

# Ocean News & Technology

News for the Ocean Industry

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August 2011

## Buoys and Mooring Systems Today's Design Challenges



Feature Story – Page 12  
**SAIC's New Generation of  
Tsunami Buoys Join the  
Global Warning Network**

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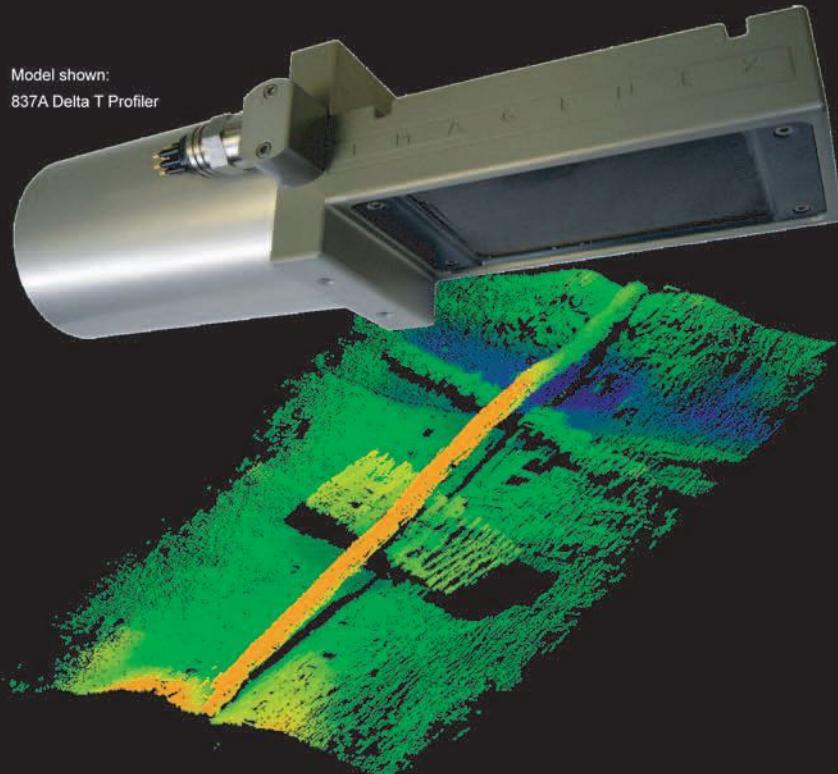
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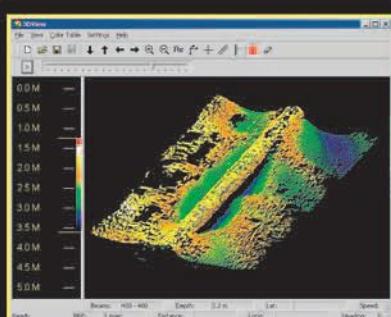
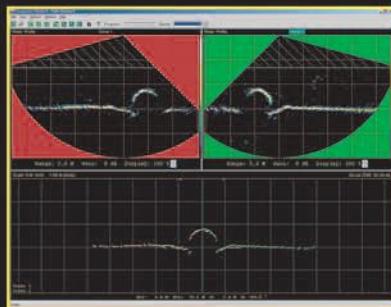
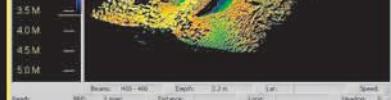
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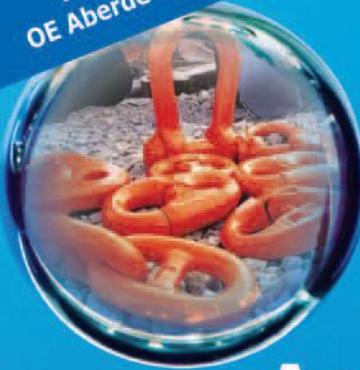
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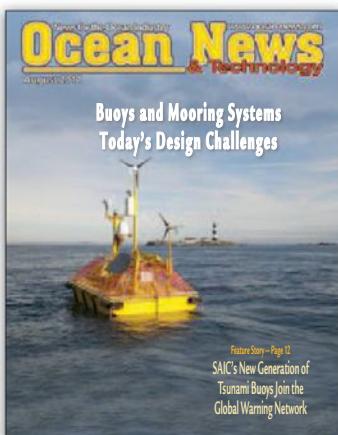
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**Cover Photo**  
The WindSentinel™ offshore wind assessment buoy (courtesy of AXYS Technologies)

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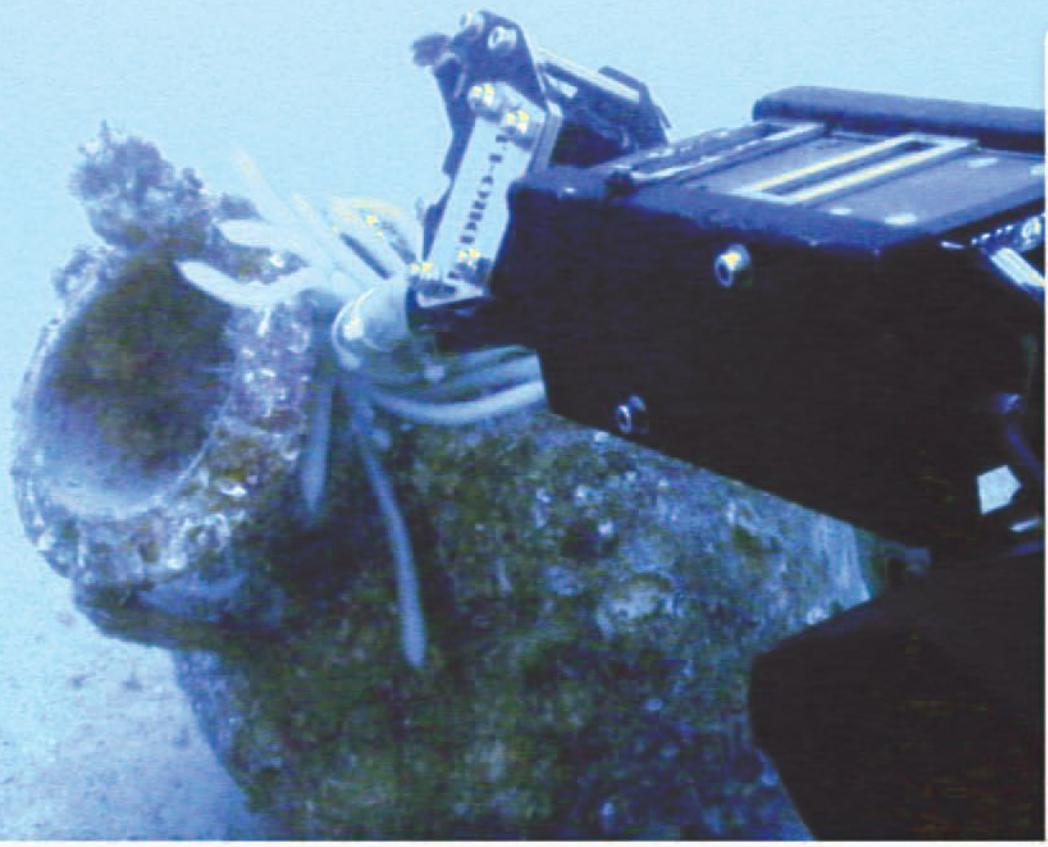
- Multibeam & Side Scan Sonars



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# Editorial

By Scott Olson

## Ocean News & Technology

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# An end of an era—the end of an American capability

I asked Scott Olsen to be a Guest Editor this month to discuss the demise of Harbor Branch Oceanographic Institution's manned submersible program. This comes after another disappointing University decision to eliminate the decades old Ocean Engineering Department at Florida Atlantic University.

As the era of the U.S. Space Shuttle is ending, people with the primal ambition to explore look forward to the next phase of space travel. Meanwhile, another era is ending with no future in sight, that of manned exploration of the deep sea at Harbor Branch Oceanographic Institution (now part of Florida Atlantic University [FAU]) on the East Coast of Florida. Recently, it was announced that all of the remaining submersible staff are to be permanently laid off in the coming months. A program that accomplished nearly 9,000 dives with the two Johnson-Sea-Link (JSL) Submersibles since 1971 has now been unceremoniously abandoned.

In the past 40 years, the subs operated from the Mediterranean Sea to the Galapagos Islands and from the U.S. Great Lakes to the Canary Islands. Thousands of people of all walks of life and nationalities have been inspired by the underwater world in the JSLs. The panoramic view from the 100% acrylic pilot sphere offered unprecedented access for human investigators down to a maximum depth of 1,000 meters. The diver lockout chamber at the stern of the vessel served Edwin Link's Man-in-the-Sea program at depths as great as 120 meters. In later years, the chamber was operated as an observation chamber, providing a seat of discovery to numerous laymen who otherwise would not have had an opportunity to witness the marvelous world of the biosphere — a place where 78% of the world's biomass exists.

With a responsive variable buoyancy system and a 500kg payload, the submersibles provided an unequalled platform that played host to a dizzying array of scientific apparatus. From a 500kg 3D holographic camera and an inverted methane hydrate sampler to a sensor winch for sampling brine pools and a one-atmosphere cosmic chamber outpost, the JSLs turned away very few would-be investigators. Detritus traps captured jellyfish the size of a thumbnail with no physical contact, and a large Bushmaster sampled an entire colony of tubeworms without losing a single crab. Close encounters with large pelagic fish and midwater organisms were numerous due to a low level of noise emission.

The JSLs also hosted many photographers and filmmakers throughout the years, with a circumnavigation of Cuba for the Discovery Channel, a 3D IMAX movie of the Galapagos Islands, and multiple tours with National Geographic Magazine.

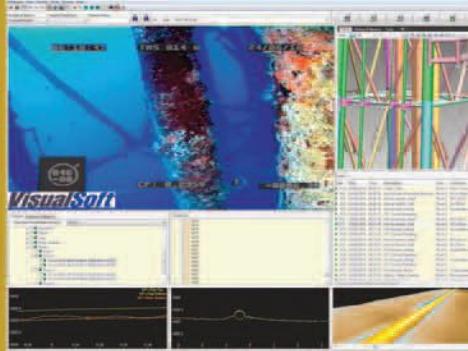
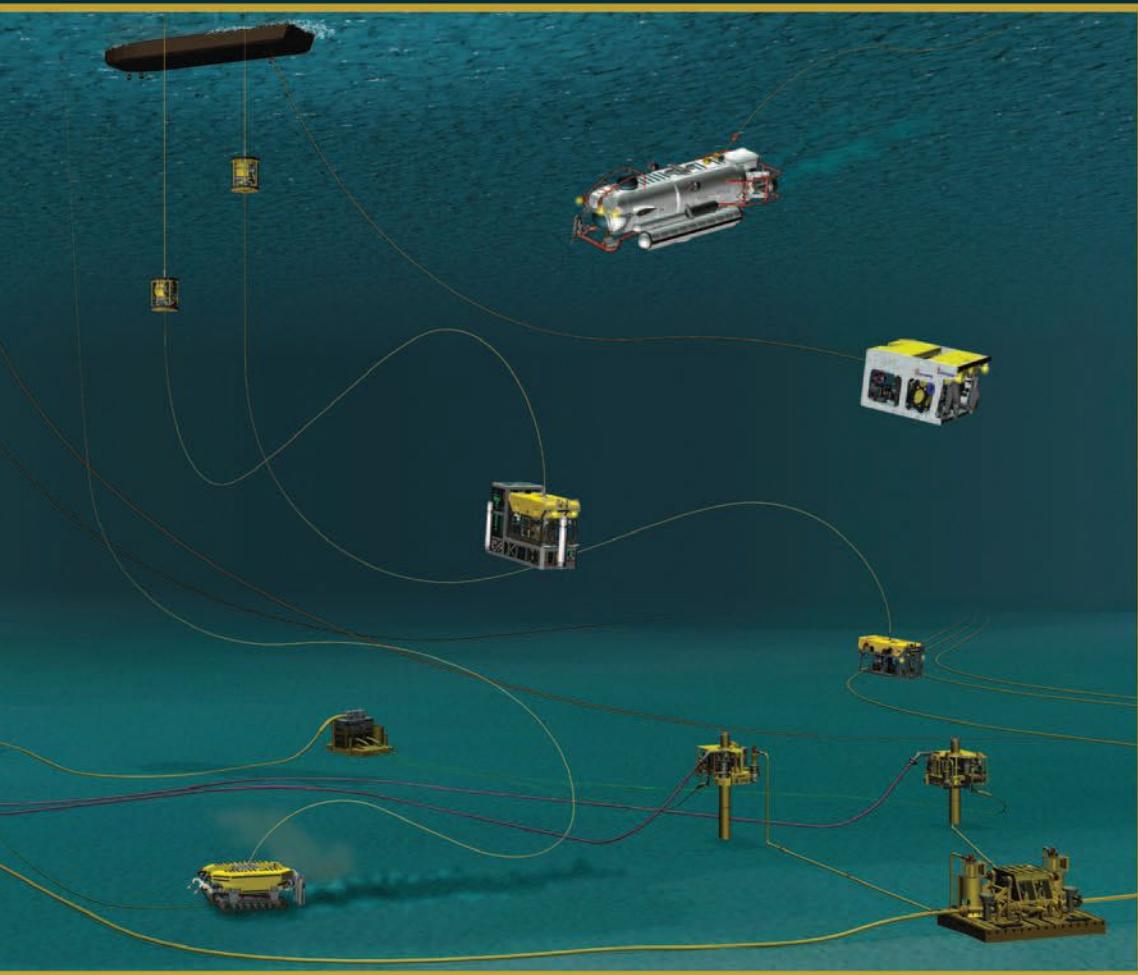
The reasons for the demise of such a successful program are convoluted; but in my opinion, they all point back to a lack of visionary leadership at multiple levels, including at the institute and at State and Federal government levels. The endowment that was bequeathed to the institute upon the deaths of its co-founders in the 1980s was severely mismanaged, and the subsequent FAU managers did not appreciate the value of the program. Much of the blame, however, also lies with the short sightedness of the U.S. public and with the infighting at the program-bloated sources of federal funding.

Underwater scientific endeavors worldwide will suffer with the loss of this manned platform. Very few marine scientists will dispute the fact that the value of an eyewitness' personal expedition of discovery is indescribable and immeasurable. An analogy would be like trying to put a "price" value on a good sermon at church. Scientists and observers alike are inspired by the human experience that is impossible to duplicate with unmanned technology. As to the current state of the subs, one is currently at a research institute in Brazil, and the other is gathering dust in a hanger, most likely destined to go to a museum.

In my opinion, the dismantling of the JSL program will mark an additional event that exposes the loosening of the grip that America once had on global scientific leadership. Foreign ultra-deep diving assets have surpassed the performance of U.S. assets for many years. However, in the biosphere, no other sub, past or present, foreign or domestic, can execute scientific missions as efficiently as Edwin Link's submersibles and their crew.

So, while no retirement party will take place and no speeches will be made, I hope you'll join me in paying tribute to the operators, developers, scientists, and especially to the subs for a great many years of devoted service and monumental accomplishments.

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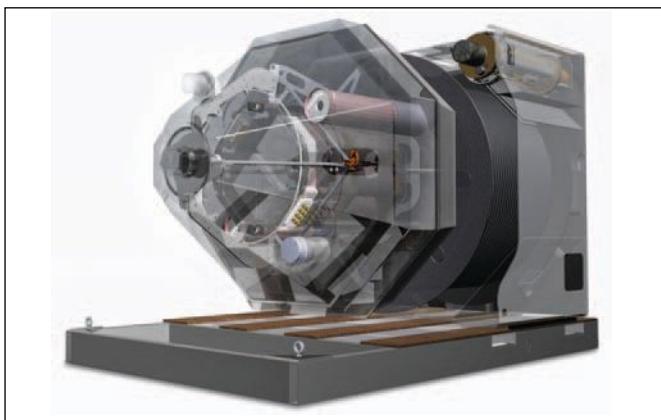
## SAIC's New Generation of Tsunami Buoys Joins the Global Warning Network

By Robert Lawson, Vice President, SAIC

The cataclysmic events of the past year continue to demonstrate the importance of a global-scale ocean sensing network to warn nations of impending tsunamis. The safety of populations and the protection of their property require a strong international capability to monitor the oceans for earthquakes and to sense the creation and propagation of tsunamis. The benefits realized from fielding new capabilities fuel their improvement, including the ability to deploy operational systems at a lower cost. Through a license agreement with the National and Atmospheric Administration (NOAA) Pacific Marine Environmental Laboratory (PMEL), Science Applications International Corporation (SAIC) is now producing and deploying a commercial version of the Easy-to-Deploy (ETD) Deep Ocean Assessment and Recording of Tsunamis (DART®) buoy system.

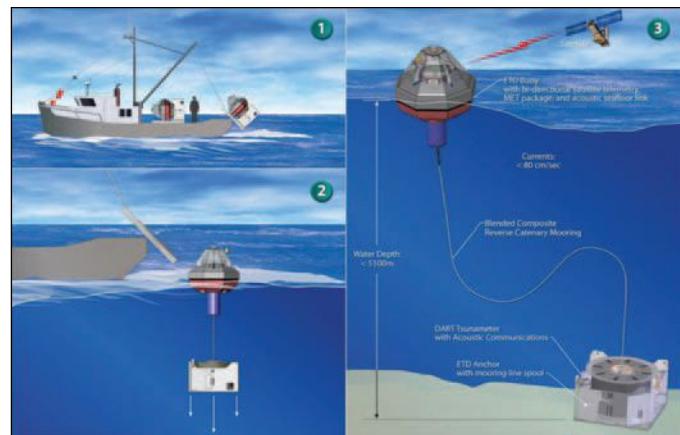
The ETD DART® has progressed from prototype to operational capability in less than five years. In the last year, two systems have been deployed for the Australia Bureau of Meteorology (AUS-BOM). One system in the Coral Sea, deployed in August 2011, collected valuable information on super cyclone Yasi in February 2011 and the globally observed Honshu tsunami in March 2011. A third system is planned to be deployed near Bali in August 2011. These three next-generation systems join the 14 other SAIC Tsunami Buoy (STB) systems that have become part of the national tsunami warning systems for Australia, China, India, Russia, and Thailand.

The ETD DART® buoy is mobilized in a self-contained package of all in-water components from anchor to buoy. Compared to deployment of standard DART® buoy systems, ETD DART® installation requires fewer steps, fewer people, significantly less time, and a smaller, less expensive vessel. The ETD DART® reduces the complexity of deployment to improve the safety and reliability of its installation and to lower overall costs. **Figure 1** is a cutaway view of the ETD DART® poised for launch.



**Figure 1** Easy-to-deploy tsunami buoy

**Figure 2** illustrates the steps in this simplified deployment. In Step 1, the buoy is tilted up (**Figure 3**) from its pallet and released for a gravity launch. In Step 2, the buoy separates from the mooring line reel and anchor, which houses the bottom pressure sensor, or tsunami meter, and an acoustic modem. In Step 3, the cable spools out as the anchor descends to rest on the seafloor.



**Figure 2** ETD DART® deployment process



**Figure 3** ETD DART® ready to deploy

On 27 August 2010, a team from AUS-BOM, NOAA, and SAIC, aboard a small off-shore workboat, launched the first ETD buoy (WMO Station 55023) in the Coral Sea. The launch, which took 10 seconds to complete, required no crane operations at sea. Forty-five minutes later, the anchor settled on the bottom in 4,500 meters of water. Successful data communications were confirmed a few minutes after touchdown. **Figure 4** illustrates the actual launch sequence for the Coral Sea buoy. Within days, AUS-BOM declared the system fully operational and incorporated it into their national tsunami warning buoy network.



**Figure 4** ETD DART® deployed in Coral Sea 27 August 2010

One event provides insight into the new scientific data available from an ETD DART® buoy. On February 2, 2011, the Coral Sea ETD DART® demonstrated its reliability and resiliency to extremely severe weather when it survived a direct strike from Yasi, a Category 5 cyclone. Super-cyclone Yasi generated winds near 130 knots and estimated seas of 15 meters. Based on barometric pressure data from the buoy (**Figure 5**), the eye of the cyclone passed right over its location. The barometer recorded a drop in atmospheric pressure from 1,004 to 941 mbar in a span of three hours. The strength of the cyclone caused some lengthy dropouts in data just after it passed the station. (These have been

## Buoys & Monitoring Instrumentation

artificially filled with dashed lines in the plot.) Although the system was not expected to withstand such harsh conditions, the ETD DART® survived and continued to operate as designed, missing only those few hours of data as Yasi passed over. Except for the anemometer, which was carried away during the storm, the ETD DART® remains operational, performing its important warning and protection missions off the northeast coast of Australia.

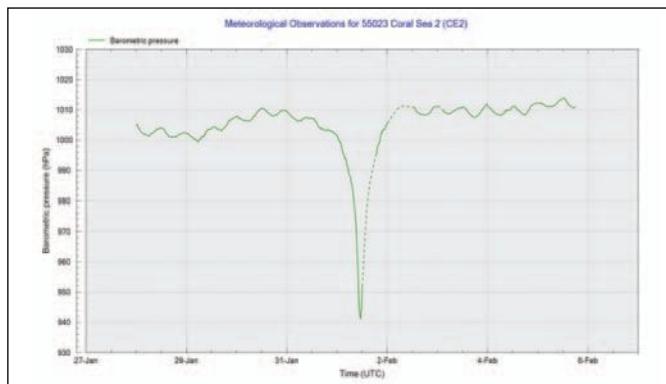


Figure 5 Atmospheric pressure drop during passage of Super Cyclone Yasi 2 February 2011

On 11 March 2011, a 9.0 Ms earthquake struck an area approximately 130km east of Sendai, Japan, generating a global tsunami. As a result, the entire Pacific Basin received tsunami warnings or initiated tsunami watches. The Sendai tsunami was so powerful that beyond the massive damage in Japan, there was wide-scale damage across Oceania and along the Pacific coasts of North and South America. In spite of the distance from the generation point, interaction with the seafloor, bathymetric features, and partial shielding provided by the Solomon Islands and New Guinea, the Coral Sea ETD DART® system detected tsunami waves nearly 9.5 hours after the earthquake. The buoy allowed AUS-BOM to monitor the tsunami propagation. Observing wave amplitudes slightly less than 30 millimeters and wave periods of 35 minutes (Figure 6), AUS-BOM had the confidence in providing “No Threat” warnings to the coastal populations of Eastern Australia.

A second SAIC-produced ETD DART® system was deployed in the Tasman Sea on 8 April 2011 and declared operational by AUS-BOM just days after deployment (WMO Station

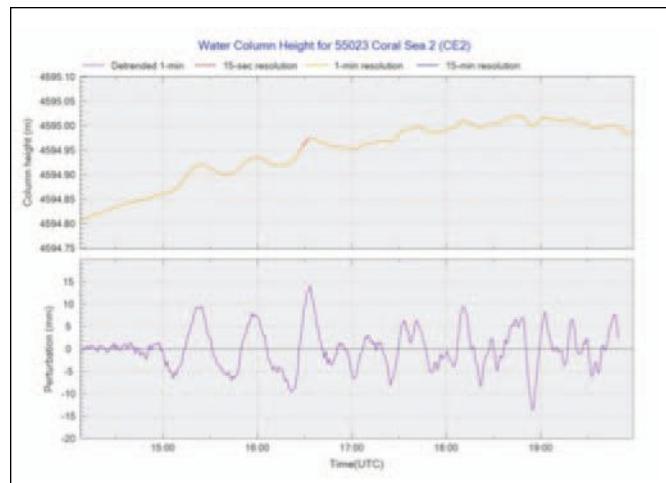


Figure 6 Honshu Tsunami waves detected at Coral Sea ETD DART®

55042). Since that deployment, this system has experienced storm force winds and seas up to 20 meters from the storms that swirl around Antarctica in the Southern Ocean. In this challenging environment, the ETD DART® has demonstrated its resilience and reliability in harsh, sustained conditions. With the deployment of the third system south of Bali in August 2011 and plans to deploy additional systems in the Indian Ocean and western and southern Pacific Oceans in the next 12 to 24 months, the ETD DART® system is rapidly becoming a key element in the international tsunami warning network.

SAIC values its participation in fielding an international system of warning buoys for the benefits of multiple nations vulnerable to significant planetary and climate events. This program is an opportunity for SAIC to use its deep domain knowledge to solve problems of vital importance to the nation and the world.

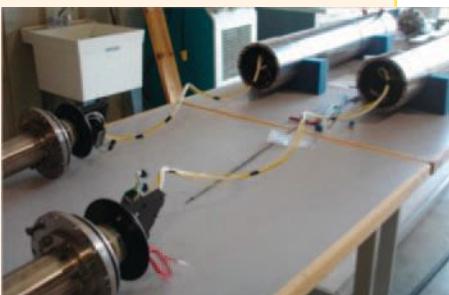
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### Cable Terminations

Among the technical products available to the maritime and ocean research communities, SAIC offers an alternative to the standard telecommunications cable termination. SAIC has a line of fully qualified designs for commercial and military applications. The majority of these designs are assembled on cables before installation. However, owners and operators of cabled systems like those deployed for scientific ocean observation suffer periodic cable damage, interrupting service or destroying system functionality. This vulnerability merits a reliable, low cost repair solution.

In answer to this need, when SAIC terminations are used for field repairs, they can be installed on recovered

cables in hours rather than the days historically required for specialized terminations. This reduces ship time and restores system operation at lower cost than other repair scenarios. At sea repair using SAIC cable terminations requires DP-capable vessels of opportunity with modest recovery capabilities rather than a telecommunications cable ship with open ocean capabilities.



The SAIC termination features an integrated test port allows for a post-assembly full-pressure hydrostatic test, allowing the detection of any performance compromising primary seal assembly contamination. This is particularly appealing for new cabled sensor arrays that require multiple connections on relatively short lengths of cable, such as an inter sensor node connections. The SAIC termination features polyethylene jacket tension and torque restraint that uses a proven bonding process instead of a traditional crimping process. This eliminates concern over stress concentration induced polyethylene failure. The combination of design, material selection and quality control, and thorough mechanical and pressure testing results in a high quality product that addresses the needs of the industry.

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The "Oxybox" battery capacity will provide four months of continuous operation at 10-min. transmit interval. The system is currently in operation at more than 50 locations off the coast of Norway, and testing is currently ongoing at fishfarms in Chile.

For more information, please contact Ole-Erik Gunnulfsen, Nortek ([inquiry@nortek.no](mailto:inquiry@nortek.no)).

## Deepwater mooring testing



Leading deepwater rope manufacturer, Lankhorst Ropes Offshore Division has invested Euro 2M in a synthetic fiber rope test machine that, for the first time, will enable naval architects to run "what if" scenarios to simulate the effects of storms and hurricanes on deepwater mooring lines.

Located at Lankhorst Ropes' fiber rope production facility in Portugal, the rope test machine will be used to test the mechanical performance and fatigue behavior for a range of new materials and rope constructions for deepwater mooring and single point mooring (SPM) systems.

The rope test machine can test 20m ropes with loads up to 1,200 tonnes. It has a primary cylinder rated at 1,200 tonnes x 3m stroke and a secondary cylinder of 1.5m length coupled to a power pack of 350kW. In addition, the machine features a precise mechanical control system designed to maintain peak load such that target loads can be maintained within 10kN during testing.

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

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### Free 2D CAD from the makers of SolidWorks

You know sometimes all you need is a good 2D drawing. Dassault Systems, maker of SolidWorks, offers a free 2D CAD program for Mac, Windows and Linux machines. Called "DraftSight", the maker claims it "provides professional CAD users, students, and educators with a better way to create, edit" and view DWG files." DraftSight has already passed 1 million downloads. Learning resources, testimonial stories and software links are at: [www.3ds.com/products/draftsight/free-cad-software/](http://www.3ds.com/products/draftsight/free-cad-software/).

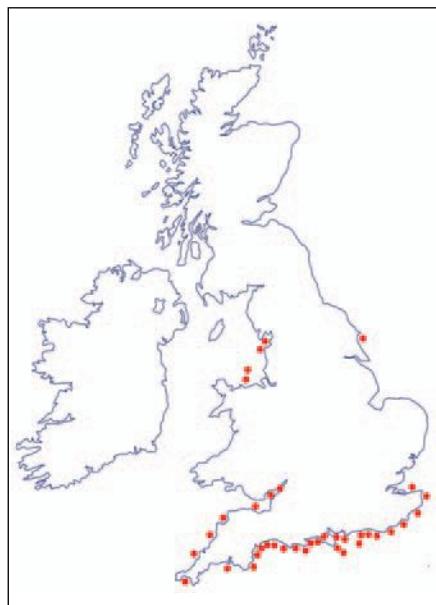
### Launch of concentrated inspection campaign on structural safety and international convention on load lines

The 45 Maritime Authorities of the Paris and the Tokyo Memoranda on Port State Control will begin a joint concentrated inspection campaign with the purpose to ensure compliance with structural safety and the Load Line Convention. This inspection campaign will be held for three months, ending on 30 November 2011. The States party of the Viña del Mar Agreement, the Indian Ocean MOU, the Mediterranean MOU, and the Black Sea MOU will follow the same routine during the campaign. The background for this CIC is that, as an average for the last eight years, deficiencies related to structural safety and load lines account for 15% of the total number of deficiencies. Furthermore, structural safety for ship types other than bulk carrier and compliance with the Load Line Convention in general have never been addressed with the special attention typical for a CIC. During this campaign Port State Control Officers will verify applicable documents and aspects as loading instruments; the protection of hatch openings, the vessel's hull, bulkheads and deck, and other features of the Load Line Convention; and structural integrity in more detail.

### AXYS exceeds 200 TRIAXYS buoys

AXYS Technologies Inc. (AXYS) has recently surpassed the construction of its 200th TRIAXYS™ Directional Wave Buoy. TRIAXYS™ Directional Wave buoys are currently deployed worldwide gathering wave data for renewable energy potential, research and impact studies, marine operations, and general marine safety.

### EMU Limited detects the English Channel tsunami



A network of coastal tidal and wave monitoring stations maintained by Southampton-based EMU Limited recorded the progress of the waves caused by this week's minor tsunami along the south coast.

A massive underwater landslide in the Atlantic 200 miles off the Cornish coast is believed to be the cause of a small tsunami along the south coast, which created waves of between 0.5 and 0.8 meters and resulted in abnormal tidal records at the Channel Coastal Observatory and Plymouth Coastal Observatory shore stations.

EMU Limited's Principal MetOcean Scientist, Mr. Robin Newman, initially thought there was a malfunction with the oceanographic instruments, installed by EMU for the Southeast and Southwest Regional Coastal Monitoring Programmes, due to the unusual data patterns recorded by the Etrometa Step Gauges and Rosemount WaveRex Radars.

"There was a significant amount of variation in the observed data against what would be expected, so I checked at multiple sites and they were all consistent with some sort of movement from east to west," Mr Newman said. "We subsequently realized we had recorded what appears to be a minor tsunami."

"While 0.8 metres waves may not sound like much, it could have caused flooding events if combined with high tides," he said. "Tsunamis are not expected to affect the UK, so this is a very rare

event. But from this week's experience, clearly they can, but also clearly we can now say we have an operational system which can detect these unusual events."

EMU Limited will monitor the continuing wave movements as these may be a form of standing-wave oscillation, or seiching, in the Channel.

For more information on EMU Limited visit [www.emulimited.com](http://www.emulimited.com).

### Ban on commercial shark fishing in Bahamas

The oceans just got a little safer for sharks, and conservationist, artist, and scientist Guy Harvey couldn't be more pleased.

Responding to this week's announcement from the Government of the Bahamas that it will prohibit all commercial shark fishing in its more than 240,000 square miles of territorial water, Dr. Harvey commented: "I am very impressed and pleased that the Government of the Bahamas has taken the necessary and correct step to further protect its marine resources from over-exploitation by both local and foreign interests. This new legislation complements the ban on commercial long line fishing enacted 20 years ago. The ban on commercial shark fishing and exportation by shark by-products is a huge step in the conservation of sharks worldwide."

Through the Bahamas National Trust, Dr. Harvey met with government officials last March to add his voice and influence as a highly respected conservationist to call for strict regulations to ban the commercial fishing of all sharks in The Bahamas — an archipelago of 700 islands sweeping across 500 miles of open ocean. The Bahamas is the fourth country to ban shark fishing after Honduras, the Maldives and Palau. Estimates are that more than 70 million sharks are killed annually around the world.

One of the premier shark-watching destinations for divers, reeling in \$800 million over the past 20 years for the Bahamian national economy, sharks, according to Dr. Harvey, were worth much more alive than dead.

"Many countries have seen their populations of sharks annihilated by commercial over-exploitation," said Dr. Harvey. "Research has shown that shark populations do not recover. In addition, the economic value of a living shark to eco-tourism is now widely accepted as a sustainable and non-consumptive use of a marine resource with many additional

benefits to respective island nations."

In related shark conservation activity, Dr. Harvey offered his artistic talent and foundation sponsorship funding in support of the recent Circle Hook Symposium held in Miami. The symposium, hosted by the National Oceanic and Atmospheric Administration (NOAA), is an international gathering of scientists, resource managers, and constituents convening to discuss the performance and use of circle hooks in commercial, recreational, and artisanal fisheries. While it is legal to use a J-hook to fish for sharks, experts such as Dr. Harvey recommend using a circle hook, where the barb points inward and not outward.

### Atocha sterncastle found

Divers in the Florida Keys have recovered a large emerald ring and two silver spoons believed to come from Nuestra Senora de Atocha, a shipwrecked Spanish galleon that has already yielded one of the greatest treasures ever recovered from the sea.

Employees of Mel Fisher's Treasure, the salvage company that has worked the shipwreck site since 1969, believe the latest haul signals they are close to finding the sterncastle, a key missing portion of the ship.

The sterncastle is where the clergy and elite were with their personal items.

The Atocha was headed back to Spain with a load of gold and silver from the New World when it sank and broke up in a hurricane not far from Key West in September 1622.

After a 16-year-search, Mel Fisher and his crew found the "mother lode" of the shipwreck in September 1985. They hauled up more than 40 tonnes of gold and silver, including more than 100,000 Spanish silver coins known as "Pieces of Eight," along with Colombian emeralds and other artifacts. The company estimated its worth at nearly \$500 million.

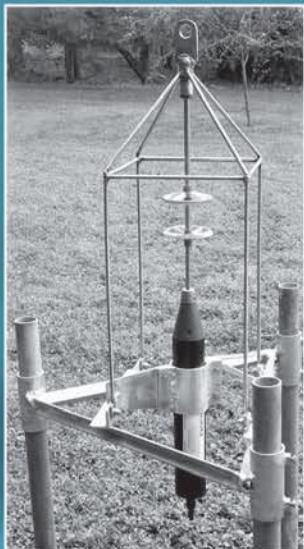
Since then, Sean Fisher, son of Mel Fisher, said the crew has made many other discoveries within a 10-mile (16-km) spread of the original site, and in a straight line.

He has a copy of the Atocha's manifest and going by it, he expects to find at least 100,000 coins, 400 silver bars and personal jewelry at the sterncastle location. However, there was a lot of smuggling so the clergy and nobility wouldn't have to pay the king's tax, and Fisher expects there will be many items around the sterncastle that are not on the manifest.

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MAVS-4DL	.	.	.	.	.	.	6000 m. Logging
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## Ocean Industry Briefs

### OCEANS '11 MTS/IEEE Kona — conference preview

OCEANS '11 will be held 19-22 September 2011 on Hawaii's Big Island at the Hilton Waikoloa Village on the Kohala Coast. The following is some summarized information on the event.

#### Honorary Co-Chairs are:

- Dr. Brian Taylor, Dean of the School of Ocean and Earth Science and Technology (SOEST) at the University of Hawaii.

- The Honorable Billy Kenoi, Mayor of the Big Island of Hawaii.

#### General Co-Chairs are:

- Dr. John Wiltshire, Director of the Hawaii Undersea Research Laboratory at the University of Hawaii at Manoa.
- Alan Hilton, Technical Director of the National Defense Center of Excellence for Research in Ocean Sciences (CEROS).

**Featured Speaker:** The Honorable Neil Abercrombie, Governor of Hawaii.

**Conference Theme:** Oceans of Opportunity: International Cooperation and Partnerships Across the Pacific.

#### Technical Program:

- more than 750 abstracts submitted.
- 94 abstracts from the International Symposium on Underwater Technology conference which had to be cancelled because of the earthquake and tsunami disaster in Japan.

#### Plenary Keynote Speakers:

- Dr. Marcia McNutt, Director, U.S. Geological Survey.
- Mike Utsler, Chief Operating Officer, BP Gulf Coast Restoration Organization (GCRO).
- Dr. Eddie Bernard, former Director NOAA Pacific Marine Environmental Laboratory.
- Professor Masanao Shinohara of the University of Tokyo and Dr. Yoshiyuki Kaneda of JAMSTEC.

#### Tutorials:

- Two full-day and seven half-day sessions are available on September 19th.
- A broad range of technical and business-oriented topics of interest to the oceans technology community are offered.
- Participants may be eligible for Continuing Education Certificates.

#### Workshops:

- Local (Near Field) Tsunami Detection, Assessment and Warning Guidance - "When Minutes Matter" with Donna Kocak, Eddie Bernard, Kenji Khirata, Rob Lawson, Andrew Clark, Thomas Helzel, Marie Eble, Chip McCreery.
- GEOSS Workshop XLII – Toward Global Ocean Observations with Francoise Pearlman.
- Partnerships across the Pacific: Ocean Technology Collaborations with Government, Academia and Industry with Michael J. Larkin.

#### Student Programs:

- Grant from Office of Naval Research supports 20 students to travel to conference for Student Poster Competition.

**Special Tour:** Attendees and guests can tour the nearby Natural Energy Laboratory of Hawaii Authority, an 870-acre state facility with commercial and noncommercial organizations exploring opportunities for alternative energy production, solar-based energy techniques, aquaculture, marine biotechnology.

**Registration:** Early-bird registration through August 1, 2011. For information on exhibiting at OCEANS '11 MTS/IEEE Kona, contact Exhibits Chair Ty Aldinger at [exhibit@oceans11mtsieekona.org](mailto:exhibit@oceans11mtsieekona.org).

The advertisement features the AK Industries logo on the left and the product name 'HydroVolt Underwater Electrical Connectors' on the right. It highlights the connector as the most rugged and reliable low-cost underwater electrical connector in the world.



