News for the Ocean Industry
Ocean News & Technology
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May 2011

AUVs and Gliders
For Science, Defense, and Oil & Gas Applications

LEDs – the Choice for Underwater Lights

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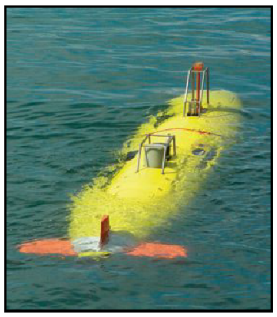

Offshore Industry

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Institute of Nautical Archaeology excavation of 9th-century Byzantine shipwreck at Bozburun, Turkey using BIRNS Snooper lights

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in the next issue

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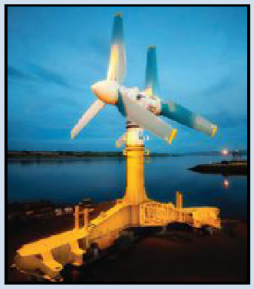

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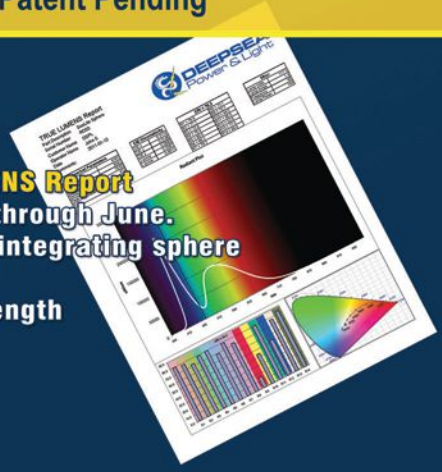

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By Dan White

Ocean News & Technology

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AUVs are here at last

AUVs and gliders are now being used for science, defense and oil & gas

I can remember years ago, at a long-running AUV conference in Connecticut, there were no AUVs built and operating, just talk about how they would benefit the industry. Some attendees boldly argued that "AUVs were a solution looking for a problem."

But the smart ones knew that as the technologies improved, they would become a workhorse just like their tethered cousins, the ROVs.

As demonstrated in the following pages, propeller-driven AUVs and gliders are now being used regularly for science, defense, and oil and gas. Their performance vastly outweighs their cost, supporting the capex vs. opex arguement.

Their success is impressive, with vehicles such as the Hugin, Remus, and Gavia used for both military applications and in commercial survey work. The AUVs ability to find mines or other objects of interest and perform large multibeam surveys of the seafloor have proven it to be a fast and economical tool for the industry.

Even more impressive is the project underway off West Africa where an AUV is being designed for use in a deepwater oilfield for inspection, repair, and maintenance (IRM) tasks. French company Cybernetix S.A. is developing the SWIMMER a hybrid AUV-ROV, which, in simple terms, is launched in AUV mode and programed to dock in multiple locations in a subsea deepwater field where, once docked, deploys an ROV to perform IRM tasks. The docking stations at multiple locations in the field provide power and command and control of the ROV.

And now a new type of AUV has emerged—the glider. Another concept that has been around for decades has now proven itself in several military and commercial applications. As opposed to traditional propelled AUVs, gliders use shifts in mass to steer and changes in buoyancy to dive and surface and can stay at sea for very long periods of time.

Highlighted by its trans-Atlantic crossing in 2009, the U.S. Integrated Ocean Observing System (IOOS®) glider operated by Rutgers University proved its endurance after a seven month journey from the U.S. to Spain.

In contrast, from 24 January to 11 February 2011, in the Ionian Sea to the southeast of Sicily, three gliders participated for the first time in an anti-submarine warfare (ASW) exercise. During Proud Manta 11, NURC — a NATO Research Centre in La Spezia — successfully used the gliders to collect in situ, three-dimensional environmental data to support military operations.

According to Andrew Shepard, the Associate Director, of the Cooperative Institute for Ocean Exploration, Research and Technology at the University of North Carolina Wilmington, the first step in this transition of emerging technologies is recognition of AUV technologies' integral role in strategic plans.

The Navy has had an AUV Implementation Plan since 2004, which has sparked development of many of today's unmanned platforms. The National Oceanic and Atmospheric Administration (NOAA) is not far behind.

The NOAA Next Generation Strategic Plan calls for deployment of "Autonomous Underwater Vehicles (AUVs) and Unmanned Aircraft Systems (UASs) to explore hard-to-observe regions such as deep oceans and the Arctic." NOAA's Office of Ocean Exploration also has a Strategic Plan now in final review that states they want to be a NOAA and national focal point for the design, development, deployment, testing, and evaluation of new marine technologies and tools including instrument systems, sensors, and platforms [including AUVs].

A new report, "Remotely Operated Vehicles (ROV) and Autonomous Underwater Vehicles (AUV) in the Energy Market 2011-2021," says ROVs and AUVs are a vital component of subsea work, especially where great depths and extreme environments create challenging conditions. The report states that the global ROV and AUV market in the energy sector was worth $1.27B in 2010.

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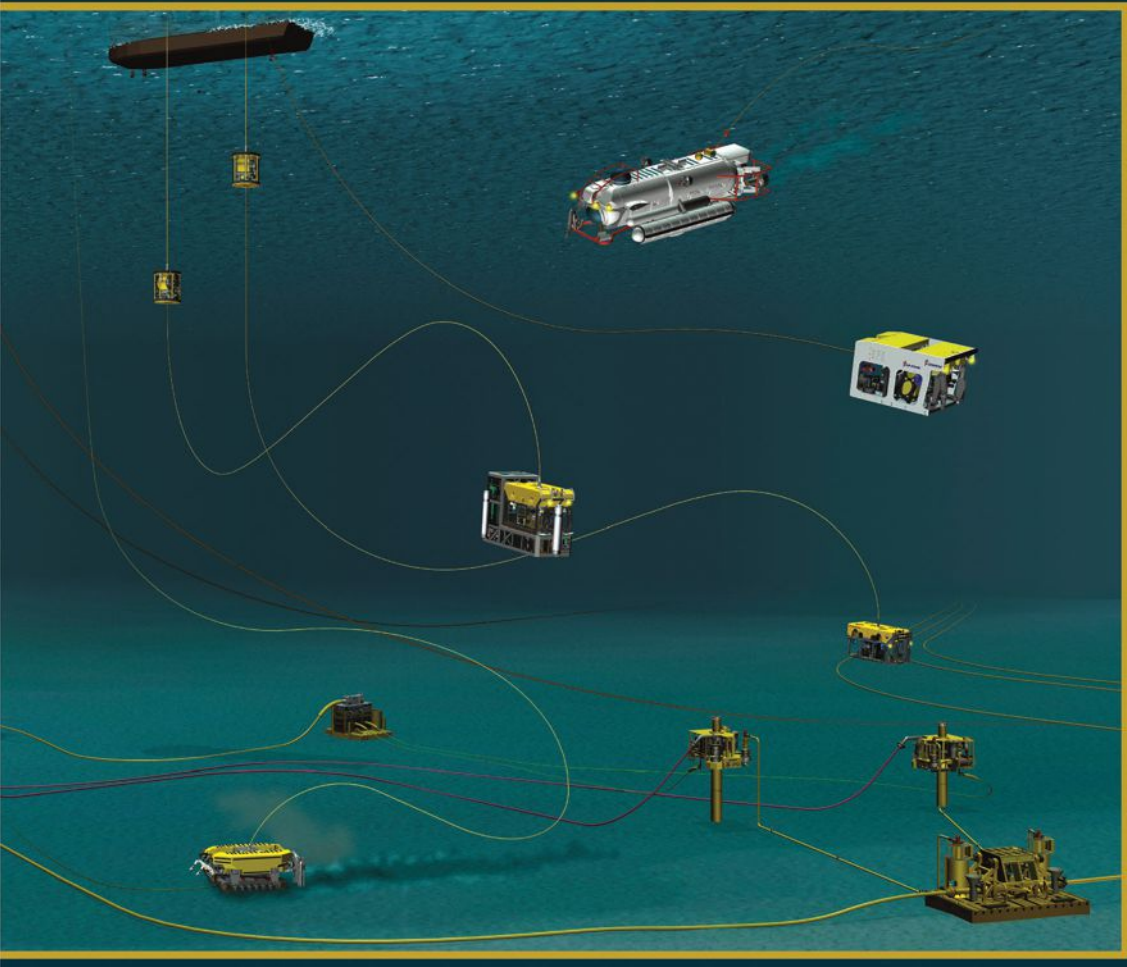

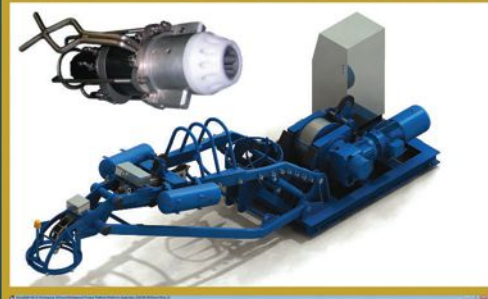

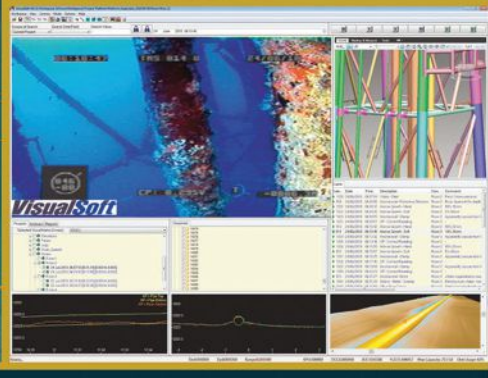

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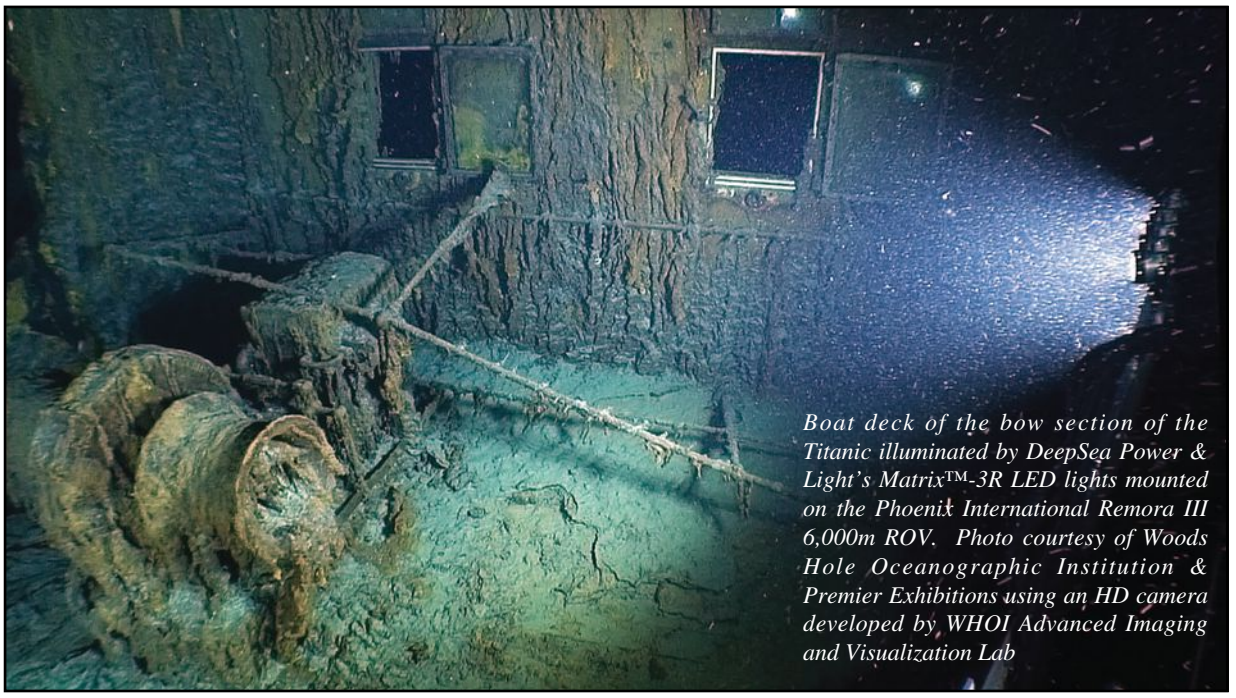


Boat deck of the bow section of the Titanic illuminated by DeepSea Power & Light's Matrix™-3R LED lights mounted on the Phoenix International Remora III 6,000m ROV. Photo courtesy of Woods Hole Oceanographic Institution & Premier Exhibitions using an HD camera developed by WHOI Advanced Imaging and Visualization Lab

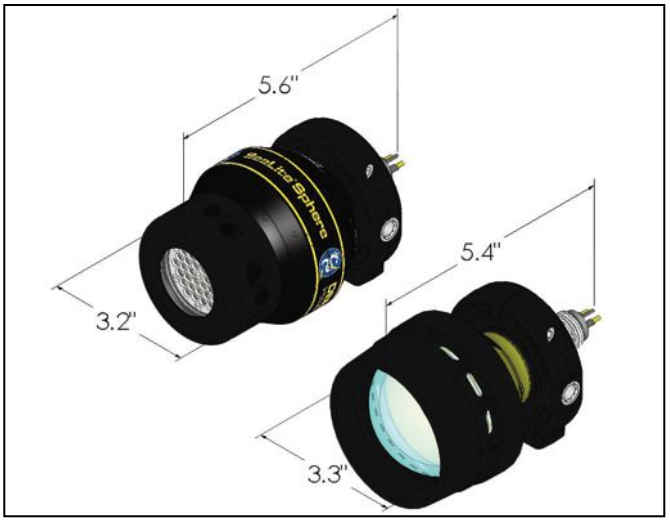
LEDs Are Now the Choice for Underwater Lights

John Chew, General Manager,
DeepSea Power & Light

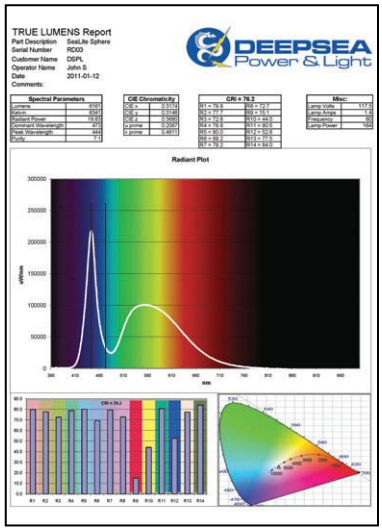
In the picture above, the boat deck of the bow section of the Titanic looks almost like it is illuminated the same as one would illuminate a room in their house. Flip a switch and the light goes on. It's that simple, right? Well, in the end, it really is just a matter of applying power to the light, but there was a long development path for those LED lights before they ever got near the Titanic.

The history of the Light Emitting Diode, or LED, started in 1907. It took decades before LEDs found their initial practical application as indicator lamps in the 1960s. And it took several more decades of ongoing improvements before they became popular for a much wider range of lighting applications. LEDs began being used for underwater lighting in the 2000s and they are now taking over as the industry standard. This is not surprising when one considers that today's standard LED lights can provide about 3.4 lumens of light per dollar versus about 2.3 lumens per dollar for a halogen light, both in housings rated for 6,000m depth – nearly a 50% advantage for LED lights over the previous standard underwater lighting technology.

Compared to other forms of lighting technology, LEDs are inherently rugged and efficient with a long expected lifetime – all key factors for underwater use. But to be successful underwater, lights also have to be easy to operate and perform reliably. This requires driver electronics, sometimes called ballasts, to condition incoming power and enable dimming. To maximize light output, as many LEDs as possible are typically squeezed within the pressure housing. Today's underwater LED lights should be able to provide 5,000 to 6,000 lumens of light with input power consumption of 160 watts or less. This is approximately four times more efficient than the previous



The SeaLite® Sphere represents current underwater LED lighting technology in a 6,000m housing that is about the same size as the Deep Multi-SeaLite halogen light which it replaces in a 'plug & play' manner



A useful accessory for successful LED lighting technology is a report that documents true lumen output as well as dominant and peak wavelength, CIE chromaticity, and color rendering index

halogen lighting technology, leaving more power available for other uses such as thrusters, manipulators, and instrumentation, which is of particular importance for AUVs operating on batteries.

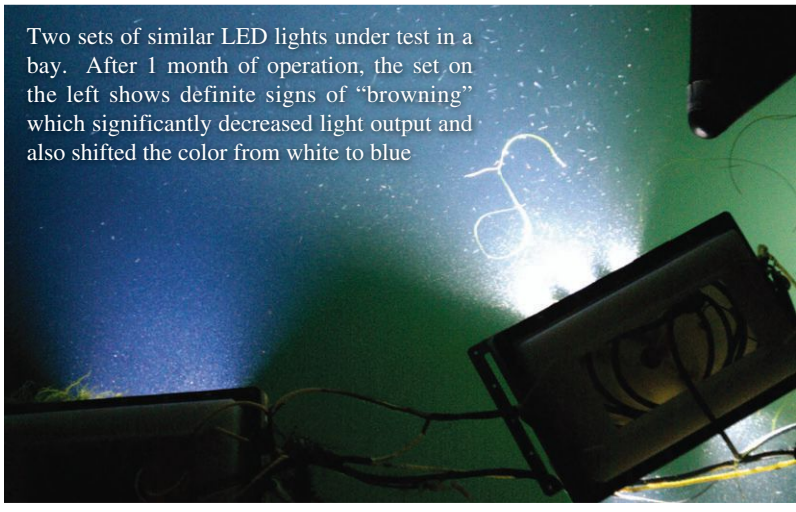
Properly designed underwater LED lights can be "plug & play" replacements for halogen lights. They can operate using the same wide choice of connectors, the same input power (120VAC or low voltage DC), and the same dimming controls (variable voltage or phase control dimming) as the halogen lights that they replace. This makes it easy for underwater operators to significantly upgrade the lighting that they use without encountering complex or costly changes in the process.

For many years, the light output of underwater halogen lights has been estimated simply by using the bulb manufacturer's specification. The output of LED lights were initially estimated in a similar manner by multiplying the LED manufacturer's output specification for each LED times the number of LEDs used in each light. Such calculations ignore several factors, including reflector design, window transmittance, and driver efficiency. Tests recently conducted on a number of popular LED lights indicated that the output specifications published for those LED lights were overstated by 40% and more. LED lights are now available with a report of measurements made using a calibrated integrating sphere that accurately determines the true total lumen output. These reports ensure users that the light outputs meet or exceed the manufacturer's stated lumen specification before they are sent offshore and installed on a vehicle. These reports also include dominant and peak wavelength, CIE chromaticity, and color rendering index, all of which can be useful information above and beyond just knowing how much light output one is actually obtaining from the light.

Light color temperature is another area where LEDs offer some advantages. Halogen lights typically operate with a color temperature of about 3,000°K; HID and HMI lights typically operate in the range of 4,000°K to 7,000°K. The most efficient LEDs typically operate at about 9,000°K, which is even better for most underwater viewing, especially for driving lights for ROVs. However, if a user desires, some of the more advanced underwater LED lights also offer a mix of LEDs of varying color temperatures to achieve an overall color temperature of about 6,000°K for users who prefer a warmer light. This is sometimes requested by customers who want to use a warmer light for their underwater photography.

Underwater LED lights with 5,000 to 6,000 lumen output also compare favorably against incandescent lights in terms of light output per pound of weight, another important characteristic to be evaluated when selecting optimum lighting for underwater activities. A 6,000 lumen LED light provides about 22.5 lumens per gram while previous halogen lights offer about 13.2 lumens per gram, again comparing both in housings rated for 6,000m depths. One could have more LED light for the same weight as previous halogen lights or equal light with less weight on the vehicle. This can translate into power or thrust savings or both, perhaps not in significant quantities for work vehicles but for smaller vehicles on missions with longer deployment times, especially for AUVs operating on self-contained battery power.

One unique aspect of LED lighting that requires caution on the part of the user is browning of the LEDs. Browning is a phenomena in which a coating develops inside of the LED envelope itself, resulting in decreased light output to the point where a browned LED light is actually less efficient than a halogen light. Browning can be caused by overheating and by chemical contamination within the lighting fixture. Some lights can lose 50% or more of their output after less than eight hours of use if care is not exercised in the design. LED lights should be rigorously and relentlessly tested prior to release of the product and then light output measured during and after production in order to catch the browning phenomena. Although thorough design testing can typically eliminate browning due to overheating, it is more difficult to detect potential contamination that can cause browning that has an equally devastating effect on light output. The contaminants might come from varying production processes and the browning may occur relatively slowly, taking many hours to become visible to the naked eye. Once installed next to a camera, the effects of the browning will be masked until the camera's automatic compensation circuits can no longer compensate for the decreasing light, at which time it will finally be obvious to the user that the lights are not functioning as expected and need to be replaced. This unwelcome surprise can be avoided if the output is measured in an integrating sphere during and after



Two sets of similar LED lights under test in a bay. After 1 month of operation, the set on the left shows definite signs of "browning" which significantly decreased light output and also shifted the color from white to blue

continued next page

An advanced remote head system configuration with three remote LED light heads and a single ballast housing containing the drivers for all remote heads. Housing material in this case is beryllium copper for use in a special long-term immersion application

assembly to ensure that light output has not unknowingly decreased due to browning of the LEDs, even if undetectable to the human eye in the early stages.

Most underwater LED lights include a mechanism to sense when the internal temperature gets high enough to compromise the safe operation of the electronic components. Some lights simply shut the light off until the temperature falls within acceptable limits. More advanced underwater LED lights incorporate a graceful fold back arrangement in which the light output is decreased but not turned off. As the light output is decreased, the internal temperature of the light also decreases, automatically returning full power when the temperature is again at a safe level. This enables an ROV to avoid blackout situations and also enables the light to be run safely in air for long time periods during on deck tests.

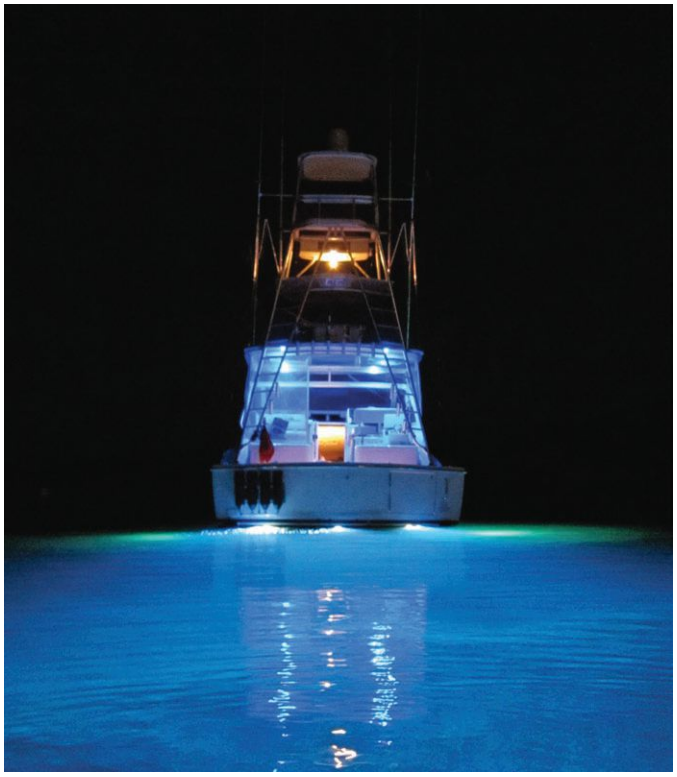
While most LED lights are designed to replace the 250-watt halogen light that was the standard light used on most ROVs used in offshore oil applications, LED lights have also been replacing higher power HID lights used on ROVs for research and filming missions. These LED lights can produce greater than 18,000 lumens or 50% more light than a 400 watt HMI light. Such lights could also be useful as "headlights" positioned on the brow of most offshore oil work class ROVs.

The most advanced configuration of LED lights is to position tiny remote LED light heads where needed around the ROV while individual drivers for each remote light head are housed together in one or more central housings. This takes advantage of the small size of the LED light heads without their accompanying driver electronics. This system design can help with balancing and weight distribution of a vehicle by locating the relatively larger and heavier ballast close to the center of gravity and positioning the tiny and lighter remote light heads wherever the lights are needed to optimize the lighting tasks at hand. This configuration can also save on overall cable weight.

As a testament to the ability of underwater LED lights to withstand high vibration and normal in-air usage, it is interesting to note that DeepSea Power & Light also designs and manufactures LED lights that are used as underwater thru-hull lights on recreational boats.

The goal of this application is primarily one of aesthetics with some fishing boats taking advantage of the ability of the lights to attract fish. The lights are most often mounted on the transom where they experience a high vibration environment. While they are underwater when the boat is at rest, the lights are often kept on when the boat is running, which means they are operating out of the water. And of course, the lights are typically constantly in the water for several months at a time, even when not powered on. The basic ruggedness of LED lights proves their value in these applications as does the automatic thermal control circuitry.

As a world-leading supplier of underwater lights and cameras, DeepSea consistently strives to optimize its underwater LED lighting designs. LED technology has been improving at a rapid rate, and DeepSea has kept pace by designing and manufacturing six "generations" of underwater LED light designs over the past 6 years, culminating in today's SeaLite Sphere underwater LED light which typically provides 6,000 lumens of light with graceful thermal rollback and a patented mechanical construction that provides maximum LED density in a high-pressure housing, along with test and measurement documentation that guarantees the lights perform as expected when subsequently installed in the field. Further improvements will no doubt take place, but today's LED lighting has already laid claim as the preferred technology for underwater lighting of all types.



Because of their excellent vibration resistance and long life, underwater LED lights are also used for thru-hull applications on recreational boats. This 36-ft. Cabo sportfishing boat has three white, three blue, and three green 12-LED On-Hull SeaLites® mounted below the water line in its transom as well as one white 18-LED Thru-Hull SeaLite mounted on each side

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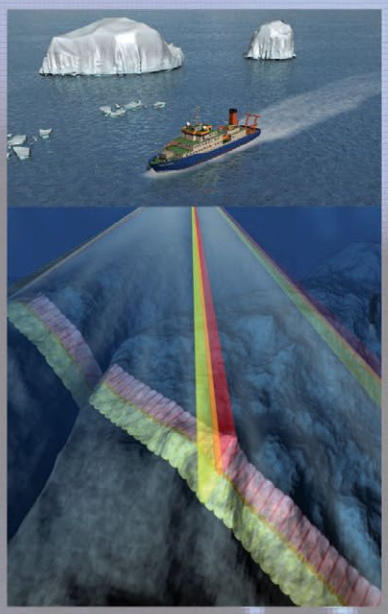

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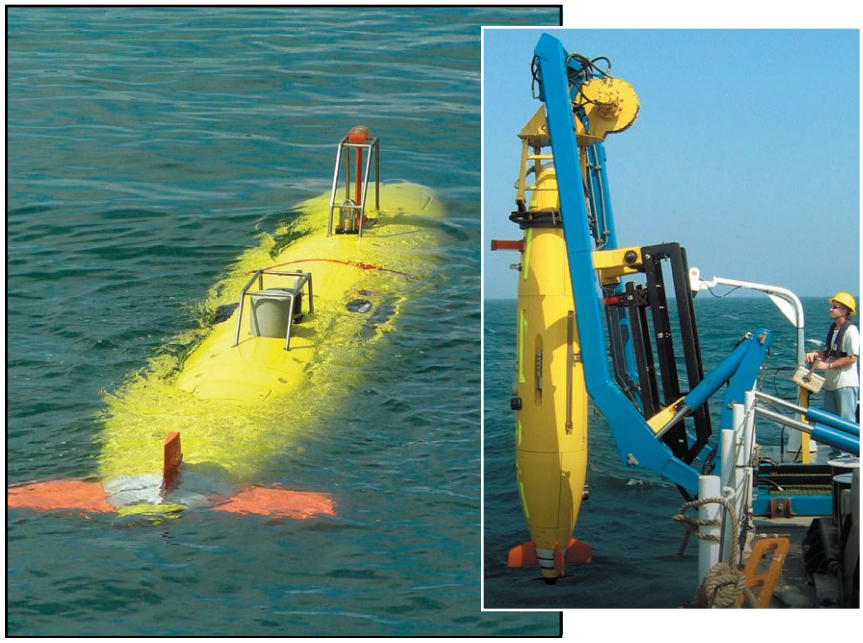
Hydroid REMUS 6000 AUVs aid in Flight 447 location



Hydroid, Inc., a subsidiary of Kongsberg Maritime, the leading manufacturer of Autonomous Underwater Vehicles, announced today that three of its REMUS 6000 AUVs aided in the search for and discovery of wreckage from downed Air France Flight 447 nearly two and a half miles below the surface off the Atlantic Ocean off the coast of Brazil. The Airbus A330-200, traveling from Rio de Janeiro to Paris, crashed on 1 June 2009, after encountering severe thunderstorms.

The search team, led by the Woods Hole Oceanographic Institution (WHOI), employed two REMUS 6000 vehicles owned by the Waitt Institute for Discovery and another owned by Leibniz Institute of Marine Sciences (IFM-GEOMAR). The vehicles, capable of autonomous operations in up to 6,000 meters of water, can stay below the surface for as long as 20 hours.

One week into the search, on 3 April 2011, through the use of the Hydroid REMUS 6000 vehicles equipped with EdgeTech dual-frequency side scan sonar and 4 megapixel digital cameras, searchers discovered large pieces of debris, including parts of the aircraft's wings, engine, landing gear, and fuselage. This was the fourth search mission since the 2009 crash.

"Time and again, REMUS vehicles have proven themselves as exceptional tools for the most critical missions," said Christopher von Alt, president and co-founder of Hydroid.

The REMUS 6000 AUV is the deepest member of Hydroid's growing family of AUVs. It was designed under a cooperative program involving the Naval Oceanographic Office (NAVOCEANO), the Office of Naval Research (ONR), and WHOI in support of deepwater autonomous operations. The vehicle boasts the same proven software and electronic subsystems found in Hydroid's highly successful REMUS 100 AUV and is capable of carrying a payload to great depths in order to measure ocean water characteristics and map the seabed.

For more information, visit www.hydroid.com.

NCS Survey gets Technip contract

NCS Survey, of Aberdeen, has been awarded a Frame Agreement by Technip UK Limited for the Provision of Survey Services. Operating a number of subsea construction and installation vessels in the North Sea, Technip has an ongoing requirement for the provision of survey and positioning services onboard their vessels. The Frame Agreement commenced on 1 January 2011 and is valid for 3 years with the option to extend (www.ncs-survey.com).

IMCA publishes offshore checklist

Survey contractors, ROV contractors, pipeline installation contractors, and their clients have a variety of in-house checklists for mobilization of offshore survey operations. Now, the International Marine Contractors Association (IMCA) has provided a standard framework for an industry-wide list in its new publication "Mobilization Checklist for Offshore Survey Operations" (IMCA S 016). The slim document provides a framework to build either a brief or detailed mobilization checklist for survey support operations and could be expanded to cover any offshore survey operation. The extent of the checklist developed depends on the complexity of the survey. IMCA members can download the document free of charge from the members-only website with printed copies available at £2.50 for members and £5.00 for non-members. Copies can be ordered from www.imca-int.com/publications.

Activists continue Arctic oil rig occupation

At press time climbers, from the environmental group Greenpeace were still occupying a huge oil rig that departed from Turkey bound for a deep water drilling operation in the Arctic. Campaigners boarded the 53,000 tonne rig at dawn in a bid to stop it. The Leiv Eiriksson is currently navigating the Dardanelles Straits – a stretch of water that links the Sea of Marmara to the Aegean Sea – as it makes its way towards the High North and Greenland's Baffin Bay. The activists used inflatable speed boats to intercept the rig shortly after it left a port near Istanbul. A number of the volunteer climbers scaled the vessel and unfurled a banner demanding "Stop Arctic Destruction." They remain onboard as the giant rig approaches Greek waters. "At some point Cairn will have to stop this rig. Until then our volunteers have supplies to last for days," said Greenpeace campaigner Ben Ayliffe. The group says it is trying to protect one of the world's most precious natural environments from oil drilling.

Nations take first step towards global R&D collaboration in marine and ocean technology

ISTPCanada and OceansAdvance, alongside partners from across Canada, hosted a groundbreaking event that brought together senior leaders from Brazil, China, India, Israel, and Canada to explore new models of R&D collaboration that will help innovators capitalize on the $1.5 trillion global ocean economy.

More than 40 representatives from the five countries convened at the three-day Multilateral Roundtable on Innovation and Research Collaboration in Marine and Ocean Technology from 21 to 23 March 2011 in St. John's, Newfoundland and Labrador to establish actions that advance cooperative R&D and commercialization in this field.

This roundtable represents an important first step towards the establishment of a Global Centre of Excellence in Marine and Ocean Technology (GCEMOT). Under the leadership of OceansAdvance, the marine and ocean industry cluster anchored in St. John's, the GCEMOT approach would facilitate multilateral R&D projects among participating countries. Downstream, this Centre promises to stimulate new economic activity, wealth creation, and improved environmental stewardship across collaborating jurisdictions.

For additional information about these initiatives, please contact Sonya Shorey, Senior Communications Strategist, ISTPCanada, at: 613-851-9416 or sonyashorey@istpcanada.ca.

Restoration of Bimini mooring buoys underway

Replacement and restoration of mooring buoys used to protect sensitive reefs and dive sites from indiscriminate anchoring in Bimini is underway.

World-recognized diver Neal Watson, who with celebrated marine artist Guy Harvey opened Neal Watson's Dive Bimini operation at the Big Game Club earlier this year, said original mooring buoys had gone missing or had been badly damaged over the years.

The Guy Harvey Ocean Foundation awarded a grant to restore the buoys, which are used to identify and protect fifteen of Bimini's best dive sites.

Dr. Mahmood Shivji , director of the Guy Harvey Research Institute at Nova Southeastern University looks on as Guy

Harvey signs a mooring buoy that is being placed off the waters of Bimini (above).

OTC Brasil expands exhibition for new conference in Rio de Janeiro in 2011

OTC Brasil (www.OTCBrasil) is expanding its exhibition space because of strong company interest in participating in the inaugural event, scheduled for 4 to 6 October 2011 in Rio de Janeiro. The event is being held at Riocentro, and the expansion adds approximately 3,500 square meters of net additional space, bringing the total space to more than 14,450 square meters. National pavilions from China, USA, Korea, Norway, Denmark, and Finland are confirmed, and more than 50 Brazilian companies are exhibiting.

Northrop Grumman enters cooperation agreement with online maritime training

Northrop Grumman Corporation's Sperry Marine business unit is the first manufacturer to enter a cooperation agreement with Safebridge™ to provide online training for users of Sperry Marine's advanced VisionMaster FT™ ship navigation technology. Safebridge™ software programs allow students to complete online training specific to the navigation products installed on the ships they sail. Users can log on to the Safebridge™ server via the Internet to access a range of e-learning modes, a guided tutorial on the live system, self testing with feedback, and free play of the live system. Upon successful completion of the course assessment, students receive a certificate of competence (www.northropgrumman.com).

Bollinger receives SCA award

Bollinger Shipyards, Inc. was awarded the 2010 "Award for Excellence in Safety" by the Shipbuilders Council of America (SCA). The award was presented during the association's 5 April 2011 general membership meeting held in Washington, D.C. The Award for Excellence in Safety is given to member companies who have an end-of-year Total Recordable Incident Rate (TRIR) below the average SCA rate.

BNWAS: new IMO requirements

New regulations from IMO will require carriage of a Bridge Navigational Watch Alarm System BNWAS from 1 July 2011 for new ships over 150 GT and all new passenger ships. The overall goal is to reduce the risks of accidents due to incapacitated Officer On Watch (OOW) and create a safer environment at sea. The purpose of a BNWAS is to monitor bridge activity and detect operator disability, which could lead to maritime accidents, thus enhancing safety of navigation. Therefore, a BNWAS in operation on the ship's navigation bridge is expected to minimize the risk of ship accidents caused by an OOW becoming incapacitated during the watch.

ShipConstructor 2011 R2 released — speed increased up to 50%

The latest release of ShipConstructor CAD/CAM software offers performance enhancements and new tools to speed up the ship design and construction process. ShipConstructor Software Inc. is promoting the ShipConstructor 2011 R2 release of its AutoCAD- based program as a continuation of its strategy of being the most intuitive and efficient of all the major shipbuilding-specific CAD/CAM applications. "Shipbuilders have told us that slow, inefficient, complicated programs are unacceptable," said ShipConstructor Software Inc. CEO Darren Larkins. "In both mature and emerging markets, shipbuilders need to quickly find and train staff. They are also under increased pressure to increase efficiencies, so we have deliberately constructed software that we believe is the easiest to learn and use" (www.shipconstructor.com).

Waller Marine finalizes installation of largest floating power generation barges

Waller Marine, Inc. announced the successful installation of its recently constructed floating power generation barges into a prepared basin at Tacoa, Venezuela. The two 171-MW barges, each supporting a GE 7FA dual fuel industrial gas turbine, will quickly be connected to the grid and soon supply much needed power to Caracas.

The basin will be closed from the ocean this week for the installation of two large structural caissons, each having dimensions of 115 feet long by 16 feet wide by 26 feet high and weighing450 tons, which will be positioned at the entrance of the basin to house the power barges.

"When we started this project, we always knew this would be a major undertaking and represent one of our most significant challenges," stated David Waller, president of Waller Marine, Inc. "The successful completion of this project will allow an additional 340-MW average capacity to meet the long term power demands in Caracas."

For phase II of the project, Waller is also preparing two 180,000-barrel fuel storage barges, one fitted with a large reverse osmosis plant, which shall moor offshore Tacoa to supply diesel fuel and demineralized water to the floating power plant. It is proposed that the diesel fuel systems will be substituted by gas in the near future by a floating LNG storage and regasification facility designed and constructed by Waller Marine.

