions protected under UK TUPE regulations. Subject to approvals, the company said it intends to complete the sale and transfer of operatorship before the end of the year.

Tidewater Subsea awarded Australian ROV support project
Tidewater Subsea has been awarded a WROV services contract by Allseas with the Campos Tide in Australia. Operations commence mid-April on the Chevron Wheatstone project. This award follows the successful completion of the company's first ROV project offshore Western Australia earlier in the year.

Fugro set for southwest Pacific campaign with additional airborne laser bathymetry survey capability

Fugro has commissioned an additional airborne laser bathymetry system to underpin its leading position in the development and application of bathymetric LiDAR technology. The combined Fugro LADS Mk 3 and Riegl VQ-820-G systems provide seamless measurements and mapping of nearshore and shallow water environments. The increased capability will enable Fugro to deliver simultaneous topographic and bathymetric surveys in multiple geographical areas. With high power and frequency, the combined systems achieve superior coverage that minimizes gaps and outperforms lower energy alternatives and single sensor systems in all conditions, particularly in difficult environments. They are highly adaptable and small enough to be installed in a variety of light aircraft. With continued operations across the Middle East during 2015, Fugro will also begin a South West Pacific ALB survey campaign following the award of projects in multiple locations to support nautical charting, coastal engineering, scientific assessments, coastal management, benthic habitat mapping and climate change initiatives. Since 2012 Fugro has operated simultaneous topographic and bathymetric LiDAR systems in France, Japan, New Zealand and the Middle East. Successful results from Japanese coastal areas include returns from the Fugro LADS Mk3 sensor to 50 m while recent surveys in Saudi Arabia had even more impressive results, with 65 m depth returns. The deep water returns combined with high density shallow water and near coastal returns result in a seamless dataset from ridge to deep reef.

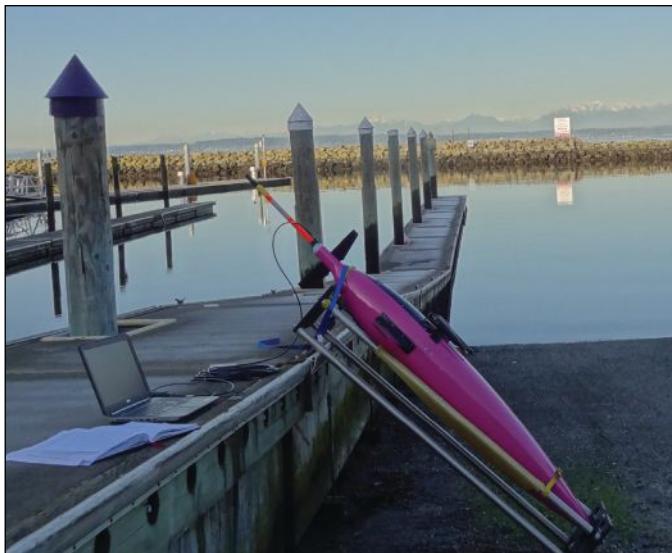
Hydroid announces AUV training schedule for 2015

Hydroid, Inc., a subsidiary of Kongsberg Maritime and the leading manufacturer of AUVs, announced its open enrollment training schedule for 2015. The schedule will feature five unique courses from June through October, and provide participants with operation, maintenance, troubleshooting and navigation skills for REMUS vehicles. All courses are led by Hydroid's expert technicians, and will be held at the company's new manufacturing facility, located at 3 Henry Drive in Pocasset, Massachusetts.

The 2015 schedule and course descriptions are as follows:

- **REMUS 100 Field Maintenance Course** | June 15-19 and September 14-18: This 5-day course is designed to provide REMUS 100 operators with a more detailed view of maintenance procedures and troubleshooting techniques for both onboard maintenance and daily routines. Students who successfully complete course requirements will receive a Field Maintenance Certificate.
- **REMUS 100 Operators Course** | July 13-17: This introductory 5-day program is designed to provide a limited number of attendees with a thorough understanding and hands-on operational experiences required to successfully operate and maintain the REMUS system.
- **NAV-P Course** | October 19-20: This 2-day course is designed for operators that require a greater understanding of the navigation component and accuracies within the vehicle, how it relates to the data collected, and practical guidance on improving and monitoring those accuracies.
- **NAV-Lab Course** | October 21: This course is designed for NavLab users and focuses on the analysis of post processing data from practical exercises to consolidate information learned in the Nav-P Course.
- **Side Scan Sonar Data Interpretation Course** | August 17-19: This 2-day course will focus on sonar operational theory and data interpretation for overall survey, as well as targeted search operations and mapping applications. It will be presented jointly with John Perry Fish, founder of American Underwater Search and Survey.

Kongsberg delivers first glider with Rockland Scientific turbulence sensor



Kongsberg Underwater Technologies, Inc. (KUTI) has announced that they have delivered their first Seaglider™ vehicle equipped with a Rockland Scientific International (RSI) MicroPod™ turbulence sensor. The vehicle was commissioned by University of East Anglia in the UK (UEA).

The MicroPod™ package is the result of extensive collaboration between KUTI and RSI in an effort to develop a sensor solution that is suitable for integration on Seaglider's low drag composite fairing. This sensor configuration minimizes any potential impact on the high glide efficiency of the Seaglider™.

Ocean turbulence is being recognized as an increasingly important parameter for understanding and modeling climate change. It provides a measure of the interaction between the ocean and the atmosphere and thereby the regulation of the oceanic deposition of greenhouse gases, carbon and pollutants. It also controls the exchange of water masses, which affects polar ice melt rates and global ocean circulation. Having this optional sensor package available for Seaglider will greatly enhance the customer's ability to investigate these phenomena.

"This new Seaglider with the RSI sensor will allow us to map ocean turbulence and mixing rates over much wider areas than possible with a traditional microstructure profiler," said Dr. Rob Hall of UEA. "We will use it to map the 3-D structure of internal tide driven mixing around submarine ridges and canyons, and investigate the impact of near-surface turbulence in the Indian Ocean on monsoon dynamics."

Rockland Scientific, based close to KUTI in Victoria, British Columbia, specializes in highly sensitive measurement systems for turbulence in aquatic environments. RSI instruments cover a variety of deployment options, such as vertical profilers, modular sensor payloads, and sensor modules for lakes or laboratory flows. Operating depths are from surface waters to ocean depths of 6,000 m.

The Centre for Ocean and Atmospheric Sciences (COAS) at UEA focuses on regional and global topics in marine and atmospheric chemistry, oceanography and meteorology. Its scientists are at the forefront of research into the role played by the atmosphere and oceans in the Earth's functioning. Their work is a major contributor to international scientific

UNDERWATER INTERVENTION

assessments such as the Intergovernmental Panel on Climate Change (IPCC) and to national and European government policy making.

ASV C-Enduro delivered to Heriot-Watt University

ASV announced the delivery of a C-Enduro unmanned surface vehicle (USV) to Heriot-Watt University's Edinburgh Campus.

Current plans for the part solar-powered vehicle include coastal operations off Scotland's east coast as well as inland loch surveys. The C-Enduro will also be used as a platform for interacting with other unmanned systems such as AUVs.

A spokesman from Heriot-Watt University said, "We acquired the vehicle for the Edinburgh Centre for Robotics, to be used in multi-vehicle research and within the Centre for Doctoral Training in Robotics and Autonomous Systems. It will also be available to researchers from around the UK as part of the National Research Facility, part of the Fields Systems section of the Robotarium National Research Facility."

The 4-m long USV is controlled using the ASView Unmanned Control System which integrates with ROS (Robot Operating System). The vehicle is battery powered and harvests energy from the deck mounted solar panels.

This is the third C-Enduro built by ASV. Other versions of the vehicle feature the three pillar power structure of solar power, a wind turbine and a diesel generator which, when combined, enable very long endurance deployments.

ASV is a leading manufacturer of Unmanned Marine Systems with specialist expertise and experience in USV design, build, operation and maintenance. ASV provides solutions for commercial, defense and scientific applications in the UK and across the globe.

For more information, visit www.asvglobal.com.



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A new generation of trenching

SMD has recently delivered a Q-Trencher 400 telecoms vehicle to United Arab Emirates-based company E-Marine. The vehicle is to be installed on the company's new build CS Maram, E-Marine's dedicated Submarine Cable Installation and Maintenance Vessel currently undertaking dock trials ahead of its maiden voyage later this year.

SMD has supplied E-Marine with the full trenching system, including control system and gantry style telescopic Launch and Recovery System, and has worked closely with E-Marine to integrate the bespoke gantry system into the state-of-the-art cable ship. The Q-Trencher vehicle is rated to 2,500 m water depth and, with high specification Curvetech thrusters, capable of operations up to 4.0 kts.

The last cable maintenance machine of this size was delivered over a decade ago. The Q-Trencher 400 marks a new generation, equipped with SMD's DVECS II advanced vehicle control technology. DVECS II features such as Time Trending, "Point to Fault" and flexibility of the GUI & I/O benefit the pilot, reducing their workload such that operations are performed with increased accuracy and reliability, driving down task-based operational costs.

Established in 1984, E-Marine is the principal provider of submarine cable installation and repair solutions in the Middle East and Sub-Continent region, offering services in the field of Marine Project Management and Consultancy, Marine Route Survey, Cable Freight Management Storage and Chartering. Besides the telecommunication field, E-Marine provides a complete range of solutions to the offshore oil & gas industry. This expansion will help to strengthen E-Marine's presence in the high growth subsea cable market and undertake activities to satisfy demand from telecoms and energy sectors.

As a world leading manufacturer of remote intervention equipment, SMD has been building trenching ROVs for two decades. Its product portfolio



includes the world's largest range of subsea remotely operated vehicles (ROVs) such as work-class and specialist trenching vehicles, and its subsea engineering expertise results from over forty years of experience.

Paul Davison, deputy MD responsible for SMD's subsea trenching business commented, "E-Marine already owns a number of SMD built vehicles, built over a decade ago and its returning custom is testament to our machines' performance and reliability. We are delighted to be working with E-Marine again and hope to contribute to its continuing success."

Omar Jassim Bin Kalban, managing director & chief executive officer of E-marine said, "Our commitment to providing cable owners in the region with optimum solutions is significantly enhanced by the installation of the Q-Trencher 400 vehicle on CS Maram. Its ability to work closely with us to develop and install the bespoke gantry LARS made SMD the obvious choice for supply and one that we believe will help to increase our market share in the region. SMD also offers us access to its global customer support network, as well as excellent simulation and training facilities."

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

Great Eastern Group takes delivery of Seatronics Predator ROV system

Seatronics, an Acteon company with global expertise in marine electronic and subsea survey rentals, is happy to announce that Great Eastern Group (GEG) has taken delivery of two Predator inspection-class ROV systems integrated with SeeByte's SeeTrack CoPilot. The Seatronics and SeeByte collaboration on the Predator offers a complete comprehensive system for ROV inspections.

Great Eastern Group, specialists in global marine engineering, offshore power and subsea telecommunication fiber optic construction will use the Predators to provide enhanced capabilities for their survey and inspection tasks.

The Predator is built for reliability and performance; some of its components are manufactured using nanotechnology and the highest specification materials found in any Inspection-class ROV today.

SeeTrack CoPilot will allow operators to automate inspection tasks using point-and-click software to fly the ROV to any given point. The software allows



pilots to simply click on an area they would like to inspect on the CoPilot interface and the ROV is able to accurately fly autonomously to the location.

Bruce Morris, GEG director of engineering & operations, commented, "We are delighted to be able to offer this marine environment functionality to our customers. We are always looking for ways to deliver quicker, better and more accurate results to our customers and the Predator system does exactly that."

SeeTrack CoPilot is the world's most advanced, easy-to-use, plug-and play software that makes piloting any ROV a much simpler task. SeeTrack CoPilot permits pilot controlled auto-transit and stop-and-hover, while providing automated sonar tracking and movement relative to a target.

The Predator, a 300-m depth-rated inspection class ROV has been developed to meet the demanding markets for rugged and reliable underwater viewing systems. It offers superb in-water power and stability capabilities in a two-man portable package.

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

Ultra Deep Solutions orders new HD ROV

Ultra Deep Solutions (UDS) has secured a new contract for one HD ROV from manufacturer FMC Technologies Schilling Robotics. The 4,000-m rated HD system will be delivered and will mobilize in December 2015. UDS recently announced the new build vessel with Marin Teknikk. The new vessel will feature a MT6023



design with an 18-man, single bell sat dive spread. Vessel specifications are 111.58-m LOA, 23-m beam, grade two DP, 120 beds, 150-tonne crane rated to 3,000-msw, plus 300-msw rated 10-ton crane, and facilities to host the work-class ROVs.

"The purchase of the HD ROV is the first step in our long-term partnership with FMC Technologies Schilling Robotics for growing our fleet in the coming years. These ROVs are recognized in the industry as the most advanced in terms of ease of operation and ease of maintenance, says Shel Hutton, CEO and chairman of Ultra Deep Solutions. "We are very pleased to have been chosen by UDS to supply a piece of equipment as critical as an ROV to their operations. The reliability and performance of the HD ROV was of key importance to them," stated Tyler Schilling, president for FMC Technologies Schilling Robotics.

UDS specializes in the design, construction and operation of world-class ultra deep diving heavy construction vessel to the offshore industry. Their onshore and offshore expertise provides top-class quality offshore-related services/knowledge with excellent high standards. UDS designs and builds "Ultra Deep High Tech" which will be among the largest and most advanced DP3 vessels in the offshore industry. The vessels are designed and built for the worldwide market, including Asia Pacific, African, South American, and the Gulf of Mexico markets.

For more information, visit www.ultradeepsolutions.com.

Millennium Falcon launches X-wing into marine world

The long-term effect of renewable energy installations on marine animals is to be investigated by researchers at Washington University.

The instrumentation package to achieve this comes in a specially designed underwater monitoring system deployed by a Saab Seaeye Falcon ROV.

The launch and delivery platform was dubbed the "Millennium Falcon" by the researchers who saw the detachable instrument pod—called an Adaptable Monitoring Package or AMP—as reminiscent of an X-Wing Starfighter from the Star Wars epic.

"The Adaptable Monitoring Package can gather information in unprecedented detail about how marine life interacts with equipment used to harvest wave

and tidal energy," explains Dr. Brian Polagye, assistant professor of mechanical engineering at the university.

"This is a first attempt at a 'plug-and-socket' instrumentation package in the marine energy field that could change the way industry views environmental research and development," he suggests.

"The breadth of sensors and various conditions that the Adaptable

Monitoring Package can observe is unprecedented," adds Dr. Polagye.

Sights and sounds underwater can be tracked and measured through a variety of instrumentation options.

The AMP has hydrophones to hear marine mammal activity, a click detector to listen for whales, dolphins and porpoises, and even a device to detect fish tags. It also has a sonar system,

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sensors to gauge water quality and speed, and a stereo camera to collect photos and video. A fiber optic cable connection allows for real-time monitoring and control.

Dr. Polagye says the system is unique for its ability to attach to most types of underwater infrastructure, ranging from tidal turbines to offshore oil and gas rigs. This allows researchers to easily deploy the instrumentation far offshore and recover it quickly at a relatively low cost compared with other approaches. Speedy deployment and recovery is possible because the instrument pod attaches to the Falcon for delivery to a docking station, either integrated onto a turbine or other existing subsea infrastructures.

Despite the monitoring package being "about the size of a desk," the researchers were able to fit an off-the-shelf Falcon with five extra thrusters on an external frame for more power to move the mass of the instrumentation package against turbulent currents. Actuators on the vehicle latch the monitoring instruments onto a subsea docking station before the Millennium Falcon disengages, leaving the instruments in place and traveling back to the water's surface.

"This could be a first step toward a standardized 'science port' for marine energy projects," declares Dr. Polagye.