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**USCG to use risk-based targeting to increase oversight of foreign mobile offshore drilling units on U.S. Outer Continental Shelf**

To complement its existing safety inspection regime for foreign-flagged vessels operating in U.S. waters, the U.S. Coast Guard announced an additional layer of risk-based safety oversight for mobile offshore drilling units (MODUS) as part of an on-going review of marine safety policies following the April 2010 Deepwater Horizon explosion, fire, and subsequent oil spill. Currently, U.S. and foreign-flagged MODUS operating in U.S. waters undergo annual examinations to verify compliance with domestic laws, regulations, and international conventions – ensuring that a vessel's major systems are in compliance and that crew training and performance, such as lifesaving and firefighting drills, meet all applicable standards.

**Kongsberg to supply Polaris simulators**

Tromsø Maritime School has selected Kongsberg Maritime to provide cutting-edge Polaris simulators for navigation and Dynamic Positioning (DP) training. The established Northern Norway training facility has ordered an extensive suite of new simulators following an open tender that saw leading simulator developer Kongsberg Maritime come out on top in terms of the proposed technical solution, customer service program and customer references. The scope of supply, which has been designed to enable Tromsø Maritime School to meet strict new Nautical Institute guidelines for DP operator training and certification includes a Polaris ship's bridge simulator (DNV class B); 3 x smaller Polaris ship's bridge simulators; 4 x KONGSBERG K-Pos DP Basic Trainers (limited-task simulators); and a DP 2 Advanced Trainer (multi-task simulators), which will be interfaced with the main Polaris ships bridge simulator for maneuvering and DP advanced training.

**USCG and EPA team up on vessel emissions**

The USCG and the U.S. Environmental Protection Agency (EPA) announced an agreement to jointly enforce U.S. and international air pollution requirements for vessels operating in U.S. waters. The requirements establish limits on nitrogen oxides (NOx) emissions and require the use of fuel with lower sulfur content, protecting people's health and the environment by reducing ozone-producing pollution, which can cause smog and aggravate asthma. The most stringent requirements apply to ships operating within 200 nautical miles of the coast of North America. The large marine diesel engines that provide propulsion and auxiliary power on many ocean-going vessels emit significant amounts of pollution. Without further action, EPA estimates that by 2030, NOx emissions from ships will more than double, growing to 2.1 million tons per year. The Memorandum of Understanding signed by the EPA and USCG outlines the agencies' commitment to jointly enforce federal and international laws that the EPA projects could prevent 12,000 to 31,000 premature deaths annually by 2030. Under the MOU, both the USCG and EPA will perform inspections and investigations and will take appropriate enforcement actions if a violation is detected.

## Universal box cooler anti-fouling system

Cathelco has developed a new "universal" box cooler anti-fouling system in collaboration with Blokland Non-Ferro, the Dutch manufacturers of box coolers.

The purpose of the seawater pipework anti-fouling system is to eliminate the growth of barnacle and mussel bio-fouling in box coolers, which can impair the efficiency of the heat transfer process.

The advantage of the "universal" design is that the anti-fouling anode can be installed in a number of different ways to suit the requirements of various box coolers.

In the case of Blokland supplied units, the anode can be suspended beneath the box cooler tubes on an integral framework. This method means that the box cooler and anti-fouling system are supplied as a complete assembly and, therefore, no fabrication work is required by the yard, which simplifies the installation process.

"One of the advantages of the integral design is that Blokland engineers will replace the anode when the vessel drydocks for scheduled maintenance after a period of either 3 or 5 years," said Garry Churm of Cathelco's technical department.

Alternatively, to cater for the requirements of other types of box coolers, the anode can be bracket mounted on the seachest, which makes the design completely universal in its range of applications.

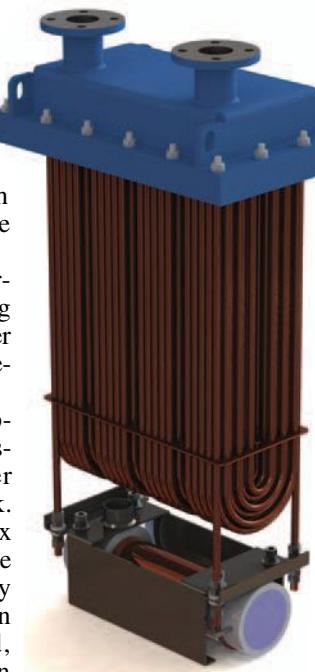
The Cathelco anti-fouling unit consists of a copper anode that is wired to a control panel. In operation, the anode produces ions that prevent barnacle and mussel larvae from settling and breeding in the box cooler, eliminating the formation of marine growth that prevents heat transfer.

As the "universal" unit is mounted directly beneath the box cooler, the ions are distributed evenly along the length of the tubes for greater effectiveness. The unit also incorporates cathode plates which ensure an even wear pattern on the anode to maximize its longevity.

One of the most recent vessels to be installed with the new anti-fouling unit is an RST-25 tanker which is being built at the Nobel Brothers Shipyard at Rybinsk in the Yaroslavl region of Russia.

The system will protect five box coolers on the 6,600 ton deadweight tanker, which is the first of a series of river-sea vessels to be constructed for the Moscow River Shipping Company for the transport of crude oil and oil products.

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



## Seeds lead to anti-fouling solution

Scientists from the Biomimetics-Innovation-Centre have developed a new anti-fouling surface based on a seed from a species of palm tree. "These plants have seeds which are dispersed by the ocean currents. As it is an advantage for these seeds to remain free of fouling to allow them to disperse further, we guessed they might have specialized surfaces we could mimic," said Katrin Mühlenbruch, a Ph.D. researcher who presented this work at the Society for Experimental Biology Annual Conference in Glasgow on 4 July 2011.

The researchers floated seeds from 50 species in the North Sea for 12 weeks. The seeds of 12 species showed no fouling at all. "We then began by examining the micro-structure of the seeds' surfaces, to see if we could translate them into an artificial surface. The seeds we chose to mimic had a hairy-like structure," says Mühlenbruch. "This structure might be especially good at preventing fouling because the fibers constantly move, preventing marine organisms from finding a place to settle."

Using a silicone base, the scientists created an artificial surface similar to the seeds, with fibers covering the surface. Currently, the new surface is being trailed by floating it in the sea.

Fouling by seaweeds and marine animals is a problem for the shipping industry, resulting in increased fuel costs. Currently, the only solutions are highly toxic and environmentally damaging marine paints that are specifically designed to leach biocides to prevent organisms from settling on the hull.

Future work will include analyzing the chemical composition of the seeds' surface to find out whether this adds to their anti-fouling properties.

## Austal awarded first Wind Express OSVs

Following the launch of Austal's Wind Express series in mid-2010, Austal is pleased to announce the award of a contract for the design and construction of three purpose-built 21 meter offshore support vessels (OSVs) for Turbine Transfers Limited, based in Holyhead, United Kingdom.

The Austal-built OSV catamarans will be used to transport service crews and equipment to the many offshore windfarms that are located off the coastlines of several European countries. Turbine Transfers is a well-established fleet owner that has been supporting windfarm owners and operators for a number of years. The company currently



owns and operates a fleet of 18 vessels. The Austal-built OSVs will be the first that Turbine Transfers has commissioned outside the United Kingdom.

Austal has adopted an advanced fine entry chine hull form that, in association with a high tunnel height, will enable the vessels to operate at speeds of up to 30 knots with targeted seakeeping ability in up to 2 meters significant wave height.

Due for delivery in May 2012, the vessels will be built at Austal's Henderson shipyard.

### Vessel Specifications

- Length overall: 21.30m
- Length waterline: 18.40m
- Beam (molded): 7.30m
- Hull depth (molded): 3.50m
- Hull draft (approx): 1.40m
- Crew: 3
- Wind Farm Personnel: 12
- Maximum Deadweight: 12.5 tonnes
- Main engines: 2 x MTU 10V 2000 M72
- Propulsion: 2 x Waterjets Rolls Royce 45 A3
- Speed: 30 knots at 100% MCR

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

## Heavy lift operator, Jumbo, expands fleet with new vessel

An agreement has been signed with the Brodosplit shipyard in Split, Croatia, for the construction of a top segment heavy lift vessel. The construction of this new generation vessel confirms Jumbo's position as market leader in heavy lift shipping.

The new vessel will have a length of 152.60m and a beam of 27.40m and is equipped with 2 x 1.100mt cranes (at 27.5m outreach). In tandem, the cranes can lift up to 2.200mt; this makes it the strongest heavy lift vessel in the world. To be able to work in Arctic regions, the vessel is to be built under ice class. For offshore operations, the vessel will be prepared for future DP2 installation.

Estimated delivery date of the new vessel is March 2013 and the vessel will be operational in June 2013. Jumbo also has an option for a second vessel at the shipyard in Split.

By this fleet expansion, Jumbo will serve her customers with a versatile fleet of 13 (optional 14) heavy lift vessels with lifting capacity in the range of 500t to 2.200t.

For more information, visit [www.jumboshipping.nl](http://www.jumboshipping.nl).

## Guidance for Annual DP Trials for DP Vessels

*Guidance for Developing and Conducting Annual DP Trials Programmes for DP Vessels* (IMCA M 190) has been published by the International Marine Contractors Association (IMCA) to describe the development, conduct, and management of annual dynamically positioned (DP) trials programmes for all types of vessels equipped with DP systems meeting the requirements of International Maritime Organization (IMO) Equipment Classes 1, 2, or 3.

"The guidance is intended to assist vessel operators in the development of a suitable annual DP trials programme," explains IMCA's Technical Director, Jane Bugler. "This programme provides consistent content for similar vessels, more effectively demonstrates the vessel's ability to maintain position following identified single failures, demonstrates that the DP system is in good working order, contributes to the effective management of the failure modes and effects analysis (FMEA), and ensures best use of the time available for DP system tests by more effectively identifying items which do not need to be tested every year, or whose reliability can be demonstrated by other means."

Sister publication, IMCA M 191 *Guidelines for Annual DP Trials for DP Mobile Offshore Drilling Units*, sets out a programme of continuous trials throughout the year. However, much of the guidance produced in the new document (IMCA M190) will also be applicable to mobile offshore drilling units.

## Hyundai Heavy Industries contract WGP Ltd consultancy services

WGP Ltd announces an engineering and consultancy contract pertaining specifically to marine seismic systems with Hyundai Heavy Industries (HHI), the world's largest shipbuilder.

HII has been contracted by the Geological Survey of India (GSI) to build a high specification, multi-role function oceanographic research vessel to include advanced seismic exploration capabilities. To ensure the vessel will meet the client's requirements, WGP has been contracted to advise on optimum specification, layout, tendering and installation of the seismic equipment.

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

## Improving CTD Data from Gliders by Optimizing Sample Rate and Flow Past Sensors

By Carol D. Janzen, Ph.D., Sea-Bird Electronics, Inc., Bellevue, Washington

Free-flushed CTD (conductivity-temperature-depth profiler) installations currently deployed on gliders are being replaced in favor of a modular, low-powered, and flow-controlled CTD configuration. There are several practical and scientific advantages motivating this change.

The practical advantages are improvements in ease of use, including installation, data acquisition, and data handling. The self-contained CTD module allows glider manufacturers and operators to exchange CTDs without opening the pressure hull of the glider. Internal memory in the CTD module allows self-recording of a constant sample-rate time series, a feature not always possible on the free-flushed Glider CTD installations that rely on the glider data acquisition system for logging data. Flexible sampling choices provide a variety of options to conserve power while achieving competent data, from constant sampling at a fixed rate of up to 1Hz while pumping continuously down to "spot sampling" with intermittent pumping. Data handling is simplified because data can be uploaded directly from the CTD in engineering units at the end of a dive or mission, and, if required, consistent, routine data processing protocols can be easily implemented over an entire data set.

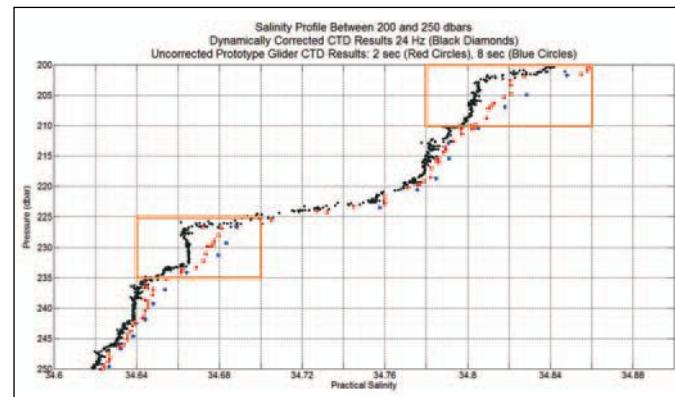
Data quality improvements also are motivating the switch from free-flushed CTDs to flow-controlled modular CTDs. Accurate computation of core physical parameters, such as salinity and density, requires knowledge of the temperature (T) and conductivity (C) sensor response times and the ability to temporally align their responses. The drawback with free-flushing CTDs comes to bear because conductivity sensors have a response-time dependence on the water volume flow rate through the sensor and also experience a temporal lag in response while traversing temperature gradients due to heat stored in the sensor materials. The latter causes a cell thermal mass error in conductivity values and subsequent derived parameters (e.g., salinity). Having a steady flow through the conductivity cell is desirable because T-C responses are known and can be matched, and the amplitude and lag period of the cell thermal mass error can be quantified and corrected for in the data. A constant sample rate time series is also critical to implementing effective T-C alignment and cell thermal mass corrections.

The flow-controlled modular CTD, therefore, improves data quality and also simplifies data processing and analysis. More accurate data are achieved directly by matching T-C sensor response and reducing cell thermal mass errors. Removing heat trapping materials from around the C sensor on the modular CTD improves external flushing, further reducing cell thermal mass errors in raw conductivity data. In-line, ducted, and pumped T-C sensors guarantee the same water parcel is sampled by the T-C sensors (and dissolved oxygen if installed), a requirement for temporal T-C measurement alignment and accurate salinity computation. Using the flow-controlled CTD results in quantifiable and consistent T-C responses and allows simple and consistent T-C measurement alignment and conduc-

tivity cell thermal mass corrections to be made if desired. In contrast, free-flushed, un-ducted T-C configurations cannot assure that the water measured by the thermistor will be the same water that enters the conductivity sensor. Furthermore, they rely solely on glider movement to provide water flow past the T-C sensors. Glider speeds can vary widely on a given dive, causing free-flushed CTDs to experience variable flow rates, resulting in variable T-C responses that are much more difficult to correct for in the data.

To demonstrate the performance of two different sampling schemes available on the modular Glider CTD, salinity profiles made with two prototype flow-controlled Glider CTDs are compared to a side-by-side profile made with a standard 24Hz CTD (SBE 9plus). One prototype Glider CTD was configured to continuously pump water past the in-line, ducted T-C sensors at a constant rate of 10ml/s, while sampling at 0.5Hz (every 2 seconds). The other was programmed to run the pump for 2 seconds, make a measurement, then turn off the pump until the next sample at a rate of 0.125Hz (every 8 seconds). All three CTDs were deployed together on a frame and lowered through the water column at about 50cm/s. The T-C data from the 24 Hz CTD were temporally aligned and thermal mass corrected to produce an accurate salinity profile for comparison with the prototype Glider CTD salinity profiles.

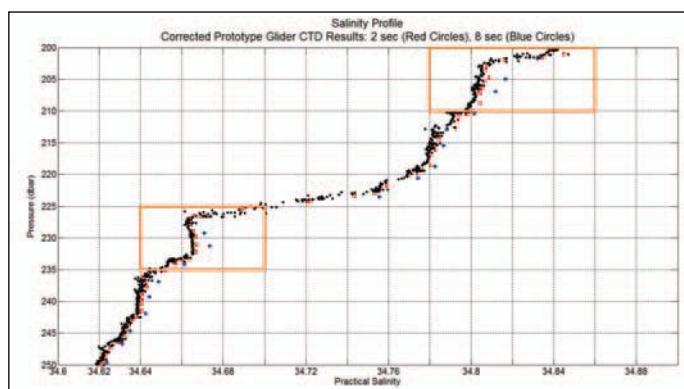
**Figure 1** shows that the 0.5Hz prototype Glider CTD data (Red Circles) better resolves the salinity features observed by the 24Hz CTD (Black Diamonds), as compared to the 0.125Hz prototype Glider CTD. However, both prototype Glider CTD salinity profiles show discrepancies from the dynamically corrected 24Hz CTD profile in regions with steeper salinity gradients (regions shown in the orange boxes between 200-210 dbar and 225-235 dbar).



**Figure 1** A salinity profile between 200-250 dbar from three co-deployed CTDs. Black Diamonds show dynamically corrected SBE 9plus computed salinity data. Red Circles and Blue Circles show the uncorrected computed salinity profiles made using data from the 0.5Hz ( $dt=2$  sec) and the 0.125Hz ( $dt=8$  sec) prototype Glider CTDs, respectively. Orange boxed sections show regions where dynamic corrections are required.

## Monitoring Instrumentation

**Figure 2** shows dynamic corrections made to the prototype Glider data for T-C alignment and cell thermal mass significantly reduce the computed salinity errors observed in **Figure 1**. These corrections are possible because of the fixed flow rate past the sensors and the fixed sample rate of both CTDs. Once aligned and cell thermal mass corrected, the salinity profile from the continuously pumped 2-second prototype Glider CTD agrees closely with the profile from the 24Hz CTD. Despite having the same dynamic corrections applied to both Glider T-C outputs, the improvements on the 8-second prototype Glider salinity data are clearly less successful. The sample rate and discontinuous pumping are a factor in this example. The 8-second sample rate was too coarse to resolve small temporal misalignments between T-C response times and may have been too close to the time scale of the conductivity cell thermal mass lag (~10 seconds at a constant flow of 10ml/s) to make the cell thermal mass corrections effective. Discontinuous pumping while moving through a thermally stratified region may have also induced variations in the cell thermal mass amplitude and time lags, resulting in less reliable corrections.



**Figure 2** Same salinity profiles as shown in **Figure 1**, but here, the prototype Glider CTD data have been corrected for T-C temporal alignment and cell thermal mass. Note how the slower sampled (8 second) Glider CTD salinity (Blue Circles) still shows large discrepancies from the 24Hz CTD values, despite having the same corrections as those made on the 2 second Glider CTD (Red Circles). This is largely due to undersampling in time and in part due to discontinuous pumping.

New features available on the modular Glider CTD will produce more accurate CTD data while offering more flexibility in sampling protocols, making instrument and data handling much easier and more efficient for the glider operator. The choices - continuous versus discontinuous pumping, as well as fast versus slow sample rate - should be based on the deployment environment, desired salinity accuracy, spatial resolution requirements, and power considerations for a given glider mission.

*Carol Janzen, Ph.D. (cjanzen@seabird.com) is a Physical Oceanographer at Sea-Bird Electronics. She has worked as a coastal observational oceanographer for over 25 years in private consulting, state government, and academia, and has extensive experience collecting and analyzing observational data from multiple ocean-going platforms and instrumentation packages. At Sea-Bird, she assists in R&D efforts characterizing sensor response and calibration as well as evaluating instrumentation and sensor performance in the field. She also serves as a science-liaison for the company and travels internationally to teach courses on oceanographic CTD principals of operation, sources of error and methods for correction. Current interests include freshwater applications of sensor technologies, and evaluating data accuracy requirements for monitoring climate change and ocean and coastal circulation models.*

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### **Study shows small-scale fisheries impact on marine life**

Fishing is a growing industry in Peru, and the country is now home to more than 100 ports, nearly 10,000 fishing vessels, and 37,000 people working in fisheries. The industry provides an increasingly important role as an employer in Peru. The research team suggests that changes to fishing practices, such as introducing circle hooks and dehookers to line fishing and using net illumination, could help reduce sea turtle bycatch. "Bycatch" is the term used to describe fish or other sea animals being caught unintentionally by fisheries and is usually associated with large-scale industrial fishing, such as trawling and longlining. Focusing on fisheries in Peru, the study suggests that thousands of sea turtles originating from nesting beaches as far away as Australia, Costa Rica, Mexico and the Galapagos are likely to be captured each year as bycatch while they forage in Peru's waters. This research was funded through Defra's Darwin Initiative and the U.S. National Marine Fisheries Service.

### **Strong El Niño could bring increased sea levels, storm surges to U.S. East Coast**

Coastal communities along the U.S. East Coast may be at risk to higher sea levels accompanied by more destructive storm surges in future El Niño years, according to a new study by NOAA. The study was prompted by an unusual number of destructive storm surges along the East Coast during the 2009 to 2010 El Niño winter. The study, led by Bill Sweet, Ph.D. from NOAA's Center for Operational Oceanographic Products and Services, examined water levels and storm surge events during the 'cool season' of October to April for the past five decades at four sites representative of much of the East Coast: Boston, MA; Atlantic City, NJ; Norfolk, VA; and Charleston, SC. From 1961 to 2010, it was found that in strong El Niño years, these coastal areas experienced nearly three times the average number of storm surge events (defined as those of one foot or greater). The research also found that waters in those areas saw a third-of-a-foot elevation in mean sea level above predicted conditions.

### **Life in 'Inner Space': Joint Mission to Film Marine Life Three Kilometers Down**

Undiscovered 'alien' life forms that thrive without sunlight in temperatures approaching boiling point may soon come to light thanks to a groundbreaking Irish-led marine research mission aboard the national research vessel RV CELTIC EXPLORER. In collaboration with scientists from the UK's National Oceanography Centre, the researchers set sail from Galway for the mid-Atlantic Ridge July 13. The voyage is being filmed for the National Geographic Channel for inclusion in an upcoming series about the ocean. The mission, led by Dr. Andy Wheeler of University College, Cork (UCC), will be investigating life at 3,000m below the surface of the sea on the 45° North MAR hydrothermal vent field using the remotely operated vehicle (ROV) Holland 1. These vents, which spew mineral rich seawater heated to boiling point by volcanic material in Earth's crust below, are home to a rich variety of marine life that thrives in complete darkness on bacteria fed by chemicals.

## **Right Whale - Fighting Back From Extinction**

Researchers at Oregon State University and the University of Auckland have determined through DNA fingerprinting that southern right whales are now migrating once again from sub-Antarctic islands to their ancestral calving grounds on the mainland of New Zealand. (Photo by Auckland Islands Team 2009, courtesy of Oregon State University)



After being hunted to local extinction more than a century ago and unable to remember their ancestral calving grounds, the southern right whales of mainland New Zealand are coming home.

A new study recently published has shown for the first time that whales from a small surviving population around remote, sub-Antarctic islands have found their way back to the New Zealand mainland.

Before the onslaught of 19th century whaling, historical records suggest that up to 30,000 of these impressive whales once migrated each winter to New Zealand's many sandy, well-protected bays to give birth and raise their calves. As a particularly social and acrobatic species, they could be seen from shore as they frolicked, slapped their tails, and breached almost entirely out of the water.

And now they're coming back, according to researchers from Oregon State University, the University of Auckland, and other institutions. The findings were just published in *Marine Ecology Progress Series*.

Because of their playful behavior and inclination to swim close to shore, Baker said, southern right whales have become a major tourist attraction in Argentina and South Africa, where their population has increased more rapidly.

The right whales – three species are now recognized – earned their names from the dubious distinction of being the "right" species to kill. They could be hunted from small boats launched from shore, they couldn't flee rapidly from approaching boats, and they floated when killed because of their large stores of blubber. The same characteristics that made them an ecological marvel also caused them to be sought by hunters.

A large baleen whale, adult right whales can reach up to 60-ft in length and weigh up to 100 tons. Even calves weigh a ton, and right whales are thought to live for 70 years or more.

Hunting of right whales peaked in New Zealand and Australia in the 1830s and 1840s, the researchers noted in their report, and small remaining populations were further depleted by illegal hunting by the Soviet Union in the early 1960s. None were seen around mainland New Zealand for decades during the 20th century.

A small population of this species survived, however, near the Auckland and Campbell Islands south of New Zealand in sub-Antarctic waters and lately, a few right whales have started finding their way back home. By 2005, there were estimates of fewer than a dozen reproductive females sighted near the mainland. And while there are still only a few dozen, the new study showed that some of them definitely are coming from the sub-Antarctic islands.

## NOAA, BOEMRE and USFWS advance nation's largest survey of marine protected species

The nation's largest survey of protected marine species is now underway for its second year along the East Coast, officials from the National Oceanic and Atmospheric Administration (NOAA), the Department of the Interior's Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE), and the U.S. Fish and Wildlife Service (USFWS) announced.

Aboard the NOAA ships HENRY B. BIGELOW and GORDON GUNTER, researchers are documenting animals in deeper waters beyond the edge of the continental shelf, with the BIGELOW off the northeastern U.S. and the GUNTER off the southeastern U.S. During July and August, NOAA aircraft will carry observers surveying for animals in the shallower waters on the shelf all along the East Coast, and USFWS aircraft will survey for seabirds during August from Maine to Florida.

The expeditions are part of the Atlantic Marine Assessment Program for

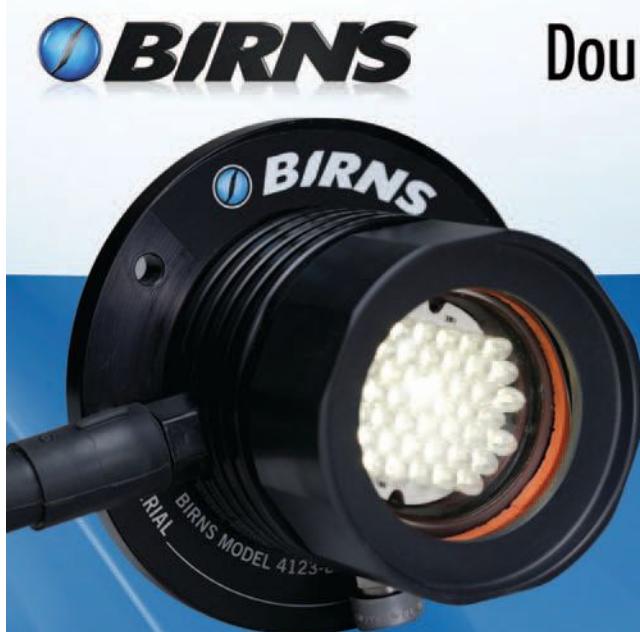
Protected Species (AMAPPS), a joint multi-year study involving NOAA's Fisheries Service, BOEMRE, and USFWS. Under an interagency agreement, NOAA and BOEMRE will assign scientists to this summer's and future expeditions and BOEMRE will provide \$7.6 million for the study, which runs from 2010 until 2014.

Comprehensive surveys of this type are rare, partly because it is difficult to collect the data. These surveys will allow scientists to not only better estimate the abundance of marine mammals, sea turtles, and sea birds in U.S. Atlantic waters, but also to investigate how the animals' distribution and abundance relate to the physical and biological ecosystem.

The study will help NOAA's Fisheries Service manage, conserve and protect living marine resources within the United States Exclusive Economic Zone (EEZ), waters 3 to 200 miles offshore. The study also will help inform BOEMRE's decision-making process for future energy development. Finally, this partnership will give USFWS much better scientific information about seabird populations, so that the agency can more clearly define the needs of these species and make better management decisions.

The project will also test new remote sensing technologies that increasingly make it easier to gather data. Some of the technologies include underwater recorders that capture sounds animals make, pattern recognition software that helps scientists identify species by their outer markings, tags attached to animals that transmit information about their locations and ocean conditions when they surface, and underwater robots outfitted with a variety of sensors.

Researchers will also develop models and other tools to translate the survey data into estimates linked to time, space, and habitat. Models using acoustics data are already in development, with first results expected in 2012. These tools will help to decide how best to use and protect the ocean. Eventually, the data will be incorporated into a comprehensive geospatial database and made available online to both public users and government agencies. For



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example, the U.S. Navy will be able to use these new data in support of its marine stewardship goals on its at-sea test and training ranges.

In addition to the surveys currently underway, AMAPPS research in 2011 has included harbor seal tagging this spring in Massachusetts and Maine, followed by an aerial seal survey along the New England coast during peak pupping season in late May and June. In addition, a loggerhead turtle-tagging and biological sampling cruise was just completed ahead of schedule this month aboard two New Jersey commercial scallop vessels. Researchers put satellite tags on 25 juvenile loggerhead turtles, adding to the 44 tagged last year by scientists from both NOAA's Northeast and Southeast Fisheries Science Centers.

For more information about the BOEMRE Environmental Studies Program, visit [www.boemre.gov/eppd/sciences/esp/index.htm](http://www.boemre.gov/eppd/sciences/esp/index.htm).

## More monitoring on the Mediterranean Sea

Researchers in the Balearic Islands and beyond will soon gain a better understanding of the environmental conditions in the Western Mediterranean Sea due to a recent contract award to SIDMAR, who represents AXYS Technologies Inc. (AXYS) Marine Systems products in Spain.

The contract award comprises a variety of monitoring equipment, including buoys, ROVs, and gliders, as well as service and maintenance efforts. AXYS will supply two 1.8m WatchMate™ data buoys. These new monitoring platforms will be deployed in 40m and 800m of water, respectively, and will capture a wide variety of data parameters, including winds, barometric pressure, temperature, waves, currents, conductivity and temperature (CTD), and dissolved oxygen, to name a few.

Sub-surface sensors will be deployed along a mooring line and will transmit data via acoustic modem up to the WatchMate buoy. The buoys will transmit all collected data each hour via two types of telemetry: GSM for the nearshore buoy and Iridium satellite for the offshore buoy. The buoys will be outfitted with secondary telemetry devices, and all data will be logged onboard for time series and historical studies.

Data will be received and displayed by researchers at SOCIB, a Coastal Ocean and Observing and Forecasting System located in the Balearic Islands. SOCIB is a

multi-platform distributed and integrated system that will provide streams of oceanographic data and modeling services to support operational oceanography in a European and international framework, ultimately contributing to the needs of marine and coastal research in a global change context.

The WatchMate™ buoys will be delivered and deployed this fall.

For more information, visit [www.axystechnologies.com](http://www.axystechnologies.com) or [www.sidmar.es/en/](http://www.sidmar.es/en/).

## Teledyne Webb Research awarded Open Ocean glider contract for Ocean Observatories Initiative

Teledyne Webb Research announced that it has been selected to provide Open Ocean gliders for the Ocean Observatories Initiative (OOI). This award follows closely on the recent award to Teledyne Webb Research of the Coastal Glider program for the OOI. The Open Ocean Slocum G2 gliders will support the high-latitude Global Arrays of the OOI. Similar to the Coastal Glider program, this second contract also includes a prototype vehicle to be delivered this year that will incorporate the specific sensor requirements of the Open Ocean program. Production units will be delivered beginning in September 2012. The initial contract also includes an option to purchase up to 24 Open Ocean gliders. Teledyne Webb Research was chosen by the Consortium for Ocean Leadership and the Woods Hole Oceanographic Institute (WHOI) to provide the gliders for this project that is funded by the National Science Foundation (NSF).

The Slocum G2 gliders are designed for long deployment endurance with the ability to maneuver and operate where the total water depth is up to 1,000 meters. The uniquely modular vehicle construction facilitates both swappable payload bays for a multitude of integrated sensor suites and optimized buoyancy control for various depth regimes. The high latitude ocean, where the gliders will operate, plays an important role in ocean dynamics, especially during climate variability and change. This area of the ocean has been sampled sparsely, and the information provided by the gliders will improve scientists' understanding of the physics, chemistry, and biology of the ocean in the high-latitude regions.

"The Teledyne Webb Research team is excited to provide both the Open Ocean and Coastal Gliders for the OOI. The



Slocum glider has proved itself as a robust system for both shallow and deepwater applications. With the OOI and U.S. Navy Littoral Battlespace – Glider programs anchoring our continued sales of the commercial Slocum glider worldwide, we anticipate more than 500 Teledyne Webb Gliders operating globally by 2015," said Thomas Altshuler, general manager of Teledyne Webb Research.

The OOI is a multi-scale observatory that will utilize a network of sensor systems to collect physical, chemical, geological, and biological data from the ocean and the seafloor on coastal, regional, and global scales. A unique cyber-infrastructure will make the data available to anyone with an Internet connection. The information will increase understanding of climate change, ocean and coastal ecosystems, environmental health and climate, and biodiversity.

For more information visit [www.teledyne.com](http://www.teledyne.com) or the Ocean Observatories Initiative at [www.oceanleadership.org/programs-and-partnerships/ocean-observing/](http://www.oceanleadership.org/programs-and-partnerships/ocean-observing/).

## Green turtles lead the way in Mnemba Island conservation coups

Breaking previous records, the staff at &Beyond's Mnemba Island has discovered 39 endangered green turtle nests in 2011. A mere 10 miles in circumference, Mnemba Island is not only the epitome of understated luxury, but also home to a number of conservation coups that have had a profound impact on three specific animal species — green sea turtles, Zanzibari suni (native deer species), and Ader's duikers (the rarest antelope species in Africa).

"&Beyond Mnemba Island Lodge is the only marine lodge in the company's portfolio and one of the smallest in terms of guest numbers. By contrast, the benefits of its conservation measures and successes are substantial — and far-reaching," says &Beyond's group conservation manager, Les Carlisle.

Mnemba is one of only two protected nesting sites in Zanzibar for the endangered green turtle. Last year, teams recorded 45 nests and supervised the hatching of approximately 3,150 baby turtles.

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



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# Autonomy in the Extremes

By Edison Hudson, iRobot Corporation Maritime Systems

Autonomous underwater gliders have come a long way in the past decade, maturing into reliable tools for research and oceanographic monitoring. Since the first commercial glider was sold in the mid-1990s, about 500 systems have been built and used in oceanographic research. In the early years, most gliders were used close to shore or in relatively benign environments. In recent years, the robust nature of these underwater robots has gone far beyond the docile to tackle some of the harshest ocean environments.



*Seaglider in frozen estuary poking through the ice to send its data*

For example, beginning around 2005, the Applied Physics Laboratory of the University of Washington has explored the ice-covered regions of the Arctic. Professor Craig Lee's team annually deploys Seagliders in the Davis Straits up to 70°N, operating under ice using RAFOS beacon navigation for 4 to 6 months on a single mission. The Seaglider searches for openings in the ice flows and transmits its data whenever there is an opportunity or stores the data until it reaches the edge of the ice shelf.

## Seaglider at the Poles – going under the ice for months

Gliders more recently have been used to research phenomena at the South Pole as well. A mission to the Ross Sea in December 2010 to gather data on unusual algal blooms was conducted last December by a science team, including Dr. Vernon Asper and colleagues from the University of Southern Mississippi, the University of Washington in Seattle,

Old Dominion University in Norfolk, Virginia, the Virginia Institute of Marine Sciences, and the U.K.'s University of East Anglia. Professor Karen Heywood's team from the University of East Anglia is planning another mission to the Antarctic Ross Sea area to use its Seagliders equipped with a new type of echosounder to study krill mass, an important part of the ocean food chain.



*USM, UW, UEA, and Old Dominion University teams preparing for Ross Sea Launch in December 2010*

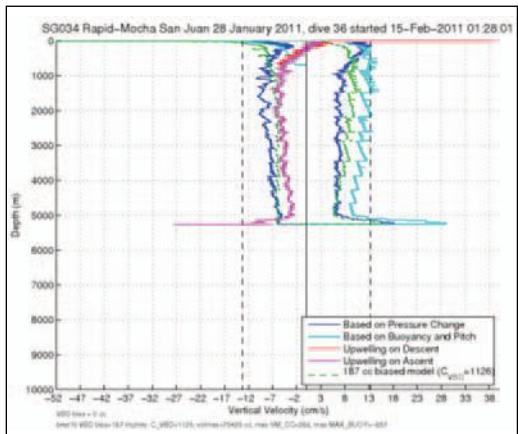
Dr. Asper's USM team perhaps needed an Antarctic mission to cool off from their extreme summer of 2010 project in the steaming heat of the Gulf of Mexico, next door to the burning Deep Water Horizon site. There, in conjunction with iRobot, Dr. Asper directed only a mission beginning a few weeks after the DWH platform sank for over two months until two weeks after the well was capped. In this mission, Seagliders were used to measure impacts from the oil spilling, including crude presence, oxygen levels, turbidity, and other physical parameters.

Ocean gliders have set some extreme records recently, including crossing the Atlantic Ocean, and other missions covering thousands of kilometers while on a nearly 10-month mission. Autonomous gliders were originally confined to the first 200 meters of depth, but systems such as the iRobot Seaglider have now accumulated more than several decades of cumulative experience operating to depths of 1,000 meters. Recently, Professor Charlie Eriksen of the University of Washington's Department



*After the mission - tail and antenna of Seaglider after spending two months gathering data next door to the Deep Water Horizon site*

of Oceanography has been testing a next generation of Seaglider that has successfully operated to a depth of 6,000 meters, showing how robot gliders will soon be able to go the depths of nearly 98% of all the world's oceans.



*Data from DeepGlider testing to 6,000 meters*

From the poles to the equator, from surface to the abysmal depths, robot gliders can operate for months on end gathering huge quantities of data about previously unexplored ocean phenomena in remote and harsh environments. New sensor developments are increasing the breadth of data types that can be gathered autonomously, ranging from advanced acoustics to 3D current mapping and in situ chemistry. Gliders are rapidly becoming the global tool for ocean research and are opening the door to commercial and military applications anywhere.

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**DOE releases wind power market report**

On 12 July DOE released a market report that illustrates growth and deployment in wind power. The 2010 Wind Technologies Market Report, produced by DOE's Lawrence Berkeley National Laboratory (LBNL), analyzes trends in wind power capacity, manufacturing, performance, and costs. Wind energy installations comprised 25% of new U.S. electricity capacity additions in 2010, representing \$11 billion in new investments, LBNL's report said. The newest wind installations created enough new capacity to power roughly 1.3 million homes. The report also notes that U.S. manufacturing of wind turbine components continues to increase, with domestically produced goods used in U.S. wind power projects reaching approximately 68% in 2009 to 2010, up from 52% in 2005 to 2006.

