



Ocean News & Technology

News for the Ocean Industry

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August 2012

NOAA Shuts Hatch on NURP Funding

Vertical Scanning with
Marine Sonic's HDS
Side Scan System
Feature Story – Page 10



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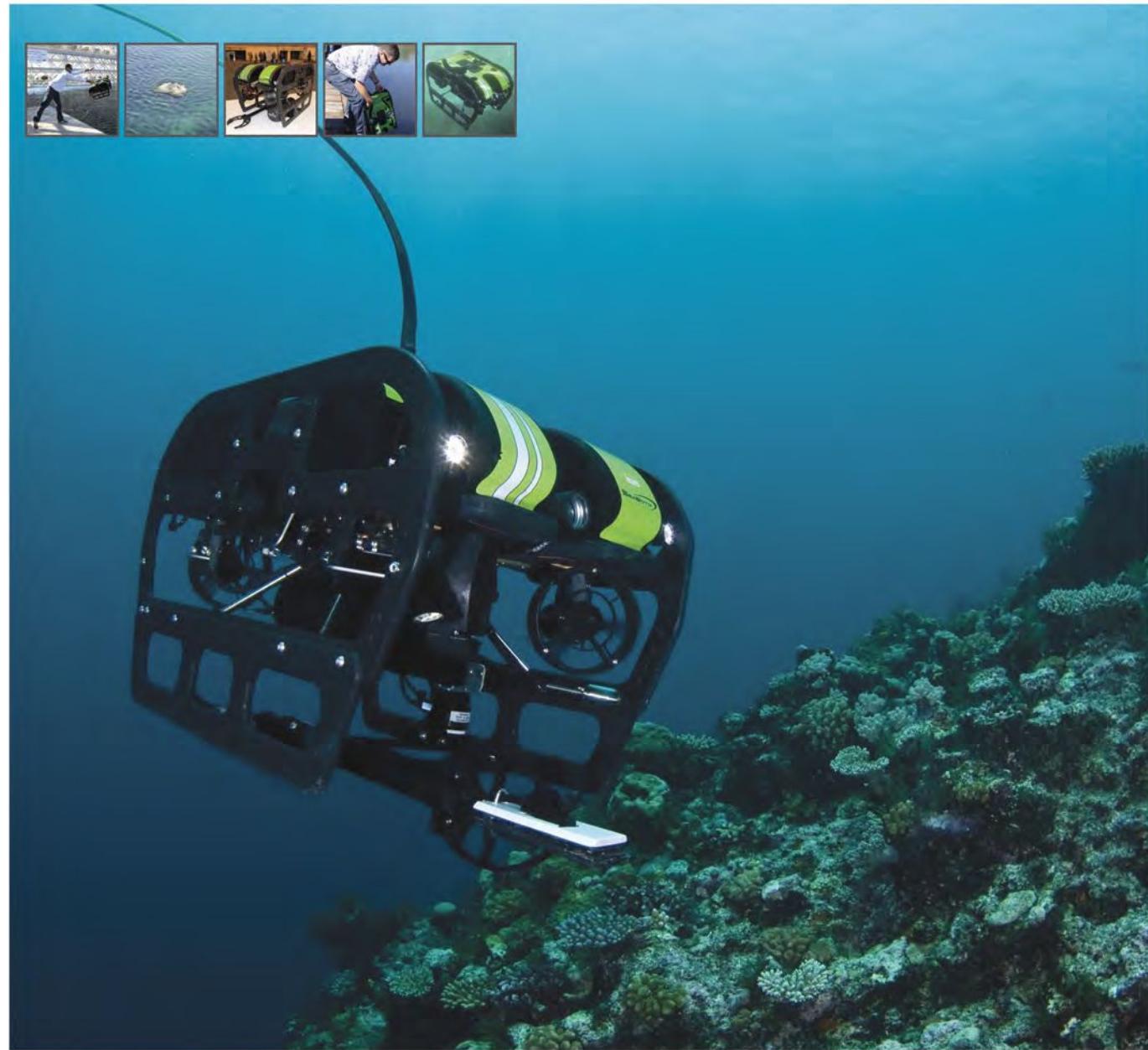
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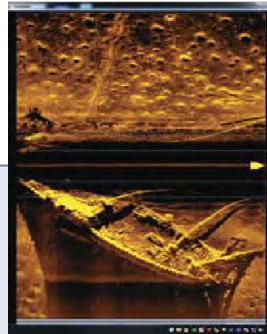
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Aquarius Reef Base

(Photo: Stephen Frink)