He sees it as a key technology for the future of monitoring for tidal energy systems that will increase the rate of progress in environmental studies, including research around these and other structures that form artificial reefs like oil and gas rigs.

The enterprise is a collaboration project between researchers in Mechanical Engineering and the Applied Physics Laboratory within the Northwest National Marine Renewable Energy Center, a multi-institution organization

that develops marine renewable energy technologies. The centre and the Applied Physics Laboratory recently received \$8 million from the U.S. Navy to develop marine renewable energy for use at its own facilities worldwide. The project leads include Dr. Polagye (Mechanical Engineering), Dr. Andy Stewart (Applied Physics Laboratory), and James Joslin (Mechanical Engineering).

The worldwide success of the Falcon comes from its intelligent control architecture, which provides this kind of exceptional task flexibility, along with the capability to operate in strong currents.

For more information, visit www.seaye.com.

Precision subsea burial of pipelines, umbilicals and cables

Global Marine Systems Limited has extended its subsea capability with the acquisition of a powerful jet trenching ROV. The new submersible complements the existing burial equipment portfolio and is designed for pre- and post-lay trenching as well as simultaneous lay and burial in the offshore subsea cable sectors.

The new addition is the Q1000 Jet Trencher, whose modular design allows it to be easily mobilized onto vessels. With 1,000 hp of total installed and variable jetting power, the ROV is suitable for trenching pipelines, umbilicals and cables to a burial depth of 3 m at a speed of up to 400 m per hour.

Operationally rated to a depth of 1,000 m, the Q1000 is easily configured for use with either tracks or skids to suit the application and can be deployed for trenching operations on all seabed conditions, from fine sand to firm clay. Its state-of-the-art cable detection and tracking system results in time-saving, precision burial. In addition to this, the jet trencher is able to handle product up to 500 mm in diameter, increasing the scope of work that Global Marine is able to undertake.

The high specifications of the Q1000 Jet Trencher will enable the submersible to operate globally in extreme environments and in challenging weather conditions. For this purpose, it has heavy latch beam LARS designed for Sea State 6.

"As a company we constantly seek to find ways to enhance our services, and to provide engineered solutions that meet customers' demands and deliver these with versatility, innovation and accuracy," commented Bruce Neilson-Watts,



director strategy & operations. "It is an approach that has allowed Global Marine to successfully operate in multiple business sectors, even in the present economic climate. The acquisition of the Q1000 is a good example of our continued commitment to providing exceptional subsea engineering services globally."

For more information, visit www.globalmarinesystems.com.

Multimillion pound Norwegian contract extension for Nautronix

Leading provider of through water communication and positioning technology to the offshore industry, Nautronix has been awarded a multimillion pound contract extension to continue to provide survey services to Ocean Installer for the next 3 years.

Nautronix have been growing their survey services division since 2012 and have provided their services to projects world-wide on all Ocean Installer vessels. They have been a key supplier to Ocean Installer in delivering high quality, safe and efficient services to major operators in Brazil, UK, Norway and the USA.

With the growth of Nautronix' survey services division there has been a significant investment in people and equipment, with the division now employing approximately 50 people and owning a significant quantity of survey equipment. By securing this contract, Nautronix can continue to build and develop their survey services division as it looks to further expand the business.

CEO of Ocean Installer Steinar Riise commented, "We have been delighted with Nautronix' performance over the last 3 years and the quality of service they provide is recognized by our teams onshore and offshore. We look forward to continuing our relationship with Nautronix in order to deliver the quality and value our clients expect."

CEO Mark Patterson said, "It has been a pleasure working with the Ocean Installer team. Our goals are aligned and we are working closely to ensure the



end client gets a high-quality, safe and cost-effective solution. This commitment made by Ocean Installer to extend the contract for 3 years is a major achievement for the company and I am delighted that we can continue to grow the division in this challenging market where efficiency and value are key."

For more information, visit www.nautronix.com.

Fincantieri selects Kongsberg hydroacoustic package for new polar reaearch icebreaker

The new RV Kronprins Haakon, the first Norwegian Icebreaker built for Polar research, and the first purpose built polar research vessel since Roald Amundsen's Maud launched in 1917, will start regular scientific cruises in 2017 with a complete hydroacoustic systems package from Kongsberg Maritime. Builder Fincantieri has selected a combined delivery of Kongsberg Maritime survey technology, including a wide range of Simrad scientific research systems for the Kronprins Haakon. Kongsberg Maritime will also supply an extensive K-Bridge system to meet the complex navigation needs of this sophisticated new research vessel.

The building of Kronprins Haakon will start in June this year in Italy. The vessel will be operated by The Institute of Marine Research (IMR) under ownership of the Norwegian Polar Institute. Its homeport will be Tromsø in Northern Norway, where its third and biggest user, The Arctic University of Norway (UiT) is based. As one of the

most advanced polar research vessels ever built, Kronprins Haakon will become integral to gaining a greater scientific understanding of the polar and global environment.

The KONGSBERG scope of supply covers deep and medium depth multi-beams for bottom mapping including the EM 302, EM 710 and EA 600, while systems such as SBP300 and TOPAS can be used to look at subbottom structures. Position reference will be provided by the state-of-the-art and industry standard HiPAP 501 system. Also part of the delivery is the KONGSBERG series of Simrad scientific systems, including a new EK80 wideband single beam system, modern scientific multi-beam systems ME70 and MS70, and omnidirectional sonars SH90, in addition to the new SU90 that can detect and track biology for several kilometres around the vessel. Kronprins Haakon will also carry the new Simrad FX80 trawl monitoring system, which can provide a live camera feed from the vessel sampling trawl.

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

World-first and new standard achieved in floating LiDAR as AXYS selects ZephIR 300

AXYS Technologies Inc. (AXYS) has achieved a world-first that is likely to become the new standard in floating LiDAR devices by deploying a dual ZephIR 300 arrangement on the leading WindSentinel buoy. The WindSentinel "floating laboratory" delivers a customized full suite of meteorological and metocean data, in addition to the wind speed & direction data used for resource assessment, to better inform the development of offshore wind farms.

The AXYS WindSentinel combines the well-proven NOMAD buoy designed to perform in harsh marine weather and the ZephIR 300 continuous wave (CW) wind LiDAR with more than 200 individual IEC compliant performance validations. The AXYS design philosophy for reducing risk associated with met data acquisition provides dual or even triple redundancy on all major components. Further, the inclusion of two wind LiDARs allows for staggered servicing of the wind measurement sensors to permit continuous data capture during the campaign.

Terry Tarle, president & CEO at AXYS commented on the world-first launch, on show at Ocean Business

2015, Southampton, UK: "Every element of our WindSentinel floating LiDAR buoy aims to include the best-in-class of each and every sensor, cable and connector. ZephIR 300 is a proven market leader in the LiDAR sector and providing clients with an option for dual deployment really does offer an unparalleled level of risk reduction. We are also pleased to now offer 'Data as a Service' to the industry with no need to acquire technology, just the high quality data it provides. We can mobilize to any site, anywhere."

ZephIR 300, a continuous wave (CW) wind LiDAR provides high-resolution measurements at an unmatched data rate of 50 Hz. Every second, 50 points are measured in the free space targeted by the sensor, and chosen by the user, anywhere from 10 m (33 ft) up to 200 m (656 ft). This type of CW wind LiDAR gives very accurate measurements of the wind speed, direction and other characteristics including Turbulence Intensity (TI). ZephIR 300 is also the single most validated wind LiDAR at a consistent IEC compliant met mast site.

Ian Locker, MD at ZephIR LiDAR welcomed the news: "We have been working with AXYS since 2007 where we installed ZephIR offshore on a purpose-built meteorological station. Almost a decade later and AXYS are now delivering fleets of their WindSentinel floating LiDAR buoys for offshore wind resource assessment at a fraction of the cost, and time, of a traditional fixed met mast. This new standard for dual ZephIR 300s provides real benefit in continuous data capture even during service periods which can be made out of sync."

For more information, visit www.axystechnologies.com.



Tampnet, Marlink sign partner agreement for offshore 4G services

Marlink and Tampnet have signed a partner agreement for the delivery of offshore LTE-based services in the North Sea. The agreement forms the foundation for Marlink to integrate cutting-edge, low-latency 4G services into its established VSAT and MSS portfolio, which is used by Marlink equipped offshore support vessels for operational and crew communication in the North Sea. By adding 4G services to the connectivity portfolio, Marlink can better serve vessels in the North Sea by providing them the best available connectivity at any time regardless of where they sail. A key aspect of Tampnet's 4G infrastructure service for offshore communication is low latency, with Round Trip Delay between offshore vessels and client corporate offices expected to be no more than 25 to 35 ms, depending on where they are located. This supports a high-quality user experience for diverse applications where lower latency can improve performance, such as video calling or machine-to-machine communication on critical, specialist operations. By adding 4G as another carrier to the Marlink connectivity portfolio, offshore customers can benefit from much higher throughput compared to other carriers in remote locations. Tampnet's 4G service is built on top of its offshore core network consisting of 2,500 km of offshore fiber. This core network connects the producing oil platforms in the North Sea, delivering 4G connectivity to rigs, vessels and anything else of a mobile nature at sea via base stations mounted to rigs and other fixed installations. Tampnet is building a single LTE based network covering the Norwegian, British and Danish sectors of the North Sea, enabling vessels to move freely from different areas of operation without losing connectivity. The technology is as flexible as the 4G mobile technology used onshore and planned roaming agreements will enable vessels to retain their connectivity near the coast and in port.

EMC to acquire MTN

Emerging Markets Communications (EMC) has signed a definitive merger agreement to acquire MTN Communication. The combined entities bring together the most talented and experienced professionals in the remote communications industry, servicing land and maritime-based customers, with a transformative suite of network products and services for businesses and people, connecting in hard-to-reach places or on the move. The acquisition will benefit the organizations' combined 1,600 vessels and more than 8,000 land-based customer sites in the most hard-to-reach places on all continents and in every ocean. Customers will represent multiple verticals, including maritime, energy, cruise lines and ferries, yachts, non-governmental organizations, telecommunications providers, global enterprises and governments. The combined entity will be one of the largest independent providers of satellite connectivity services for both land-based sites and maritime vessels, worldwide. The company will also be the largest provider of connectivity services, in some of the most strategic verticals within the satellite industry, backed by ABRY Partners, a private equity firm specializing in funding some of the most successful communications companies in North America, with more than \$42 billion of completed transactions. EMC and MTN have proven track records of delivering a broad range of transformative communications solutions. They bring faster, more efficient Internet, content and cellular services—including voice, text and 3G Internet access—for business, personal and critical missions. The acquisition will leverage patented and patent-pending solutions, including optimization, cloud computing and hybrid networks. This complementary acquisition will expand global footprints, service centers and teleports, and invaluable products. EMC's global infrastructure features 52 field support centers, three wholly-owned teleports, and global satellite capacity available in C-Band, Ku-Band and Ka-Band, enabling fast installations and response times for customers worldwide. The company's value-added services leverage patented technology and have transformed the industry with products such as SpeedNet®, a cloud-based browser providing a faster Internet experience over satellite. The agreement is subject to regulatory review and other customary conditions, and is expected to close by second quarter of 2015.

KVH launches global conference series



Photo Courtesy of Vroon

KVH Industries, Inc., KVHI, has launched the 2015 Maritime Connectivity Conference Series to inform maritime professionals about the essential trends in connectivity, big data, and training that are transforming the industry. The inaugural event took place in Limassol, Cyprus in April, and included presentations from experts in the areas of connectivity and content delivery, maritime training, voyage optimization, electronic chart data access, and options for addressing crew entertainment.

"With the exploding demand for broadband at sea coupled with the challenges of controlling costs in a competitive market, commercial maritime operators are exploring the best resources for leveraging modern satellite communications services to improve their fleet operations," said Martin Kits van Heyningen, KVH chief executive officer. "By bringing together industry experts in key ports worldwide, we hope there will be a good exchange of information so operators can take action."

The series is intended for maritime professionals, including ship masters, fleet operators, personnel and manning professionals, fleet managers, and maritime IT and communications professionals.

The events are structured to include presentations by experts at Videotel™, a KVH company in the forefront of maritime e-Learning; Transas, a top producer of electronic chart display and information systems (ECDIS) and provider of electronic navigation charts; Jeppesen, a leading producer of electronic navigation charts and digital navigation solutions; and AWT, a marine industry leader in weather forecasting and ship routing. Videotel, Transas, Jeppesen, and AWT are operations-content partners with KVH's breakthrough new content delivery service, IP-MobileCast™, which utilizes multicasting technology to deliver large amounts of content to many ships at once, overcoming the prohibitively high satellite communications costs typically charged to deliver files for individual use.

The events will also feature connectivity experts from KVH's mini-VSAT Broadband satellite network, content-delivery experts from KVH's IP-MobileCast content delivery service, and entertainment content specialists from KVH Media Group, a leading provider of entertainment content for

the maritime industry. Hands-on demonstrations of the IP-MobileCast service are available as well. KVH is unique in the maritime industry for offering a complete maritime connectivity solution that includes satellite communications antenna hardware, network management hardware, connectivity, commercially licensed content, and content delivery.

For more information, visit www.kvh.com.

MTN delivers UltraBurst for yachts this Mediterranean Season

MTN Communications announces the launch of MTN UltraBurst for yachts for the 2015 Mediterranean Season. The MTN UltraBurst service delivers the only on-demand, consumption-based, high-throughput Ku-band connectivity solution available to yachts today. The satellite bandwidth “burst ability” of this service is ideal for streaming content and media to user devices and systems on board yachts. Customers can use their existing antenna hardware. This is key to delivering the fastest speeds, on demand, at the

best value while meeting customers' lifestyle and communications needs.

MTN UltraBurst enables yacht captains and electronic technical officers (ETOs) to select the highest-speeds available whenever needed through a touchscreen via the MTN Maestro mobile app—MTN Conductor. They can make UltraBurst available down to specific users and devices on their networks. MTN Conductor makes managing and optimizing multiple networks on board a yacht as simple as a swipe or click.

“We are able to introduce this level of control and on-demand speeds because we directly own, manage and operate the industry’s most powerful communications and content delivery network,” said Derik Wagner, managing director, yacht services, MTN. “This is one more service from our unmatched technology toolkit designed to exceed the needs of the world’s most bandwidth-intensive yachts. It also extends our ability to offer on-demand, consumption-based plans in one more maritime market. This model provides the most flexibility, while delivering the fastest speeds, at the best value and

price, where customers pay only for what they use.”

Each yacht captain or ETO can customize or manage their UltraBurst service to the needs of their owners and guests with mode controls via MTN Conductor. This helps with “owner/guest on” and “owner/guest off” bandwidth demands. It also takes managing the Quality of Service (QoS) configuration of onboard networks to a new level. Captains and ETOs only use bandwidth bursts when needed, while staff maintain their same levels of operational tasks and crew welfare services.

MTN, the chosen provider to 300+ of the world’s largest yachts, has accommodated an increase of more than 200% in bandwidth usage in the past 2 years in the Mediterranean region. MTN custom-designed UltraBurst to address the needs of customers requiring such on-demand high-speed services on short notice.

This service launch is the first of many high-speed options MTN plans to roll out, including its High-Throughput Multi-Spot Beam (MTN HTMS™) capacity, beginning in 2016.

For more information, visit www.mtnsat.com.



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MCP and TMR integrate to seize communications opportunities

Telenor Maritime Radio's (TMR) business unit for the commercial maritime communications market, MarCom, will integrate with Maritime Communications Partner (MCP). The internal transfer in Telenor, effective from 1 June 2015, strengthens MCP with expert competence on maritime communications, new products and solutions, better coverage and the opportunity to maintain growth in Europe and the US with further expansion into Asia.

MarCom, with a Nordic focus, has delivered satellite communication to ferries and other vessels, whereas MCP has delivered mobile coverage globally to three main segments: cruise, ferry and the offshore market.