**BOEMRE analyzing proposed wind energy areas offshore NJ, DE, MD, and VA**

As part of Secretary of the Interior Ken Salazar's "Smart from the Start" initiative for Atlantic offshore wind development, the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) announced it is seeking public comment on a draft Environmental Assessment (EA) that considers potential environmental and socioeconomic effects of issuing renewable energy leases in designated Wind Energy Areas (WEAs) offshore New Jersey, Delaware, Maryland, and Virginia. The draft EA also considers potential environmental impacts associated with site assessment activities such as the installation and operation of meteorological towers and buoys on leases that may be issued in these areas. This draft EA is part of the "Smart from the Start" initiative being led by Deputy Secretary David J. Hayes and Director Bromwich to facilitate efficient and environmentally responsible development of renewable energy resources on the Atlantic OCS. The initiative includes the identification of areas on the OCS that appear to be suitable for renewable energy development where BOEMRE will focus its leasing efforts. Any leases ultimately issued will not authorize construction or operations; instead, specific proposed projects will be the subject of subsequent environmental review and analysis with additional opportunities for public comment. BOEMRE identified the WEAs offshore the mid-Atlantic states in consultation with other federal agencies and BOEMRE's state renewable energy task forces. In February, BOEMRE announced these areas in a Notice of Intent (NOI).

**DOE awards nearly \$7.5 Million to develop next generation wind turbines**

DOE announced on 28 June that six projects in four states — California, Colorado, Florida, and New York — have been selected to receive nearly \$7.5 million over two years to advance next-generation designs for wind turbine drivetrains. Drivetrains, which include a turbine's gearbox and generator, are at the heart of the turbine and are responsible for producing electricity from the rotation of the blades. The advances in drivetrain technologies and configurations supported through these research and development projects will help the United States maintain its position as a global leader in wind energy technologies. The projects will also help promote and accelerate the deployment of advanced turbines for U.S. offshore wind energy. These early research and development projects will focus on reducing the cost of wind energy by increasing component reliability or redesigning drivetrains to eliminate the need for some components altogether. Some funded projects will work to increase the amount of energy drivetrains can produce or help develop drivetrain designs that minimize the use of rare earth materials.

**OPT's PB 150 Outperforms in Sea Tests**

Ocean Power Technologies, Inc. (Nasdaq: OPTT) ("OPT" or the "Company"), a leading wave energy technology company, announced that the first of its new generation utility-scale PowerBuoy® device, the PB150, has delivered better-than-expected initial results from tests being conducted off the northeast coast of Scotland.

Rated at 150 kilowatts, this device was designed and developed by OPT to work in arrays of multiple PowerBuoys to generate renewable energy at commercial-scale wave power stations worldwide. It was deployed on 15 April 2011 for ocean trials at a site approximately 33 nautical miles from Invergordon, Scotland. The trials are expected to continue for an additional one to two months.

Wave conditions encountered have included storm waves, and electrical power generated by the PB150 has included peaks of over 400 kilowatts. Average electrical power of 45 kilowatts was generated at wave heights as low as 2 meters. These levels of power exceeded OPT's expectations of performance for this first PB150 deployment and verified that the system could produce up to 150 kilowatts on average, in higher wave conditions.

Onboard equipment replicates grid-connection conditions to ensure the PowerBuoy's electrical systems are subjected to full operational testing for utility applications. The power take-off system's performance has exceeded expectations with respect to its energy conversion efficiency in the irregular ocean wave conditions encountered. The device is transmitting data in real-time for analysis by OPT's engineers in both the United Kingdom and the United States.

A wave data buoy located near the site provides detailed information regarding incoming waves. Using that information, OPT's engineers calculate the power levels that should be

## Ocean Energy

achieved by the PB150 and analyze these against actual power generation. The result of this process confirms the Company's ability to accurately predict the PowerBuoy's performance in varying wave conditions. The PB150 is performing in a wide range of sea conditions as OPT's engineers have allowed the PowerBuoy to function freely in the incident sea and weather conditions. Functional and operational analysis has confirmed that the PB150 has met or exceeded all expected system performance. Since deployment, the PB150 has remained on site and has produced power in accordance with plan. Future planned maintenance can be performed in situ without relocating the PB150, which serves to reduce operating costs and reflects cost economies that result from the Company's experience of nearly 15 years in marine energy operations and related infrastructure.

The PB150 PowerBuoy was deployed using local maritime industry resources. During the ocean testing, periodic inspections of the system have been conducted utilizing Scottish marine operations personnel and vessels. In addition to using the services and fabrication capabilities of local companies for the PowerBuoy's construction and deployment, OPT's business strategy is to continue such partnerships with regional suppliers over the expected 25 to 30 year life cycle of PowerBuoy power stations.

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

### Aquamarine Power's next generation Oyster 800 wave energy device unveiled by Scotland's First Minister

The UK's leadership in the development of wave-generated power continued as wave energy developer Aquamarine Power invited Scotland's First Minister Alex Salmond MSP to unveil the Oyster 800, the company's next-generation hydro-electric wave energy converter.

At a ceremony at Burntisland Fabrications' yard at Methil, Fife, the First Minister welcomed the advancements in wave energy conversion being made by Aquamarine Power and unveiled the 800kW device. It will now be transported by sea from the Firth of Forth to the European Marine Energy Centre (EMEC) in Orkney for installation later this summer.

The project has been supported through grant funding awarded by Scottish Enterprise and the Carbon Trust Marine Renewables Proving Fund.

Aquamarine Power installed and grid-connected its first full-scale 315kW

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Oyster at EMEC in 2009. This first device operated through two winters and delivered over 6,000 operating hours.

The Oyster 800 operates in the same way as Oyster 1, but Aquamarine Power has used data and lessons learned from the first Oyster to significantly improve its power output, simplify installation, and allow easier routine maintenance.

The device shape has been modified and made wider to enable it to capture more wave energy. It is now mounted on two seabed piles, rather than four to simplify installation. Oyster 800 has also been designed to make maintenance and operations easier and more cost effective.

The device was manufactured by Burntisland Fabrications at its Methil and Arnish yards.

The Oyster 800 will be the first of three devices to be installed at EMEC, with further Oysters to be deployed in 2012 and 2013. All three Oysters will be linked to an onshore hydro-electric plant to form a 2.4MW array.

A jack-up barge is currently stationed at EMEC's Billia Croo site, just north of Stromness, and has begun drilling piles into the seabed to provide foundations for Oyster.

The installation of the Oyster 800 will see the device being fixed to the seabed around 500m from shore. This will be followed by a commissioning process that will see it connected to an onshore hydro-electric generator via subsea pipelines.

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

### LDD wins major renewables contract in the Bay of Liverpool, UK

LDD, an Acteon company, has won a multimillion-pound contract with RWE npower renewables to provide specialist drilling services to help install 160 wind turbine foundations at the Gwynt y Môr wind farm 18km off the North Wales coast.

LDD will commission what is believed to be the world's largest and most-powerful reverse-circulation drill, and four of its specialist engineers will operate the drill from onboard RWE's installation vessel later this year.

The Gwynt y Môr project consists of 160 turbines producing a total of 576MW of energy, two offshore substations, a large new onshore substation, and 11km of underground cabling. It is a shared investment between partners RWE Innogy, Stadtwerke München GmbH, and Siemens. Once fully operational, Gwynt y Môr wind farm is expected to produce energy equivalent to the average annual needs of around 400,000 homes.

Drilling will be undertaken using the new LDD-designed LD5000 drill rig. The bottomhole assembly will be configured to drill a standard 4.3m-diameter rock socket, which can be increased up to 6m in diameter by engaging the drill bit underreamers. Sister company MENCK is providing its MHU1900S piling hammer for the project.

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

**AN UNDERWATER TECHNOLOGY STORY:**

February 2007 near Toulon, France

## "Flashes in the deep..."

Near the bottom of the sea is possibly the last place you would expect to catch glimpses of energy from distant stars. Yet at depths of around two and a half kilometres, a network of 12 detectors on 350 metre cables records information about objects and important events millions of miles from our planet.

Near-zero mass neutrinos that travel at speeds close to the speed of light, whose collisions the underwater telescope detects, are the only known particles to travel fast enough to escape the core front of a collapsing supernova.

These neutrinos travel almost unimpeded through everything and collisions with other atoms are rare but because trillions of neutrinos pass through the earth every second, there are enough impact flashes to be detected by an array of sensors.

The large area water Cherenkov detector constructed by the ANTARES Collaboration gathers information about supernovae, black holes and can even help study dark matter. One day, neutrino research might even look right into the core of our own galaxy..."

Read the full story at  
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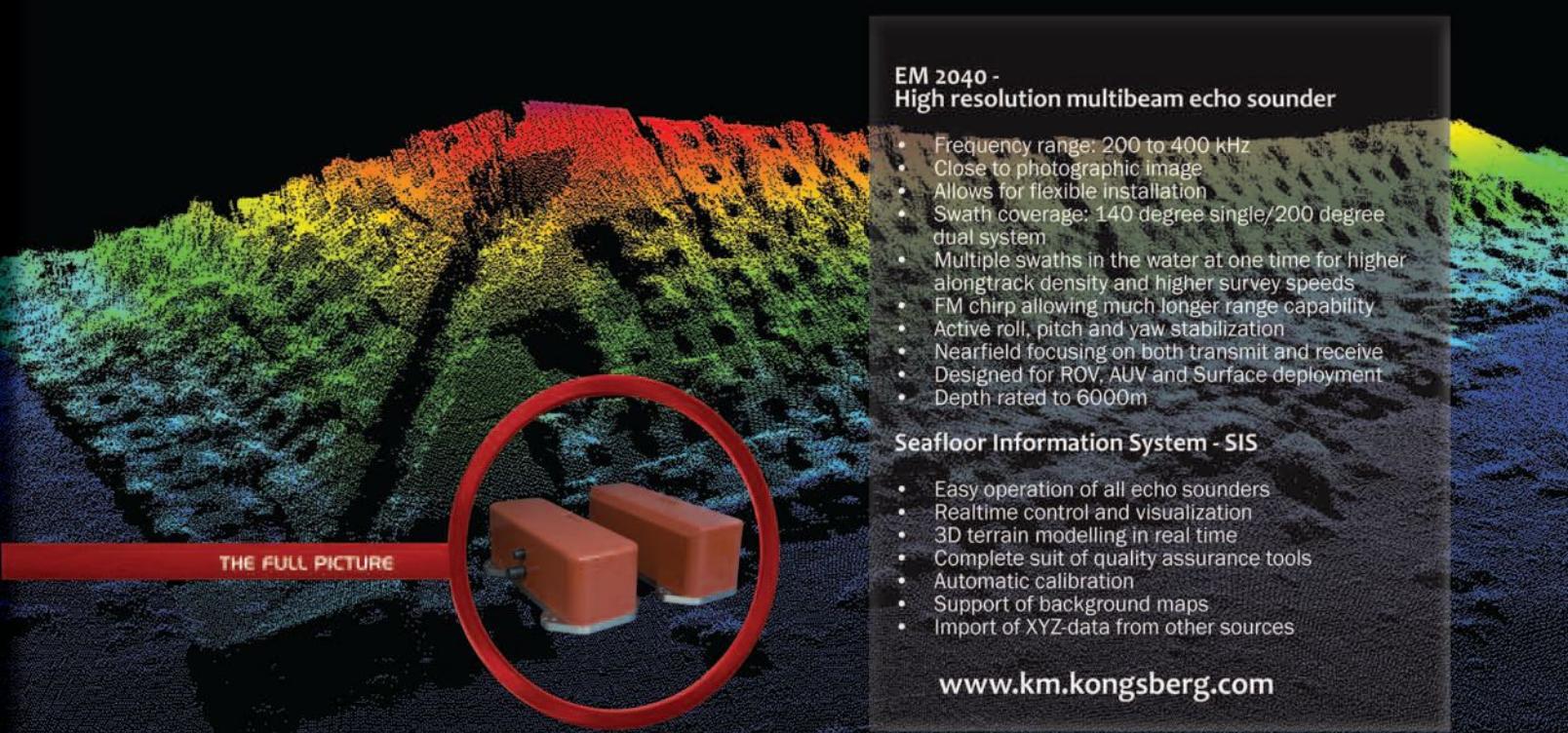
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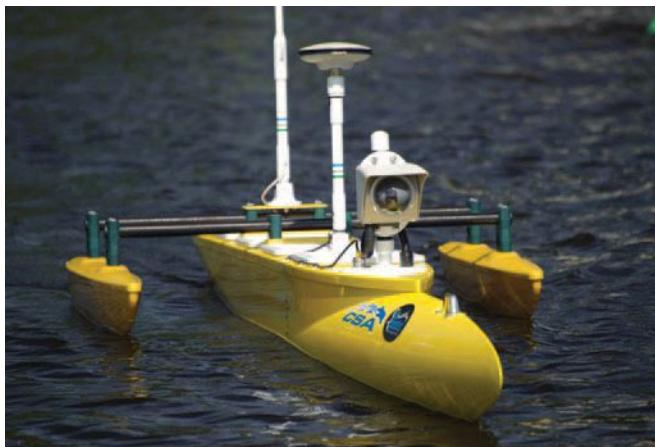
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# Mapping and Measuring Muck

**Advanced tools and techniques for mapping and measuring muck and sediment deposits in shallow water estuaries**

By M. J. Thompson and Tony Martin, CSA International, Inc.

Side-scan sonar, dual-frequency single-beam bathymetry, and global positioning system (GPS) positioning are all “off the shelf” technologies for various marine industries. But now, these technologies are being applied in innovative ways during habitat restoration efforts in estuaries and rivers throughout the United States. Combining these technologies with the latest in remotely controlled shallow water survey vessels provides a unique approach to solve a difficult problem – accessing, mapping, and measuring sediments in very shallow and complex areas.



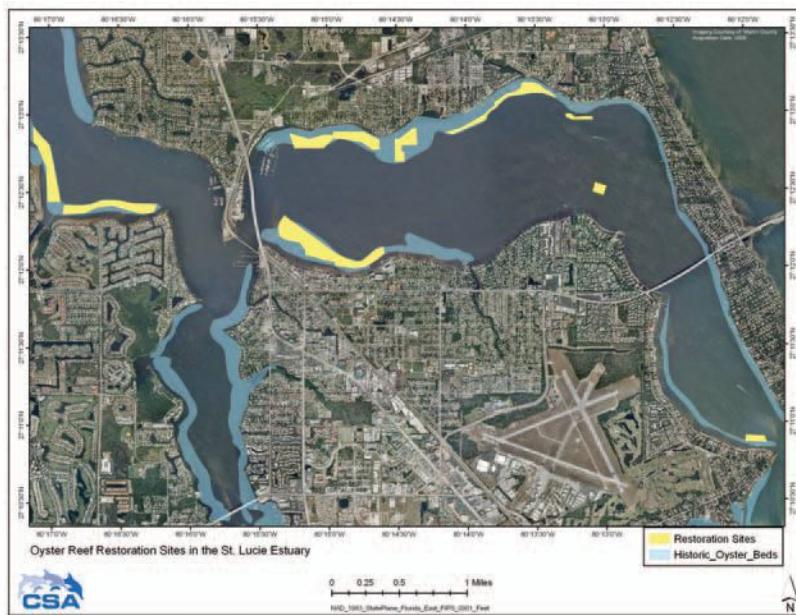
The St. Lucie River Estuary and Loxahatchee River System, located in Martin, Palm Beach, and St. Lucie Counties, Florida, have lost 80% of their historic 450 acres of oyster reefs due to estuary habitat loss, degraded water quality, and depositions of silt and muck. In 2009, CSA International, Inc. (CSA) assisted Martin County in acquiring the necessary State and Federal permits and conducted a major oyster reef restoration project in the area where these two water bodies join. The project objectives focused on ecosystem enhancement, habitat restoration, and public education regarding the environmental resources of the St. Lucie and Loxahatchee Estuaries. Enhancing oyster populations significantly improves water quality and provides essential habitats for commercially and economically important fish species.

Like most urban marine environments, the shallow water oyster reef environments in the St. Lucie and Loxahatchee River systems are a complex mix of residential and commercial docks, bridges, moorings, and channel markers. Because of this complex network of anthropogenic marine structures, the survey activities were completed in two phases. Initially, geo-referenced bathymetric and side-scan sonar surveys covering 80% of the potential project area were performed using a 25-ft vessel. The remaining 20%

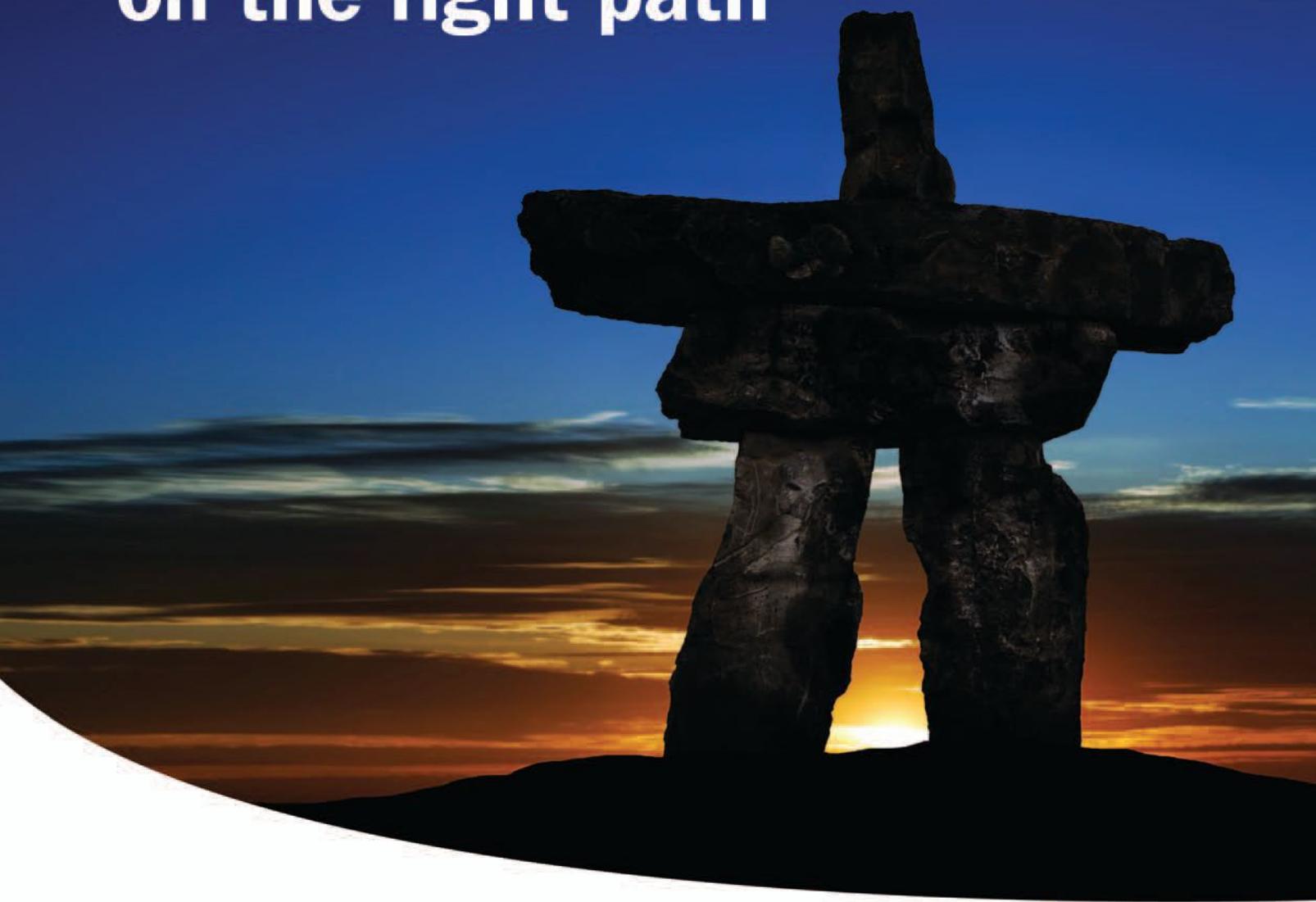
required a specially configured advanced autonomous surface vehicle (ASV) that could navigate within and around slips and out of shallow confined waters (less than 1.5 m depth), while deploying positioning, bathymetric sonar, and side-scan sonar systems. Both of the vessel platforms utilized dual-frequency single-beam bathymetric systems. The low-density suspended sediment locations (i.e., muck) were mapped, and the muck depth was measured using a combination of a 200-kHz acoustic impulse (to differentiate the surface area of the muck) and a 28-kHz acoustic impulse (to penetrate through this muck layer and determine if there was hard substrate beneath that might provide a suitable base for oyster reef construction).

The resulting side-scan mosaic covered 66,888,228 m<sup>2</sup> (6,688.8 hectares [16,528.4 acres]) of survey area, of which 121.22 hectares (299.5 acres) of suitable habitat were identified and ground-truthed utilizing the side-scan sonar equipment and vessel platforms. This survey identified overlaying muck thickness and historical reef areas – which allowed for the positioning of oyster reef restoration material at the most ideal sites, maximizing the potential oyster colonization and restoration success. Sites were selected, and the restoration site plan was developed based on water depth, muck layer depth, salinity levels, water quality, and past existence of oyster beds. A total of 11.2 hectares (27.83 acres) of oyster reef and more than 20,184,860 Kg (44,500,000 US lbs) of cultch were deployed. The St. Lucie and Loxahatchee reefs are currently being monitored for oyster colonization and project success.

For questions concerning this project or for information relative to other CSA marine environmental services, contact CSA International, Inc. at 772-219-3000 or visit our website at [www.csaintl.com](http://www.csaintl.com).



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**Austal awarded contract for JHSV 6 and 7**

The U.S. Navy has exercised contract options funding the construction of the sixth and seventh Joint High Speed Vessel (JHSV), as part of a 10-vessel program potentially worth over US\$1.6 billion. The construction contract for both vessels is valued at approximately US\$313 million. Austal is also currently building a second Independence-variant 127m Littoral Combat Ship (LCS) for the U.S. Navy, Coronado (LCS 4), which is scheduled for launch in September 2011.

**BAE Systems and SeeByte sign agreement to develop autonomous maritime operations solutions**

BAE Systems and SeeByte Ltd of Edinburgh, Scotland have signed a Co-operation Agreement to pursue business opportunities associated with the UK's Mine Counter Measure (MCM), Hydrography and Patrol Capability (MHPC) Programme. BAE Systems Mission Systems and SeeByte have identified a shared vision for the managed introduction of autonomous computing into future military mission systems through the exploitation of open or



modular, yet secure, architectures. Thus, they intend to work together to develop fully integrated MCM mission systems offering innovative, flexible, and adaptable solutions for the adoption of unmanned systems into future MCM operations.

**3rd Cutter completes builder's trials**

The third National Security Cutter, Stratton, successfully completed builder's trials in Pascagoula, Mississippi, marking a significant step in preparing Stratton for delivery to the U.S. Coast Guard. Teams from Huntington Ingalls Shipbuilding and Lockheed Martin Maritime Systems and Sensors operated propulsion, communications, damage control, weapons, aviation, and small boat launch and recovery facilities and assessed the cutters underway performance during the 5-day event. The Coast Guard Cutter Stratton is named for Capt. Dorothy Stratton, who became the first director of the Woman's Reserve of the Coast Guard in 1942, known as the SPARs.

**Turkey and Germany agree on sub deal**

A \$2.7 billion deal between Turkey's arms procurement agency and Germany's ThyssenKrupp Marine Systems for the joint manufacture of six U214 submarines was finally approved July 1.

**Russia to deliver sub by the end of the year**

Russia will deliver a long-awaited nuclear submarine to India by the end of the year, the country's navy chief was quoted as saying by the state RIA Novosti news agency on July 1. The date for the delivery of the Nerpa submarine in which 20 people died in an accident during sea trials in 2008 has been pushed back several times.

# **Lockheed Martin awarded \$85M contract to support the anti-submarine warfare mission**



*The military Sealift Command ocean surveillance ship USNS IMPECCABLE (T-AGOS-23) is one of five ocean surveillance ships that are part of the 25 ships in the Military Sealift Command Special Mission Ships Program. IMPECCABLE directly supports the Navy by using both passive and active low frequency sonar arrays to detect and track undersea threats. (U.S. Navy Photo/Released)*

Lockheed Martin received an \$85 million contract to continue its operations and maintenance support to five U.S. Navy ocean surveillance ships as part of the service's anti-submarine warfare mission. The competitive one-year contract includes four additional one-year options.

The Surveillance Towed Array Sensor System program provides sustainment and logistics management for all installed antisubmarine warfare mission systems, including passive and active surveillance equipment and computer network systems.

"The antisubmarine warfare mission is of significant importance to the Navy," said Carey Smith, vice president of technical services in Lockheed Martin's Global Training and Logistics business. "The equipment we maintain is vital to that mission, whenever and wherever these ships may be."

Operated by the Navy's Military Sealift Command, the ships and their crews conduct training and missions worldwide. Maintenance is primarily performed at Commander Fleet Activities Sasebo, Japan. Other locations include the United Kingdom and Virginia Beach, Virginia.

Headquartered in Bethesda, Maryland., Lockheed Martin is a global security company that employs about 126,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration, and sustainment of advanced technology systems, products, and services. The Corporation's 2010 sales from continuing operations were \$45.8 billion.

## **Phoenix participates in successful submarine rescue exercise, Bold Monarch 2011**

Phoenix International Holdings, Inc. (Phoenix) is the prime contractor for the maintenance and operation of the Submarine Rescue Diving and Recompression System (SRDRS), the U.S. Navy's state-of-the-art submarine rescue system. Phoenix responsibilities include the maintenance and 24/7 readiness of all SRDRS components in strict compliance with Navy certifications, the planning and conduct of system mobilization and demobilization for all rescue events, and the piloting of the Pressurized Rescue Module (PRM). The PRM is the SRDRS element designed to lock onto the hatch of a disabled submarine and transfer its occupants to the sea surface.

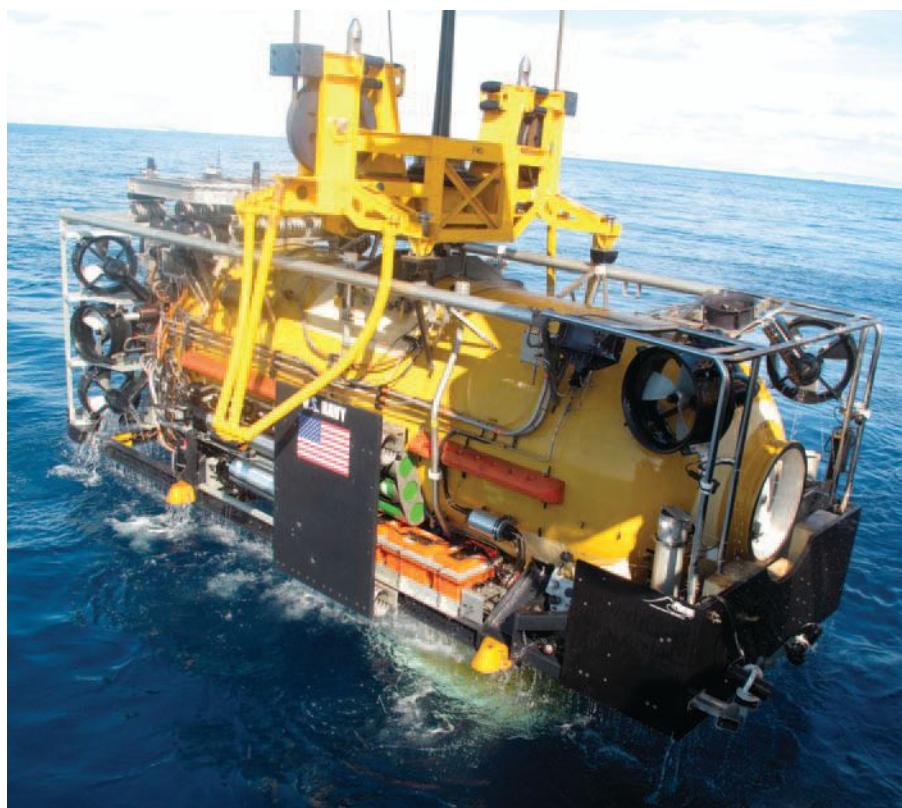
SRDRS's significant capabilities were successfully demonstrated during the recently completed, international submarine rescue exercise, Bold Monarch 2011, which was held offshore Cartagena, Spain 30 May to 10 June. Thirteen NATO and non-NATO nations, four submarines, four rescue and intervention systems, and more than 2,000 personnel participated in this year's event, which is held every three years and is the world's largest submarine rescue exercise. History was made on 7 June 2011 when the U.S. Navy's PRM mated with the

Russian submarine, SSK ALROSA, a first time ever event. During the exercise, the PRM completed 12 manned dives, performed 10 submarine mates, and transferred ("rescued") 138 personnel.

The U.S. Navy's submarine rescue team consists of a cadre of Navy (active duty and reservists) and Phoenix personnel who operate out of the Deep Submergence Unit Facility on Naval Air Station, North Island in San Diego, California. For Bold Monarch 2011, the DSU/Phoenix team loaded the SRDRS onto two Antonov C124 heavy lift cargo planes in San Diego, and flew to Alicante Spain where the system was installed on the commercial vessel of opportunity, HOS Shooting Star.

Phoenix provides manned and unmanned underwater operations, design engineering, and project management services to clients in the defense, offshore oil and gas and other ocean-interest industries worldwide. Expertise is available from six regional offices in the areas of wet and dry hyperbaric welding, conventional and atmospheric diving, and robotic systems and tooling. Our capabilities are directed to underwater inspection, maintenance and repair; deep ocean search and recovery; submarine rescue; construction; subsea tieback; plug & abandonment; archaeological and documentary projects.

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



## **Divex wins Oceaneering contract**

Divex has been selected as the main build sub-contractor for the supply of a Deck Transfer Lock (DTL) unit by Oceaneering International, Inc. (OII).

The DTL forms part of an overall equipment spread for the Submarine Rescue and Diving Recompression System (SRDRS) that OII is managing on behalf of the U.S. Navy.

The SRDRS is to be used by the U.S. Navy in the event a Disabled Submarine (DISSUB) ensuring that they are able to provide rapid deployment of this worldwide capable system.

The DTL is the "hub" of the SRDRS. The rescue vehicle upon return to the SRDRS mates to the Pressurized Flexible Manway (PFM3) on the DTL allowing the submariners to transfer to one of the recompression chambers, which also forms part of the SRDRS. The PFM3 has been the subject of a separate development project by Divex for OII.

With its extensive saturation system, launch and recovery, and decompression chamber experience, Divex was the ideal choice as build contractor. Divex have also provided this expertise on a similar system, the NATO Submarine Rescue System (NSRS), giving it a track record in the field of air portable rescue systems. Divex provided the design, build, and full commissioning service for the NSRS Transfer Under Pressure (TUP) system, which has just entered full operational capability, and the success of this system establishes Divex's capabilities in this highly specialized field.

Divex will have a dedicated project team working on the DTL project, encompassing engineering support, quality assurance and project control. Due to the stringent, system cleaning parameters, certification, and material control, the project will be meticulously documented building conformance with NAVSEA requirements.

Danny Gray, Divex project manager for the DTL contract, commented: "Based on our expertise and previous experience to provide Navies around the world with Submarine escape systems, we're delighted to have the opportunity to supply Oceaneering International Inc. with the SRDRS - DTL for the U.S. Navy. All the project team are excited to be involved with such a high-profile contract for the U.S. Navy."

The DTL is to be delivered to OII in early June 2012.

# Case Study — Maersk Peregrino FPSO Mooring and STP Buoy Installation

By Brian Green, General Manager, First Subsea Ltd.

When the Peregrino field in Block BM-C-7 of the Campos Basin began production earlier this year, it was the first FPSO to use a submerged turret production buoy mooring system offshore Brazil. The first phase of field development includes two drilling and wellhead platforms (Peregrino A & B), which are tied back by flowlines and power umbilicals to the Maersk Peregrino (owned and operated by Maersk FPSOs), and moored in 100m of water, for processing the heavy crude oil for subsequent off-loading.



*Maersk Peregrino FPSO*

The 600 tonne submerged turret production (STP) buoy supplied by Advanced Production and Loading (APL), a National Oilwell Varco company, uses a single point mooring system comprising 10 mooring lines arranged in three clusters and is anchored to the seabed at a radius of 760m from the mooring centre. Each mooring line is anchored to the seabed by a driven pile, connected to chain and spiral strand wire, which, in turn, is attached to the mooring buoy by using a Ballgrab Series II subsea mooring connector with a MBL of 10,600kN.

### Deepwater Mooring

Developed by First Subsea, the Ballgrab mooring connector uses ball and taper technology and works on the simple principle of a ball engaged in a taper. The mooring connector comprises a male connector and female receptacle. The male connector is inserted within the female receptacle – it is self-energising and self-aligning – to complete the connection. As the male connector's balls roll up the connector's tapers, the tightness of the grip in the female receptacle increases in direct proportion to the load applied. It cannot be released unless the load is removed. The simplicity and speed of connection allows a flexible approach to mooring line deployment.

When mooring a Spar, floating production unit (FPU), and floating production storage and offloading (FPSO) vessel, the mooring connectors' female receptacles are first pre-installed in a docking porch (for a suction pile) or a clip (for a driven pile)



*Male Ballgrab Series II subsea mooring connector*

on each of the piles. Once the FPU is on station, a male connector is attached to the end of each of the mooring lines and lowered from the surface ship to within 50m above the female connector using a purpose-built, Mooring Line Deployment Winch. An ROV removes the female connector's receptacle plug, and the male Ballgrab is guided into position directly above the female receptacle using the mooring vessel's dynamic positioning and stabbed into the female receptacle. When fully inserted and locked into position, the complete mooring line is put under tension. Typically, the male connector is installed within a few minutes once it is positioned above the female receptacle.



*STP buoy being lifted into the water showing the female connectors on the side of the buoy*

## Offshore Mooring Systems

### Simpler and safer STP buoy mooring

For STP buoy mooring, First Subsea has developed an alternative method of mooring that uses the flexibility of the ball and taper to provide a simpler and safer mooring. Traditional STP buoy mooring involves tow out to the field with the mooring lines pre-installed on the buoy, which are then connected to piles in the seabed. This is expensive, complex, and hazardous, particularly where the buoy has to travel through shallow water. The mooring lines have to be supported by tugs for the duration of the tow. This increases the number and cost of vessels required in the fleet and raises the environmental and project risk factors due to the number of simultaneous operations that have to be carried out.

For the Maersk STP buoy mooring, the normal mooring line connection method was reversed: the mooring line was installed and brought up from the seabed to the buoy to complete the mooring connection.

By pre-installing the Ballgrab female receptacles on the buoy's side with a uni-joint arrangement pointing upwards at an angle of 60 degrees, the buoy could be towed to the field without mooring lines and, hence, required fewer vessels in the fleet. In addition, having no lines connected to the underside of the buoy made it easier to lift the buoy into water without the need for numerous cranes to support the wires as the buoy was lifted.



*Ballgrab connector on deck showing adjustable brace*

Once the buoy was in position, it was moored temporarily using a clump weight, some 60m below the surface. Each pile was then installed together with their ground chain and spiral wire mooring line, the spiral wire rope's end socket raised to the surface, and the Ballgrab male connector added.

For the Peregrino buoy mooring, the male mooring connector was fitted with an ROV-activated installation aid to overcome the negative loading arising from the weight of the mooring line and to release the normally self-energising, connection mechanism. In addition, to ensure a smooth connection to the buoy-mounted female receptacles, the connector was held in a brace at an angle of 30 degrees. To accommodate variations in the angle of the female connector, an adjustable brace was used. The male connector, attached to the mooring line, was lowered overboard and inserted into the female receptacle with the assistance of a ROV. The mooring line connection was repeated sequentially until the buoy mooring was completed. All subsea work was executed using two ROVs and without the need for divers.

### Peregrino STP buoy pull-in – another first

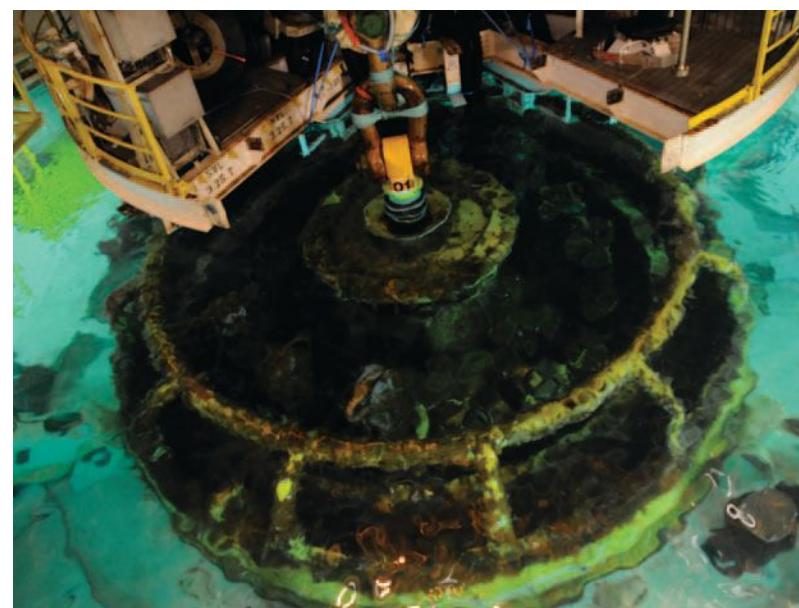
The way in which the Peregrino STP buoy is moored is a first for the Campos Basin. So too is the method of using a Ballgrab Series III male connector to retrieve and pull-in the submerged turret production buoy into the Maersk Peregrino FPSO.

During construction of the STP buoy, a female connector receptacle was installed within the top of the buoy. Ahead of the Maersk Peregrino

FPSO coming on station, a male Series III Ballgrab (MBL 1,200 tonnes) attached to the buoy pull-in rope was lowered into the female connector on the STP buoy by the installation vessel Maersk Attender. Once the FPSO was in position, the



*Buoy mooring connection subsea*



*STP buoy pull-in using Ballgrab connector*

buoy, held 22m below the surface, was pulled into the vessel's mating cone module. With the STP buoy locked in position, the Maersk Peregrino FPSO was moored at its location. The Ballgrab pull-in tool performed well, enabling the STP buoy to be lifted into position within the project schedule.

In the event the FPSO needs to move off-station for maintenance work or to avoid a hurricane, the Ballgrab male connector can be used to lower the buoy for subsequent retrieval when the FPSO returns.

For more information on Submerged Turret Production buoy mooring in both shallow and deepwater, contact First Subsea on +44 (0)1524 387777, e-mail [info@firstsubsea.com](mailto:info@firstsubsea.com), or visit [www.firstsubsea.com](http://www.firstsubsea.com).