Waller Marine is forging new energy-efficient initiatives to several countries with its gas to wire technologies that involve relatively small-scale floating natural gas liquefaction, regasification, and storage systems as well as small-capacity articulated tug barge transport vessels with LNG-fueled propulsion systems. These initiatives have opened up significant opportunities for countries and areas of population to produce lower cost electrical power with simultaneous reduction in the emissions of greenhouse gases.

For more information, visit www.wallermarine.com.

Markey offers hybrid technology as a standard option

Markey Machinery has released its HYBRID power regeneration feature as a standard option for new Render-Recover™ equipped electric winches.

Following a long tradition of solid innovation, Markey first integrated its DEPGF-42 HYBRID Electric Hawser Winch into Foss Maritime's HYBRID Carolyn Dorothy in 2009. Since then, the operational capability and environmental efficiency of the Carolyn Dorothy exceeds all expectations.

Maritime websites and journals currently offer many articles about the high points of the successful blending of two proven technologies. The number of DEPGF-42 winches deployed in Foss Maritime's fleet clearly indicates their level of satisfaction with Markey's product.

Results of the University of California–Riverside study of the Carolyn Dorothy's operations in San Pedro Bay underscore the environmental and operational efficiency of blended HYBRID winches and tugs.

The dramatic November 2010 rescue of the stranded cruise ship Carnival Splendor by the Markey-equipped SMBC Monterrey provides a dramatic exclamation mark emphasizing the underlying strength and controllability of Markey's next generation technology.

For more information, visit www.markeymachinery.com.

Austal USA breaks ground on three new facilities

Austal USA held a combined groundbreaking ceremony to celebrate the start of work on three new facilities, including Phase 2 of the Modular Manufacturing Facility (MMF), a new office complex, and an additional waterfront Assembly Bay.

The ceremony was held at Austal USA's shipyard in Mobile, Alabama, where construction is underway on the U.S. Navy's Independence-class Littoral Combat Ship (LCS) program and the Joint High Speed Vessel (JHSV) program.

This event was attended by several notable dignitaries, including Alabama Governor Robert Bentley; Rear Admiral Joseph F. Campbell (Deputy Commander, Logistics, Maintenance and Industrial Operations, Naval Sea Systems Command); Mobile County Commission President Merceria Ludgood, and representatives from Senators Sessions and Shelby and Congressman Bonner's office.

At the ground breaking ceremony, Governor Bentley commented: "Thanks to Austal USA, hope and opportunity have been brought to those living along the Alabama Gulf Coast. Employment at Austal USA has increased from 113 employees in May 2004 to an employment level in excess of 2,000 today."

Located on Dunlap Drive in Mobile, Alabama, the Phase 2 MMF project will double the existing manufacturing floor space to 700,000 sq. ft. and add 30,000 sq. ft. of office space. When complete, the state-of-the-art facility will be capable of constructing six large aluminum vessels such as the Navy's LCS and/or JHSV per year.

New Head Vent System

The long awaited Head Vent System is now in full production. Boat builders and OEMs have been calling for this next-generation system, and Delta "T" Systems has delivered. The Head Vent System uses a single powerful blower to extract air from multiple heads on a vessel. It is compact, quiet, highly effective, and fully automatic.

The entire Head Vent System including the blower, the control unit, and the dampers is housed within a central, remotely-located plenum box.

The plenum box measures only 16-in. L x 12-in. W x 13-in. H. A single Head Vent unit is capable of ventilating up to four heads. The system is fully automatic and requires no input from the user. Each head is fitted with a highly sensitive motion detector. When a person enters one of the heads, the system automatically initiates the flow of air from that head. When the person leaves the head, the system remains on for a preset length of time in order to fully ventilate the space, and then shuts down automatically. The Head Vent System is also available in a manual version where the flow of air is started and stopped using a wall-mounted switch within each of the heads.

The new Head Vent System runs on 24 volts DC and requires only one exhaust port through to the outside of the vessel. It is simple to install, seamless to operate, and it will add value and true functionality to vessels.

If boatbuilders are tired of weak head fans that do little, if anything, except make noise, then it is time they take a look at Delta "T" Systems' new Head Vent System.

For more information, visit www.deltatsystems.com.

Surf Subsea, Inc.'s 292-ft. Surf Challenger makes a mark in the Gulf of Mexico

The Class II DP MSV, the Surf Challenger, has just completed intervention, maintenance, and repair operations for a major oil and gas company in the Gulf of Mexico. This job is just one of several that the vessel has worked on since its acquisition by Surf Subsea, Inc. in 2010. Equipped with a 100Te knuckle boom crane, a 113Te heave compensated, multi-purpose lifting tower, a 25-ft. X 23-ft. moonpool, and outfitted with two Triton XLS work class Remotely Operated Vehicles, the MSV has performed tasks from Tree Installations to Plug and Abandonment operations.

Speaking on the performance of the Surf Challenger, Wade Abadie, president and CEO stated, "We are pleased with the timely and efficient manner in which the Surf Challenger has completed the tasks assigned by our clients. The vessel still represents the first of her kind in the Gulf of Mexico, and we believe the quality and cost effectiveness of using a vessel of this type is a perfect example of how Surf Subsea intends to do business here in the Gulf and worldwide."

The Surf Challenger is well suited to carry out subsea construction and field development works, deepwater intervention tasks, flying lead installation, and jumper installation. If you are interested in securing your time slot for the Surf Challenger, please contact Jim McClaugherty or Wade Abadie at 281-305-4411.

Glen M. Paine SOCP President

Glen M. Paine, Executive Director of the Maritime Institute of Technology and Graduate Studies (MITAGS), the Pacific Maritime Institute (PMI), and the Conference Center at the Maritime Institute (CCMIT) has been elected to a one-year term as president of the Ship Operations Cooperative Program (SOCP).

SOCP is a non-profit cooperative dedicated to addressing common maritime operational issues. SOCP, with support of the Maritime Administration, brings industry,

labor, and government together to work on common challenges through identifying solutions that will improve vessel operations in the areas of safety, training, efficiency, and environmental stewardship. The Cooperative allows participating members to become involved in operational research that might otherwise not be economically feasible on an individual basis or possible within a single sector of the industry. SOCP, a unified industry voice, is making recommendations to state, federal and international regulatory organizations. The organization is open to all U.S.-based vessel operations.

For more information, visit www.socp.us.

Wärtsilä to supply total propulsion package for world's largest semi-submersible heavy lift vessel

Wärtsilä, a marine industry's leading solutions integrator, has been awarded the contract to supply a total propulsion package for a new semi-submersible heavy lift vessel. With an overall length of 270 meters, this ship is the largest of its type ever to be built.

The scope of supply for the contract specifies two Wärtsilä 6L38 engines and two Wärtsilä 12V38 engines for the ship's main propulsion and one Wärtsilä 6L20 auxiliary engine. Wärtsilä will also supply the reduction gear system, two controllable pitch propellers, two retractable thrusters, and one bow thruster. The equipment has been ordered by Hyundai Heavy Industries Co. Ltd, who will build the ship for the owner and operator, Dockwise Shipping BV, The Netherlands-based provider of transportation and logistics services for heavy marine applications. The vessel is scheduled to be launched in the fourth quarter of 2012.

The unique design of the vessel represents a new generation in heavy lift transport ships. It is an entirely fresh concept that is capable of transporting complete Floating, Production, Storage and Offloading (FPSO) units for the offshore industry.

For more information, visit www.warsila.com.

Coast Guard re-emphasizes the value of Operation Paddle Smart

The U.S. Coast Guard responded to a report of an unmanned canoe found adrift approximately three miles west of Beverly Beach, Oregon. After searching for approximately two hours, the Coast Guard suspended the search.

The canoe had no identifying markings on it that would enable the Coast Guard to contact the owner to determine if there was an emergency.

Due to situations similar to this, the Coast Guard would like to re-emphasize the importance of Operation Paddle Smart to canoe and paddle craft owners in the Pacific Northwest. Operation Paddle Smart is a Coast Guard initiative that provides free water-proof stickers for labeling owner identification and contact information to small paddle craft vessels.

In the event that the Coast Guard receives a report or discovers a paddle craft adrift, it has to assume the owner is in trouble and needs assistance until it can find evidence to support otherwise. As a result, the Coast Guard spends hundreds of thousands of tax dollars per year searching for potential people in distress when there was no one actually in danger.

The information on the Paddle Smart sticker can correct this problem by allowing response entities to quickly identify the vessel's owner and aid search and rescue planners in determining the best course of action.

ON&T suggests this concept extend to all watercraft in all parts of the world in addition to the Pacific Northwest.

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Ocean Science

Radiation concerns off Japan
High levels of radiation in the sea off the coast of Fukushima have raised concerns over harm to local marine life and the risk of contaminated fish, shellfish, and seaweed entering the food chain. Tests on seawater near the nuclear power plant showed that levels of radioactive iodine reached 3,355 times the legal limit on Monday, one of several peaks in recent days that have fallen rapidly as radioactive substances decayed and were steadily diluted and dispersed by ocean currents.

Arctic freshwater increasing
The freshwater content of the upper Arctic Ocean has increased by about 20% since the 1990s. This corresponds to a rise of approx.imately 8,400 cubic kilometers and has the same magnitude as the volume of freshwater annually exported on average from this marine region in liquid or frozen form. This result is published by researchers of the Alfred Wegener Institute in the journal Deep-Sea Research. The freshwater content in the layer of the Arctic Ocean near the surface controls whether heat from the ocean is emitted into the atmosphere or to ice. In addition, it impacts global ocean circulation.

Rising winds and waves
Ocean wind speeds and wave heights across the globe have increased significantly over the past quarter of a century, according to Australian research that has given scientists their first global glimpse of the world's rising winds and waves. Published in the journal Science, the research — the most comprehensive of its kind — used satellite data collected from 1985 to 2008. It shows the extreme wave height off southwest Australia's coastline rose to six meters on average, more than one meter higher than in 1985.

U.S. warns coastal Americans to take tsunamis seriously
In the wake of Japan's tsunami disaster, NOAA is urging Americans who live and vacation at the coast to take the threat of tsunamis seriously. With more coastline than any other country in the world and proximity to several major fault lines, the Pacific, Atlantic, Gulf, and Caribbean coasts of the United States are vulnerable to tsunamis. NOAA's National Weather Service, which operates the U.S. tsunami detection and warning system, says that the key to surviving a tsunami is staying informed and moving quickly to higher ground when a tsunami threatens.

Scripps library may close
With budget cuts arising on a regular basis, news of more casualties have been reported. The University of California, San Diego, however, is feeling the threat of tightening purse strings in a whole new way. For the students, scientists, and public that frequent the Scripps Institution of Oceanography (SIO) Library, Gov. Jerry Brown's proposed cuts could mean the end of an era: the largest library in the world dedicated to marine science will likely close this summer.

WHOI selects Teledyne Webb coastal gliders

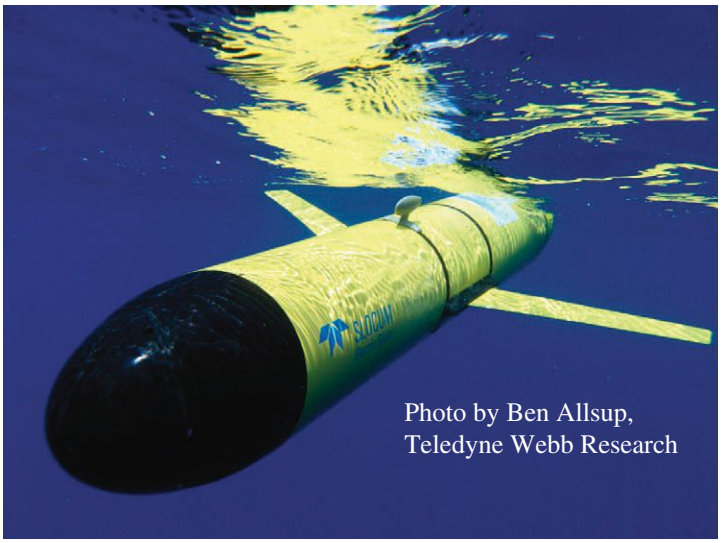


Photo by Ben Allsup, Teledyne Webb Research

The Woods Hole Oceanographic Institution (WHOI) and the Consortium for Ocean Leadership (OL) announced Teledyne Webb Research of East Falmouth, Ma., will provide coastal gliders supporting the Pioneer and Endurance Arrays of the Coastal and Global Scale Nodes (CGSN) for the Ocean Observatories Initiative (OOI).

WHOI, an implementing organization on the OOI Program, awarded the contract for approximately $260,000 to Teledyne Webb Research. Under the terms of the contract, Teledyne will make necessary design modifications to the company's "Slocum" glider in order to meet the CGSN specific requirements. Testing and production contracts, including the development of a prototype vehicle, will follow later this year. The first production units are scheduled to be delivered in April 2012.

Gliders are autonomous underwater vehicles that use buoyancy propulsion to travel through the ocean gathering data on ocean physical, bio-optical, and chemical properties such as temperature, salinity, chlorophyll, and dissolved oxygen. Their missions will last up to three months during which they will travel up to 1,800 km. While employed, they will relay their data to shore via satellite telemetry.

The OOI, a project funded by the National Science Foundation (NSF), is planned as a networked infrastructure of science-driven sensor systems to measure the physical, chemical, geological, and biological variables in the ocean and seafloor. As a fully integrated system, OOI will collect and disseminate data on coastal, regional and global scales. Through a unique cyber-infrastructure, OOI will make ocean observing data available to anyone with an Internet connection. Greater knowledge of the ocean's interrelated systems is vital for increased understanding of their effects on biodiversity, climate change, ocean and coastal ecosystems, environmental health and climate.

WHOI and its partners, Oregon State University and Scripps Institution of Oceanography, are responsible for the OOI coastal and global arrays and their autonomous vehicles.

Coastal gliders are modular and designed with the ability to maneuver and operate where the total water depth is as little as 30 meters and to sample to 1,000m in deep waters adjacent to the coast. The OOI coastal gliders will operate south of New England as part of the Pioneer Array and off the Pacific Northwest as part of the Endurance array.

Mauritius brings UNCLOS arbitration against the UK over the Chagos Archipelago

Peter Prows of the American Society of International Law brought ON&T Up to date on the dispute over the Chagos Archipelago. He says the Chagos Archipelago, which dots the heart of the Indian Ocean, is in the middle of a very 21st century international dispute. In April 2010, the United Kingdom, with the backing of ocean science and environmental groups, declared most of the exclusive economic zone (EEZ) of the archipelago a marine protected area (MPA) and off-limits to all fishing. Extending over a quarter-million square miles would be the largest "no-take" MPA in the world. The island of Diego Garcia, which houses a major U.S. military base, listening post, and occasional prisoner waypoint for the wars in Iraq, Afghanistan, and beyond, is excepted from the MPA designation.

Mauritius also claims title to the archipelago and asserts that Mauritius and the people who previously lived there (the Chagossians or Îlois) have rights to the archipelago's fisheries and other resources.

In early December 2010, the dispute between the United Kingdom and Mauritius came into sharp relief when the Wikileaks website published a leaked cable from the U.S. Embassy in London recounting a conversation with the Director of Overseas Territories in the UK Foreign and Commonwealth Office. He is reported to have suggested that the MPA was designated not for environmental reasons, but to prevent the Chagossians from returning to the islands and interfering with the Diego Garcia base.

On 20 December 2010, Mauritius instituted arbitral proceedings against the United Kingdom under the UN Convention on the Law of the Sea (UNCLOS). Mauritius seeks to resolve title to the archipelago and challenge the MPA. This suit has the potential to upend military operations at Diego Garcia and to address several important outstanding questions in international law.

On the merits, this case presents a conflict between the right of a coastal state to enact environmental restrictions on fishing in its EEZ and the rights of others to fish to protect their livelihoods. MPAs have become a favored tool of marine scientists, environmentalists, and policy makers to protect and conserve global fish stocks, as exemplified by the call in the 2002 World Summit on Sustainable Development to establish "representative networks" of marine protected areas around the world by 2012. But human rights groups have also raised concerns about the potential of MPAs to restrict disadvantaged peoples (like the Chagossians) from using those resources to improve their condition. This case presents an opportunity for the tribunal to decide whether the United Kingdom struck the right balance with this MPA.

Expedition to extend human intervention in mesophotic zone

Ocean Opportunity, a Rhode Island based not for profit organization, is pleased to announce a forthcoming expedition to explore and document the natural history of the mesophotic, or "middle light", zone from 200 to 500 feet in the Exumas, Bahamas from 28 April through 8 May to be hosted at the John H. Perry Jr. Caribbean Research Center — a facility synonymous with a long lineage of advancements in marine technology and innovations in ocean exploration.

This expedition is an extension of a successful November project to Andros,

Bahamas in which the team worked to 430 feet - more than 3 times the depth of conventional SCUBA diving.

November's expedition, made possible by a grant from the National Geographic Society's Waitt Grants Program, proved catalytic and has attracted a multidisciplinary team of collaborators, including well respected biologists, geologists, and technologists interested in accessing the unexplored Mesophtoic Coral Ecosystems (MCEs) to gather data from this alien environment. Collaborators include individuals from the American Museum of Natural History, the City University of NewYork, the University of Connecticut, and the University of Kentucky.

The deep diving team (including Jeff Godfrey of UConn and NGS/Waitt Grantee Michael Lombardi of Ocean Opportunity) will use advanced manned diving techniques to allow direct, hands-on access to the deep coral reef environment. Throughout the Bahamas, a vertical 'wall' provides a direct physical linkage from the shallows to more than 2,000 feet. These precipitous drop-offs are the focal point for investigation.

In November, the team conducted six dives deeper than 300 feet, with two deeper than 400 feet. Exploration diver Jeff Godfrey described the dives as "being like diving the Grand Canyon." These depths, especially pushing the lower limit of the mesophotic zone at sub-400 feet, provide an opportunity for very real demonstrations of the working capacity of humans in an extreme environment.

Lombardi commented, "We are continuing to gather data throughout these expeditions that will be analyzed to evaluate the in-water biomechanics and efficiency of humans working at depths considered the 'twilight zone' or 'innerspace' or 'mesophotic' (200 to 500 feet) in remote locations. This work represents a paradigm shift in scientific diving, as we are now demonstrating a rate of efficiency comparable to more conventional shallow water scuba. This is being done at low cost and with limited surface support and infrastructure. These deep excursions, while considered exploratory, are providing very real data to enable discovery and drive innovation by both U.S. and international collaborators."

Ambitious, yet critical undertakings for the project include science tasks to support a multidisciplinary collaborative team of biologists, ichthyologists, ecologists, and chemists from institutions including the American Museum of Natural History, the City University of New York, the University of Connecticut, and others.

When asked "why work to the frontier limits of manned exploration?", Lombardi states, "The reaction time, real-time decision making, and personal interaction offered by wet diving at these depths, as opposed to robotics use, brings the raw and intimate experience of human exploration back into the game. Nearly 70 years of marine science has been fueled by the ability to routinely access the shallow coral reef ecosystems — that excitement and creativity made possible by a researcher actually being there catalyzed the marine science field that we know today. We are on the verge of creating an opportunity for the next 70 years. This is a very exciting time for benthic marine scientists."

Imagery gathered will be hosted on www.mesophotic.org.

Nations take first step towards global R&D collaboration in marine and ocean technology

International Science and Technology Partnerships Canada (ISTPCanada) and OceansAdvance, alongside partners from across Canada, are coming together with delegates from Brazil, China, India, and Israel to explore new models of R&D collaboration that will help capitalize on the $1.5 trillion global ocean economy.

More than 40 senior leaders from the five countries convened at the three-day Multilateral Roundtable on Innovation and Research Collaboration in Marine and Ocean Technology from 21 to 23 March 2011 in St. John's, Newfoundland and Labrador to establish actions that will advance collaborative R&D and commercialization in this field. This roundtable represents an important first step towards the establishment of a Global Centre of Excellence in Marine and Ocean Technology (GCEMOT). Under the leadership of OceansAdvance, the marine and ocean industry cluster anchored in St. John's, the GCEMOT approach would facilitate multilateral R&D projects among participating countries. Downstream, this Centre promises to stimulate new economic activity, wealth creation, and improved environmental stewardship across participating jurisdictions.

The event culminated in a record that articulates high-level outcomes, enabling delegates to take the next steps within their respective countries and reconvene within one year to develop a collaborative action plan that supports the implementation of GCEMOT. The roundtable was organized and led by ISTPCanada and OceansAdvance with essential support from the Government of Canada (including Foreign Affairs and International Trade Canada and the Atlantic Canada Opportunities Agency), the Canada-Israel Industrial R&D Foundation (CIIRDF), the Government of Newfoundland and Labrador, the City of St. John's and the NRC Institute for Ocean Technology.

For additional information, visit www.istpcanada.ca.

GuLF STUDY

A new study that will look at possible health effects of the Gulf of Mexico's Deepwater Horizon oil spill on 55,000 cleanup workers and volunteers begins in towns across Louisiana, Mississippi, Alabama, and Florida.

The GuLF STUDY (Gulf Long-term Follow-up Study) is the largest health study of its kind ever conducted among cleanup workers and volunteers, and is one component of a comprehensive federal response to the Deepwater Horizon oil spill. The study is being conducted by the National Institute of Environmental Health Sciences (NIEHS), part of the National Institutes of Health, and is expected to last up to 10 years. Many agencies, researchers, outside experts, and members of the local community have provided input into how the study should be designed and implemented.

"Over the last 50 years, there have been 40 known oil spills around the world. Only eight of these spills have been studied for human health effects," said Dale Sandler, Ph.D., chief of the Epidemiology Branch at NIEHS and principal investigator of the GuLF STUDY. "The goal of the GuLF STUDY is to help us learn if oil spills and exposure to crude oil and dispersants affect physical and mental health."

Over time, the GuLF STUDY will generate important data that may help inform policy decisions on health care and health services in the region. Findings may also influence responses to other oil spills in the future.

The GuLF STUDY will reach out to some of the 100,000 people who took the cleanup worker safety training and to others who were involved in some aspect of the oil spill cleanup. The goal is to enroll 55,000 people in the study.

Working from lists of people who trained or worked in some aspect of the oil spill response, the GuLF STUDY will contact potential participants by mail, inviting them to take part in the study.

The NIH is funding the GuLF STUDY. A small part of the funds have been provided by BP made to NIH specifically for research on the health of Gulf area communities following the spill, though BP is not involved in the study.

For more information, visit www.niehs.nih.gov/GuLFSTUDY .

Ocean Energy

UHI to lead marine energy project
Lews Castle College UHI, part of the University of the Highlands and Islands, is to lead a key research project that could help to make the Hebrides one of the most valuable and sought-after marine energy sites in Europe. The wave power to the west of the Outer Hebrides is said to be one of the best in Europe, and UHI specialists will be working with others to explore the potential and address government renewable energy priorities for commercial development. The Hebridean Marine Energy Futures project – backed by £900k in Scottish Funding Council knowledge exchange grants announced 22 March – will develop and exchange skills, models, data, and strategies to inform the nation's marine energy industry. One of the tasks will involve constructing an energy resource assessment wave model of Hebridean waters.

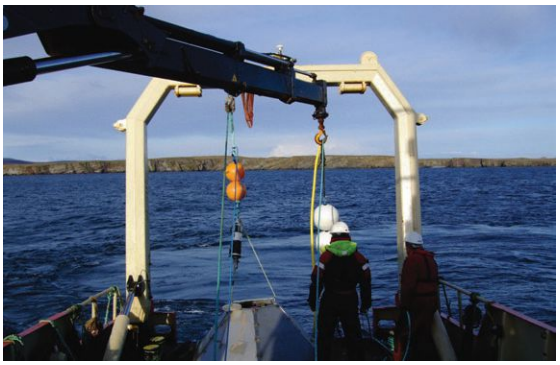
FoundOcean is awarded grouting contract for Walney Offshore Wind Farm
FoundOcean has been awarded the offshore grouting contract for Walney Offshore Wind Farm (OWF) Phase 2 substation installation by Volker Staal en Funderingen BV. The substation jacket is a four-legged steel structure with one pile sleeve per leg. The jacket will be secured to the seabed by injecting grout into the annuli between the pile and the sleeve. The type of cement used will be Portland Cement CEM I Type 52.5N. The jacket has been designed with a conventional grouting system with primary and secondary grout lines. The grout line connections are located on the work platform.

California boosts RPS to one-third renewables
A new California law requiring public utilities to get one-third of their electricity from renewable energy in less than a decade took effect on 13 April. Governor Edmund G. Brown, Jr. signed the legislation, which increases California's current 20% renewables portfolio standard (RPS) target in 2010 to a 33% RPS by 31 December, 2020. This makes it the highest such standard in the United States.

Obama outlines energy plan
President Barack Obama outlined his energy security plan on 30 March, calling for a variety of energy efficiency and renewable energy measures designed to reduce U.S. oil imports by one-third by 2025. The President said that when he took office, the United States was importing 11 million barrels of oil a day. Now, he believes that in little more than a decade, that amount can be cut substantially. The roadmap to achieving that goal is contained in the administration's "Blueprint for a Secure Energy Future," which was also released on 30 March.

Deepwater platform aims to harness offshore wind and wave power
Principle Power, Inc. of Seattle is using $1.4 million in funding from DOE's Office of Energy Efficiency and Renewable Energy to develop the WindFloat, which combines a floating offshore wind turbine platform with wave energy convertors, so the system can simultaneously generate electricity from the wind and the waves. It relies on a floating triangular platform submerged below sea level and anchored to the seabed by cables. The tower that supports the turbine is built on top of one of the columns that form the corners of the triangle. These vertical columns are ballasted to ensure that the turbine remains upright. Existing wind turbine designs can be installed on the platform because the design is so stable. Due to this floating design, the WindFloat could be placed in locations where water depth exceeds 50 meters, out of sight from the shore and where higher wind speeds offer superior electricity generation potential.

Partrac completes work at fifth UK site



Marine data experts, Partrac Ltd, have announced the successful completion of oceanographic measurements at a fifth tidal energy site in the UK. They have indicated that further measurements have already been programmed at three more sites in 2011. Partrac has also secured further contracts to undertake oceanographic measurements at two wave energy sites and an offshore wind site in the UK in 2011 / 2012.

Partrac's success in acquiring high-quality current profile (and wave) data at tidal energy sites comes as a result of high level expertise in oceanographic instrumentation, combined with innovative methods of equipment deployment and recovery designed by a highly experienced team of marine data experts.

By their very nature, tidal energy sites present a serious challenge to acquiring high-quality data. The limited tidal window in which to operate (only 10 minutes at some sites), is the most obvious problem to address. The issue is further complicated by irregular seabed conditions, including the presence of relict glacial boulder fields and rock fissures, all of which present difficulties in emplacing the kit securely on the seabed but which are largely unknown prior to getting out to the site.

With so much at stake for tidal energy developers, both in terms of the technical challenge and the financial commitment, the necessity to obtain highly accurate tidal data is critical to the entire development process. In response, Partrac has evolved with the industry requirements in order to meet the oceanographic challenges that each individual site presents, tailoring the methods used to the tidal and seabed conditions at each site.

As a result of this process, Partrac has now completed 28 individual deployments at tidal energy sites, in each case delivering 100% high quality data return. Partrac and itsteam are understandably very proud of this technical achievement.

Such is Partrac's success in the tidal energy market that it is now exporting the expertise abroad, with several projects in the pipeline. They have also further developed their data analysis capability and are able to offer high level processing including annualized power predictions, analysis of water column turbulence, extreme value analysis and the frequency-magnitude of wave-current interactions at sites. Partrac also offers guidance to developers on the stability of the seabed in the less energetic regions (e.g. cable route corridors and cable landfall). A firm understanding of each of these factors is essential for site viability, infrastructure integrity, and engineering design assessments.

For more information, visit www.partrac.com.

BOEMRE and Oregon form offshore renewable energy task force

The Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) held its first offshore renewable energy task force meeting with the State of Oregon. This inter-governmental task force was established to facilitate communication between BOEMRE and state, local, tribal and federal stakeholders concerning commercial renewable energy leasing and development on the Outer Continental Shelf (OCS) off the coast of Oregon.

The task force includes state government officials designated by the governor and officials from affected federal agencies, elected local government officials, and tribal leaders.

"BOEMRE created this task force to coordinate and consult with the State of Oregon and others on potential renewable energy activities on the OCS off Oregon," said BOEMRE Director Michael R. Bromwich. "We will work together with federal, state, local, and tribal stakeholders to consider issues and approaches relating to future offshore renewable energy leasing and development to support Oregon's energy goals and expand our nation's energy resource portfolio."

"The State of Oregon welcomes the opportunity provided by the task force to work with BOEMRE, federal agencies, and tribes, in setting the path for responsible and well-informed planning and management for renewable energy development of the Outer Continental Shelf. Oregon has designated the OCS as its' Ocean Stewardship Area under Goal 19 and the Territorial Sea Plan, which outlines our interest in the conservation and use of marine resources for their long-term ecological, economic and social value," said Robert Bailey, manager of Oregon's Coastal Management Program.

The task force meeting includes an overview of existing regulatory processes and discussions on how best to complement Oregon's ongoing ocean planning process when considering renewable energy development on the OCS.

In April 2009, President Barack Obama and Secretary Salazar announced the final framework for renewable energy development on the OCS. This framework establishes the process BOEMRE uses for granting leases, easements, and rights-of-way for offshore renewable energy development activities, such as the siting and construction of renewable energy facilities on the OCS. The framework also allows for BOEMRE to use task forces in carrying out its responsibilities for authorizing OCS renewable energy activities in partnership with state, local and federal agencies and tribal governments.

Elsewhere, task forces have been formally established with Delaware, Maine, Maryland, Massachusetts, New Jersey, New York, Rhode Island, Virginia, and North Carolina and are in the process of being established for South Carolina and Florida.

OPT awards four new contracts for Reedsport wave energy project

Ocean Power Technologies, Inc. (OPT), a leading wave energy technology company, announced it is awarding four major new contracts to Oregon companies in connection with the manufacture of its PB150 PowerBuoy® wave energy generating device, and its deployment off the coast of Reedsport, Oregon.

The new contracts, with the previously

awarded contract to Oregon Iron Works ("OIW") for the fabrication of the buoy's steel structure, or spar, takes the total invested by OPT in the local economy to over $6 million, creating or saving up to 100 manufacturing and marine services jobs at the four companies and their suppliers. The contracts will also indirectly generate additional jobs for suppliers and service providers in the local coastal communities and the Portland area. The project will lead to further job creation in the coastal areas for the continuing operations and periodic maintenance of the PowerBuoy after its deployment.

With these new contracts, OPT and Oregon are entering an exciting phase of Oregon's initiative to be a world leader in the responsible development of wave energy. After the initial PowerBuoy is deployed and tested off the coast of Reedsport, expected later this year, OPT plans to construct the first commercial-scale wave power station in the U.S., consisting of up to nine additional PowerBuoys and grid connection infrastructure, subject to receipt of all necessary regulatory approvals and additional funding. This wave energy array will be developed by Reedsport OPT Wave Park, LLC.

The four Oregon companies receiving the new contract awards are leaders in their industry. In alphabetical order, they are American Bridge Manufacturing; Cascade General, a subsidiary of Vigor Industrial, LLC; Oregon Iron Works; and Sause Bros., Inc.

For more information, visit www.oceanpowertechnologies.com.

Levant Power and Battelle join forces to develop ocean power harvesters

Battelle and Levant Power Corporation jointly announced the two companies plan to develop and commercialize wave energy harvesting technology for ocean systems. Providing consistent, uninterrupted power to sensors, vehicles, and communications systems for ocean borne-devices is an industry-wide challenge. Battelle and Levant say that challenge can be overcome by OceanGen power units, which could facilitate expansive deployment of advanced and innovative ocean-borne devices.

"The Navy and commercial markets have identified the delivery of new sources of underwater power as critical over the next decade," said Steve Kelly, Battelle President National Security Global Business. "The commercialization and deployment of OceanGen will herald a new era of advanced sensors and real-time awareness across a broad spectrum of applications."

The first two phases of the program will involve development and a technology demonstration. Levant and Battelle plan to jointly manufacture the OceanGen system.

Around the globe, thousands of buoys and seafloor-mounted and floating platforms derive nominal power from solar cells, battery packs, and, in extreme cases, diesel generators. The severely limited available energy, which currently comes in unreliable intermittent bursts, means real-time status for sensitive communication systems is greatly compromised.

The first OceanGen systems are targeted at weather buoys, oil and gas platforms, research platforms, and military applications requiring 50 to 100 watts of power, although future systems will have applications ranging from naval C4ISR systems to marine navigation and sensor platforms. Importantly, this technology can scale up to the kilowatt range, if required.

The work will supplement ongoing development within both organizations. Battelle currently is a world-leader in sensors, materials, and anti-biofouling techniques. Levant Power is a leader in hydraulic energy harvesting and ocean-energy technologies and has been actively developing OceanGen for the last year.

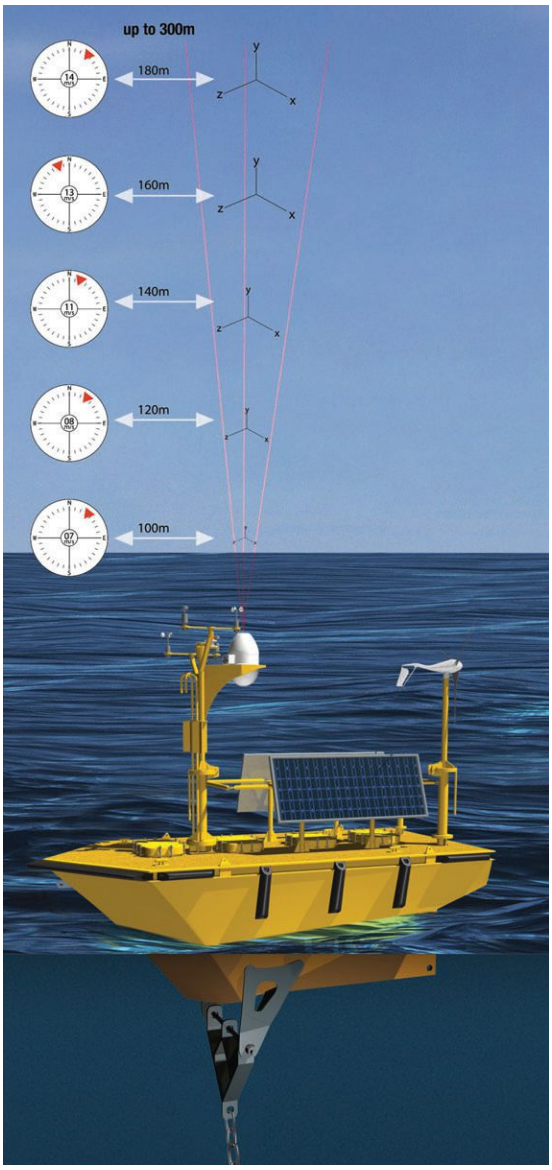
WindSentinel: North America's first offshore wind assessment buoy

Fishermen's Energy, LLC has recently confirmed their reputation as a leading innovator in the field of offshore wind farm development by purchasing the first of AXYS Technologies' WindSentinel™ wind resource assessment buoys to be deployed in North America.

The million dollar WindSentinel™ buoy represents a substantial cost savings over ocean-based meteorological masts, which cost $5 to $10 million, take a season to build, and require significant regulatory approval. As a floating platform, the WindSentinel™ can be built and deployed within six months of order and still provide the high level of accurate data required by the project.

It is important at this stage of the project that data gathered can be used by Fishermen's Energy to support future funding and development for the project, known in the industry as "bankable data". Fishermen's has already installed the WindSentinel's Vindicator® Laser Wind Sensor (LWS) onshore next to a traditional calibrated meteorological tower in order to verify accurate wind data.

The WindSentinel™ buoy will be deployed close to an onshore meteorological tower for a period of time to confirm the data quality prior to the final deployment at the site of Fishermen's planned 66 turbine wind farm in federal waters 12 miles off the coast of Atlantic City. The buoy will collect data not only for wind resource assessment, but will also acquire a full range of environmental and weather data, including avian activity.

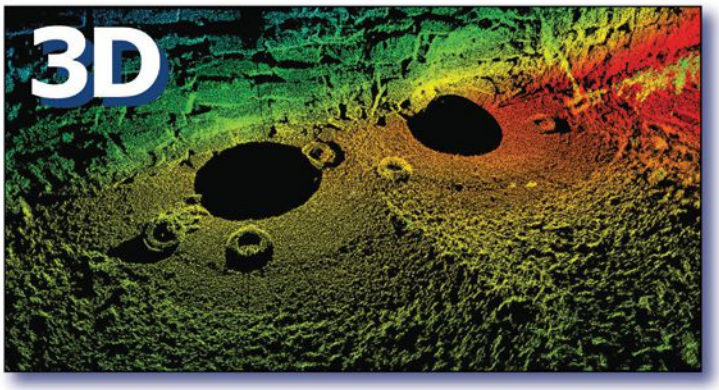


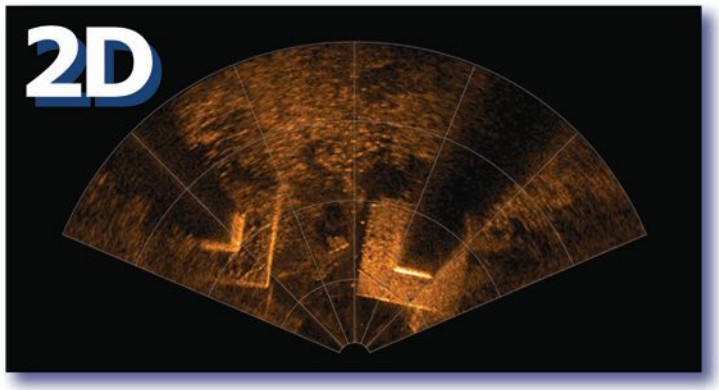
There is significant offshore wind potential along the Atlantic Coast. According to the U.S.Department of Interior, the greatest offshore wind energy potential in the U.S. lies off the Atlantic Coast and could ultimately provide one quarter of national electricity demand.