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John Manock

SR. V.P./ SALES & MARKETING
MJ McDuffee

PRODUCTION COORDINATOR
Amy Hamm

ART DIRECTOR
Suzanne Short

COPY EDITOR
Robyn Schuricht

CIRCULATION
Samantha Burn
subscription@ocean-news.com

ADVERTISING SALES

SR. V.P./ SALES & MARKETING
Mj McDuffee
Tel: +1 (772) 219 3027
Fax: +1 (772) 221 7715
mjmcduffee@tscpublishing.com

NORTH AMERICAN AD SALES:
Lisa Chilik
Tel: +1 (574) 261 4215
Fax: +1 (574) 255 1006
Lchilik@tscpublishing.com

INTERNATIONAL AD SALES:
Zinat Hassan
Tel/Fax: +44 (0) 845 6522 483
Mobile: +44 (0) 781 1200 483
zhassan@tscpublishing.com

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NURP Funding Dries Up

By Dr. Sylvia Earle, Guest Editor



*Dr. Sylvia Earle in the Aquarius Habitat
(photo Kip Evans)*

What is NOAA thinking, terminating the National Undersea Research Program (NURP)? To save \$5 million a year? Think three cents per US citizen per year or of the \$6-8 million spent by the federal government every minute, less than a minute to support the Aquarius Undersea Laboratory, the two Pisces submersibles at the University of Hawaii, and a modest expansion of critical research and exploration of the ocean by actually being IN the ocean.

Three penny wise and pound foolish, the decision to extinguish NURP represents an enormous loss for ocean science and technology at a time when more, not less, support is urgently needed. The billions invested in the nation's space program are paying off handsomely; neglect for the ocean is

costing us dearly. Exploring the universe should be a national priority – including the tiny blue speck that gives us life. It is baffling but true: less than five percent of the ocean systems that dominate Earth have been seen, let alone explored. More accurate maps exist of the moon, Mars and Jupiter than of the blue part of our home planet.

Funding for basic ocean research has always been a struggle, even within NOAA, the agency with primary responsibility for exploring, exploiting and caring for the nation's blue homeland – an area extending 200mi seaward from the shore, embracing submerged territory ¼ larger than the part of the country that is above. Now, more than ever, investment in ocean research is vital to provide the underpinnings of policies that can reverse the swift deterioration of aquatic systems critical to the nation's economy, health, and security.

Aquarius is a unique window into the sea, where for two decades hundreds of scientists and engineers have conducted projects that have given important new insights into the nature of coral reefs, systems that have declined globally by nearly half in 30 years. Long term monitoring of ecosystems anywhere, from the high Arctic to rainforests, is providing priceless insight into changes that are currently sweeping the planet -- and what can be done to reverse the troubling trends.

Data sets collected by Aquarius scientists over the years make it possible for the first time to connect the dots, see patterns, relate behaviors within a single system, coupled with physical and chemical monitoring that makes this a particularly valuable investment. It is an effective link in the dream of establishing an international network of ocean observatories – IOOS – but with humans, not just instruments, gathering data. Terminating this precious time series means losing irreplaceable continuity of data and expansion of the hard-won insights about the nature of coral reefs. Hundreds of millions of dollars are being invested globally in coral reef research, but there is only one place - Aquarius - where scientists can actually live as a part of a coral reef, using the ocean itself as their laboratory.

The Pisces subs, with Woods Hole Oceanographic Institution's Alvin, currently in dry dock, are the nation's only assets capable of taking human observers more than a mile underwater. Rated to 2,000m, the subs have been successfully operating in Pacific waters for 30 years and could serve the country for another 30 with funding considered a "rounding error" in most federal agencies. They have more than paid their way by incidentally recovering equipment lost at sea over the years, while providing hundreds of scientists unique access to deep sea volcanoes, canyons, trenches, and deep coral ecosystems.

Granted, money is tight in 2012. But funding continues for NOAA ships dedicated to fisheries and Okeanos, an elegantly outfitted research vessel, satellites, and various other remote sensing programs. NURP involves partnering with institutions outside the agency – the University of Hawaii, the University of North Carolina, the University of Mississippi, "external" programs more easily dropped than those fully "internal" to NOAA. Normally, such partnerships are considered highly desirable – public-private partnerships that enhance the power of taxpayer resources.