## Applanix Products & Solutions for Marine Environments

### Who we are, what we do

Applanix Corporation, a wholly owned subsidiary of Trimble, designs, builds, delivers, and supports products and solutions designed specifically for the hydrographic survey industry. Even in the harshest marine environments, our products and solutions provide robust, reliable, and repeatable positioning and motion compensation for moving vessels. Mobile mapping and positioning with Applanix technology not only cuts costs associated with marine surveys, it also delivers tremendous accuracy.

### Our technology: What is POS?

Applanix Position and Orientation Systems (POS™), with integrated precision GNSS and advanced inertial technology, obtain uninterrupted measurements of the position, roll, pitch and true heading of mobile platforms. We offer fully-integrated turnkey solutions for high-productivity in-motion surveying, direct data georeferencing, and robust mobile mapping.

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LANDMark Marine provides a solution for the acquisition of topographic information in the nearshore. Applications are numerous and include:

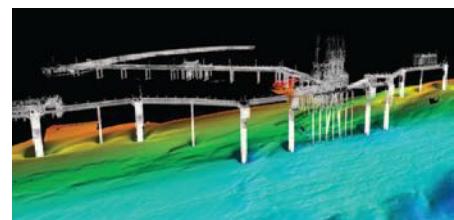
- Charting the shoreline and other hazards to navigation above the waterline;
- Coastal erosion monitoring;
- Change detection for security applications;
- Monitoring of offshore structures.



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The health and safety aspect of monitoring offshore structures cannot be overstated and being able to do so remotely without the need for the additional certification and insurance overheads associated with deploying personnel on the asset is vital.



With an effective range of 1,800 m, LANDMark Marine allows the hydrographic surveyor to collect such data from the same platform and at the same time as the bathymetry without any need to go ashore. This produces a seamless point cloud both above and below the waterline, allowing the production of a base surface against which future ongoing monitoring can be compared.

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# OFFSHORE INDUSTRY

## Most Americans believe country not doing enough to develop resources

A national poll conducted by Rasmussen Reports found that 75% of likely voters do not believe the country is sufficiently developing its own oil and gas resources, while 19% of those surveyed said the government is doing an adequate job of developing them.

Almost 50% of respondents also said that, given a choice, they would rather see the country develop its domestic reserves rather than cut back on gas and oil consumption. But the question was divided: another 42% said reducing consumption was the better policy.

The results were heavily split along party lines, the poll found, with 69% of Republican respondents preferring the resource development policy and 59% of Democrat respondents preferring reducing consumption.

The survey of 1,000 likely voters was conducted from June 26 to 27 by Rasmussen Reports — just days after the Obama administration decided to release 30 million barrels of stockpiled oil from the Strategic Petroleum Reserve.

## Warner, Webb introduce bill to lift drilling moratorium off Virginia

U.S. Senators Jim Webb and Mark Warner have introduced legislation to lift a moratorium on drilling off the Virginia coast enacted by President Obama after last year's oil rig explosion in the Gulf of Mexico.

The bill from the Virginia Democrats would allow oil and natural gas exploration and production and direct half of any leasing revenues to be paid to Virginia to support a range of projects, including land and water conservation, clean energy development, transportation, and other infrastructure improvements in the state.

Virginia was set to become one of the first East coast states to drill offshore for oil and natural gas. But after the Deepwater Horizon oil rig exploded in April 2010, spewing millions of gallons of oil into the gulf, Obama pulled the plug on a lease sale planned for 2012.

"We should not be sending hundreds of billions of dollars each year to oil-producing countries that do not like us," Warner said. "Senator Webb and I firmly

believe that Virginians should benefit from any energy resources that are developed off of our coast, and our legislation specifically requires the federal government to make reasonable royalty payments to the Commonwealth."

## Coast Guard bolsters inspection of foreign-flagged drilling rigs

The U.S. Coast Guard is vowing to beef up inspections of mobile offshore drilling rigs operating in U.S. waters under foreign flags, a step that comes in the response to last year's Deepwater Horizon disaster in the Gulf of Mexico.

Transocean's Deepwater Horizon rig, which drilled BP's ill-fated Macondo well, was registered in the Marshall Islands, prompting calls for tougher safety reviews of foreign-flagged vessels.

The Coast Guard's new policy — spelled out in a formal "policy letter" last month — applies an additional layer of "risk-based" review to complement annual inspections.

A Coast Guard summary of the plan says the new review of drilling units will "determine the risk they pose by examining accident history, past discrepancies, flag state performance and classification society performance to identify those vessels requiring additional oversight. Risk-based targeting allows for more frequent examinations of the highest risk (Mobile Offshore Drilling Units) and efficient use of Coast Guard resources."

## ConocoPhillips to split into two companies: refining and E&P

ConocoPhillips will split itself into two by spinning off its refining arm and focusing on exploration and production, said on Thursday, sending its shares up more than 7%.

With the move, ConocoPhillips, the third-largest U.S. oil company, becomes the first of the so-called super majors to shift away from the strategy that led the industry to consolidate into a handful of players with global reach in the oil and gas production and oil products businesses.

"We have concluded that two independent companies focused on their respective industries will be better positioned to pursue their individually focused business strategies," said Jim Mulva, Conocophillips' chief executive officer.

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## Gulf of Mexico could support over 400,000 jobs across the United States

A study released July 11 by the National Ocean Industries Association (NOIA) and the American Petroleum Institute (API) shows the important nationwide jobs and economic impact of the Gulf of Mexico offshore oil and gas industry and reveals the effect of permitting on those figures.

According to the study conducted by Quest Offshore Inc., the Gulf offshore oil and gas industry supported more than 240,000 jobs across the country while contributing more than \$26 billion to the nation's GDP in 2010.

"The Gulf offshore oil and gas industry supports tens of thousands of jobs outside the Gulf of Mexico,"

said Randall Luthi, president of NOIA. "These jobs are found across the United States – at places like Redwing Shoe Company in Minnesota, Godwin Pumps in New Jersey, and Hammerhead Industries in California, just to name a few."



But offshore industry-related jobs are down from 2008, the study shows, due in part to the poor economy, the deepwater moratorium, and the continuing slow pace of new drilling permits in the Gulf. More than 60,000 jobs have been lost in the Gulf states alone since 2008, according to the study.

There is potential for good news, though: the study also projects that if exploration and development permitting return to historic levels and backlogued projects are processed, the Gulf offshore industry could help create an additional 190,000 jobs by 2013 for a total of more than 400,000 industry supported jobs across the United States. The Gulf offshore industry could also contribute nearly \$45 billion dollars to the nation's GDP by 2013.

The study also found that the vast majority of industry-related spending, more than 95%, stays right here in the United States, creating more jobs and more economic growth at home.

### Petrobras reschedules startup of U.S. Gulf Cascade-Chinook project

Petrobras has delayed the start of oil production from its Cascade-Chinook deepwater oil development in the U.S. Gulf of Mexico to the end of this year.

The development is located 165 miles offshore Louisiana, in a water depth of more than 8,000 ft.

Production was rescheduled from the middle of the year due to the repair of a link that resulted in the collapse of the five freestanding hybrid risers connected to the Cascade-Chinook FPSO.

Petrobras had initially planned to start production in 2010, but the deepwater drilling moratorium passed by the U.S. Government caused the 2011 delay.

### Proposed Gulf of Mexico lease sale moves closer to reality

A supplemental Environmental Impact Statement (EIS) filed by federal drilling regulators moves forward the prospects of a 2012 Gulf of Mexico lease sale going forward as planned.

The original sale date was postponed as a reaction to the Macondo oil spill incident, and this filing progresses toward a sale before 30 June 2012.

The area up for lease — the central planning area in the Gulf of Mexico — covers 63 million acres off the coasts of Louisiana, Mississippi, and Alabama. All of the territory is in deepwater, as much as 11,345 ft in some cases.

The government estimates that 1.624 Bbbl of oil and 3.332 tcf of natural gas could be developed as a result of the sale.

Publication of this supplemental EIS started a 45-day public comment period.

### National Oilwell Varco, Ameron International announce merger

National Oilwell Varco, Inc. and Ameron International Corp., have entered into an agreement under which National Oilwell will acquire Ameron in an all-cash transaction that values Ameron at \$772 million. Under the agreement, Ameron's stockholders would receive \$85 per share in cash in return for each of the roughly 9.1 million shares outstanding. Pending shareholder approval, closing could occur as early as the fourth quarter of 2011.

### Republicans bash White House oil release as political move

Top House Republicans bashed the White House decision to release 30 million barrels of oil from the nation's strategic stockpiles, calling it an inappropriate political move that ignores what they call undue barriers to domestic drilling.



Crude oil pipelines at SPR Bryan Mound site near Freeport, Texas

"Frankly, it's pathetic that Democrats not only block domestic energy production at every turn, President Obama is now drawing down on our nation's 'strategic' oil reserve, which is intended for national emergencies, not as a political tool when a president is feeling heat over high gas prices," said House Majority Whip Kevin McCarthy (R-Calif.) in a statement.

The White House in June announced that the Energy Department would release 30 million barrels of oil from the Strategic Petroleum Reserve. It's part of a broader international plan to bring a total of 60 million more barrels from strategic reserves into the market over 30 days to offset supply disruptions from unrest in the Middle East.

Meanwhile, the Department of Energy said it had secured contracts for the 30 million barrels of oil, awarding 28 contracts to 15 companies, including ConocoPhillips, ExxonMobil, Valero, and Shell. The Department is working with the Department of Homeland Security and the Maritime Administration to distribute the oil.

### Joy Global, Rowan complete LeTourneau acquisition

Joy Global Inc., a leader in high-productivity mining solutions, has completed the acquisition of LeTourneau Technologies Inc. from Rowan Companies, Inc. for \$1.1 billion in cash.

LeTourneau is a world leader in the manufacture of large capacity wheel loaders for the surface mining market as well as jack-up rigs and ancillary equipment for the oil and gas drilling industries.

"The acquisition of LeTourneau brings two very strong business platforms to Joy Global," said Michael Sutherlin, chief executive officer of Joy Global.

LeTourneau is a leading brand in oil and gas drilling rig equipment and design, and this business is leveraged to an emerg-

ing demand for higher specification rigs.

"We are delighted to have achieved this combination and are confident it will create additional opportunities for LeTourneau and its employees," said Matt Ralls, Rowan's chief executive officer.

### Arctic holds promise for the future, says Douglas-Westwood

The next offshore discovery frontier is the Arctic, said Andrew Reid, CEO of Douglas-Westwood, speaking at the IADC World Drilling Conference.

"More than 400 fields have been discovered to date in the Arctic, providing reserves in excess of 240 Bboe," he said. "There is no doubt that further drilling activity in this region could have a major impact on offshore production in the foreseeable future."

Looking ahead in the Arctic, Reid said 412 Bboe in undiscovered resources might be found there and that 84% of that would be offshore.

In a shorter term, Brazil and West Africa look set to lead the way in expenditure with a combined forecast total of \$126 billion in 2015 and that deepwater oil production is expected to grow a further 13% by 2020, up from zero in 1990 and 9% in 2010. Current estimates are that offshore production, in general, accounts for 33% of the total oil produced today.

### Gulf Drilling International buys Enasco-95 jack-up; rated to 250 ft

Gulf Drilling International, Ltd said that it purchased from Enasco Offshore International Co. the jack-up drilling rig known as Enasco-95.

The rig is a three-legged Hitachi cantilevered drilling rig rated for 250 feet of water. GDI is most satisfied with the fine cooperation and support that Enasco has extended to make this transaction possible, the company said. This is not GDI's first encounter with Enasco, as the Al-Rayyan jack-up rig (formerly the Enasco-55) was acquired from them back in 2005.



GDI will have a full special survey performed prior to placing the rig into service in order to obtain a new class certificate. This will necessitate the rig being put into shipyard for a three to four month period where major refurbishment will be done. The rig will be deployed for operating in Qatari waters on completion.

## President Obama signs order forming Alaska drilling task force

President Obama signed an executive order officially forming an interagency task force to coordinate oil and gas development in Alaska.

Obama first said he would form the task force during a 14 May radio address in which he outlined a plan designed to show that the administration is serious about expanding domestic oil production and lowering gas prices.

"Interagency coordination is important for the safe, responsible, and efficient development of oil and natural gas resources in Alaska, both onshore and on the Alaska Outer Continental Shelf (OCS), while protecting human health and the environment, as well as indigenous populations," the executive order reads.

Membership on the task force will include deputy-level officials at the Defense Department, Commerce Department, Agriculture Department, Energy Department, Department of Homeland Security, the Environmental Protection Agency, and the Office of the Federal Coordinator for Alaska Natural Gas Transportation Projects.

The task force also includes officials from the White House Council on Environmental Quality, the Office of Science and Technology Policy and the Office of Management and Budget office, among others.

## U.S. Seismic Systems gets order for downhole seismic arrays

U.S. Seismic Systems (USSI), a subsidiary company of Acorn Energy, Inc. has received an order for custom down-hole seismic systems based upon its revolutionary fiber optic sensor technology from a leading international oilfield seismic equipment company. The value of the contract to USSI once in full production is anticipated to be approximately \$6 million annually. This is the third significant order received by USSI from a major oilfield equipment company in 2011.

"This order, which is for high temperature, permanent downhole systems, addresses the growing need for high resolution seismic systems designed to facilitate enhancing the recovery from mature, declining oil-fields. We continue to have meaningful negotiations for the integration of our seismic systems in the solutions of a number of innovative players in the oilfield business," Jim Andersen, CEO of USSI said.

According to U.S. Department of Energy estimates, enhanced recovery techniques could eventually add as much as 430 billion new barrels to the recoverable oil resources of the United States.



### Elastec/American Marine (USA) delivers two custom oil spill boats

Elastec/American Marine (USA) has delivered two custom oil and debris skimming boats manufactured in Europe to an undisclosed major client in Asia. The 10m/32ft craft is capable of collecting, storing, and transporting recovered oil and debris.

The boats were built after many months of consultation and are a development of an early skimming pontoon concept.

Trash is collected using a powerful collection scoop operating between the bows. This same scoop serves a vital function when the boat is in oil recovery mode, allowing trash to be screened prior to oil recovery. Oily debris presents a big issue in most oil spills by clogging skimmers and pumps.

A pair of unique dynamic oil recovery chambers is incorporated in the hulls. As the vessel moves forward, oil is collected in the chambers where it is selectively skimmed using an Elastec drum skimmer or a self-adjusting weir skimmer. The vessel provides hydraulic power to operate the trash scoop, skimmers, and pumps. Oil is stored onboard in special tanks.

The lightweight aluminum hulls are powered by twin water jet propulsion, providing for a stable maneuverable and shallow draft platform.

## READ downhole monitors head for Petrobras field offshore Brazil

Petrobras has taken delivery of READ's new PerForM permanent reservoir monitoring system following a final acceptance test. The equipment is going to Brazil for ultimate installation down-hole in the Namorado oilfield in the second half of this year.

Following installation, READ plans a 4D seismic survey and the system will provide continuous real-time micro-seismic monitoring of the reservoir.

The system can have as many as 120 levels of seismic sensor nodes downhole and can include pressure, temperature,

and other measurements on a high-speed data link to the surface. Placing the sensors in the annulus allows for real-time data acquisition without interruption of well production.

When the micro-seismic monitoring is combined with real-time multiple migrations, PerForM offers a combination to image large reservoir areas, said READ. PerForM also enhances well safety by providing early indication of reservoir leakages, gas accumulations, and seabed subsidence.

## Shareholders ante up \$250M to fuel Expro expansion program

Expro has announced a new investment program that includes expanding the company's established fleet of subsea safety systems and well test packages and globalization of the group's strong drill stem testing (DST) heritage and emerging, innovative telemetry capability.

Expro said investments are also being made to fuel specific customer growth initiatives in the wireline and production systems product lines and new product developments in production surveillance (multi-phase metering) and fluid analysis.

The funds for the program are being provided by a \$250 million equity injection from the company's shareholders. Additional flexibility and the opportunity to accelerate growth have also been provided by increased covenant headroom under the mezzanine facility and the expansion of the group's revolving credit facility from \$100 million to \$160 million.

## Chevron receives EPA's approval for Western Australia LNG project

Chevron's \$25 billion Wheatstone liquefied natural gas (LNG) project, offshore the northwest coast of Australia, has received conditional approval from Western Australia's Environmental Protection Agency.

Under the terms of the approval, Chevron must reduce its environmental impact by way of decreasing carbon dioxide emissions by 10 million tons per year and limit the impact of extensive dredging. Chevron will outline its final investment plan at the end of the year, the company said.

The project is expected to produce 25 million tons of LNG per annum, primarily for export, and the first phase of the project will have a capacity of 8.9 million tons per annum of LNG as well as a domestic gas plant.

Partners in the Wheatstone project include Apache, Kuwait Foreign Petroleum Exploration, and Shell, holding 13%, 7%, and 6.4% equity, respectively.

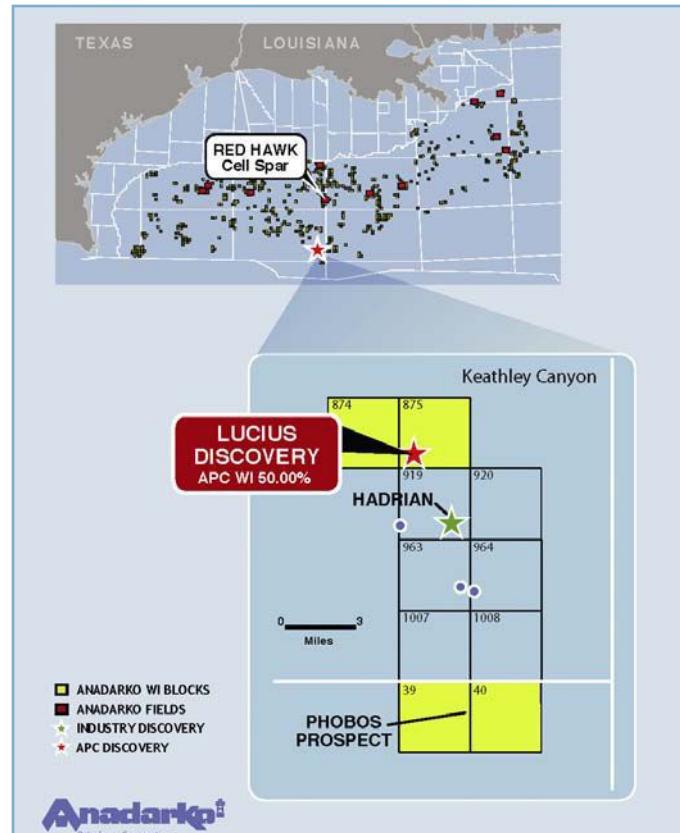
**AGR providing cuttings management for Goliat**  
 Eni Norge has commissioned AGR Drilling Services' Cuttings Transportation System (CTS) for deployment on the 24 wells the company plans to drill in the Barents and Norwegian Seas. Twenty-two of these will be drilled by the new semi-submersible Scarabeo 8 for the Goliat field development located 51 miles northwest of Hammerfest in the north of Norway. The other two will be on Eni's Marulk development by the Scarabeo 5. CTS allows cuttings to be transported up to 1.24 miles from the wellhead. This helps keep the well area free of debris, ensuring associated operations, such as laying cables and tying in umbilicals, run smoothly. The CTS also enables operators to deposit cuttings away from environmentally sensitive areas. AGR's contract runs for 4 years, with an optional one-year extension.

**Aker Solutions secures Statoil EPCI contract**  
 Aker Solutions has won an engineering, procurement, construction, and installation (EPCI) contract from Statoil to provide subsea compression topside modifications on the Asgard field off the Norwegian coast. Work under the \$116.79 million contract includes building and installing an 800 ton new module and integration work on the Asgard A and B platforms in the North Sea. The Asgard licence will employ a subsea gas compression concept that involves gas compressors installed on the seabed. Modifications will enable the supply of electricity to the Asgard subsea compressor units, which will be installed in 2013. The contract is expected to be completed in the fourth quarter of 2014. The contracts for Asgard's pipelines, marine operations, and other major procurement items will be awarded later this year.

**Gulf Island gets contracts for three new projects**  
 Gulf Island Fabrication, Inc. said that through its subsidiary, Gulf Island, LLC, it has signed contracts for the fabrication of three new projects totaling \$125 million and approximately 1.2 million man-hours — which will be included in the company's consolidated backlog when the company announces its earnings results for the second quarter ended 30 June 2011. The three contracts are for 320-ft long by 160-ft wide dry dock awarded by the Terrebonne Port Commission for the LaShip project; 6,200 ton process module for ATP Oil & Gas Corp.'s Cheviot project managed through Bluewater Industries; and 7,000-ton topsides for Williams Partners' proprietary floating-production system, Gulfstar FPS™.

**Schlumberger acquires rest of Framo Engineering**  
 Schlumberger has acquired the remaining equity shares from Frank Mohn AS in Framo Engineering AS — a privately owned Norwegian company specialized in the business of developing, manufacturing and selling products and services relating to multiphase pumps and subsea pump-systems, multiphase metering systems, and swivels and marine systems to the oil and gas industry. The closing of the transaction is subject to regulatory approval.

## Exxon, Anadarko may develop discoveries as a single Gulf unit



ExxonMobil Corp. and Anadarko Petroleum Corp. are reportedly considering plans to develop two separate discoveries in the deepwater U.S. Gulf of Mexico as a single unit.

ExxonMobil previously unveiled three oil and gas discoveries, including the oil-rich Hadrian North prospect, located a few miles from Anadarko's Lucius discovery, which the independent company announced in 2009.

Located some 250 miles southwest of New Orleans, Lucius and Hadrian North are so close that some analysts think they share the same giant oil reservoir. But, the discoveries are in two different federal leases, which currently have different owners and operators. However, that could change once the oil companies begin to draw plans for a production platform.

ExxonMobil spokesman Patrick McGinn said in an e-mail to Dow Jones Newswires that it's "a good assumption" to believe the company would develop the area in a jointly and coordinated manner with all the owners of the separate discoveries, a procedure known in the energy industry as unitization.

Under this arrangement, owners of rights in the same reservoir agree to coordinate drilling, build one production platform and pipeline, and share production in order to reduce costs and maximize the recovery of resources. The agreements avoid each separate owner attempting to secure its share of the underground oil bounty by drilling more and pumping faster than its neighbor.

Lucius' reserves are estimated at more than 300 million barrels of oil equivalent, while ExxonMobil's Hadrian discoveries are estimated to hold a combined 700 million boe.

## Gulf of Mexico

### Italy's Eni starts first oil at Gulf of Mexico Appaloosa field

Italian oil and gas group Eni has started oil production from the Appaloosa field in the U.S. Gulf of Mexico, the group said in early July.

It is the second start-up this year for Eni in the U.S., strengthening its role as operator and its position as a producer in the Gulf of Mexico.

Appaloosa production started on 21 June through a subsea development and a 20-mile long flow line tied back to the Eni-operated Corral platform, the group said in a statement.

The well was flowing at a rate of about 7,000 barrels of oil equivalent per day. Eni's total daily net production in the United States is in excess of 100,000 barrels of oil equivalent.

### Nexen cleared for U.S. Gulf of Mexico exploration well

Nexen Inc. has been given approval to drill its first exploration well in the Gulf of Mexico since last year's oil spill.

BOEMRE approved a permit for the prospect, approximately 180 miles southwest of New Orleans, according to a doc-

ument on its website. Nexen has a 72.5% stake in the prospect, while Statoil controls the remaining interest.

### GE Oil & Gas secures Chevron tension leg platform contract



GE Oil & Gas, through its drilling and production business, has secured a \$45 million contract to supply a tension leg platform (TLP) marine riser tensioner system to Chevron.

A TLP will be employed at Chevron's Big Foot oil and gas field in the deepwater Gulf of Mexico and operate at water depths of 5,200 feet.

The Big Foot TLP will be located approximately 225 miles south of New Orleans and include an onboard drilling rig. The TLP will have a production capacity of 75,000 barrels of oil and 25 million cubic feet of natural gas per day.

GE will begin the installation of the TLP in November 2012, and the production of first oil is expected in 2014.

### U.S. approves deepwater drilling permit despite legal challenge

U.S. regulators said that Shell can drill an exploratory oil well in its Appomattox prospect, the deepwater project in the Gulf of Mexico that environmental groups have targeted for a major legal test of post-Macondo permitting.

The permit allows Shell to drill 7,256 feet below the water surface, or 43% deeper than BP's Macondo well.

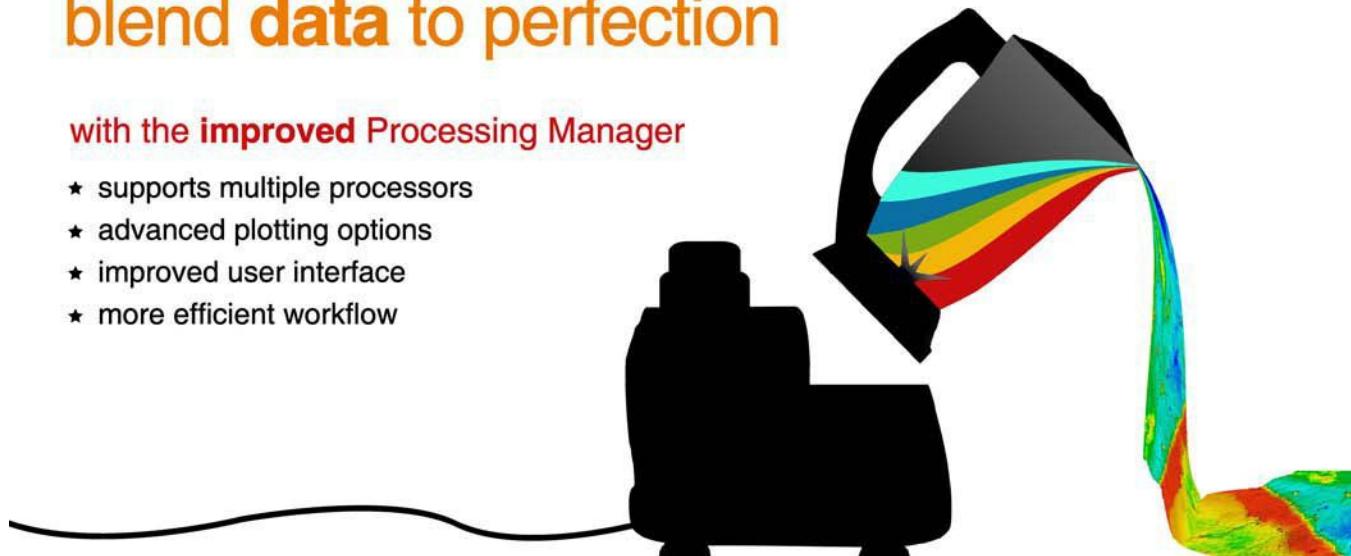
Shell plans to use Transocean's Deepwater Nautilus rig.

The approval was the 18th deepwater drilling permit issued by BOEMRE, Regulation and Enforcement since the agency lifted its moratorium imposed during last year's oil spill disaster, the worst ever in the U.S. Gulf.

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**Maersk expands ultra-deepwater drilling fleet with \$1.3B investment**

Maersk Group has taken up an option for two new ultra-deepwater drillships for \$1.3 billion. Both will be built by Samsung Heavy Industries in South Korea and should be delivered during the second and third quarters of 2014.

The total project cost of around \$1.3 billion covers a turnkey contract with the yard, owner-furnished equipment, project management, commissioning, start-up costs, and capitalized interest.

Maersk Drilling also has secured an option for the construction of two additional drillships.

The two 748-ft long drillships will be of a similar design to two newbuilds Maersk Drilling ordered from Samsung in April. They will be able to operate in water depths up to 12,000 feet, and to drill wells of more than 40,000 feet.

The design follows Maersk Drilling's high-efficiency philosophy for ultra deep-water semis. Features include a dual derrick, which allows for parallel and offline activities. Extensive storage areas and tank capacities should prove advantageous when operating in areas with less developed infrastructure and fewer sup-

pliers. Also, the drillships' higher transit speed and increased capacity should reduce operators' logistics costs. Both vessels will accommodate 230 personnel.

**GeoGlobal confirms Israel rig contract for 'Homer Ferrington'**

GeoGlobal Resources Inc. said the company has finalized the terms of the assignment agreement entered into with a third party

w h e r e b y GeoGlobal took assignment of the third party's rights and obligations to an existing contract for a semi-submersible drilling rig. The Noble HOMER FERRINGTON is a fourth generation enhanced Pacesetter design semi-submersible rig capable of drilling in water depths of up to approximately 7,000 feet. The rig will be available around 1 December 2011.

"The HOMER FERRINGTON is an extremely competent rig," said Paul B. Miller, chief executive officer of GeoGlobal.

*Homer Ferrington***Samsung Heavy Industries extends contract with Pacific Drilling**

Samsung Heavy Industries has signed an agreement with a subsidiary of Pacific Drilling to extend its contract for the construction of a seventh ultra-deepwater drillship. The construction contract was extended until 31 October 2011.

Pacific Drilling is expecting the delivery of another two drillships in 2013 from Samsung Heavy Industries which has also secured a contract worth \$604 million to construct a drillship for a Greek shipper, according to Reuters.

**Seadrill agrees to sell 'West Janus' to Harrington for \$73M**

Seadrill has agreed to sell its jack-up WEST JANUS to Harrington LLC in Dubai for \$73 million. The company expects to record a gain on the sale of the rig, built in 1985, of over \$50 million on closing. Transfer of ownership should go through later this year, after the rig has completed its current drilling assignment.

"We remain optimistic about the market outlook for premium jack-up rigs," said Alf C. Thorkildsen, chief executive officer of Seadrill Management.

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## McDermott to engineer, construct and install compressor modules

One of McDermott International, Inc.'s subsidiaries was awarded full engineering, procurement, construction, and installation (EPCI) of a 750-ton compressor module for BG Trinidad & Tobago's Hibiscus field development offshore Trinidad. The contract is valued at more than \$50 million and was included in McDermott's second-quarter 2011 bookings.

"We are ... working for the BG Group again to deliver this full scope compressor module for the Hibiscus gas field, which will enable BG to increase gas supply to its Atlantic LNG trains," said Stephen M. Johnson, McDermott's chief executive officer. "Where we add value to this field development is by providing the full range of engineering and construction services and managing the project interfaces in house."

Detailed engineering design of the compression module will be carried out by McDermott's Houston-based engineering office along with procurement for the module equipment and some specialty items. McDermott's Morgan City fabrication facility will handle procurement of bulk items and construct the module on



*McDermott is upgrading DB50 which will carry out installation of the Hibiscus module for BGT&T offshore Trinidad. (Photo: Business Wire.)*

site in Louisiana. Engineering commenced in the first quarter of 2011 and fabrication is due to begin by the first quarter of 2012 – with loadout and transportation scheduled for the first quarter of 2013.

McDermott's heavy lift vessel DB50 will set the compressor module at the installation site on the existing Hibiscus platform in a water depth of 500 feet, before performing the compressor mod-

ule tie-in, hook-up, and commissioning on site. The field lies 28 miles off the north coast of Trinidad.

The Hibiscus field is part of BG T&T's North Coast Marine Area development to supply gas to trains 2, 3, and 4 of Atlantic LNG in Point Fortin, South Trinidad.

McDermott is upgrading derrick/pipelay barge, DB50, for deepwater projects to significantly increase the station-keeping capability of the vessel by adding new thrusters and increasing its electrical power supply.

The DB50 will have a new diesel-engine generator set totaling 19.2MW, new switchboards and a state-of-the-art power management/alarm system. Six new 2.4MW fixed pitch / variable AC drive thrusters, will be installed to provide 44 tons of thrust each.

In addition, the freshwater and salt-water cooling system and the supply/exhaust ventilation system will be upgraded in both engine and thruster machinery spaces. DB50 is capable of lifting loads up to 4,400 tons and laying pipe through Reel-Lay and J-Lay up to 20-in. in diameter, in more than 9,000 feet of water.

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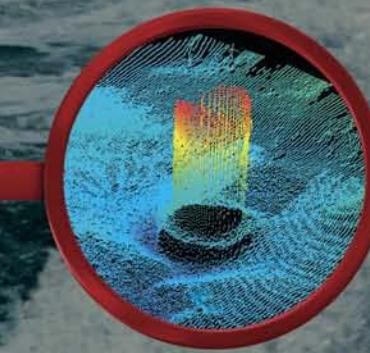
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#### Petrobras joins Gabon pre-salt search; takes a 50% stake in PSC

Petrobras is set to farm into two production-sharing contracts (PSCs) offshore Gabon. The company has agreed to acquire 50% of Ophir Energy's interests in the PSCs, covering the Mbeli and Ntsina blocks. Petrobras also has the right to assume operatorship in both cases. In return, the company will provide a promoted contribution towards the cost of an agreed work program.



Initially, the partners will acquire at least 772 sq mi of 3D seismic data. The acquisition and processing parameters will be designed to image deep pre-salt potential not previously explored in the area.

After completion of the initial program, Petrobras may opt to make a promoted contribution toward the first two exploration wells or withdraw from the PSCs. It also has the right to assume operatorship in both cases.

Petrobras said the transaction was part of its strategy to step up assessment of the pre-salt section along the Atlantic basins. "The Coastal Basin of Gabon is located in an operation focus area for Petrobras – the west coast of Africa," the company said.

#### Chevron frontier exploration well in UK Atlantic margin abandoned

Chevron's Lagavulin exploration well in the UK Atlantic margin has reached target depth, according to partner Faroe Petroleum.

The 217/15-1z well, spudded in October 2010 by the drillship Stena Carron and drilled in 5,141 feet water depth west of Shetland, reached total depth on June 10.

It encountered hydrocarbons and a working petroleum system, but no workable reservoir was present and the well was to be plugged and abandoned.

Faroe said drilling progress was slower than expected, mainly due to operational and technical issues, notably poor weather and the variable drilling formation. These delays pushed up the well cost, the company said.

However, Faroe said the results will further its understanding of the geology and its ability to unlock the basalt play in the Atlantic margin. The company is to participate in two more exploration wells in the area.

#### Repsol makes new oil discovery in Campos Basin offshore Brazil

Repsol Sinopec has made a new oil discovery in the 1-REPF-11A-RJS (Gavea) well in the Campos Basin, offshore Brazil. The Repsol-operated well is located 190km off the coast of Rio de Janeiro.

Gavea was drilled using the STENA DRILLMAX I drillship at a depth 2,708m, reaching a water depth of 6,851m.

The exploration consortium is owned by Repsol Sinopec and Statoil, which each hold a 35% interest, and Petrobras, which has a 30% stake. The consortium is analyzing the results of the well before continuing with exploration and evaluation work in the area.

#### Conoco awarded pair of blocks in deepwater Bay of Bengal

ConocoPhillips has signed a production sharing contract (PSC) with the government of Bangladesh and Petrobangla, covering two blocks in the deepwater area of the Bay of Bengal.

This is the company's first foray into exploration in Bangladesh; it has a 100% working interest in the PSC.

Blocks DS-08-10 and DS-08-11 cover a total area of 1,992 sq mi, in water depths of 3,300-5,000 feet, around 175 miles from Chittagong.

ConocoPhillips claims the awarded area – in Bangladesh's portion of the Bay of Bengal – holds the largest submarine fan in the world.

Bangladesh's deepwater area is virtually unexplored, the company said. Work will start as soon as possible on acquisition of a "large" 2D seismic survey.

#### Seabird to conduct seismic survey on Bonaparte Basin, Australia

Australia's Octanex, through its subsidiary Goldsborough Energy, awarded Seabird Exploration a contract to carry out 2D and 3D shoots over four permits in the South Bonaparte basin, Western Australia.

Under the contract, Seabird will acquire 600 km<sup>2</sup> of 3D seismic data and 1,000 km of 2D seismic data. Seabird will collect the data in permits WA-422-P, WA-420-P, WA-407-P, and WA-421-P. Octanex has completed the reprocessing of 11,000 line km of good quality 2D seismic data.

### Apache dominates Alaska lease sale, gets Cosmopolitan tracts

Apache Corp. won rights to explore for oil and gas in wide areas of Alaska's Cook Inlet, including rights to a known offshore oil field that was recently abandoned by its developer.

Apache, a Houston-based independent energy company, on 22 June submitted most of the \$11 million in high bids received in the lease sale held by the Alaska Division of Oil and Gas this week.

Among the tracts Apache won were portions of the Cosmopolitan field that was being developed by Pioneer Natural Resources Co., according to the Alaska Division of Oil and Gas.

Apache's Alaska subsidiary already had over 300,000 acres in Cook Inlet leases prior to 22 June sale.

The Cosmopolitan leases were relinquished by Pioneer after it decided early this year to abandon the project in favor of more lucrative options.

### Salamander makes oil discovery in East Terrace offshore Thailand

Salamander Energy has made a new oil discovery in the East Terrace prospect, offshore Thailand. The prospect was drilled using the OCEAN SOVEREIGN jack-up rig located on the Bualuang wellhead platform.

The drilling program covered three new horizontal production wells, two horizontal sidetracks of existing wells, and a pilot hole to test the East Terrace prospect.

Salamander encountered a 35m net oil play within three zones: 6m in the upper T5 sandstone interval, 18m of net oil play in the deeper T4 interval, and 11m of net oil play in the lower T3 interval.

Preliminary evaluation of the data from the pressure measurements and fluid sampling evaluations indicate a mid-case estimate of 50 million barrels of oil in place and a most likely recoverable volume in the range of 8 to 14 million barrels of oil.

### Ocean Vanguard to drill Norwegian wildcat for Statoil in the North Sea

Statoil has permission from the Norwegian Petroleum Directorate to drill an exploratory well close to the Volve field in the central Norwegian North Sea. Ocean Vanguard will drill the well after it has completed another wildcat (30/11-8 A) for Statoil in production license 035. The location for well 16/7-10 will be around 6.2 miles northeast of Volve in PL 569, which was awarded earlier this year under Norway's APA 2010 licensing round. The license covers the southwestern portion of Block 16/4. Statoil is the operator, in partnership with ExxonMobil and Total.



*The Saipem 10000 drillship*

### Saipem wins charter extensions for three rigs; approves merger

NDC has extended the charter of Saipem's jack-up Perro Negro 2 by 12 months, starting from the second quarter of 2011. The rig is working offshore the United Arab Emirates. Perro Negro 2 can operate in water depths up to 300 ft.

Eni also has extended its charter of the SAIPEM 10000 drillship by 24 months, starting August 2012. This rig can operate in water depths of up to 10,000 ft. in full dynamic positioning mode.