Fishermen's Energy was founded by East Coast commercial fishermen to respond to the public's need to develop the ocean for renewable wind energy. Fishermen's goal is to turn the North Atlantic coastal waters into an unmatched source of clean energy, while maintaining a vibrant commercial fishing industry.

For more information, visit www.fishermensenergy.com and www.axystechnologies.com.

Your Challenges, Our Solutions.





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Naval training facility opened
The Royal Australian Navy (RAN) opened its recently upgraded ship's bridge simulator training facility at HMAS Watson in Sydney on 25 March 2011. Featuring a host of new full mission and desktop simulators from Kongsberg Maritime, the new facility represents one of the most advanced naval training centers in the world and will be used by RAN cadets to learn to pilot the next generation of warships alongside a wide range of critical training applications, including anti-piracy (www.kongsberg.com).

Navy Energy Conservation opens BAA
The Naval Surface Warfare Center, Carderock Division (NSWCCD) has issued a Broad Agency Announcement (BAA) discussing Energy Conservation Applications for the U.S. Navy's Military Sealift Command (MSC) Combat Logistics Force, Auxiliaries and Sealift ships. The BAA solicits innovative concepts for Navy shipboard energy conservation and carbon footprint reduction with the potential for rapid transition to fleet operation. The solicitation is BAA number N00167-11-BAA-01. The Energy Conservation BAA will be open for two years and white papers may be submitted any time throughout the period beginning 1 December 2010 and ending 31 October 2012. This BAA, more information, and directions for submitting white papers to NSWCCD can be found at http://www.navsea.navy.mil/nswc/carderock/pub/business/baa.aspx.

Taiwan plans stealth warship
Taiwan plans to build a new "stealth" warship armed with guided missiles next year in response to China's naval build-up, a top military officer and a lawmaker said 18 April. Construction of the prototype of the 500-ton corvette is due to start in 2012 for completion in 2014, deputy defense minister Lin Yu-pao said in answer to a question by Kuomintang party legislator Lin Yu-fang at parliament. The twin-hulled boat will be armed with up to eight home-grown Hsiung-feng II ship-to-ship missiles and eight other more lethal Hsiung-feng III anti-ship supersonic missiles.

India to seek German help on sub upgrades
Construction delays to four French-designed submarines have led India to reverse an 11-year-old decision and seek German help to upgrade four older subs. Estimated to cost about $500 million, the upgrade of the four HDW T-1500-class subs will replace their weapon control systems, data links, torpedoes, and missiles. The Indian defense ministry wants the German submarines to be upgraded at Indian facilities with technical assistance from HDW Germany. The Indian Navy has seen its fleet of usable submarines shrink from 21 in the 1980s to 14 today. In 2000, when the Navy decided to buy the new Scorpene submarines, it shelved plans to upgrade the T-1500s, which have now been in disrepair for several years.

Bluefin awarded contract to develop mine/IED neutralization HAUV variant

Bluefin Robotics, a leader in the design and manufacturing of AUVs, was awarded a contract to develop a robotic ship hull mine and Improvised Explosive Device (IED) identification and neutralization capability for use in Joint Service Explosive Ordnance Disposal. A manipulator arm will be integrated onto the HAUV, a hovering AUV designed specifically for ship hull inspection. HAUN-N is the name of the new variant of the HAUV.

"We are looking forward to the opportunity to leverage the work done on the HAUV and under our other underwater systems programs for this important U.S. Navy requirement," said David. P. Kelly, president and CEO of Bluefin Robotics.

The current practice for hull mine/IED identification and neutralization involves sending divers to scan the hull for targets and, when found, to mark them and neutralize them manually. The Bluefin Team — consisting of Bluefin Robotics; Oak Ridge National Laboratory of Oak Ridge, Tennessee; and Orca Maritime of San Diego, California — proposes to accomplish the task with an HAUV-N equipped with a high-precision manipulator arm and a video camera. The AUV will be capable of maintaining station at the target while a remote operator neutralizes the device, thereby keeping divers out of harm's way and completing the task more expeditiously.

Development of HAUV began in 2002 as an Office of Naval Research (ONR) program to automate hull searches. HAUV's development has undergone a series of developmental steps, culminating with the successful demonstration of 100% non-complex area coverage in 2008. In 2011, Bluefin was awarded a $30 million contract modification exercising the production option for the Explosive Ordnance Disposal Hull Unmanned Underwater Vehicle Localization System (HULS).

The ONR is the contracting office for the Joint Service Explosive Ordnance Disposal program.

For more information, visit www.bluefinrobotics.com.

Republic of Korea Navy adds Schilling Robotics' new HDTM

Schilling Robotics, LLC, experts in subsea systems, announced the order for a new 150-hp., 3,000m-rated HDTM ROV system from GMB USA, Inc. for delivery to the Republic of Korea (ROK) Navy.

This order reflects the expansion of the ROK Navy's salvage and rescue operations. The exceptional performance, reliability, and configurability of the HDTM results in an ideal solution for such applications. "The HDTM has been designed to be a compact, yet powerful and flexible system that can be configured for a variety of market applications," said Tyler Schilling, chief executive officer for Schilling Robotics. "We are very pleased that the ROK Navy has selected Schilling Robotics for their expansion program."

The HDTM ROV provides increased reliability and availability through an integrated design philosophy for all major subsystems. This drives a significant reduction in components, enables modular maintenance, and reduces major component replacement timeframes from potentially tens of hours to one hour or less. The HDTM ROV also provides industry leading stability and position control accuracy for performing remote intervention.

For more information, visit www.schilling.com.

FOXX floating port security barrier

Waterside barriers, developed by the Geobrugg AG, Romanshorn / Switzerland Security Engineering Division, protect sensitive infrastructures like oil and LNG terminals, ships, harbours and ports, nuclear facilities, dams, bridge piers, and waterside industry from intruders and terrorist attacks. The threat can arise from high speed / low tonnage vessels and low speed/high tonnage vessels loaded with explosives.

There are two forms of waterside protection barriers, the "Fixed Security Barrier FSB" and the "Floating Port Security Barrier PSB."

The Fixed Security Barrier FSB can be attached to existing structures or driven piles. High-tensile SATURN nets from Geobrugg are fixed to the piles without resorting to a wear-intensive floating construction. The protection system can span widths of up to 60m, sustain large tidal differences, and be resistant to wind, currents and corrosion (seawater). Such fixed security barriers are in use in the very tough environment of the Persian Gulf since 2005.

Safety at harbor: speed boat attack stopped by Geobrugg FOXX Floating Barrier during live crash test

The new Geobrugg FOXX Floating Port Security Barrier (PSB) consists of independent floating modules of 50m in length equipped with the high-tensile MAXX nets with a height of 2.5m. The FOXX Floating Barrier can easily be assembled on shore and drawn to water. The floating modules are connected to each other and, thus, protect a defined area from waterside boat attacks. Under the supervision of the Polish Naval Academy, the FOXX Floating Barrier successfully passed live crash tests with multiple hits. Due to the floating design, the barrier absorbs large tidal differences, heavy winds and waves. Due to the low drag in the water, the FOXX floating barrier is very suitable for gate operations. Made from high-tensile stainless steel wire, the barrier is highly corrosion and UV resistant.

For more information, visit www.geobrugg.com/floatingbarriers.

U.S. Navy chooses Metal Shark training boats

Metal Shark Boats has completed delivery of two 38 Defiant training craft to the U.S Navy as a Force Protection Boat-Large (FPB-L) Training platform. Designed for global deployment as a force/asset protection vessel, the 38 Defiant fleet will be based out of the Little Creek Training Center in Virginia. With 19 Force Protection Boats-Small (FPB-S) vessels — based on the Metal Shark 27 Defiant platform — currently deployed to Bahrain for Naval asset protection, the Defiant platform is already a well-known asset to Naval forces worldwide.

Metal Shark Boats, a subsidiary of Gravois Aluminum Boats, LLC., manufactures and markets a full range of commercial- and military-grade aluminum boats.

For more information, visit www.metalsharkboats.com.

U.S. Navy awards Austal LCS 8 contract

The U.S. Navy has announced a fixed price incentive contract for the construction of a fourth 127-meter trimaran Independence-Class Littoral Combat Ship (LCS 8) valued at USD$368.6 million.

This is the second ship awarded under Austal's recently announced U.S. Navy contract for construction of up to an additional 10 Littoral Combat Ships to be appropriated in the following five years, with a total value in excess of USD$3.5 billion. Once commissioned, these 10 ships will join the Austal-built USS Independence (LCS 2), which was commissioned in January 2010.

Austal CEO, Andrew Bellamy, commented, "The award of this ship allows us to continue the build up of our workforce and reinforces the Navy's need for these vital ships."

This 10-ship contract will require Austal to more than double its U.S. workforce to approximately 3,800 employees in order to fulfill the contracts currently awarded.

Construction of LCS 8 will commence in January 2012 at Austal's shipyard in Mobile, Alabama.

Philippines to patrol disputed areas

The Philippine military said 15 April it planned to use a new U.S.-made vessel to boost patrols in disputed South China Sea waters amid a flare-up in tensions with China over rival claims. The navy was looking to use the modern Hamilton-class patrol craft, recently bought from the United States, around the Philippine-claimed area of the Spratly archipelago. The Philippines and China, along with Brunei, Malaysia, Taiwan, and Vietnam, claim all or part of the Spratlys, which are believed to sit on vast mineral resources and lie near vital sea lanes.

The dispute flared up again last month when Manila complained that Chinese patrol boats had harassed a Philippine oil exploration vessel in disputed waters near the Spratlys.

The Philippines later announced plans to pursue oil exploration in the area and to upgrade its military airfield on one of the islands and lodged a formal protest at the United Nations over China's claims. Amid the flare-up China has repeatedly reiterated its exclusive claims to all the disputed areas and their adjacent waters, much of which are much closer to Philippine land than Chinese.

The U.S. considers the Philippines a major non-North Atlantic Treaty Organization military ally, and the two countries are bound by a 1951 mutual defense pact. China has repeatedly told the U.S. that it has no right to be involved in the Spratlys dispute.

NURC, NATO Research Centre
La Spezia, Italy

Proud Manta 11
Anti-Submarine Warfare Exercise

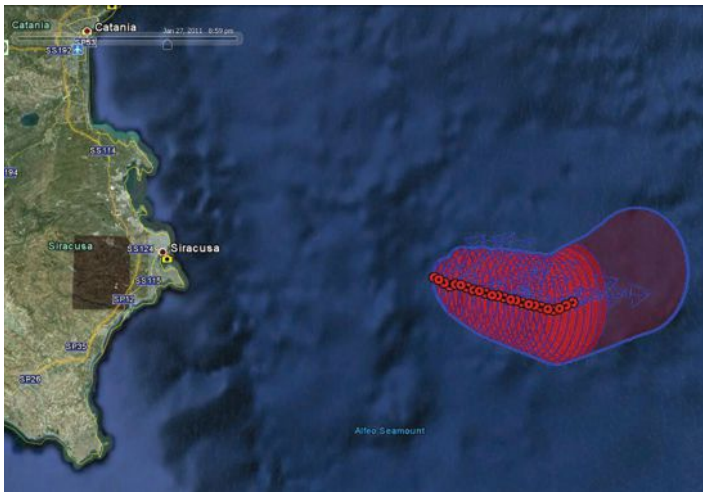
From 24 January to 11 February 2011, in the Ionian Sea to the southeast of Sicily, three gliders participated for the first time in an anti-submarine warfare (ASW) exercise. During Proud Manta 11, NATO Undersea Research Center (NURC) in La Spezia — successfully used the gliders to collect in situ, three-dimensional environmental data to support improved operational planning and decision-making tools. As opposed to traditional propelled AUVs, gliders use shifts in mass to steer and changes in buoyancy to dive and surface and can stay at sea for very long periods of time.

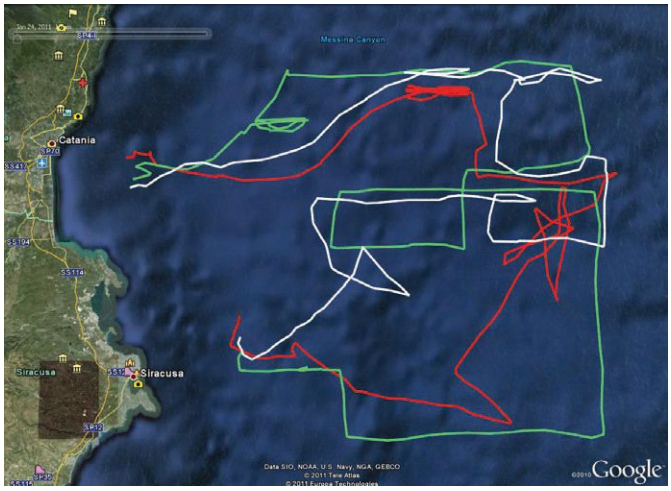
Two shallow-water gliders and one deep glider were deployed from the Italian Navy vessel Levanzo on 24 January offshore from Augusta, Sicily and performed a 3-week intensive data collection resulting in a total of more than 1,000 water column profiles and 1,000 nautical miles transit distance. For 18 days, the gliders operated autonomously, sending data every three hours through an Iridium satellite link back to a command and control room at NURC. Glider missions were refined daily so as to focus on areas where environmental uncertainties were high and where data impact on forecast and effectiveness was highest using "adaptive sampling" algorithms developed at NURC.

The three gliders offered a complete and real-time synthesis of oceanographic data of the Proud Manta exercise area, which helped participants mitigate the impact of environmental uncertainties on operations. "We have developed sophisticated models and software to ensure effective glider mission planning and safe operations management during the exercise — according to Michel Rixen, NURC's Proud Manta 11 scientist-in-charge — "Glider data have been exploited continuously in ocean prediction systems and anti-submarine warfare tactical decision aids to support and optimize operational planning and asset management". For example, by providing daily range predictions (transmission loss, signal excess, and probability of detection) to submarines, surface ships, and air units and crew briefings whenever possible."

The objectives of the NURC experimental component of Proud Manta 2011 were to 1) conduct pre-exercise and live-exercise Rapid Environmental Assessment by operating a fleet of three gliders while ensuring a safe water space management and 2) deliver ASW Tactical Decision Aids to exercise participants based on sonar performance predictions.

Gliders vehicles were deployed and recovered with the support of the Italian Navy ship LEVANZO with no difficulties encountered. They demonstrated cost-effective and covert Battlespace Characterization using autonomous vehicles. The two shallow units (maximum depth rating 200m, effective use 200m) collected over 1000 temperature and salinity profiles each, whilst the deep unit (max depth rating 1,000m, effective use 400m) collected approximately 500 profiles. For 18 days, the gliders each travelled approximately 500km and operated autonomously, sending data every three hours through an Iridium satellite link back to a command and control room at NURC.





Through sophisticated data assimilation procedures and state-of-the-art numerical prediction, the three gliders provided a real-time synthesis of the oceanographic conditions of the Proud Manta exercise area, which was then further exploited in ASW tactical planning aids. For the whole duration of the live exercise, daily "acoustic impact" briefs were prepared by a team of two NURC scientists at Sigonella for MPA and MPH flight crews and other exercise participants in close collaboration with the "in-stride debrief team."

Note that the endurance of the gliders would have allowed them to operate for an additional week.

This first participation of NURC in the Proud Manta exercise series has identified a number of lessons learned. The exercise area posed a number of environmental and operational prediction challenges: gliders data have demonstrated the existence of a very complex and dynamic environment full of fine-scale features expected to impact operational effectiveness.

The experiment has also prompted a number of new ideas for NURC participation in Proud Manta 2012, currently under consideration.

For more information, visit www.nurc.nato.int.

Andrew N. Shepard, Associate Director, Cooperative Institute for Ocean Exploration, Research and Technology, University of North Carolina Wilmington

Cost-effective Monitoring and Vanguard Technologies for Ocean Management

AUVs — self-powered, untethered, subsea platforms equipped with a wide variety of payloads — are emerging tools for oceanography. Subsea gliders are a class of AUVs designed to conduct jigsaw water column sensor profiles over long distances for example, the recent transatlantic expedition led by Teledyne-Webb and scientists from Rutgers University using RU's Slocum Glider (Sea Technology, Feb. 2010). AUVs and gliders played a prominent role in the 2010 post-spill assessment following the Macondo well site accident in the Gulf of Mexico, mapping oil and providing input to regional current models (Figure 1). At a post-spill meeting sponsored by the Council for Ocean Leadership (COL, 2010), experts recommended use of AUV and glider sampling "to quantify concentrations of dispersed oil and identify microbes to ascertain impacts on respiration." The Joint Analysis Group's June post-spill report (JAG, 2010) highlighted the importance of fluorometric data on the likely presence of sub-surface oil and its location in the water column. The Gulf glider fleet completed over 34,000 profiles with fluorometric and CTD sensors.

Figure 1 *Glider paths achieved between May and July 2010 in response to the DWH spill event*

These are high-profile examples of glider applications. The question is what role will gliders play in federal agencies' mission responsibilities? Acceptance by these agencies, not just the Navy, will be essential to the transition of emerging technologies to operational status and successful enterprises.

AUV strategic plans

The first step in this transition is recognition of AUV technologies' integral role in strategic plans. The Navy has an AUV Implementation Plan since 2004, which has sparked development of many of today's unmanned platforms. The National Oceanic and Atmospheric Administration (NOAA) is not far behind.

The NOAA Next Generation Strategic Plan calls for deployment of "Autonomous Underwater Vehicles (AUVs) and Unmanned Aircraft Systems (UASs) to explore hard-to-observe regions such as deep oceans and the Arctic." NOAA's Office of Ocean Exploration also has a Strategic Plan now in final review that states, "OER strives to be a NOAA and national focal point for the design, development, deployment, testing, and evaluation of new marine technologies and tools, including instrument systems, sensors, and platforms [including AUVs]."

Manley (2006) described many AUV applications relevant to NOAA's mission, offering practical reasons for transition beyond exploring hard-to-reach frontiers. Most important is the role AUVs will play in complementing and replacing traditional oceanographic methods, based, for example, on cost-per-observation, density of observations, and ability to respond quickly to events. Transition will be accomplished at different time and space scales, including single-vehicle deployments, event-based swarms (similar to the Gulf response), and regional networks of coordinated platforms.

UNCW Glider

With funding from NOAA via its National Institute for Undersea Science and Technology, the University of North Carolina at Wilmington (UNCW) purchased and operates a 100m Webb-Slocum glider, Pelagia (Figure 2).

Payloads include:

- Conductivity/temperature: SeaBird SBE41CP conductivity/temperature sensor
- Fluorometer: WET Labs 3-channel ECO Puck Chlorophyll-*a*
- Colored dissolved organic matter (CDOM) 600nm optical backscatter
- Beam Attenuation: WET Labs BAM sensor for beam attenuation coefficient c
- Dissolved oxygen: Aanderaa Optode 3835 0 to 120% saturation sensor

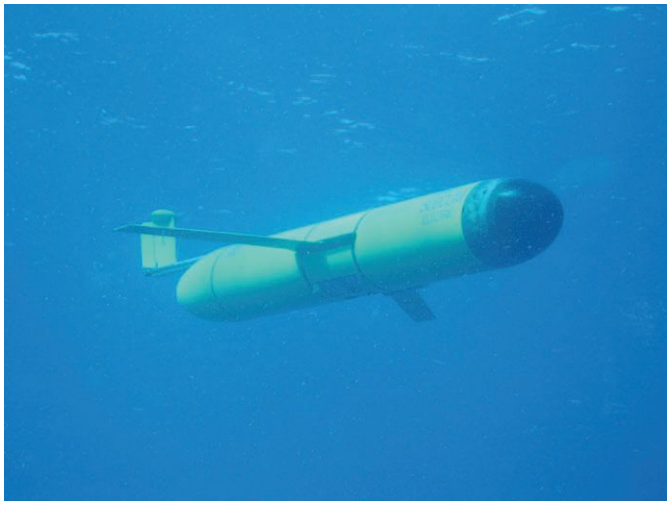


Figure 2 *UNCW's Webb-Slocum glider, Pelagia*

Purchased in 2005 for $100,000, including the Eco-Puck fluorometer, operational costs include:

- Current day rate for use of UNCW glider is $1,200 per day for a 10-day mission;
- Estimated cost for a small boat to deploy and recover within 5nm of shore is $3,000;
- Estimated shipping and support personnel travel to a location off the southeast U.S. is $5,000; and
- Total cost for a 10-day mission would be $20,000; based on a 6-second sampling rate, this results in a cost-per-observation record (all of above measurements; 144,000 records) of $7.20.

Emulating this sampling program using a support vessel and towed (to-yo) sensor package, would require the following:

- Support vessel, estimated to be $3,000 per day (very conservative and uncomfortable if out for 10 days)
- Towed vehicle costs similar to glider day rate ($1,000/day);
- Other support costs also similar ($8,000 per mission); and
- Total for 10-day mission of $48,000, or almost 2.5 times the glider cost-per-observation record. This does not include the likelihood of weather days, which are not an issue for glider operations (Pelagia has sailed in a tropical storm).

Pelagia Applications

In 2004, hypoxic water mass formation in Long Bay, SC, resulted in a "flounder jubilee" off Myrtle Beach, driven to the shore piers by the low oxygen conditions (SCSG, 2011). Similar events occurred in the summer of 2009. The conditions that led to these hypoxic events were a combination of factors, including strong water column stratification and inputs of nutrients from offshore and land-based sources. In the summers of 2004 and 2009, strong southwesterly winds pushed cold, deep water from far offshore toward the Long Bay beachfront in a process called upwelling. These southwesterly winds and resulting upwelling were persistent, constraining a mass of colder water in the nearshore zone just seaward of the surf zone. Pelagia was part of a 2008 sampling program funded primarily by the South Carolina Sea Grant Consortium to document shelf transport and helped define water column properties and contribution of Gulf Stream intrusions to potential delivery of upwelled nutrients to the coast (Figure 3).

Mesoscale eddies and fronts associated with the Florida Current are critical to the presense and survival of the coral reef ecosystem off the Florida Keys. Fiechter (2007) employed a modeling and in situ sampling program to characterize particle, nutrient, and larval dispersion on the East Florida Shelf. As stated, "Acquiring high-resolution *in situ* observations is critical to the understanding of larval transport mechanisms in shallow-water near coral reefs." High-resolution *in situ* measurements using acoustic Doppler current profilers, surface drifters, and the Pelagia glider were used to characterize the physical environment in the vicinity of the reef tract, and provide a basis for model-data comparison.

Regional Networks - Southeast US Glider Network

Rudnick et al. (2004) reported on AUV activities in Monterey Bay as part of the Autonomous Ocean Sampling Network (AOSN), described as "observing platforms linked by real-time communication to form an array that could adapt its strategy according to observations made." As they further observed, "A wide range of sensors has already been deployed on gliders, with many under current development, and an even wider range of future possibilities. Glider networks appear to be one of the best approaches to achieving subsurface spatial resolution necessary for ocean research."

Seim et al. (1999) provided a comprehensive plan for a regional ocean observing system off the southeast U.S. capable of observing, simulating, and predicting ocean processes that are three-dimensional, time-dependent, and occur on many space–time scales, using a "multi-platform, multi-variable" observational approach integrated with models. As proposed, the system would include a combination of profiling floats, moored profilers, AUVs, and gliders to obtain regular (i.e., routine, standardized, and sustained) mapping of the vertical and horizontal T/S structure and other variables with the addition of appropriate sensors. Over a decade later, their vision may be launched in 2011 with funding from the NOAA Integrated Ocean Observing System to the Southeast Coastal Ocean Observing Regional Association (SECOORA).

Led by SECOORA, the proposal for "Coordinated Monitoring, Prediction and Assessment to Support Decision Makers Needs for Coastal and Ocean Data and Tools" (SECOORA, 2011) will integrate and augment existing SECOORA regional observational, modeling, data management, and education assets to help the following accomplish:

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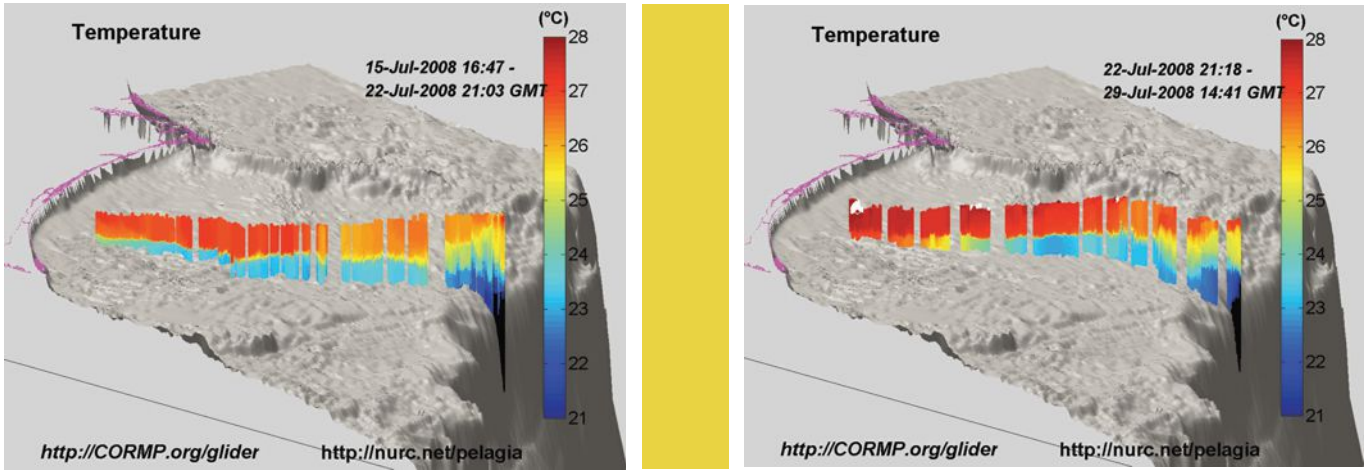

Figure 3 *Glider track from 15 to 22 July 2008 in Long Bay, SC,: temperature data (left-out and right-back) show water column stratification that existed throughout mission, but weakens in last couple of days nearshore during passage of Tropical Strom Cristobal*

- Protect people and communities through quantitative improvements in the forecast of potentially destructive winds, waves, and storm surges;
- Improve coastal and marine use decision-making through enhanced and more comprehensive characterization of the coastal and marine environment;
- Improve public safety through more timely and site-specific health advisories, storm surge, and rip current warnings;
- Support safer and more efficient marine operations and emergency response through enhanced coastal and marine situational awareness;
- Provide positive economic impact through facilitation of more informed decision-making regarding commercial and recreational fisheries, and shoreline and climate change impacts.

C. Edwards, Skidaway Institute for Oceanography, led development of the initial glider sampling plan to be implemented in years 2 to 5 contingent upon funding and in collaboration with operational, modeling, and fisheries management partners (Figure 4). Survey areas coincide with important fisheries habitats, areas of ongoing stakeholder work, historical data, and other operational SECOORA assets (e.g., HFR, moorings). The plan also is timed with spawning seasons of key fisheries and to overlap with modeling domains to support verification. Observations will support product development, such as the stock assessment work, and be used to improve, validate, and constrain regional circulation and ecosystem models. Regional and subregional circulation models also will be used to optimize vehicle control and mission strategy, taking advantage of control theory and model predictions of currents and frontal positions to guide glider sampling.

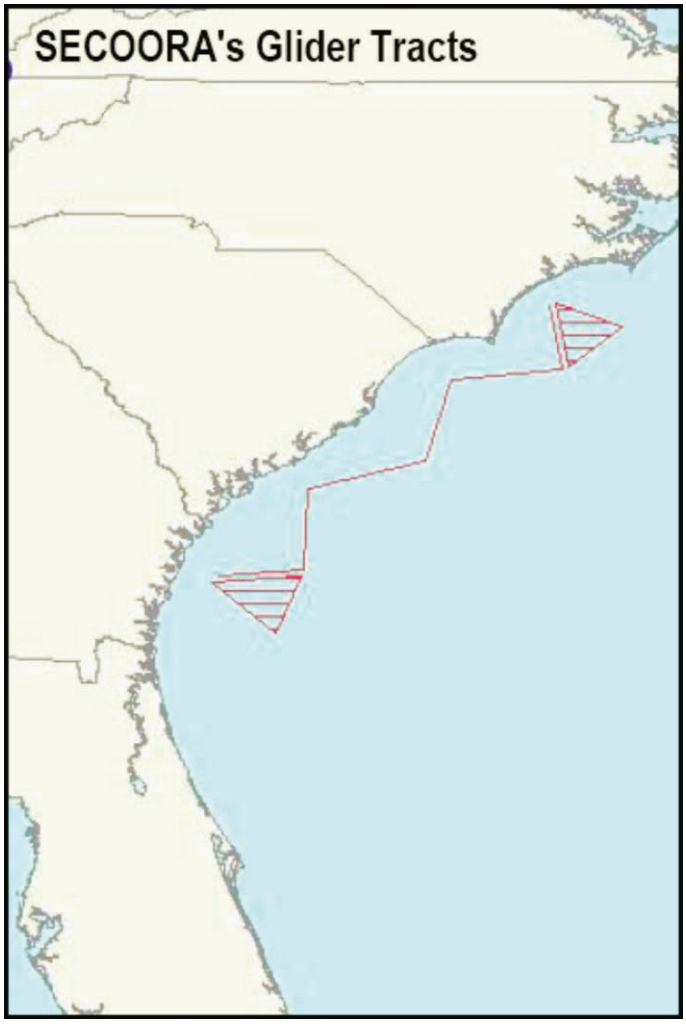

Figure 4 *SECOORA Glider Observatory study areas*

Looking Glass

Looking back on the 2010 Gulf oil spill disaster, critical lessons enlighten the way ahead to improving prevention and response preparedness. Recommendations from the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, report to the President in January 2011, "Deep Water: The Gulf Oil Disaster and the Future of Offshore Drilling," specifically call for the National Response Team to develop and maintain expertise within the federal government to obtain accurate estimates of flow rate or spill volume early in a source-control effort. As Klemas (2010) observed, "to limit the damage by a spill and facilitate cleanup efforts, emergency managers need information on spill location; size and extent; direction and speed of oil movement; and wind, current, and wave information for predicting oil drift and dispersion. The main operational data requirements are fast turn-around time and frequent imaging to monitor the dynamics of the spill." These are requirements for many of the nation's marine environmental challenges and gliders are a vanguard technology in this battle.

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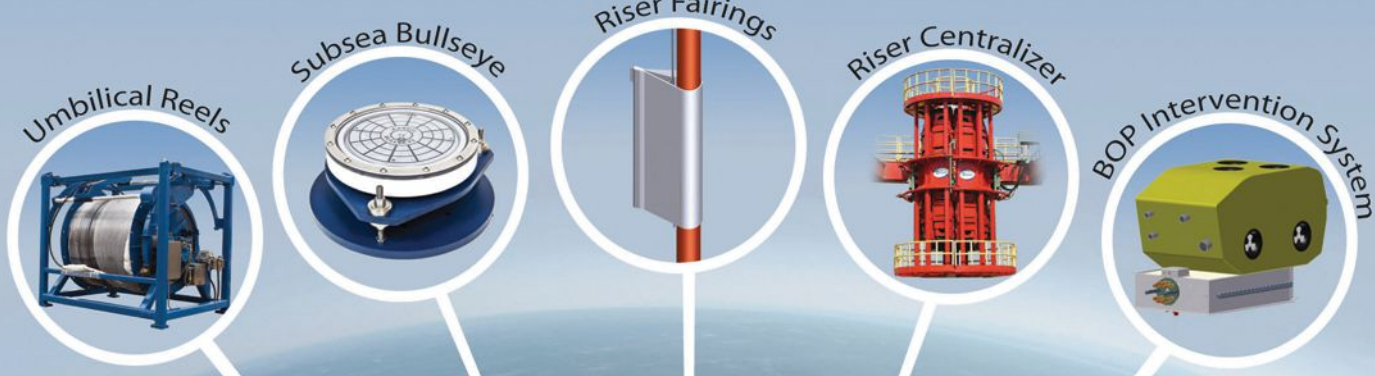

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OFFSHORE INDUSTRY

U.S. Interior Department plans new rules on subsea blowout preventers

U.S. Interior Department officials are planning new regulations to bolster subsea blowout preventers at offshore oil and gas rigs. The blowout preventer, a supposedly fail-safe device to contain runaway wells, did not deploy correctly when BP's Macondo well ruptured in the Gulf of Mexico last year. Interior Secretary Ken Salazar told reporters in an 5 April conference call that regulators are examining issues, including instrumentation and the need for a more robust system of so-called blind shear rams.

A federally commissioned forensic report on the blowout preventer used at BP's well found that its shear rams — powerful metal arms intended to close off wells — were unable to close around a piece of pipe that became trapped during the accident. The Interior has already issued a series of new offshore safety requirements as a result of last year's spill, covering issues such as well design and the ability to swiftly contain spills from deepwater wells.

Drilling activity down 25% across UK Continental Shelf: Deloitte

North Sea offshore drilling activity fell 25% in the first quarter of 2011, according to oil and gas industry figures released by Deloitte.

The North West Europe Review, which documents drilling and licensing in the UK Continental Shelf (UKCS), reveals just five exploration and four appraisal wells were spudded in the UK sector between 1 January and 31 March, compared to a total of 12 during the fourth quarter of 2010.

Analysts at Deloitte's Petroleum Services Group said while the drop cannot be attributed to the recent budget announcement, which proposed increased tax rates for oil and gas companies, it could set the pattern for activity in the future. Since the budget, a number of companies have announced that they intend to put appraisal and development projects on hold, so the industry will have to wait to see the full effect of this change on North Sea activity levels over the coming months.

"It is important to clarify that we are talking about a relatively small number of wells that were drilled during the first quarter of the year, the traditionally quieter winter months, so this is not, in itself, an unexpected decrease," said Graham Sadler, managing director of Deloitte's Petroleum Services Group.

First quarter U.S. drilling up from 2010, but still below 2009 level

U.S. oil and gas drilling in this year's first quarter climbed 29% from a year earlier but remained below the first quarter 2009 level, the American Petroleum Institute (API) said in its latest quarterly well completion report.

An estimated 10,431 oil wells, natural gas wells, and dry holes were completed in the first quarter of this year, down almost 8% from first quarter 2009, API said. API figures show that the resurgence in oil-well completion activity that began earlier in the decade continues as an estimated 5,718 oil wells were drilled in first quarter of 2011, a 51% increase from levels 1 year ago.

For most of this decade, gas has been the primary U.S. drilling target, but the figures of oil-well completions show the focus is changing, API said. The estimated number of oil wells drilled in this year's first quarter outnumbers gas wells by 5,718 to 3,860. API also reported total estimated footage of 75,662,000-ft. drilled in the first quarter of 2011, a 38% climb from a year earlier.

BP doesn't face added requirements to drill, Director Bromwich says

BP, owner of the Gulf of Mexico well that exploded in April 2010, won't be singled out for extra conditions when attempting to resume exploration in deep waters, Michael Bromwich, director of the U.S. Bureau of Ocean Energy Management, Regulation and Enforcement, said in a recent interview in Bloomberg's Washington bureau. The blowout preventer, a stack of valves sitting atop BP's Macondo well, failed to seal it. "They would have to satisfy the same requirements of other operators," Bromwich reportedly said. "We don't have a provision for any requirements, extra requirements, to be imposed on BP because they're BP."

Five percent of world's natural gas wasted through flaring, GE report

An estimated 5% of the world's natural gas production is wasted by burning or "flaring" unused gas each year, an amount equivalent to 30% of consumption in the European Union and 23% in the United States, GE says in a recently released study titled, "Flare Gas Reduction: Recent Global Trends and Policy Considerations."

Gas flaring emits 400 million metric tons of CO_2 annually, the same as 77 million automobiles, without producing useful heat or electricity. Worldwide, billions of cubic meters (bcm) of natural gas are wasted annually, typically as a by-product of oil extraction.

The study finds that the technologies required for a solution exist today. Depending on the region, these may include power generation, gas re-injection (for enhanced oil recovery, gathering, and processing), pipeline development, and distributed energy solutions. Nearly $20 billion in wasted natural gas could be used to generate reliable, affordable electricity and yield billions of dollars per year in increased global economic output.

"Power generation, gas reinjection, and distributed energy solutions are available today and can eliminate the wasteful practice of burning unused gas. This fuel can be used to generate affordable electricity for the world's homes and factories," said Michael Farina, program manager at GE Energy and author of the white paper.

According to the paper, low natural gas prices and higher costs related to capturing flare gas in the Middle East inadvertently encourage the wasteful burning of unused gas.

"With greater global attention and concerted effort, including partnerships, sound policy, and innovative technologies, large-scale gas flaring could be largely eliminated in as little as five years. It's a win-win outcome," GE's Farina said.

Subsalt expected to propel Brazil to top five oil exporter by 2020

The rapid increase in subsalt production in Brazil will allow the country to emerge as a major oil exporter by 2020, Offshore Technology Reports said, noting that Brazil's oil production is expected to reach close to 5.2 million barrels per day (bpd) by 2020, making the country one of the top five oil exporters globally. A large part of this production growth is expected to come from the subsalt basins as the total subsalt oil production in Brazil is expected to reach 1.8 million bpd in 2020.

Huge oil and gas finds in the subsalt areas have prompted the Brazilian government to develop a new petroleum regime for the region. The new regime will abandon the concession system and shift to production sharing contracts. Through the new legislation, Petrobras will be granted full ownership of new subsalt acreage and will be guaranteed a minimum 30% share of any subsalt area that the government decides to tender in licensing rounds.