"We are developing our technology portfolio to address a bigger market in the maritime industry that consumes ever more bandwidth. We are integrating satellite and mobile to ensure the best possible customer experiences. Additionally, we will be able to increase the efficiency of and develop the whole value chain resulting in cost-efficient solutions," said MCPs CEO Frode Støldal. "Innovation has always been key for Telenor and MCP, recently demonstrated by the news MCP is building the largest 4G offshore network in the world."

Fifteen MarCom employees transferred to MCP, with offices in Bergen and Stavanger, in addition to the existing offices in Arendal and Ft. Lauderdale, U.S. TMR's Coastal Radio unit continues in Telenor Norway operating VHF, MF, Navtex and handling of certificates, radio inspections and licenses.

For more information, visit www.mcp.com.

Industry report confirms KVH leads the maritime VSAT market

The mini-VSAT Broadband(sm) service of KVH Industries, Inc., has been cited in a newly published report as the market share leader in the maritime VSAT industry by vessels in service. "The COMSYS Maritime VSAT Report, 4th Edition" estimates that KVH's mini-VSAT Broadband customers account for 17.9% of the vessels using maritime VSAT service, as of the end of 2014. According to COMSYS, KVH's market share is nearly double the nearest competitor, whose cus-



tomers account for an estimated 9.6% of vessels using VSAT service.

"KVH's success in building the largest installed base of vessels over little more than 6 years from a standing start illustrates how powerful the combination of a smaller antenna, easier installation and better onboard integration can be," reports Simon Bull, the well-respected VSAT industry analyst at COMSYS, the U.K.-based research firm specializing in the satellite communications market. "The past 2 years have seen the company introduce a range of attractive value-added services and invest heavily in content and integration in an impressive strategy to establish itself as much more than just a bandwidth reseller."

KVH launched the mini-VSAT Broadband service in 2007 and designed it from the ground up to be a next-generation maritime satellite communications solution, utilizing advanced spread spectrum technology that enables KVH's TracPhone® V-IP antenna systems to be 85% smaller than competing maritime VSAT products, thereby reducing the installation time and cost for maritime customers. The mini-VSAT Broadband service provides fully global coverage from 24 satellite transponders; is very fast, providing Internet downloads as fast as 4 Mbps; and has low latency, making it ideal for new applications being adopted by leading ship management companies.

"It is great to see one of the most highly regarded research reports in the satellite communications industry quantify KVH's success in winning the maritime VSAT market leadership position," said Martin Kits van Heyningen, KVH chief executive officer. "We've listened carefully to our customers and tried to continually improve our service to provide them with the connectivity and content services they need to add

value for their customers, enhance their efficiency, and keep their crews happy. Our strategy is clearly paying off, as 2014 was a record-breaking year for the company, during which our global mini-VSAT Broadband network delivered more than 500 terabytes of data and 25 million minutes of voice calls to our customers around the world."

To better serve maritime customers in their need to affordably bring entertainment and operations content onboard ships at sea, KVH developed the IP-MobileCast™ content delivery service. This service utilizes multicasting technology to broadcast large files to all ships at once, an efficient and cost-effective delivery method that stands in stark contrast to most competitors' current practice of unicasting files individually to each vessel and charging them for the satellite service consumed. With IP-MobileCast, customers pay a monthly subscription fee for entertainment and news content—new-release Hollywood movies and TV shows, for example—but do not pay a data transmission fee.

KVH is also collaborating with leading maritime navigation and weather content providers such as Jeppesen, Transas, and AWT to deliver electronic charts and high-resolution weather data via the IP-MobileCast content delivery service. Aware of the importance of seafarer safety and professional qualifications, KVH also plans to provide multicasting delivery of maritime training content from Videotel™, a leader in maritime training and a company that KVH acquired in July 2014.

COMSYS notes strong overall growth in the maritime VSAT market, estimating close to 21,000 vessels were equipped with maritime VSAT as of the end of 2014. It attributes this growth to changing attitudes within shipping companies about the return on investment of satellite connectivity and to the realization that improved communications and Internet access for crews can save them money.

For more information, visit www.kvh.com.

Speedcast partners with Thuraya to expand product portfolio

SpeedCast International Limited has established a distributor agreement with Thuraya Telecommunications Company. The new agreement brings new options for satellite mobility solutions for SpeedCast's global customer

base and expands SpeedCast's mobility product portfolio.

Under the agreement, SpeedCast will now have access to Thuraya's portfolio of innovative mobile satellite products and services, including Thuraya SatSleeve, XT satellite phones, land and maritime broadband terminals. The agreement further allows SpeedCast to distribute Thuraya mobile satellite products and services throughout its reseller and end-user customer base. The expanded portfolio will offer SpeedCast's customers with an even broader range of solutions to meet their communication requirements, particularly for the maritime, energy and enterprise sectors.

This new agreement follows SpeedCast's announced acquisition of Geolink Satellite Services in February, a specialist in mobile satellite services, which will further enhance SpeedCast's mobility products and services in the Middle East and African regions.

For more information, visit www.speedcast.com.

Arianespace launches maritime communications satellite

Arianespace extended Ariane 5's track record of success with another heavy-lift mission performed from the Spaceport in French Guiana, which launched a mixed payload of commercial and military telecommunications satellites—including the THOR 7 maritime communications satellite—for European operators.

Both spacecraft were deployed following their ascent from the Spaceport's ELA-3 launch zone, with THOR 7 released some 28 minutes after liftoff, and SICRAL 2 separating approximately 6 minutes later to complete the flight sequence.

Ariane 5 delivered an estimated total lift performance of 9,850 kg, including its two passengers and hardware for the launcher's dual-payload deployment system. This mission—designated VA222 in Arianespace's numbering system—was the 222nd launch of an Ariane-series vehicle since 1979, and the 64th consecutive success for Ariane 5, as well as its 78th flight overall.

THOR 7 was built by SSL (Space Systems/Loral) for operation by Telenor Satellite Broadcasting, a major European satellite provider of broadcast and data communication services for customers in the broadcast, maritime, and oil and gas markets.

To operate from an orbital slot at .8 deg. West longitude, this spacecraft will serve the maritime sector—offering high-powered coverage over the North Sea, the Norwegian Sea, the Red Sea, the Baltic Sea and the Mediterranean. A Ku-band payload for broadcast and television services in Central and Eastern Europe also is incorporated in the relay platform.

For more information, visit www.arianespace.com.



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IMSO formally starts evaluation of Iridium as GMDSS provider

On 4 February 2014, the International Mobile Satellite Organization (IMSO) director general launched a Consultancy Programme inviting appropriate experts to assist in the evaluation of mobile satellite communications systems for the GMDSS. The IMO Maritime Safety Committee, at its 94th session in November 2014, agreed that IMSO should undertake the technical and operational evaluation of the Iridium mobile satellite system to assess compliance with the relevant criteria for recognition as GMDSS satellite provider, noting that IMSO would convene a Group of Experts from the Consultancy Programme.

IMSO has formalized an agreement with Iridium Satellite LLC to perform such technical and operational evaluation and the IMSO director general has reported progress to the IMO Sub-Committee on Navigation, Communication and Search and Rescue (NCSR 2), held in London from 9-13 March 2015.

Captain Esteban Pacha informed NCSR 2 in relation to the appointment of the Group of Experts which was composed of professionals with extensive experience on all the different elements that have been identified by IMO to cover issues related to Earth Stations, space segment, mobile terminals, terrestrial networks, GMDSS and search and rescue communications.

The Group is expected to complete an evaluation report to be presented by the IMSO Director General for consideration by the next session of the IMO Subcommittee on Navigation, Communications and Search and Rescue (NCSR-3) to be held in 2016. The Group of Experts will organize its own work through the Project Administrator under the coordination of the IMSO director general in the most cost-effective manner.

The scope of the technical and operational evaluation will be to assess compliance with the criteria set out in IMO Resolution A.1001(25) on criteria for the provision of mobile satellite communication systems in the Global Maritime Distress and Safety System (GMDSS).

For more information, visit www.imso.org.

Kymeta, Airbus to deliver mTenna™ antennas to market

Kymeta Corporation and Airbus Defence and Space announced a partnership in which Airbus intends to sell

Kymeta's new mTenna™ satcom antennas in key markets on an exclusive basis. In the deal, Airbus Defence and Space has plans to purchase maritime terminals, which will be combined with compelling new service offerings and made available to the commercial shipping and super-yacht market.

As part of the new agreement, Airbus Defence and Space is providing Kymeta with key strategic and market inputs to assist in developing mTenna systems for the maritime market, as well as providing pilot customers for a forthcoming testing program.

Kymeta's new mTenna suite of satellite antennas are based on electromagnetic metamaterials technology. These ultra-thin antennas use a holographic approach to electronically acquire, steer, and lock a beam to any satellite. Kymeta's flat, light and low-cost satellite tracking antennas are designed to work seamlessly with Intelsat's current generation satellite fleet and next generation EpicNG, and are ideal for many users in a variety of communications markets where traditional antennas are not currently practical or feasible.

For more information, visit www.kymetacorp.com.

RigNet signs contract for services on offshore drilling rig

RigNet, Inc. has signed a 3-year contract with a Norwegian international midwater drilling contractor to deliver managed network communications solutions on a semi-submersible offshore drilling rig in the North Sea.

"We are very pleased to add this offshore driller's semi-submersible to the RigNet network," said Øyvind Folge, region vice president, Scandinavia and Europe. "We look forward to demonstrating the superior value proposition that RigNet offers around reliable connectivity and a growing array of value-added solutions that addresses the acute needs of the demanding oil and gas community."

A high-performance and secure network is a high priority for the oil and gas community, ensuring effective and reliable communications, both offshore and onshore, and access to business-critical IT applications. Through this contract, RigNet is delivering a fully-managed end-to-end IP network solution using VSAT technology for last-mile connectivity. RigNet's fully managed network solutions ensure that the rig derives greater value from network services through increased standardization and innovation. The solution

includes CrewWifi, VoIP, enterprise data and Internet access services supported by 24/7 network monitoring and support from RigNet's Network Operations Center and, if required, local field technician support, with backhaul to the company's offices via MPLS connection. The end user experience is improved through a WAN optimization service powered by Riverbed® Steelhead® appliances.

For more information, visit www.rignet.com.

Panasonic to acquire ITC Global

Panasonic Corporation and ITC Global announced that they have entered into a definitive agreement for Panasonic to acquire ITC Global, a leading provider of satellite communication services for the maritime, energy and mining markets. Founded in 2001 with regional headquarters in Houston, Texas; Sion, Switzerland; and Perth, Australia, ITC Global serves customers at more than 1,200 remote sites across 70 countries and all the world's oceans.

Panasonic, through its subsidiary Panasonic Avionics Corporation, is a leading provider of inflight communications and entertainment systems to the aviation market. By combining complementary strengths, ITC Global and Panasonic Avionics will become a new leader in global satellite services poised to support long-term customer requirements as demand for bandwidth and efficient, reliable communications solutions continues to grow across the maritime, energy, mining and aviation markets. Panasonic Avionics' satellite network already covers 99% of all airline flight hours and 98% of all maritime traffic routes, and the organization is in the process of adding High Throughput Satellite capacity that will wrap around the globe.

Upon the closing of the acquisition, ITC Global will become "ITC Global, A Panasonic Company" and will operate as an independent unit of Panasonic Avionics. ITC Global will continue to execute its current strategic plan under the leadership of Joe Spytek, ITC Global's founder and chief executive officer, who will report to Paul Margis, president and chief executive officer of Panasonic Avionics. ITC Global's management team will remain in place and will continue to focus on its customers in the energy, mining, and maritime markets, while Panasonic Avionics will remain dedicated to its customers in the aviation market.

For more information, visit www.panasonic.net.



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Skagerrak 4 inaugurated

Prysmian Group announced that Skagerrak 4, the High Voltage Direct Current (HVDC) cable system interconnecting Norway and Denmark, is ready for commercial operation. Prysmian was awarded the contract for the land HVDC cable system for the Skagerrak 4 interconnection between Norway and Denmark worth approximately €40 M by the Danish transmission grid operator Energinet.dk in January 2011. The contract comprises the supply, jointing and testing of 92 km of 500-kV mass-impregnated underground cable system and related accessories, with a transmission capacity of 700 MW, made at Prysmian's manufacturing facility in Arco Felice (Naples, Italy). The realization of Skagerrak 4 had been agreed upon by the Danish and the Norwegian transmission grid operators Energinet.dk and Statnett in order to increase the capacity of the power transmission system between Norway and Denmark, thus enhancing the efficiency and competitiveness of the Nordic electricity market. Moreover, the project contributes to the development of a more environmentally-friendly power market in Europe, by supporting the export of renewable energy produced in Norway and the growth of wind power generation in Denmark. In addition to Skagerrak 4, Prysmian has recently announced the successful commissioning and hand over of two HVDC offshore grid connections in Germany (BorWin2 and HelWin1) and official inauguration of the land HVDC interconnection between France and Spain, INELFE. A further two DC offshore grid connection projects, SylWin1 and HelWin2, are near completion and are scheduled to take up commercial operation within the first half of 2015. Prysmian is currently implementing the HVDC cable systems for the DolWin3 and BorWin3 projects.

Transatlantic cable supply contract comes into force

AquaComms Limited has brought its contract into force (CIF) with TE SubCom, a TE Connectivity Ltd., which has begun manufacturing on the America Europe Connect (AEConnect) subsea fiber optic cable system. AEConnect is scheduled to be ready for service in December 2015, as the latest transatlantic subsea fiber optic cable system connecting North America to Europe with unprecedented capacity and reliability. AEConnect will land in Shirley, NY, and Killala on the West Coast of Ireland, spanning more than 5,400 km with stubbed branching units for future landings, and will use CeltixConnect, an Irish Sea subsea cable wholly owned by AquaComms, to provide extended connectivity to London and greater Europe. AEConnect will utilize the latest optical technologies to provide the most advanced subsea telecommunications system, coupled with a control plane based on innovative Software-Defined Networking (SDN) technologies to serve bandwidth-intensive applications. Featuring the latest technology of 130 Gbps x 100 Gbps per fiber pair, AEConnect will provide low latency connectivity to satisfy the bandwidth requirements of global data centers, cloud-based networks and content providers. AEConnect is a product of partnerships with TE SubCom and key customers. The initial project cost is expected to be \$300 million and is funded in part through a debt offering arranged by Nomura. "AquaComms' strategy is to build and operate a diversified, solution-based network, providing term and peak capacity product offerings and working in partnership with its contractors, equipment suppliers, backhaul network providers and customers to support the U.S. and Europe's expanding data requirements of today and for tomorrow, ultimately offering 'infrastructure-as-a-service,'" says Greg Varisco, COO of AquaComms. "AEConnect is currently being constructed using state-of-the-art technology, with 100G-coherent design for low latency, reliable delivery for even the most bandwidth-hungry applications and direct data center to data center connectivity across the Atlantic." "With explosive data growth comes significant demand for SubCom's capabilities," said Aaron Stucki, CEO of TE SubCom. "The AEConnect cable system will provide the infrastructure necessary to support Europe's expanding data needs and we look forward to working with AquaComms on their future builds."

Jan De Nul to install Burbo Bank cables



Jan De Nul Group has secured two contracts with Dong Energy to execute cable installation works for the Burbo Bank Extension Offshore Wind Farm in Liverpool Bay—one for the installation of the export cables and one for the installation of the infield cables.

Jan De Nul Group will install and bury the 25 km export cable between the offshore transformer platform and the beach as well as the 32 infield cables between the wind turbines and the offshore transformer platform, including crossing and protection of existing cables and pipelines.

For both installation works, which will take place during spring and summer 2016, Jan De Nul Group will use its Cable Laying Vessel Willem de Vlamingh. The burial of the export cable will be executed by Jan De Nul Group's Trailing Suction Hopper Dredger modified with side installation pipe and for the trenching of the infield cables Jan De Nul Group will use its subsea trencher UTV1200.