But closing NURP may reflect something more, a risk-averse drift toward putting humans in places that appear safer, more comfortable, less worrisome than having scientists diving into the sea in dry subs or actually getting wet. Robots and remote sensing systems have become so effective in recent decades that some suggest they should totally replace humans in space as well as the ocean. But I am among those who have come to recognize the value of both manned and unmanned exploration. The amazing new technologies developed in recent decades extend – but never entirely replace – the precious qualitative – and sometimes quantitative – advantages of "being there."

Aquarius has delivered on the promise of being able to use the ocean as a laboratory, a concept initiated 50 years ago when the US Navy, Jacques Cousteau and Edwin Link gave new meaning to the term "working under pressure." The Pisces subs have amply proven their worth by providing effective access to the deep sea beyond the physiological limits of divers. In business terms, the ROI (return on investment) of NURP is enormous. Rather than eliminate the program, the Administration, Congress, NOAA, and the people of this country would do well to consider funding it at the level of maybe as much as two minutes of the nation's annual expenditure. Imagine what a nickel a year from each of us could do for the ocean – and therefore, for all of us.

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Vertical Scanning with Marine Sonic's HDS Side-Scan System

By Sgt. Ken Purcell and Mike Bean, Boone County Water Rescue

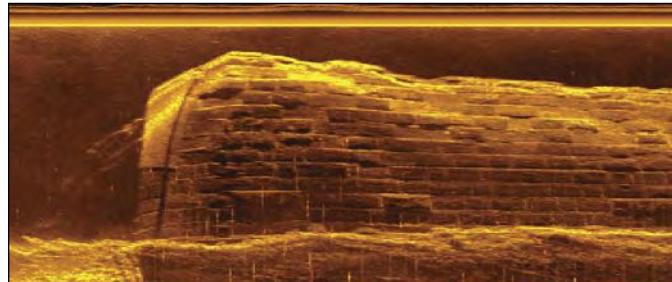
Boone County Water Rescue (BCWR), established in 1967 under the direction of the Boone County (KY) Civil Defense program, is a group of 51 dedicated volunteers who work more than 12,000hrs annually in water rescue activities. Currently a branch of the Boone County Emergency Management Services and administered on a not-for-profit basis by the Boone County Fiscal Court, the team is available 24/7 to all government agencies.

One of the services our team provides for Homeland Security and the local Coast Guard is scanning bridge piers to identify suspicious objects that may pose a structural threat. Our focus is in the Cincinnati area and on the eight major bridges that cross the Ohio River over a 12mi span. For us, using side-scan sonar is the most efficient and safest way to accomplish the task.

Over the past several years, we've scanned and cataloged images of bridge piers and were impressed with the image quality; but, we wanted to see more of the surface area of the piers, not just the outline or base. On a recent check of the piers, we decided to take the opportunity to try an alternate method called vertical scanning. This involves rotating the tow fish to get a different scanning angle. The results were staggering compared to our previous images of the piers.

Initially, we didn't expect much from changing the orientation of the tow fish. We had tried this in the past, but found the imaging to be less than desirable. Based on what we have read, to scan vertical structures the tow fish should be rotated so that the side facing the vertical object is turned downward, or more toward the bottom of the object. We've tried this method in the past at various angles, distances/ranges, and depths, but were not able to see a vertical surface in detail.

This time, we decided to rotate the tow fish in the opposite direction, positioning the opposite transducer towards the vertical structure. The first few scans were not very successful until we rotated the transducer around 100° to 110° from the normal horizontal position (taking into consideration any existing down tilt built into the tow fish). When scanning piers, we also noticed that it's important to run the tow fish as close as possible to the pier and just below the surface of the water. This provides not only the best imaging but also reduces



Bridge pier, vertical scan

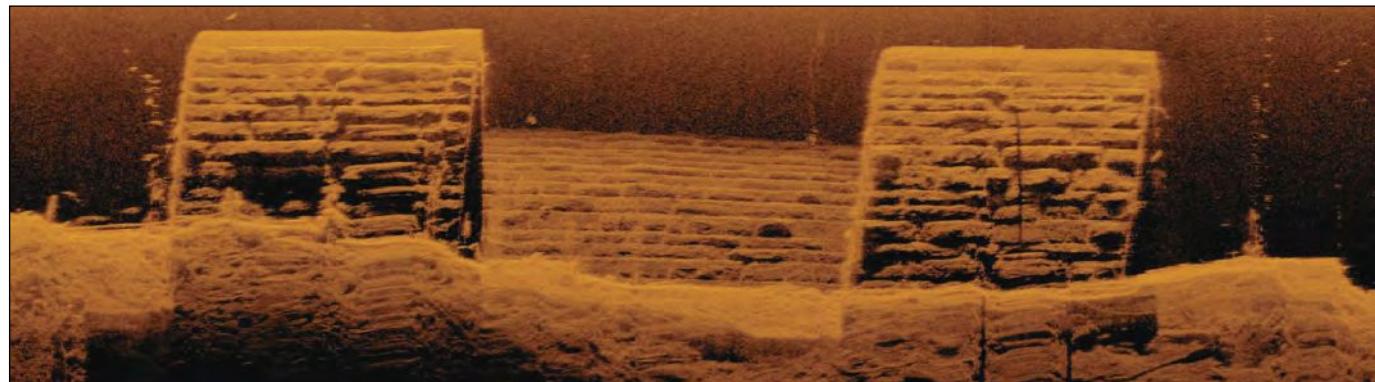
the Nadir zone and covers more area of the pier towards the water line. The depth of water is a factor in the scan range selected. We found the best range to use is one that is slightly greater than the depth of water. For now, this appears to be the optimum configuration when scanning piers, but we think that there is more that can be done, and we are continuing to explore other configurations.