But these legislative changes will diminish the attractiveness of Brazil's upstream sector to international oil companies, Offshore Technology Reports said, adding that the companies already operating in the subsalt areas will continue to operate under the existing terms but the changes in the law will significantly reduce the chances of companies without subsalt acreage having interests in these resources.

Brazil to account for huge chunk of Latin America's drilling capex

Offshore drilling expenditure in South and Central America totaled more than $55 billion from 2000 to 2008, with Brazil accounting for more than $45 billion of this, according to GBI Research estimates. Furthermore, South and Central America are estimated to attract close to $100 billion in the period from 2009 to 2015, with Brazil alone expected to attract a drilling spend of more than $80 billion.

Arctic, sub-Arctic may hold over 130-billion boe: Infield Systems

Infield Systems has identified more than 130-billion barrels of oil equivalent (boe) in discovered oil, gas, and condensate reserves throughout the world's offshore Arctic and sub-Arctic regions. About 114 billion boe, or 86% of the total, are gas reserves, with around 16 billion barrels of oil. Roughly 99 billion boe lies in discovered natural gas fields in the Russian offshore Arctic region, not including the Sakhalin Island area.

Infield Systems has published a new report on prospects for the offshore Arctic oil and gas sector through 2017. It analyzes market drivers and constraints; technological, vessel, and drilling rig requirements for the region; and forecasts capital expenditure per sector. The report encompasses current and future offshore oil and gas developments within the Arctic Circle and developments in the sub-Arctic regions of Sakhalin Island, the Jeanne D'Arc basin offshore Eastern Canada, and the Cook Inlet in Alaska.

Infield counts 147 discovered fields, of which only 25 currently produce and an additional 13 fields either with a firm plan or under development. Most of the fields (i.e. 101) are classified as "possible" developments, and many are unlikely to be developed until the longer term.

But capital expenditure in the Arctic region should increase steadily throughout this decade, Infield said, rising at over $7 billion annually through 2017. Russia, with its large reserves, should largely drive this expenditure, especially during 2013 to 2015, assuming the Shtokman project goes ahead in the Barents Sea.

At present, Shtokman, with reserves of over 24 billion boe, is due onstream in 2016. Further development of Sakhalin Island and other projects in the area should also consume a large share of Russia's capex.

Canada may experience a sustained rise in expenditure after 2013, Infield added, particularly offshore Newfoundland, with the possibility of some (currently speculative) projects to come on smaller fields in the Canadian Arctic islands. Other areas of sustained expenditure are the Snøhvit and Goliat fields in the Norwegian sector of the Barents Sea. Off Greenland and Alaska, the focus likely will remain more on exploration.

Judge approves sale of Seahawk Drilling to rival Hercules for $177M

Texas oil rig operator Hercules Offshore Inc. won bankruptcy court approval to buy a smaller rival, Seahawk Drilling Inc., and its fleet of shallow-water drilling rigs.

U.S. Bankruptcy Judge Richard S. Schmidt approved the sale at a hearing 5 April in a Corpus Christi, Texas, courtroom, fulfilling a plan that Seahawk Drilling first proposed when it filed for Chapter 11 bankruptcy protection in February. But the value of the deal, estimated at $176.8 million, grew since the sale announcement. Hercules agreed to pay $25 million in cash and 22.3 million of its shares, which have crested on higher gas prices.

Seahawk blamed its financial hardship on the global financial crisis that took hold shortly after it was formed in August 2009. Company officials also blamed the company's financial woes on tighter environmental regulations that followed the BP oil spill, the largest U.S. offshore spill in the petroleum industry's history. Drilling in shallow water was not affected by the moratorium that followed, but the process slowed. In the filing, company officials said they have been "unable to obtain drilling permits in a timely manner."

'Floatel' Jupiter sinks in Mexico's Bay of Campeche, no injuries

A floating hotel or "floatel" used to house Mexican offshore workers sank in the Gulf of Mexico on April 12 after an open valve flooded the vessel's pontoons, according to AFP.

The platform, named Jupiter, went down off the coast of Ciudad del Carmen in the Bay of Campeche, on Mexico's southern coast in the Gulf of Mexico. The water is roughly 38m deep, meaning the 50m-wide platform is still partially above water.

The incident was first reported around 7:30 a.m., which led to the evacuation of 638 workers to a nearby platform. When attempts to pump out the water failed, the rest of the crew was evacuated.

The floatel, which is owned by Cotemar and managed by PEP, has 2,075 barrels of diesel stored in the pontoons and 82 barrels of jet fuel stored in containers on the deck. In a statement, Pemex said there did not appear to be any signs of leakage. Crews were investigating the platform for causes of the accident.

Helix Well Group to significantly expand deepwater capabilities

The Helix Well Containment Group (HWCG), consisting of 22 deepwater operators in the Gulf of Mexico, plans to substantially increase its subsea well containment capabilities this year by expanding its ability to control and contain a release in water depths up to 10,000 feet. HWCG's current system is capable of facilitating control and containment of spills in water depths up to 5,600 feet and will utilize Helix Energy Solutions Group's Q4000, the intervention vessel effectively used during the Deepwater Horizon response. The system features a 10,000 psig capping stack.

By 8 April, the system was expected to have increased containment capacity and capabilities for water depths up to 8,000 feet as well as capture and processing capabilities of 55,000 barrels of oil per day and 95 million cubic feet of natural gas per day. In the coming weeks, HWCG will also add a 15,000 psig capping stack. Full operational capability for water depths up to 10,000 feet is anticipated mid-summer.

Building upon equipment effectively used in the Deepwater Horizon response, HWCG has signed an agreement with Helix Energy Solutions Group to provide the primary components of the response. Additionally, HWCG has agreements in place with more than 30 service providers who will provide additional services, products, and personnel, if needed.

Helix Energy says up to 17 days would be needed to contain a spill

Helix Energy Solutions Group Inc. and its partners would need as many as 17 days to contain a Gulf of Mexico oil spill, or five times faster than it took BP to plug the ruptured Macondo exploration well last year, according to Bloomberg.

Helix's Q4000 ship would need about three days just to arrive at the spill site, CEO Owen Kratz said in an interview with the news agency. A cap to contain the seabed well would arrive at the same time, he said.

"If the integrity is such that we can just shut it in then, then it will immediately be shut in and that's the end of the problem," he said. However, a well that's significantly damaged and cannot be shut would require Helix to lower a riser or pipe from the Q4000 to the wellhead to capture the crude, he said.

The Helix Marine Well Containment Co. would deploy equipment when notified by an operator, and response times would vary, member ExxonMobil said.

Atlantic region bracing for stronger than normal 2011 hurricane season

If recent predictions are accurate, the 2011 Atlantic hurricane season will be a stormy one whose impact will be felt along the U.S. coastline.

AccuWeather recently released its spring forecast for the 2011 season, which begins on 1 June and culminates 30 November. AccuWeather forecasters are calling for "an active season with more impact on the U.S. coastline than last year," predicting 15 named tropical storms, eight reaching hurricane strength and three becoming "major" (Category 3) storms.

AccuWeather cites a waning La Nina, Saharan dust, and positive warm Atlantic waters as major factors in the 2011 prediction. An average Atlantic hurricane season produces 10 named tropical storms, with six hurricanes, two of which are categorized as major.

While the start of the season is still a month away, MXenergy is one company that is encouraging its customers along the coastline to think about how to prepare.

"The potential for hurricanes is just a fact of life for people living on the coastline," said Marjorie Kass, MXenergy's managing director. "Whether the 2011 season is as strong as predicted remains to be seen, but the forecast should serve as an excellent motivator to help people prepare."

Nearly 80% of poll respondents say U.S. needs to drill its own oil first

Nearly 8 in 10 (78.9%) of registered voters say America should drill its own oil first before buying from other countries, according to a recent American Pulse survey of 5,252 respondents. Republicans voted 88.1% in favor, Independents 78.0%, and Democrats, 72.8%. Additionally, more than 8 in 10 (85.9%) registered voters say they are somewhat-very concerned that gasoline prices could double. Also, 52.6% of registered voters do not think President Obama deserves to be re-elected; 28.1% think he does; and 19.3% are neutral.

Maersk orders two ultra-deepwater drillships from Samsung for $1.3B

Maersk Drilling has contracted Samsung Heavy Industries to construct two ultra-deepwater drillships at a total cost of $1.3 billion. The vessels are scheduled for delivery in the third and fourth quarters of 2013. The contract has an option for two additional drillships.

Maersk said the 748 ft. long drillships will be able to operate at water depths up to 12,000 feet and capable of drilling to more than 40,000 feet The DP system will maintain a fixed position in severe weather conditions with waves up to 36 feet and wind speeds up to 58 mph.

Similar to Maersk Drilling's ultra-deepwater semi-submersibles, the drillship design includes features for high efficiency operation including a dual derrick, and extensive storage areas and tank capacities. Together with the higher transit speed, the increased capacity will reduce the overall logistics costs for the oil companies. The drillships will have accommodation capacity for 230 people.

Meanwhile, Seadrill has exercised an option to build a new ultra-deepwater dual derrick drillship at the Samsung yard. Total project price is estimated at $600 million. The delivery is scheduled for the third quarter 2013. The new unit is similar to the two drillships Seadrill ordered from Samsung in November 2010.

Transocean sets world ocean depth drilling record in 10,194 ft. of water

Transocean Ltd. said that as of April 11, its ultra-deepwater drillship Dhirubhai Deepwater KG2 set what the company believed to be a world record for the deepest water depth by an offshore drilling rig of 10,194 feet of water while working for Reliance Industries offshore India. The rig, which is owned by a joint venture with Quantum Pacific Group, surpassed Transocean's prior record of 10,011 ft. of water, set in 2003 by the Discoverer Deep Seas working for Chevron in the U.S. Gulf of Mexico.

The new record comes approximately one year after the dynamically positioned Dhirubhai Deepwater KG2 was placed into service in India under a 5-year drilling contract. The vessel is equipped to work in water depths of up to 12,000 ft. and outfitted to construct wells up to 35,000 feet deep.

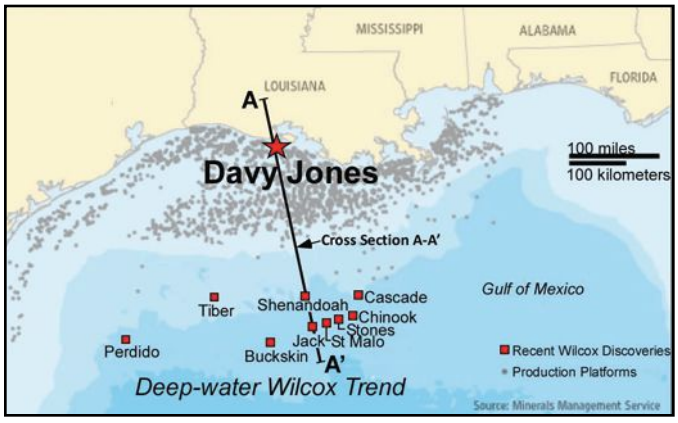
Halliburton gets Asia's first ultra-HP/HT contracts
Halliburton was awarded several contracts for the provision of equipment and services on two offshore blocks in the South China Sea. This is the first ultra-high-pressure/high-temperature (HP/HT) oil and gas drilling project in Asia. The exploration campaign calls for two firm wells and one potential well. Halliburton will provide directional drilling, measurement-while-drilling, and logging-while-drilling (M/LWD) services; well completion equipment and services; surface well testing and downhole drillstem testing (DST) equipment and services; and cementing equipment, fluids, and pumping services. Drilling is scheduled to start in the third quarter 2011. This project is expected to push existing technology limits, with required equipment specifications at 250 °C and 15,000 psi. Under these contracts, Halliburton will provide several ultra-HP/HT technologies for drilling, completions, cementing and testing, including the industry's first M/LWD sensors rated to 230 °C (446 °F) and 25,000 psi (172.37 Mpa) as well as the industry's first multi-cycle DST tools rated to 260 °C (500 °F).

TGS to conduct second Tarakan Basin survey
TGS is to acquire a second multi-client 3D seismic survey in the Tarakan Basin, off the coast of Northern Indonesia. The TBB11 survey, which is supported by industry funding, will add 1,820km² of new data to the previous survey announced in December 2010. The new survey, to be conducted in an underexplored and poor data region, will also increase coverage in the area to about 3,500km². The new data will improve the understanding of the complex structural setting of the oil and gas province, particularly in prospect delineation and well planning. The data are being acquired by Seisquest, and the process was expected to be completed in the second quarter of this year.

Technip awarded North Sea contract by RWE Dea
Technip was awarded a full EPIC(1) contract by RWE Dea, for the Clipper South gas field development in the North Sea. The field is located 70km northeast of the Bacton gas terminal in 25m of water. The contract covers full project management, detailed pipeline design, installation and tie-in of a 15.5km 12-in. production line and 3-in. methanol piggyback line from the new Clipper South platform to the existing LOGGS (Lincolnshire Offshore Gas Gathering system) platform. The contract builds on past experience with RWE. In 2008, Technip provided pipelay and umbilical installation for the Topaz field development located in the Southern gas basin.

Aker to provide EPC contract for ConocoPhillips
Aker Solutions has won a $979 million engineering, procurement and construction contract to deliver the topside and bridges of the production platform at ConocoPhillips' Eldfisk field in the North Sea. One of the two biggest fields in the Greater Ekofisk Area, Eldfisk is located in the southern part of the North Sea, about 300km from the Norwegian shore.

Tuscaloosa sands may be present in 'Davy Jones' play



If confirmed by an offset appraisal well, operator McMoRan Exploration Co. believes the addition of Tuscaloosa sands on the same structure containing already proven Wilcox sands could enhance the prospectivity of its immense 20,000-acre Davy Jones trend and the value of McMoRan's other ultra-deep prospects on the Gulf of Mexico's continental shelf.

McMoRan said in late March it planned to evaluate the Davy Jones No. 2 well with wireline logs upon reaching the proposed total depth of 30,450 feet., which would rank it among the deepest wells ever drilled on the shelf. The well had reached a true vertical depth of 29,800 feet to evaluate exploration objectives below the Wilcox pay sands, including possibly the Upper Cretaceous (Tuscaloosa) sections.

Based on interpretations of drilling data, McMoRan believes the well has possibly encountered Upper Cretaceous sands and may be immediately above the Lower Tuscaloosa. The Tuscaloosa section, if present in deeper horizons on the shelf at Davy Jones, would be correlative with the prolific Tuscaloosa trend onshore South Louisiana. Wilcox sands extend from the opposite direction, north from below the deeper waters of the U.S. Gulf, and are thought to cover large areas of the shelf.

In January 2010, McMoRan logged 200 net feet of pay in multiple Wilcox sands in the Davy Jones No. 1 well on South Marsh Island Block 230. In March 2010, a production liner was set and the well was temporarily abandoned to prepare for completion. McMoRan is now preparing to complete a flow test on the No. 1 well, which is expected in late 2011. In April 2010, the company began drilling an offset appraisal well two-and-a-half miles southwest of the No. 1 well. In February 2011, preliminary log results from the Davy Jones No. 2 well confirmed Wilcox sand continuity and the major structural features of the Davy Jones prospect.

Davy Jones encompasses four OCS lease blocks. McMoRan holds a 60.4% working interest and a 47.9% net revenue interest in Davy Jones. Other working interest owners in Davy Jones include Energy XXI (15.8%), Nippon Oil Exploration USA Ltd. (12%), W.A. (Tex) Moncrief, Jr. (8.8%), and a private investor (3%).

McMoRan's 150,000-acre ultra-deep shelf position alone contains a dozen more drill-ready prospects based on seismic studies, initial data recovered from Davy Jones and an earlier McMoRan ultra-deep well, Blackbeard.

InterMoor completes subsea tree installation for LLOG in U.S. Gulf

Acteon company InterMoor has successfully completed the installation of two subsea trees for LLOG Exploration Co. in the Gulf of Mexico, InterMoor president Tom Fulton said.

The subsea trees were installed at Mississippi Canyon Block 199 in a water depth of 2,460 feet The trees, weighing 45 tons each, were installed on the two existing well locations. InterMoor used Shell's patented Heave Compensated Landing System (HCLS) to facilitate the installation.

This system is one of the many techniques InterMoor employs when the lowering and recovering of subsea equipment mandates minimal subsea heave and increased ROV maneuverability.

The anchor handling vessel used for the installation was the AHTS Joshua Chouest. The vessel's aft-mounted A-frame allowed for the subsea trees to be overboarded and transferred to the pendant wire via a dry handoff technique, independent of a rig crane.

The subsea trees were dock tested at InterMoor's Fourchon shore base. Both were then loaded onto the AHTS to be batch set at the open water location. The

entire offshore installation operation of both trees was completed in less than 34 hours.

"When installing subsea equipment, the use of an anchor-handling vessel already on charter offers significant cost savings and flexibility over a spot rate installation vessel," said Jacob Heikes, project manager. "This project has been a display of InterMoor's operational proficiency with the HCLS system as well as our continued commitment to provide the most cost-effective solutions to increasingly challenging offshore installation requirements."

Contango Oil & Gas hits pay dirt at Gulf of Mexico 'Swimmy' prospect

Contango Oil & Gas Co. said it drilled a successful exploratory well at its 'Swimmy' prospect located on Vermilion Block 170 in the Gulf of Mexico. The company's independent third-party engineer estimates the well to have proved reserves of 48 billion cubic feet of natural gas and 1.2 million barrels of condensate.

Production is expected to begin this fall at an estimated rate of 15 million cubic feet equivalent per day net to Contango, the company said, noting that estimated net costs to Contango to acquire, drill, complete, and bring the well to full production status amount to around $26.5 million.

Meanwhile, Contango said it submitted an application to the U.S. Bureau of Ocean Management, Regulation and Enforcement for an exploration permit to drill its Eagle prospect at Ship Shoal 134 in the Gulf of Mexico.

"We are hopeful that we will receive a permit to drill this prospect sometime this summer, but due to hurricane season, we may not spud the well until the October-November ... timeframe," said Kenneth R. Peak, Contango's chairman and CEO.

Permits moving 'painfully slow': Chevron

The U.S. government continued to issue Gulf of Mexico deepwater drilling permits into April, but evidently not fast enough to suit House Republicans and at least one major Gulf explorer and field operator. Chevron Corp.'s head of North American deepwater operations said U.S. regulators need to accelerate "the painfully slow" pace at which they are approving exploration there.

Chevron leased the Discoverer Inspiration for work in the GoM.

"We've got billions of dollars in investment in place and, obviously, if we can't get the system working, we're going to go elsewhere with that funding," Steve Thurston, a vice president at Chevron's North American exploration and production unit, said during an industry breakfast in Houston. One of the largest leaseholders in the Gulf, Chevron has six major producing fields there, eight projects in development, and 45 prospects, Thurston said.

The U.S. government halted deep-water drilling in the Gulf of Mexico last spring after the BP Deepwater Horizon disaster, which killed 11 workers and led to the largest marine oil spill in the country's history. Though an official moratorium on deepwater activity was lifted in October, it wasn't until late February that regulators issued a permit to return to drilling.

As of mid-April, 10 drilling permits had been issued. One of those went to Chevron, which has applications before U.S. regulators to drill 11 deepwater wells and begin five exploratory projects. Amid the government's ban, Chevron developed a plan to spend $14 billion on new deepwater Gulf of Mexico projects. To carry out the plan, Chevron needs five deepwater drillships operating, Thurston said, noting that the company had two working with a third sitting idle as the company awaited drilling permits.

Meanwhile, the U.S. House Natural Resources Committee voted to establish a 60-day maximum for the Interior Department to approve or deny offshore drilling permits. If Interior took longer, the permit would be deemed approved. The committee also approved a bill requiring the U.S. to open areas off the Virginia coast and in the Gulf of Mexico to oil and gas exploration, paving the way for a vote by the full House in May.

The bills are part of an effort by House Republicans to support domestic oil and gas production, which they have stepped up in recent months in the face of rising gasoline prices. Democrats have pushed back, saying that Congress should focus on providing incentives for non-traditional energy sources and reducing energy consumption.

"What we're attempting to do is provide some certainty to those who would give us American-made energy," said Rep. Doc Hastings (R-Wash.), chairman of the Natural Resources Committee and a main sponsor of the House Republican sponsored energy bills.

CHC waves goodbye to a former 'workhorse' of the North Sea

Offshore services provider CHC Helicopter has bid a fond farewell to the last of the iconic L-type Puma aircraft, known for generations as the "workhorse" of the North Sea oil and gas industry.

First introduced in 1999, the Ls played a pivotal role in supporting the growth of the UK's burgeoning offshore sector throughout the decades.

At its peak, CHC operated a 13-strong fleet of Ls, using them to transport the rapidly expanding oil and gas workforce to installations across the north, central and southern North Sea.

The final L to leave the fleet – Zulu Gulf – clocked up almost 30,450 hours in its time with the company before departing to CHC's Norwegian maintenance facility for final checks before it was sold to begin the next chapter of its career.

With the introduction of new technology over the years, the L fleet has been superseded by more advanced aircraft, and now CHC, the largest helicopter operator in the North Sea, has decided to take its six remaining aircraft out of service.

Pictured with Puma from left to right are pilot Fred Ferrucci, chief engineer Stuart Leith and co-pilot Jason O'Flynn.

"This is a momentous day for everyone at CHC as these aircraft have been a mainstay of the oil and gas industry from the very start and have done a fantastic job in their 12 years of service for us," said Nick Mair, CHC vice president.

"They have been a familiar sight over the skies of Aberdeen for many years, so there are a lot of people who will be sad to say goodbye; however, advances in aviation technology have meant that, for us, the time has come to bring and end to their era."

Fred Ferrucci, who piloted the final flight, admitted it was an emotional occasion. "The L has been part and parcel of our operations for so long, and it'll be strange not having them around," he said. "They have been fantastic servants through the years but technology dictates it is time for them to make way for newer aircraft." CHC is the largest commercial helicopter company in the world, operating over 250 multi-engine aircraft in more than 30 countries.

ConocoPhillips may double asset sale to $20B; Will buy back stock

ConocoPhillips, the third-largest U.S. oil company, said it might double its planned sale of less desirable assets to $20 billion, with proceeds going to buy back stock.

Conoco is executing a plan, first announced in late 2009, to increase shareholder value through debt reduction, stock buybacks, and increased dividends.

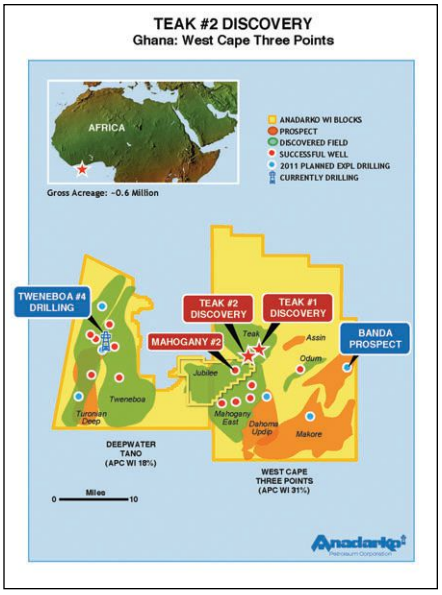
The Houston company first said it would shed $10 billion of its oil and gas properties, but said recently that it planned to sell an additional $5 to $10 billion in assets over the next two years. Conoco did not immediately specify what might be sold, but did say those assets targeted would be mature, high-cost projects.

Discovery again confirms resource potential

Anadarko Petroleum Corp.'s deepwater discovery at the Teak-2 prospect, located in the West Cape Three Points Block offshore Ghana, encountered about 90 net feet of high-quality oil, condensate, and natural gas pay in stacked Campanian- and Turonian-age reservoirs, Anadarko said.

"The Teak-2 discovery is another confirmation of our geologic model that adds to the substantial resource potential of the area and extends the success of our multi-well exploration program on the West Cape Three Points Block," said Bob Daniels, Anadarko Sr. Vice President, Worldwide Exploration.

Results encountered in the discovery well will be further evaluated with future appraisal activity, Daniels said, adding that Anadarko would continue working with its partners and the Republic of Ghana to advance the company's exploration and appraisal programs "as well as the increasing number of development opportunities in both the West Cape Three Points Block and adjacent Deepwater Tano License."



The Teak-2 well was drilled to a total depth of 11,185 feet in water depths of about 2,900 feet The well is about 5,900 feet southwest and fault-separated from Teak-1 and approximately two miles northeast of the Mahogany-2 well. After preserving the well at Teak-2 for future use, the partnership plans to mobilize the rig to drill the Banda prospect, also located in the West Cape Three Points Block.

Anadarko owns a 30.875% working interest in the West Cape Three Points Block, which is operated by Kosmos Energy (30.875%). Other co-owners in the block include Tullow Oil plc (22.896%), the E.O. Group (3.5%), Sabre Oil & Gas Holdings Ltd. (1.854%), and the Ghana National Petroleum Corporation (10%).

Meanwhile, Anadarko has finalized plans for its previously announced 2011 drilling campaign in the Liberian Basin. To carry out this program, Anadarko intends to mobilize the Discoverer Spirit drillship from the Gulf of Mexico to West Africa after it finishes completion activities on the third Caesar-Tonga well. Subject to the finalization of a contract amendment with the rig owner, the Discoverer Spirit is expected to begin drilling in West Africa during this year's third quarter.

As part of this program, Anadarko plans to drill its first Mercury appraisal well, located approximately seven miles west of the Mercury discovery well offshore Sierra Leone in Block SL-07B-10. In addition, the company plans to drill the Jupiter exploration prospect on the same block later in the year. Anadarko operates Block SL-07B-10 with a 65% working interest.

Offshore Liberia, Anadarko plans to drill the Montserrado exploration well on Block 15, which is operated by Anadarko with a 57.5% working interest. Further to the east, on Block 10, Anadarko recently completed the acquisition of a 2,400-square-kilometer 3D seismic survey. Processing of the survey is expected to take approximately six to nine months, and, with the acquisition of these data, Anadarko will have 3D seismic information covering virtually all of its acreage in the Liberian Basin.

"Mobilizing the Discoverer Spirit to West Africa ensures our ability to deliver upon our exploration and appraisal programs in a timely fashion in an area that offers tremendous potential with more than 30 identified Jubilee-like prospects on our acreage," said Al Walker, Anadarko's president and CEO. "We plan to keep the Ensco 8500 rig in the Gulf of Mexico to conduct an extended well test at Lucius and, once we receive drilling permits, we are confident that we will be able to utilize the Ensco 8500 and contract a deepwater rig of opportunity to resume our development and exploration programs in the Gulf."

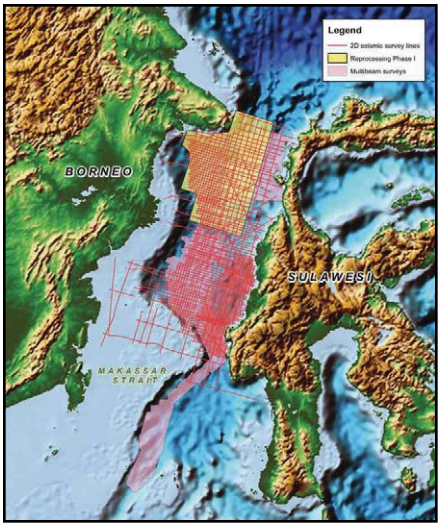
TGS launches 2D reprocessing project in Northern Makassar Strait

TGS has commenced an extensive multi-phase reprocessing program of 2D seismic data located in the Makassar Strait, Indonesia. The first phase consists of 2,700km of seismic data in the Northern Mahakam Delta.

The original and reprocessed data support the exploration potential of the deepwater area of the Mahakam Delta. Interpretation of the seismic data since 2001 has demonstrated potential hydrocarbon prospectivity in the basin, resulting in the award of exploration acreage and the drilling of several exploration wells. Partial relinquishments of the exploration blocks have also recently created opportunities for new exploration in the area.

The data will be reprocessed with customized techniques to enhance imaging of the main structures and reservoir targets in the basin. The reprocessed data are intended to enhance definition of Direct Hydrocarbon Indicators (DHIs) and Amplitude Versus Offset (AVO) anomalies associated with turbidite reservoirs seen on the original 2D seismic data. Data from this initial phase of reprocessing will be available for clients in this year's third quarter. The project is supported by industry funding.

Meanwhile, TGS said that it will conduct extensive reprocessing of over 13,550km of 2D multi-client seismic data located in waters off the Faroe Islands. This project, designated Offshore Faroe Reprocessing 2011, will extend to the UK-Faroe border. Data from the project will be available in the third quarter, TGS said.



TransAtlantic signs contract for AHT/Icebreaker Balder Viking

TransAtlantic has signed a contract with the English company Capricorn Energy Ltd. for the AHTS/Icebreaker Balder Viking. Capricorn is a wholly owned subsidiary of the British oil company Cairn Energy UK plc based in Edinburgh.

The AHTS/Icebreaker Balder Viking was to assist oil drilling west of Greenland starting at the end of April 2011. The operation extends over a four month period.

The assignment is for "supply services" for the drilling operation and will probably also include towing but not icebreaking as the operation will take place in open water.

Rederi AB Transatlantic is a leading Swedish shipping company. Operations are organized into two business areas: Offshore/Icebreaking and Industrial Shipping. Ships fleet consists of 35 vessels, two anchor-handling vessels on order to be delivered in 2011 to 2012, and ships chartered for shorter periods. The company has about 750 employees.

Statoil, Eni, Petoro oil find opens new province in Barents Sea

Statoil, Eni Norway, and Petoro have made an oil discovery on the Skrugard prospect in the Barents Sea. The well hit a proven gas column of 33m and an oil column of 90m. The site on the Skrugard prospect is located 100km north of the Snohvit gas field in the Barents Sea.

The estimated volume of the discovery is between 150 million and 250 million recoverable barrels of oil equivalent, with further upside potential in the license of up to 250 million barrels.

Statoil executive vice-president for exploration Tim Dodson said that the Skrugard find is significant and a breakthrough for frontier exploration in the Barents Sea.

"This opens a new oil province that can provide additional resource growth," Dodson said, adding, "If the volume estimates are confirmed, then this discovery could provide a basis for an independent development."

Presently, Statoil and its partners are in the process of concluding drilling operations with the Polar Pioneer rig on the Skrugard prospect.

Statoil is the operator of licence 532 with a 50% share, along with Eni, which holds 30%, and Petoro with 20%.

Noble Energy says drilling begins at Tamar gas field offshore Israel

Houston-based Noble Energy Inc. and its local partners said that drilling has begun in the Tamar natural gas field offshore Israel. The drilling, which will be done in three stages, is expected to take about one year and Tamar is expected to start producing natural gas by the end of 2012, the companies said. The field is estimated to contain up to 9 trillion cubic feet of natural gas.

Statoil opens Norwegian Continental Shelf subsea field

Statoil has officially opened the Tyrihans subsea field on the Norwegian Sea, offshore Trondheim, Norway. The field already produces 100,000 barrels per day, contributing to the total capacity for the export of oil and condensate from the Kristin platform.

Tyrihans comprises Tyrihans South, a gas-capped oilfield, and Tyrihans North, a gas and condensate field with a thin oil zone. Tyrihans is tied back to the installations and infrastructure of the Kristin and Asgard fields on Haltenbanken.

The well stream is transported through a 43.6km-long pipeline to Kristin. Gas is exported from Kristin through the Asgard transport pipeline to the Karsto facility in Rogaland.

Development and Production Norway executive vice-president Oystein Michelsen said that Tyrihans will make a considerable contribution to the company's production on the Norwegian Continental Shelf, which is strategically significant for the development of its activities in the Norwegian Sea.

Rolls-Royce Marine receives drill system from Aker unit for Yme field

Rolls-Royce Marine has received a drilling fluid and well control system from Aker Solutions unit STEP Offshore for use on the Yme field in the North Sea. STEP Offshore delivered an ultra-compact, skid-mounted system for drilling fluid circulation and well control.

The system will monitor drilling fluid volume in the well by the dual trip tank system, route drilling fluid from seawater pumps or a water injection system to a standpipe, trip tank system, or choke and kill manifold.

The system is designed for a light work-over unit, with easy transportation capability to and from the well-head platform, along with easy hook-up to the work-over unit for well intervention operations in drilled and completed wells. The system includes trip tanks, remote controlled valves, a choke and kill manifold, an HPU, and a control system.

Directional wells under way on Athena, Jacky fields in North Sea

The semi-submersible Sedco 704 has started drilling the final production well for Ithaca Energy's Athena field in the UK Central North Sea. Well 14/18b-A2 is being drilled directionally from the Athena drill center to access oil in the field's northwestern portion.

It will also intersect the top reservoir (Top Scapa A sands) at a point within the appraised Athena oil pool and continue north, drilling at a high angle to provide data on another area targeted for future development. This program should last around 80 days.

In the UK Outer Moray Firth, the jack-up Energy Enhancer has spudded a second production well on Ithaca's Jacky field. Well 12/21c-J03 is being drilled to access additional reserves and increase production. The rig has been positioned over the Jacky platform to drill from a spare wellbay, facilitating early tie-in to the existing production stream. The well is being drilled directionally to a northern section of the field within the same structure and geological unit (Beatrice "A" sand) as the existing wells. This program should last 72 days.

The Sedco 704

Jubilee set for development spree; Phase I cost close to $3.1 billion

Tullow Oil expects the final cost of Phase I of the Jubilee project offshore Ghana to be within 5% of the original $3.1 billion budget. Current production is running at over 69,000 barrels per day of oil from five wells, building to full capacity of 120,000 b/d during the next few months as the remaining four producers are completed and brought on line.

Water injection to two wells is currently around 110,000 b/d, and a further four water injectors will be completed this year to maintain plateau oil production. Gas injection was to start in March to a single well, with the second injector due to be completed this summer.

Planning on the Phase Ia Jubilee development started late last year, designed to help sustain plateau output and entailing an additional five to eight wells. The partners will likely take an investment decision during the summer following analysis of reservoir performance and submission of plans to the Government of Ghana. Tullow adds that subsurface planning has already identified the additional well locations, and tenders are out for a deepwater rig to execute the program starting early in 2012.

ALE completes module transport for ONGC's Indonesia platform

ALE has successfully completed the transport and load-out of five modules for Oil and Natural Gas Corp.'s ICP-R process platform project in Jakarta, Indonesia. The project is a part of the redevelopment of the Mumbai High South offshore oilfield and comprises a main structural frame, a building module, a process module, a turbo generator, and a compressor module.

ALE provided the transportation of the modules, which weigh between 1,400-tons and 2,850-tons, one of which is 45m high. The firm delivered an engineering solution that allows the frame to be shifted by self-propelled modular transporters, which will use specially modified transverse beams to spread the load without overstressing the transporters. A total of 154 axle lines and 18 ballasting pumps were used for the project.

Ekulo Cheyenne at OML 123, commences work for Addax

Kaztec Engineering Ltd., an Abuja based engineering, procurement, construction, installation and commission company and owners of Ekulo Cheyenne and Ekulo Tornado, said that Ekulo Cheyenne is now at OML 123, Calabar, Cross River State, Nigeria, and had commenced work for Addax Petroleum Development Nigeria Ltd.

In a statement released in Abuja, Kaztec Engineering Project Manager Rick Reggio said the 350-ft. by 100-ft. by 25-ft. depth pipelay-derrick and construction barge, Ekulo Cheyenne is expected to execute TB - 1921 call-off contract for installation of subsea pipelines and topsides for Addax. This installation-focused contract will enable the various facilities currently being designed and manufactured to be collected, shipped to site, craned into position, and hooked up together with the laying of interconnecting pipelines and installation of associated riser systems.

Subsea 7 bags $1B pre-salt contract in Santos Basin offshore Brazil

Petrobras has awarded Subsea 7 a contract worth $1 billion for development of the pre-salt deepwater GuarÃ¡ and Lula NE in the Santos Basin offshore Brazil, Subsea 7 said.

Subsea 7's work scope will include engineering, procurement, installation, and pre-commissioning of four decoupled riser systems. The systems will feature four submerged 1,900 ton buoys, foundations and tethers, along with 27 steel catenary risers measuring 3.9km and associated pipeline end terminations for 18 production lines, three water injection lines and six gas injection lines.

The GuarÃ¡ and Lula NE areas are in water depths of about 2,200m. Installation is scheduled to begin in the second half of 2012.

Salamander aiming to lift production at Bualuang field in Gulf of Thailand

Salamander Energy aims to lift production from the Bualuang field in the Gulf of Thailand to around 10,500 barrels per day of oil this year. Last year, the field in Block B8/38 averaged 8,200 b/d following completion of its Phase IV development.

The Bualuang Alpha wellhead platform was extended recently to accommodate additional electric pump drives, allowing 10 of the platform's 12 well slots to be used as oil producers. Current drilling will result in 10 producers and two water disposal wells being in service, the company said.

Last year, after raising its interest in the block to 100%, Salamander decided to accelerate the Bualuang development plan. During the fourth quarter of 2010, the company initiated design, construction, and installation of the 16-slot Bualuang Bravo wellhead platform. A contract was awarded earlier this year, with delivery scheduled for mid-2012.

This platform will double the number of horizontal production wells on the field with drilling starting during the first half of 2012. These new wells will complete a skimming network across the attic of the reservoir, which should increase production to 15,000 b/d in 2013.

A 3D seismic survey over the B8/38 license last year defined numerous prospects, including Bualuang East Terrace, an undrilled fault terrace adjacent to the main Bualuang field; and the Bualuang NW Terrace, a series of small fault terraces directly on the oil migration fairway from the basin center to the Bualuang field.

Salamander aims to drill the B8/38 prospects this year after the Ocean Sovereign jack-up rig has completed development drilling on Bualuang.