In March, DONG Energy also awarded the export cable installation (laying and burial) for the Race Bank Offshore Windfarm for which Jan De Group during summer 2016 will use its new Cable Laying Vessel Isaac Newton.

For more information, visit www.jandenul.com.

New course to support power cable operations

Offshore Marine Academy (OMA), the leading renewables training operator, has unveiled a brand new course for 2015 tailored to address the knowledge and skills gap in subsea power cable operations.

OMA's 'Understanding Subsea Power Cables' course, which launched earlier this month, will ensure personnel are trained in the use of subsea power cables as well as understand the problems and faults that can occur.

It has been developed in partnership with OMA's sister company, Offshore Marine Management, as well as other offshore contractors who have many years of experience in subsea cable operations across the offshore renewables, telecoms and oil and gas industries.

Refined from a similar course previously provided by OMA in South America, the 'Understanding Subsea Power Cables' course has been tailored to reflect specific requirements from clients spanning the Americas, the Middle East and Europe—ensuring it appeals the global offshore energy industry. The courses content now focuses on historical devel-

opments of subsea power cables, and installation techniques to operations and maintenance and legal and environmental considerations.

Antony Lewis, business manager at OMA, said, "As the face of offshore energy changes and the number of personnel required in the industry increases, there was a clear need for us to amend our previous course to ensure personnel working across the sector have a thorough understanding of the use of subsea power cables. It was vital we developed a course to meet the required knowledge and skills, increasing the know-how of front line personnel and those managing projects. The industry can benefit from the cost reductions associated with an increased knowledge base and awareness of historical lessons learnt which facilitates an effort to reduce remedial works during cable installation projects," he said. "Those attending the course can expect to gain a robust understanding of the practical application of subsea power cables as well as an in-depth insight into the industry, enabling them to work more confidently."

The "Understanding Subsea Power Cables" course runs over a number of days and can be delivered onsite or at an organization's offices by experienced industry trainers with first-hand knowledge of the offshore energy sector.

Lewis added, "Our original course was well received and we are excited to be able to offer this refined course to personnel across the wider market. Companies with a desire to enter the market should look towards such courses to make this process as streamlined as possible."

For more information, visit www.offshoremarineacademy.com.

Siemens hands over world's largest offshore grid connection

Siemens has handed over SylWin1, the third North Sea grid connection this year, to its customer TenneT. The German-Dutch transmission grid operator has now put the world's most powerful grid connection to date into commercial operation. The offshore platform of the SylWin1 grid connection is located around 70 km west of the island of Sylt, after which the project was named. The electricity generated by wind power is transmitted over a more than 200-km subsea and underground cable link to the land-based station Büttel. Up to 864 megawatts (MW) of green electricity can now be transmitted with this grid

connection—enough to supply more than a million German households.

Electricity from the three wind farms Butendiek, DanTysk and Sandbank is transmitted to the mainland via the SylWin1 grid connection. Siemens installed the grid connection in high-efficiency DC technology for network operator TenneT. The combined total of 232 Siemens wind turbines linked to the

grid connection will provide enough electricity to supply more than one million households in the future. From the platform, there are wind turbines in view as far as the eye can see.

"This year we have completed the world's first three offshore grid connections with efficient direct-current technology—SylWin1, BorWin2 and HelWin1. We also intend to put the

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A large ship is shown laying a long subsea cable across the ocean floor. The OSI logo, featuring two dolphins above the letters 'OSI' in blue, is prominently displayed at the top. Below the logo, the text 'Subsea Networks connecting your business' is written in yellow. The word 'Globally' is overlaid on the left side of the ship, and 'in the Field' is overlaid on the right side. At the bottom, the text 'Network development from business plan to commissioning' is written in yellow, and 'at Depth' is written in white. A QR code is located in the bottom right corner.

fourth project HelWin2 into commercial operation as planned in the coming weeks," stated Jan Mrosik, CEO of the Siemens Energy Management Division. "2015 is a special milestone year for TenneT," emphasized Lex Hartman, member of the managing board of TenneT TSO GmbH, "as we will be completing further offshore grid connections by the end of the year, meaning that all in all we will have implemented a capacity of more than 5,000 MW, or more than two-thirds of the offshore expansion goal set by the Federal German government by then." The government's offshore expansion goal aims at implementing 6,500 MW by 2020.

The three offshore wind farms DanTysk, Butendiek and Sandbank, each with a capacity of 288 MW, are linked to SylWin1. DanTysk and Butendiek both consist of 80 Siemens wind turbines, each rated at 3.6 MW. Sandbank will be realized with 72 Siemens wind turbines in the 4-MW class. At present, more than 100 wind turbines are already linked to the grid connection, with new turbines being connected almost on a daily basis. Under optimal wind conditions, such as those which the low-pressure storm front Niklas brought with it recently, a capacity of 350 MW was already transmitted via the SylWin1 grid link.

Transmission system operator TenneT contracted the consortium comprising Siemens and the Italian cable specialist Prysmian for the HelWin1 offshore grid connection early in 2011. The offshore platform was built by Nordic Yards in Germany. In total, Siemens has been awarded five North Sea grid connection projects by TenneT: HelWin1 (576 MW) and HelWin2 (690 MW) off of Helgoland, BorWin2 (800 MW) and BorWin3 (900 MW) off of Borkum and SylWin1 (864 MW) off of Sylt. Three of these, BorWin2, HelWin1 and SylWin1, have already taken up normal operation.

The fourth grid connection HelWin2 is scheduled to take up commercial operation in the first half of 2015 as well. Siemens received its latest order for a grid connection in the North Sea, BorWin3, in a consortium with Petrofac in the spring of 2014. Commissioning of this fifth grid connection from Siemens is scheduled for 2019. The grid connections implemented by Siemens for TenneT will have a total transmission capacity of more than 3.8 gigawatts (GW), providing electricity from offshore wind power to supply nearly five million households.

Thanks to the Siemens high-voltage direct-current (HVDC) technology, transmission losses for each grid connection, including cable losses, are less than 4%. This Siemens HVDC technology is installed on the offshore platforms and in the land-based converter stations. The wind-based electricity is transmitted as alternating current to the converter platform, transformed into direct current and fed to the mainland via a subsea cable. The land-based station converts the direct current back into alternating current and feeds the electricity into the extra-high voltage grid. HVDC is the only efficient transmission solution for cable lengths of more than 80 km.

The HVDC Plus technology used by Siemens is less complex and extremely compact, making it predestined for use in sea-based applications. In contrast to classic HVDC technology used in a vast majority of land links, systems equipped with HVDC Plus feature self-stabilization. As fluctuations in the grid must always be reckoned with for wind-based power generation, grid stability and reliability is enhanced considerably through the use of the Siemens HVDC Plus technology.

For more information, visit www.siemens.com.

TenneT starts online consultation process for offshore electricity grid

A special website has been created by European energy grid operator TenneT that allows relevant stakeholders to provide feedback on the development of an offshore electricity grid.

For some time, TenneT has been consulting stakeholders on technology and planning. The overall goal of this process is to optimize, together with stakeholders, the offshore grid configuration and realization against minimum societal cost. By collaborating from the start with energy producers, suppliers, NGO's, the Ministry of Economic Affairs, the Ministry of Infrastructure and the Environment and other parties, TenneT ensures transparency and a feasible concept for an offshore electricity grid that can be used to connect future wind farms to the onshore grid. TenneT recently engaged consultancy firm Ecofys to provide support during the consultation process, in order to facilitate a successful first call for tenders by the end of 2015.

Relevant stakeholders can register via a dedicated website

www.tennet.eu/nl/offshore-grid-nl.html to keep informed on the consultation process. The website will also be used to post information about the topics currently on the agenda, the choices made, and the considerations underlying them. Stakeholders can also consult the website for an overview of scheduled expert meetings. All feedback and information submitted will be documented anonymously and used in the decision-making process.

TenneT will organize monthly meetings on topics relevant to the development of wind farms, such as technology and planning. A limited number of experts will be invited to attend these meetings to facilitate a detailed discussion of key issues related to the development of the offshore electricity grid. The list of invitees has been coordinated with the Ministry of Economic Affairs and the Netherlands Wind Energy Association (NWEA). All information, reports and position papers will be published on the website after the expert meetings have been held.

By means of the National Energy Agreement, the Dutch government wants to achieve a substantial increase in the share of wind energy in the Netherlands. To increase offshore wind energy capacity, the government has designated three zones in the North Sea for the development of new wind farms. After the wind farms have been constructed, they will be connected to the national transmission grid by means of an offshore electricity grid. In 2014, Minister Kamp of Economic Affairs took a so-called "directional decision" to appoint TenneT as the operator of this offshore electricity grid. In order to maintain the required pace, TenneT is taking its responsibility and making the necessary preparations in anticipation of its statutory appointment as the offshore grid operator.

TenneT regards collaboration between all offshore wind energy stakeholders as a crucial element in the government's new policy approach. TenneT involves stakeholders at an early stage to ensure that the offshore grid is developed in the most efficient way possible. During the preparation phase, there are ongoing consultations with the Ministry of Economic Affairs, the wind farm developers and other stakeholders. In constructing the connections and platforms, TenneT wants to reduce environmental impact while creating the broadest possible public support. TenneT is

also working with the NGO Natuur & Milieu and other organizations to minimize any impact on the human environment and existing flora and fauna.

A coordinated approach to connecting offshore wind farms will lead to lower societal costs and will reduce the impact on the human environment. This structured approach is more efficient and faster than realizing separate connections. In Germany, TenneT has gained extensive know-how and experience in connecting offshore wind farms to the grid. Wind farms in The Netherlands will be linked up to standardized platforms. Cost reduction is achieved through economies of scale, lower financing costs, procurement advantages, standardizations, combined management and maintenance, and optimizing the output of each wind farm through redundant designs. The platforms will be designed in such a way that in future, wind farms located further out to sea may be connected to the grid, including at higher voltage levels if required.

For more information, visit www.tennet.eu.

Study on subsea power cable lifecycle published

The European Marine Energy Centre (EMEC) and The Crown Estate have published a report on the performance of subsea cabling in high energy environments to support the development of commercial wave and tidal energy sites.

The key aim of the Subsea Cable Lifecycle Study is to improve the industry's understanding of how best to specify and manage subsea cables for wave and tidal energy projects, by investigating how the cables installed at the EMEC test sites in Orkney have been performing since installation. The report, available to download from The Crown Estate's website, provides a summary of the review to inform the marine renewable energy industry on factors affecting the integrity and performance of subsea cables.

With its first cables installed over 10 years ago, EMEC has collected considerable amounts of data with numerous routine remotely operated vehicle (ROV) and inshore dive surveys undertaken to examine structural integrity, alongside comprehensive electrical cable testing. During the study, this data was reviewed in relation to installation

methods, faults, and operational life of the cables. The study found that the subsea cables installed at the EMEC test sites appear to be in extremely good condition considering the environment in which they are deployed.

The report concludes that in sites with high tidal flow the greatest risk to subsea cables is the effect of cable strumming—vibration caused by the flow of water past the cable. Key recommendations to developers of wave and tidal energy projects include carrying out calculations to assess the risk of strumming at an early stage; completing detailed site surveys and optimizing the cable route to avoid key risks; and protecting the cables with armoring in high energy environments.

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

TE SubCom introduces Open Cables standard

TE SubCom, a TE Connectivity Ltd. company, introduced "Open Cables," a new flexible business model that allows customers to select their preferred Submarine Line Terminating Equipment (SLTE) line card supplier to create an interoperable and complementary dry

June 2015

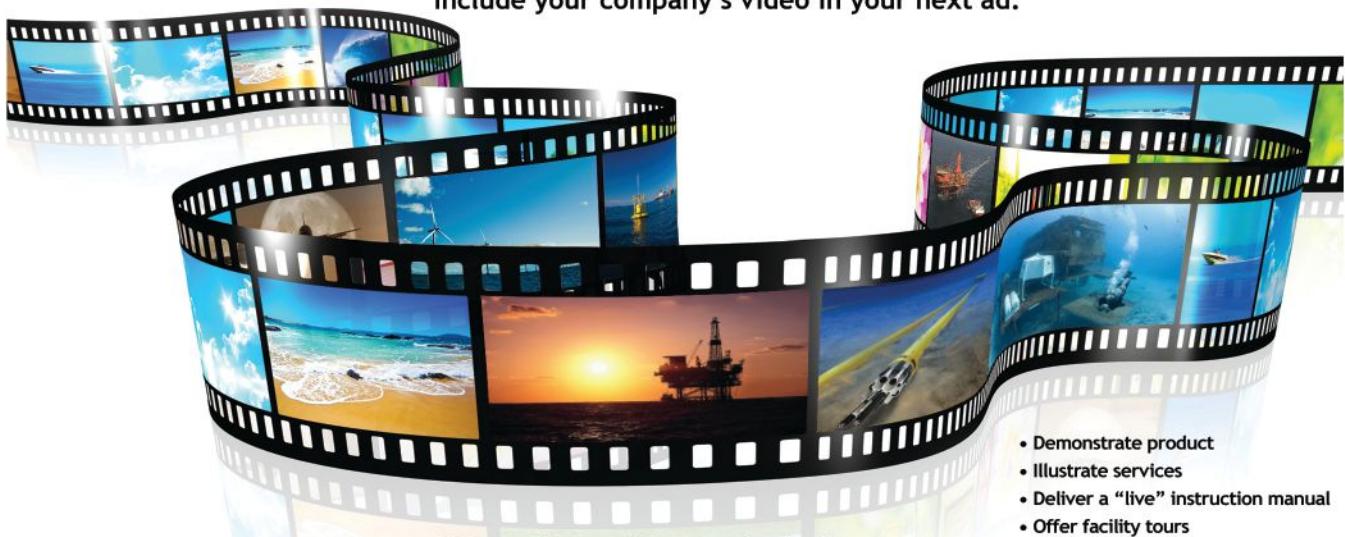
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and wet plant. SubCom will continue to offer and invest in its advanced SLTE product line, in addition to the new Open Cables alternative, to provide customers with ultimate flexibility.

Available immediately, the Open Cables model provides SubCom customers greater choice and flexibility in choosing line cards while continuing to benefit from the company's latest technology. The Open Cables model takes advantage of fundamental facts in coherent technology together with transmission properties of high dispersion fibers in undersea systems. These fundamental principles allow the wet plant to be optimized regardless of the line card provider. Purchasers now have a cost effective, comprehensive yet bespoke solution that allows for a multi-vendor supplier base for transponders. The choice of third-party equipment allows the customer to leverage line cards and converged terrestrial network integration.

"There are many elements that influence our customer's choice of line terminating equipment over a subsea network, not least of which is their existing core terrestrial network architecture," said Mark Enright, managing director, customer solutions, TE SubCom. "Current technology improvement cycles for equipment are shorter than manufacturers can synchronize to. With the Open Cables model, SubCom can now provide new options to integrate our undersea cable systems into overall networks. We want to offer the freedom of choice in a line card partner while continuing to evolve our own leading edge line card products."

In support of the new Open Cable model, SubCom is introducing the Ocean Gateway common equipment. Ocean Gateway common equipment includes a suite of SubCom supplied equipment for wet plant maintenance, operations and troubleshooting. It allows multiple vendors of third-party line card equipment to interface with a single fiber. It also establishes a common access to the wet plant for upgrades for third party equipment makers.

For more information, visit www.subcom.com.



Alcatel-Lucent, Ocean Networks to build South America Pacific Link

Alcatel-Lucent Submarine Networks (ASN), the undersea cables subsidiary of Alcatel-Lucent, and Ocean Networks, Inc., a developer of submarine cable systems, will build a 14,200 km submarine cable system linking Hawaii to South America.