Four-door car, trunk open, passenger window slightly open; door handles and side view mirror are noticeable

After scanning the piers, we focused on scanning other objects to see the effects of this rotation. Again, the results were staggering.

All images were recently taken using the vertical approach. We have also included a list of other developments we have been working on. All scans were taken using Marine Sonic's HDS side-scan sonar system with a dual frequency 900K/1800K tow fish.



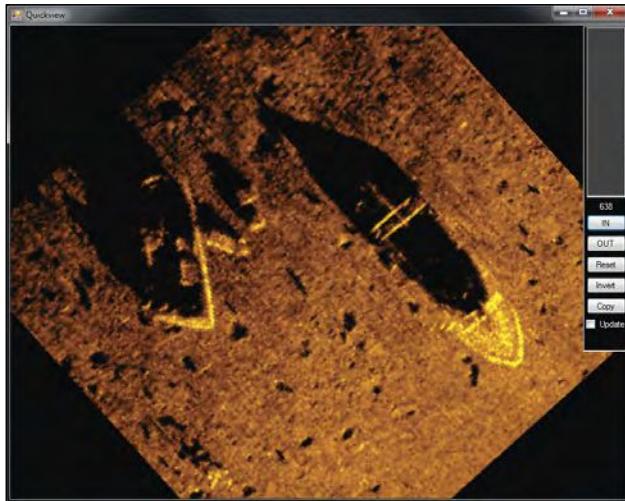
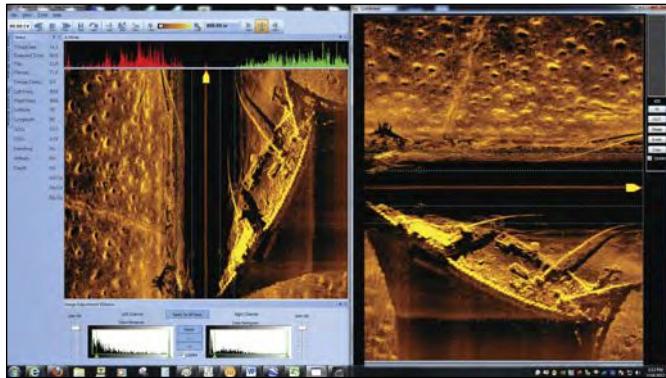
Bridge piers, vertical scan

Mapping & Survey

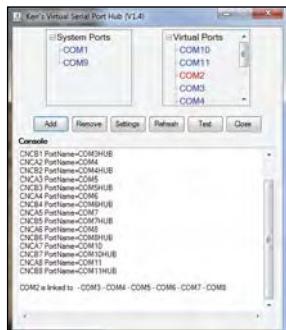
The following are just some of the PC-based tools we've developed to aid us in our operations.

Image viewer

This allows users to crop a section of screen creating a snapshot picture that you can rotate to any angle, zoom in or out, and invert the color to get a different view of objects. The viewer also has a "live" feature that allows you to display a cropped area of the screen while imaging. This tool is very useful during vertical scanning.



Virtual serial port hub



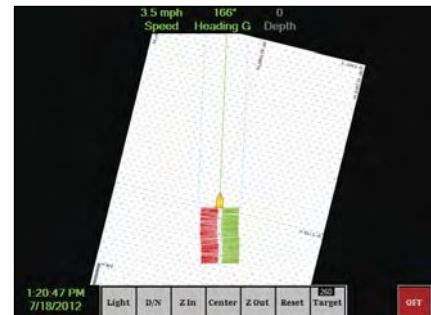
This creates Windows virtual serial ports to allow multiple applications to share serial data from one or more physical devices. It uses Com0Com freeware virtual serial port driver. Basically, any COM port configured in Windows can be shared across other applications using this utility by simply adding a port and using the settings menu to link the ports together.