Offshore Nigeria, Addax has extended its charter of Saipem's SCARABEO 3 by 6 months, starting in November. This is a second generation semi-submersible, operable in waters up to 1,200 feet deep.

In a separate development, Saipem's board has approved the incorporation of Saipem Energy Services into Saipem. Saipem Energy Services offers engineering and project management services and FPSO business management.

The purpose of the merger is to rationalize the holding structure of Saipem's Italian group companies, by integrating Saipem Energy Services' offshore competencies into Saipem's Engineering and Construction Business Unit.

### Noble plans offshore Cyprus gas drilling by year's end

U.S. energy company Noble said it will commence drilling offshore Cyprus for gas by the end of this year and is encouraged by initial indications of deposits. Noble has a concession to explore for hydrocarbons in a field south east of the Mediterranean island, close to major discoveries it made off Israel in 2009 and 2010. Exploration work off Cyprus will be the first attempt by the east Mediterranean island to tap hydrocarbon reserves.



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**Indonesia gives Ruby development the go-ahead for latter part of 2013**

BPMIGAS, Indonesia's upstream oil and gas agency, has approved development of the Ruby gas field in the Makassar Strait between Kalimantan and Sulawesi. Partners PEARLOIL (Sebuku) Ltd., Total E&P Sebuku, and INPEX South Makassar Ltd., expect to invest a total of \$500 million in the field.

The block covers 905 sq mi in the Sebuku production sharing contract area with water depths of 164 to 656 feet.

Plans call for drilling four production wells and installing a wellhead platform and a bridge-linked production platform. Gas will go to shore in a 14-in, 194-mile long pipeline. It is scheduled onstream in the latter part of 2013.

**Nord Stream completes subsea hyperbaric tie-ins in Baltic Sea**

All three sections of the first Nord Stream 760-mile gas pipeline in the Baltic Sea have been joined together using underwater hyperbaric tie-ins. The completed pipeline will now be prepared ahead of connection later this summer to landfalls in Russia and Germany.

Hyperbaric tie-ins were performed at two locations. The connection of the Gulf of Finland and central sections took place offshore Finland in a water depth of 262 feet; linking of the central and southwestern sections was effected in 361 feet of water off the Swedish island of Gotland.

Each tie-in was conducted in an underwater welding habitat and remotely controlled from the Technip DSV Skandi Arctic. Nord Stream will eventually have two parallel pipelines comprising 39-ft. long, 48-in. diameter concrete-weight coated steel pipes, each weighing around 25 tons. Nord Stream will have capacity to transport 2 tcf of gas a year to mainland Europe.

**FMC Technologies to supply sub-sea systems for Shell's Prelude**

FMC Technologies, Inc. (FMC) has signed an agreement with Shell Development (Australia) Pty. Ltd. (Shell) to supply subsea production and associated topside systems for the Prelude field development.

The companies also announced an aftermarket agreement that will result in FMC performing installation and commissioning services for the project. Orders associated with this award will be received throughout the remainder of 2011.

The Prelude field is located in the Browse Basin, northeast of Broome

**Teekay awarded contract for Knarr FPSO project in North Sea**

Teekay Corp. has entered into an agreement with BG Norge Ltd. to provide a floating production, storage, and offloading (FPSO) unit for the Knarr oil and gas field located in the North Sea.

The contract will be serviced by a newly-built FPSO unit to be constructed by Samsung Heavy Industries in South Korea, as previously announced by the company, for a fully built-up project cost of approximately \$1 billion.

The FPSO unit, which will have a maximum design production capacity of 63,000 bbls/d, is scheduled to deliver during the first quarter of 2014, at which time it will commence operations under its charter contract with BG for a firm period of either 6 or 10 years plus extension options for a total period of up to 20 years. Under the terms of the agreement, BG has until the end of 2012 to decide on the firm period of the charter contract.

The Knarr field, previously known as Jordbaer, is located in the Tampen

area in the northern North Sea and is estimated to contain recoverable reserves of some 70 million barrels of oil equivalents, which could increase if drilling results from nearby prospects in the region prove to be successful.

"This project plays to one of our core competencies, which is our strong track record of operating FPSOs in harsh weather environments," said Peter Evensen, Teekay's president and chief executive officer.

The Knarr FPSO design, which makes use of Samsung's previous experience in delivering turnkey FPSO units, incorporates top-side configuration designed for high uptime; the turret mooring system is a proprietary technology the company jointly developed with Framo.

"Over the past several months, we have been working together with Samsung and other key suppliers on the detailed engineering specifications for the FPSO prior to finalizing the contracts with both Samsung and BG," Evensen said.

Evensen added: "Offshore oil fields in the northern North Sea are well suited to FPSO solutions due to the deep-water geography and the lack of existing infrastructure. Given the current high level of offshore activity in the North Sea, this bodes well for further FPSO opportunities for Teekay."

BG is the operator of the Knarr field and its partners are Idemitsu Petroleum Norge AS, Wintershall Norge ASA, and RWE Dea Norge AS.

Western Australia, in water depths of approximately 820 feet.

It will become Shell's first field development to utilize a floating liquefied natural gas (FLNG) facility. FMC's scope of supply includes seven large bore subsea production trees, production manifolds, riser bases, subsea control systems and other related equipment. All subsea equipment will be delivered from FMC's Asia-Pacific operations.

**Total takes delivery of Walkinside 'ITS' for the Pazflor FPSO**

VRcontext International was recently awarded a milestone contract with Total E&P Angola to deliver a 3D Immersive Training Simulator (ITS) for the Pazflor FPSO to be anchored on one of Total's largest offshore producing assets.

Walkinside allowed the Total Training Room Instructors to create customized collaborative scenarios that

were later used to develop improved communication skills of the trainees and to test their execution performance.

Walkinside ITS' scenario editor helped Total E&P Angola simulate real-life workflow situations using different training mode options, with diverse immersive scenarios specifically designed for the planning, scheduling and execution of standard operating procedures.

The implementation of these scenarios can be timed and stored for subsequent operators' assessment, improvement tracking and playback for refresher courses, or novice training, making learning more effective, fun, and easy.

The 3D Virtual Reality models can be automatically created from the existing 3D Engineering CAD drawings using the smart Walkinside converter capabilities. This breakthrough technology helps accelerate safe start-up operation and time to first oil.

## Production

### Pemex to acquire eight offshore platforms in south Gulf of Mexico

Mexico's Pemex is to acquire eight offshore oil platforms worth more than \$1.2 billion in the southern Gulf of Mexico.

The company will use the rigs for the drilling, termination, maintenance, and repair of wells as part of its program to maintain crude oil output at its two biggest oil complexes in the Gulf: the mature Cantarell fields and the nearby Ku-Maloob-Zaap (KMZ).

Five platforms will be used for the KMZ production site, which produced 845,000 barrels a day during the first five months of 2011.

Pemex will also use two Cantarell platforms, which produced 465,000 barrels a day in the January-to-May period this year. The platform leasing program will complete in 2016.

### Petrovietnam to double output from Vietnam field

Petrovietnam is to start production from its jacketed Te Giac Trang field in block 16-1, offshore Vietnam, doubling its output to 95,000 barrels per day.

Soco International, which has a 28.5% interest in the field, said that

from next month, 55,000 bpd will be extracted from the field.

Hoang Long, operator of the block, signed a \$44 million deal with Petrovietnam Equipment Assembly & Metal to construct the topsides of the H4 jacket between now and May 2012, Reuters reported.

Production from the H4 jacket is expected to start from Aug. 2012. With the H4 development, Hoang Long will add 40,000 bpd to Te Giac Trang's output.

### Ithaca Energy restores Jacky field output in UK sector of North Sea

Ithaca Energy has restored stable production from the J01 well in the Jacky field, which is located in the UK sector of the North Sea.

J01 reached 3,120 barrels of oil per day following the replacement of a dual ESP system with slightly larger pumps, which provides greater operational flexibility and prolonged life.

Before the loss of the pump-assisted flow, the well produced 2,800 bpd. The Jacky field is owned by operator Ithaca, which holds a 47.5% interest, along with Dyas and North Sea Energy, which hold 42.5% and 10%, respectively.

### Apache drills two productive wells in North Sea's Forties field

Apache Corp. said it drilled two high-yielding oil wells in the Forties field in the UK North Sea, a sign that new technology is helping to revive the oilfield.

The Charlie 4-3 well began producing at a rate of 12,567 barrels of oil a day, the highest rate seen for a well in the field since 1990, Apache said. The Delta 3-5 well had an initial production rate of 8,781 barrels a day, it said.

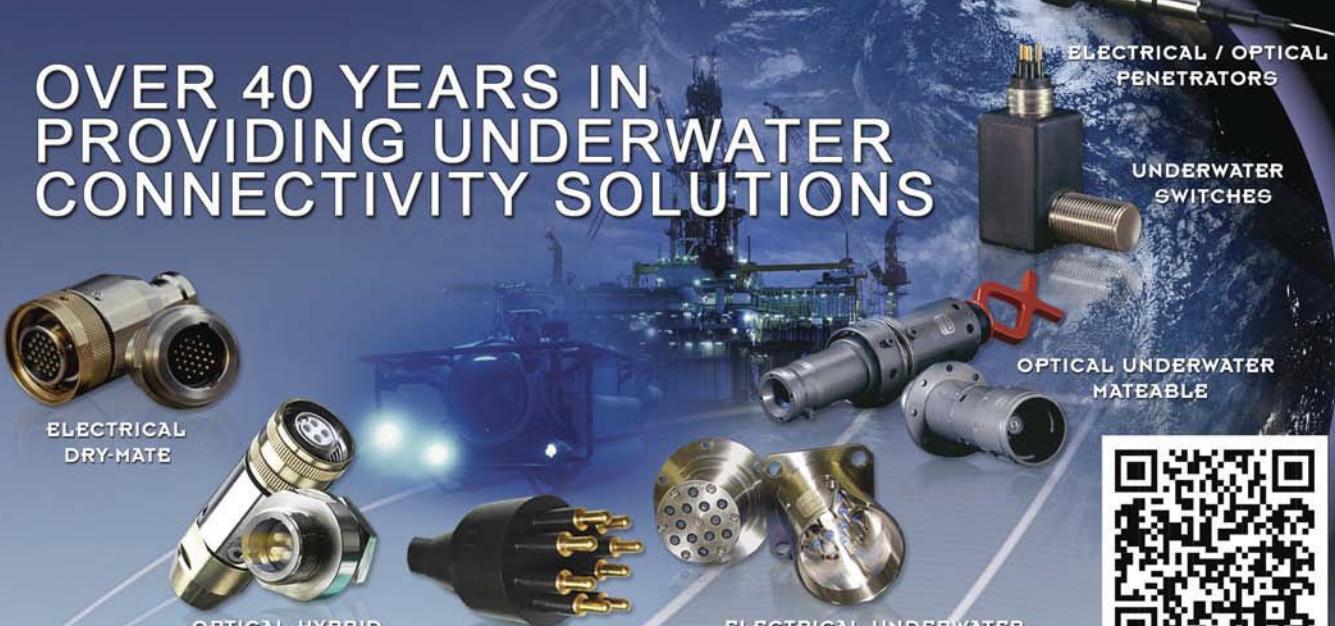
Both wells were completed in June. They are the eighth and ninth development wells drilled during 2011 after Apache acquired a new seismic survey last year, which has allowed the Houston company to identify new pockets of oil and gas. Apache said it expects to drill a total of 16 wells in the field this year.

The Forties field is the UK's second-highest producing oilfield in the UK North Sea. Apache bought the Forties field in 2003. At the time, it was producing 40,000 barrels a day of oil equivalent. The new wells have brought production up to 70,000 barrels of oil equivalent a day, despite disruptions due to construction projects and temporary pipeline closures, Apache said.



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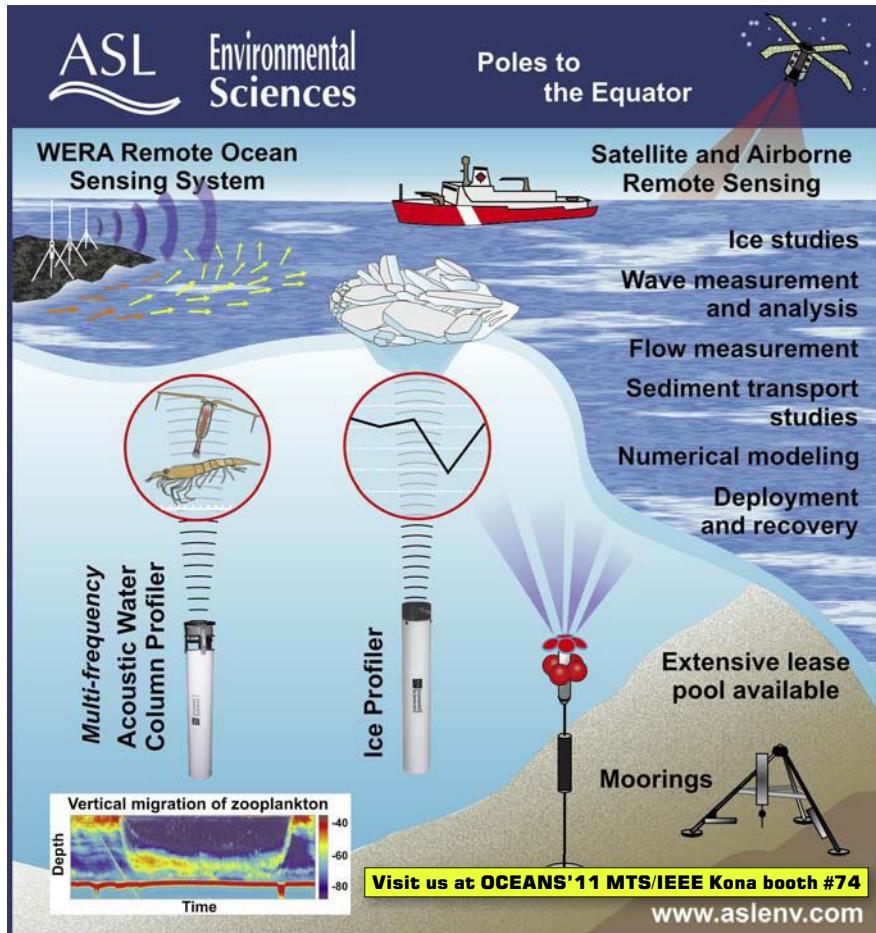
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## Oilfield Equipment

Pipe-Pulse set to revolutionize removal of subsea blockages

Paradigm Flow Solutions has launched patented technology to tackle the persistent industry challenge of restrictions and blockages in subsea pipelines, taking the treatment to the topside for the very first time.

The Aberdeen-headquartered company said that subsea blockages cost operators tens of millions of dollars each year, which before now could only be properly treated by very expensive methods such as deploying a coiled tubing system from a rig into the pipeline or undertaking subsea interventions using a remotely operated vehicle (ROV) or saturation divers.



Pipe-Pulse is a remote, non-intrusive method of locating and removing blockages in long distance pipework up to 30 miles. The system is designed to be connected on the topside facilities of the host platform through either the pig launcher or the umbilical termination unit to clear the blockages. The Pipe-Pulse unit delivers high energy and volume pressure pulses into the pipeline or subsea umbilical, which are transmitted at the speed of sound to the blockage several miles away.

For further information, contact Gayle Nicol, tel. +44 (0) 7702 737135, email [gayle.nicol@bigpartnership.co.uk](mailto:gayle.nicol@bigpartnership.co.uk).

### Schlumberger releases Petrel 2011 E&P with new productivity

Schlumberger has released its Petrel 2011 E&P platform. The new release adds the Studio E&P environment, new productivity, and technological advances, the company said.

Studio Find provides data and knowledge awareness capability as an extension of the Studio Knowledge database, added Schlumberger. This gives search, browse and select options within the context of the project and inside Petrel. "Favorites" lets users make a collection of their most often used processes, and Studio Annotate adds information to highlight items.

"We see three key requirements in a modern software system — integration, extensibility, and productivity. At the heart

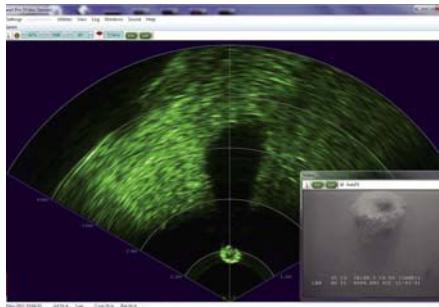
of Petrel is the shared earth model, which enables users across the spectrum of E&P disciplines to integrate information and expertise into a robust reservoir representation," said Tony Bowman, president of Schlumberger Information Solutions.

### **Tritech's latest version of Seanet Pro allows subsea data streaming**

Tritech International announced the latest release of its survey data acquisition, display, and logging software package. Seanet Pro, Version 2, now offers users the ability for remote networkability, allowing subsea data to be streamed between several PCs connected to the same Local Area Network on the surface.

Building on existing capability to network multiple subsea sensors, the package has been updated in line with Tritech's existing and imminent new product ranges, including SeaKing Hammerhead DST sonar and the Gemini multibeam range. The system also provides users with the ability to display a multitude of Tritech sensors and third-party data through SeaNet Pro at any one time.

With the new release, users of Seanet Pro can now create their own windowed layout by selecting their Tritech products and adjusting how they are displayed on screen, highlighting Seanet Pro's straightforward "plug and play" functionality. Seanet Pro is accurate and user-friendly, allowing subsea data to be captured, processed, and translated with ease. The advancement of Seanet Pro is driven by the skills of Tritech's software development team.



Working behind the scenes to capture the very best customer solution for acquisition, control visualization, and data logging, the Seanet Pro software development team comprises Kevin Matson (Software Manager), Christophe Auger & Matt Chamberlain (Software Engineers), alongside three new recruits; Pauline Jepp, Paul McMaster and Edward Thurman. In addition, all new product ranges can be connected and operated with existing Tritech products from a single Surface Control Unit.

To download the latest release of Seanet Pro, visit Tritech's website at [www.tritech.co.uk/support/support-software-seanet.htm](http://www.tritech.co.uk/support/support-software-seanet.htm).

### **SPOC Automation introduces pump control package, HPS Series**

SPOC Automation, the largest independent artificial lift controls manufacturer in North America, has introduced what it believes is the oil and gas industry's most comprehensive, logic-controlled injection pump control package: the HPS Series Drive.

After nearly 3 years of research, development, and field testing, SPOC is delivering a simple, integrated, and cost-effective answer to a pump operator's problems. The days of confusion are gone; the HPS drive has incorporated powerful control logic to conveniently integrate all inputs, relays, and controls inside one panel, making system operation simpler and more effective. The HPS drive also minimizes expenses by decreasing the mechanical wear and tear on the machinery, reducing costly downtime and repairs, and saving energy.

"If your H-pump, Triplex, or other pumps are operating on across-the-line starters, then peak demand charges from utility and energy consumption can cost you thousands of dollars," said Bobby Mason, founder of SPOC Automation. "Running the pump at the required speed to maintain the optimum pressure or tank level, rather than simply using full speed on-off control, reduces energy costs and puts less stress on your pump system."

For more information about the HPS Series Drive or any of SPOC Automation's products, call (205) 661-3642 or visit [spocautomation.com](http://spocautomation.com).

### **Oldham introduces the OLCT 200 gas detection transmitter**

Oldham, an industrial scientific company and leading global provider of fixed gas detection equipment and services, has introduced the OLCT 200 gas detection transmitter. The OLCT 200 fixed transmitter is intended for use in monitoring for hazardous levels of industrial gases. It is designed for use with multiple gas detection technologies, including electrochemical, catalytic bead, infrared, and photoionization detection sensors. This allows the OLCT 200 to detect many typical gases and provides users the ability to standardize one transmitter for all of their gas detection needs. The OLCT 200 is designed for application flexibility and is compatible with nearly any fixed gas detection installation.

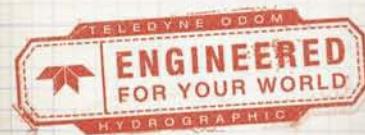
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# Instrumenting and Monitoring Moorings for Wave Energy Converters Testing

By David Parish, Project Engineer, PRIMaRE

Although we know we must reduce our carbon emissions from fossil fuels, there is no consensus on any one obvious replacement energy source — so a variety of technologies are being tried that offer a challenge to science. The rewards for success are immense though, as a future consisting of green energy can offer energy independence as well as environmental and economic benefits. Scientists researching new energy sources, such as innovations that obtain renewable energy from waves, often need the help of other advanced technologies to overcome particular operational difficulties. Once such challenge was solved by Applied Acoustics' Easytrak, which was used to provide crucial seabed positioning information during trials conducted by engineers from the University of Exeter off the coast of Cornwall, UK, last summer.

One of many engineering challenges being faced by the emerging wave energy industry is that of mooring floating devices to the seabed in areas that are renowned for their harsh conditions. The design of a wave energy converter (WEC) mooring system must allow for the forces of a "100 year wave event" with a reasonable factor of safety, and yet the mooring system must remain affordable, deployable, durable and must not impose unacceptable loadings onto the WEC. Further conflicts arise from station keeping requirements and the necessity of many devices to achieve a particular dynamic response to waves such that the energy conversion is achieved. As with any engineering design problem, the more conflicts that are embedded into the design criteria, the more difficult it becomes to identify a suitable solution.

A team at The University of Exeter, led by Dr. Lars Johanning, has developed a facility to assist WEC developers with just this problem. Working within the PRIMaRE group with funding from the European Regional Development Fund and the UK's South West Regional Development Agency, the team of engineers has designed, constructed, and commissioned The South West Moorings Test Facility (SWMTF).



The SWMTF buoy provides the test bed for WEC mooring systems, aiding their design and reducing performance uncertainty and cost

The SWMTF is based around a heavily instrumented three meter diameter buoy with a displacement of 3.3 tonnes. Specially developed "tri-axial" load cells bolted to the underside structure provide data corresponding to both the instantaneous magnitude and direction of the mooring line loads at the attachment points. Further axial load measurement is made on each mooring limb to provide redundancy to these data sets. Onboard measurement of the buoy's dynamic behavior is made by an inertial sensing unit, and the buoy position is recorded to a high accuracy by a survey quality DGPS rover set operating with a dedicated base station located close by. The data acquisition system operates at 20 Hz using the GPS time stamp to mark the individual data sets for post processing and analysis. Wind and surface water currents are also measured onboard the buoy with wave recording being performed by acoustic Doppler current profilers (ADCPs) located on the seabed adjacent to the buoy.



1.1-tonne drag embedment anchors provide the seabed attachment points for the buoy (Photo courtesy of Mojo Maritime Ltd)

By analyzing the data transmitted to shore from the buoy, Dr. Johanning and his team will be able to accurately define many critical performance parameters of the mooring systems deployed and relate these to the real sea conditions encountered. As well as facilitating design improvements, this work will reduce the uncertainty associated with WEC moorings which will in turn reduce their cost and, ultimately the cost of electricity generated from wave energy.

The buoy's initial mooring configuration comprises three chain catenaries with nylon rope tails installed at the upper end to reduce snatch loadings. Each of these mooring limbs is anchored to the seabed by a 1.1-tonne drag embedment anchor and a short length of ground chain.

Critical to the complex analysis of each mooring system deployed for evaluation is knowledge of the precise location of the embedded anchors. To ensure that the team can survey anchor positions for each deployment, the University of Exeter

has purchased an ultra-short baseline (USBL) acoustic positioning system from Applied Acoustic Engineering Ltd. Unlike some USBL positioning systems, the Easytrak system will accept a GPS (or DGPS) input and can output absolute positions for the acoustic beacons rather than positions relative to the survey vessel. This feature was pivotal in the selection of the AAE positioning system for the SWMTF.

The Easytrak USBL system uses a specific acoustic signal generated from the transducer suspended just below the survey vessel. This signal is received by a beacon attached to the target object, and a reply is sent back to the transducer on a different frequency. The measured two-way travel time allows computation of range, and the bearing is calculated from phase measurements of the signal returning to the USBL transducer. Integral pitch and roll sensors correct for transducer movement. In this operation, the Easytrak transducer was suspended on its cable, rather than from a metal pole, speeding up deployment.

The SWMTF is located off the eastern coast of the Lizard peninsula in Cornwall, UK, four nautical miles from Falmouth harbour entrance. The waters are busy and are host to shipping, scientific, engineering, and defense activity. To ensure a good signal to noise ratio and hence preserve the accuracy of the system, Applied Acoustics' 1000 series Mini beacons were selected rather than the smaller Micro beacons. The larger Midi beacons were considered too large for the planned dive operation in a depth of 33 meters.

Marine contractors Sub Marine Services Ltd were engaged to deploy the beacons by means of a surface air dive team having full communications and a live video link to the dive support vessel.

Three divers in turn descended to the three anchors at HW slack tide and used cable ties to attach the beacons to the anchor shackles before returning to the surface. The

beacons were positioned close to vertical to ensure a clear signal path to and from the survey vessel. The acoustic survey was then undertaken by University of Exeter engineers between tides, and the beacons were recovered at LW slack tide. The survey itself was undertaken from the University's research vessel, a fiberglass Workcat, while the steel hulled dive support vessel was moved away to minimize the ferromagnetic effect acting on the USBL transducer's internal compass. Any remaining ferrous effect was calibrated out following the procedure detailed in the Easytrak manual.

A DGPS rover receiver provided a NMEA-format position input to the Easytrak system. The GPS antenna providing the uncorrected rover position was mounted directly above the Easytrak USBL transducer during the survey, and the rover unit was receiving the error correction signal over 458MHz radio from the dedicated DGPS base station located at the Nare Point NCI station. Several short bursts of data were taken, transferring the text files to a ruggedized laptop for analysis. The Easytrak system displays absolute position coordinates according to the UTM (Universal Transverse Mercator) grid system based on the WGS84 ellipsoid.



*The Applied Acoustics' positioning beacons were attached to the anchor shackles in an upright position*



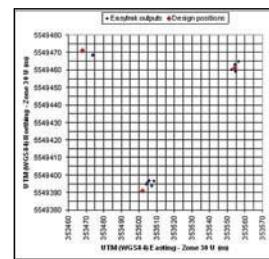
*The steel dive boat was moved away during the acoustic survey to reduce ferrous effects on the system's compass*

The diagram (right) shows the design target anchor positions for the initial deployment of the SWMTF and the position results returned by the Easytrak system. The results demonstrate that a good level of accuracy had been achieved when the anchors were deployed. There are five data points for each anchor position, the NW position showing extremely good repeatability in the results.

The team from the University of Exeter will also use the Easytrak system to accurately survey the position of the ADCPs. This will allow the wave event time series to be aligned with the time series data recorded onboard the buoy.

Since conducting the anchor survey, the SWMTF has been acquiring and transmitting data, which are now being processed and analyzed onshore. The mooring system will be changed during 2011, and it is expected that a second anchor position survey will be required at this time.

The on-going research activity that will utilize the SWMTF includes projects with industrial partners that are funded through national and international funding bodies such as the Carbon Trust and the Technology Strategy Board. These organizations recognize that by reducing the uncertainty that is associated with WEC moorings the cost effective generation of electricity from wave energy can move a step closer — with the accurate seabed positioning data provided by Easytrak playing a valuable role.



*The results demonstrate that the anchors were deployed with a good level of accuracy*



*David Parish is a Project Engineer at PRIMaRE (Peninsula Research Institute for Marine Renewable Energy) at the College of Engineering, Mathematics and Physical Sciences (CEMPS), University of Exeter, UK.*

## University of Maine orders Iver2 AUV

The Physical Oceanography Group (PhOG) of the University of Maine, School of Marine Sciences, has purchased an Iver2 (model EP42) for research programs, with delivery expected July of this year. Professor Neal R. Pettigrew's PhOG research unit has operated an array of oceanographic real-time data buoys and an HF radar network as an Integrated Ocean Observing System (IOOS) in the Gulf of Maine since 2001. They plan to use the Iver2 to extend and verify observations from the buoy array and carry out detailed surveys as part of their new Maine Center for Autonomous Marine Surveys (MCAMS).

Initial tasks for the Iver2 include surveys in Casco Bay and Penobscot Bay that will focus on transport through channels between islands and peninsulas and small-scale fronts caused by flow around islands and over shoal bottom topography. Iver2 survey data will be combined with current measurements from data buoys to characterize the general circulation of the bays. The Iver2 will also be used for mapping bottom topography and tracking tagged fish in the region.

The Iver2 AUV, equipped with side scan sonar, multi-beam sonar, current profiler (ADCP), and CTD sensors will be an additional asset used for data collection and mapping in the Gulf of Maine and other regional waterways. Data collected during Iver2 AUV missions will supplement other methods already in practice, including observations from satellites, ships, buoys, floats, gliders, and cabled instruments. The EP42's open system architecture also gives the University of Maine the opportunity to add additional internally developed sensors for a range of applications.

All Iver2 AUV models come standard with OceanServer's VectorMap Mission Planning and Data Presentation tool, which provides geo-registered data files that can be easily exported to other software analysis tools. This unique AUV design has enabled OceanServer to carve out a very strong position in the research space for AUVs, sensors, and behavioral studies. The VectorMap program can input NOAA ENC or any geo-referenced charts, maps or photo images, allowing the operator to intuitively develop AUV missions using simple point-and-click navigation.

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



## U.S ports to be protected by VideoRay technology

VideoRay announced that it has been awarded a \$2.2 million dollar contract by the Combating Terrorism Technical Support Office (CTTSO) of the U.S. Department of Defense to modernize the United States Coast Guard's (USCG) fleet of VideoRay ROVs.

VideoRay systems have been employed by the Department of Homeland Security at various ports since 2003, inspecting ships and harbor infrastructure. The ROVs have been used for both routine and emergency responders to inspect ship hulls and individual pilings of piers and bridges for explosive devices; to help direct divers to an area of interest; to search for, and recover, evidence that has been discarded in a body of water; and to inspect an object or area of interest before deploying divers.

This contract will update all USCG VideoRay ROVs to the latest technology, including sonar, an improved non-acoustic navigation system, video enhancement, advanced ship hull inspection capabilities, and other improvements required to expand their role and work in challenging conditions. The CTTSO and USCG project includes requirements for 100% search coverage while assuring 100% probability of detection (POD) in very strong currents, with low visibility water.

"VideoRay is honored to be selected by CTTSO and the USCG for this contract," said Scott Bentley, president of VideoRay LLC. "The Technical Support Working Group (TSWG) within CTTSO has considerable experience and expertise in selecting the most effective tools from vendors in a competitive marketplace, then helping field those solutions effectively."

This contract will help take VideoRay's dominant worldwide market position in underwater security and bring it to the next level, integrating our robots with the most effective sensors and software to accomplish very challenging underwater missions."

Suppliers of sensors integrated on the new VideoRay configurations include KCF Technologies of State College, Pennsylvania; BlueView Technologies of Seattle, Washington; and Lyyn AB of Lund, Sweden.

VideoRay's current ship hull crawler capabilities – which lead the industry – were critical in the selection of VideoRay in this contract. Through this contract, CTTSO and the USCG will work with VideoRay to increase their flexibility and capability.

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



### New subsea drill passes schilling robotics factory acceptance testing

Schilling Robotics, LLC, experts in subsea systems, and Gregg Marine, Inc., experts in drilling and geotechnical testing services, announced the successful completion of their Factory Acceptance Testing on their new Seafloor Drill. Gregg will begin field testing their drill in the waters offshore of Vancouver, British Columbia this July.

The Seafloor Drill was conceived by John Gregg, president of Gregg Drilling, Inc. He approached MARL Technologies and Schilling Robotics to bring his concept into reality. MARL was able to provide the drilling platform, and Schilling engineered the controls, power systems, and subsea packaging for the system.

"This is one of the first platforms commercially available to truly compete with traditional geotechnical drill ships, and the only one to utilize patented wireline technology," said Gregg. "The design and durability of this platform will save companies on cost, increase accuracy, and offer a positive environmental impact. The system is rated to 3,000msw, and with the initial tooling, will drill up to 500ft (150m) under the seabed. This is the first seabed



drilling unit to combine this much power and drilling precision on the seabed."

Combined with Gregg's 3000msw rated DeepCPT and 6m One-pass Drill, the Seafloor Drill will benefit oil and gas companies, mineral and mining companies, and scientific organizations. Gregg feels that in the future with additional tooling capacity, the unit will be capable of exceeding 200m.

"We are proud to again partner with Gregg Marine for the engineering and assembly of their Seafloor Drill system. This is the first of four systems that Gregg will build, and it is changing the landscape of drilling and core sampling technology," said Tyler Schilling, president and CEO of Schilling Robotics, LLC. "We are excited to be a part of the innovation and global applications that Gregg is implementing," said Schilling.

The Drill will be used for geotechnical surveying and core sampling, but its design flexibility also allows Gregg to change the tools downhole for additional activities. Utilizing patented wireline technology through a license from Williamson Technologies, Gregg will be able to switch out the drill head and perform Cone Penetration Testing (CPT) to determine strength parameters in soft soils. Other tools are being developed, such as a down-hole vane shear test and geophysical tools to give 3D modeling capabilities. Gregg's seafloor drill will revolutionize the industry with the capability to offer all of these technologies within one platform.

For more information, visit [www.schilling.com](http://www.schilling.com) or [www.gregdrilling.com](http://www.gregdrilling.com).

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## Underwater Intervention

Canada's Pro-Dive Marine Services is first to take delivery of the powerful new Panther XT Plus work ROV from top manufacturer, Saab Seaeye.

Billed as the most powerful ROV of its class, the Panther XT Plus has over 50% more thrust than its nearest competitor and a power to weight ratio twice that of the competition.

Packed with ten powerful thrusters, it can swim over 30% faster than anything else and will hold steady in strong cross currents, making it ideal for a range of work and survey tasks.

Ten thrusters in hand also bring peace of mind to operators working on a tight deadline or in difficult conditions by offering a reassuringly high degree of redundancy.

The Panther comes with two Schilling Orion manipulators, one four function with a 7.8-in. gripper and the other seven- function with a 3.8-in. PA gripper. Also included is a manipulator-held hydraulic cleaning brush tool and a CP contact probe.

In addition to operating larger and heavier manipulator arms, the ROV's



higher payload allows a greater range of tools and sensors to be fitted.

The Pro-Dive vehicle itself comes ready to take additional sensors and is fitted with an Imagenex 881A sonar head.

Also onboard is a Seaeye wide-angle low-light color camera; a Kongsberg high-definition mono low-light CDD camera; and a Kongsberg color zoom camera.

Pro-Dive's complete system includes a Saab Seaeye tether management system (TMS) fitted with two cameras along with an A-frame launch and recovery system (LAR) upgraded to Atex Zone II specification and fitted with a snubber-rotator upgrade for safe recovery.

The whole operation is managed from a purpose-made, Lloyds-certified, 16 foot control cabin.

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

### Hydro-Lek Manipulator used to recover black boxes from Air France Flight 447

A Hydro-Lek manipulator was used to successfully recover both flight recorders from Air France 447. The HLK HDR6R is a compact, rugged 6-function arm designed for the new breed of smaller work class ROVs. It was used by U.S.-based Phoenix International Holdings, Inc. (Phoenix), experts in deep ocean search and recovery operations, on its ROV Remora at depths of 3,900 meters to clear debris and grab hold of the FDR and CVR and place them into a basket for recovery to the surface.

Fitted with a selectable actuator at the shoulder joint, the HLK HD6R is mountable in four separate positions to allow port and starboard mounting as well as offering additional up or down functions. This allows for additional reach into holes or restricted pipe ends.

"Phoenix has used Hydro-Lek's 6-function rate manipulator for a number of years now. It offers excellent value for the money and has helped perform numerous successful salvage operations for our government and commercial

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## Underwater Intervention

clients in depths of up to 5,400 meters," said Steven Saint Amour, Phoenix's Manager of ROV Operations.

Phoenix has used the HLK HD6R manipulator for the past 12 years in the recovery of an F-14, SH-60 helicopter, Airbus 310, ATR 72, and a Boeing 737 – testimony to the ability of Hydro-Lek's products to withstand the toughest conditions over a long period of time.

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

### BlueView secures integration agreement and initial order with Schilling Robotics

BlueView Technologies, the world leader in compact acoustic imaging and measurement technology, and Schilling Robotics, a leading global, deep-ocean robotics company, signed a Systems Integrator Agreement that enables Schilling to re-sell BlueView 2D and 3D products on Schilling Remotely Operated Vehicles (ROVs). In the coming weeks BlueView will deliver the 4,000 meter depth rated systems to Schilling for integration onto their ROV systems. The deepwater imaging sonar utilizes BlueView's new S2 oil compensated elec-



tronics in the industry's smallest deepwater housing to deliver crisp imagery and accurate data.

"BlueView imaging systems are in high demand and quickly becoming standard equipment for offshore ROVs providing essential data and imagery for operators, especially in low and zero visibility conditions," said Peter MacInnes, Vice president sales & marketing, Schilling Robotics, LLC.

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](http://www.blueview.com).

### USCG and ADCI announce partnership to help promote commercial diving industry safety

The USCG and the Association of Diving Contractors International announced an agreement to form a Partnership Action Team to promote and improve safety within the commercial diving industry.

The USCG and ADCI seek to achieve improved safety within the industry through enhanced communication, collaboration, and cooperation. The intention of the agreement is to complement other industry partnerships and provide a more efficient means for joint USCG and ADCI interactions.

"Today's agreement aligns our shared efforts to elevate commercial diving safety standards," said Rear Adm. Paul Zukunft, the assistant commandant for Marine Safety, Security, and Stewardship. "As the effort to revise commercial diving regulations continues, I'm hopeful this partnership will improve effectiveness by bringing the Coast Guard and the represented segment of industry together in a cooperative effort to enhance diver safety and environmental protection within the commercial diving community."

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**KVH debuts online training center**

KVH Industries launched its new E-Learning Center for marine technicians who install and service KVH products at dealerships and distributorships around the globe. The KVH E-Learning Center features a complete training course for the TracPhone V7 and mini-VSAT Broadband SM service. The comprehensive course is divided into easy-to-follow modules that can each be completed in less than an hour. The system tracks participants' progress through the course, so it's easy for technicians to pick up where they left off at their convenience. Once they've completed all of the modules, technicians take the certification exam online. When they pass the exam, technicians are granted Certified Service Provider status. In the coming months, the E-Learning Center will offer courses on KVH's other TracPhone satellite communications and TracVision satellite entertainment systems.