The South America Pacific Link (SAPL) system will connect Oahu in Hawaii, Balboa in Panama and Santiago in Chile, providing additional capacity to meet the ever-increasing demand for bandwidth-hungry ultrabroadband access services around the Pacific Rim, as well as enhance the role of digital connectivity in regional economic development.

Thanks to its point of presence in Hawaii, a hub for many transpacific submarine cable systems, SAPL will also provide a diverse route to the U.S. West Coast and a low latency route from Central and South America to the Asia-Pacific region, in particular to Australia and New Zealand. The 100 Gbps SAPL system will have a capacity of 10 Tbps on each of its three fiber pairs.

The system is also designed for further connectivity via branching units to Manta in Ecuador, Lima in Peru, Arica in Chile and the big island of Hawaii.

Scott J. Schwertfager, CEO at Ocean Networks, said, "This project is very significant as the SAPL system will fulfill a long-standing need of the markets of Central and South America for connectivity to the Asia Pacific region by interconnecting with existing and planned submarine cable systems. The collaboration with Alcatel-Lucent and the deployment of their leading-edge subsea cable system technology will enable us to foster cost-effective high-speed broadband connectivity in the region."

Philippe Dumont, president of Alcatel-Lucent Submarine Networks, said, "We are pleased to be supporting Ocean Networks in the expansion of services and applications enabled by high-bandwidth networks, which are a catalyst for economic and social progress. Connecting to the Hawaii hub will boost access to the worldwide infrastructure, opening up traffic diversity to increase access and service reliability as demand from consumers and businesses alike grows rapidly."

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

NCP consortium commence construction phase

The NCP consortium, composed of Chunghwa Telecom Co. (CHT), China Mobile, China Telecom, China Unicom, KT Corporation, Microsoft, SoftBank Mobile Corp, and TE SubCom, a TE Connectivity Ltd. company, announced that the New Cross Pacific (NCP) Cable Network has commenced construction.

Spanning more than 13,000 km, the NCP Cable Network will link Hillsboro, Oregon (U.S.A.) with connectivity to Chongming (China mainland), Nanhui (China mainland), Lingang (China mainland), Busan (South Korea), Toucheng (Taiwan), and Maruyama (Japan). Using state-of-the-art optical amplifier technology to achieve high performance and reliability in the transmission of multiple wavelength channel signals on multiple fiber pairs, the 100G repeatered cable system will deliver up to 80 Tbps of capacity.

NCP will be designed to interconnect with other cable systems in the region to maximize the throughput of data, as well as to support future upgrades, with the expectation for the service to launch in late 2017.

Dr. Yuan-Kuang Tu, resident of international business group of Chunghwa Telecom, stated, "After investing in the Asia-Pacific Gateway (APG), CHT starts the construction of NCP in order to establish a strong global network infrastructure. With the tendency on highly demands of the international bandwidth, we can provide the most reliable and sufficient capacities to meet the most stringent requirements. We will further integrate these network resources with CHT Taipei IDC to provide international enterprises with the best quality ICT services and lead Taiwan to become the information, operation and communication center of Asia-Pacific region."

For more information, visit www.cht.com.tw.

Alcatel-Lucent to supply Orval cable system

Alcatel-Lucent and the Algerian Ministry of Post, Information Technology and Communications have signed a turnkey agreement for the deployment of the Orval system, an over 560-km submarine fiber optic cable that will link Oran in Algeria to Valencia, Spain.

With completion expected in 2016, the 100 Gbps system will deliver an ultimate design capacity of 20 Tbps. This speed and capacity will facilitate

SUBSEA CABLES

the delivery of broadband services to an estimated 42 million Internet users in Algeria and Spain.

Additionally, the Orval submarine cable system is part of the Orsec plan which has been put in place by the Algerian Ministry in order to reinforce the ability to face natural disasters such as in the case of the earthquake in 2003 and of which strengthening international communications is a key element.

Alcatel-Lucent will be lead contractor in charge of designing and manufacturing the system in consortium with IT Marine, who will be responsible for marine operations.

Commenting on the agreement, Abdelhak Benkrid, general secretary of the MPITC, said, "Broadband access is a fundamental contributor to both businesses and consumers. The Orval network represents a strategic technology investment that will strengthen access to high-quality network services. Based on Alcatel-Lucent's technology and expertise, Orval will give us an edge to continue developing our service offer to and to an increasing number of broadband users."

Philippe Dumont, president of Alcatel-Lucent Submarine Networks, said, "The Orval undersea cable system will help meet the broadband demand and strengthen overall connectivity in the Mediterranean. As we enter in an upward cycle of submarine cables constructions, this new project highlights the continued need for higher capacity and connectivity that is critical for broadband expansion."

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

APTelecom appointed by MENA-SCS

Leading facilities-based telecom and fiber consulting company APTelecom announced that it 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 set to become the primary route for those seeking connectivity 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, 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 Tbps totaling to an ultimate capacity of 40 Tbps. 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).

Middle East and North Africa Submarine Cable Systems (MENA-SCS) is a subsidiary of Orascom Telecom Media and Technology (OTMT). MENA-SCS has developed, constructed, owns and operates a submarine telecommunications system connecting Europe to the Middle East and South East Asia. MENA cable infrastructure, together with already existing cables, is expected to cover current and future international communications requirements among Egypt, the Arab World, India and Europe.

For more information, visit www.aptelecom.com.



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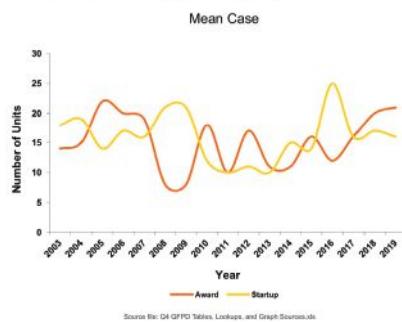
AG GEOPHYSICAL PRODUCTS | CABLE SOLUTIONS | CORMON | DGO | IMPULSE | ODI



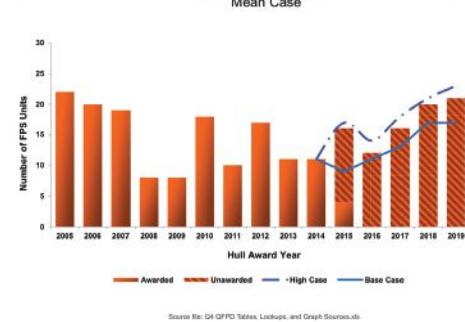
Reliable power, communication, and sensing solutions for subsea environments.

Quest Offshore Activity Report

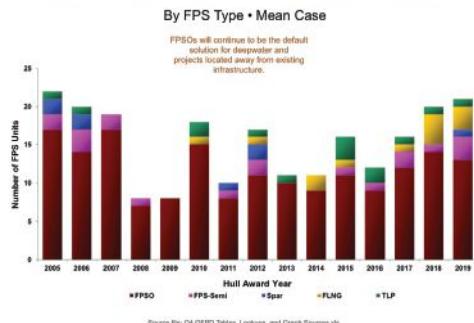
Worldwide Floating Activity by Year 2003 – 2019e



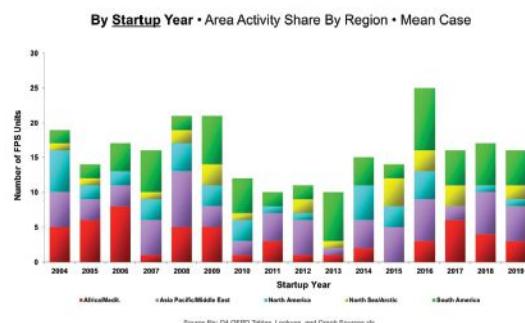
Worldwide Floating Awards by Year 2005 – 2019e



Worldwide FPS Awards 2005 – 2019e



Worldwide Forecast Floating Activity 2004 – 2019e



Worldwide Forecast Floating Activity 2004 – 2019e

By Startup Year • Share by FPS Type • Mean Case

Worldwide Forecast FPS Construction 2015 – 2019e

By Startup Year • 86 Units, 58 Under Construction • Mean Case

June 2015

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FOR MORE DETAILED INFORMATION

(281) 491-5900 - USA • 44 (0) 1737 371704 - London • e mail: corp@questoffshore.com
www.QuestOffshore.com • www.SubseaZone.com • www.FloatingProductionZone.com

Monthly Stock Figures & Composite Index

Industry Company Name	Symbol	Close(Mid) May	Close(Mid) April	Change	Change %	High	Low
						52 week	
Diversified, Production Support and Equipment Companies							
Baker Hughes, Inc.	BHI	65.83	68.26	-2.43	-3.6%	75.64	47.51
Cameron Intl. Corp.	CAM	52.24	50.71	1.53	3.0%	74.89	39.52
Drill-Quip, Inc.	DRQ	76.84	74.91	1.93	2.6%	110.23	65.28
Halliburton Company	HAL	46.21	47.84	-1.63	-3.4%	74.33	37.21
Tenaris SA	TS	31.04	31.65	-0.61	-1.9%	48.45	26.28
Newpark Resources, Inc.	NR	9.23	10.53	-1.30	-12.3%	13.60	8.07
Schlumberger Ltd.	SLB	92.04	91.08	0.96	1.1%	118.76	75.60
Superior Energy Services, Inc.	SPN	23.72	25.44	-1.72	-6.8%	37.05	16.70
Weatherford International, Inc.	WFT	14.38	14.37	0.01	0.1%	24.88	9.40
Deep Down, Inc.	DPDW	1.02	1.02	0.00	0.0%	1.99	0.49
FMC Technologies	FTI	41.80	40.57	1.23	3.0%	63.92	34.85
Total Diversified, Production, Support and Equipment.....	454.35	456.38	-2.03	-0.4%	643.74	360.91	
Geophysical / Reservoir Management							
Dawson Geophysical Company	DWSN	5.56	5.91	-0.35	-5.9%	17.28	4.22
Mitcham Industries, Inc.	MIND	4.57	5.12	-0.55	-10.7%	15.80	4.30
Compagnie Gnrale de Gophysique-Veritas	CGV	7.71	7.19	0.52	7.2%	15.14	5.31
Total Geophysical / Reservoir Management.....	17.84	18.22	-0.38	-2.1%	48.22	13.83	
Offshore Drilling Companies							
Atwood Oceanics, Inc.	ATW	33.13	32.63	0.50	1.5%	53.90	26.12
Diamond Offshore Drilling, Inc.	DO	32.72	30.55	2.17	7.1%	51.75	26.02
ENSCO International, Inc.	ESV	25.50	25.05	0.45	1.8%	55.89	19.78
Nabors Industries, Inc.	NBR	15.36	15.51	-0.15	-1.0%	30.24	9.91
Noble Drilling Corp.	NE	16.98	17.45	-0.47	-2.7%	30.29	13.15
Parker Drilling Company	PKD	3.62	4.44	-0.82	-18.5%	7.18	2.51
Rowan Companies, Inc.	RDC	22.95	20.20	2.75	13.6%	32.85	17.33
Transocean Offshore, Inc.	RIG	20.55	18.25	2.30	12.6%	46.12	13.28
Total Offshore Drilling.....	170.81	164.08	6.73	4.1%	308.22	128.10	
Offshore Contractors, Services, and Support Companies							
Helix Energy Solutions Group, Inc.	HLX	16.91	16.8	0.11	0.7%	28.00	13.06
Gulf Island Fabrication	GIFI	12.62	16.18	-3.56	-22.0%	23.57	12.32
McDermott International, Inc.	MDR	4.53	5.38	-0.85	-15.8%	8.43	2.10
Oceaneering International	OII	52.87	58.85	-5.98	-10.2%	79.05	48.37
Subsea 7 SA	SUBCY.PK	11.72	11.28	0.44	3.9%	21.10	8.17
Technip ADS	TKPPY.PK	17.32	18.1	-0.78	-4.3%	27.97	13.39
Tetra Technologies, Inc.	TTI	6.68	7.30	-0.62	-8.5%	12.11	4.72
Total Offshore Contractors, Service, and Support.....	122.65	133.89	-11.24	-8.4%	200.23	102.13	
Offshore Transportation and Boat Companies							
Seacor Holdings, Inc.	CKH	72.94	77.62	-4.68	-6.0%	84.25	67.36
Gulfmark Offshore, Inc.	GLF	14.57	15.66	-1.09	-7.0%	46.82	12.80
Bristow Group	BRS	60.11	63.27	-3.16	-5.0%	81.60	50.80
PHI, Inc.	PHII	31.87	31.41	0.46	1.5%	52.98	29.10
Tidewater, Inc.	TDW	27.66	26.97	0.69	2.6%	56.98	18.84
Trico Marine Services, Inc.	TRMAQ.PK	13.71	13.18	0.53	4.0%	14.53	11.63
Hornbeck Offshore	HOS	22.42	24.19	-1.77	-7.3%	47.45	17.91
Total Offshore Transportation and Boat	243.28	252.30	-9.02	-3.6%	384.61	208.44	

June 2015

Ocean News & Technology

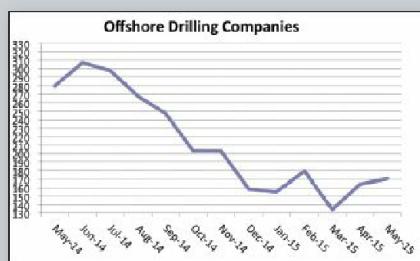
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Monthly Stock Figures & Composite Index

Industry	Close(Mid) May	Close(Mid) April	Change April	Change % May	High 52 week	Low 52 week
Diversified, Production Support & Equipment Companies						
Total Diversified, Production, Support and Equipment	454.35	456.38	-2.03	-0.4%	643.74	360.91
Total Geophysical / Reservoir Management	17.84	18.22	-0.38	-2.1%	48.22	13.83
Total Offshore Drilling	170.81	164.08	6.73	4.1%	308.22	128.10
Total Offshore Contractors, Service and Support	122.65	133.89	-11.24	-8.4%	200.23	102.13
Total Offshore Transportation and Boat	243.28	252.30	-9.02	-3.6%	384.61	208.44
Total Offshore Source Index	1,008.93	1,024.87	-15.94	-1.6%	1,585.02	813.41

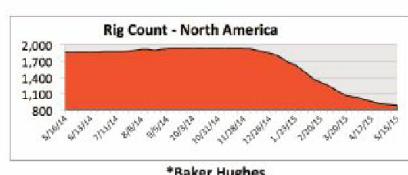
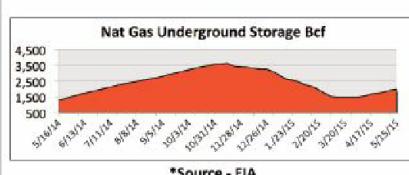
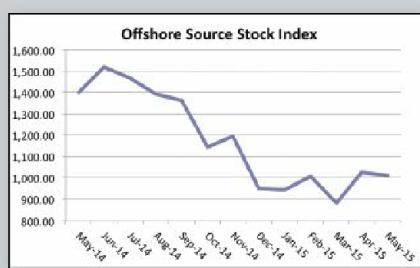
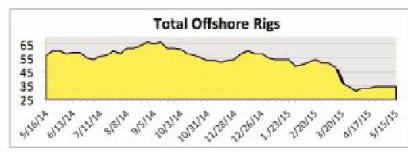
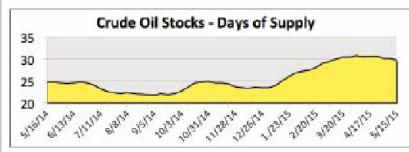
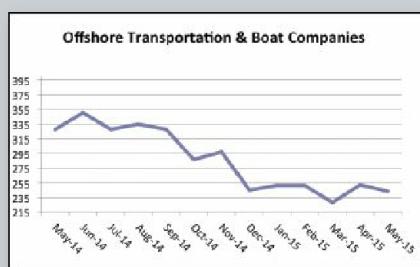
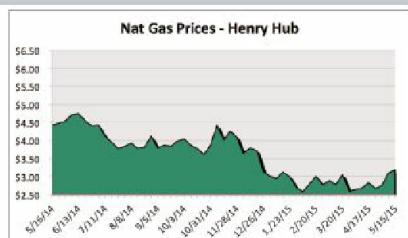
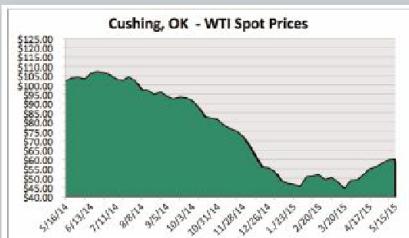
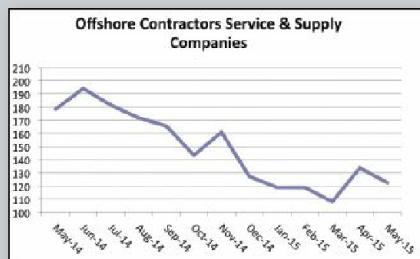
DISCLAIMER