ExxonMobil: Oil to account for most new production in 5 years

ExxonMobil Corp. expects to add nearly 1.4 million barrels of oil equivalent (boe) net daily to its production by 2016, and oil will account for 80% of that new production, company executives recently told analysts in New York.

"There is no bias for us one way or the other," ExxonMobil's Chairman and CEO Rex Tillerson said of the company's oil-gas production ratio. "Our bias is to make money."

During 2010, ExxonMobil's overall production was 54% oil. Total 2010 daily average production was 4.5 million boe.

ExxonMobil plans to deliver 120,000 boe/d net in 2011 from 2010 project startups. The company's average reserve replacement unit cost during 2005 to 2009 was $8/boe. Proved reserves equal 24.8 billion boe, up 8% from 2009.

"Our ability to replace more reserves than we produce at attractive unit cost positions us to continue to deliver profitable volume growth in the future," Tillerson said.

During 2012 to 2013, Tillerson expects 10 projects will come on stream, including 2 projects in Angola, 3 in Nigeria, 1 oil sands project in Canada, the first phase of Kashagan oil field development in Kazakhstan, and the Kipper-Tuna gas project in Australia's Gippsland basin.

Andy Swiger, ExxonMobil senior vice-president, said the company's unconventional resources account for more than 40% of the company's total 84 billion boe resource base. This includes heavy oil and oil sands, gas and oil shales, coalbed methane reservoirs, and tight gas sands across about six million acres from northern Canada to South Texas.

Z-Sight's method of boosting oil production

Last month, downhole monitoring specialist Zenith Oilfield Technology Ltd. showcased its revolutionary Z-Sight technology at high-profile engineering conferences in Houston: the SPE Digital Conference and the ESP workshop. The Scottish-based company presented its ground-breaking well-surveillance technology, which has been proven to boost oil production.

Zenith Oilfield recently completed successful well trials in South America and believes there is huge potential for the cutting-edge reservoir management technology in the American oilfield market. The South American results proved that Z-Sight can significantly increase oil production by up to 30% per day, the company said, noting that this news follows excellent well trial results in Kuwait and an additional seven Z-Sight trials with major operators in the Middle East and India.

Zenith's experts pioneered Z-Sight as a one-stop device for managing reservoir drawdown using automated optimization on the artificially lifted wells, taking artificial lift firmly into the future of the digital oilfield. Three trials in South America have now revealed that optimum production in artificially lifted wells can be achieved by utilizing the Z-Sight technology.

In one of the well trials, Z-Sight showed that production could be boosted by more than 1,000 barrels of oil per day. This was achieved when the Z-Sight technology immediately identified that the capability of the well exceeded the flow capability of the electrical submersible pump (ESP) that was installed.

"Our previous well trials already showed significant increase in production rates through the use of the Z-Sight technology, but what these new trials highlight is the very quick turnaround of accurate information that can lead to almost immediate optimization," said Julian Cudmore, new technology manager at Zenith.

"In the well lifting operations industry, good information is vital to production optimization and improving equipment run-life," Cudmore added. "Z-Sight provides an efficient management tool, in a one-look screen that provides real time recommendations on how best to operate the well to achieve optimum production within the limitations of the lifting equipment. The technology is a major step forward into the realms of the automated digital oilfield for the artificial lift sector of the oil industry."

A second trial in South America diagnosed that an ESP was underperforming by 30%. This issue was picked up as soon as Z-Sight was implemented on the well. Analysis of the data sent via the Z-Sight technology confirmed that resolving the ESP performance problem would increase draw down on the well by 60 psi and production would increase by 230 barrels of oil per day.

Formed in 2004, Zenith designs, assembles, and supports high-spec technology related to the gathering and analysis of downhole data and the design of completions equipment.

Z-Sight offers remote access and control through the Internet, giving operators complete control of their operations in an instant. They are immediately notified by e-mail or SMS when a well shuts down and production is being lost.

With 80 staff operating out of 30 countries, the majority of Zenith's workload comes from oil and gas operators and service companies working and producing in the Middle and Far East.

Processing and recycling drill cuttings on Stena Spey rig in UK North Sea

Oil and gas environmental waste contractor TWMA is to install and operate its offshore waste recycling system on the Stena Spey rig in the UK North Sea, currently contracted to Chevron.

Worth around $1.62 million over an initial six months, the contract awarded by Chevron North Sea Ltd. is TWMA's first with the operator. Chevron has opted to process and recycle drill cuttings on site as a more effective and energy-efficient method of waste management. TWMA is the first company in the world to offer this complete waste management capability offshore.

"Using TWMA's environmentally sensitive TCCRotoMill and CCDS system allows Chevron to contain, reuse, and recycle drill cuttings on site, which increases efficiency and improves environmental performance offshore by removing the need for skip and ship operations and reusing the recovered oil in the drilling fluid," said Ronnie Garrick, managing director of TWMA. "We are delighted to be working with Chevron for the first time and look forward to developing a long-term relationship with their environmental team."

Jim Cantlay, TWMA service support manager, operating the TCCRotoMill

The TWMA TCCRotoMill and its mobile counterpart, the TCCRotoTruck, are thermal cuttings processing units that recycle tens of thousands of drilled cuttings each year by effectively breaking them down into oil, water, and solid components for reuse.

The technology, recognized by the Department of Energy & Climate Change as "best available technology" for treating drilling wastes, drastically cuts the amount of waste going to landfill resulting in major safety and environmental benefits for operators and clients.

DMT has now completed the development of the new generation of drill core scanners. The CoreScan3 system is a portable, high-tech core logging tool generating high-resolution digital images of drill core.

Used in combination with dedicated analytical software this technology is DMT's response to customer requests for mobile, high-quality geological evaluation of drill core. Geologists are able to generate a reliable and transparent database for the assessment of deposits and reservoirs.

Varel International delivers world's largest roller cone drill bit

Varel International reports that it has recently completed a massive 44-in. steel-toothed roller cone bit for the oil and gas industry. The bit, which weighs in at more than 6,000 pounds and is over 22% larger in diameter than any previous roller cone bit, was requested specifically by Saudi Aramco, an integrated global petroleum company in the Middle East.

This bit features an advanced cutting structure with optimized row placement, tooth spacing, and cutter geometry for increased drilling efficiency. These attributes also work to minimize tooth wear and prevent cutter tracking in a wide variety of formations and conditions.

David Harrington, vice president of Varel's roller cone technology group, explained how the ultra-large diameter bit will work to create efficiencies in current field operations by offering a single bit solution to top-hole drilling, which previously involved drilling a pilot hole and then re-drilling with a hole opening assembly.

"Drilling with this large diameter bit in the top-hole section is a more efficient solution. The bit saves the operator time and money through a reduction of tripping to change bits and the need for hole enlargement tools," said Harrington. "The inaugural run of this innovative product is scheduled for the first quarter of 2011."

World's first online course focused on oil and gas drilling equipment

Following two years of development, Aberdeen Drilling Consultants has launched its new ADC Virtual Academy division, offering the world's first online course focused on drilling equipment for the oil and gas industry.

Understanding Drilling Equipment is a foundation course that will help participants achieve a greater understanding of the equipment on offshore or land-based drilling rigs. The aim is to improve competence, effectiveness, and safety through a better understanding of all the drilling equipment and systems.

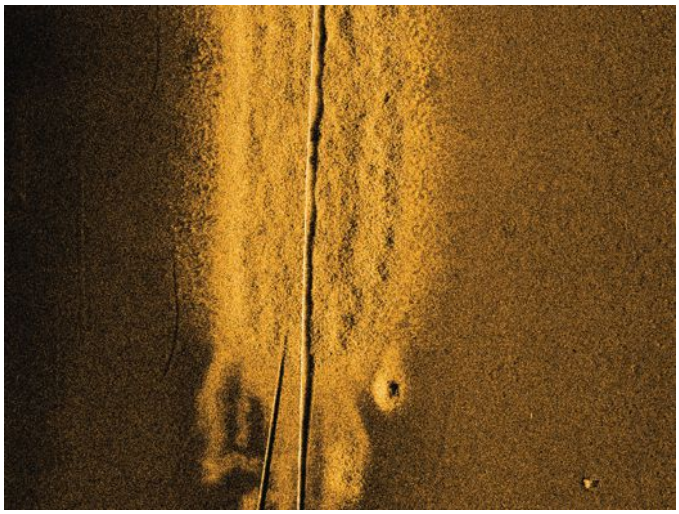
As the first-ever online training of its type, Understanding Drilling Equipment can be accessed anywhere in the world where there is a broadband internet connection. Participants can also choose to study at times best suited to them and their work schedules. The result is substantial cost savings, in terms of time, travel and accommodation, compared with equivalent "classroom-style" training courses.

"The subject has never been taught and illustrated like this before. We have developed the Understanding Drilling Equipment course for new entrants to our industry – such as graduate engineers – and also for all existing personnel whose roles would be enhanced by a greater understanding of rig equipment," managing director Douglas Hay said.

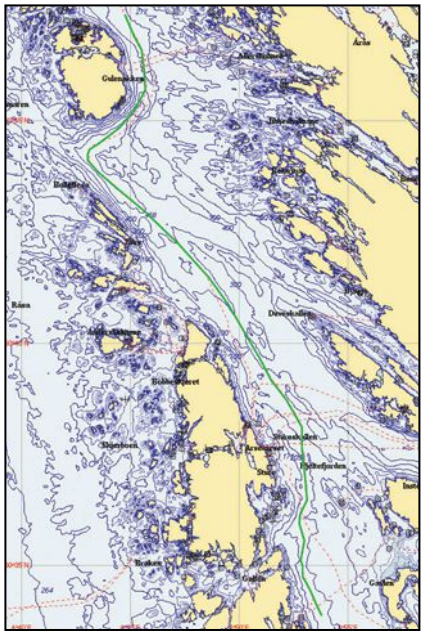
The 30-hour Understanding Drilling Equipment course has eight modules, including health and safety, drilling equipment, well control, mechanical equipment, electrical equipment, deck equipment, and audit. For more information, visit www.kenmcewen.com.

Hugin 1000 completes world's longest multi-sensor AUV pipeline inspection

KONGSBERG has completed the world's longest multi-sensor AUV pipeline survey using one of its cutting-edge HUGIN 1000 AUV. The pipeline inspection took place 9 to 11February 2011, in the Hjelte fjord near Bergen, Norway, and the HUGIN 1000 was operated from the Royal Norwegian Navy vessel HNoMS Maloy.



The subject of the inspection was two subsea pipelines going to the Mongstad oil refinery. The HUGIN 1000 AUV was equipped with a an advanced suite of KONGSBERG imaging equipment, including the HISAS 1030 synthetic aperture sonar, EM3002 multibeam echo sounder, and an optical camera with LED lighting. The instruments were used to inspect around 30km of subsea pipeline in an 8-hour, two-pass mission.



In the first pass, side-scan data from the HISAS 1030 sonar were used to detect and track the pipelines in real-time using PipeTracker software for pipeline detection and tracking extracted pipe-like features in the sonar images, with a high degree of robustness towards false detections.

The PipeTracker software, which was developed in a collaborative effort with the Norwegian Defence Research Establishment (FFI) in a project funded by the Norwegian Research Council, runs as a plug-in module in the standard HUGIN payload system. The HUGIN 1000 control system, in turn, uses the identified pipeline tracks to position the vehicle at an optimal range for HISAS imaging. The whole process is fully automated inside the AUV and requires no operator intervention.

In the second pass, HUGIN followed the pipeline tracks identified in the first pass at low altitude and inspected the pipelines using the EM 3002 multibeam and the optical camera. After the mission, the recorded HISAS 1030 data were post-processed into high-resolution (4x4cm) sonar images and bathymetry maps of the pipeline. Together, with the optical images and the multi-beam data recorded in the second pass, this gave a detailed view of the pipeline surroundings and the pipeline itself. The complete procedure was repeated the next day over the second pipeline in a new 8-hour, two-pass mission.

Both pipelines were surveyed at a constant speed of 4 knots and at 4 to 25m altitude, depending on the sensor in use. Water depth was 180 to 560m. The greater speed of the HUGIN 1000 compared to that of a ROV meant that 60km of pipeline could be inspected in a little over 16 hours during the two passes. Furthermore,

the stability of the HUGIN platform and the ability to simultaneously operate both at high speed and low altitude resulted in an efficient survey with clear images from the onboard optical camera.

Kongsberg Maritime and subsidiary Hydroid offer "Full Picture" HUGIN and REMUS AUV solutions, where the vehicles themselves and required instruments can be supplied by Kongsberg Maritime, ensuring users have a single company to cooperate with for any kind of survey. The company is aligning the two product lines, providing users operational synergies and a strengthened technology base suitable for all underwater survey applications.

UTEC Survey enhances GAVIA AUV capabilities

UTEC Survey has announced the successful completion of a system acceptance test (SAT) of a sub-bottom profiler module for the GAVIA AUV.

With the addition of the adapted Teledyne Benthos Chirp III system, the enhanced GAVIA AUV now provides a comprehensive, pre-engineering survey capability particularly suited to subsea pipeline, umbilical, and cable route surveys.

Trevor Hughes, Director, Sales and Marketing comments, "The ability to provide a full pre-engineering route survey capability from a modular, easily transportable AUV system demonstrates UTEC's commitment to providing a truly global geophysical service in shallow to medium water depths, deployable from any suitable cost-effective vessel of opportunity."

The GAVIA AUV's design allows the end-user to attach an individual sensor package or a combination of packages, including multi-beam (MBES), side scan or sub-bottom profiler. These sensors, combined with a state-of-the-art inertial navigation module, provide a highly accurate, efficient and stable work platform that delivers unmatched data quality.

UTEC Survey is one of the world's largest independent offshore survey companies providing a wide range of offshore survey services, including construction support, industrial measurement, positioning, geotechnical, and geophysical survey services. With offices in Houston, Aberdeen, Calgary, Perth, and Singapore, UTEC delivers client-focused innovative survey solutions in both shallow and deepwater environments.

For more information please visit www.utecsurvey.com.

Subsea 7 adds new Schilling Robotics ROV systems to fleet

Schilling Robotics, LLC, experts in subsea systems, announced today the award of new contracts for ROV systems from Subsea 7. A total of three new ROV systems will be supplied for delivery in second quarter 2011, including one 150-hp., 3,000m-rated ACV ROV system and two 150-hp., 3,000m-rated HDTM ROV systems.

The ACV ROV system is an addition to Subsea 7's existing fleet of construction vehicles and will be mobilized on Subsea 7's new pipelay-heavy lift vessel, the Seven Borealis. Incorporating advanced power sharing technology, the ACV is capable of performing the most demanding subsea construction tasks and has a comprehensive track record for delivering both performance and reliability.

The HDTM ROV system is a work-class vehicle that provides flexibility for construction and inspection, maintenance, and repair (IMR) applications. The HD's™ integrated system design leverages modular sub-systems for ease of maintenance, and provides the most on-board space available in a mid-size vehicle for integrating specialized intervention tooling. Subsea 7 will mobilize the HD systems to support ROV-based IMR work in the Norwegian Sea and North Sea.

For more information, visit www.schilling.com.

Underwater Intervention

Delivery of the new QX Ultra ROV gathers pace.

Since November 2010, SMD has delivered four of the QX Ultra vehicles for i-Tech's multi-ROV contract for Petrobras in Brazil. The 125hp work class ROV system is designed primarily for rig support and field maintenance, but is also capable of carrying out construction tasks and survey operations. The Ultra QX follows in the footsteps of the successful Centurion QX vehicles and incorporates new technologies from SMD's new ultra-compact ROV due to arrive in the U.S. later in 2011.

The design criteria was to create a reliable and versatile work platform. The QX Ultra's frame has been built using weight-saving techniques from the aerospace industry. Impact-resilient side protection are easily removed to give unprecedented component access. Two hydraulic control units, a Zipjet, and a high-pressure water jet tool are fitted within the frame.

The new DVECS2 control system offers the pilot excellent diagnostics and graphical feedback. An advanced trending and logging system can be used to help locate intermittent problems. The proven distributed network is used to save vehicle weight, space, and complexity. As with all SMD's systems, the pod remains serviceable in the field. The respected Curvetech range of hydraulic components include the HTE300 and HTE380 thrusters, intelligent valve packs, a lightweight HPU, and compensators — are all used to give excellent power, reliability, and supportability.

SMD remains the only work class ROV manufacturer with the in-house capability to design and build the complete scope of an ROV system, including the LARS, winch and HPU. This optimizes deck space and simplifies the client's project management and product liability.

A Planned Maintenance System and component tagging are integral to the control system. These monitor usage, flag maintenance tasks, and track reports and component history. The data onboard is synchronized onshore to help Asset Managers track vehicle specification, spares usage, and maintenance records across the entire fleet. This can then be coordinated with any of the SMD regional support offices located in Houston, Macae, UK, and Singapore.

In addition, SMD will be featuring a 200 shaft hp Quantum vehicle at OTC. The 3000 msw vehicle, which is one of two systems to be supplied to Hallin Marine, is the larger cousin to its Atom and Quasar vehicles. The system was designed to be delivered with a custom SMD gantry LARS and pilot control environment, integrated into the vessel. The SMD tether-friendly top-hat TMS with 950m of capacity enhances the vehicle operating envelope.

The Quantum vehicle capability includes; an impressive 1,100kg of longitudinal and lateral and 900kg vertical thrust, a basic payload of 350kg and a through frame lift of 3,000kg. A secondary tooling circuit of more than 80-hp. is available to power tools and other ancillaries. Low density buoyancy and industry standard 7-function and 5-function manipulators compliment the performance.

For more information, visit www.smd-us.com.

GOSL gets Sub-Atlantic Mohawk integrated with SeeTrack CoPilot

SeeByte, the global leader in creating smart software technology for unmanned systems, has successfully integrated and delivered SeeTrack CoPilot with the Sub-Atlantic Mohawk to Geodetic Offshore Services Limited (GOSL).

GOSL recently purchased the Mohawk Inspection Class ROV to offer offshore pipeline surveys, inspection surveys, and tooling capabilities in order to support the growing needs of their clients. Realising the benefits of the solutions offered by SeeByte's SeeTrack CoPilot software, GOSL has purchased a SeeTrack licence to accompany the Mohawk. The system was demonstrated and accepted at the Sub-

Atlantic test tank in Blackburn, Aberdeenshire on 12 April.

"It was great to have GOSL witness their new SeeTrack CoPilot software in action with their Mohawk ROV," commented Ioseba, sales manager at SeeByte. "SeeTrack CoPilot offers a range of benefits for ROV service providers; the intuitive interface makes piloting the ROV a simple point-and-click task. This means that the performance and data gathered during subsea inspections is much improved."

Having never piloted an ROV prior to this demo, Emanuel Ekpeyong, CEO of GOSL, was given the opportunity to discover the advantages in using SeeTrack software. "I was very pleased to see for myself how easy it was to control the ROV using SeeTrack" commented Ekpeyong. "The concentration and skill required to manually maneuver the vehicle shows what a difficult task pilots are faced with, and by simply adding SeeTrack CoPilot, the mission becomes a much simpler and efficient act. I am looking forward to providing this capability to my pilots and also improving the standard of service available to oil companies."

"This has been an interesting project, and we have worked hard to ensure that GOSL are satisfied with their system," said John Ferguson from Sub-Atlantic. "I am certain that the Mohawk is going to be of great value to GOSL and their customers."

SeeTrack CoPilot software can now be integrated to all Sub-Atlantic ROVs.

For more information, visit www.seebyte.com.

IMCA publishes Annual Audit of Diving Systems

Guidance notes published by the International Marine Contractors Association (IMCA) under the general heading of 'DESIGN' – Diving Equipment System Inspection Guidance Notes – have played an important role in the offshore diving industry for many years. Addressing the configuration of diving systems as utilized in the industry, they cover the four types of diving system – air, saturation, surface-supplied mixed gas, and mobile/portable surface-supplied diving systems. Now, revised guidance on annual auditing of diving systems has been published.

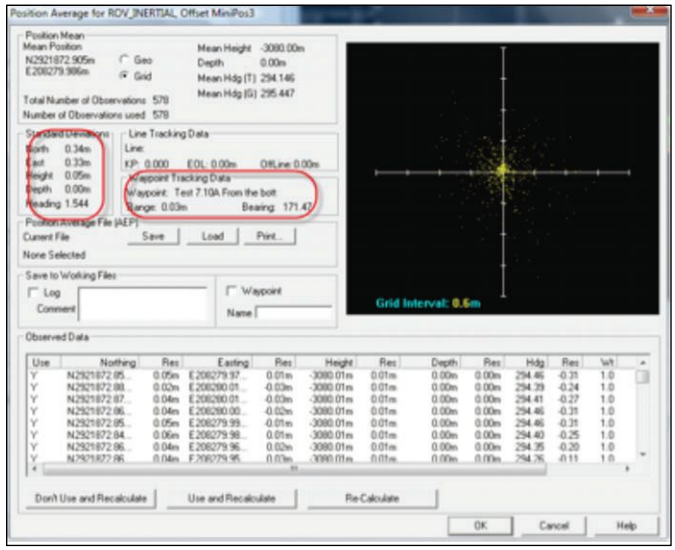
It is now common practice for each diving system to undergo a comprehensive audit annually and for the DESIGN documents to be kept up-to-date and available for review and inspection by clients and others wishing to spot check one or more items within the audit document. The latest in the series "Annual Auditing of Diving Systems" (IMCA D 011 Rev 1) sets out guidance on how the DESIGN process is carried out, and bears in mind the wide number of individuals and organizations interested in the outcome.

CDL and Schilling Robotics make ROV mid-water station keeping a reality

An affordable and functional solution for mid-water station keeping (MWSK) has been on the wish list of most ROV operators and manufacturers for some time now; the huge benefits in terms of operational efficiency and the future potential for pre-planned automated missions has made it a case of when, not if.

Against this backdrop and at the request of C-Innovation, CDL and Schilling Robotics engineers started work on a collaborative solution over 12 months ago; the results of this effort were demonstrated in March in the Gulf of Mexico following an extensive period of Factory Acceptance Tests.

Traditional ROV station keeping functions rely on a Doppler Velocity Log (DVL) system on the ROV, which can only maintain bottom lock within a limited distance of the seafloor (typically meters) with the added disadvantage of only providing relative position. USBL positioning systems, while providing absolute position, are unable to support MWSK functionality due to inaccuracy (especially in deep water) and slow update rates, while inertial systems suffer from drift when unaided.



The solution centers around fusing these readily available positioning technologies (INS, USBL, and DVL) and the integration of those technologies with Schilling's next generation closed-loop control system. At the heart of the solution is the CDL MiniPOS3 INS (Inertial Navigation System) platform, which uses the USBL position (and DVL when available) to produce a highly stable INS aided solution feeding precise position, acceleration, and rotation information directly to the control system on the ROV at update rates of up to 50Hz.

During the trials carried out in March 2011 on the Chouest Holiday, a C-Innovation performed an extensive set of test procedures with a UHD ROV system to demonstrate the world's first practical ROV MWSK system utilizing inertial technology aided by a surface-based USBL positioning system. MiniPOS3 is hardware independent and can work with any USBL or LBL system and a variety of topside software packages. The first software package to fully support the functionality is WinFrog by Fugro Pelagos, which was used during testing.

The performance of the MiniPOS3 and the Schilling control system can be seen in the screenshot above and the results are remarkable. The absolute positioning accuracy of the ROV (without DVL) was noted at a standard deviation of less than 40cm during MWSK. With DVL lock this improved dramatically to approximately 3cm.

For more information, contact Neil Manning at Neil.Manning@cdltd.net.

Orolia announces the launch of VLINK
Orolia has announced the launch of VLINK by its subsidiary KANNAD. VLINK is a Vessel Monitoring System (VMS) design for the monitoring and control of information from fishing vessels, bringing together multiple technologies and utilizing Iridium satellite systems for the data transfer. This solution is certified by the French maritime fisheries and aquaculture authorities, enabling fishermen to send daily updates on catch reports and the position of their vessel at regular intervals throughout the day. VLINK is fully compliant with European regulations. In France, there are more than 30 distributors and maintenance stations approved by Kannad and Sodena who will be responsible for the sale, installation and maintenance of the equipment onboard the vessels (www.kannad.com).

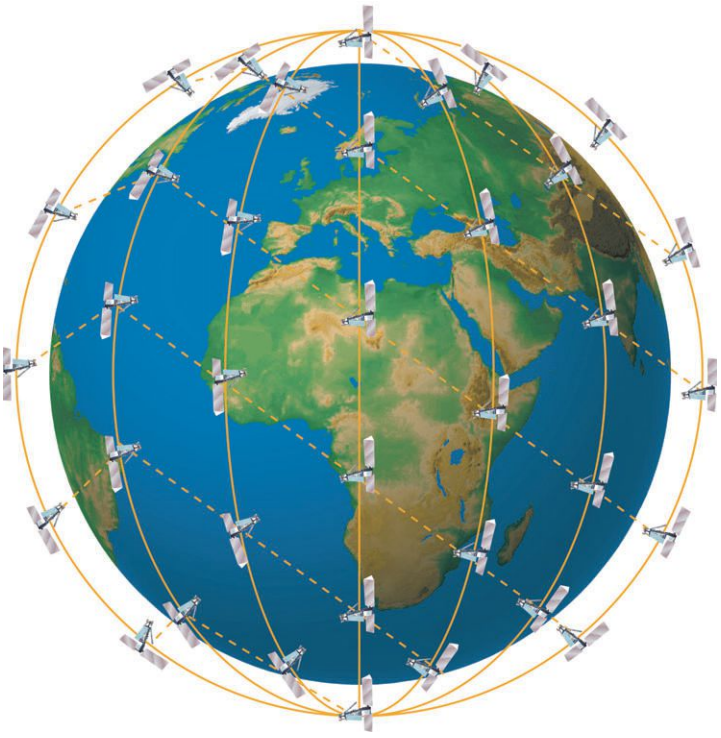
SRT wins orders from Chinese customers
Software Radio Technology plc (SRT) has received orders from two Chinese customers totaling US$ 300,000. The orders are for SRT's Class B products and are destined to fill demand from local authorities that are fitting AIS to their fishing fleets. China is in the process of building the world's largest AIS network to cover up to 550,000 vessels that are planned to be fitted with an AIS device by 2015 (www.softwarerad.com).

Fairplay Towage selects FleetBroadband
Stratos Global announced it is deploying the Inmarsat FleetBroadband satellite communications service on six deep-sea tugboats in Fairplay Towage's fleet. Deployment on four of the vessels has already been completed. Based in Hamburg, Fairplay Towage is one of Europe's leading tugboat operators in the ports of Hamburg, Rotterdam, Antwerp, Rostock, Wismar, Szczecin, and Swinoujscie. Its fleet includes 27 modern vessels for harbor, coastal, and deep-sea towage (www.stratosglobal.com).

ORBIT ships 1,000th OrSat Maritime VSAT system
ORBIT Communication Systems, Ltd. has recently shipped its 1,000th OrSat maritime VSAT system. Originally introduced to the market in 2007, the OrSat is claimed by ORBIT to be currently recognized as the world's best performing VSAT system and leading the industry in satellite regulation compliance. OrSat supports high-performance, high-speed, 2-way broadband communications (www.orbit-cs.com).

Marlink secures contract with Fugro-Geoteam
Marlink, the global provider of maritime satellite communications, has recently extended its contract with seismic vessel operator Fugro-Geoteam for an additional five years. As part of the latest agreement, Marlink will supply its innovative Sealink™ VSAT service to eight seismic vessels via Marlink's Eik teleport in Norway, providing 512 Kbps of bandwidth and 10 to 15 telephone lines for each vessel. Marlink's latest contract with Fugro-Geoteam follows a new global agreement with Fugro Marine Services BV, which has established Marlink as a preferred supplier of VSAT communications to Fugro vessels worldwide (www.marlink.com).

Iridium OpenPort® Global Service Program in operation



Iridium Communications Inc. has announced the operational launch of its Global Service Program to support all customers of the Iridium OpenPort® broadband maritime satellite communication service, effective 1 April.

The Iridium OpenPort Global Service Program will enable Iridium's Customer Care team to dispatch 24/7 shipboard technical support at more than 50 ports around the world. Iridium is the first mobile satellite service provider to offer full-service support of this kind for any of its products. Imtech Marine, through its member Radio Holland, is the first service partner for the Iridium OpenPort Global Service Program.

In addition to the establishment of its worldwide network of maritime service centers, as of 1 January 2011 Iridium is backing up its promise of service excellence by providing a five-year standard warranty for all new and existing Iridium OpenPort units.

Under the service agreement, Imtech Marine through Radio Holland is managing the program's three regional service centers and technical support at more than 50 ports around the world, enabling Iridium to focus on delivering on its promise of network excellence and dependable communications.

Iridium has shipped more than 3,500 Iridium OpenPort terminals for use on a wide range of vessels, including merchant fleets, government and navy vessels, fishing fleets, and personal yachts.

For more information, visit www.iridium.com.

Harris Corporation completes acquisition

Harris Corporation, an international communications and information technology company, has completed its previously announced acquisition of the Global Connectivity Services (GCS) business from an operating unit of Schlumberger.

Harris combined the former Schlumberger GCS business with its existing Maritime Communications Services business, the recently acquired CapRock Communications, and infrastructure assets from Core180's government business to form Harris CapRock Communications — the leading provider of managed communications services for remote and harsh environments, including those in the energy, government, and maritime industries.

Harris CapRock Communications has more than three decades of experience serving customers in more than 100 countries. The business has more than 1,400 employees; a local presence in 23 countries; and a robust self-owned and operated infrastructure that includes teleports on six continents, six 24/7 Network Operation Centers, and an extensive terrestrial network.

Solutions from the newly combined business include mission-critical communications; converged voice, video and data; highly reliable and secure connectivity; and rapid and mobile deployments. Energy customers include national oil companies, major oil companies, independent oil companies, oil field service companies, seismic companies, oil and gas marine companies, and rig owners. Harris purchased the Schlumberger GCS business for $397.5 million in cash, subject to post-closing adjustments.

For more information, visit www.harris.com.

Inmarsat to acquire maritime VSAT provider Ship Equip

Inmarsat has announced the acquisition of Ship Equip International, a leading provider of VSAT maritime communications services to the shipping, offshore oil and gas, and fishing markets.

Ship Equip is ideally positioned to support the evolution of parts of the maritime market to higher speed services such as Inmarsat's forthcoming Global Xpress™ service, planned for launch in 2013.

The company, based in Norway, will operate as a separate Inmarsat subsidiary alongside Stratos Global and Segovia.

For more information, visit www.inmarsat.com or www.ship-equip.com.

Marlink provides Sealink™ to Atlantic Oilfield Services

Marlink, a global provider of maritime satellite communications, has recently confirmed delivery and installation of its innovative Sealink™ VSAT solution on the Atlantic Oilfield Services oil and gas support unit "KS TITAN 2". Chartered by Exxon Mobil, KS TITAN 2 is the second Atlantic Oilfield Services rig to be installed with Marlink's Sealink™ system.

Marlink's Sealink™ C-band VSAT system will provide the KS TITAN 2 rig with up to 256 Kbps bandwidth and eight telephone lines for a multitude of critical offshore applications, including real-time data management and data sharing with sites onshore. Atlantic Oilfield Services is an independent drilling contractor providing drilling rigs in both the heavy land rig and offshore shallow water segments. The company has headquarters in Dubai, UAE, and Singapore, and operates rigs in Arabian Gulf, Egypt, Kurdistan, Northern Iraq, Indonesia, Nigeria, the North Sea, Pakistan, and Tunisia.

Marlink's extensive product range for the oil rig and offshore industry includes its own regional, multi-regional, and global Ku-band and C-band Maritime VSAT systems @SEAdirect™, WaveCall™, and Sealink™ as well as on-demand services such as Inmarsat FleetBroadband, Iridium, and Thuraya. The maritime satellite communications provider also has established regional customer service facilities in major regions of the world, supporting its global customer base.

For more information, visit www.marlink.com.

Globecomm Maritime completes major implementation milestone

Globecomm Systems Inc. has completed a maritime milestone, installing its 100th se@COMM system for the customer Briese Schiffahrts. The se@COMM system and Satlink Inmarsat FB250 FleetBroadband terminal were supplied and installed by Telaurus, a Globecomm company, on the 2008-built combination carrier BBC Jade in March 2011, two years after Briese became the first company in Europe to fit FleetBroadband FB150 on its coastal vessel Saxum.

The migration to FleetBroad band using the se@COMM system involved the replacement of Briese's legacy communications and e-mail messaging system, reflecting greater volumes of critical data traffic and the need for transparency in managing the cost of ship-shore messaging.

Globecomm Maritime's flagship product, se@COMM, allows users to communicate via e-mail, fax, telex, and SMS, as well as permitting controlled web browsing. se@COMM features real-time e-mail delivery capabilities and unique pre-pricing by the kilobit, enabling users to control their communication spends.

For more information, visit www.globecommsystems.com.

Swire Pacific Offshore chooses communications platform

Station711, the mobile satellite arm of RRsat Global Communications Network Ltd, has signed a contract for the provision of Inmarsat FleetBroadband services to Swire Pacific Offshore (SPO) in collaboration with service provider SMTS. Singapore-based SPO, a leading service provider to the offshore oil and gas industry, is set to install the new broadband satcom service on 60 vessels and intends to use it for operations, logistics, navigation, and crew welfare services.

The agreement, for a minimum of three years, comprises a smart@sea communication gateway, SAILOR FB500 terminals, a tailored fleet-wide pricing package from Inmarsat, and ongoing maintenance and support services from SMTS and Station711. SMTS will provide the turnkey solution for the installation of the terminals and onboard LANs on SPO's vessels. Station711 will provide satcom management applications from its Station711 solutions range, such as the smart@sea gateway for UTM security, crew welfare voice and data module, IP traffic real-time compression, acceleration, caching and filtering, VoIP platform, shore-side unified POP facility providing a centralized management interface, and a powerful control system.

For more information, visit www.station711.com.

Subsea Cables

Pacific Fibre releases invitation to tender
Pacific Fibre announced today that its Invitation to Tender was released to selected vendors for the Pacific Fibre Cable System connecting Australia to New Zealand and the U.S. The 5.12 Tbps two fiber pair system, which includes new-build cable landing stations in each country, will allow Australian and New Zealand carriers to secure supply of sufficient capacity to take advantage of the NBN and UFB fiber rollout plans. The Invitation to Tender was sent to established leaders in the submarine cable system supply industry. Vendor responses are due in mid-May, with contract negotiations expected to commence with a preferred vendor soon after (www.pacificfibre.net).

NSW leases equipment from Blue Offshore
Blue Offshore has been awarded a lease agreement for a subsea cable installation system by Norddeutsche Seekabelwerke GmbH (NSW). The system includes the uniquely adaptable modular turntable system, loading arm assembly, tensioners, trackways, and associated equipment to assist with the installation of submarine transmission cables. The order value has not been disclosed, with mobilization beginning in 2012 (www.blueoffshore.com).

Level 3 to acquire Global Crossing
Level 3 Communications, Inc. and Global Crossing Limited have entered into a definitive agreement under which Level 3 will acquire Global Crossing in a tax-free, stock-for-stock transaction. The combined company will operate a unique global services platform anchored by fiber optic networks on three continents and connected by extensive submarine fiber optic cable facilities. The combined network will serve a worldwide customer set with owned network in more than 50 countries and connections to more than 70 countries (www.level3.com or www.globalcrossing.com).

Dominion Virginia Power announces study of offshore power line
Dominion Virginia Power, a subsidiary of Dominion, is initiating a study of what it would take to build a high-voltage underwater transmission line from Virginia Beach into the Atlantic Ocean to potentially support multiple offshore wind farms. Dominion sees this as the first of many steps, with the ultimate goal being the design, construction, operation, and maintenance of the transmission line necessary to make the offshore wind resource available to its customers. Dominion plans to complete the study this year, evaluating options to best support multiple offshore wind projects off the coast of Virginia (www.dom.com).

AWC files for 650-mile offshore cable network
Building on the significant momentum in support of the development of the Mid-Atlantic region's abundant offshore wind energy resource, the Atlantic Wind Connection (AWC) has filed the first-ever unsolicited right-of-way application with the Department of Interior's Bureau of Ocean Energy Management for the use of certain areas of the U.S. Outer Continental Shelf to construct an offshore transmission system. The project ultimately will span roughly 300 miles of federal waters from the northern New Jersey/New York City metropolitan area to Virginia. In preparing the application, nearly 9,700 square miles of the OCS were examined in a process that included extensive analysis of the offshore marine environment, resources, geologic and geotechnical hazards, and public safety.

Cable ship chartered to recover debris of AF447 flight

Alcatel-Lucent and Louis Dreyfus Armateurs, partners in the joint-venture Alda Marine, announced the signature of a contract with the Bureau Enquêtes et Analyses (BEA) for chartering their cable ship Ile de Sein. BEA will manage the mission, which is part of the fifth phase of the marine operations under the ongoing investigations of the AF447 flight from Rio to Paris, which crashed on 1 June 2009.

The campaign's objective is to find the black boxes and recover some of wreckage of the crashed aircraft that lies at a depth of 3,900 meters. The Ile de Sein will be equipped with an ROV manufactured by Phoenix International Inc.

The Ile de Sein, which is expected to arrive in the Canary Islands this week to load the equipment required for this mission, is a cable ship specialized in laying and maintaining submarine cable networks. It is ideally suited for this type of search and recovery mission thanks to its extremely powerful equipment allowing for dynamic positioning (assisted by GPS), which enables the vessel to maintain its position even in rough sea conditions (1 meter close up to force 7). The Ile de Sein is currently involved with her twin cable ship Ile de Bréhat in the deployment of the West Africa Cable System, (WACS) on behalf of a consortium of operators that will connect landing sites along West Africa, from South Africa to Portugal, via an undersea broadband optical connection.