**Vizada launches advanced broadband packages**

Vizada has launched a range of highly flexible global maritime broadband packages seamlessly integrating Ku-band VSAT and mobile satellite services (MSS), including the newly-launched Vizada XChange™. The Vizada global maritime broadband packages provide unmatched choice to shipping companies: they can select the combination of VSAT, MSS hardware, and airtime best suited to their needs while being able to upgrade to a higher bandwidth plan or next generation satellite service during or after contract termination. The packages range from unlimited 256 Kbps VSAT airtime-only starting at \$1,500 per month up to an unlimited 1024 Kbps VSAT plus MSS airtime and hardware back-up for a monthly fee of \$2,750. Customers can choose between a VSAT antenna from Thrane & Thrane, Vizada's preferred partner, as well as Intellian or Sea Tel, with the Inmarsat FleetBroadband 250 and 500 or Iridium OpenPort service as back up. The coverage of Vizada's Pharostar VSAT service will be extended in the Indian and Southern Atlantic Oceans in 2011 and 2012, enabling shipping companies to benefit from global Ku-band connectivity. In this way, Pharostar connectivity is available on the main shipping routes from Asia to South Africa, overcoming what is considered the main gap in global VSAT coverage.

**MTN wins Product of the Year award**

MTN Satellite Communications (MTN) announced that its MTN Worldwide TV service was selected as a winner of the 2010 Communications Solutions Product of the Year award. Launched in March 2010, MTN Worldwide TV is the first fully-digital, multi-channel television service for the maritime industry servicing more than 54 ships and reaching more than 44,000 cabins globally. MTN Worldwide TV delivers programming from seven major U.S. and international television networks, including BBC World News, CNBC, Fox News, and Sky Sports News. The service leverages three overlapping satellite beams that integrate seamlessly with a ship's existing Television Receive-Only (TVRO) antenna and onboard video distribution system to make installation easier. By managing the satellite network and the content, MTN assures that viewers on the ships receive reliable, uninterrupted service. The Communications Solutions Product of the Year award recognizes the industry's most innovative products that facilitate voice, data, and video communications. For this award, TMC considered products and services that were brought to market between March 2009 and March 2010.

## Consilium, Orange announce agreement for maritime satellite services



Consilium Marine Group, a worldwide supplier of marine products and customer services, and Orange Business Services, a leading global integrator of communication solutions, have signed a high-level global cooperation agreement. Under the terms of the agreement, Consilium will globally market Orange marine VSAT communication solutions through its 34 offices in 19 countries.

Orange Satellite Services includes a VSAT satellite communication system specially developed for marine communications that integrates vessels into a corporate network, enabling access to all business applications as if the vessel is a terrestrial office.

This global cooperation brings together the 40 years of satellite and maritime experience from Orange Business Services with Consilium's leadership in developing and marketing products and systems for safety and navigation to the shipping industry.

For more information, visit [www.orange-business.com/content/bridging-ships/bridging\\_ships.htm](http://www.orange-business.com/content/bridging-ships/bridging_ships.htm) or [www.consilium.se](http://www.consilium.se).

### Inmarsat announces upgrade pathway to Global Xpress service

Inmarsat has announced a pathway product to its future Global Xpress™ (GX) service, providing maritime users with access to both Ku-band VSAT and L-band FleetBroadband services in a bundled package.

Initially available from Ship Equip and Stratos, Inmarsat's direct distribution channel, the new offering will deliver a fully-integrated managed service for an inclusive monthly fixed fee. It is intended to be available to all GX-appointed distributors.

Designed to provide a bridge to Inmarsat's Ka-band

Global Xpress service, the package includes a guaranteed free hardware upgrade when Inmarsat's new service becomes available in 2013.

### **SS/L to provide multi-mission communications satellite to Telenor**

Space Systems/Loral (SS/L), the leading provider of commercial satellites, has been awarded a contract to provide a multi-mission spacecraft for Telenor Satellite Broadcasting (TSBc). The satellite, THOR 7, will include Telenor's first Ka-band payload, which will be used for maritime broadband services. It also includes a Ku-band payload for expanded broadcast capacity in Central and Eastern Europe.

THOR 7 will be positioned, together with the existing THOR fleet, at 1 degree West. Based on SS/L's highly reliable 1300 satellite platform, it will be equipped with 11 Ku-band transponders, dedicated to expanded broadcast services in Europe, and additional Ku-band capacity for backup. The Ka-band payload will be used to meet the growing demand for high-bandwidth broadband communications by the maritime industry and includes spot beams over the North Sea, Norwegian Sea, Red Sea, Baltic Sea, Persian Gulf, and Mediterranean.

THOR 7 is scheduled to begin service in early 2014.

For more information, visit [www.ss-loral.com](http://www.ss-loral.com) or [www.telenorsbc.com](http://www.telenorsbc.com).

### **Marlink supplies VSAT to Songa Offshore**

Marlink has recently signed a new contract with offshore drilling specialist, Songa Offshore. As part of the new agreement, Marlink will deliver and install its Sealink™ C-band VSAT services on Songa's semi-submersible rigs, including

SONGA ECLIPSE, a 6th generation Friede & Goldman ExD ultra deepwater rig, providing each drilling rig with 1024 Kbps bandwidth to support a range of business critical applications.

Throughout the provision of its services to Songa Offshore, Marlink will work closely with Viking Innovations, an IT service provider to the global offshore market. Marlink's ongoing collaboration with the company will enable Songa Offshore to benefit from an extensive range of advanced satellite communications and network services, including



VoIP telephony for local dialing tones virtually anywhere, specialized networking aboard each rig, e-mail and storage solutions and desktop support.

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

### **KVH mini-VSAT Broadband to cover South America**

Fulfilling its goal of creating a seamless global maritime VSAT network, KVH Industries, Inc., announced that coverage for the last remaining region in KVH's original network plan — South America — is now under contract and scheduled to go live in July 2011 using the IS-14 satellite. This joint effort by KVH and its partner, ViaSat, Inc., will provide mini-VSAT Broadband(SM) service to leisure mariners, commercial shipping and fishing vessels, and the expanding South American oil and gas industry as well as network coverage for ViaSat's Yonder(R) in-flight broadband network for commercial and business aircraft.

A managed airtime network solution, mini-VSAT Broadband equips vessels with the highest data rates available today, with downloads as fast as 2 Mbps and uploads as fast as 512 Kbps, as well as

Voice over IP (VoIP) telephone lines with optimized service and prioritization of applications. The network uses ViaSat ArcLight(R) spread spectrum technology, which was previously available only for military applications.

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

### **Stratos introduces Inmarsat XpressLink managed broadband service**

Stratos Global announced the commercial availability of Inmarsat XpressLink from Stratos, its newest managed global broadband service for the maritime industry.

Inmarsat XpressLink is the latest addition to Stratos' maritime broadband portfolio. Inmarsat XpressLink from Stratos offers enhanced Ku-band coverage and bandwidth and leverages the global capabilities of FleetBroadband. Inmarsat XpressLink offers the only guaranteed upgrade path to Inmarsat's Global Xpress Ka-band service. Global Xpress, which is expected to be commercially available in 2013, will deliver speeds of up to 50 Mbps.

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

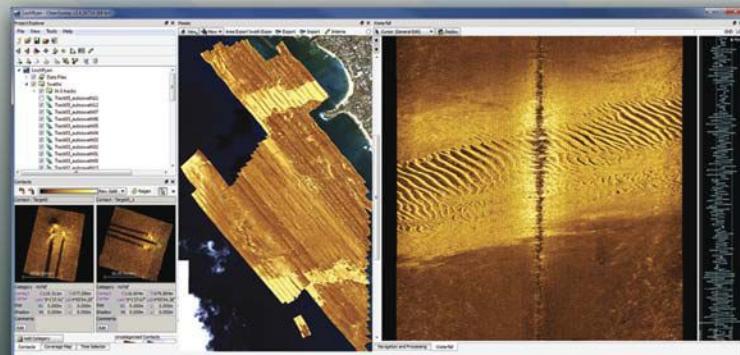
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**Nexans to build cable plant in U.S.**

Nexans has announced its intention to build a plant for the manufacture of underground Extra High Voltage (EHV) cables and possible extension to submarine HV activities in the United States. Nexans is investing in the new plant to capitalize on the significant investments expected in EHV cables in North America in the coming years. The total investment is expected to be approximately US\$80 million. The plant is expected to begin operation in the summer of 2013.

**OSD to design Boskalis-SMIT cable laying vessel**  
OSD-IMT, the UK arm of Offshore Ship Designers, has been chosen by Samsung and Boskalis-SMIT Engineering to develop the basic design, detailed design and production drawings for a 99 meter cable laying vessel. The vessel combines a large, obstruction free main deck with ample accommodation facilities, allowing for multiple future configuration possibilities. In the current cable laying configuration, the deck has a cable loading capacity of 5,000 tons. In May, Royal Boskalis Westminster N.V. placed an order with Samsung for the construction of a power cable laying vessel. The vessel with an overall length of 100 meters and is expected to be completed in the second half of 2012.

**Global Marine Systems invests in upgrade of CS Sovereign**

Global Marine Systems Limited has announced a major upgrade of its CS SOVEREIGN vessel. Global Marine's marine engineering team worked closely with an offshore handling equipment supplier to design and build two 2,300 ton turntables, in order to expand the ship's capability for a further round of offshore renewable energy projects. The CS SOVEREIGN, which is stationed at Portland in Dorset, has had two basket turntables built into its existing cable tanks during a brief dry-docking period. These turntables are designed to operate at a maximum linear speed of 1,000m/hr and have been adapted to seamlessly accommodate the vessel's existing hydraulic power units. The conversion further expands the flexibility of CS SOVEREIGN, enhancing its role as an ideal vessel for the installation and burial of coilable and non-coilable cables.

## **Emerald Atlantis engages TE Subcon for trans-Atlantic system**



Emerald Atlantis Limited (EA) and TE SubCom, a TE Connectivity Ltd. company and an industry pioneer in undersea communications technology, today announced the finalization of an Instruction to Proceed (ITP) to build the Emerald Express Trans-Atlantic Cable System. The first phase of this project will provide both low-latency and ultra-high bandwidth capacity between the U.S., Canada, UK and Iceland, requiring 5,200km of advanced submarine fiber optic cable. To achieve the desired ultra-high capacity rates, Emerald Express has been designed to support 100x100Gbs on each of its six fiber pairs.

The trans-Atlantic marine cable route survey between UK and Canada commences in early August and the Emerald Express system will enter service in late 2012. The Emerald Express system includes a high-capacity connection to Iceland, allowing Iceland-based data centers to offer ultra-low latency connections to Europe and North America, and provides two stubbed branching units positioned off Newfoundland and Ireland to support future connectivity.

For more information, visit [www.emeraldatlantis.com](http://www.emeraldatlantis.com) or [www.subcom.com](http://www.subcom.com).

**G-P cable retired**

The Guam-Philippines (G-P) submarine fiber optic cable has been retired after 12 years of service. The owners of the cable reported to the U.S. Federal Communications Commission (FCC) that the cable was retired on 30 June 2011.

The cable connected Batangas, Philippines with Tanguisson Point, Guam. It entered service in March 1999 at 5 Gbps. Although it reportedly could be upgraded to at least 20 Gbps, its capacity remained at 5 Gbps until its retirement, according to FCC data.

G-P was owned and operated by the Guam Philippines Cable Limited Partnership, a private joint venture led by Japan's Kanematsu Corporation.

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

**Infinera supports Pacnet in restoration after Japan earthquakes**

Infinera has announced its achievement in delivering technology to support Pacnet's restoration of damaged terrestrial and subsea optical networks following the earthquakes and tsunami that devastated northeast Japan earlier this year.

## Subsea Telecom

Pacnet is Asia's leading independent telecommunications service provider and operator of a regional network providing connectivity among Japan, Hong Kong, China, the United States, and other countries throughout the Pacific Rim.

Days after the disaster, Infinera was given the task to deliver 400 Gbps of capacity over Pacnet's Japanese subsea and terrestrial networks as quickly as possible without compromising Infinera's high standards. Infinera's response was an immediate commitment to get the network into the customer's desired state, the company said in a statement.

Without any delay, Infinera assembled a virtual task force in Tokyo, Singapore, and Sunnyvale to put in place a detailed recovery plan. Four days later, all the equipment required to restore the 400 Gbps of capacity over the Pacnet subsea and terrestrial networks was shipped to Tokyo.

In all, it took the Infinera Japanese support team — after battling extreme conditions and tight timelines — less than four weeks to install, commission and test the entire new 400 Gbps of capacity.

The Infinera DTN based Submarine Solution delivers the benefits of Infinera's

Digital Optical Networks architecture, enabling ease of scalability and operation, as well as seamless interoperability with a terrestrial Infinera network. Infinera has deployed more than 85,000 kilometers of subsea networks across five continents.

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

### Transworld, SubCom to upgrade TW1

Transworld Associates (Pvt.) Ltd. (Transworld), Pakistan's first private submarine fiber optic cable operator, and TE SubCom (SubCom), a TE Connectivity company formerly known as Tyco Telecom and an industry pioneer in undersea communications technology, announced plans to upgrade the TW1 undersea cable system. TW1, which was constructed by SubCom and began operations in 2006, connects Pakistan, UAE, and Oman. The upgrade, scheduled for completion by the end of 2011, will deliver enhanced connectivity in the region.



The TW1 system, which spans more than 1,200 kilometers, is composed of a two-fiber pair link with an ultimate design capacity of 1.28 Tbps. SubCom's flexible upgrade solution will provide the option of adding six additional wavelengths using plug and play technology. Upgrading TW1 will provide additional high-speed connectivity needed to fuel the ongoing growth of IT and telecom in Pakistan.

For more information, visit [www.tw1.com](http://www.tw1.com) or [www.subcom.com](http://www.subcom.com).

### BIMP-EAGA spells out cable plan

The Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN Growth Area (BIMP-EAGA) is continuing the development of an estimated \$150 million submarine cable link that will establish direct connectivity from Borneo to Mindanao, the cable link gateway in Southern Philippines.

The submarine cable project, dubbed as BIMP-EAGA Ring, was one of the collaborative projects discussed in the 4th BIMP-EAGA CEO Forum held in Puerto Princesa City recently. The forum was a private-sector gathering of key private ICT players from all across the sub-region.

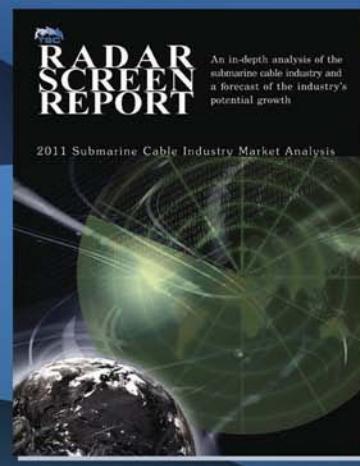
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## Subsea Telecom

The proposed BIMP-EAGA Ring will facilitate direct interconnection and allow telecommunications services in BIMP-EAGA to expand, connect, and diversify networks with the rest of the Asian countries, particularly Singapore and Hong Kong.

A collaboration project on setting up a BIMP-EAGA international telecommunication link is being explored between Brunei International Gateway (BIG) and Malaysia's Sedcom Communication Sdn Bhd of Sabah.

For more information, visit [www.bimp-eaga.org](http://www.bimp-eaga.org).

### REANNZ and Pacific Fiber sign foundation agreement

REANNZ (Research and Education Advanced Network New Zealand Ltd) and Pacific Fiber have signed a \$91 million definitive agreement for the supply of international capacity on the new Pacific Fiber cable system. The agreement was approved by the REANNZ board and by shareholders Ministers Hon. Bill English and Hon. Dr. Wayne Mapp.

Formed in 2005, REANNZ owns, operates, and enhances New Zealand's advanced network — the Kiwi Advanced Research and Education Network (KAREN) — with and for the New Zealand academic community.

REANNZ, which was founded by the Crown in 2005, has 129 member organizations with connections at 186 sites across New Zealand. The international capacity agreement will secure their ability to fully participate as part of a global network of over 100 research and education networks.

For more information, visit [www.karen.net.nz](http://www.karen.net.nz) or [www.pacificfibre.net](http://www.pacificfibre.net).

### Pacnet boosts Japan network capabilities

Pacnet, Asia's leading independent telecommunications service provider, has increased the capacity between its Osaka Point of Presence (PoP) and its cable landing station (CLS) in Shima with the addition of two 10G waves to meet the growing demand for connectivity as businesses enhance their business continuity and disaster recovery (BCDR) plans across Japan.

Beyond expanding backhaul capacity, Pacnet has also enhanced its network to enable traffic from Western Japan to go directly out of Japan to Asia through its Shima CLS. Previously, network traffic would need to be routed terrestrially through Eastern Japan before leaving Japan through its Ajigaura CLS. With this shorter route, customers are able to benefit from a reduction in network latency, which improves the performance of their latency-sensitive applications.

Additionally, this route enhancement also boosts Pacnet's network diversity in Japan by delivering alternative routing, which delivers more resilient connectivity across the country.

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

### Huawei completes construction of Mataram-Kapang Cable System

Huawei Marine Networks (HMN) has successfully completed construction of the Mataram-Kupang Cable System. This system is about 1,200km long, connecting five islands off the east of Indonesia, with a total of seven landing points.

The MKCS system is the first fiber optic submarine cable system in this region and has the potential to increase bandwidth over a thousand times what is currently available in these areas, HMN said in a statement.

The MKCS system is owned by PT Telkom, the largest state-owned telecoms operator in Indonesia. The project represents phase one of the Palapa Ring program launched by the Indonesian government and will connect central and western communications backbone, giving Indonesia's major islands high-speed Internet access. The new system supports a wide range of broadband applications, such as high-

**Subsea Telecom**

speed video and 3G services as well as providing conventional communications services for east Indonesian residents.

The system includes two links, both of which are more than 400km long. It marks the first commercial deployment by Huawei Marine Networks using advanced Enhanced Raman technology.

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

**Agreement reached for commercial operation of Alexandros**

Cyprus Telecommunications Authority (CYTA) has announced an agreement for the commercial operation of the Cyprus-Egypt segment of its private submarine cable subsystem, Alexandros. Following the successful activation of the Cyprus-France segment in August 2010, the Cyprus-Egypt segment is planned to be activated during summer 2011, complementing available capacity and connectivity in the Mediterranean ahead of other competing submarine systems passing through Egypt. Furthermore, the landing in Egypt provides the opportunity to transport CYTA traffic to key European and Asian destinations and cost-effectively reach regional markets accessible via Egypt.

Alexandros subsystem is the result of the strategic co-operation agreement in the Mediterranean region between CYTA and Telecom Egypt (TE), according to which CYTA participates on an ownership basis in the TE submarine cable system TE NORTH (TEN), connecting Egypt with Points-of-Presence of TE and CYTA, in France. The TEN system has been constructed by Alcatel-Lucent and utilizes eight fiber pairs with total capacity of more than 10 Tbps. The system is equipped with branching units that enable it to be extended to selected countries in the Mediterranean, thus creating a communications bridge between these countries, Europe, Africa, and Asia, as well as business opportunities in the Mediterranean and Eurasia.

Under the agreement, the TEN system has been extended to Cyprus via a direct branch and CYTA has acquired separate fiber pairs between Cyprus-Egypt and Cyprus-France, each with 96x10 Gbps total capacity. CYTA intends to further upgrade most of the 96 available wavelengths to 40 Gbps, and later on to 100 Gbps. The agreement also allows for an option of extending the Alexandros subsystem to a CYTA landing station in Greece.

Through the Alexandros subsystem, CYTA achieves an optimum configuration

for its business needs, enhancing connectivity in the Mediterranean and providing international network robustness and reliability. At the same time, Alexandros allows CYTA to provide high-quality bandwidth to other telecommunications providers in Cyprus and elsewhere and access new markets, serving the international telecommunications needs of Cyprus in general.

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

**Pacific Fibre selects TE SubCom**

Pacific Fibre and TE SubCom, a TE Connectivity Ltd. company, announced the signing of a supply contract for the Pacific Fibre undersea cable system. The system will stretch 12,750 kilometers and boast a significantly higher cross sectional capacity than any other trans-Pacific cable.

Intended to meet the increasing demand for international bandwidth in Australia and New Zealand, which has

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**Globally**

**in the Field**

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**at Depth**

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[www.oceanspecialists.com](http://www.oceanspecialists.com)  
Florida - Boston - Houston - Singapore

**Volume 17 • Issue 7**

**ON&T August 2011**

**67**

A large advertisement for Ocean Specialists Inc. (OSI) features a central image of a submarine cable system stretching across the ocean. The cable is shown being laid by a ship, with an oil rig visible in the background. The OSI logo, featuring two blue dolphins above the letters 'OSI', is prominently displayed at the top. Below the logo, the text 'Subsea Networks' and 'connecting your business' is written in yellow. The word 'Globally' is overlaid on the left side of the cable, and 'in the Field' is overlaid on the right side. At the bottom, the text 'Network development from business plan to commissioning' is written in yellow, followed by 'at Depth'. The bottom of the ad contains the OSI contact information: 'Ocean Specialists Inc.', 'www.oceanspecialists.com', 'Florida - Boston - Houston - Singapore', and a QR code. The page number '67' and the issue information 'ON&T August 2011' are also present.



been growing at a rate of 55% per year, the Pacific Fibre system is planned for completion in 2014. The two-cable system will link Australia and New Zealand via a trans-Tasman cable, while connecting New Zealand to the United States via a trans-Pacific cable. The cable landing points will be in Sydney, Australia; Auckland, New Zealand; and Los Angeles, California in the United States.

Upon completion, the Pacific Fibre system will be the highest-capacity-per-fiber-pair system ever built. The cables will each have two fiber pairs, with an ultimate cable design capacity of 12.8 Tbps.

For more information, visit [www.pacificfibre.net](http://www.pacificfibre.net) or [www.subcom.com](http://www.subcom.com).

### LS Cable wins first U.S. project

LS Cable & System has won a turnkey contract for a submarine power cable pro-

ject in the United States. The award is the first for a submarine power cable manufacturer from South Korea in the U.S. market. The company won a contract for a 35kV submarine cable project from National Grid, a power grid operator in the eastern United States.

The project is for a submarine cable link between Long Island and Captree Island in New York. According to LS Cable & System, the significance of this contract is that it is a turnkey contract covering cable delivery to installation and completion test. The installation is scheduled for completion by the end of 2011.

Since becoming the first submarine power cable maker in Korea, LS Cable & System has won a number of contracts. Following a contract for submarine cable installation between Jeju-do and Jindo in 2009, LS Cable & System won contracts for a submarine cable network project between Hwawon and Anjwa; a wind power plant pilot complex in Woljeong-ri, Jeju-do; and a submarine cable project for tidal power generation complex covering from Jangjuk to Sudo of Jeollanam-do in 2010.

In addition, LS Cable & System won a contract for a 20kV submarine cable

installation project for 10 kilometers from Tidore Island to Ternate Island to the north of Indonesia in 2010 and a contract for a 33kV submarine cable delivery and power grid project in the island areas of Sarawak, Malaysia in 2011.

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

### India-Sri Lanka power cable

Plans for a submarine power cable connecting the electricity grids of India and Sri Lanka are progressing. The project, estimated to cost Rs 25 to 30 billion, is to be jointly implemented by the PowerGrid Corporation of India and the Ceylon Electricity Board, the largest power company of Sri Lanka.

The total length of the connection between the two countries will be 285km, with the submarine portion being about 50km. The 1,000Mw line was scheduled for completion in 2013, but that date has been pushed back.

PowerGrid has completed the feasibility study for the project and has offered to assist Sri Lanka in completing theirs.

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

### Nur Energie plans Tunisia-Italy power cable

Solar project developer Nur Energie Ltd. announced the acceptance of the technical terms for the connection of its TuNur utility-scale solar export project from Tunisia into the Italian power network.

Under the terms of the offer, Terna, the Italian high-voltage transmission network operator, has specified a preliminary technical solution to connect up to 2,000MW of solar power produced in the Tunisian desert to the Italian network with grid infrastructure sufficient to transport electricity to neighbor European countries.

Based on Terna's offer, Nur Energie will now accelerate planning for the cable interconnection across the Mediterranean, which involves laying a submarine high-voltage direct-current (HVDC) power cable to transport the electricity from Tunisia directly to European markets.

Nur Energie is an independent solar power plant developer in the Mediterranean region. Since 2008, it has focused on projects using CSP, PV, and CPV technology in Europe as well as North Africa. Its first project is a 38MW CSP project on the island of Crete in Greece, and it is active in Tunisia and Morocco as well.

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

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## Power Cables

### BOEMRE completes study of undersea power cables

The Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) announced the completion of a two-year study into potential ecological effects of electromagnetic fields (EMF) emitted by sub-sea power transmission cables. The study's key findings relate to engineering solutions that reduce EMF exposure, identification of data gaps in existing scientific literature, and suggested research priorities to direct future work in studying electromagnetic fields.

The findings will assist the Bureau in evaluating the effectiveness of strategies designed to avoid or reduce potential effects on marine wildlife from cables associated with future offshore renewable energy projects on the Outer Continental Shelf (OCS).

"As the nation moves toward commercial development of offshore renewable energy resources, we must continue our effort to expand our knowledge and understanding of the potential effects on the marine environment of emerging technologies and power transmission," said BOEMRE Director Bromwich.

Renewable energy projects on the OCS are expected to use subsea power cables to transmit electricity generated offshore into an onshore power grid. These undersea power transmission cables generate EMFs that may be detected by marine organisms. This study synthesizes information regarding the potential ecological effects of EMF exposure on marine organisms. The results of this study will assist in the evaluation of the cables and configurations most well-suited for energy transmission, environmental protection, and economic viability.

Although the study suggests more work is needed to fully understand the nature and magnitude of any potential effects on marine species from subsea power cables, the findings provide useful technical assistance that will be useful in analyzing proposed renewable energy projects on the OCS.

*Effects of EMFs From Undersea Power Cables on Elasmobranchs and Other Marine Species* is available at: [www.gomr.boemre.gov/PI/PDFImages/ESPIS/4/5115.pdf](http://www.gomr.boemre.gov/PI/PDFImages/ESPIS/4/5115.pdf).

### Phase one of Prysmian/Draka integration completed

Prysmian has unveiled its new organizational structure, marking an important step forward in the integration with Draka, following the closing of the acquisition in March and the delisting from the Amsterdam Stock Exchange in April.

Along with the new organizational structure, which comes into effect from July, the Group has set itself a new Mission and a new strategy that aims at promoting both the Prysmian and the Draka commercial brands under the new Prysmian Group corporate umbrella.

Most of the product lines will be managed by both geography and business, from building wires and underground power transmission and distribution, to fiber optic and copper telecom cables and

special cables for industrial applications for renewable energy and the oil & gas industry. The more globalised product lines (submarine cables, optical fiber and telecom components, cables for the automotive, transport and aerospace industries, flexible pipes and umbilicals for the oil & gas industry, special cables for elevators) will be managed cross-nationally by business.

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

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## Meeting Growing Domestic and International Demands for Moorings and Navigational Aids

Within this ever-changing offshore industry, timing is everything. In every situation, being proactive wins each time over simply reacting to the cyclical conditions created by the downturn in the economy, the increasing bureaucracy, and the never-ending regulatory changes that dictate the way the offshore industry is able to move – or in many cases not move.



### Industry Adaptive

A global presence for a company that works within an industry that is growing globally while stagnating regionally is not just important, it is absolutely necessary. One company that has targeted this global marketplace is Wet Tech Energy.

Based in south central Louisiana and incorporated since 1999, Wet Tech has become one of the largest offshore mooring and navigational aid service providers in the Gulf of Mexico through the introduction of their own fully mobilized offshore service vessel for their projects.



Wet Tech serves a wide range of production and exploration companies, from the super majors to the large and small independents, including engineering and service firms offering aids to navigation buoys, mooring/anchoring, fabrication, and many other diverse services. Its track record includes the highest level of customer satisfaction, top quality service, and a safety record that is second to none in the hazardous industry of anchor handling.

With an experienced management team that for many years has thought outside the box while adapting and evolving with the ebb and flow of the industry, Wet Tech has not only successfully provided services to the offshore oil industry for over a decade, but has also ventured into a wide range of other industries such as government and private weather monitoring, alternative energy, military contracts, ports and harbors, and the fabrication and construction industries.

### Globally Proactive

As the leading Gulf Coast supplier of cost-effective mooring services, fixed structure and floating aids to navigation, and a host of other technical services, Wet Tech has always adapted to the ever-changing needs of the offshore industry.



With the domestic offshore industry remaining stagnant, Wet Tech has aligned itself with two major players in the global marketplace: Tideland Signal Corporation and Floatex S.R.L. who, respectively are the world leaders in aids to navigation and buoy manufacturing. With a global footprint extending to the farthest reaches of the world's oceans, both Tideland Signal and Floatex have been providing their customers with products of unmatched quality and unequalled reputation for over 50 years.

With Tideland providing a complete inventory of the highest quality self-contained and conventional LED lanterns, range lights fog signals and detectors,



solar power systems, rotating beacons, Racon systems, and customized remote monitoring systems and Floatex providing anchor buoys, pipeline floats, and subsea flotation products engineered to perform in depths of up to 3,000 meters below the sea surface, Wet Tech will be able to handle projects anywhere in the world and in any environment. These new partners will provide their professional products to Wet Tech for installation, maintenance, and service all over the world and concurrently in Wet Tech Energy's "back yard", where both companies are seeking to establish a strong presence with a company such as Wet Tech to handle the crucial service end of the equation.

### Meeting Higher Demands

These plans will offer the Gulf of Mexico operators a new cost-effective and much more proactive approach to the service and maintenance of their fixed and floating aids to navigation systems. Gulf of Mexico operators, amidst all the recent regulatory changes, are ready for this optional service method that will enable them to reduce operating costs, maintain better data, and not only meet stringent new government regulations but exceed them on all fronts.

Working together to create a synergistic relationship among this combined group of experienced industry leaders, the winners will be not just the broad range of clients with whom they work and who will enjoy the benefits of the highest combined quality of products and services but, most importantly, the mariners whom they all ultimately serve and support by ensuring navigation and moorings all over the world are consistently operationally reliable and of the highest level of safety.



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# Offshore At-A-Glance

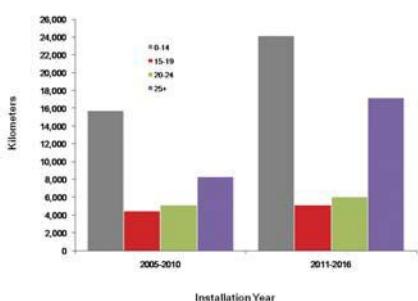
## Quest Offshore Activity Report

### Worldwide Pipeline Demand Growth

#### Worldwide Pipeline Demand Growth

2005 – 2010 vs. 2011 – 2016

Globally, future pipeline demand will see more export pipeline kilometers installed than infield kilometers as key trunk line projects near fruition.

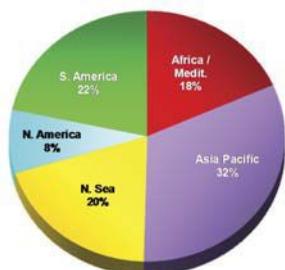


### Worldwide Pipeline Demand by Region

#### Worldwide Pipeline Demand by Region

2011 - 2016

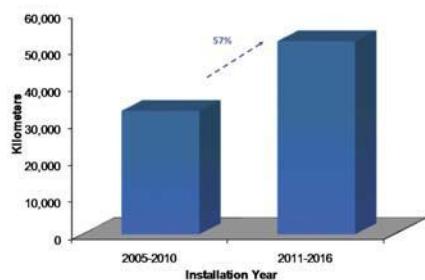
Globally, deepwater pipeline demand is fairly evenly spread across the regions, with the exception of Southeast Asia



### Worldwide Pipeline Demand Growth

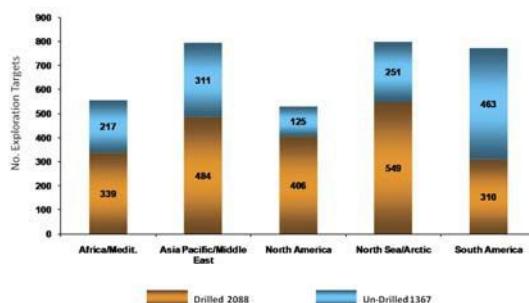
#### Worldwide Pipeline Demand Growth

2005 – 2010 vs. 2011 – 2016



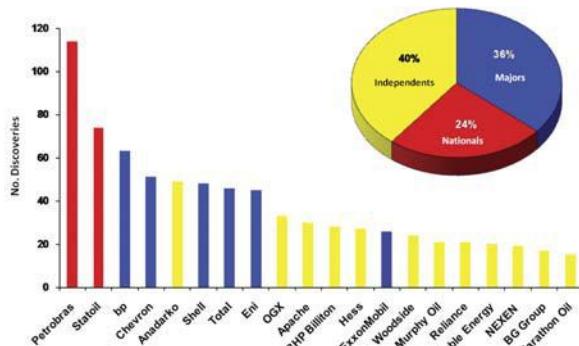
### Exploration Targets

#### Exploration Targets by Hemisphere 2004-2013 (Normalized) 3,455 Exploration Targets



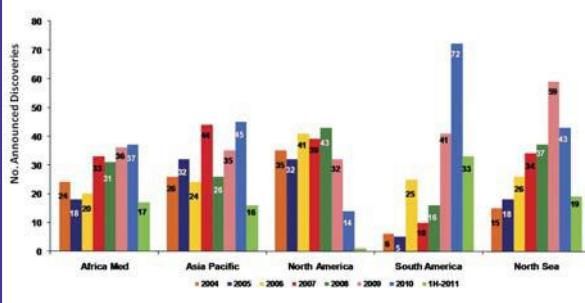
### Top 20 Operators

#### Top 20 Most Successful Operators 2004-1H-2011 (771/1160 Discoveries)



### Discoveries

#### Discoveries by Hemisphere 2004-1H-2011(1160)

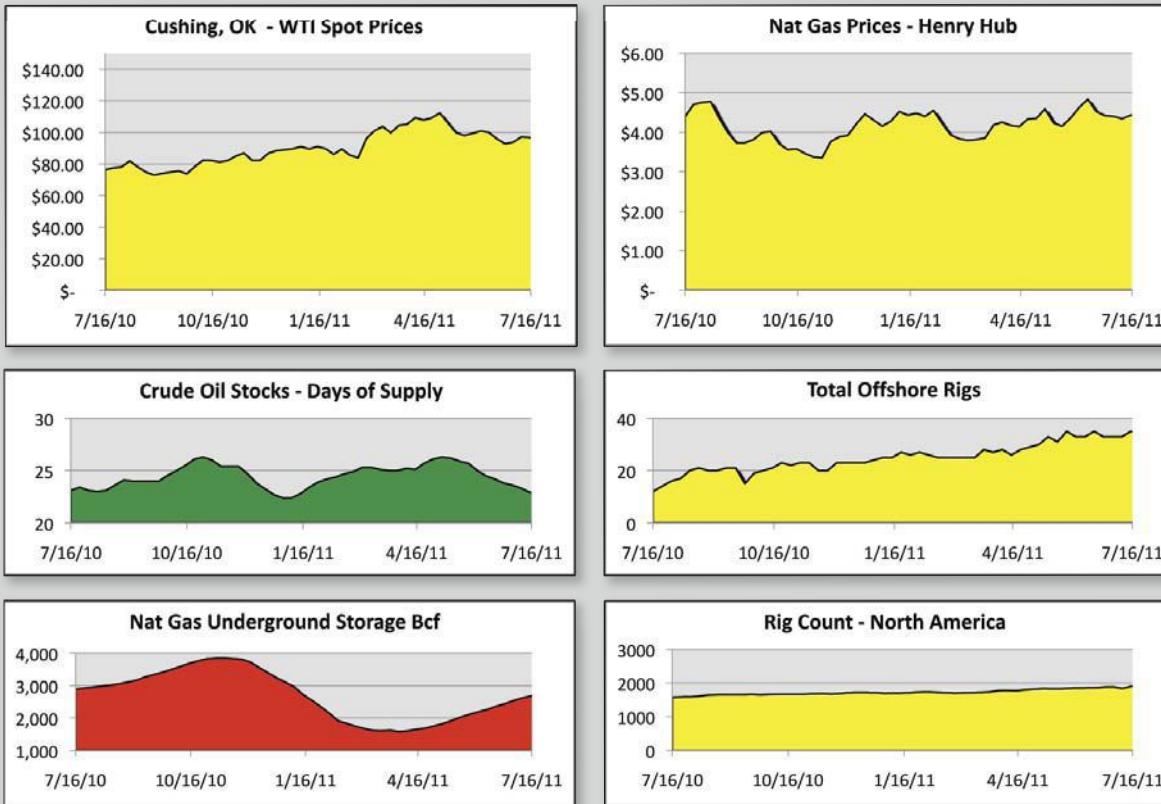


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# Oil & Gas Industry Trends

*Monitoring the pulse of the US Offshore Oil & Gas Industry*



**positive trend at least 3 weeks**

**changing trend < 3 weeks**

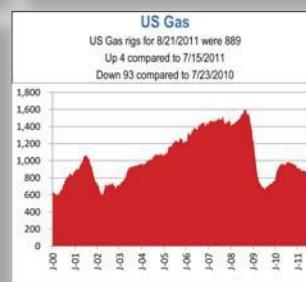
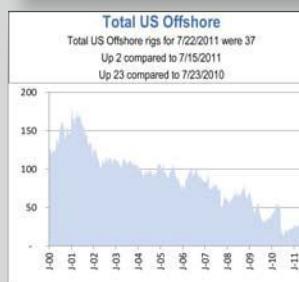
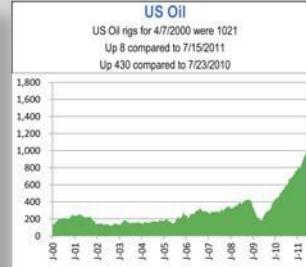
**negative trend at least 3 weeks**

## Baker Hughes Rig Report

### North American Rig Report

July 22, 2011

Location	Week of 7/22	Week Ago	Year Ago
	+/-	+/-	+/-
Land	1861	9	1852
Inland Waters	18	0	18
Offshore	37	2	35
U.S. Total	1916	11	1905
Gulf of Mexico	37	2	35
Canada	376	-18	394
N. America	2292	-7	2299



# Gulf of Mexico Data

## Current Deepwater Activity

Operator	OCS Area/Block	Lease	Rig Name	Prospect Name	Water Depth(ft)
Shell Offshore Inc.	AC 859	G20871	NOBLE DANNY ADKINS	Tobago	9,627
Anadarko Petroleum Corp.	DC 620	G23528	ENSCO 8500	Spiderman	8,055
Shell Offshore Inc.	AC 857	G17565	H&P 205	Great White	7,813
Statoil Gulf of Mexico LLC	WR 969	G26419	T.O. DISCOVERER AMERICAS		7,813
ExxonMobil Corp.	KC 919	G21447	MAERSK DEVELOPER	Hadrian	6,941
Chevron USA Inc.	KC 736	G22367	T.O. DISCOVERER INSPIRATION	Moccasin	6,750
Chevron USA Inc.	KC 785	G25806	T.O. DISCOVERER DEEP SEAS		6,590
Noble Energy Inc.	MC 519	G27278	ENSCO 8501	Santa Cruz/Santiago	6,500
BP Exploration & Production inc.	GC 743	G15607	T.O. DEVELOPMENT DRILLER III	Atlantis	5,405
Eni US Operating Co. Inc.	MC 728	G16644	T.O. DEEPWATER PATHFINDER	Triton (mc)	5,376
BHP Billiton Petroleum (GOM)	GC 738	G16786	T.O. DEVELOPMENT DRILLER I		4,468
Chevron USA Inc.	GC 640	G20082	T.O. DISCOVERER CLEAR LEADER	Tahiti	4,298
BHP Billiton Petroleum (GOM)	GC 653	G20084	GSF C.R. LUIGS	Shenzi	4,232
ATP Oil & Gas Corp.	MC 941	G16661	NABORS 202	Mirage	4,000
Nexen Petroleum USA Inc.	GC 504	G22968	ENSCO 8502		3,600
ATP Oil & Gas Corporation	GC 299	G22939	DIAMOND OCEAN VICTORY	Clipper	3,456
Murphy E&P Co.	GC 338	G21790	NABORS MODS 200	Front Runner	3,325
Marathon Oil Co.	GB 515	G20792	DIAMOND OCEAN MONARCH	Ozona	3,287
Shell Offshore Inc.	MC 762	G07957	NOBLE JIM DAY	Deimos	3,140
Shell Offshore Inc.	GB 158	G07995	H&P 202	Brutus	2,985
Shell Offshore Inc.	MC 807	G07963	H&P 201	Mars b	2,945
Shell Offshore Inc.	GB 426	G08248	AUGER	Auger	2,861
Shell Offshore Inc.	GB 427	G07493	NOBLE JIM THOMPSON	Auger	2,721
Chevron USA Inc.	VK 786	G10944	NABORS 87	Petronius	1,754
LLOG Exploration Offshore, LLC	MC 751	G33175	NOBLE AMOS RUNNER	Goose	1,624
Mariner Energy, Inc.	MC 66	G24040	CAL DIVE Q-4000	Ochre	1,144
Stone Energy Corp.	MC 109	G05825	H&P 206	Amberjack	1,030
Nexen Petroleum USA Inc.	GC 50	G24139	DIAMOND OCEAN SARATOGA	GC 50	922

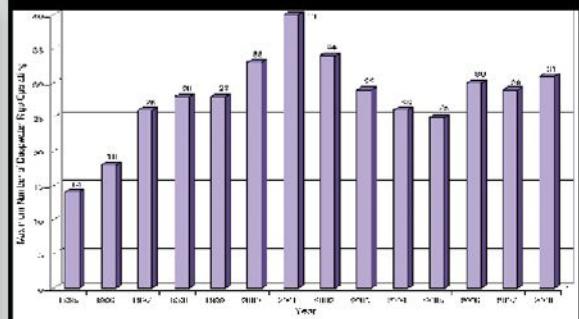
Deepwater prospects with drilling and workover activity: 28

### Current Deepwater Activity as of Monday, July 18, 2011

#### Activity by Water Depth

Water Depth in Meters	Active Leases	Approved Applications	Active
0 to 200	1,965	33,819	3,172
201 to 400	130	1,110	20
401 to 800	300	835	10
801 to 1,000	395	510	7
1,000 & above	3,302	1,653	26

#### Rig activity by year



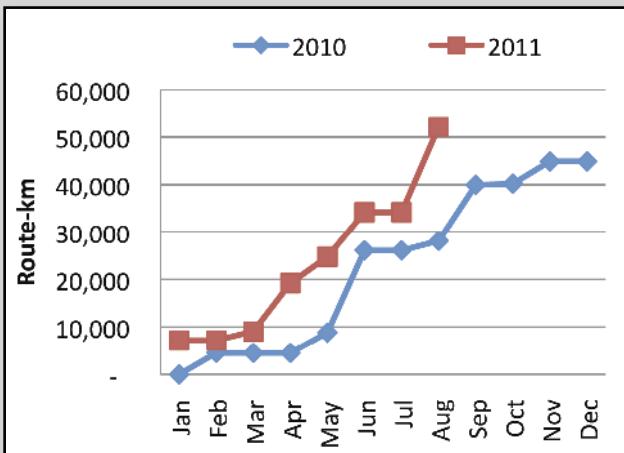
Activity by water depth Information current as of Monday, July 18, 2011

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.