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Oil & Gas Industry Trends

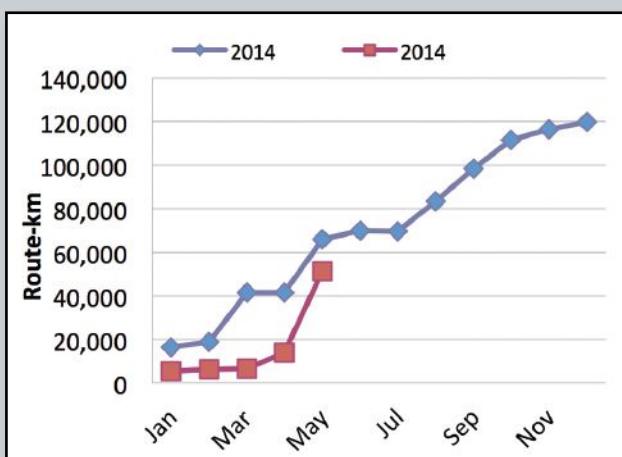
Monitoring the Pulse of the U.S. Offshore Oil & Gas Industry



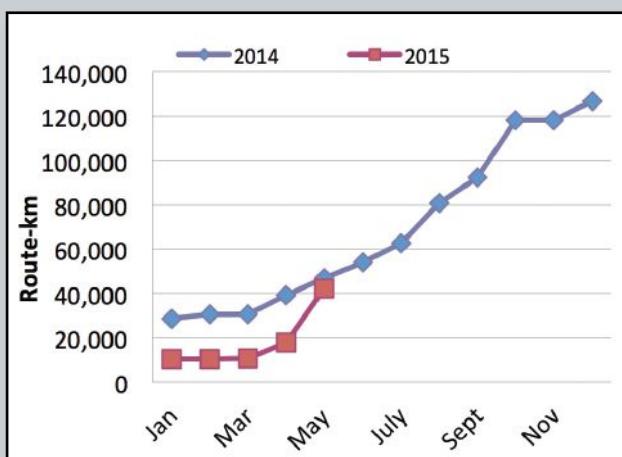
Positive trend, at least 3 weeks
Changing trend, less than 3 weeks
Negative trend, at least 3 weeks

Subsea Telecom & Power Cable Data

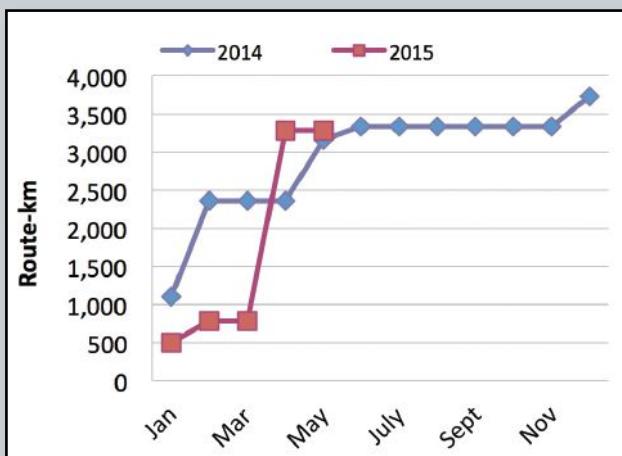
FO Cable Awards by Month



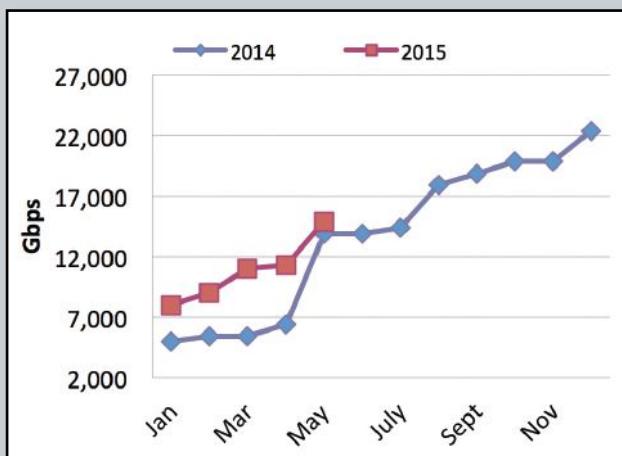
FO Cable Announcements



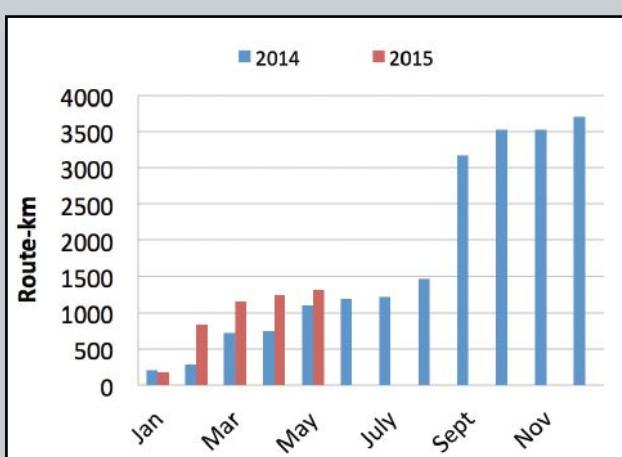
Submarine FO Cables Entering Service in Route-km



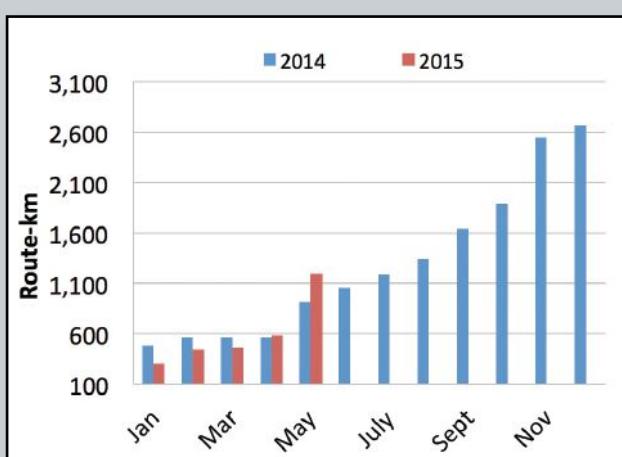
Upgrades of Existing Cable Systems in Gbps



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
Petrobras America Inc.	WR	469	G16997	VANTAGE TITANIUM EXPLORER	Chinook	8,835
Anadarko Petroleum Corp.	AT	261	G16997	DIAMOND OCEAN BLACKHORNET	Vortex	8,344
Anadarko Petroleum Corp.	DC	621	G23529	ENSCO 8506	Spiderman	8,087
ExxonMobil Corp.	WR	584	G20351	MAERSK VIKING	Julia	7,120
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	WR	634	G18745	PACIFIC SHARAV	Saint Malo	6,803
Union Oil Co. of California	KC	814	G25810	PACIFIC SANTA ANA		6,758
Deep Gulf Energy III, LLC	MC	563	G21176	ENSCO 8505		6,560
LLOG Exploration Offshore, LLC	MC	300	G22868	SEADRILL WEST NEPTUNE	Delta House	6,131
Noble Energy, Inc.	MC	948	G28030	ATWOOD ADVANTAGE	Gunflint	6,094
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
Freeport-McMoRan Oil & Gas LLC	MC	127	G19925	NOBLE TOM MADDEN	Horn Mountain	5,467
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
BP Exploration & Production Inc.	GC	825	G09981	ENSCO DS-3	Mad Dog Phase 2	5,176
Anadarko Petroleum Corp.	GC	680	G22987	BLAKE 1007	Constitution	4,972
BP Exploration & Production, Inc.	KC	93	G25780	ENSCO DS-4	Gila	4,860
Cobalt International Energy, LP	GB	958	G30876	ROWAN RELIANCE		4,846
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
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
BHP Billiton Petroleum (GOM) Inc.	GC	609	G16764	T.O. DEEPWATER INVICTUS	Shenzi	4,288
LLOG Exploration Offshore, LLC	VK	959	G34874	SEADRILL SEVEN LOUISIANA	Imtegral	4,252
BP Exploration & Production Inc.	KC	147	G30926	SEADRILL WEST VELA		4,248
Shell Offshore, Inc.	MC	943	G34467	STENA ICEMAX	Oasis	4,213
Anadarko Petroleum Corp.	GC	561	G16753	NOBLE BOB DOUGLAS	K-2	4,144
Chevron USA Inc.	GC	596	G16760	T.O. DISCOVERER INSPIRATION	Tahiti North	4,023
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.	VK	956	G06896	NABORS 202	Ram-Powell	3,214
Shell Offshore, Inc.	MC	762	G07957	NOBLE BULLY I	Deimos	3,144
Anadarko Petroleum Corp.	GB	668	G17407	DIAMOND OCEAN BLACKHAWK	Gunnison	3,106
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
Murphy Exploration & Production Co.	MC	582	G16623	T.O. DISCOVERER DEEP SEAS	Medusa	2,463
Energy Resource Technology GOM, Inc.	GC	237	G34971	ENSCO 8503	Phoenix	2,249
Marubeni Oil & Gas (USA) Inc.	MC	496	G14005	HELIX 534	Zia	1,804
Chevron USA Inc.	VK	786	G12119	NABORS 87	Petronius	1,751
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	G28351	NABORS MODS 200		665
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, 4 May 2015

Activity by Water Depth

Water Depth (m)	Active Leases	Approved Applications	Active
0 to 200	1,377	36,103	2,326
201 to 400	97	1,127	20
401 to 800	205	890	10
801 to 1,000	343	579	9
1,000 & above	3,096	2,025	28

Rig Activity Report 8 May 2015

Location	Week of 05/08	Week +/- Ago	Week +/- Ago	Year Ago
Land	858	-10	868	-924
Inland Waters	2	-1	3	-12
Offshore	34	0	34	-25
U.S. Total	894	-11	905	-961
Gulf of Mexico	33	0	33	-25
Canada	75	-4	79	-70
N. America	969	-15	984	-1031
				2000

Activity by Water Depth Information current as of Monday, 11 May 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

Industry first subsea clamping solution

Red Marine has developed the modular umbilical clamp system, made up of six purely mechanical elements, in conjunction with the global subsea provider, FMC Technologies. The clamp solution will be commissioned on board the deep water well intervention vessel, Island Performer, in the Gulf of Mexico and used as a key system element in Well Intervention Operations.

The state-of-the-art vessel was purpose built for deep water well interventions and features the latest innovations from FMC Technologies including a Riserless light well intervention (RLWI) stack that enables it to complete intervention operations in water depths of up to 6,500 ft.

Speaking about the umbilical clamp development programme, Joe Orrell, managing director at Red Marine said, "Because this vessel features a number of new technologies, it was essential we created a product that complemented this level of innovation. Red Marine has an established track record of consistently developing and delivering intelligent engineering solutions and this is one we're particularly proud of. We'd even go as far as to say it's one of our landmark projects of the year, offering an elegant, mechanical solution to a particularly challenging operational requirement."

The engineering challenge was to develop a clamp to securely hold a new type of subsea umbilical that is compressible, very sensitive to the squeeze force applied and has a low friction outer sheath.

The solution is unusual in the industry—perhaps even the first—with its modular system of six elements, each of which houses a number of spring applied pads to ensure a consistent

and reliable clamping force to the umbilical.

Even more impressive is the clamp's ability to securely hold the compressible umbilical with in excess of 20 tonnes of back tension.

Red Marine is based in Hexham, Northumberland and core services include offshore installation engineering, subsea solutions and qualification testing. The company is well known in the industry for the rapid delivery of intelligent solutions to complex offshore challenges. Clients include Subsea 7, Technip, FMC Technologies and GE Oil and Gas.

For more information, visit www.redmarine.com.



MacArtney introduces range of advanced hydrostatic pressure vessels

MacArtney is pleased to introduce its new range of advanced in-house developed hydrostatic pressure vessels. While the company has long offered worldwide access to cutting-edge hydrostatic test facilities and services, the company also designs and supplies its own range of pressure vessel to clients who require to set up their own facility capable of putting almost any type of underwater equipment to the test.

"When it comes to quality, safety and performance in harsh underwater environments, we always place the highest of demands on our products and systems. Therefore, MacArtney have been testing its own and customers' gear for decades" says a MacArtney spokesperson and continues:



"When it comes to hydrostatic pressure testing, we have managed to develop a tried and trusted system concept based on the advanced pressure vessels which are currently deployed by MacArtney and customer test facilities in Denmark, Norway, the UK, France, Holland and Germany alike."

Based on this concept and technology, MacArtney now offers a range of four highly capable and versatile standard pressure vessels. Furthermore, MacArtney is able to supply customized or bespoke vessels featuring alternative dimensions and pressure rating. If required, the company can even quote and supply a complete test environment including all equipment, systems and ancillaries.

With a pressure capacity up to 690 bar, MacArtney standard pressure vessels can readily simulate the hydrostatic operating conditions at 7,000 m of ocean depth. In further support of simulating realistic subsea operation and getting accurate results, the entire testing process is computer controlled—with real-time electric and optical measurements. Moreover, in-house developed control software enables plug-and-play testing, bespoke test programs and repeated pressure cycling. Other pressure vessel benefits include lid integrated penetrators and the user friendly "clamp-lock" system that allows for swift test mobilization and turnaround. Optional features include live video monitoring and in-vessel temperature control.

Finally, MacArtney pressure vessels are available with on-site installation and operators training. Once installed, the pressure vessels require minimal maintenance and have a long service life.

For more information, visit www.macartney.com.

Introducing the 360Abyss: 7.5 K 360 video at 1,000 m

360Heros announce the 360Abyss, the world's smallest HD underwater 360 video gear. A revolutionary new scuba gear, the 360Abyss can capture 360 video and panoramic photos at depths as low as 1,000 m.

Interchangeable camera compartment doors give the unit variable buoyancy, with divers given the option to operate with either a positive or negative buoyancy. Individual GoPro camera compartments prevent leaks, while polycarbonate acrylic domes create 360 video resolutions as high as 7.5K.

With a depth rating of 1,000 m, the 360Abyss can film 360 video at depths that were previously unattainable. This opens the door for an exciting range of possibilities in terms of applications. From filming deep sea wildlife to monitoring underwater construction, the 360Abyss is a versatile and powerful tool.



With 8 standard 3/8" corner mounts for divers and 6 – 3/8" 45° lens mounts designed for ROVs and submarines, the 360Abyss is compatible with virtually any dive gear.

For more information, visit www.360heros.com.

New switchable Miko magnet launched as practical ROV tool

A powerful magnet has been developed by Miko Marine AS of Norway as a practical and versatile tool for ROV operators. Incorporating patented technology that increases its performance, the magnet has been designed so that it can be switched on and off by an ROV manipulator and used for a wide range of applications underwater. The new magnet can be applied instantly to any steel structure where it is capable of holding weights up to 750 kg and it can



significantly reduce the amount of time required for an ROV to undertake a task.