Solicited to assist in these types of operations, Alcatel-Lucent and the Louis Dreyfus Armateurs Group leverage a wide experience in wreck recovery. In 2004, the cable ship Ile de Batz identified and recovered the black boxes and some debris of the jetliner that crashed in the water off Sharm El Sheikh, Egypt. In 2007, a similar operation had been conducted by the cable ship Ile de Ré when an aircraft crashed off Moorea Island in French Polynesia.

The Louis Dreyfus Armateurs Group had already participated in the search of the wreck of the Rio-Paris flight, through its shipping subsidiary Fairmount Marine. Two of the most powerful tugboats in the world – the Fairmount Glacier and the Fairmount Expedition – had been implemented to tow hydrophones from the U.S. Navy in June 2009.

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

TE SubCom and NEC win SJC supply contract; provides 40G upgrade

The global consortium of telecommunications companies formed to build and operate the South-East Asia Japan Cable (SJC) system officially announces the start of the construction of the project that will link Brunei, China Mainland, Hong Kong, Philippines, Japan, and Singapore, with options to extend to Indonesia and Thailand.

The SJC consortium signed an agreement with TE SubCom and NEC Corporation to supply and install the system based on their decades of combined experience, technology superiority, and extensive record of on-time and on-budget project completions. The SJC system is expected to be ready for service in the second half of 2013.

First announced in December 2009, the cable was initially planned to be 8,300km in length, linking five countries/territories. SJC's length is now 8,900km, which could extend up to 10,700km, linking up to eight countries/territories while supporting an initial design capacity of over 15 terabits per second.

In addition, Tyco Electronics Subsea Communications (SubCom) has been contracted to provide the first 40G upgrade in a system more than 9,500km in length. The use of SubCom's next-generation G4 SLTE enables the increase of cross sectional capacity by 100% to 1.92 Tbps per fiber pair, a new record for transpacific distance.

SubCom remains committed to assisting its customers in the optimization of existing system investments by migrating capacity from 10G to 40G to 100G data rates and beyond. The company is well positioned with both its technology and expertise to ensure its customers are able to consistently provide the most advanced, high-capacity services.

For more information, visit www.subcom.com.

Nexans' offshore technologies help fish farmers

To serve Norwegian fish farms, Nexans' AQUAFISH hybrid power and fiber-optic cables replace noisy and polluting diesel onboard generators and various radio links with a reliable, cost-effective, and environmentally-friendly onshore energy and broadband-based communications system.

Fish farms need electrical power and communications for automatic feeding, monitoring of fish health, and overall operations. Underwater illumination promotes fish growth, while buoy-mounted beacons warn passing ships. Future applications will include subsea electrical fences for confinement and parasite-control.

Since fish farms are dynamic floating structures, Nexans Norway drew on its offshore experience in stress-resisting mini-hybrid cables to provide subsea power, control, and communications capabilities (including optical fiber). The AQUAFISH cable was specified to meet fish farmer needs in terms of functionality, durability, mechanical behavior, and easy

shore-to-sea installation. Nexans created a turnkey solution with dynamic connective equipment capable of enduring storms and tough seas. A complete installation includes an onshore transformer, an interface to the electrical grid and telephone network, and civil engineering.

With 1,000 Norwegian fish farms producing over one million tons of salmon for the world market, this breakthrough has contributed to enhancing the environmental profile of the industry. Cultivated salmon, trout, cod, and shellfish can now be marketed as sustainable, environmentally-friendly and healthy alternatives to open sea fishing. Added benefits are high-power reliability for stable illumination, lower fish mortality rates, reduced fuel costs, lower vibration, less pollution and a quieter coastline, lighter loads for floating structures, enhanced communications (including Internet, onboard voice, and TV entertainment), remote control, and improved safety for personnel.

For more information, visit www.nexans.com.

Pacnet to enhance connectivity in Taiwan and India

Submarine fiber optic cable owner Pacnet has signed agreements with carriers in Taiwan and India to increase its network reach throughout the region.

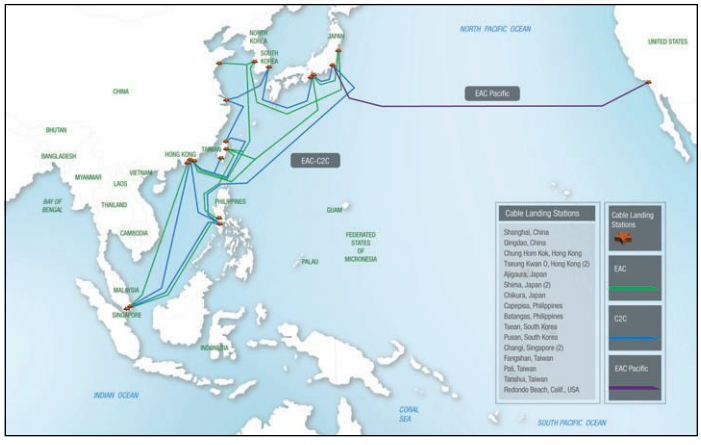
In the first deal, Pacnet and Far EasTone's subsidiary New Century InfoComm Tech Co. (NCIC) have announced a partnership to increase Taiwan's network connectivity and resiliency. Through the partnership, Far EasTone will deliver additional terrestrial connectivity between Pacnet's PoPs and the cable landing stations in Taiwan where EAC-C2C lands, while simultaneously increasing Far EasTone's international connectivity through Pacnet's subsea network.

The capacity boost between the cable landing stations enables even more capacity for Pacnet's fully meshed EAC-C2C network to re-route traffic to bypass congested or impacted segments of the network, so as to maintain and optimize network connectivity.

In India, Pacnet has signed agreements with Bharti Airtel Limited to deliver a new high-speed network connecting Chennai to the United States. The US$120 million network, created through the synergy of Bharti Airtel's i2i cable system and its domestic network in India, together with Pacnet's EAC-C2C and EAC Pacific submarine cable network will enable businesses and consumers across India to enjoy enhanced high-speed broadband connectivity to the United States via Asia.

Pacnet's EAC-C2C is Asia's largest privately-owned submarine cable network of 36,800km, which lands at 18 cable landing stations in China, Hong Kong, Japan, Korea, the Philippines, Singapore and Taiwan. EAC-C2C has a design capacity of 17.92 to 30.72 Tbps to and from each of the landing countries with continuous upgrades underway.

For more information, visit www.pacnet.com.



GBI cable reaches Qtel's station

Gulf Bridge International (GBI), the Middle East's first privately-owned submarine cable operator, and Qtel, one of the region's telecommunications companies, announced the landing of the GBI cable in Qatar, which will connect to the new purpose-built Qtel landing station.

This is second of two GBI cable landings in Qatar and one of ten planned cable landings around the Gulf region. To be launched later this year, the GBI Cable System is a high capacity, fiber-optic communications cable that will connect all the countries of the Gulf region to each other and provide onward connectivity to Europe, Africa, and Asia. The GBI Cable System will offer the most comprehensive geographic reach of any subsea network in the region.

Within the coming months, the cable ship Responder will continue the installation process of the GBI Cable System, which is configured as a self-healing ring within the Gulf. The GBI Cable System deploys several state-of-the-art technologies, such as the new dual-stage repeaters and wavelength monitoring units that guarantee flawless and error-free operations throughout the entire system.

For more information, visit www.gbi-inc.com.

GlobeNet's cable upgrade complete

GlobeNet, an international wholesale provider of submarine capacity and a wholly owned subsidiary of Oi, has completed the 200 Gbps upgrade of its submarine fiber optic cable system, increasing its total lit capacity to 560 Gbps. Delivering the lowest latency capacity connecting North America and South America, the GlobeNet network expansion will support increased bandwidth demands in the region due to the widespread adoption of advanced technologies and telecommunications services.

With over 22,000 kilometers of submarine fiber optic cable built with the lowest latency design on all network segments, GlobeNet offers network availability in excess of 99.99%. Its state-of-the-art architecture based upon the latest Dense Wave Division Multiplexing (DWDM) technology coupled with GlobeNet's carrier-class customer support offers the wholesale marketplace cutting-edge services and technical support.

GlobeNet's international capacity serves Brazil, Bermuda, Colombia, the United States, and Venezuela, offering a wide range of products and services, including International Private Line, Wavelength, and Carrier Ethernet. GlobeNet plans an additional network upgrade later this year that will offer more than 1 Terabyte of total capacity.

For more information, visit www.globenet.net.

WACS prepares for South Africa landing

MTN Group's $90 million investment in the West Africa Cable System (WACS) will reach an important milestone this month when the 14,000km-long submarine cable lands at Yzerfontein in the Western Cape of South Africa.

The WACS submarine cable is an ultra high-capacity fiber optic submarine cable system that links Southern Africa and Europe, spans the west coast of Africa and terminates in London, United Kingdom. This $650 million cable system is the biggest to ever land on the Africa continent. It has 15 terminal stations that anchor along the western coast of Africa, including countries where MTN has operations such as Republic of Congo, Cameroon, Nigeria, Ghana, and the Ivory Coast.

WACS is a minimum 4-fiber pair cable system linking South Africa to Portugal, with landings in several intermediate countries and an extension Segment to the United Kingdom and London Point of Presence. It has a designed capacity of 5.12 Terabits per second and will initially be equipped at more than 500 Gbps. Most of the system is based on 10 Gbps wavelengths, carrying between 128 and 160 x 10 Gbps wavelengths per fiber pair; however, certain segments will deploy 40 Gbps wavelengths technology from first day of operation.

For more information, visit www.mtn.com.

Indian Ocean cable suffers outage

On 18 March 2011 at 20:48 GMT, the Falcon submarine fiber optic cable system supporting access to the Global Internet and other data services to Bahrain was disrupted due to a suspected damaged fiber.

The cable is one of the current four diverse physical Telecom routes that connects the Kingdom of Bahrain to the rest of the world, and the incident resulted in lower browsing experience during peak hours for some users, according to Bahrain's telecommunications regulator. The fault was confirmed to be a damaged fiber off the coast of Dubai. Very close to the incident, the cable needed to be maintained due to a shunt problem and both operations were performed at the same time.

A cable ship was mobilized and reached the fault location on 22 March starting repair operations for an estimate 7 days of work. On 31 March after completion of the initial repair, another problem was identified, requiring the ship to move and perform additional work on the cable.

On 3 April, the Falcon submarine cable service was restored and the Internet services were confirmed stable after a monitoring period of 24 hours.

For more information, visit www.tra.org.bh.

Red Eléctrica begins laying third cable to Balearic Islands

Red Eléctrica has begun the laying of the last of the three submarine cables that will make up the electrical interconnection between the Spanish peninsula and the Balearic Islands (Rómulo project). The ship Giulio Verne — that already carried

out the laying of the first cable in January — has begun in Santa Ponsa (Majorca) the laying of the first few meters on the sea bed. Work will continue on the high seas until reaching Sagunto (Valencia), where the cable will then be connected with the peninsular electricity system.

Once the installation is finished, a test period will begin during the summer months with the objective of commissioning the interconnection in the last quarter of 2011. The project involves the first submarine electricity transmission interconnection in direct current in Spain and the second in the world in which the cables run at a maximum depth of 1,485 meters.

The Giulio Verne is equipped with a dynamic positioning system that allows it to follow the established route with precision and remain perfectly stationary when sea conditions demand that work be halted. These devices are hugely important given that the laying of each of the three cables is carried out in one continuous length, without the need to perform joints.

For more information, visit www.ree.es.

Siem Offshore enters the submarine cable installation market

Siem Offshore Inc. will enter into the business for submarine cable installation, repair, and maintenance projects. The company has identified the installation of submarine cables and associated services to be an emerging growing market, both with respect to field and landfall cables in the offshore oil and gas industry and to inter-array as well as export cables in the offshore renewable energy market.

The company and the shareholders of Five Oceans Services (FOS) have reached an agreement whereby Siem Offshore will acquire all shares in FOS. The transaction combines the marine operating capacities of Siem Offshore with the engineering capabilities and project execution expertise of FOS and forms a strong entity to meet the forecasted market growth and customer requirements.

Siem Offshore will invest approximately US$8 million as consideration for shares and injection of working capital. The amount includes the issue of 200,000 shares by Siem Offshore to the past shareholders of FOS.

BritNed cable activated

The BritNed cable, the first electricity connection linking UK and The Netherlands, has successfully gone live. It marks another step towards a single European electricity market.

The 1,000 MW high-voltage connection between the Isle of Grain in Kent and Maasvlakte near Rotterdam will transmit power in both directions, driven by supply and demand patterns and by price differentials between the two power markets. BritNed was completed on time and within the € 600 million budget.

BritNed is a commercial cable and is funded and operated independently from its joint venture partners National Grid's and TenneT's regulated businesses. This interconnector allows 100% third-party access for all market participants. Customers have open access to the capacity through a combination of "implicit" auctions (day ahead) facilitated by APX-ENDEX, and BritNed's "explicit" auctions (annual, monthly, intraday).

For more information, visit www.britned.com.

Underwater Service Stations for AUVs

G. Grenon, A. Fidani, S. Tollet, Cybernetix, France http://www.cybernetix.fr, mailto:offshore@cybernetix.fr

Autonomous Underwater Vehicles (AUVs) are becoming more and more popular tools. Originally developed for the military and scientific communities, they are now proving their value to commercial industries, and particularly the oil and gas market. The oil and gas industry started using similar AUVs for survey missions in order to provide detailed mapping of a future oil field. Recent progress in AUV control systems demonstrated the value of AUVs for object identification and tracking, particularly for pipe tracking and surveying.

The benefits of AUVs, when compared with conventional solutions, are significant and worth detailing. For the scientific and commercial markets alike, substituting a tow fish with an AUV in order to conduct acoustic mapping surveys allows for closer range and higher mapping quality. In addition, AUVs can also significantly reduce overall campaign costs by enabling operations to be conducted from smaller, lower cost support vessels than required for Remotely Operated Vehicles (ROV) or towed systems and more quickly.

One main limitation of AUVs, however, is range. Unlike tethered systems powered from their support vessels, AUVs must embark on their own energy and therefore, have a limited coverage capability. The use of lithium batteries improved onboard energy storage, enabling AUVs to run missions as long as 12 and even beyond 24 hours. Other emerging technologies, such as fuel cells, were demonstrated on AUVs, with the Urashima, Hugin, and more recently Ifremer's asterX vehicle, and further extend their range. Still, AUVs are, in general, followed at all times by their support vessel while performing their surveys and are recovered on a daily basis onboard the ship in order to download mission data, recharge batteries, and execute various operations of maintenance.

As early as 1997, Cybernetix has taken the autonomy of AUVs a step further, reducing the need for a support vessel to its strict minimum by the introduction of the concept of a subsea docking station. As part of the SWIMMER system, such stations are installed close to oil and gas Subsea Production Facilities (SPS) and connected to a surface control room by means of an umbilical. A hybrid AUV/ROV vehicle connects itself autonomously to these subsea bases, from which ROV-based IMR operations are performed on the SPS, AUV-based inspections are launched, batteries are recharged, and mission data are downloaded to the surface control station. This method, combined with significant improvements in vehicle reliability, enabled Cybernetix to promote the concept of subsea resident AUVs, capable of remaining subsea and conducting continuous operations for several months without resurfacing for maintenance.

Cybernetix and Total are currently working on the implementation of a full-blown SWIMMER system on one of Total's blocks in West Africa for 2014 to 2015.

Beyond SWIMMER, the concept of an Underwater Service Station (USS) can be extended to satisfy the needs of other applications, ranging from seafloor mapping campaigns, environmental sampling, or subsea infrastructure monitoring by enabling an AUV to conduct a complete multiple-mission campaign without surface support.

The USS was investigated in recent years by a number of actors. Cybernetix and partners in 2001 and 2003, WHOI in 2001, FAU in 2004, MBARI and others demonstrated different techniques to dock an AUV to a station autonomously and developed various associated sub-functions. Backed by over 10 years of expertise in developing and qualifying the key functionalities of subsea stations for AUVs, Cybernetix is taking steps to address the rising needs of AUV operators, proposing to provide the industry with USS solutions as a means to enhance their capabilities and optimize operating expenses.

This article discusses the potential of a USS for the subsea market. After presenting the principles of the USS, the paper highlights its benefits to potential end-users, describes configuration options to best fit the varying contexts of operation, and closes on an overview of the main functionalities and their current level of maturity.

The Underwater Service Station

The Underwater Service Station (USS) is a subsea base installed on the seafloor, either permanently, or deployed only for the duration of a campaign, where the AUV can:

- Recharge its batteries between missions
  Download its mission data to a local repository, and upload new mission plans, and possibly communicate with operators staying on dry land;
- Operate over long periods without the need for a surface support, ranging from days to months; and
- Remain safely secured near the seafloor while awaiting the next mission.

In order to achieve such task, the USS must integrate, at a minimum, the following functionalities (Figure 1):

- A supporting structure;
- Means to guide the AUV and perform docking into the station;
- Means to transfer electrical power from the USS to the AUV; and
- Means to transfer data both ways between the USS and the AUV.

It may also integrate a connection link to external systems, mainly for data communications with the operator and to receive power from an external source.

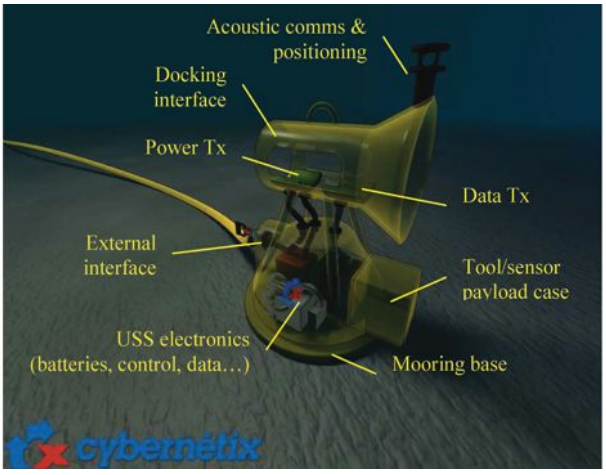


Figure 1 *USS general architecture*

Applications

End users may find a purpose for the USS in a wide number of situations, which can be grouped into two main categories depending on the scope of the mission.

Large area mapping with minimal surface support

The USS is deployed on the seabed prior to initiating the campaign, around the center of the target zone, and later recovered upon completion of the missions. The AUV surveys an area within the limits of its onboard energy capacity, returns to the USS for battery recharging and data downloading and then resumes the survey where it left off. The operation is repeated until the whole area is mapped. The USS may be fully autonomous or connected to the surface (buoy) or subsea structures for power and data supply.

Scientific applications may include geological surveys, habitat mapping, or measurements of marine properties. Oil and gas companies may use an USS-based AUV for field mapping at the exploration or post-commissioning stages, pipeline positioning, and post-hurricane/earthquake inspections prior to resuming production (Figure 2). Last but not least, the USS may be used as a portable base structure for a marine observatory deployed for an extended period, integrating not only the AUV, but also subsea sensors measuring the various water properties of interest to either the scientific community or the industry (e.g., salinity, temperature, marine currents, seismic and seafloor properties, etc.).

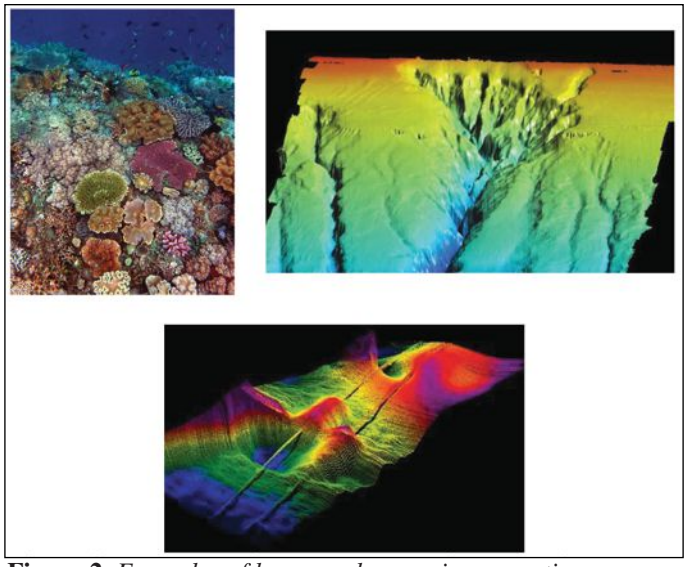


Figure 2 *Examples of large-scale mapping operations*

Long-term monitoring with minimal surface support

The USS is installed permanently on the seabed, and typically connected to local existing infrastructures for power and data supply. The AUV is launched from the USS or from a support vessel and conducts recurring inspection or survey missions at scheduled intervals or upon request.

Scientific applications may be the periodic inspection of areas of ecologic interest to subsea observatories and laboratories (e.g., Canada's NEPTUNE observatory, subsea Neutrino telescopes such as ANTARES) (Figure 3). For the energy industry, periodic mapping of oil and gas fields, in order to inspect pipelines and identify structure changes such as pipe walking and buckling or locate dropped objects, may greatly benefit operators in anticipating maintenance and intervention before damage actually occurs to the infrastructures, hence preventing production interruption and environmental disasters. Note that if the USS is interesting to the shallow and deepwater oil & gas fields, it will be even more valuable to the Arctic areas, where no inspection or intervention is possible during the icy season.

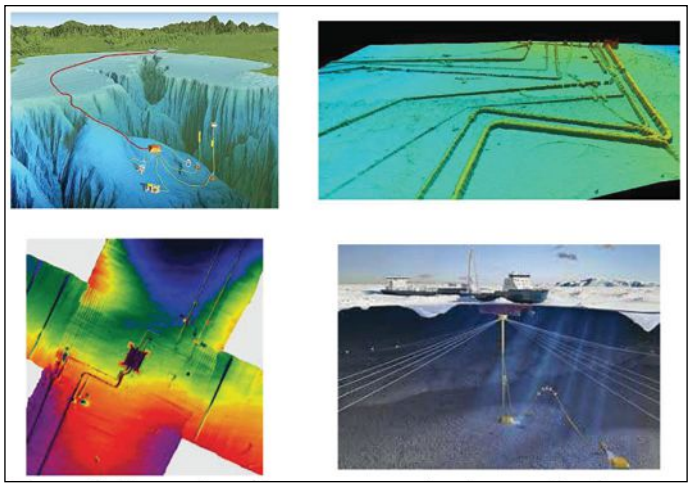


Figure 3 *Examples of long-term monitoring applications*

Configurations

Several configurations of the USS may be proposed to adapt it to specific contexts of operation.

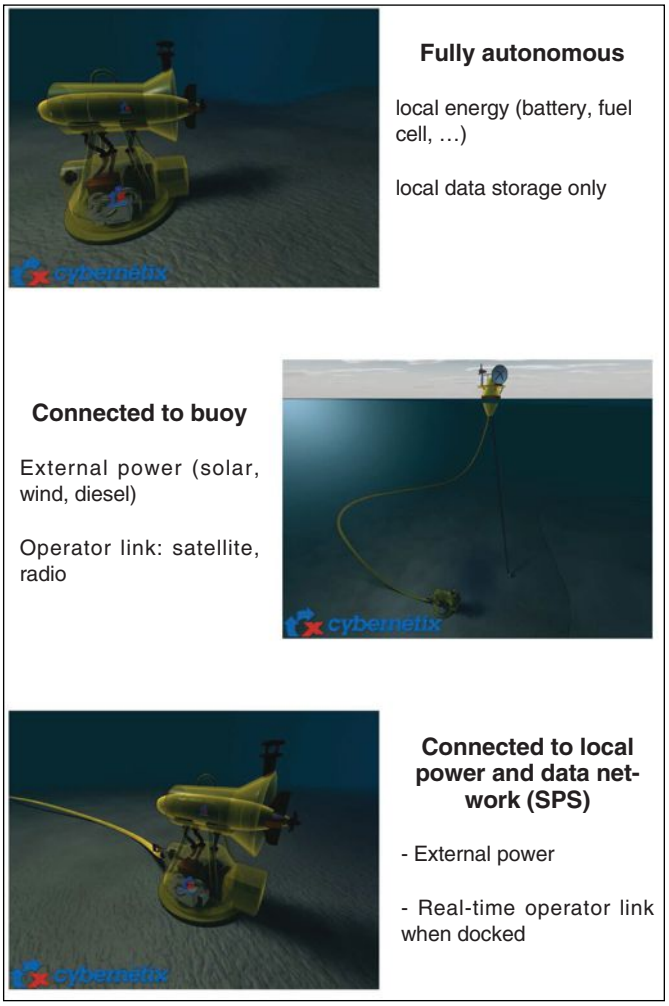


Figure 4 *USS configuration options*

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As mentioned earlier, the USS may be either permanently installed for continuous monitoring of an area of interest or only for the duration of a survey campaign. It may be fully autonomous, storing energy locally on batteries, possibly coupled with a marine energy or a subsea fuel cell power generator, or connected to a Subsea Production System (SPS) by an umbilical, or to a surface buoy, through which power and data are exchanged; it may, finally, be dedicated to a single AUV or made capable of hosting a variety of them by proposing a standard package of interfaces. Figure 4 above illustrates several scenarios under consideration, from fully autonomous (no external link) to fully integrated (attached to the local power and data network).

Key Technologies

The previous sections focused on describing the services the USS may provide to subsea actors. Because the AUVs display various mechanical characteristics and the operating conditions vary from application to application (depth, marine currents, seabed properties, mission duration, onboard energy, etc.), a standard USS, that is fully interchangeable for all applications is unlikely. A number of functionalities are, however, common to all situations and constitute the core components of the USS: mooring, securely hosting and guiding the AUV, supplying power and data to it, and making the overall system capable of remaining operational underwater for a long period without external assistance.

As part of its strategy of promoting intervention AUVs, Cybernetix has focused its recent efforts on the development and qualification of these enabling technologies. Their current developments are discussed below.

Docking station

The docking station is a light structure conveniently deployed and retrieved with a small size vessel and crane. It provides a mooring interface with the seafloor and a mechanical and locking interface to hold the AUV in place. It embeds the hardware necessary to assist the AUV in docking, and power and data modules.

The AUV interface is directly dependent on the AUV design itself and the docking method. A funnel entrance was commonly used for torpedo-type AUVs (although hook capture systems were also demonstrated), whereas Intervention AUVs have used different interfaces, either pyramidal for vertical docking with the Cybernetix SWIMMER AUV or a standard ROV panel adapted to be AUV-friendly, such as was demonstrated with Cybernetix ALIVE AUV.

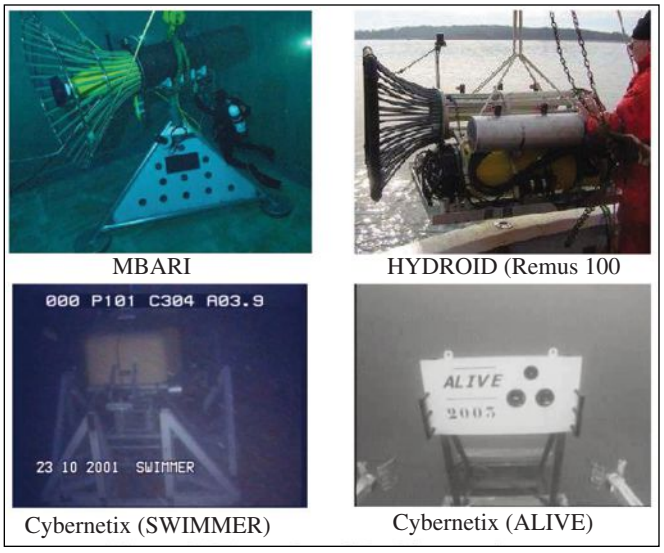
Figure 5 and 6 present illustrations of past realizations of docking stations.

Docking guidance

Docking the AUV to the docking station is one of the most critical phases of a mission. After returning to the docking station area using its onboard dead reckoning navigation system, the AUV switches to a relative guidance system that will direct it precisely into the docking station.

A variety of solutions were successfully tested for AUV docking. As is often the case for underwater applications, acoustics was the preferred technology, being fairly long range, accurate, and mostly immune to environmental conditions.

The 4-DOF (Degrees Of Freedom) SWIMMER prototype vehicle was autonomously docked to an AUV in two stages, using Long Base Line (LBL) positioning for a first approach



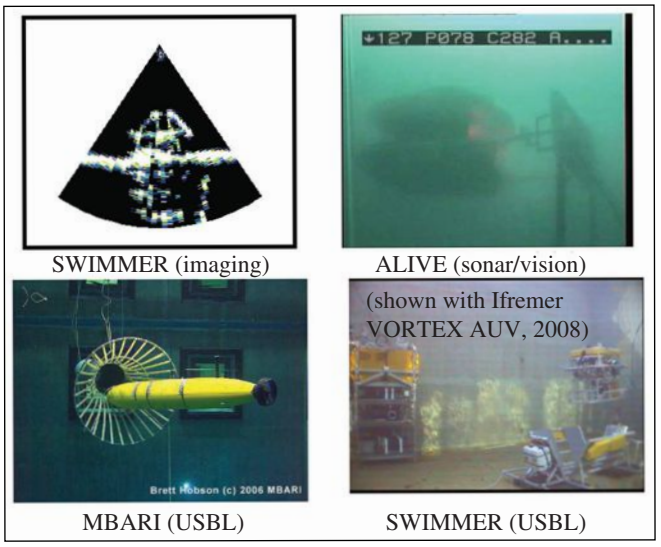
MBARI | HYDROID (Remus 100
Cybernetix (SWIMMER) | Cybernetix (ALIVE)

Figure 5 *Examples of docking stations*

above the docking station and then acoustic imaging to land into the station structure (2001). This method enables autonomous docking of the AUV into a completely passive docking station.

Similarly, the ALIVE vehicle, another Cybernetix hovering-capable AUV, demonstrated docking into a fully passive ROV panel. A two-stage method was also demonstrated, first using sonar imaging to position the AUV in front of the ROV panel, then switching to hybrid acoustic-vision guidance to precisely move the AUV in position to grab the ROV handles of its docking panel (2003).

Other methods require an active docking station to achieve successful docking. The Ultra Short Base Line (USBL), being of compact size, easily mountable into an AUV, and of high precision at short range, is the most popular choice for AUV docking, and was used for instance on MBARI, FAU, and WHOI survey AUVs, as well as on Cybernetix SWIMMER AUV (2008). On the docking station, a single acoustic transponder is installed on the docking station, whereas a USBL transceiver is installed into the AUV nose.



SWIMMER (imaging) | ALIVE (sonar/vision)
MBARI (USBL) | SWIMMER (USBL)

Figure 6 *AUV automated docking options*

Battery refueling

Wet-mate subsea connectors are the standard technology for transferring power between two systems that are mated together underwater. Mating a pair of these high-grade products is performed under human supervision, either by a diver in shallow waters or by an ROV and manipulator arm. Indeed, mating plug and receptacle together requires precise, although fairly tolerant, alignment. Moreover, it is highly recommended to maintain the connector protected by a cap when not in use, in order to protect the electrical pins against seawater. Performing the operation with a fully autonomous system may prove a difficult task and may render the connection ineffective rapidly. Facing this challenge, a number of engineering teams turned to the development of Inductive Power Transfer.

It consists in transferring power between a source and a load by inductive coupling, without electrical contacts between them. Subsea Equipment Associate Limited (SEAL) developed a module as early as 1975, and TRW Ferranti, in the 1980s, realized inductive units capable of transferring several kilowatts. In 2004, FAU developed a smaller product integrated into a subsea docking station, at 1kW. In 2010, Cybernetix developed and demonstrated a prototype capable of transferring from 5 to 50kW and up in order to power a subsea system, such as the SWIMMER AUV, or a subsea equipment. Also in 2010, Cybernetix pursued its efforts by developing a second prototype of a different technology, this time transferring very low power (300mW) with good efficiency and suitable for higher power ranges compatible with AUV battery recharging (1kW and beyond).

Developments in the 1970s and 1980s produced systems of fairly large size and low efficiency. Recent improvements in modeling, integrated microelectronics and marine materials led to a new generation of solutions and made it possible to propose highly compact, efficient, and reliable systems. Cybernetix is now at the stage of industrializing its technologies for a number of power ranges. Its wireless power transfer products require no accurate alignment, making them particularly suitable for an AUV-USS configuration since it relaxes docking mechanical constraints.

Data transfer

Wet-mate data connectors are not the ideal solution for data transfer either, and wireless options are again considered.

Acoustic communication is widely used underwater as it guarantees long range and reliability, but at very low bandwidth.

Optical modems are one alternative for subsea data communications. Capable of transmitting very high bandwidth at fairly long range, optical modems are however highly sensitive to turbidity and marine growth, unlike RF.

RF data transfer suffers from very high signal attenuation in seawater. Indeed, electro-Magnetic (EM) attenuation is a function of medium conductibility and signal frequency. At 2.4GHz (Wi-fi frequency), signal attenuation in seawater is such that range is limited to a few centimeters at the very best. This short distance is achievable between a station and docked AUV, making RF transmission a potential solution underwater in this specific case. This was demonstrated by FAU and MBARI. Cybernetix improved performance, mainly by designing specific antennas, and qualified the system for the SWIMMER application at bandwidth as high as 25MBps, which is more than sufficient for downloading data from a survey AUV.

Long term deployment

In order to ensure the highest level of reliability, Cybernetix conducted extensive analysis and qualification programs aimed at guaranteeing the lowest rate of failure occurrence for a USS system. Engineering efforts include thorough component selection, robust and redundant hardware architecture design, and strict reduction of the number of critical points of failure. They were validated by deploying a test platform at sea similar to a USS in terms of equipment, and successfully keeping it under operation for 6 consecutive months, confirming the USS design life of over 10 years.

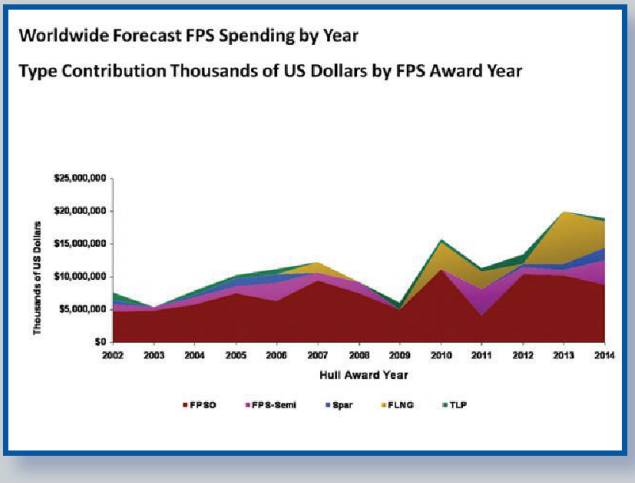
Conclusion

Subsea technology is evolving quickly to cope with the growing needs of the oil and gas industry and oceanography : on one hand, the search for new reserves in frontier areas accelerates the introduction of increasingly complex and automated subsea production systems; on the other hand, new stringent environmental regulations asks for the surveillance of protected marine areas and coastal zones. AUVs are, therefore, going to play a increasingly important role to address these needs and a series of important ancillary accessories, such as the USS, the LARS, the interfaces with the field installations, are going to be gradually introduced in the field to make their operation easier, more efficient, and more reliable. Cybernetix has been involved in the development and qualification of so-called intervention AUVs, related infrastructures, and key technologies for more than 10 years and is ready to leverage its experience and skills to continue playing an active role to build this new world.