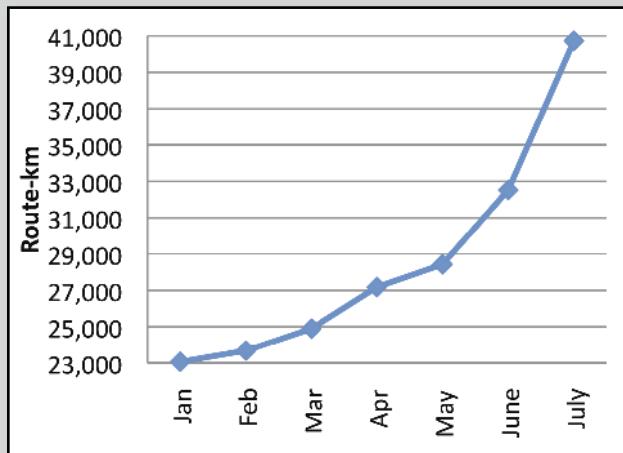
Information provided courtesy of the U.S. Bureau of Ocean Energy Management

# Subsea Telcom & Power Cable Data

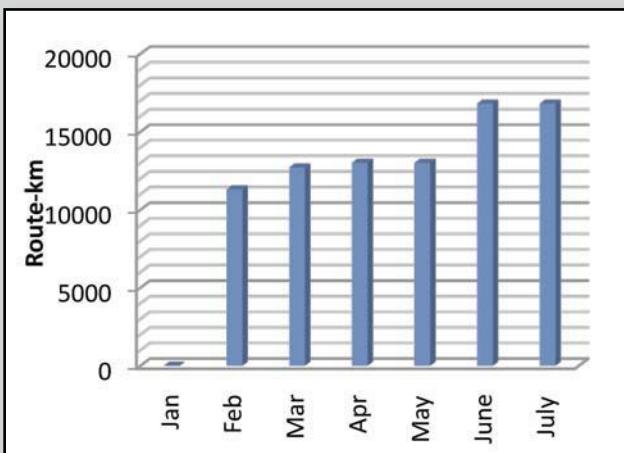
**FO Cable Awards by month**



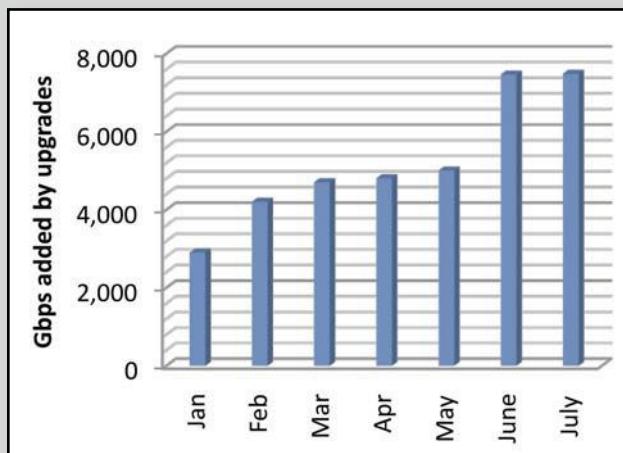
**FO Cable Announcements 2011**



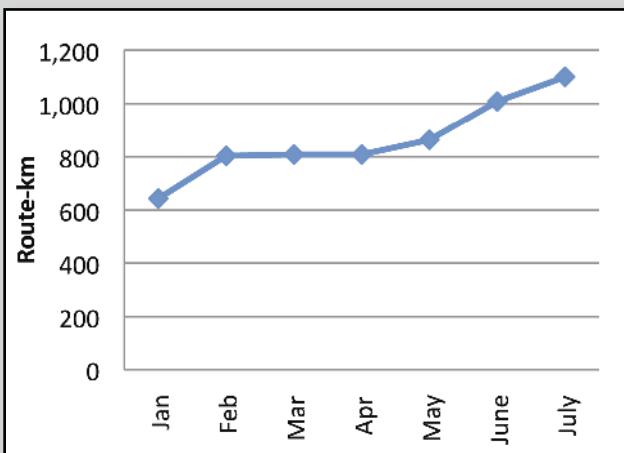
**Submarine FO Cables Entering Service 2011 in route-km**



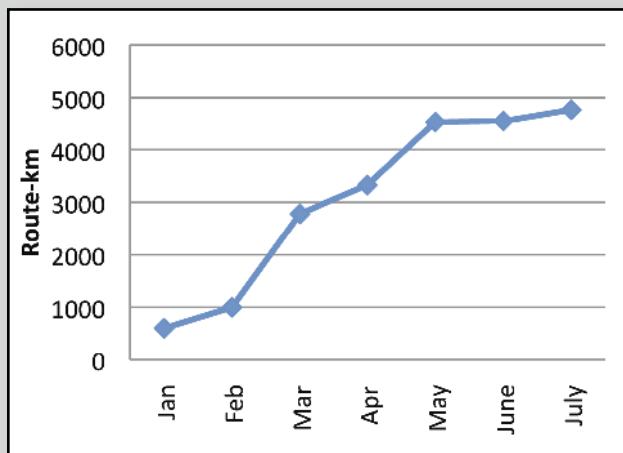
**Upgrades of Existing Cable Systems in Gbps**



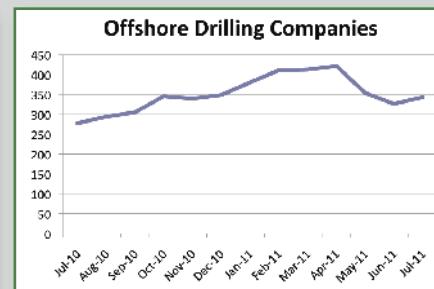
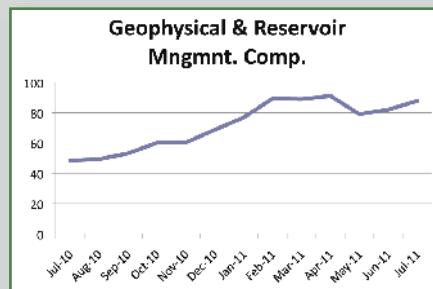
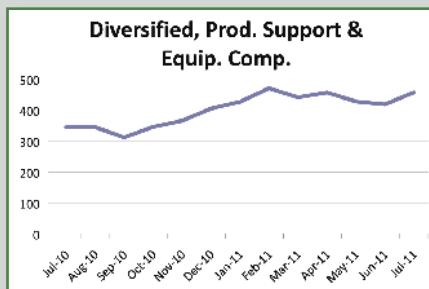
**Submarine Power Cable Awards 2011 in route-km**



**Submarine Power Cable Announcements 2011 in route-km**



# Monthly Stock Figures & Composite Index

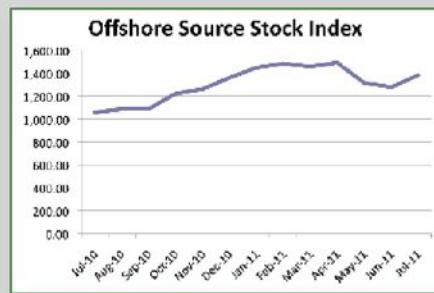
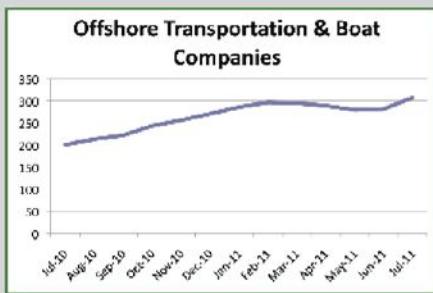
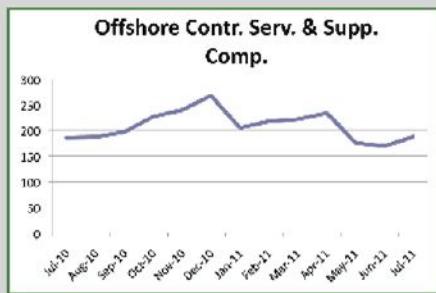


Industry Company Name	Symbol	Close Mid-July	Close Mid-June	Change	Change %	High 52 week	Low
<b>Diversified, Production Support and Equipment Companies</b>							
Baker Hughes, Inc.	BHI	78.46	70.93	7.53	10.6%	79.24	36.76
Cameron Intl. Corp.	CAM	51.17	46.78	4.39	9.4%	63.16	34.38
Drill-Quip, Inc.	DRQ	72.08	64.54	7.54	11.7%	83.80	46.39
Halliburton Company	HAL	55.18	47.05	8.13	17.3%	55.29	27.36
Tenaris SA	TS	44.59	44.85	-0.26	-0.6%	51.07	32.91
Newpark Resources, Inc.	NR	9.28	8.67	0.61	7.0%	10.00	5.12
Schlumberger Ltd.	SLB	88.80	83.93	4.87	5.8%	95.64	52.91
Superior Energy Services, Inc.	SPN	39.75	35.25	4.50	12.8%	41.65	20.40
Weatherford International, Inc.	WFT	18.70	17.41	1.29	7.4%	26.25	14.42
Deep Down, Inc.	DPDW	0.10	0.08	0.02	0.0%	0.29	0.05
<b>Total Diversified, Production, Support and Equipment.....</b>		<b>458.11</b>	<b>419.49</b>	<b>38.62</b>	<b>9.2%</b>	<b>506.39</b>	<b>270.70</b>
<b>Geophysical / Reservoir Management</b>							
Dawson Geophysical Company	DWSN	34.77	31.88	2.89	9.1%	50.81	21.31
Mitcham Industries, Inc.	MIND	19.25	14.75	4.50	30.5%	19.63	6.25
Compagnie Gnrale de Gophysique-Veritas	CGV	33.82	35.47	-1.65	-4.7%	38.12	16.42
<b>Total Geophysical / Reservoir Management.....</b>		<b>87.84</b>	<b>82.10</b>	<b>5.74</b>	<b>7.0%</b>	<b>108.56</b>	<b>43.98</b>
<b>Offshore Drilling Companies</b>							
Atwood Oceanics, Inc.	ATW	46.88	40.43	6.45	16.0%	47.00	23.75
Diamond Offshore Drilling, Inc.	DO	72.34	67.54	4.80	7.1%	81.19	57.76
ENSCO International, Inc.	ESV	51.81	51.90	-0.09	-0.2%	60.31	39.48
Nabors Industries, Inc.	NBR	26.88	23.65	3.23	13.7%	32.47	15.54
Noble Drilling Corp.	NE	37.32	38.23	-0.91	-2.4%	46.72	29.03
Parker Drilling Company	PKD	6.85	5.88	0.97	16.5%	7.45	3.58
Rowan Companies, Inc.	RDC	37.54	36.52	1.02	2.8%	44.83	23.36
Transocean Offshore, Inc.	RIG	63.07	61.78	1.29	2.1%	85.98	44.30
<b>Total Offshore Drilling.....</b>		<b>342.69</b>	<b>325.93</b>	<b>16.76</b>	<b>5.1%</b>	<b>405.95</b>	<b>236.80</b>

## DISCLAIMER

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

# Monthly Stock Figures & Composite Index



Industry Company Name	Symbol	Close Mid-July	Close Mid-June	Change	Change %	High 52 week	Low
<b>Offshore Contractors, Services and Support Companies</b>							
Helix Energy Solutions Group, Inc.	HLX	17.85	16.20	1.65	10.2%	19.20	8.38
Gulf Island Fabrication	GIFI	33.98	29.43	4.55	15.5%	35.85	14.47
Global Industries, Ltd.	GLBL	5.53	5.28	0.25	4.7%	10.23	4.06
McDermott International, Inc.	MDR	20.29	18.60	1.69	9.1%	26.14	12.10
Oceaneering International	OII	43.96	37.54	6.42	17.1%	46.19	22.65
Subsea 7 SA	SUBCY.PK	26.65	24.20	2.45	10.1%	26.68	14.11
Technip ADS	TKPPY.PK	26.24	26.05	0.19	0.7%	28.35	15.24
Tetra Technologies, Inc.	TTI	13.04	12.31	0.73	5.9%	16.00	8.00
<b>Total Offshore Contractors, Service and Support.....</b>	<b>187.54</b>	<b>169.61</b>	<b>17.93</b>	<b>10.6%</b>	<b>208.64</b>	<b>99.01</b>	
<b>Offshore Transportation and Boat Companies</b>							
Seacor Holdings, Inc.	CKH	106.19	95.54	10.65	11.1%	116.00	70.42
Gulfmark Offshore, Inc.	GLF	44.50	40.18	4.32	10.8%	47.31	25.24
Bristow Group	BRS	52.04	45.61	6.43	14.1%	52.79	30.58
PHI, Inc.	PHII	22.22	21.52	0.70	3.3%	23.55	14.01
Tidewater, Inc.	TDW	54.82	51.92	2.90	5.6%	63.55	38.63
Trico Marine Services, Inc.	TRMAQ.PK	0.09	0.08	0.01	12.5%	1.07	0.03
Hornbeck Offshore	HOS	27.01	26.49	0.52	2.0%	31.77	15.16
<b>Total Offshore Transportation and Boat .....</b>	<b>306.87</b>	<b>281.34</b>	<b>25.53</b>	<b>9.1%</b>	<b>336.04</b>	<b>194.07</b>	
<b>Total Diversified, Production, Support and Equipment</b>	<b>458.11</b>	<b>419.49</b>	<b>38.62</b>	<b>9.2%</b>	<b>506.39</b>	<b>270.70</b>	
<b>Total Geophysical / Reservoir Management</b>	<b>87.84</b>	<b>82.10</b>	<b>5.74</b>	<b>7.0%</b>	<b>108.56</b>	<b>43.98</b>	
<b>Total Offshore Drilling</b>	<b>342.69</b>	<b>325.93</b>	<b>16.76</b>	<b>5.1%</b>	<b>405.95</b>	<b>236.80</b>	
<b>Total Offshore Contractors, Service and Support</b>	<b>187.54</b>	<b>169.61</b>	<b>17.93</b>	<b>10.6%</b>	<b>208.64</b>	<b>99.01</b>	
<b>Total Offshore Transportation and Boat</b>	<b>306.87</b>	<b>281.34</b>	<b>25.53</b>	<b>9.1%</b>	<b>336.04</b>	<b>194.07</b>	
<b>Total Offshore Source Index...</b>	<b>1,383.05</b>	<b>1,278.47</b>	<b>104.58</b>	<b>8.2%</b>	<b>1,565.58</b>	<b>844.56</b>	

## SURFACESUPPLIED provides Lighting to Aquarius

Originally designed for external bell lighting, California-based SURFACESUPPLIED's NORDIC range of high-intensity LED lighting has found application aboard NOAA's Aquarius Reef Base.

"The Aquarius habitat, located 60 feet underwater, 4 miles offshore of the Florida Keys has become a magnificent artificial reef in the 20 years it has been underwater," said Saul Rosser, operations director of Aquarius. "Live video of the habitat and surrounding reef is streamed online in an effort to engage public interest in scientific research, in general, and Aquarius operations in particular. Unfortunately, power and reliability issues make it difficult to provide sufficient lighting for night time cameras."

The NORDIC range of lights put out between 5,000 and 8,000 lumens during operation, a feat achieved through a powerful LED array and micro-controlled electronics.

Jason Van der Schyff, of SURFACESUPPLIED explains, "the electronics behind NORDIC differentiate us from every other light on the market. We managed to achieve the performance of AC-powered lighting from only 12VDC; our circuit incorporates thermal run-away protection for out-of-water operation and optimal performance. The best part is that we only need 50 Watts, generally halving the amount of power needed by traditional AC bell lights."

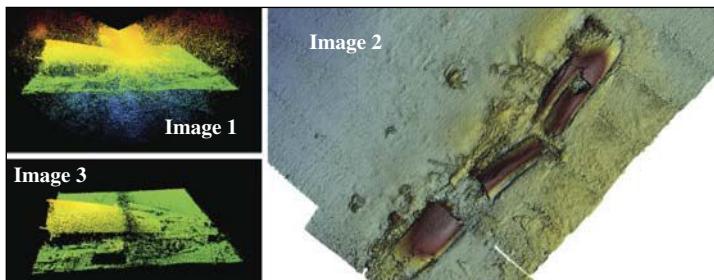
Both the NORDIC5 and NORDIC8 are rated for operation at depths up to 500 meters and are available with a choice of mating connectors. An AC powered retrofittable version is available upon request.

As for Aquarius' night time lighting, Saul Rosser stated, "I am excited about the prospect of high reliability and high efficiency LED lights from SURFACESUPPLIED."

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



## OIC supports GeoSwath Plus data processing, provides AUV-mounted interferometry solution



In response to the improved performance and growing popularity of interferometric sonar systems, Oceanic Imaging Consultants, Inc. (OIC) has continued to expand its list of supported sensors and formats. The most recent addition is the GeoSwath Plus .rdf format, which can now be read by OIC's data processing software package, CleanSweep. CleanSweep has long been the industry leader in processing of interferometric swath bathymetry data from sensors such as the SeaMARC product line, the C3D from Teledyne-Benthos and the Deepscan/Artemes product line from Ultra Electronics.

In parallel with the development of increasingly accurate and compact interferometers, the industry has also

Clockwise from top-left: 1) Image shows sample point cloud of raw GeoSwath Plus data. 2) Same data after application of CleanSweep filters. 3) Bathymetry of the wreck of the SS SHIRVAN, 100m bow to stern, collected by the Icelandic Coast Guard using a GeoSwath 500kHz sonar on a Gavia AUV in ~100m water depth. The data was processed to a 20cm xyz grid in OIC's CleanSweep.

recently witnessed significant advancements in AUV technology. These parallel advances in sonar and vehicle have led to a new piece of equipment in the hydrographic surveyor's toolbox: the interferometric sonar mounted on a man-portable AUV.

Having spent much of the last 2 decades building software products designed to handle data sets acquired from submerged platforms, OIC has developed a suite of processing tools that are perfectly suited to meet the needs of the commercial AUV-surveying market. The use of specialized tools for improving AUV positioning in post-processing combined with the newly developed interferometry processing filters make CleanSweep the most effective solution available for processing AUV-acquired interferometric data sets.

For more details or to request a trial version of CleanSweep, please contact Oceanic Imaging Consultants, Inc. at [info@oicinc.com](mailto:info@oicinc.com).

## Onset weather stations selected for UMass coastal network

Scientists with the UMass Boston Center for Coastal Environmental Sensing Networks (CESN) have developed and deployed five environmental monitoring buoys in Boston's Neponset River Watershed for tracking dangerous bacteria levels and unusual environmental conditions off Boston Harbor.

The monitoring buoys were developed as part of CESN's Boston Environmental Area Coastal Observation Network (BEACON) project, a two-year program funded by the Department of Energy and the Office of Naval Research. The buoys are tracking nearshore climate conditions around the harbor and measuring colored dissolved organic matter (CDOM) content in area estuaries on a 24/7 basis.

Each buoy is outfitted with a web-based weather station from Cape Cod-based Onset Computer Corporation, which measures air temperature, wind speed and direction, solar radiation, barometric pressure, and other environmental parameters. The stations transmit the information to the Internet via cellular networks.

The collected data, which will be made available to the public on the Internet, will



alert the researchers to dangerous bacteria levels in the water, rising seas, and unusual weather events that occur in the area.

"The Neponset is one of the big CDOM contributors to Boston Harbor, yet many people are unaware of the conservation issues connected to this important water system," said Francesco Peri, managing director for CESN. "By monitoring the system closely and raising public awareness, we are hoping to increase pressure on local decision makers who can help implement policies to help preserve the watershed."

The network of monitoring buoys, according to Peri, represents a test-bed for innovative sensor technologies that CESN hopes to build upon over the next decade.

"What we are building is a scalable sensor infrastructure where we can easily add more sensors around Boston Harbor for greater measurement profiles," he says. "Eventually, we are hoping to establish a sensorial 'skin' over the watershed so we can sense everything that is happening there."

For more information, visit [www.cesn.org/projects/beacon.php](http://www.cesn.org/projects/beacon.php).

## Unique Group's QATOFIN buoy

The QATOFIN Buoy-based Temperature Monitoring System was installed in open sea, 700m away from land at Qatar. This system is being used to measure temperature of the seawater cool-



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ing return pipe outlet. The probe can be mounted to a depth of between 1 to 3m under the surface of water.

The buoy is to be moored with a single chain having a swivel arrangement anchored to a sinker block at the client specified location.

A base station PC to receive the temperature data is also to be setup at the QATOFIN base inside the port at location. The base station PC receives data from buoy using GSM communication.

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

### TRIAXYS buoys assess wave energy offshore Chile

AXYS Technologies Inc. (AXYS) has recently delivered two TRIAXYSTM Next Wave Directional Wave Buoys to Instituto Nacional de Hidráulica (INH) in Santiago, Chile. INH is developing the study, *Catastro del Recurso Energético Asociado a Oleaje Para el Apoyo a la Evaluación de Proyectos de Generación de Energía Undimotriz* to measure offshore wave characteristics for the purpose of assessing wave energy potential at various sites along the vast coast of Chile using different calibrated numerical models capable of



propagating offshore wave characteristics to nearshore.

The TRIAXYSTM buoys will measure full directional wave data, store the data on an internal data logger, and transmit the processed data in near real-time to shore using either the GPRS or VHF telemetry option. The data, provided by TRIAXYSTM, is critical in determining whether the nearshore site is appropriate for a full-scale wave energy facility.

An AXYS Field Service Specialist recently travelled to Santiago, spending five days at INH providing system training and coordinating the deployment of the first buoy off the coast of Valparaíso. The second TRIAXYSTM will be deployed off

the coast of Lebu, about 550 kilometres south of Santiago in late July.

### WaveRadar Rex

WaveRadar Rex is a precision wave, air-gap, and sea level sensor with origin within the Rosemount Tank Gauge stable. With its control and ranging features specifically customized for the acquisition of wave and air-gap data, the microwave-based sensor is ideal for operation aboard offshore oil and gas platforms, offshore wind farm turbines, tsunami warning



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assemblies, and coastal monitoring stations. WaveRadar Rex is exclusively and globally distributed by RS Aqua Ltd from its base in Hampshire, UK.

The original WaveRadar development was a collaborative project between Rosemount Tank Gauging (then Saab Tank Gauging), Shell Expro, and RS Aqua. After intensive field testing in the North Sea, the product was released to the market in 1995; since then it has established its position as an industry standard device. Typical purchasers are oil companies, metocean system integrators, and coastal monitoring authorities.

In more recent times, WaveRadar Rex usage has migrated to the offshore wind farm and coastal monitoring market sectors where the reliability experienced in the harsh offshore oil and gas sector was immediately recognized by the design and operating engineers.

Of particular note are the multiple units included within the Channel Coastal Observatory (CCO) network installed along the UK south coast. Our image shows a CCO installed WaveRadar Rex West Bay, Dorset, England.

WaveRadar Rex operates by sampling the distance between itself and the sea surface at 10Hz to an accuracy of better than 6mm to distances of 50m. When operating in the range 50 to 65m, the accuracy is slightly reduced. Supporting accessories for the core product include a mounting frame and WaveView processing software. Some metocean system integrators have developed wave direction measuring techniques via the installation of multiple WaveRadar Rex units aboard a single structure.

#### **WORKHORSE synthetic rope Thimble**

Advancements in recent years of synthetic ropes have ushered in the development of high-strength Polyester and HMPE (Dyneema and Plasma) ropes. Today, these new synthetic ropes are finding applications once traditionally reserved for wire rope. Deepwater moorings, heavy-lift applications, salvage operations, subsea installations, and MODU tow lines are now embracing the advantages of ultra-high strength, lightweight, zero-buoyancy synthetic ropes.

One factor limiting the complete integration of HMPE ropes, however, has been the lack of R&D for accompanying hardware and end-terminations. Until recently, end-terminations for synthetic ropes were designed to simply protect rope eyes from



abrasion. When strength issues have been a critical consideration, wire rope Hawser thimbles have been the only answer.

Addressing this need, DCL Engineered Solutions has unveiled the WORKHORSE SRT (Synthetic Rope Thimble). Unlike the standard rope thimble, its many assets include the following:

- An MBL far exceeding the MBL of corresponding HMPE ropes.
- Detachable ears, allowing insertion into existing eyes and grommets.
- A 3:1 D/d ratio accommodating the full strength of grommets.
- Full channel-depth covering the entire diameter of the rope, thereby providing 100% protection of rope eyes.
- NDT and proof testing, certification and individual traceability.

DCL Engineered Solutions is currently involved with R&D of additional HMPE and polyester rope hardware. The SRT is distributed by DCL Mooring & Rigging in New Orleans, LA and Southwest Ocean Services in Houston, TX.

#### **Mooring safety paramount in LNG terminal build**

The May 2011 completion of the 175 million cu.m. (6,000 million scf) per day Escobar LNG terminal, Argentina, within seven months of initiation, has included the adoption of advanced Trelleborg Marine Systems mooring equipment to ensure ship and terminal safety during critical gas discharge operations.



"By using Trelleborg Quick Release Hooks with Remote Release and SmartHook® Load Monitoring systems, the terminal operators and vessel masters can ensure rapid response to potentially hazardous conditions," comments Simon Wilson, managing director of Trelleborg Marine Systems' Docking and Mooring Division.

"Load and tension changes within the mooring lines — due to ship movements caused by current, tide, weather and loading condition — can lead to a potentially dangerous situation. Without warning alerts and the ability to react swiftly, accidents can happen which impact on both

plant and personnel. Investment in safety is always worthwhile," he added.

The new Escobar LNG terminal is Argentina's second facility and is located 70km up the river Parana del las Palmas, and 40km north of Buenos Aires. The inland location secures better winter gas supplies to the important Buenos Aires region; the other terminal is nearly 700km further south.

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

#### **Parker awarded mooring contract by Subsea 7 for Guara and Lula development**

The Energy Products Division of Parker Hannifin Corporation, the global leader in motion and control technologies, has been awarded a contract from Subsea 7 for one of the world's largest mooring projects. Parker will supply the steel wire tether system for the deepwater Guara and Lula NE submerged buoys in Brazil. Subsea 7 has been contracted by Petrobras to provide engineering, procurement, installation, and pre-commissioning of four decoupled riser systems in this field.

Parker will provide Subsea 7 with 34 sheathed tethering lines, each measuring more than 6,000 feet in length. These steel tethers will keep the submerged buoys securely moored to the seabed of the Guara and Lula NE fields. The mooring lines will be engineered and constructed at the Tønsberg, Norway manufacturing location.

EPD's general manager, Craig Anderson, states: "We are proud to have been selected to provide our mooring products for the Guara and Lula NE development, and we look forward to partnering with the Subsea 7 project team on this world-class project."

#### **Hemisphere GPS Supplies Crescent GPS in Brazil**

Hemisphere GPS announced the supply of its Crescent GPS technology and components to TechGeo in Brazil.

TechGeo, a leading manufacturer of geodetic GPS solutions based in Juiz de Fora, Brazil, integrated Hemisphere GPS' proven Crescent GPS engine into a feature-packed smart antenna product, named Zénite. The portable, all-in-one GPS receiver combines the Crescent GPS board with a high-performance GPS antenna, Bluetooth communication, internal memory, tilt sensors, battery, and more. The automated data recording and other unique features of Zénite make it simple to set up and operate for precise operations.

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

### BMT to provide marine instrumentation system for Shell Olympus

Shell Offshore Inc. (Shell) has awarded a contract to BMT Scientific Marine Services Inc. (BMT) to provide a Marine Instrumentation System (MIS) to the Olympus TLP in the Mars B Development Project in the Gulf of Mexico.

The MIS is a comprehensive computer-based system for acquiring, displaying, and recording vessel, marine, and environmental data for operators. It is composed of interdependent subsystems and software applications, including marine instrumentation, a tendon instrumentation system (TIS), ballast monitoring, topside tank level monitoring, human machine interface (HMI) displays and historical archive software (HAS).

BMT brings valuable experience to this project, having successfully provided a variety of Marine Monitoring Systems on over 47 floating platforms, including prior work for Shell.

For more information, visit [www.bmt.org](http://www.bmt.org) or [www.scimar.com](http://www.scimar.com).

### Mobilarm completes field trials

Global marine safety company,

Mobilarm Limited, announced that it has successfully completed field testing for the Crewsafe V200 Maritime Survivor Locating Device (MSLD) used for submarine escape and abandonment. The Crewsafe V200 MSLD is being developed by Mobilarm as part of a Sole Source contract with United States Naval Sea Systems Command ("NAVSEA") awarded in April 2010.

Joint field-testing was conducted by Mobilarm and NAVSEA at its Atlantic Underwater Testing and Evaluation Center on 6 June 2011 and separately by Mobilarm off the South West coast of Australia on 22 June 2011.

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

### PT-1-hit with archaeologists

A diverse group of people from marine archaeologists to commercial divers are using a new compact, hand-held magnetometer, the PT-1, designed to locate iron and steel objects underwater. One company having great success with this instrument is Cosmos Agencia Maritima based in Peru. They provide a broad range of services to their clients, including ship husbandry, cargo transportation and storage,



machinery and equipment rental, supply of fuel and parts, and diving services. A common request they receive is for underwater inspections of hulls, propellers, and bow thrusters. While performing repair work, a diver may drop a part or tool, which quickly disappears into the silty bottom. When this happens, an underwater metal locator is required to find the missing item.

Based in The Netherlands, DUC Diving has more than 25 years experience in commercial diving operations and an established reputation for successful and timely completion of projects. Using the hand-held mag, DUC's team of underwater specialists was able to locate and mark the position of a pipeline running under the seafloor to prevent it from being damaged during a dredging operation. Divers not only tracked the route of the pipe, but also found and removed a number of junk objects from the ocean bottom that could have damaged the dredge.

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

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# 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:** AUVS  
**Deadline:** June 17th  
**Product Focus:** Subsea Tools & Manipulators, Seismic Monitoring

### August

**Editorial:** Coastal Engineering, Aquaculture & Marine Resources, Offshore Mooring Systems  
**Distribution:** Offshore Europe • OCEANS'11 MTS/IEEE Kona  
**Deadline:** July 15th  
**Product Focus:** Buoys & Monitoring Instrumentation

### September

**Editorial:** Offshore Wind, Subsea Telecom, Deepwater Pipeline Repair & Maintenance  
**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, OTEC  
**Distribution:** LAGCOE • MAST Americas • Clean Gulf  
• Offshore Communications  
**Deadline:** September 16th  
**Product Focus:** Acoustic Modems, Releases & Transponders

### November/December

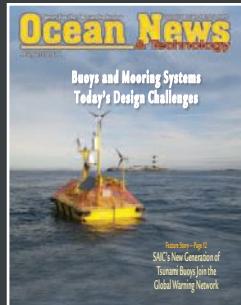
**Editorial:** Ocean Mapping & Survey, Commercial Diving, Decommissioning, Plug & Abandonment  
**Distribution:** International Workboat • Subsea Survey/IRM  
• Underwater Intervention  
**Deadline:** October 28th  
**Product Focus:** Workboats & Special Purpose Subsea Vehicles

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# People & Company News

Knight Oil Tools named **Kenny Bennett** corporate account representative. Bennett, a former professional baseball player with the New York Yankees, has held sales positions with Integrated Production Services, Smith Services, Cudd Pressure Control and American Pipe & Steel. His most



Bennett

recent position was U.S. executive sales with Scomi Oil Tools. Based in Oklahoma City, Bennett will be responsible for oil and gas customers in the company's mid-continent region.

Noble Corp. said that **Jeffrey L. Chastain** was named vice president, investor relations. In this capacity, Chastain will be responsible for managing and fostering relationships with the global investment community. Prior to joining Noble, Chastain had most recent-

ly served as vice president, investor relations for Pride International.

McDermott International, Inc. said that **Gene Rice** joined one of its subsidiaries as technical director-rig repairs. In this role, Rice is responsible for the engineering development of rig repair and upgrade services at the company's Altamira, Mexico fabrication facility. An offshore and marine industry veteran of more than 35 years, Rice has significant experience in managing project engineering for drillships, submersibles, semi-submersibles and jack-up rigs for major drilling companies. Prior to joining McDermott, most recently he was director of engineering at Signal International and previously held engineering positions with Alabama Shipyard and Tampa Shipyards.

Atwood Oceanics, Inc., a Houston-based international drilling contractor, announced the death of board member **Robert W. (Bob) Burgess**, who passed away in mid-June in Massachusetts at the age of 69. Burgess joined Atwood's board of directors in 1990 and has served as chairman of the audit committee since 2008. He was the former chief financial officer (senior vice president) of CIGNA investment division, CIGNA Companies.

Aberdeen-based Glacier Energy Services appointed **Frazer Blyth** sales and marketing director. An engineer, with 14 years marketing experience, Blyth will be responsible for developing and implementing a global sales and marketing strategy that aims to more than double its existing market share.

**Ewa Ginal** was named international marketing manager at Fugro Multi Client Services. Operating out of the Perth, West Australia office, Ginal will be responsible for the sales and marketing of non-exclusive seismic data projects to the oil and gas market, primarily in the Asia Pacific region to include; Australia, New Zealand, Timor, Papua New Guinea, Indonesia, India, and the Seychelles Islands.