Typical uses could be to quickly provide a stable anchor point for an ROV during welding or inspection work or for the temporary storage of tools while work is in progress. The ROV Magnet's adhesion power also makes it a quick and easily applied fixing point during lifting operations or to provide a convenient solution for securely positioning instruments, lights or cameras exactly where they are needed.

The Miko ROV Magnet functions completely mechanically without the need for cables or wires and permits gentle contact with painted surfaces on subsea structures or when used while working on fragile wrecks or other objects vulnerable to damage. It is compatible with all common types of manipulator claw (parallel, three-finger or four-finger) and is supplied with an interchangeable fixing bracket that Miko can customize to meet the user's needs and to ensure that the most suitable one can be chosen for the job in hand. For additional holding power it can be used in conjunction with other magnets while retaining its simple on/off functionality. In this way it can be used to provide stability to a large work class ROV or for undertaking heavy lifting and should become an essential part of any ROV's normal equipment package.

Miko's new ROV Magnet is contained within a SS 316L stainless steel housing that is combined with a high quality pressure compensator to ensure that it can resist corrosion at all depths. It is supplied in its own specially designed travel and storage case to ensure that it is completely isolated and compliant with air transport regulations. Miko can also supply a range of new shielding packages that are now available for use by existing users of its magnets who may

have a need to transport or safely store the products they already possess.

Miko Marine specializes in the use of magnets for marine and offshore applications and has unrivalled experience in their use. The company also manufactures a range of magnetic patches that may be used to provide an instant watertight seal for damaged ships or storage tanks. These have been responsible for preventing the sinking of ships on numerous occasions or for preventing the escape of marine pollutants.

Miko Marine AS is based in Oslo, Norway, from where it also provides a range of unique salvage and support products for the marine industry. The company's most recent innovation has been the Moskito oil recovery tool that was recently introduced as the first tool that can enable bunker fuels and other hydrocarbon cargoes to be quickly and easily extracted from the tanks of sunken vessels.

For more information visit www.mikomarine.com.

HTL Worldwide drive innovation with expanding OEM bolting solutions range

Hydraulic bolting equipment manufacturer HTL Worldwide are leading the bolting market with the launch of their own range of hydraulic torque tooling and complementary products.

The dynamic company who pride themselves on ultimate customer satisfaction have harnessed unrivalled bolting knowledge to design the most innovative torque tooling to date. The 100% British-made tooling range includes both low profile and dedicated square drive torque wrenches, tensioners, nut splitters and standard and high flow hydraulic pumps with other complementary products in development.

The company has also strengthened its complete controlled bolting solutions offering by introducing complementary products which include Bolt Pro and Joint Pro; HTL Worldwide's bolting calculator software and joint integrity database management system that can greatly reduce resource requirements



and costs. HTL lubricant and hydraulic oil are also new additions to their all-encompassing product portfolio offering a one-stop-shop for world-class controlled bolting solutions.

HTL Worldwide Ltd form part of the HTL Group network of innovative and extremely dynamic companies. The group is a well-established organisation with an enviable reputation for unparalleled knowledge and expertise in the bolting industry that has positioned them to effectively provide world-class controlled bolting solutions to a wide cross section of industries.

The highest level of design, workmanship and materials have been applied in the production of this premium quality product range, offering optimum performance and making them extremely versatile.

For more information, visit www.htl-worldwide.com.

Diver6 diver tracking system

No longer are bubbles the only available topside diver position information. The Diver6 system is a new maritime tracking technology that significantly enhances diving command, control, and safety. As a supplemental resource, Diver6 assists dive supervisors in monitoring and tracking divers, providing unparalleled situational awareness. Diver6 is proudly made in the USA.

Diver information is transmitted via an underwater modem to a receiving unit deployed on the surface, and then to a monitoring computer that records, calculates, and displays various parameters such as diver air pressure, depth, water temperature, and position using a 2D and 3D tracking display. Diver6 communicates with divers up to 100 m in depth and 1,000 m in range from the topside receiving unit.

Dive logs are created for each diver



with divers having access to electronic and hard copy data history. The data logs are recorded each time the modems connect with the software. The extensive Diver6 features provide up-to-date information on divers allowing the diver supervisor to make faster, safer, and more accurate decisions with significantly enhanced situational awareness.

For more information, visit www.diver6.com.

Revolutionary survival platform from Salvare is bound to save lives

Having a place of safety and allowing time for survivors to recover before being rescued at sea is behind the newly designed SEAPOD™ inflatable survival platform. The device combines the latest technology, with proven research to solve the age old problems of surviving critical hours before rescue comes; problems of quick deployment, hypothermia, visibility of survivors and staying safely out of the water.



UK Company, Salvare Worldwide, has developed the ingenious SEAPOD™ as a solution. A lightweight, easily deployed, fully interlocking inflatable life saving platform based on the Carley Liferaft concept. But unlike the Carley Liferaft, the SEAPOD™ is light, (it weighs less than 4 kg and is packed in a water activated case) and offers good protection from the onset of hypothermia, increasing the chances of survival. Because of its compactness the SEAPOD™ can be stowed on large ships, coastal vessels, small boats, helicopters and aircraft alike. So reliance upon lifejackets alone is a thing of the past.

The SEAPOD™ has two separate auto inflatable chambers activated as soon as it hits the water and capable of retaining a steady position. Even if one chamber is punctured the SEAPOD™'s unique design enables the other chamber to be manually further inflated to maintain optimum buoyancy.

A small freeboard allows water to flow freely over the platform, cutting

down on the amount of water retained on-board. Getting onto the platform has been made simple by reducing the overall thickness of each platform. The SEAPOD™ is only a few centimetres thick and has strategically placed hand and foot holds to ensure survivors board easily. Once there, they stay in position, without being immersed in freezing water, a critical factor delaying the onset of Hypothermia.

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

Chesapeake Technology announces enhancements to SonarWiz software

In its most significant product announcement in the past 5 years, Chesapeake Technology has launched a new version of its SonarWiz that delivers a new level of data acquisition, processing, and 3D visualization capabilities to the marine technology industry.

"We wanted to make sure we continued to provide the industry's premier 'all-in-one' solution for seafloor mapping," said John Gann, VP, software development for Chesapeake. "Now surveyors have better acquisition, processing, and visualization tools. Analysts can more easily visualize their bathymetry, sidescan, and sub-bottom data together in 3D. And interferometric sonar users can get more from their systems."

The latest version of SonarWiz features backscatter post-processing for bathymetric data including beam averaged and time-series (snippets) amplitude records. The software allows users to create crisp amplitude mosaics through automatic, whole-survey gain optimization.

"We wanted to allow users to create great-looking backscatter mosaics without reviewing each survey line individually," said Gann. "Now the processing and normalization is an automatic process that requires little to no user involvement. It's a huge time-saver."

The new SonarWiz allows users to rescue or fine-tune data with automatic and semiautomatic grid creation and editing tools. And the software includes flexible gridding options that may be used concurrently to ensure survey coverage and quality.

"With the addition of dual channel independent sidescan bottom tracking and the expansion of the Vessel Editor, users can process all data types with more precision and sidescan data from a broader range of platforms, including

the larger ROVs and AUVs with port and starboard channels distant from each other," said Gann. "We're pleased to be able to provide the most advanced bathymetric data processing, rendering, and reporting in the industry."

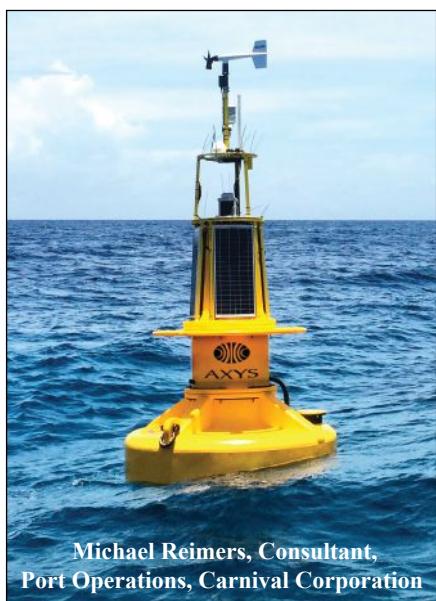
The latest version of SonarWiz features new icons, a bright color scheme, and a streamlined interface. It also provides faster processing speeds.

For more information, visit www.chesapeaketech.com.

AXYS WatchKeeper buoys to support 2016 Olympics

AXYS Technologies Inc (AXYS) is pleased to announce that four WatchKeeper metocean buoys were selected by the Federal University of Rio Grande (FURG) to be used by the Autoridade Publica Olímpica (APO) in support of the 2016 Rio de Janeiro Olympics. The WatchKeeper buoys will be deployed in July of 2015 to provide real-time metocean data for some regional games as a trial before the Olympic Games in 2016.

The buoys will be deployed at Copacabana beach and Guanabara Bay to provide wind speed and direction, air temperature, relative humidity, barometric pressure, solar radiation, directional waves, current speed and direction, water temperature and salinity data for forecast improvements and real-time data specific to sports such as beach volleyball, sailing, triathlon, cycling and marathon swimming. AXYS field technicians will travel to Brazil to commission and deploy the buoys, as well as train local service workers on their continued operation and maintenance.



Once the Olympic Games are complete the WatchKeeper buoys will be retrofitted with additional sensors and redeployed by FURG along the Brazilian coast as part of the permanent Brazilian Coastal Monitoring System (SiMCosta) to provide metocean and water quality data critical for climate change related issues in coastal zones. The SiMCosta project is designed to plan, acquire and develop the equipment and knowledge needed to implement a robust monitoring program off the Brazilian coast. SiMCosta aims to install platforms along the 8,000-km Brazilian coastline, to generate a reliable database on shelf and coastal zone for modeling, forecast and alert purposes.

"AXYS is thrilled to be supporting the Rio de Janeiro Olympic Games with our real-time metocean buoy systems," said Chad MacIsaac, international accounts manager at AXYS Technologies. "We are also pleased to be able to help SiMCosta with their objective of improving the capability of predicting the effects of climatic variability and climate change."

"We hope that a fruitful partnership can be built between SiMCosta/Brazil and AXYS/Canada to provide excellent services to the Olympic Games, but also to develop new ideas for monitoring climate changes in coastal and ocean regions in the near future," says Carlos Garcia, Ph.D. at Núcleo de Oceanografia Física at the Universidade Federal do Rio Grande.

For more information, visit www.axystechnologies.com.

Cygnus Instruments launches new range of multi-mode ultrasonic thickness gauges

Cygnus Instruments Ltd, the leading manufacturer of Multiple-Echo digital ultrasonic thickness gauges used for measuring remaining metal thickness without the need to remove protective coatings, unveils the latest range of surface instruments.

The new range of thickness gauges is launched following extensive customer engagement, working within industry standards and following careful and exhaustive design reviews.

Cygnus has now incorporated two additional measuring modes into their latest range of thickness gauges. Single-Echo and Echo-Echo modes, both using twin crystal probes, can assist in obtaining measurements in areas of extreme corrosion or back wall pitting:



- Single-Echo measuring mode—Ideal for measuring uncoated surfaces with heavy front face and/or backwall corrosion and attenuative materials such as cast metals, plastics and composites

- Echo-Echo measuring mode—Used for measuring painted metals but with heavy back wall pitting for improved back wall detection.

The range consists of five new models offering a comprehensive array of new features, including A-scan and B-scan displays; hands free units for climbing or rope access; simple sequential data logging or comprehensive data logging with features including Grid Format, offering 16 directional formats; vibrate alert to warn the operator when the measurement is out of tolerance; Bluetooth data transfer capability; and MSI™ (Measurement Stability Indicator).

Used in Single-Echo and Echo-Echo modes, this trademarked technique samples returning echoes to ensure they are all identical. If the returning echoes are identical the display changes color or format, which indicates the reading is stable and reliable.

There are two data logging models in the range, one offering simple sequential measurements to be recorded while the other offers comprehensive data logging where the user can add defined text comments, create templates and add radial measurements around a last logged measurement point. Both models record up to 5,000 measurement points, including A-scans.

Data logging models are supplied with the Cygnus CygLink Software. CygLink is a Windows® application for PC's running Windows 7 and above and is used for uploading data from a data logging gauge. The information can then be analyzed, stored, reports can then be created and the data can be exported as a .pdf or .csv file.

Designed for use in the most severe operating conditions, the purpose designed enclosure is both extremely tough and strong while small and light weight. Manufactured using a twin shot injection moulded enclosure that has a

soft but durable TPE outer skin, makes them both comfortable and extremely durable, while the inner shell is strong, keeping the electronics totally sealed from the outside environments.

This new instrument enclosure has allowed Cygnus to achieve the tough American Military Standard MIL SPEC 810G for environmental protection. These new gauges will survive the harshest operating conditions including drop, vibration, dust and water ingress (IP67) together with low and high temperature cycling.

For more information, visit www.cygnus-instruments.com.

ABPmer creates innovative underwater noise mapping tool

ABPmer, a specialist in marine data and management, has been contracted by the Marine Management Organisation (MMO) to create a GIS tool that generates data to map the distribution of man-made continuous underwater noise in the south marine plan areas.

The outputs of the tool will improve the MMO's understanding of underwater noise. They may also inform marine planning and decision making processes.

Elena San Martin, EIA and underwater noise specialist at ABPmer said: "We are excited to be developing such an innovative tool for the MMO. The marine environment experiences noise from both natural and man-made sources. Over the past decade, there has been a growing recognition of the potential harm of man-made underwater noise."

"Although challenging to develop, the maps will assist in the creation of sustainable development policies in the south marine plan areas."

ABPmer is a recognized authority in marine planning and has developed a number of related tools. Past developments include scoping a strategic co-existence assessment tool and a data processing tool to decode and display Automatic Identification System (AIS) data to understand shipping activity.

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

STR first to invest in new Sonardyne Syrinx DVL

Sonardyne International Ltd., UK, has announced that Subsea Technology and Rentals Ltd (STR), a multi-disciplinary technology expert specialising in the design, production and rental of innovative marine survey equipment,



has become the first company to invest in their new 'Syrinx' Doppler Velocity Log (DVL). The order for two 4,000 m depth rated units was placed at the recent Ocean Business exhibition in Southampton in response to demands from STR's customers globally for a DVL that is capable of providing high integrity, high performance navigation over a wide range of altitudes and seabed types.

Sonardyne is well known for its market leading subsea acoustic and inertial navigation systems. The introduction of Syrinx, its first ever DVL, is a natural extension of the company's existing 6G and SPRINT product lines and follows a major research and development program aimed at creating a new performance benchmark for 600 kHz DVLs.

Syrinx differs from other DVLs through its use of fully linear signal processing, low noise electronics and adaptive bottom lock. These features enable Syrinx to operate at altitudes over 50% higher than conventional 600 kHz DVLs with the high resolution performance of a 1,200 kHz DVL, all while navigating over undulating and challenging terrain of any type.

Alongside its class-leading precision and accuracy, STR identified Syrinx's concurrent Ethernet and serial output capability as a feature that will have considerable appeal to its customers. It means that Syrinx can be employed as a standalone DVL, as part of an integrated navigation system, or perform both functions at once, allowing both vehicle pilots and survey teams to simultaneously share the output from Syrinx. This will return both operational costs savings and savings in vehicle payload space.

Syrinx has been designed to be easy to install, set-up and use and can make use of existing DVL mounting arrangements on host vehicles. Available in

depth ratings up to 6,000 m, STR selected the 4,000 m rated, corrosion resistant titanium model for their rental pool. This decision will ensure compatibility with the next generation of work-class ROVs which are being designed, built and equipped for 4,000 m operations.

When it comes to ownership costs, STR will benefit from the fact that Syrinx has factory replaceable "capsule" transducers that can be individually replaced should they become damaged during normal operations. With other DVLs, repairing damaged transducers typically involves replacing the entire transducer assembly; an expensive option if only one transducer actually needs replacing.