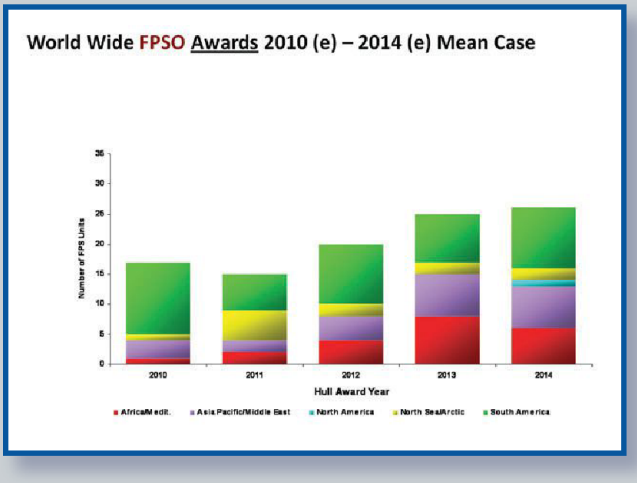
Offshore At-A-Glance

Quest Offshore Activity Report

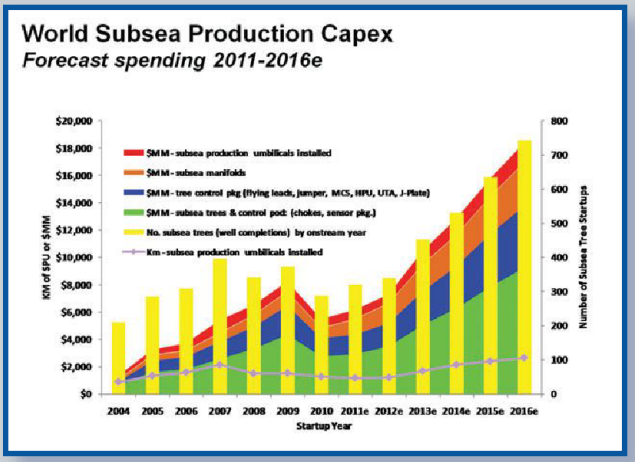
Worldwide Forecast FPS Spending



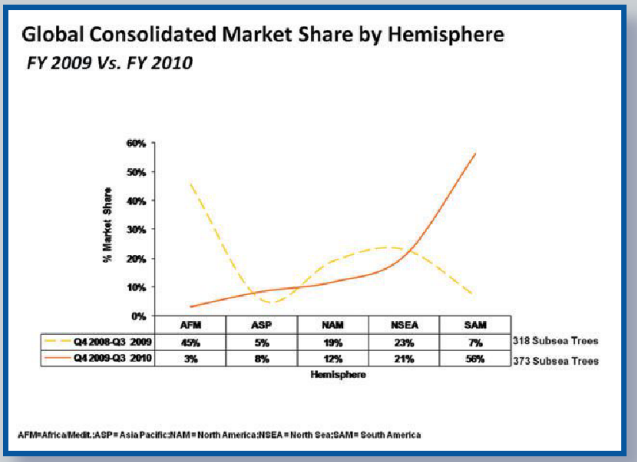
Worldwide Awards



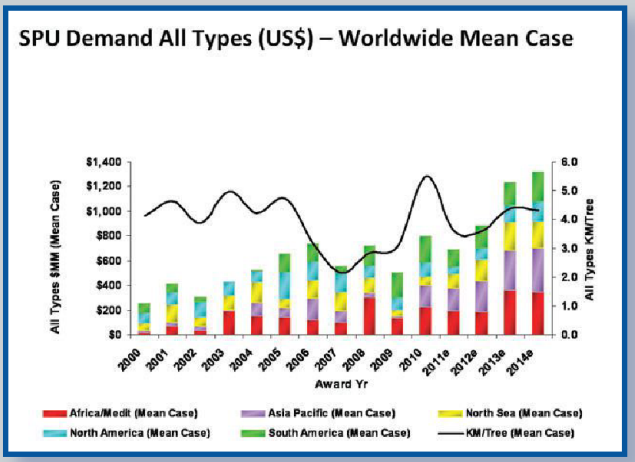
Global Subsea Production



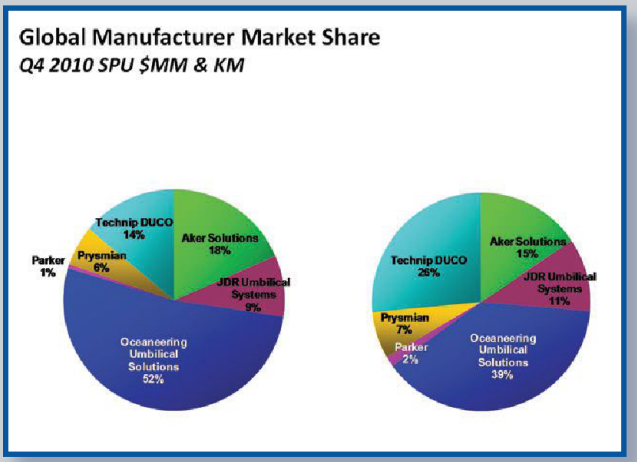
Global Consolidated Market Share



Worldwide SPU Demand



Global Manufacturer Market Share



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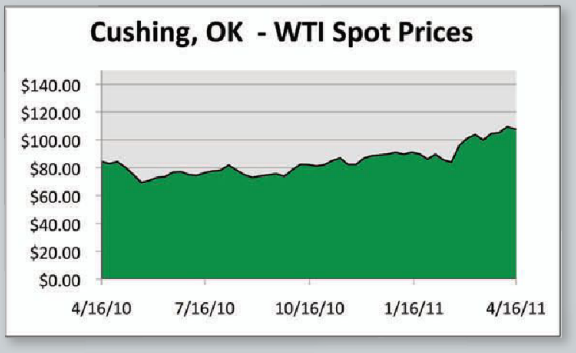
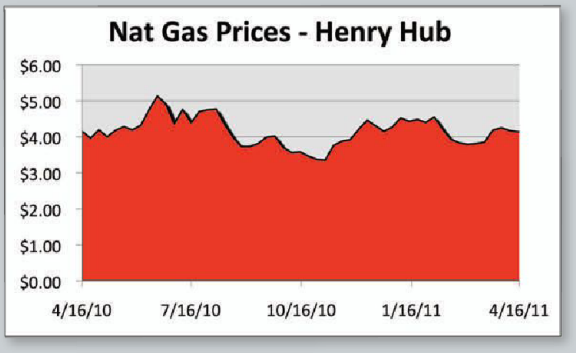
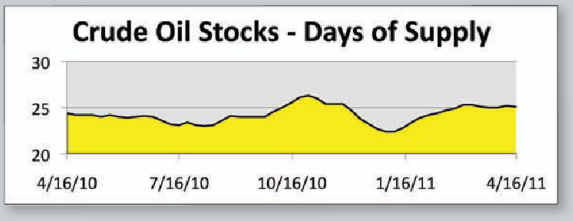
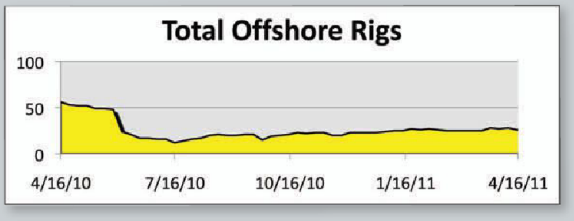
Oil & Gas Industry Trends

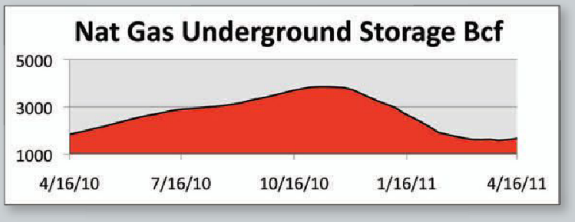
Monitoring the pulse of the US Offshore Oil & Gas Industry

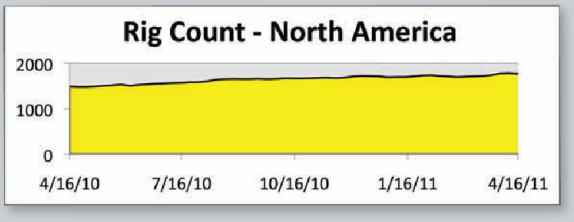










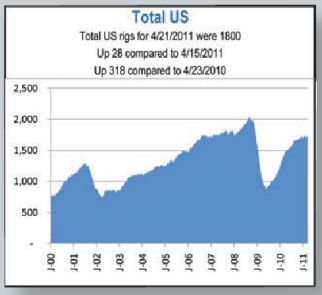


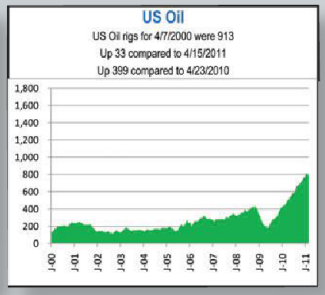
positive trend at least 3 weeks
changing trend < 3 weeks
negative trend at least 3 weeks

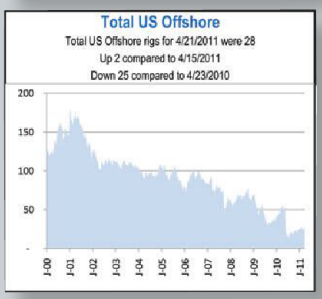
Baker Hughes Rig Report

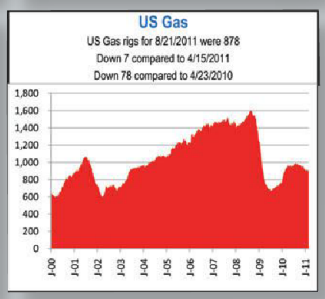
North American Rig Report
April 21, 2011

Location	Week of 4/21	+/-	Week Ago	+/-	Year Ago
Land	1754	27	1727	339	1415
Inland Waters	18	-1	19	4	14
Offshore	28	2	26	-25	53
U.S. Total	1800	28	1772	318	1482
Gulf of Mexico	27	1	26	-25	52
Canada	143	-24	167	33	110
N. America	1942	4	1939	351	1592









Gulf of Mexico Data

Current Deepwater Activity

Operator	Area/Block	OCS Lease	Rig Name	Prospect Name	Water Depth(ft)
Shell Offshore Inc.	AC 857	G17565	H&P 205	Great White	7,813
Anadarko Petroleum Corp.	KC 875	G21444	ENSCO 8500	Lucius	7,103
ExxonMobil Corp.	KC 919	G21447	MAERSK DEVELOPER	Hadrian	6,941
Chevron USA Inc.	KC 736	G22367	T.O. DISCOVERER INSPIRATION	Moccasin	6,750
Noble Energy Inc.	MC 519	G27278	ENSCO 8501	Santa Cruz/Santiago	6,500
Eni US Operating Co. Inc.	MC 772	G24107	T.O. DEEPWATER PATHFINDER	Triton (mc)	5,413
Anadarko Petroleum Corp.	GC 726	G24184	T.O. DISCOVERER SPIRIT	Tonga	4,674
BHP Billiton Petroleum (GOM)	GC 654	G20085	T.O. DEVELOPMENT DRILLER I	Shenzi	4,383
Chevron USA Inc.	GC 640	G16770	T.O. DISCOVERER CLEAR LEADER	Tahiti	4,292
BHP Billiton Petroleum (GOM)	GC 653	G20084	GSF C.R. LUIGS	Shenzi	4,234
ATP Oil & Gas Corp.	MC 941	G16661	NABORS 202	Mirage	4,000
Shell Offshore Inc.	MC 809	G09883	H&P 204	Princess	3,800
Shell Offshore Inc.	MC 807	G07963	H&P 201	Mars b	2,945
Eni US Operating Co. Inc.	MC 460	G18244	T.O. AMIRANTE	Appaloosa	2,823
Shell Offshore Inc.	GB 427	G07493	NOBLE JIM THOMPSON	Auger	2,721
Shell Offshore Inc.	GC 200	G12210	CAL DIVE Q-4000	Troika	2,672
Chevron USA Inc.	GC 205	G05911	NABORS 85 (MAYRONNE 162)	Genesis	2,598
LLOG Exploration Offshore, LLC	MC 199	G32301	NOBLE AMOS RUNNER	MC 199	2,465
Energy Resource Technology	GC 282	G26302	DIAMOND OCEAN VICTORY	Phoenix	2,346
Anadarko Petroleum Corp.	VK 826	G06888	NABORS P-10	Neptune	1,932
Chevron USA Inc.	VK 786	G12119	NABORS 87	Petronius	1,754
Stone Energy Corp.	MC 109	G05825	H&P 206	Amberjack	1,030

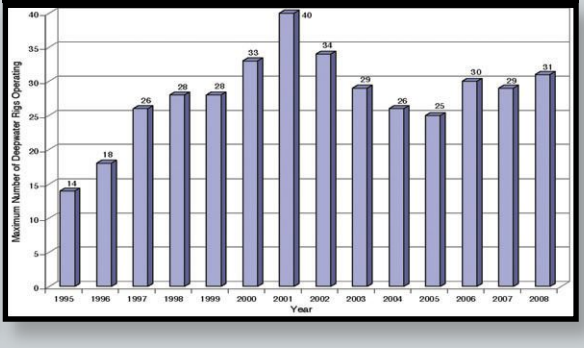
Deepwater prospects with drilling and workover activity: 22

Current Deepwater Activity as of Tuesday, April 19, 2011

Activity by Water Depth

Water Depth in Meters	*Active Leases*	*Approved Applications*	*Active*
0 to 200	*2,072*	*33,772*	*3,241*
201 to 400	*136*	*1,107*	*20*
401 to 800	*314*	*833*	*10*
801 to 1,000	*403*	*509*	*7*
1,000 & above	*3,376*	*1,643*	*26*

Rig activity by year



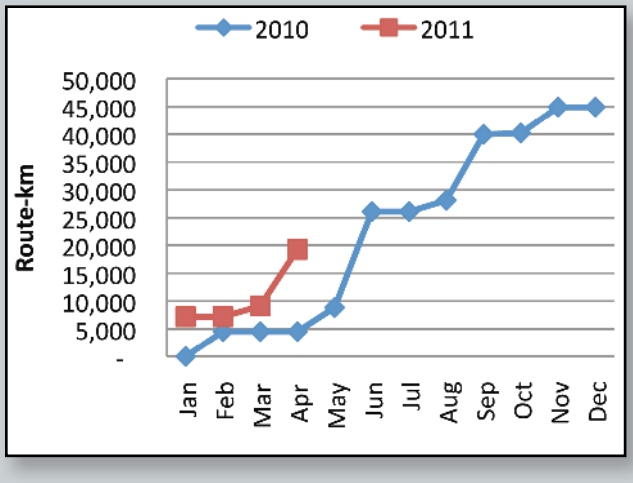
Activity by water depth Information current as of Monday, April 18, 2011

Maximum number of rigs operating in the deepwater Gulf of Mexico. The rig unit includes platform rigs operating on deepwater production facilities in addition to the MODU's. The numbers do not distinguish between rigs drilling and those in service for completion and workover operations.

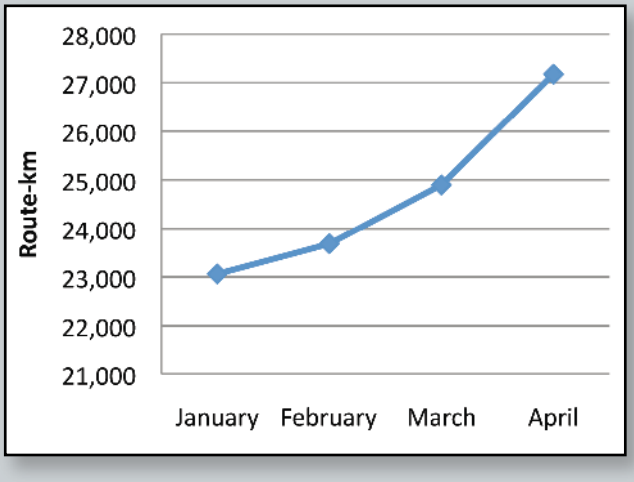
Information provided courtesy of the U.S. Bureau of Ocean Energy Management

Subsea Telcom & Power Cable Data

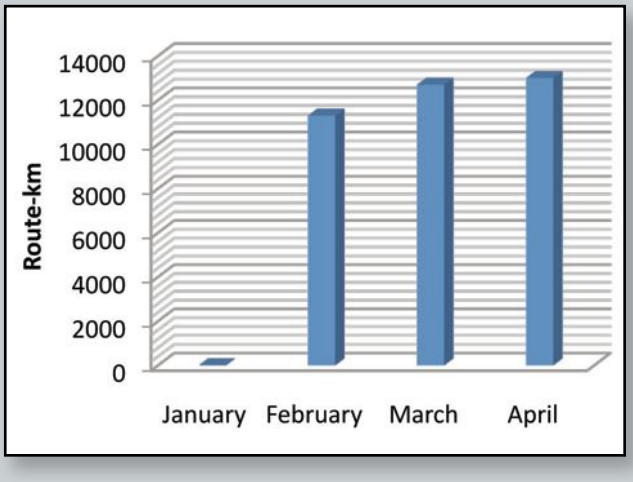
FO Cable Awards by month



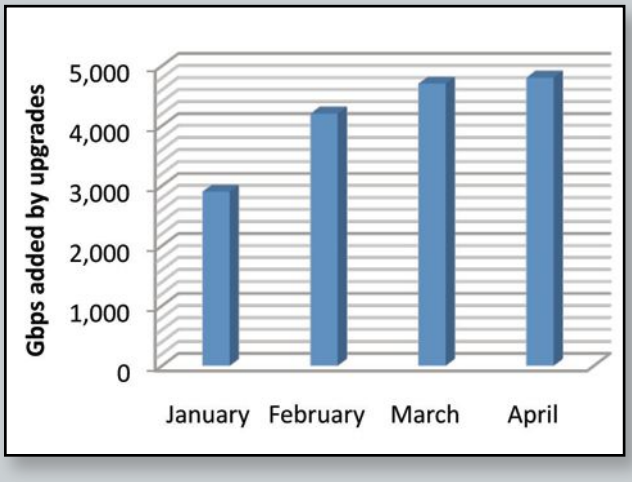
FO Cable Announcements 2011



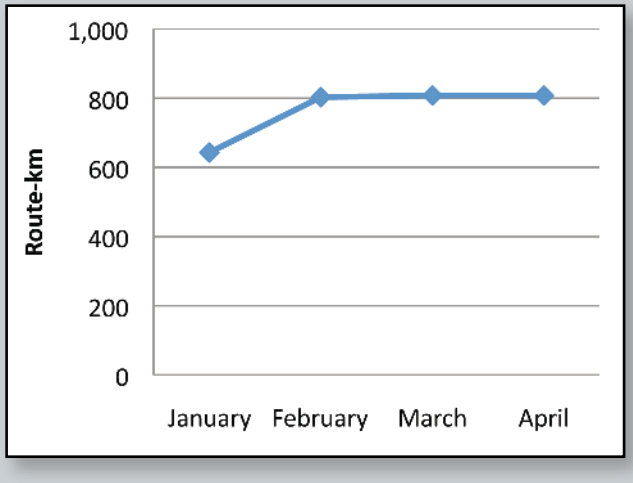
Submarine FO Cables Entering Service 2011 in route-km



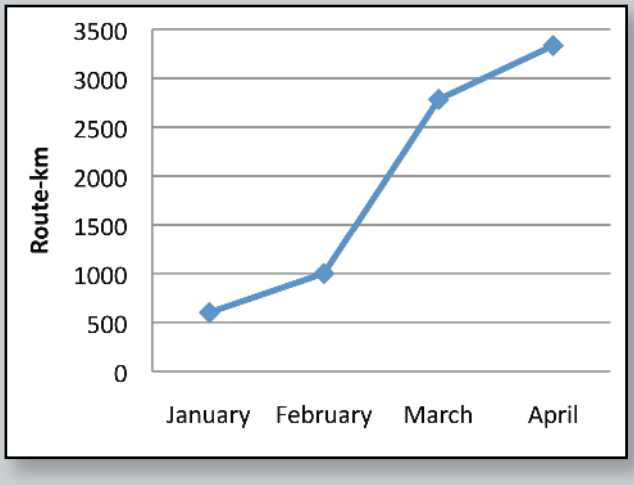
Upgrades of Existing Cable Systems in Gbps



Submarine Power Cable Awards 2011 in route-km



Submarine Power Cable Announcements 2011 in route-km



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Excerpts from

MUSINGS FROM THE OIL PATCH

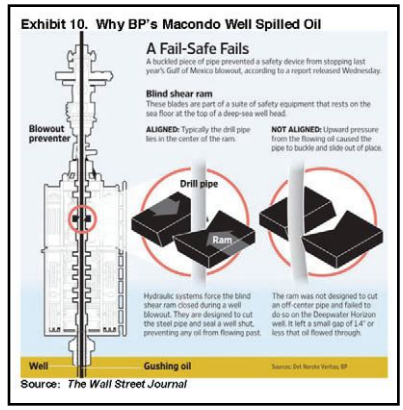
By Allen Brooks, Managing Director

PARKS PATON HOEPFL & BROWN
ENERGY INVESTMENT BANKING, LP

From the March 29, 2011 issue

BP spill report says BOP needs further work

Last week, the results were released from the forensic study of the blowout preventer (BOP) used on BP Ltd.'s (BP-NYSE) Macondo well in the Gulf of Mexico that blew out last year causing an explosion, fire and eventual sinking of the Deepwater Horizon semi-submersible drilling rig and this nation's greatest offshore environmental accident. Den Norske Veritas (DNV), the Norwegian engineering and risk-management firm hired by the U.S. Department of the Interior to assess the BOP and determine its role in last year's Deepwater Horizon disaster, after examining and testing the unit recovered from the ocean floor, prepared a 200-page report with a 351-page appendix. The inspectors' conclusion was that the shear ram valves in the BOP were unable to fully sever the drillpipe as the unit is designed to do because the pipe inside buckled from the well's initial blow-out and was out of alignment that prevented complete closure. DNV found that the shear rams had closed to within 1.4 inches. This gap, albeit small, provided sufficient room for an estimated 4.9 million barrels of oil to escape.



Source: *The Wall Street Journal*

While the report details the failure, the conclusions confirm the early belief of many drilling engineers consulted about the disaster. The inability of the shear rams to cut the pipe because of it being off center highlight potential problems for companies drilling over-pressured wells. The buckling of the pipe was due to the high pressure fluids roaring up the drilling pipe and annulus lifting the pipe until it hit an obstacle. At that point, the momentum of the pipe and pressures and heat of the flows resulted in its bending.

Questionable decisions and actions leading to disaster

The report quickly generated further criticism of the offshore oil and gas industry and its safety procedures in drilling deepwater wells that tend to exhibit high formation pressures. All facets of the oil and oilfield service industry involved in drilling these wells is working on ways to improve the performance of the drilling and safety equipment, especially the BOP. There still remain unanswered questions about what actually caused the well to blow out and there will be more information and hypotheses presented down the road, but the DNV report was the last major report on the equipment involved in the accident. The belief of most observers is that the Deepwater Horizon disaster was the result of a confluence of questionable decisions and actions by all parties involved that resulted in the creation of an unbalanced pressure differential between the downhole formation and the equipment designed to hold back that pressure.

Criticism of the DNV report came immediately from political opponents of offshore drilling including Rep. Edward Markey (D., Mass.) who said, "This report calls into question whether oil-industry claims about the effectiveness of blowout preventers are just a bunch of hot air." The man responsible for overseeing U.S. offshore drilling rules until he retired in 2009, Elmer Danenberger III, was quoted by The Wall Street Journal as saying, "They have to rethink the whole design," meaning the BOP. The DNV report concluded that the BOP failure was due to a design flaw and not the operation, abuse or maintenance of the BOP by the companies involved in drilling the Macondo well.

BOP: Last and best defense against well pressure

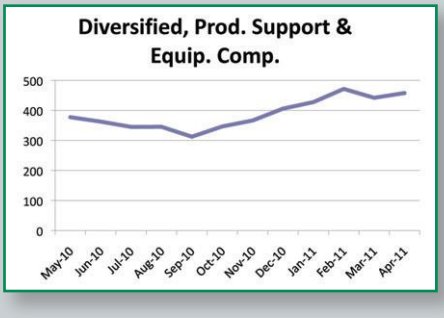
The BOP in question was manufactured by Cameron International (CAM-NYSE), the leading provider to the drilling industry of such units for over 90 years. The BOP has been the industry's last and best defense against well pressures, which often came as a result of encountering pockets of higher-pressured natural gas at shallower depths while drilling a well. In fact, the BOP that became the signature product for Cameron was developed in response to several high-pressure well workover accidents in 1922. The co-founder and majority owner of then Cameron Iron Works, James Abercrombie, was also a successful contract driller with a history of putting out well fires and blowouts, long before Red Adair made the occupation of fire-fighting glamorous.

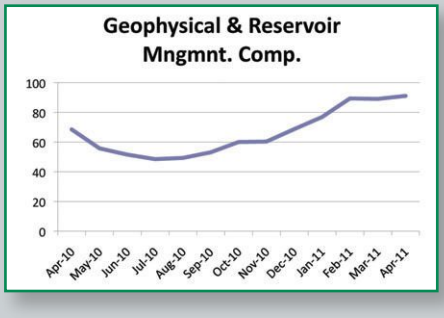
In late 1921, Mr. Abercrombie secured a contract to work over a troublesome well in the Hull field in Liberty County, northeast of Houston. This was a field with many small pockets of high pressured gas. In the course of working over wells in this field, Mr. Abercrombie's company had lost its newest and best rig and had encountered three blowouts. While each of the blowouts resulted in lost equipment, fortunately no one was hurt. The episode, however, focused Mr. Abercrombie on ways to design equipment that could be used to prevent wells from blowing out. Originally, he had used an elementary blowout preventer called a "boll weevil." It was essentially a piece of heavy-gauge pipe surrounded by a thick lead casing. There was stopcock on top of the arrangement. If it was suspected that a well might blowout, the unit was slipped over the well's casing and the stopcock closed. The unit proved impractical as a well containment device but mainly it was used to try to give the drilling workers time to get away from the rig before the well blew.

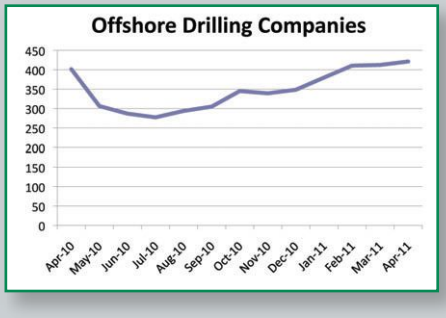
We shouldn't stop drilling after a drilling accident

But we have high confidence that the engineers in the drilling business will figure out how to improve the performance and safety of the drilling process, just as they have for the past 150+ years. Well control episodes have occurred throughout the history of the petroleum industry. The Deepwater Horizon was the latest and most devastating, both due to the loss of 11 lives and the environmental damage to the Gulf of Mexico from the oil spill. The evidence from the investigations of the disaster continues to show the Macondo well blowout was an accident. All aspects of our daily lives, including the energy, involve risks. We need to better understand the risks and their potential ramifications. Importantly, we need to keep a perspective on risk and our risk tolerance. We don't stop flying after a plane accident. We shouldn't stop drilling after a drilling accident.

Monthly Stock Figures & Composite Index

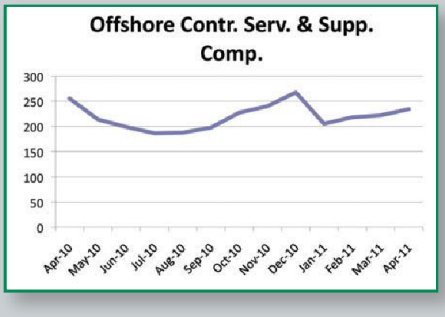


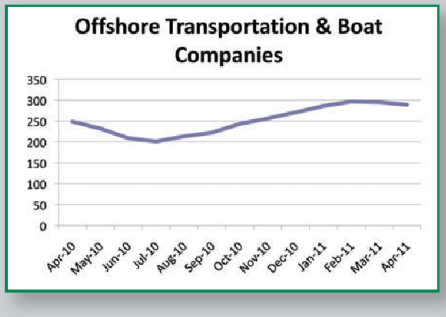


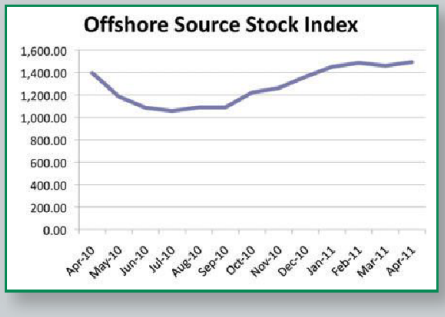


Industry Company Name	Symbol	Close *Mid-April*	Close *Mid-March*	Change	Change %	High 52 week	Low 52 week
Diversified, Production Support and Equipment Companies							
Baker Hughes, Inc.	BHI	73.75	68.41	5.34	7.8%	75.10	35.62
Cameron Intl. Corp.	CAM	54.83	59.60	-4.77	-8.0%	63.16	31.42
Drill-Quip, Inc.	DRQ	74.40	75.13	-0.73	-1.0%	83.80	40.38
Halliburton Company	HAL	49.68	44.14	5.54	12.6%	50.74	21.10
Tenaris SA	TS	49.53	45.30	4.23	9.3%	51.01	32.91
Newpark Resources, Inc.	NR	7.40	7.37	0.03	0.4%	9.50	5.12
Schlumberger Ltd.	SLB	87.65	85.63	2.02	2.4%	95.64	51.67
Superior Energy Services, Inc.	SPN	39.26	35.77	3.49	9.8%	41.65	18.02
Weatherford International, Inc.	WFT	21.27	20.54	0.73	3.6%	26.25	12.34
Deep Down, Inc.	DPDW	0.11	0.10	0.01	0.0%	0.29	0.05
Total Diversified, Production, Support and Equipment.....		**457.88**	**441.99**	**15.89**	**3.6%**	**497.14**	**248.63**
Geophysical / Reservoir Management							
Dawson Geophysical Company	DWSN	41.02	42.25	-1.23	-2.9%	50.81	20.05
Mitcham Industries, Inc.	MIND	16.00	11.20	4.80	42.9%	16.25	5.56
Compagnie Gnrale de Gophysique-Veritas	CGV	34.08	35.61	-1.53	-4.3%	38.12	16.42
Total Geophysical / Reservoir Management..……		**91.10**	**89.06**	**2.04**	**2.3%**	**105.18**	**42.03**
Offshore Drilling Companies							
Atwood Oceanics, Inc.	ATW	45.53	44.07	1.46	3.3%	46.92	23.71
Diamond Offshore Drilling, Inc.	DO	76.18	75.48	0.70	0.9%	91.92	54.70
ENSCO International, Inc.	ESV	56.89	55.60	1.29	2.3%	59.90	33.33
Nabors Industries, Inc.	NBR	31.94	26.98	4.96	18.4%	32.00	15.54
Noble Drilling Corp.	NE	43.18	43.45	-0.27	-0.6%	46.72	26.23
Pride International, Inc.	PDE	42.65	41.70	0.95	2.3%	44.00	21.51
Parker Drilling Company	PKD	7.20	5.63	1.57	27.9%	7.45	3.43
Rowan Companies, Inc.	RDC	41.86	40.82	1.04	2.5%	44.83	20.44
Transocean Offshore, Inc.	RIG	75.80	78.66	-2.86	-3.6%	92.67	41.88
Total Offshore Drilling..……		**421.23**	**412.39**	**8.84**	**2.1%**	**466.41**	**240.77**

Monthly Stock Figures & Composite Index







Industry Company Name	Symbol	Close *Mid-April*	Close *Mid-March*	Change	Change %	High 52 week	Low 52 week
Offshore Contractors, Services and Support Companies							
Helix Energy Solutions Group, Inc.	HLX	16.26	15.14	1.12	7.4%	17.75	8.38
Gulf Island Frabrication	GIFI	31.66	31.53	0.13	0.4%	34.68	14.18
Global Industries, Ltd.	GLBL	9.75	8.07	1.68	20.8%	10.23	4.05
McDermott International Inc.	MDR	22.98	23.51	-0.53	-2.3%	28.98	12.10
Oceaneering International	OII	85.68	81.82	3.86	4.7%	92.38	39.75
Subsea 7 SA	SUBC	25.91	23.72	2.19	9.2%	26.68	13.25
Technip ADS	TKPPY.PK	27.57	24.03	3.54	14.7%	27.90	14.16
Tetra Technologies, Inc.	TTI	14.18	13.95	0.23	1.6%	16.00	8.00
Total Offshore Contractors, Service and Support……..		**233.99**	**221.77**	**12.22**	**5.5%**	**254.60**	**113.87**
Offshore Transportation and Boat Companies							
Seacor Holdings Inc.	CKH	96.20	93.94	2.26	2.4%	116.00	67.01
Gulfmark Offshore, Inc.	GLF	40.22	43.54	-3.32	-7.6%	47.31	23.83
Bristow Group	BRS	43.99	46.58	-2.59	-5.6%	52.39	28.32
PHI, Inc.	PHII	23.10	22.95	0.15	0.7%	23.55	13.15
Tidewater Inc.	TDW	57.23	61.15	-3.92	-6.4%	63.55	37.99
Trico Marine Services, Inc.	TRMA	0.03	0.07	-0.04	-57.1%	3.38	0.03
Hornbeck Offshore	HOS	28.22	26.91	1.31	4.9%	31.77	12.63
Total Offshore Transportation and Boat ……..…….....		**288.99**	**295.14**	**-6.15**	**-2.1%**	**337.95**	**182.96**
Total Diversified, Production, Support and Equipment		**457.88**	**441.99**	**15.89**	**3.6%**	**497.14**	**248.63**
Total Geophysical / Reservoir Management		**91.10**	**89.06**	**2.04**	**2.3%**	**105.18**	**42.03**
Total Offshore Drilling		**421.23**	**412.39**	**8.84**	**2.1%**	**466.41**	**240.77**
Total Offshore Contractors, Service and Support		**233.99**	**221.77**	**12.22**	**5.5%**	**254.60**	**113.87**
Total Offshore Transportation and Boat		**288.99**	**295.14**	**-6.15**	**-2.1%**	**337.95**	**182.96**
Total Offshore Source Index…		**1,493.19**	**1,460.35**	**32.84**	**2.2%**	**1,661.28**	**828.26**

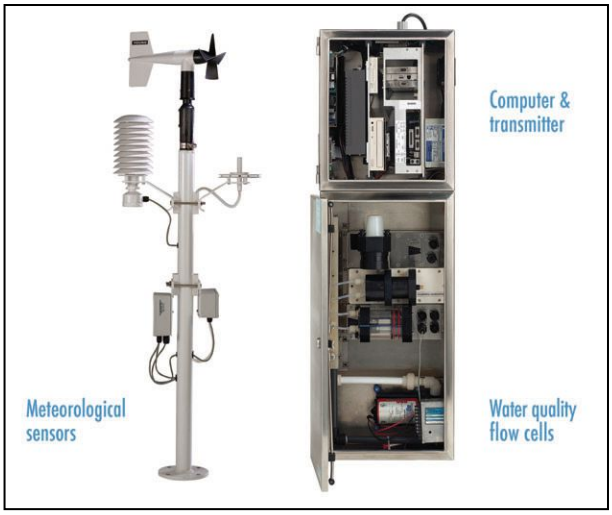
Researchers buy YSI SeaKeeper 1000 systems

The University of Victoria in British Columbia, Canada, has purchased three YSI SeaKeeper™ 1000 systems. The University will use the SeaKeepers to expand the VENUS (Victoria Experimental Network Under the Sea) coastal observing system, an element of the Ocean Networks Canada observatory system. The three systems will be installed on vessels that regularly travel across the Strait of Georgia and will enable the collection of near-surface water quality data that will complement VENUS' traditional sub-surface data sets.

The SeaKeeper 1000 systems will allow researchers to collect coastal water quality and meteorological data – such as water temperature, salinity, dissolved oxygen, chlorophyll, turbidity, solar radiation, and wind speed. Additional third-party sensors can be integrated into the units as well. The high-resolution data will be relayed to the University of Victoria database and will help inform researchers on how tides, low oxygen levels, sediment loads, and climate change affect coastal waters.

"You can't look at any single part of the ocean without looking at the rest of it – it's a system. Examining what's going on at the top of the water will help researchers also understand what's going on at the bottom," notes Geoff Morrison, YSI applications engineer.

The University of Victoria identified the YSI SeaKeeper 1000 as the system of choice after extensive requirements-driven research into a suitable technology. The SeaKeeper 1000 turnkey solution for environmental monitoring from a moving vessel will allow VENUS to extend its monitoring realm to the near surface for years to come. The Canada Foundation for Innovation and the British Columbia Knowledge Development Fund funded the purchase of the systems.



Morrison will commission the SeaKeeper 1000 systems once the vessels have been prepared for the installation of the through-hull equipment.

VENUS is an underwater laboratory for ocean research, exploration and outreach. Its terabytes of data are accessible to everyone via the Internet at www.venus.uvic.ca.

With its expertise in sensor technology, YSI Inc. has an installed base of more than 20,000 multi-parameter water monitoring instruments around the world. YSI is the exclusive licensee of the patented SeaKeeper technology from the International SeaKeepers Society. Contact YSI's office in St. Petersburg, Florida, to discuss the monitoring and configuration options for the SeaKeeper: systems@ysi.com, 877-392-9950 or +1 727 565 2201.

New ATM-900 Series Acoustic Modems

Teledyne Benthos, Inc. announced the release of its new generation of acoustic telemetry modems. The new ATM-900 series modems add features and functionality that meet industry needs based on the company's proven acoustic technology. The modems are designed to incorporate enhanced data logger capability up to 6MB in a flash file format and offer dual serial ports, allowing users to connect to two sensors with a single modem.

"The Teledyne Benthos ATM-900 Series acoustic telemetry modems are a major enhancement to previous modem lines offered. While faithfully replicating acoustic modalities of the earlier series of modems, the new ATM-900 Series provides a long list of special purpose, flexible extensions supporting multiple capabilities beyond standard underwater communications.

These capabilities range from high capacity data logging through updated data storage and user command line interfaces to real-time clock integration," said Teledyne Benthos Chief Scientist, Dale Green.

The new modems are available in three configurable formats, with others soon to follow.

For more information, visit www.benthos.com.

Calegeo orders SeaBat 8160

Calegeo, being one of the industries total solution providers within Offshore Survey and Geotechnical Drilling, recently called upon RESON for SeaBat installation support while mobilizing their geophysical survey vessel Kommandor Stuart.

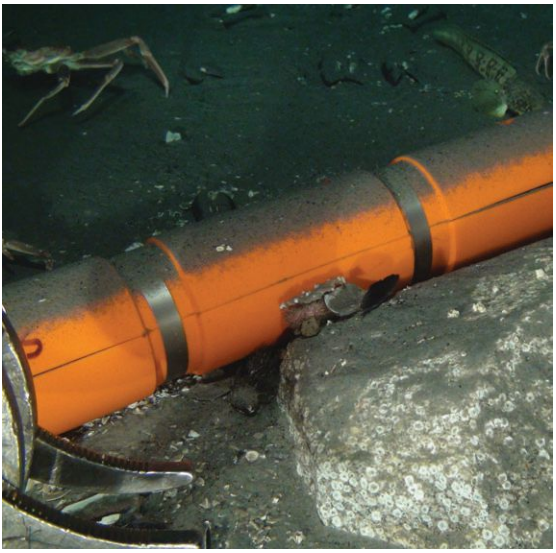
Calegeo put their trust in RESON, which resulted in the purchase of a new SeaBat 8160. The system, along with RESON Engineering Service staff, was onsite within 24 hours after order confirmation. The 50kHz multi-beam sonar unit was installed by divers and will enable Calegeo to perform high-speed surveys in shallow water areas and down to 3,000m.

RESON has recently invested heavily in engineering services and increased production capability in order to react quickly to client requests while providing a level of support that is second to none.

For more information, visit www.reson.com.