Ginal

Baker Hughes Inc. said that **Adam B. Anderson** will be appointed Baker Hughes' vice president, investor relations. In this position, he will be located in Houston and will report to Peter A. Ragauss, senior vice president and chief financial officer. Anderson will succeed **Gary R. Flaharty**, who will assume a senior role in Baker Hughes' supply chain organization. Anderson, 35, has most recently been the vice president of



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completion systems for Baker Hughes in the U.S. land geomarket. Prior to this role, he held a variety of marketing and operations management positions for Baker Hughes in the Gulf of Mexico, the Middle East, and the Product Development Center. Anderson began his career with PES/WellDynamics and served in a variety of engineering and sales positions. He earned a BS in petroleum engineering from Colorado School of Mines and a MBA from the Fuqua School of Business at Duke University.

Apache Corp. has made changes to its management team. **Jon Jeppesen** was promoted to the new role of executive vice president overseeing the operations of the Gulf of Mexico shelf, deepwater, and Gulf Coast onshore regions. **Jon Graham** was named vice president of the global environmental, health, and safety organization. **Mark Bauer** was promoted to region vice president for the Gulf of Mexico shelf. **Michael Bose** moved up to region vice president and country manager for Argentina. **Graham Lawton** was named vice president, liquefied natural gas (LNG) projects, leading the Kitimat project team for the LNG facility and Pacific Trail Pipelines. **Kenny Paterson** was named vice president, LNG marketing and shipping, of Apache Energy Ltd. Hibernia Atlantic, the only diverse trans-Atlantic high-bandwidth connectivity provider, appointed industry veteran **Kathy Perone** to the position of chief operations officer.

Ashtead Technology announced the appointment of **Chris Braithwaite** as Non-Executive Chairman of the Group. Braithwaite has over 25 years of experience in the oil and gas services sector, and was most recently chief operating officer of Wellstream Holdings plc.

Marine rental company, **Ashtead Technology**, announced the appointment of **MacArtney Norge A/S** as Ashtead Technology agent for the Nordic Region. MacArtney is a well-established global supplier of underwater technology, specializing in the design, manufacture, sales, and service of a wide range of systems. MacArtney will provide Ashtead Technology's full equipment rental fleet, incorporating Positioning Equipment, ROV Sensors, Hydrographic and Geophysical Equipment and IRM, NDT and Diving Equipment to customers in the Nordic region, from their base at Stavanger.

CSA International, Inc. (CSA), a marine environmental consulting firm based out of Stuart, Florida, announced the appointment of **Andy Brown** as Regional Manager of the Houston, Texas office. Mr. Brown will be charged with managing CSA's activities in the region and will have overall responsibility for the Metocean Business Line – expanding CSA's metocean capabilities, creating and fostering strong client relationships, and providing commercial and technical expertise on metocean projects in the Gulf of Mexico as well as around the world.

Saab's decision to centralize its underwater vehicle organization in the UK has led to the appointment of two new directors to the board of Saab Seaeye Ltd.: **Bert Johansson** is the new sales director defense, and **Mark Exeter** becomes operations director.

BlueView Technologies has added **Ed Cheesman** as Director, Global Energy Sales and Business Development. Cheesman will manage and develop BlueView's sales efforts in the growing energy segment worldwide.

Phoenix announced that **Mike Kelly** has joined Phoenix as the director of marketing and sales - oil and gas sector. Mike will be responsible for all marketing, sales and business development activities for Phoenix underwater engineering and operational capabilities to the oil and gas sector and is based in Houston, Texas.



Braithwaite



Brown

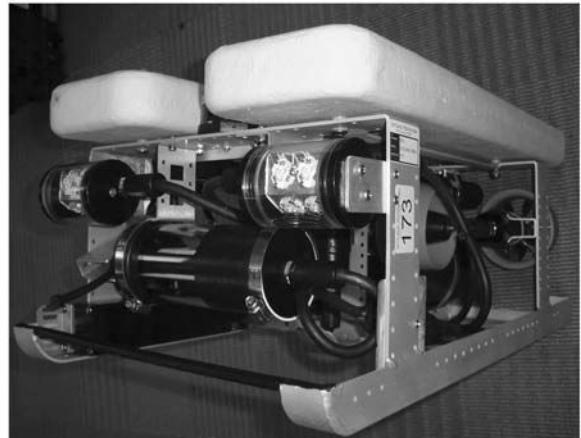


Kelly



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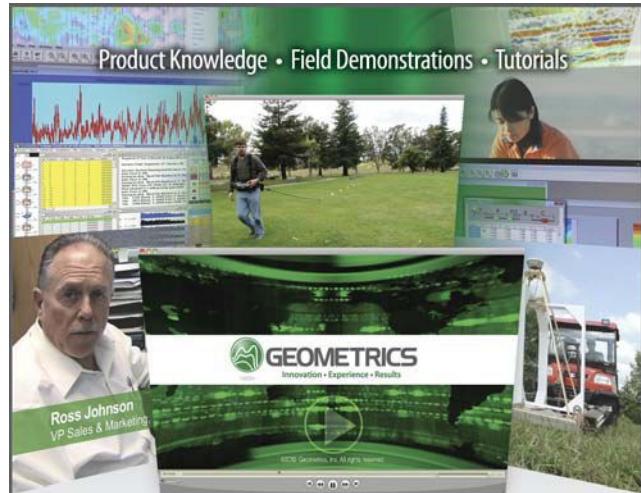
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# Calendar

August 19-22, 2011:  
**AUVSI**  
Washington, DC  
[www.auvsi.org](http://www.auvsi.org)

September 6-8, 2011:  
**Offshore Europe**  
Aberdeen, Scotland  
[www.offshore-europe.co.uk](http://www.offshore-europe.co.uk)

September 18-23, 2011:  
**SEG International Exposition**  
San Antonio, TX  
[www.seg.org](http://www.seg.org)

September 19-22, 2011:  
**Oceans 2011**  
Kona, Hawaii  
[www.oceans11mtsieekona.org](http://www.oceans11mtsieekona.org)

September 20-22, 2011:  
**Submarine Networks World 2011**  
Singapore  
[www.terrapinn.com/subnets](http://www.terrapinn.com/subnets)

October 4-6, 2011:  
**OTC Brazil**  
Rio de Janeiro, Brazil  
[www.otcnet.org](http://www.otcnet.org)

October 11-12, 2011:  
**MTS Dynamic Positioning**  
Houston, TX  
[www.mtsociety.org](http://www.mtsociety.org)

October 11-13, 2011:  
**AWEA Offshore Windpower 2011**  
Baltimore, MD  
[www.offshorewindexpo.org](http://www.offshorewindexpo.org)

October 18-21, 2011:  
**Ocean Innovation 2011**  
Iqaluit, Nunavut  
[www.oceaninnovation.ca](http://www.oceaninnovation.ca)

October 25-27, 2011:  
**LAGCOE**  
Lafayette, LA  
[www.lagcoe.com](http://www.lagcoe.com)

November 7-8, 2011:  
**MREC Technical Conference**  
Cambridge, MA  
[www.mrec.umassd.edu](http://www.mrec.umassd.edu)

November 8-10, 2011:  
**Offshore Communications**  
Houston, TX  
[www.offshorecoms.com](http://www.offshorecoms.com)

November 14-16, 2011:  
**MAST Americas**  
Washington D.C.  
[www.mastamericas.com](http://www.mastamericas.com)

Nov. 30 - Dec 1, 2011:  
**Clean Gulf**  
San Antonio, TX  
[www.cleangulf.org](http://www.cleangulf.org)

Nov. 30 - Dec. 2, 2011:  
**International Workboat**  
New Orleans, LA  
[www.workboatshow.com](http://www.workboatshow.com)

December 13-15, 2011:  
**Subsea Survey IRM**  
Houston, TX  
[www.subseasurvey.com](http://www.subseasurvey.com)

January 24-26, 2012:  
**UI 2012**  
New Orleans, LA  
[www.underwaterintervention.com](http://www.underwaterintervention.com)

March 13-15, 2012:  
**Oceanology 2012**  
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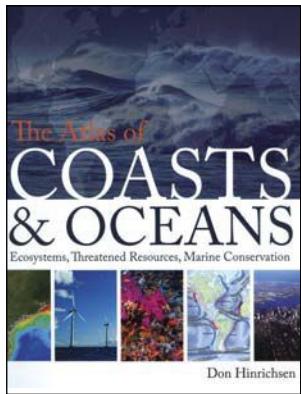
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# Media Reviews

## The Atlas of Coasts and Oceans: Ecosystems, Threatened Resources, Marine Conservation



Oceans drive the world's climate, nurture marine ecosystems full of aquatic life, and provide shipping lanes that have defined the global economy for centuries. Yet, they are increasingly threatened by human activities such as commercial fishing, coastal real estate development, and industrial pollution. Published this month by the University of Chicago Press, *The Atlas of Coasts and Oceans* by Don Hinrichsen documents the fraught relationship between humans and the earth's largest bodies of water — and outlines the conservation steps needed to protect the marine environment for generations to come.

*The Atlas* offers a fascinating and often sobering account of how urbanization, climate change, offshore oil drilling, shipping routes, global tourism,

and maritime conflict have had a profound impact on the world's oceans and coasts. Combining text and images in visually engaging, thematically organized map spreads, this volume addresses the ecological, environmental, and economic importance of marine phenomena such as coral reefs, eroding shorelines, hurricanes, and fish populations — and how development threatens to destroy the ultimate source of all life on the "blue planet." Lavishly illustrated with global and regional maps, from the Arabian Gulf to the Great Barrier Reef, from the Black Sea to the Mediterranean, and all the other major global waterways, *The Atlas of Coasts and Oceans* will be the definitive companion to any study of its subject for years to come.

ISBN: 978-0-226-34226-9, July 1, 2011, \$22.00, 128 pages

## Epitaph for a Beautiful Ship

Despite first appearances, *Epitaph for a Beautiful Ship*, by Evan Wilson, is really about maritime technology — perhaps better stated technologies. In *Epitaph*, Wilson explores the threads that came together when the popular topsail schooner, *Pride of Baltimore*, sank in 1986 with the loss of her captain and three young crewmembers.



- How the search for speed under sail went wild during the War of 1812.
- How Baltimore both ignored and embraced the historic lessons when it decided to build a replica to vivify its Baltimore clippers.
- How *Pride*'s designer actually believed his scholarship spared him the need for technologies that emerged between then and now.
- How the study of marine accidents has been strengthened because of the casualty.

ISBN: 978-1-4357-7247-2, self-published 2010, 405 pages, \$34.95 - Order at [www.lulu.com/spotlight/evanwilson51486](http://www.lulu.com/spotlight/evanwilson51486).

The logo for OTC Brasil 2011, featuring a circular design with 'OFFSHORE TECHNOLOGY CONFERENCE' around the top and 'BRASIL' in the center, with a stylized wave graphic.

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A 3D-style site plan of the exhibition floor. It shows a large rectangular area divided into several sections labeled 1 through 5. Section 1 is the 'Registration & Exhibition Hall'. Section 2 is the 'Main Exhibition Hall'. Section 3 is located in the lower-left corner. Section 4 is in the lower-right corner. Section 5 is in the center-right. Arrows point from the text labels to their respective sections on the plan. A small 'Technical Sessions' icon is also present.

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- Once the mission(s) are completed, the OCB can be moved to a new location. The OCB is particularly suited to remote areas or areas located far offshore.
- Suited both for long-term and short-term projects



## Cost Effective

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- Networks that will ultimately be cabled to shore may be deployed and operated via the OceanNET satellite telemetry system while cable routes are still being negotiated

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

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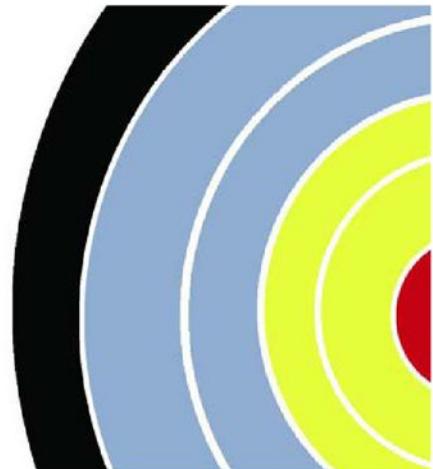
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Fax: (310) 762 1616  
E-mail: sales@ak-ind.com  
Website: [www.ak-ind.com](http://www.ak-ind.com)  
Contact: Allan Kidd

AK Industries is an agile high tech manufacturer of rugged low cost underwater electrical connectors. The HydroVolt line of connectors is the most rugged and reliable low cost connector available. AK Industries is also ideally suited to provide unique solutions engineered to customer requirements.

# OCEAN INDUSTRY DIRECTORY

ON&T's Product & Service Directory

## CONNECTORS



Continued ■

**Subconn Inc // M.J. Stewart Associates Inc.**  
 575 Washington Street, Unit 2  
 P.O. Box 328  
 North Pembroke, MA 02358  
 Tel: 781 829 4440, Fax: 781 829 4442  
 Mobile 781 361 2723  
 Website: [www.subconn.com](http://www.subconn.com)  
 Contact: Mike Stewart

SubConn® Inc has been supplying the world's leading range of underwater pluggable electrical connectors to the demanding underwater industry for over 30 years. The range is trusted by customers worldwide for shallow water use to full ocean depth rating. The latest underwater Ethernet series is a high speed underwater communications system with true Ethernet type performance. The unique cable system is based on industry standard SubConn® connector systems and can operate in full ocean depth applications. The new SubConn® combined power and Ethernet cable provides data transfer and power for underwater instruments in one high performance cable.



Tel.: +1 781 829 4440 • [www.subconn.com](http://www.subconn.com) • International: +45 7613 2000 • [www.macartney.com](http://www.macartney.com)

**TELEDYNE ODI**  
 A Teledyne Technologies Company

**Teledyne ODI- A Teledyne Technologies Company**  
 1026 North Williamson Boulevard,  
 Daytona Beach, Florida, 32114  
 Toll Free: (888) 506 2326  
 Tel: (386) 236 0780, Fax: (386) 236 0906  
 E-mail: [ODI\\_marketing@teledyne.com](mailto:ODI_marketing@teledyne.com)  
 Website: [www.odi.com](http://www.odi.com)

A leader in subsea electrical & fiber optic interconnect systems. Wet-mateable connectors include signal & high-power electrical, optical, and hybrid products. All based on patented PBOF technology. These rugged components are designed for use at any ocean depth, in the harshest environments. ODI also provides top quality custom engineered solutions for any subsea networking challenge.

**TELEDYNE OIL & GAS**

**Teledyne Oil & Gas**  
 1026 North Williamson Boulevard,  
 Daytona Beach, Florida, 32114  
 Toll Free: (888) 506 2326  
 Tel: (386) 236 0780, Fax: (386) 236 0906  
 E-mail: [oilandgas@teledyne.com](mailto:oilandgas@teledyne.com)  
 Website: [www.teledyneoilandgas.com](http://www.teledyneoilandgas.com).

Delivering engineered solutions for subsea & topside monitoring, sensing and interconnection applications. Technology-focused capabilities include corrosion & erosion monitoring networks, data acquisition/evaluation/reporting systems and turnkey systems integration, power & data interconnection systems and subsea engineering. Teledyne Oil & Gas is Teledyne ODI, Teledyne Impulse, Teledyne Cormor & Teledyne DG O'Brien.

## DIVING & MEDICAL TRAINING COURSES

**Interdive**

**Interdive Services Ltd & InterMedic Services UK**

Units 3A, Stoke Damerel Business Centre  
 5 Church Street, Stoke Plymouth  
 Devon, PL3 4DT, UK

Tel: +44(0)1752 558080, Fax: +44(0)1752 569090  
 E-mail: [vanessa@interdive.co.uk](mailto:vanessa@interdive.co.uk) or [diving@interdive.co.uk](mailto:diving@interdive.co.uk)

Website: [www.interdive.co.uk](http://www.interdive.co.uk)

Contact: Ms. Vanessa Yardley

High quality marine related training courses approved by HSE, IMCA, IDSA, NPD, MCA and RYA. Training from basic to advanced levels (including hospital based) by friendly & experienced instructors. Training providers to UK Ministry of defense. Training on your site, at our facilities, inhouse or overseas. Also, experienced diver assessments and Offshore Medic course.

## FIBER OPTIC ROTARY JOINTS

**MOOG**

**Moog Components Group**

77 Frazee Avenue  
 Dartmouth, Nova Scotia  
 Canada B3B 1Z4  
 Toll free: (800) 361 -2263 (USA)  
 Toll free: (888) 302-2263 (Canada)  
 Tel: (902) 468-2263, Fax: (902) 468-2249  
 E-mail: [mcg@moog.com](mailto:mcg@moog.com)  
 Website: [www.moog.com/marine](http://www.moog.com/marine)  
 Contact: John Purdy

Moog Components Group now offers Focal™ and Prizm™ marine products for demanding projects. Fiber Optic Rotary Joints (multi-channel, pressure compensated). Electrical slip rings (explosion proof, purged, oil filled, connectors, junction boxes). A wide range of multiplexers. Fluid rotary unions. Integrated units (electrical, fluid and fiber in one convenient package). Advanced CAD systems for rapid development of products. A leader in technology, performance and reliability.

## GYRO COMPASSES

**IXSEA Inc.**

Tel: +33 (0)1 30 08 98 88, Fax: +33 (0)1 30 08 88 01  
 E-mail: [info@ixsea.com](mailto:info@ixsea.com)  
 Website: [www.ixsea.com](http://www.ixsea.com)

## OCTANS

- IMO-certified survey grade gyrocompass
- true North-seeking Fibre Optic Gyrocompass (FOG) unit
- complete motion sensor, features roll, pitch, surge, sway, heave, speed and acceleration
- calibration and maintenance-free
- easy to install and interface (serial, Ethernet, WEB based software)

iXSea is part of the iXBlue group, built around companies, well known for their continuous innovation. iXBlue is able to combine its unique technologies, products, systems and services from across its subsidiaries to provide the kind of solutions that cannot be found anywhere else in the industry.

**TELEDYNE TSS**

A Teledyne Technologies Company

**Teledyne TSS Ltd.**

1 Blackmoor Lane, Croxley Business Park  
 Watford, Hertfordshire WD18 8GA  
 Tel: +44(0)1923 216020 Fax: +44(0)1923 216061  
 E-mail: [tsssales@teledyne.com](mailto:tsssales@teledyne.com)  
 Website: [www.teledyne-tss.com](http://www.teledyne-tss.com)  
 Contact: Carolyn Jones  
**USA Office:** 10801 Hammerly Blvd, Suite 128  
 Houston, TX 77043, Contact: Keith Pope  
 Tel: (713) 461 3030, Fax: (713) 461 3099

Supplier of the Meridian range of IMO, Wheelmark and High Speed Craft approved surface and subsea gyro compasses. Options include heave, roll and pitch and battery backup versions as well as a range of repeaters and ancillary products. TSS also continues to support the world-renowned range of SG Brown gyro compasses and marine equipment.

## INSURANCE



**John W. Fisk Company**  
 4833 Conti Street, Suite 200  
 New Orleans, LA 70119  
 Toll Free: 1-888-486-5411  
 E-mail: [insure@jwfisk.com](mailto:insure@jwfisk.com)  
 Website: [www.jwfisk.com](http://www.jwfisk.com)

John W. Fisk Company provides all types of commercial insurance to any limit required for diving, marine construction, consultants, oilfield and oceanographic research worldwide. Our coverages include Workers Compensation (USL&H and Jones Act), General Liability, Professional Liability, Hull P&I, Equipment, Umbrella/Excess, International Packages, Bonds and much more. Please contact us for more information 1-888-486-5411 or [insure@jwfisk.com](mailto:insure@jwfisk.com). Visit our website at [www.jwfisk.com](http://www.jwfisk.com)

## LIQUID STORAGE

**ATL® FLEXIBLE**  
 BLADDER DIVISION

**Aero Tec Laboratories, Inc. (ATL)**  
 45 Spear Road Industrial Park,  
 Ramsey, New Jersey U.S.A. 07446  
 Tel: (201) 825 1400 Fax: (201) 825 1962  
 E-mail: [atl@atlinc.com](mailto:atl@atlinc.com)  
 Website: [www.atlinc.com](http://www.atlinc.com)  
 Contact: David Dack

# OCEAN INDUSTRY DIRECTORY

## ON&T's Product & Service Directory

For over 40 years, ATL has specialized in the design and manufacture of custom bladder-type fluid containment systems, including bladder tanks, inflatables, pillows and bellows, for the surface and subsea industry. ATL's flexible fluid containers boast unparalleled chemical tolerance, abrasion resistance, and remarkable durability and can be used with methanol, diesel fuel, gases, ethylene glycol, hydraulic fluids and chemical cleaning cocktails. Expedited deliveries are also available.

### MAGNETOMETERS



**Geometrics, Inc.**  
2190 Fortune Drive, San Jose, CA 95131  
Tel: (408) 954 0522, Fax: (408) 954 0902  
E-mail: sales@geometrics.com  
Website: www.geometrics.com  
Contact: Ross Johnson

Geometrics, a member of OYO Corporation, manufactures, sells, and services portable geophysical instruments for land, marine, and air investigations of the subsurface. Geometrics' product line includes proton precession and cesium magnetometers, high-resolution seismographs, and electrical conductivity imaging and resistivity systems. Geometrics' instruments are used around the world for natural resource exploration, geotechnical and environmental assessments, ordnance detection, locating archeological and treasure sites, teaching and research.



**Marine Magnetics Corporation**  
135 Spy Court  
Markham, Ontario, Canada L3R 5H6  
Tel: +1 905 479 9727 x232  
E-mail: info@marinemagnetics.com  
Website: www.marinemagnetics.com  
Contact: Rebecca Milian

Designs and manufactures magnetometers using advanced Overhauser technology for high sensitivity and unmatched accuracy characteristics.  
Products include:  
• *SeaSPY* is a versatile and tough marine magnetometer that is suitable in any environment, from small zodiac-type boats to full-ocean survey vessels. It is adaptable with a large variety of options to suit many applications.  
• *Explorer* is a miniature, lightweight magnetometer designed primarily for in-shore surveys in harbours, lakes, or rivers. It is ideal for small-boat applications where size and weight are most important.  
• *SeaQuest* is a multi-sensor gradiometer. It is the most advanced magnetic search tool available - improving speed and accuracy in UXO and mine detection.  
Available auxiliary sensors include, tilt sensor, pressure sensor, altimeter, built-in GPS.

### MARINE ENVIRONMENTAL CONSULTING SERVICES



**CSA International, Inc.**  
8502 SW Kansas Ave  
Stuart, FL 34997  
Tel: 772-219-3000, Fax: 772-219-3010  
E-mail: rmulcahy@conshelf.com  
Website: www.csaintl.com  
Contact: Bob Mulcahy

CSA International, Inc. (CSA) is a marine environmental consulting firm specializing in multidisciplinary projects concerning potential environmental impacts of activities throughout the world. With extensive experience in environmental sciences and technical field operations, CSA is staffed and equipped to offer a complete range of services for projects in offshore, nearshore, estuarine, wetland, freshwater, and terrestrial environments.



### MOTION SENSING EQUIPMENT

#### IXSEA Inc.

Tel: +33 (0) 30 08 98 88, Fax: +33 (0) 30 08 88 01  
E-mail: info@ixsea.com  
Website: www.ixsea.com

#### OCTANS

- IMO-certified survey grade gyrocompass
- true North-seeking Fibre Optic Gyrocompass (FOG) unit
- complete motion sensor, features roll, pitch, surge, sway, heave, speed and acceleration
- calibration and maintenance-free
- easy to install and interface (serial, Ethernet, WEB based software)

iXSea is part of the iXBlue group, built around companies, well known for their continuous innovation. iXBlue is able to combine its unique technologies, products, systems and services from across its subsidiaries to provide the kind of solutions that cannot be found anywhere else in the industry.



**KONGSBERG** **Kongsberg Seatek AS**  
Kongsberg Seatek AS  
Piriseretet  
N-7462 Trondheim  
Norway  
Tel: +47 73 54 55 00  
Fax: +47 73 51 50 20  
E-mail: km.seatek@kongsberg.com  
Website: www.km.kongsberg.com/seatek  
Contact: Finn Otto Sanne  
finn.otto.sanne@kongsberg.com

Kongsberg Seatek is a leading international marine electronics manufacturer specializing in the development and production of precision positioning and motion sensing systems. Our commitment is to provide quality products and solutions for safe navigation and operations at sea in the commercial offshore, maritime, hydrographics and defence industries.



**Teledyne TSS Ltd.**  
UK Office: 1 Blackmoor Lane, Croxley Business Park Watford, Hertfordshire WD18 8GA  
Tel: +44(0)1923 216020 Fax: +44(0)1923 216061  
E-mail: tssales@teledyne.com  
Website: http://www.teledyne-tss.com  
Contact: Carolyn Jones

**USA Office:** 10801 Hammerly Blvd, Suite 128 Houston, TX 77043, Contact: Keith Pope Tel: (713) 461 3030, Fax: (713) 461 3099

Comprehensive family of motion sensors available; ranging from a heave sensor through to heave, pitch and roll, and at the top end of the range highly accurate position and heading systems.

### NAVIGATION SYSTEMS-INERTIAL

#### IXSEA Inc.

Tel: +33 (0) 30 08 98 88, Fax: +33 (0) 30 08 88 01  
E-mail: info@ixsea.com  
Website: www.ixsea.com

Fibre Optic Gyroscope (FOG) technology is at the heart of iXSea's INS systems.

#### PHINS, Full Inertial Navigation

- outputs position, heading, roll, pitch, depth, velocity and heave.

**PHINS 6000 with DVL ready option** is the subsea version with DVL pre-installed and calibrated.

#### HYDRINS, Hydrographic Inertial Navigation System

- interfaces with a multibeam sounder and GPS
- provides real-time, high accuracy and high frequency position, heading and attitude data

#### MARINS, Naval Inertial Navigation System

- designed to meet the demands of the navy for high specification INS

#### ROVINS, Survey full featured Inertial Navigation System

- specifically designed for offshore survey and construction works



### OCEANOGRAPHIC INSTRUMENTS



#### Nke Instrumentation

rue Gutenberg  
56700 Hennebont

FRANCE

Tel: +33 2 97 36 41 31 Fax: +33 2 97 36 46 74

E-mail: info.instrumentation@nke.fr

Website: www.nke-instrumentation.com

Contact: Yves DEGRES - Instrumentation Manager, Valérie LE PEN - Sales Dpt.

• Autonomous data loggers for the measurement of physicochemical parameters of fresh and marine waters: pressure, temperature, conductivity, dissolved oxygen, turbidity, fluorescence, pH. • Automated stations and instrumented buoys for coastal waters monitoring and MRE assessments. • Monitoring equipment for atmospheric and marine corruptions, and cathodic protection. • Specific equipments and developments: monitoring of sedimentary transports, diving systems behaviour, fishing efforts and environmental parameters, embedded measurement network. • Provor and Arvor profiling subsurface floats (ARGO project), CTD, dissolved oxygen and optical sensors; Argos and Iridium transmission. • Drifting surface buoys with temperature and GPS receiver for Surface velocity project. • Carioca drifting buoy: sea water dissolved pCO<sub>2</sub>, chlorophyll, wind speed and salinity.



#### Sea-Bird Electronics, Inc.

13431 NE 20th St., Bellevue, WA 98005

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

E-mail: seabird@seabird.com

Website: http://www.seabird.com

Contact: Calvin Lwin, Applications Engineering

Sea-Bird is the leader in accurate, stable ocean instruments for measuring conductivity, temperature, pressure (salinity); oxygen; and related variables. Our CTD profilers, water samplers, moored CT recorders, wave/tide recorders, and DO sensors are used by research institutes, ocean observing programs, government agencies, and navies globally. Investments in engineering, metrology, calibration, software, and analysis make our products the best choice.



#### Star-Oddi

Vatnargardar 14, 104 Reykjavik, Iceland

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

E-mail: baldur@star-oddi.com

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

Contact: Baldur Sigurgeirsson

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

### PIEZOELECTRIC CERAMICS

#### Channel Industries

A Division of Channel Technologies Group (CTG)

839 Ward Dr., Santa Barbara CA 93111 USA

Tel: (805) 967-0171; Fax (805) 683-3420

E-mail: ciusales@channeltech.com;

Website: www.channelindustries.com

K.Ruelas, pres.; E. Medina, vice-pres.; E. Bickel, technical sales;

J. Sharon, sales/marketing

Piezoelectric ceramics - Channel Industries, A Division of Channel Technologies Group (CTG) is a custom manufacturer of piezoelectric ceramics in lead-zirconate and barium titanate compositions. Since 1959 Channel Industries ceramics have been at the heart of thousands of underwater acoustic applications and systems. Hydrophones, towed arrays, modems, side-scan sonar, etc. Military and commercial applications worldwide for over 50 years.

# OCEAN INDUSTRY DIRECTORY

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## PRESSURE TESTING

### DeepSea Power & Light

4033 Ruffin Road  
San Diego, CA 92123 USA  
Tel: (858) 576-1261, Fax (858) 576-0219  
E-mail: sales@deepsea.com  
Website: www.deepsea.com  
Contact: Pedram Pebdani, Oceanographic Sales Manager

## PRESSURE TESTING



<http://deepsea.com/pressure.html>

20" ID x 48" x 20 KSI  
9 1/2" ID x 21" x 20 KSI  
6" ID x 24" x 30 KSI  
with feed-thrus

4033 Ruffin Road San Diego, CA 92123 - (858) 576-1261

## PROJECT CONSULTING/ADVISORY SERVICES



### Ocean Specialists Inc.

8502 SW Kansas Ave  
Stuart, FL 34997  
Tel: (772) 219-3033,  
Fax: (772) 219-3010  
Email: jbyous@oceanspecialists.com  
Website: [www.oceanspecialists.com](http://www.oceanspecialists.com)  
Contact: Jim Byous



*Ocean Specialists, Inc (OSI) provides a broad range of capabilities and services to the Offshore Oil & Gas, Submarine Telecom, Government and Scientific markets, including: Market analysis, project consulting, submarine fiber cable systems, subsea technology development, & corporate services.*

## PROPERTY SERVICES



### Morris Southeast Group

Morris Southeast Group/CORFAC International  
1776 North Pine Island Road, Suite 318  
Plantation, FL 33322  
Tel: (954) 474-1776  
Email: kennorris@morrissegroup.com  
Website: [www.morrissegroup.com](http://www.morrissegroup.com)  
BLOG: [www.morristrends.com](http://www.morristrends.com)  
Contact: Ken Morris, SIOR



*Morris Southeast Group/CORFAC International is a leading provider of commercial real estate services specializing in owner and tenant representation, corporate services and investment sales in the office, industrial and retail sectors. Based in South Florida, the firm serves corporations throughout the Americas in affiliation with CORFAC International and worldwide with FIABCI, the International Real Estate Federation.*

## ROV BROKERS



### MaRE Trans. Ltd.

MaRE Trans. Ltd.  
Kilda House  
Bruntland Road  
Portlethen, Aberdeenshire, AB12 4QL  
Tel: +44(0)1224 781123, Fax: +44(0)1224 783407  
Email: michael@m-are.com  
Website: [www.m-are.com](http://www.m-are.com)  
Contact: Mike Kernaghan

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

## SONAR SYSTEMS

### Imagenex Technology Corp.

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

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

*can sonars, the SportScan and the YellowFin, feature a revolutionary price/performance ratio. For more information please visit [www.imagenex.com](http://www.imagenex.com)*

## iXSEA Inc.

Tel: +33 (0)1 30 08 98 88, Fax: +33 (0)1 30 08 88 01  
E-mail: [info@ixsea.com](mailto:info@ixsea.com)  
Website: [www.ixsea.com](http://www.ixsea.com)

## SHADOWS

- high-performance mapping sonar • Synthetic Aperture Sonar processing
- provides real time ortho-rectified and geo-referenced images
- no gap at nadir
- perfect sonar for hydrography, geophysical and oceanography survey.

*iXSea is part of the iXBlue group, built around companies, well known for their continuous innovation. iXBlue is able to combine its unique technologies, products, systems and services from across its subsidiaries to provide the kind of solutions that cannot be found anywhere else in the industry.*

## Marine Sonic Technology, Ltd.

P.O. Box 730  
White Marsh, VA 23183-0730  
Toll Free: (800) 447-4804  
E-mail: [jherbert@marinesonic.com](mailto:jherbert@marinesonic.com)  
Website: [www.marinesonic.us](http://www.marinesonic.us)

*Marine Sonic Technology, Ltd. builds high quality, high resolution side scan sonar systems. Located in Gloucester, Virginia, Marine Sonic has been in business for 20 years. Our towed systems are rugged, easy to deploy and easy to operate. We also offer highly efficient embedded side scan systems for use in AUVs which occupy minimal space in the vessel and operate with minimal power consumption*

## Sonatech

A Division of Channel Technologies Group (CTG)  
869 Ward Dr, Santa Barbara, CA 93111-2920 USA  
Tel: (805) 683-1431; Fax: (805) 683-4862  
E-mail: [marketing@sonatech.com](mailto:marketing@sonatech.com)  
Website: [www.sonatech.com](http://www.sonatech.com)  
K.Ruelas, pres.; R. Franklin, v.p., nav & range sys;  
M. Shaw, v.p., sonar & transducer sys;  
M. Rockwood, sales/marketing

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

## SOUND VELOCITY PROBES/CTDS

### SAIV A/S

Nygardsviken 1, 5164 Laksevag, Norway  
Tel: +47 56 11 30 66, Fax: +47 56 11 30 69  
E-mail: [info@saivas.no](mailto:info@saivas.no)  
Website: [www.saivas.no](http://www.saivas.no)  
Contact: Gunnar Sagstad

- STD/CTD, Sound Velocity probes/recorder with optional multi-parameter facilities; Turbidity, Fluorescence, Oxygen etc.  
- Precision pressure/depth (0.01% accuracy) and temperature sensors/recorders.  
Applications: hydrographic profilings, installation on ROVs and towed systems, etc. Robust and compact designs are combined with accuracy and "plug and play" compatibility. Output format for sonar equipment, e.g. EM1002, EM3000, SSP, HiPAP and Reson 8125.

## SUBSEA FABRICATION



### NEW Industries

6032 Railroad Avenue  
Morgan City, LA  
Tel: 985-385-6789  
E-mail: [bill.new@newindustries.com](mailto:bill.new@newindustries.com)  
Website: [www.newindustries.com](http://www.newindustries.com)  
Contact: Bill New

*New Industries (NI) provides quality fabrication services to the offshore oil & gas and marine industries. NI focuses on large diameter, pressure vessels and deepwater subsea equipment such as jumpers, PLETs, PLEM's, suction piles and ROV components.*

## SUBSEA TOOLING



### Seanic Ocean Systems

7240 Brittmoore Rd., Suite 112  
Houston, TX 77041  
Tel: 713-934-3100  
E-mail: [contact@seanicusa.com](mailto:contact@seanicusa.com)  
Website: [www.seanicusa.com](http://www.seanicusa.com)  
Contact: Karen North

*Seanic Ocean Systems is an industry leader in providing simple, rugged and reliable deck equipment and subsea tooling for remote intervention.*

# OCEAN INDUSTRY DIRECTORY

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## SWITCHES



**SEACON Advanced Products, LLC.**  
1321 Neliaus Road, P.O. Box 767  
Bellville, Texas 77418 USA.  
Tel: (979) 865-8846, Fax: (979) 865-8859  
E-mail: sales@seacon-ap.com  
Website: www.seacon-ap.com

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

## TRANSDUCERS

**International Transducer Corp.**  
A Division of Channel Technologies Group (CTG)  
869 Ward Dr, Santa Barbara, CA 93111-2920 USA  
Tel: (805) 683-2575; Fax: (805) 967-8199  
E-mail: sales@itc-transducers.com  
Website: www.itc-transducers.com  
K. Ruelas, pres.; Art Cambell, v.p.; Jon Monroe, sales & mktg.; E. Kuntsal, eng. mgr.

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

## UNDERWATER THICKNESS GAUGES



**Cygnus Instruments, Inc.**  
PO Box 6417  
Annapolis, MD 21401 USA  
Tel: (410) 267 9771  
Fax: (410) 268 2013  
E-mail: sales@cygnusinstruments.com  
Website: www.cygnusinstruments.com  
Contact: Rod Sanders

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

## UNDERWATER VEHICLES

### ROVs



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

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



**SeaBotix Inc.**  
2877 Historic Decatur Road, Suite 100  
San Diego, CA 92106 USA  
Tel: +1 619 450-4000, Fax: +1 619 450-4001  
E-mail: Info@SeaBotix.com  
Website: www.SeaBotix.com

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



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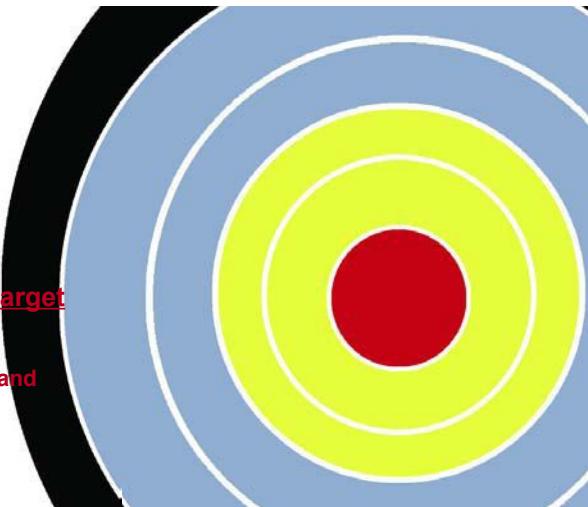
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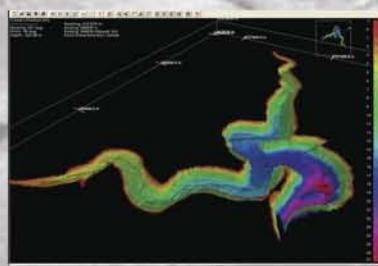
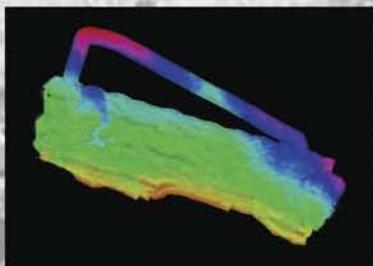
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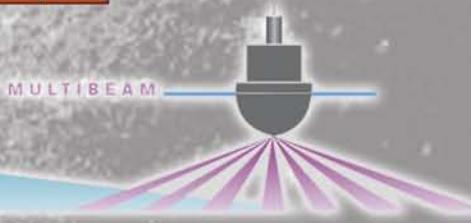
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