Barry Cairns, VP Sonardyne Europe and Africa, said, "STR trust our solutions and our ability to deliver high performance underwater navigation technology that is always a step-ahead of its rivals. Although our Syrinx DVL was launched just a few weeks ago, STR has been quick to realize the technical and commercial advantages it offers."

For more information, visit www.sonardyne.com.

LCM Systems' stainless steel toggle load links come with flexible configuration

The TOG series of stainless steel toggle link load links from LCM Systems, used extensively throughout the oil and gas industries, is one of the most flexible ranges on the market. The load links are particularly suited to permanent installations where wire loads are being measured and have been designed for added flexibility.

The major benefit of these TOG load cells is that they are manufactured with a flexible configuration of end fittings. They can be supplied with fork/eye, eye/eye or fork/fork arrangements that means they are easy to install in a wide range of applications. Accuracy is also improved as the number of additional



fittings required in the measurement path is reduced.

All load cells in the range are manufactured in stainless steel (17-4PH) and are environmentally sealed to IP67 (IP68 can also be supplied). This means that they are ideal for use in exposed situations and can withstand immersion in seawater. Load ranges are available from 750 to 9,500 kg and the load cells can be supplied with amplified output and an integral connector, if required.

As with all load cells from LCM Systems, as well as the standard range, many special design options are available and the TOG link cells can be supplied either on their own or combined with instrumentation for a complete load monitoring system.

Typical applications include mooring and towing monitoring, anchor line tension, wireline measurement and structural testing.

For more information, visit www.lcmsystems.com.

Deepwater development forecast

Timing within the deepwater sector is more critical than ever. The traditional flow through the deepwater supply chain has been affected.

Quest's strategic market forecasts show what's driving your sector of the industry. When will subsea tree orders peak? How many FPSO's will be ordered over the next 3-5 years? How much capacity will there be in Deepwater Pipelay?

Some of the forecasts include:

- *Subsea Production Systems Forecast:* A comprehensive 5-year market forecast and assessment of global subsea production system demand. Illustrates macro level trends and regional perspectives on SPS award demand with focus on regional nuances, water depth progression, annual award expectations and operator activity forecast.

- *Floating Production Systems Forecast:* An assessment and market forecast of global floating production system demand over five years. Illustrates macro level trends and regional perspectives on FPS award demand with focus on FPS type, volume and value analysis, regional nuances and operator activity forecast.

- *Marine Construction Vessel Forecast:* A 5-year global marine construction and installation supply and demand comprehensive market forecast and assessment. Illustrates macro-level

trends and regional perspectives on marine construction supply and demand with focus on work scope, capacity constraints, regional nuances and contractor market share.

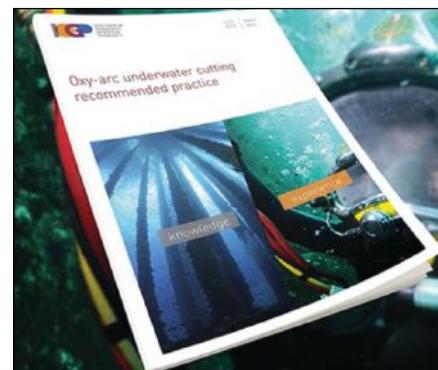
For more information, visit www.questoffshore.com.

New resource will improve underwater safety

The global diving industry's frequency of diver fatalities, injuries, incidents, and asset damage occurring while using underwater oxy-arc cutting continues to be unacceptably high.

Now, IOGP's latest publication, Oxy-arc Underwater Cutting Recommended Practice, assists divers and their supervisors with the managing this activity. It also provides control measures, guidance and processes to ensure the safe execution of this technique.

Oxy-arc cutting or "burning" is the process of cutting materials (generally ferrous metals) with a tool that combines oxygen and heat to oxidize or melt the parent material. The industry uses this method extensively in the underwater diving environment. Divers



engaged in burning need to be competent in the task—achieved through training, knowledge and experience.

The 84-page report includes chapters on alternative cutting methods; roles, responsibilities and operational control; equipment selection; consumables; pre-job considerations; on-site considerations; proper venting; diver's PPE; training and experience requirements; oxy-arc cutting risks and mitigation (a commentary). It also features checklists for oxy-arc operations and training course assessment and a bibliography.

For more information, visit www.iogp.org.

UI 2016

FEBRUARY 23-25, NEW ORLEANS

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
WWW.UNDERWATERINTERVENTION.COM

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Sea Change: Dive into Opportunity

October 19-22

What to Expect

- ✓ 2000 international attendees
- ✓ outstanding plenary speakers
- ✓ 500 technical papers
- ✓ 200 exhibits
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Good Exhibit
Space
Still Available

Patron
Opportunities

Honorary Co-Chairs



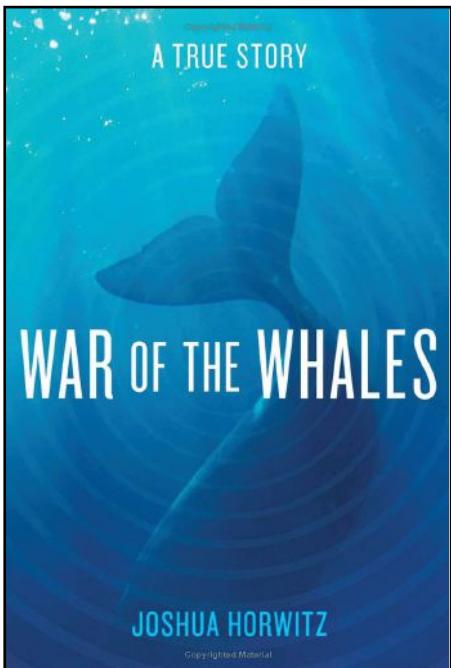
Rep. Sam Farr
Co-Chair, House
Oceans Caucus



Dr. Rick Spinrad
Chief Scientist,
NOAA

The premiere North American marine technology event will be at the Gaylord Resort & Convention Center, National Harbor

MEDIA SHOWCASE



War of the Whales: A True Story

by Joshua Horwitz

War of the Whales is the gripping tale of a crusading attorney who stumbles on one of the U.S. Navy's best-kept secrets: a submarine detection system that floods entire ocean basins with high-intensity sound—and drives whales onto beaches. As Joel Reynolds launches a legal fight to expose and challenge the Navy program, marine biologist Ken Balcomb witnesses a mysterious mass stranding of whales near his research station in the Bahamas. Investigating this calamity, Balcomb is forced to choose between his conscience and an oath of secrecy he swore to the Navy in his youth.

When Balcomb and Reynolds team up to expose the truth behind an epidemic of mass strandings, the stage is set for an epic battle that pits admirals against activists, rogue submarines against weaponized dolphins, and national security against the need to safeguard the ocean environment. Waged in secret military labs and the nation's highest court, War of the Whales is a real-life thriller that combines the best of legal drama, natural history, and military intrigue.

Simon & Schuster, ISBN: 978-1451645026
Paperback, 448 pages, Reprint edition July 2015

This advertisement features a central graphic of a blue Android robot and a blue Apple iPhone both emerging from water splashes, symbolizing availability on both platforms. To the left is a silver HTC smartphone displaying its home screen with the time 10:08 AM. To the right is a black iPhone displaying its home screen with the time 9:42 AM. The background is dark with glowing blue highlights around the devices and text. The text "Now Available for Android!" is in large yellow letters at the top, and "DIVE INTO OUR APPS" is in large blue letters below it. To the right, it says "And on iPad and iPhone!". At the bottom, the text "OCEAN NEWS" is in large yellow letters, followed by "& TECHNOLOGY" in smaller white letters. The website "www.oceannews.com" is listed, along with the contact information "www.oceannews.com • Contact 772-617-6836 for more information".

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OCEAN NEWS & TECHNOLOGY

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Angela Durkin from Baker Hughes has joined Maersk Drilling as chief operating officer. She was to assume her new role on 1 May taking over from **Jørn Madsen** and reports directly to chief executive officer Claus V. Hemmingsen. Durkin holds a master degree in electronics from the Technical University in Braunschweig, Germany. She started her career in Baker Hughes in 1996 as a MWD operator. She has held various positions such as business development manager, country manager for Denmark, vice president for operations and technical support. Her latest role was as corporate vice president for health, safety and environment. "Angela brings vast experience with her from Baker Hughes, and with her technical competencies and enormous international experience from an oilfield service provider in the drilling industry, she is just the right fit for Maersk Drilling," Hemmingsen said. Madsen will take up the position as CEO for Maersk Supply Service.

ABS Group of Companies, Inc. appointed **Todd Grove** as its 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). He has more than 30 years at ABS, in various senior technical and operational management roles across the world. 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 International Energy Agency (IEA) elected Turkish economist **Fatih Birol** as executive director. The current executive director, Maria van der Hoeven, a former Dutch economy minister, took over in September 2011 and will complete her stint at the end of August. Birol has served as chief economist at the IEA for the last 9 years of his 20-year tenure at the West's energy agency, which was founded in response to the first oil shock in 1973-74 and coordinates the release of emergency oil stocks. Birol, who worked at oil cartel group OPEC before joining the IEA in 1995, has been responsible for its World Energy Outlook, the IEA's flagship annual



Todd Grove

report, which is closely followed by energy markets. The IEA, which has 29 member states, said in a statement the appointment marked one of the rare occasions that the head of the agency had been selected from within its ranks.

Helix Energy Solutions Group, Inc. said that effective 11 May **Cliff Chamblee** was to retire after 36 years in the offshore services business and would resign as executive vice president and COO. Also effective 11 May, **Scotty Sparks** was 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 also served in various positions within Helix's robotics subsidiary, including as senior vice president, during his tenure at Helix. Prior to that Sparks 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. Helix Energy Solutions Group, headquartered in Houston, Texas, is an international offshore energy company.

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Ocean News & Technology



MCE DEEPWATER DEVELOPMENT 2016

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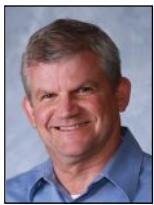
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Chet Morrison Contractors announced two changes to its senior management team. **Leroy Guidry** has been named president of Chet Morrison Contractors. In addition to this new position, he will continue to serve as chief financial officer, a position he's held since 1998. He has over 30 years of experience in the oil and gas industry, primarily in executive management positions. Guidry has played a key role in the growth of the Chet Morrison Contractors over the past 16 years, and he will be responsible for providing leadership to the senior management team as well as developing and executing corporate strategy. **Kelly Reeves** has been named vice president of marketing. Since 2007, she has served in various positions throughout the company and most recently as marketing manager for Chet Morrison Contractors and has been an essential part of promoting the company's image and position within the marketplace. With this new role she will be responsible for developing marketing and corporate business development activities to support and promote sales.

Wave energy company Aquamarine Power has appointed **Dr. Paddy O'Kane** as the company's chief executive officer, replacing interim CEO John Malcolm who has stepped down after 6 months in the role. O'Kane has been Aquamarine Power's chief technical officer since 2010. Prior to this he was head of engineering and wind resource assessment at SSE Renewables, with responsibility for the technical design and specification of almost £3 billion of renewable projects.

Seatrronics Ltd, an Acteon company and part of its survey, monitoring and data business, has promoted **Phil Middleton** from deputy managing director to group managing director. Middleton will be responsible for managing and developing Seatronics' global business with a particular focus on long-term growth, strategy and compliance. Middleton holds an honours degree in electronic and electrical engineering from Robert Gordon University, and began his career with Scientific Drilling Controls before expanding into survey industry roles.



Guidry



Reeves

ValvTechnologies, Inc., the global leader in the design and manufacturing of zero-leakage severe service isolation valve solutions, has named **Ricky Ford** upstream oil and gas industry director, announced company President Kevin Hunt. Based in Houston, Ford will have global management responsibility for ValvTechnologies' upstream oil and gas group and activities worldwide as well as long-term vision strategies for development and growth in the upstream severe service market. With almost 20 years in the oil and gas industry, Ford brings strong leadership skills and experience to the company. For more than 17 years, he served Curtiss-Wright Corporation in several roles including senior vice president, global sales and marketing, general manager, valve systems & controls (coker division) and Gulf coast sales manager, DeltaValve (a division of Curtiss-Wright). Most recently Ford served as president of American Energy Services, a licensed API 6A and API 6D valve manufacturer providing engineered valve solutions for offshore production and pipeline applications.

Ocean Signal Ltd, an innovative supplier of marine communication and safety equipment, has announced it has been acquired by **Drew Marine Ltd**. The business will operate as a unit of ACR Electronics, Inc. (ACR), a global leader in safety and survival technologies. Combining two of the most highly experienced electronic engineering teams in the marine communication industry, ACR and Ocean Signal now have the in-house capabilities to develop the next generation of survival products for the marine, land, military and aviation markets.

Crowley Maritime Corp. and **Svitzer** have reached an agreement to merge their salvage divisions to create a new company named **Ardent**. The company will be equally owned by Crowley and Svitzer and will commence operations on 1 May 2015. Svitzer Salvage, a longstanding market leader in emergency response, and Titan Salvage, a leading wreck removal company among other things known for raising the Costa Concordia, will bring together their strong heritages and expertise in an entirely new entity that will offer customers an even broader range of capabilities and marine related services.

UTEC Survey has announced the merger of **NCS Survey**, with its Aberdeen-based operations **UTEC Survey Construction Ltd** to form one organization in EMEA – **UTEC NCS Survey**. UTEC and NCS are both part of the Acteon group of companies that specializes in subsea services. The combination of UTEC and NCS provides a wide range of solutions for offshore positioning and construction support, which includes rig moves, heavy lift, AUV services, geoscience as well as industrial measurement/dimensional control and asset management support.

Kongsberg Oil & Gas Technologies

AS, a wholly owned subsidiary of Kongsberg Gruppen ASA (KONGSBERG), is pleased to announce a non-exclusive cooperation agreement with **KBC Advanced Technologies** plc to develop stronger simulation software integration and more effective engineering and operation workflows. The objective is to enable the oil and gas marketplace to respond to the demand for significantly better production economics while substantially reducing the cost of design and production over field life. The cooperation agreement defines joint technology integration activities, joint consulting and services offerings, and coordinated sales and marketing activities. Both companies have signed mutual license agreements to immediately enable cross selling of integrated software solutions.

Sonardyne Brasil Ltda., specialists in subsea navigation and positioning technology, has opened its second office in the country. Strategically located in the Energy Industries Council (EIC) building in downtown Rio de Janeiro, the new office will act as a commercial and technology training hub, supporting the company's main operational headquarters in Rio Das Ostras, 180 km to the north. The opening of the new satellite office not only reaffirms Sonardyne's commitment to ongoing investment in this growing market, but also positions the organization closer to the commercial center of its key customer base. Sonardyne's acoustic and inertial navigation equipment is operational in every deep water field around Brazil and is used to navigate underwater vehicles, install seabed structures and position multiple surface vessels. Operating from EIC's Rio de Janeiro office will allow Sonardyne to have greater contact with its clients in order to identify and better understand their current and future requirements.

Gallatin Marine has executed an MSA with **Tidewater Subsea** to provide work-class ROV services on board the AMC Ambassador DP2 Jones Act vessel. The vessel is equipped with a 60T AHC knuckle boom crane, and is currently providing IRM services primarily in the Gulf of Mexico. Tidewater Subsea has mobilized a 150 hp FMC Schilling HD work-class ROV on board. Projects have been successfully completed for Bennu Oil & Gas and Noble Energy to date.



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UNDERWATER COMMUNICATION AND POSITIONING SOLUTIONS

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S2C TECHNOLOGY: COMMUNICATION AND TRACKING COMBINED

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- low power consumption for autonomous operations
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- flexible SiNAPS positioning software
- reliable data transmissions
- range: up to 8000 m
- accuracy: up to 0.04 degrees

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- data rate: up to 62.5 kbps

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