Ashtead appointed Global Rental Agent by SubC Control

Global specialist subsea equipment rental company Ashtead Technology Ltd announces its appointment as the Exclusive Global Rental Agent for SubC Control HD Cameras and associated products. As part of the rental agreement, each Ashtead Technology hub will initially be furnished with a stock of 1CamMkII Stills and HD Video cameras.



Ashtead Technology Offshore Managing Director Mark Derry said "Ashtead Technology strive to remain at the forefront of technology. This agreement with SubC Control for their innovative stills and HD video cameras provides our global ROV customers with the latest technology available, on either a sale or flexible rental basis. This advanced technology will also be of use to customers in the diver and environmental survey sectors.'

The revolutionary camera offers 12MPixel Stills and 1080 HD video from the one camera. It requires no upgrades to your system as it records to the camera's internal 64GB memory while outputting regular SD video to surface. The 1CamMkII was designed to work in hazardous environments, and the enclosure utilizes industry standard duplex steel to give a depth rating of 3,000m.

BIRNS receives ABS Certification

BIRNS, Inc., a global innovator in the design and manufacture of unique lines of high performance lights, connectors, penetrators, and custom cable assemblies, has received American Bureau of Shipping (ABS) Product Design Assessment (PDA) Certification for its tremendously popular lines of penetrators. This certification process included rigorous testing and review by the national organization and resulted in ABS pre-approving all design, drawing, and test procedures for BIRNS electrical penetrators and cable assemblies for underwater vehicles, systems, and hyperbaric facilities for use on a variety of ABS-class vessels.

PDA certification is yet another in a long line of design and testing milestones for the 57-year-old ISO 9001:2008-certified company. "We are honored to receive this prestigious certification for our penetrator design, drawing and testing protocols, and to have the opportunity to provide yet another industry benchmark of safety, high performance, and excellence to our customers," said Eric Birns, President and CEO.

BIRNS does all penetrator testing in-house, witnessed and certified by ABS officials, and provides inclusive ABS lead times and pricing for such orders. The stringent testing procedures include high-pressure helium leak detection to the inboard side with multiple cycles of high-pressure saltwater to the outboard side, and dielectric withstanding voltage and insulation resistance testing.

For more information, visit www.birns.com.

BlueView supports the Rozalia Project for a clean ocean

BlueView Technologies, a world leader in compact acoustic imaging and measurement technology is supporting the Rozalia Project with its popular 2D imaging sonar. The Rozalia Project is a grass roots organization based in the north eastern U.S. and is dedicated to locating and removing marine debris as well as working with groups to educate and inspire people on the effects of marine debris. The Rozalia Project uses state-of-the art underwater imaging technology, including BlueView 2D Imaging Sonar on a VideoRay ROV to hunt for marine debris on both the surface and the seafloor.

"The images from the BlueView system provide incredibly clear imagery of underwater environments. Being able to see so far ahead, even when the best I can get out of the ROV's video camera is 2-ft. or less means I have a chance of avoiding obstacles, navigating successfully, and, most importantly, finding and identifying marine debris," stated Rachael Zoe Miller, founder of the Rozalia Project.

"BlueView is a proud supporter of the Rozalia Project, and we are very pleased that our technology is being used to ensure safer marine operations and a clean ocean for everyone" said Jason Seawall, BlueView COO.

BlueView is a leader in 2D imaging and 3D scanning sonar technology, with more than 500 installed systems worldwide. BlueView Technologies' advanced sonar systems are currently deployed on AUVs, ROVs, surface vessels, fixed positions, and portable tripods and have been adopted by leading manufacturers and service providers to support mission-critical operations.

For more information, visit www.blueview.com.

CorDEX Instruments launches software to support explosion-proof camera

CorDEX Instruments, manufacturer of flame-proof products, is enhancing the performance of its digital cameras with the launch of a new asset management system.

CAMS — Camera Asset Management Software — is a desktop package that boosts the capabilities of the company's explosion-proof camera equipment. The first phase can be used with CorDEX's groundbreaking ToughPIX 2300XP Series camera and will be included as a complimentary "add-on" package for CorDEX customers.

CAMS allows users to exclusively organize and manage information and images taken in the field with the ToughPIX 2300XP Series. It can generate reports and quickly manipulate images downloaded onto the system. Users can simply download images, edit and then instantly annotate to produce reports.

The software tool is ideal for maintenance professionals in the petrochemical, gas, mining, and marine industries who need to organize high volumes of images and require the added benefits of detailed report and tracking functionalities.

CorDEX launched the ToughPIX 2300XP Series earlier this year, a new service line of cameras that are ATEX- and CSA-certified to take images within Zone 1 IIC T4 and Class 1 Division 1 B, C, D hazardous areas. The streamlined camera includes a fully automatic strobe flash and red-eye reduction and can capture images in extreme low-light situations at the simple touch of a button.

Images can be reviewed on the ToughPIX 2300XP Series armored LCD screen in real-time in the field. With an onboard memory of up to 8GB, the device can store hundreds of pictures that can be easily transferred via high-speed USB communications link to a PC.

Bowtech and the hunt for lost pirates

Bowtech's latest Surveyor-HD (high definition) and Surveyor—SD (standard definition) cameras coupled with state of the art LED lighting and unique portable splashproof HD, SD, and sound recording system may have uncovered a lost piece of American / British history in the Irish Sea off the Welsh coast, a shipwreck thought to have belonged to a fleet of American sea raiders.

DeepTrek are a team of experienced subsea specialists in diving, submersibles, and deepwater ROV for the offshore industries. They have applied these technologies in the search for history for the first time. DeepTrek filmed their search of the coastline near Holyhead, Wales, UK for remnants of a shipwreck thought to have been a privateer ship on a mission from Benjamin Franklin to capture British sailors to exchange for American prisoners.

In the late 18th century, governments (including the U.S.) hired sea raiders to pillage and steal from merchant vessels. They

were given a letter of permission to engage in commerce raiding and were known as "privateers." The Irish Sea was a cauldron of kidnapping, thievery, and unrepentant skullduggery. The jagged Welsh coastline was particularly dangerous; many unsuspecting vessels met their doom there.

"Ben Franklin's Pirate Fleet" aired 6 April as part of "Expedition Week" on the National Geographic Channel.

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

CASTLE selects MS1000 sonar

As technology advances, so do our expectations, and this holds true in the field of sonar advancements. W.J. Castle, P.E. & Associates, P.C. (CASTLE) recently acquired the Kongsberg-Mesotech MS 1000 scanning sonar to stay on the cutting edge of sonar technology. Although CASTLE already has a side scan sonar that is

used primarily to view details of the channel bottom, CASTLE was looking for equipment that would be able to detail structures underwater. Since most of the bodies of water in the area are murky with limited visibility, tactile inspection alone may not always find every defect, void, or scouring. The MS1000 scanning sonar takes away the guesswork in the standard underwater tactile inspection.

The MS 1000 scanning sonar has the ability to detail the channel bottom and scan a vertical structure such as a pier or bulkhead. The sonar is placed into position either directly on the channel or attached to a pole or bracket and lowered into position. The sonar unit sends out a sound wave that bounces back from the structure or obstacle and is then transmitted as a picture and/or video to the computer on the topside. A video recording is saved that may later be used to develop a still picture of the area.

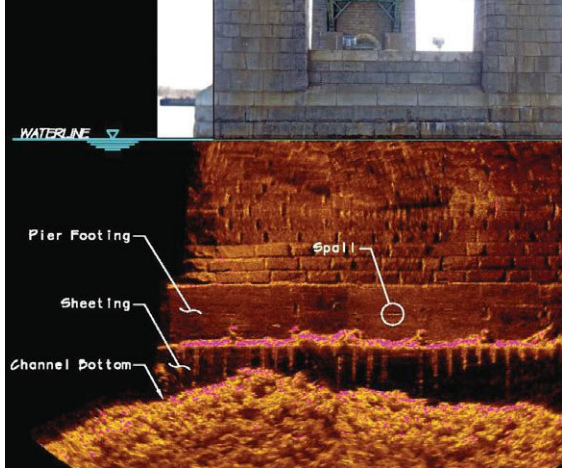
When using the sonar to scan the channel bottom, anything from large structures like a sunken vessel down to small pieces of rebar can be seen clearly. Another unique feature of this unit is its ability to detect movement. For example, a diver searching for a specific item or location underwater can be directed towards the target by the person monitoring the video feed topside.

This system is useful for various fields of study, including oil and gas, surveillance, or fisheries. However, the main purpose in obtaining this technology was to determine the existing conditions of marine structures and the channel bottom surrounding the structures. Another application anticipated for this unit is the location and verification of submerged vessels, jetties, or other structures.

The company has previously performed the location and removal of various structures, including large ships and timber jetties, and, in retrospect this unit would have been a huge benefit on those projects. An initial scan can be made to determine the exact location and dimensions of the structure and another scan can be made after the project is concluded to verify the removal is complete.

When CASTLE first purchased this system it performed several simulation projects in various locations.

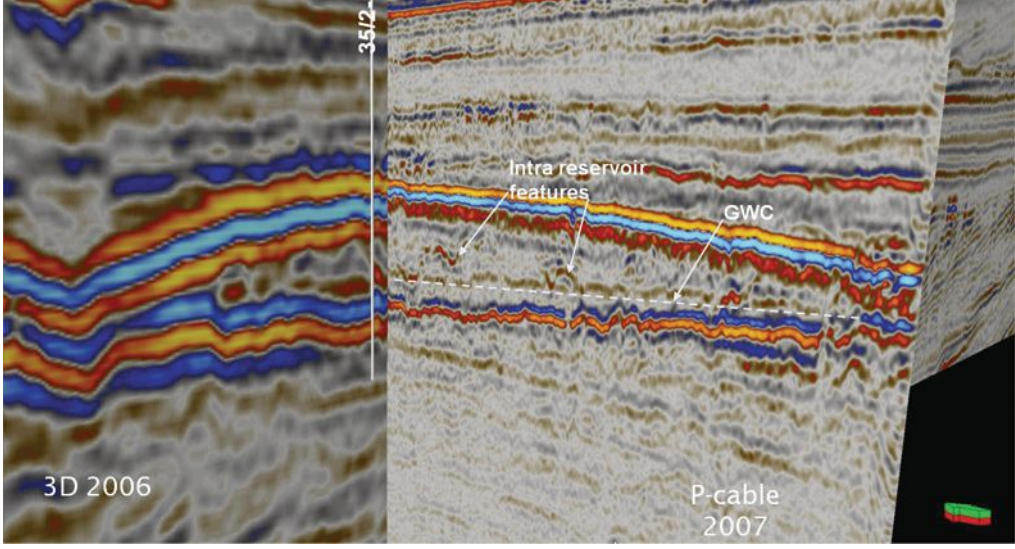
One of the test sites was a bridge pier on the Delaware River (above). The pier



structure was constructed of granite stone columns supported on a concrete footing, the bottom portion encased in steel sheeting. Individual stones were clearly detailed. Small construction defects found at regular intervals on the concrete footing were distinguishable from the spalling found towards the center of the pier. As indicated in the figure on the following page, the channel bottom was found to be mounded slightly about 15 feet from the left corner of the pier footing and sloping downward moving towards the right end of the pier.

CASTLE is excited about the potential of this system and the technological benefits it can now provide to its clients.

This scanning sonar survey unit delivers the highest resolution images available today. With the impressive capabilities of this technology, both in what it can do in the field and the output it can provide, coupled with CASTLE's extensive underwater inspection experience, it is able to provide clients with the most comprehensive inspection and survey package. Therefore, in additional to underwater inspections by certified commercial divers, including Licensed Professional Engineers, CASTLE can now show itsclients the actual underwater conditions of their structures.



P - Cable and WGP Group cooperation agreement

GP Group is pleased to announce a newly formed cooperation agreement with new 3D acquisition provider, P-Cable 3D Seismic AS (www.pcable.com).

P-Cable approached WGP as a potential partner due to its history of marine geophysical project management solutions. The basis for the cooperation agreement will be for WGP to provide technical and management services, including the evaluation and installation of P-Cable systems on client vessels, as well as providing training and technical support services in accordance with clients' needs.

P-Cable is an R&D company devoted to commercializing the patented P-Cable 3D seismic technology that has been in development since 2001. The technology is now proven, with more than 20 3D cubes having been acquired using three different P-Cable systems.

The P-Cable system offers low cost, high-resolution true 3D data. The system can be deployed from small vessels (30m or longer) and only requires five winches to support between 6 to 24 steamers. The end result is high-resolution data and detailed mapping of targets in the shallow section. The P-Cable system allows data acquisition of quality data that currently cannot be achieved with conventional acquisition methods at a fraction of the cost, time and manpower. The P-Cable system has been designed to suit an array of applications where quality, high-resolution 3D is required. Further details can be obtained from Geometrics, P-Cable's joint venture partner which manufactures the system components: http://www.geometrics.com/files/p-cable-data-sheet-v5.0.pdf.

WGP will attend a survey cruise in collaboration with P-Cable and the University of Tromso (UiT) in April 2011. During the cruise, a team of WGP's offshore technicians will review current equipment installation and deployment methods in readiness for additional trials later in the year and towards full commercialization and marketing of the system.

For more information, visit www.wgp-group.co.uk.

The new DMS-500 motion sensors

A new addition to the Teledyne TSS range of DMS motion sensors is being launched at the Ocean Business exhibition in Southampton, UK (Stand S1). The DMS-500 range is being developed specifically to meet the needs of users who require a top-quality motion sensor with Ethernet connectivity, but do not require the subsea-rated housings that typify Teledyne TSS products.

The result will be a complete range of conservatively-priced sensors that incorporate a number of advanced and innovative features for applications such as Dynamic Positioning, wave height monitoring, and structural stress monitoring. The versatile design means that the range will be available in various accuracies to make it suitable for a wide range of bespoke applications.

The first phase of the product's launch introduces the Roll Pitch range of sensors, including the DMS-525RP and the DMS-535RP and DMS-550RP, which

will both be on view at Ocean Business. These provide a highly reliable, accurate, and cost-effective choice for motion measurement with roll/pitch accuracies from 0.25° to 0.50° RMS, with high dynamic accuracy during vessel turns. Unique features of the new sensor are the ability to provide power and data over Ethernet and the inclusion of two independently configurable serial outputs — offering users a wide range of connection and application options.

The solid state circuitry of the DMS-500 is contained within a surface-use housing that is water resistant to International Standard IEC 60945 Class B for marine applications (IP65). It is designed to be DNV-certified and uses solid state angular rate sensors that offer reliability with a MTBF of more than 50,000 hours plus global availability due to the absence of any export restrictions.

For more information, visit www.teledyne-tss.com.

Sea-Bird launches low-cost, high-accuracy temperature logger

Sea-Bird Electronics announces the release of the SBE 56 Temperature Logger, providing unprecedented accuracy and stability at a price you would expect to pay for temperature recorders that are 1/10th as accurate. The SBE 56 is calibrated in Sea-Bird's state-of-the-art calibration facility. With its initial accuracy of 0.002 °C and high stability, you can calibrate at 5-year intervals for 0.01 °C accuracy. The SBE 56's low power consumption and large memory allows you to deploy for 31 days at 0.5-second intervals, 61 days at 1-second intervals, or 2 years at 15-second intervals. With fast upload and easy-to-use software, the SBE 56 can be rapidly redeployed. Only 29cm long and 2.5cm diameter, the SBE 56 can be used for depths to 1,500 meters.

For more information, visit www.seabird.com.

Applanix launches POS MV V5 for hydrographic surveys

Applanix announced the release of POS MV™ V5 (Position and Orientation System for Marine Vessels), the next generation of its industry leading georeferencing and motion compensation system for hydrographic surveying.

POS MV is a GNSS-aided inertial positioning and orientation system, specifically designed for georeferencing and motion compensation in hydrographic surveying. The system provides a user-friendly, turnkey solution for extremely accurate attitude, heading, heave, position, and velocity.

The system is available in three performance levels — POS MV WaveMaster, POS MV 320, and POS MV Elite — to produce an optimal solution for a variety of vessels and conditions. Version 5 provides the robust and reliable positioning and orientation information for which Applanix products are known, even in the most difficult environments for hydrographic survey applications.

"With the introduction of POS MV V5, we have further expanded the limits of the operating environments in which Applanix technology can excel," commented Peter Stewart, Product Manager at Applanix. "Whether you operate in a busy port, or in the most remote offshore areas, the new features of POS MV V5 ensure we continue to provide the most accurate, reliable, and robust position and orientation solution for hydrographic survey applications."

For more information, visit www.applanix.com.

HITT acquires IVS 3D

HITT NV, supplier of traffic management, hydrographic, and navigation systems for aviation and shipping signed the Share Purchase Agreement with the owners of IVS 3D. IVS 3D, market leader in marine information visualization, processing, and analysis software, has offices in United States, Canada, and Great Britain. The company was founded in 1995 and has developed highly sophisticated commercial products through key partnerships with business, government, and academic

institutions, including the Center of Coastal & Ocean Mapping of the University of New Hampshire, USA.

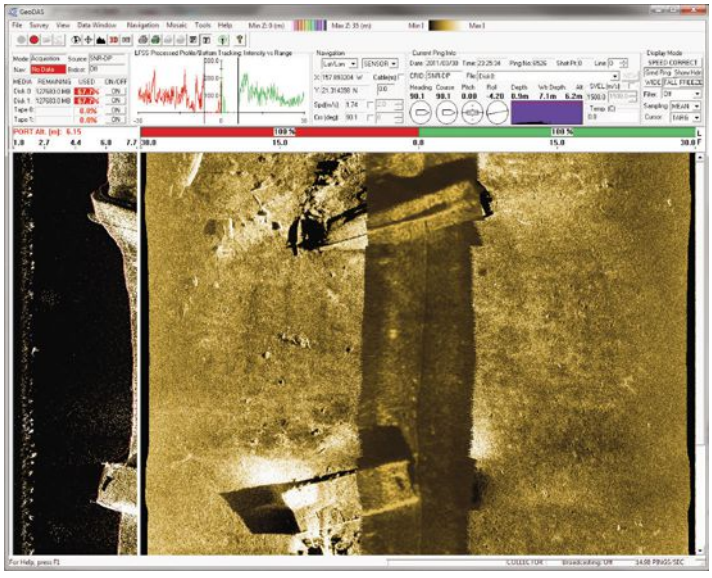
The operations of IVS and QPS, HITT's subsidiary in Zeist, The Netherlands, will be combined together to form a joint workforce of 56 highly qualified and knowledgeable employees. The organization, thereby, becomes the most significant developer and producer of commercial off-the-shelf software for data-acquisition, data-processing and 3D/4D visualization in the worldwide markets of geodesy, hydrography, oceanography, and precision navigation. The key products are known under the brand names QINSy, Fledermaus, and Qastor.

HITT is a leading player in the worldwide markets for traffic management and navigation systems. The company develops technology aimed at safety enhancement and traffic flow improvement, while also enabling significant cost reductions in infrastructure and logistics. The core activities of HITT consist of developing and selling management and control systems and services for air and vessel traffic and hydrographic and navigation systems.

For more information, contact Sjoerd Jansen (CEO) at +31(0)55 543 2590, e-mail investor.relations@hitt.nl.

Mind the GAP!

In March 2011, Oceanic Imaging Consultants Inc. completed integration support for BlueView Technologies' 2D forward-looking imaging sonar system its GeoDAS-GD (generic digital) product line.



This new development allows GeoDAS users to either support the BlueView sensor alone or in concert with any traditional sidescan to provide a nadir gap-filling capability, while retaining all of the functionality always available in GeoDAS (automated processing, target marking, precision geo-coding, real-time mosaicking). GeoDAS automatically determines the size of the sidescan nadir gap and optimally samples available forward look data to fill the gap. This translates to no more holidays, and no time wasted running extra survey lines.

For more information, contact info@oicinc.com.

Cortland creates world's largest 12-strand rope

Cortland recently produced the world's largest 12-strand rope for a European client, constructed on the giant 12-strand braiding machine using Cortland's patented Plasma® synthetic fiber. This rope will be used to create an enormous industrial lifting sling.

This unique rope was created from more than 52,000 individual Plasma® strands using Cortland's patented 12x12® braiding technique. This exclusive braiding process combines individual 12-braided ropes into a finished 12-strand rope of exceptional strength and flexibility. The finished size of this particular rope is 176mm, with a minimum tensile strength of 1845MT (metric tonnes).

Despite the exceptional size, this rope is 7 to 8 times lighter than a comparable steel rope, yet much easier to handle and splice. The rope will be used in a grommet configuration with an MBL exceeding 3044MT for heavy lift operations.

Cortland provides worldwide experience in creating lightweight rope, slings, cables, and umbilicals to the oil and gas, heavy marine, subsea, ROV, seismic, defense, and medical markets. Cortland is part of Actuant Corporation (NYSE: ATU), a diversified industrial company with operations in more than 30 countries.

For more information, visit www.cortlandcompany.com.

L-3 Klein introduces UUV 3500 next-generation side scan sonar

L-3 Klein Associates, Inc. announced the debut of its UUV 3500 high-resolution side scan sonar for Unmanned Underwater Vehicles (UUVs). The UUV 3500 was developed as a side scan sonar with the unprecedented benefit of an advanced bathymetry payload for the growing AUV, ROV and UUV markets.

L-3's UUV 3500 product line leverages powerful, state-of-the-art multi-channel processing electronics, offering both photo-quality side scan imagery and swath bathymetry that together exceed the performance of standard multi-beam echo sounders. In addition, the new system utilizes L-3 Klein's proprietary wideband technology for unmatched range and resolution while operating at lower power to deliver superior capability at a highly affordable price.

"With projections for UUVs continuing to increase, particularly for small man-portable systems, the need for mobile, high-quality, low power consumption side scan sonar payloads is on the rise," said John Cotumaccio, president of L-3 Klein. "AUV technology has moved out of the science project stage into mainstream production, and professional users are demanding better resolution, longer range, and more reliable side scan sonar systems for their vehicles. The Klein UUV 3500 answers all of these needs and more."

For more information, visit www.L-3com.com/Klein.

Winches for NARL research vessel

IBERCISA supplies oceanographic winches to NARL (National Applied Research Laboratories) from Taiwan for their new Oceanographic "Research V", which is being built on Jong Shyn Shipyard in Kaohsiung.

The main equipment supplied was designed to load 8.500m of Ø38.1mm cable. It is composed by a constant tension tractor winch. With a pull of 15Tn and a maximum speed of 80-m/min, which was designed to work with fiber cable, type Technora Aramid.

For proper work with this fiber cables, the tractor winch has been designed to work with individually driven sheaves. Eight of 11 sheaves are operated by eight motors in total. Each motor works individually over its sheave. Motors are controlled automatically, changing the sheave speed according to the enlargement produced during the cable loading. In this way, cable deformities are absorbed and friction damages are avoided.

The traction winch that works in conjunction with the tractor winch is composed by a grooved drum with capacity for 8.500m (Ø38.1mm), and by an automatic control to keep the same tension on each of the layers, increasing the speed progressively according to the work layer. A sheave managed by an independent spooling device drives the cable to be loaded.

For more information, visit www.ibercisa.es.

Ocean News & Technology

2011 EDITORIAL CALENDAR

January/February
Editorial: Inspection & Light Work Class ROVs, Offshore IRM
Distribution: Underwater Intervention
Deadline: January 14th
Product Focus: Diving Equipment & Buoyancy Materials

March
Editorial: Defense & Naval Systems, Oceanography & Meteorology
Distribution: NACE • Future Naval Forces • Ocean Business • Offshore Survey
Deadline: February 18th
Product Focus: Navigation, Mapping & Signal Processing; U/W Batteries

April
Editorial: Offshore Technology, Maritime Security
Distribution: U.S. Hydro • OTC • Maritime Security Expo-EJ Kraus
Deadline: March 11th
Product Focus: Connectors, Cables & Umbilicals

May
Editorial: AUVs & Gliders, U/W Imaging & Processing
Distribution: Oceans '11 IEEE Spain • UDT Europe
Deadline: April 15
Product Focus: Cameras, Lights & Imaging Sonars

June
Editorial: Ocean Renewables, Ocean Observing Systems
Distribution: EnergyOcean11 • Sea Work Int'l • MAST France
Deadline: May 13th
Product Focus: Tracking & Positioning Systems

July
Editorial: Work Class ROVs, Subsea Fiber Optic Networks
Distribution: AUVSI
Deadline: June 17th
Product Focus: Subsea Tools & Manipulators, Seismic Monitoring

August
Editorial: Coastal Engineering, Aquaculture & Marine Resources
Distribution: Offshore Europe • Oceans MTS/IEEE
Deadline: July 15th
Product Focus: Buoys & Monitoring Instrumentation

September
Editorial: Offshore Wind
Distribution: OTC Brasil • AWEA/Offshore Wind • MTS Dynamic Positioning
Deadline: August 19th
Product Focus: Multibeam & Side Scan Sonars

October
Editorial: Offshore Communications, Environmental Assessment & Monitoring
Distribution: LAGCOE • MAST Americas • Clean Gulf
Offshore Communications
Deadline: September 16th
Product Focus: Acoustic Modems, Releases & Transponders

November/December
Editorial: Ocean Mapping & Survey, Subsea Telecom
Distribution: International Workboat • Subsea Survey/IRM
Underwater Intervention
Deadline: October 28th
Product Focus: Workboats & Special Purpose Subsea Vehicles

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People & Company News

Paul V. Bennett was named vice president and treasurer of Chevron Corp. Bennett, 57, joined Chevron in 1980 as a financial analyst in the comptroller's department. Over the course of his career, Bennett assumed finance positions of increasing responsibility. Bennett earned his bachelor's degree in history at Wesleyan University in 1975 and his master's degree in finance at the University of California, Berkeley, 1980. He replaces **Pierre R. Breber**, who was appointed deputy managing director of Chevron's Asia South Business Unit in the company's international exploration and production business.

T.D. Williamson, Inc. (TDW) said **Mike Benjamin** joined the company as vice president, offshore pipeline solutions, located in Houston, Texas. In this capacity, which became effective 1 March, Benjamin will focus on fully implementing the full array of TDW products and services, including hot tapping and plugging, pigging, SmartPlug isolation technology and inline inspection, within the offshore arena. Formerly of Schlumberger, Benjamin has extensive experience in both operations and international sales, particularly in the offshore sector. Benjamin holds a bachelor of science degree in petroleum engineering from Louisiana Tech University in Ruston, Louisiana.

Benjamin

Bernard B. Roth, the California-based philanthropist and entrepreneur who pioneered the "self serve" gasoline station, passed away of natural causes on 27 March, at his home in Beverly Hills, California. He was 95. Roth began modestly in 1938 with a single gas station in South Central Los Angeles. Over the course of seven decades, Roth's core business principal of distributing high- quality petroleum products at lower than average prices allowed his company, World Oil Corp., to grow into one of California's largest privately-held enterprises. Today, World Oil and its affiliates operate a chain of gasoline stations throughout California, and have diversified their operations to include road and roofing asphalt production, trucking, marine terminal operations and real estate development.

Roth

Apache Corp. said that **Dave Gilbronson** and **Mark Bright** will lead Apache's oil and gas marketing organization, which will be divided along geographic lines. Gilbronson was appointed to vice president of international marketing and Bright to vice president of North America marketing. Gilbronson, director of risk management since 2009, joined Apache in 1988. Bright, Apache's controller of North America accounting since 2006, joined Apache in 1999.

UK-based Brinker Technology has highlighted its ambitious growth plans with the appointment of **Kenny McAllister** as vice president of sales and operations. Joining Brinker from Halliburton where he was most recently senior account manager, McAllister started his career working in research and development with ICI. With more than 16 years experience bringing new technology to the oil and gas industry through a variety of roles in sales, operations, and general management, he has worked across the world spending time in Europe, Africa, FSU and the Middle East. McAllister brings to Brinker extensive knowledge of downhole and surface technologies together with expertise in new technology adoption and expansion.

McAllister

Atwood Oceanics, Inc., a Houston-based international drilling contractor, said that **George S. Dotson** was appointed non-executive chairman of the board of directors effective. He has served as a board member since Febuary 1988. From 1990 until his retirement in 2006, Dotson was a director of Helmerich & Payne, Inc. (H&P). Previously he was vice president, drilling of H&P and president of Helmerich & Payne International Drilling Co., a wholly-owned subsidiary of H&P. In connection with the appointment of Dotson, **Hans Helmerich**, a director of Atwood since Feb. 1989, will discontinue his role as lead independent director but will remain an active board member.

Baker Hughes Inc. said **Alexander Peng**, 39, will be appointed Baker Hughes' vice president tax effective 1 May 2011. In this position, he will be located in Houston and will report to Peter Ragauss, senior vice president and chief financial officer. Peng was most recently the vice president, taxes for SPX Corp. Previously, he was with PricewaterhouseCoopers where he was a director focused primarily on tax advisory services for global manufacturing companies in industrial products and aerospace industries. Early in his career he worked at Arthur Andersen in a variety of tax advisory roles.

The American Petroleum Institute announced the addition of **Carrie Melvin Domnitch** to its government relations team as director of federal relations focusing on upstream issues. Her work will focus on the wide range of issues related to industry exploration and production, including reasonable access to and regulation of onshore, offshore and Alaskan lands. Domnitch was chief of staff for Representative Thelma Drake (R-VA) and began her Capitol Hill career with Representative Michael Bilirakis (R-FL) as a staff assistant. Most recently, she was the director of federal affairs for the American Chemistry Council.

Oil and gas commissioning and technology specialist qedi has bolstered its business development team to reinforce the company's growing global footprint. **Sally Hayles** was appointed business development director with **Stephanie Law** taking up the role of business development coordinator. Both will be based at qedi's Aberdeen headquarters and focus on the company's ambitious growth plans by building on the success of its high value consultancy services and industry-recognized technology as well as its impressive portfolio of international projects. Hayles, who has an impressive track record in global oil and gas business strategies and technology, will drive forward qedi's global growth by further strengthening the company's international profile and developing client relationships. Law will work alongside Hayles, implementing both her business development and marketing skills to further enhance qedi's international offering.

Law

Hayles

Remote Ocean Systems, a recognized leader in the design, development and manufacture of reliable video and lighting systems to meet the harsh challenges of Sub Sea exploration and Nuclear Facility inspections, is pleased to announce the addition of **Barrie Hay** as their new Manufacturer's Representative for the UK and European Markets. Hay is based in Aberdeen, Scotland and brings more than 20 years of sales experience covering key

market sectors like: ROV, Diving, Subsea Pipe Inspection and Oil Rig CCTV Systems.

Fugro Multi Client Services has named **Tim Addington** Chief Geophysicist, Sverre Berstad, Exploration Manager for East Africa, Middle East and Russia announced. Addington will provide geophysical support for the Americas, including seismic data processing and quality control for Fugro Multi-Client Services in both North and South America.

Addington

With Ocean Signal's rapid international growth as a leading specialist manufacturer of communication and safety at sea products, the company has appointed **James Hewitt** as its Sales and Marketing Manager for both the UK and overseas markets. He has extensive experience in marine industry electronics having worked with a leading UK electronics manufacturer as Export Sales Manager.

MMT and NetSurvey have recently merged after 6 years cooperation on various hydrographic survey assignments. The goal is to benefit from synergy effects and to jointly provide high-resolution surveys. NetSurvey will bring strong technical capabilities in the field of multibeam expertise to the MMT Group, which recently acquired all shares in NetSurvey Limited, Banbury, UK. Both companies operate at the cutting edge of technology and deliver high-quality, client-focused products to the world's energy companies, hydrographic offices, environmental agencies and government departments.

SeeByte, the global leader in creating smart software technology for unmanned systems, is pleased to welcome **Ltd Cdr Rob Cornick RN** (retired) as a newly appointed Senior Programme Manager. He joins SeeByte having recently retired from the Royal Navy after 25 years as a Mine Warfare specialist. His last post saw him act as the Mine Warfare Programme Officer at NATO's Undersea Research Centre, La Spezia, Italy.

Cornick

UTEC Survey has announced that **Carlo Pinto** has joined UTEC Survey Construction Services Ltd. as the Regional Sales & Marketing Manager. As part of the UTEC Survey's Aberdeen team, Carlo Pinto will focus on developing significant new business opportunities in Europe, the Middle East and West Africa. His extensive experience includes more than 15 years in the Offshore Survey business. After starting his career working hands-on offshore, Pinto held a number of management positions with Geolab srl and was most recently the company's Commercial Manager.

Pinto

BlueView Technologies the world leader in compact acoustic imaging and measurement technology has added **Nick Lesnikowski** as 3D Product Manager /ACSM Hydrographer. Lesnikowski will direct and manage BlueView's 3D Mechanical Scanning and MicroBathymetry product lines, and will provide technical support for hydrographic survey applications.

Calendar

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

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

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

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

June 16-17, 2011:
Offshore Brasil
Rio Centre, Brasil
www.brasiloffshore.com

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

August 19-22, 2011:
AUVSI
Washington, DC
www.auvsi.org

September 6-8, 2011:
Offshore Europe
Aberdeen, Scotland
www.offshore-europe.co.uk

September 19-22, 2011:
Oceans 2011
Kona, Hawaii
www.oceans11mtsieeekona.org

October 4-6, 2011:
OTC Brazil
Rio de Janiero, Brazil
www.octnet.org

October 25-27, 2011:
LAGCOE
Lafayette, LA
www.lagcoe.com

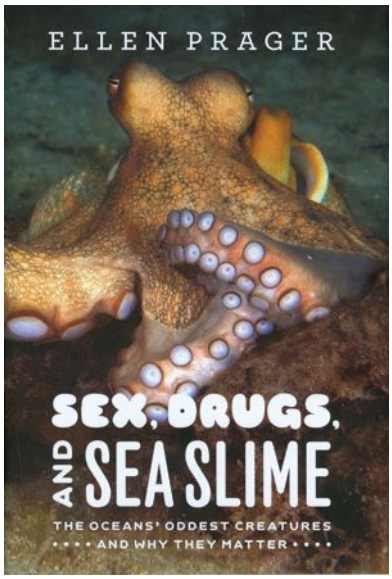
November 8-10, 2011:
Offshore Communications
Houston, TX
www.offshorecoms.com

December 13-15, 2011:
Subsea Survey IRM
Houston, TX
www.subseasurvey.com

Media Reviews

Sex, Drugs, and Sea Slime

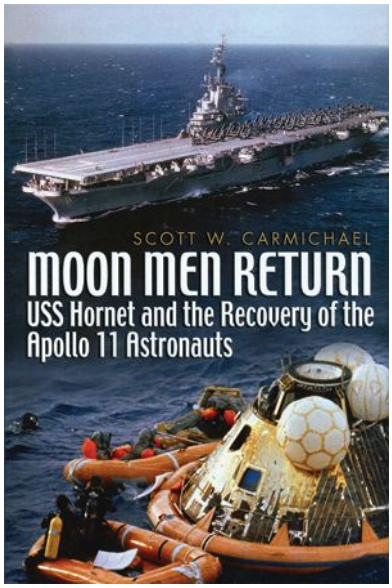
With ***Sex, Drugs, and Sea Slime***, marine scientist Ellen Prager takes us deep into the sea to introduce an astonishing cast of fascinating and bizarre creatures that make the salty depths their home. From the tiny but voracious arrow worms whose rapacious ways may lead to death by overeating, to the lobsters that battle rivals or seduce mates with their urine, to the sea's masters of disguise, the octopuses, Prager not only brings to life the ocean's strange creatures, but also reveals the ways they interact as predators, prey, or potential mates. And while these animals make for some jaw-dropping stories—witness the sea cucumber, which ejects its own intestines to confuse predators, or the hagfish that ties itself into a knot to keep from suffocating in its own slime—there's far more to Prager's account than her ever-entertaining anecdotes. Again and again, she illustrates the crucial connections between life in the ocean and humankind, in everything from our food supply to our economy, and in drug discovery, biomedical research, and popular culture.



ISBN 978-0-226-67872-6, Univ. of Chicago Press, publication date April 15, 2011, 184 pages, $26.00

Moon Men Return

The splashdown and recovery of Apollo 11 on 24 July 1969 was a historic event, that fulfilled President John F. Kennedy's national goal of placing a man on the moon and returning him safely to earth by the end of the 1960s. This book tells the dramatic story of the USS Hornet's recovery of the astronauts after the splashdown of their command module. This detailed account draws not only on historical records but also on the memories of eighty men who served aboard the Hornet and participated in the recovery operation, including Navy UDT frogman John M. Wolfram, who was the first to reach the Apollo II astronauts. Their inside account offers deck-level perspectives of events and includes details never before documented for the public. **Scott W. Carmichael** is the senior security and counterintelligence investigator for the Defense Intelligence Agency and also with the Department of Defense for nearly thirty years.



ISBN 978-1-59114-110-5, Naval Institute Press, publ. date June 21 2010, 264 pages, $36.95

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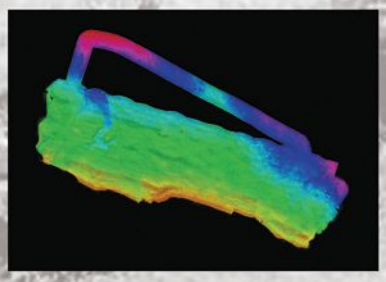

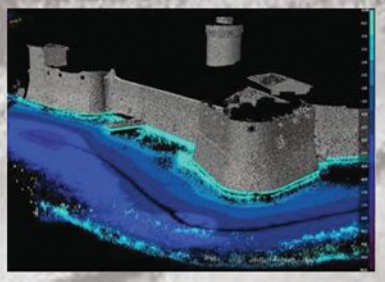

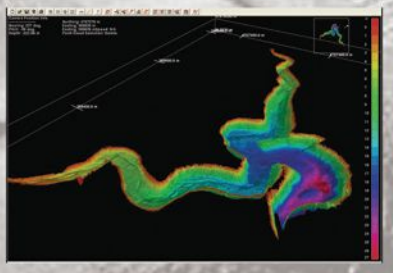

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