This tool was primarily designed to share navigation data from an NMEA device, such as a GPS receiver, with chart plotters and other mapping applications simultaneously.

Chart plotter viewer

This allows the viewing of any chart plotter, specifically plotters embedded in sonar applications, on a separate monitor. The advantages are:

- 1) The boat operator has a direct view of the plotter and can control the viewing using zoom, move the plotter around the screen, and rotate the screen manually or set to heading up, which will use the heading from an NMEA input.
- 2) Boat operators have control over the plotter on their own screen, which allows the sonar operator to focus on the imaging not navigation.
- 3) Designed for small touch screen monitors easily mounted in the helm area; screen size is 640 x 480.



GPS-based target navigation aid

The GPS-based target navigation aid is designed specifically for towed sonar systems. Once a target has been selected for scanning, the operator provides the latitude and longitude of the target, the distance the target is to be scanned, and the heading to be taken.



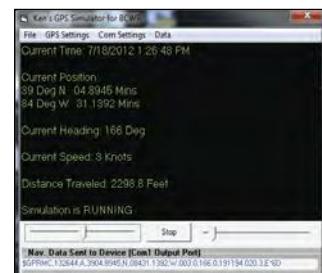
The application creates two lateral courses, one on each side of the target at the desired distance and heading to be taken. During maneuvering, the compass dial indicates the boat's heading while the course indicator displays the deviation from the scan point (the position where the acoustic beam from tow fish will pass across the target). The distance indicators display the distance to the scan point and the lateral deviation.

Future development will include an interface for inertial navigation hardware to enhance performance.

GPS simulator

The GPS simulator is a utility application used for testing and application development.

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OCEAN INDUSTRY

Funding for NURP axed, including Aquarius Reef Base and Pisces subs



Aquarius Reef Base, Florida Keys
(Photo Stephen Frink)

National Oceanic and Atmospheric Administration (NOAA) budget cuts have effectively ended any future missions to the underwater Aquarius Reef Base. The last mission shut its hatches on Sunday, 22 July 2012. The Federal budget crunch and cost overruns in NOAA's satellite program have caused the axe to fall on the reported \$5 million annual funding for the National Undersea Research Program (NURP), which includes the Aquarius lab and two Pisces submersibles.

The Aquarius Reef Base in Key Largo, Florida is a unique ocean science and diving facility within the Florida Keys National Marine Sanctuary, providing unparalleled means to study coral reefs and the ocean; test state-of-the-art undersea technology; train students, astronauts, and Navy divers; and engage the imagination of people around the world in ocean science, coral reefs, conservation, and underwater technology.

The lab allows scientists to live and work underwater for extended periods of time, where they can accomplish in 1 week what might take months to do diving from a boat. NASA routinely uses the lab as an underwater habitat for training astronauts to live and work in space, having just completed a simulated mission of visiting an asteroid.

The undersea habitat is owned by NOAA, and the program is operated out of Key Largo, Florida by the University of North Carolina Wilmington (UNCW).

Funding for the program dropped from \$7.4 million in Fiscal Year 2011 to \$3.98 million in Fiscal Year 2012 and is now slated for elimination in Fiscal Year 2013. By contrast, NOAA has requested more than \$2 billion for its weather satellite program.

There is some hope. The Aquarius Foundation, a non-profit organization, was formed to support the continued operation of the Aquarius Habitat in response to the planned termination of Federal funding. The Foundation's goal is to raise between \$1 and \$3 million to keep the program alive.

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Greenpeace ship to study unexplored Arctic ocean habitats threatened by Shell's drilling program

The Greenpeace ship Esperanza will depart on an Arctic expedition to study unexplored ocean habitats threatened by offshore oil drilling as well as industrial fishing fleets. The "Save the Arctic" tour will employ an array of modern research tools, including small submarines, acoustic monitoring equipment, and unmanned aerial vehicles, and begins as Shell's drill rigs approach their staging ground in Dutch Harbor to await further melting of the Arctic sea ice. Since Greenpeace launched its Save the Arctic campaign in Rio on 21 June, nearly 500,000 people have joined together to call for the area around the high Arctic to be made into a global sanctuary and the wider region made off limits to industrial development. The first leg of the Esperanza ship tour includes submarine research in the deep canyons of the Bering Sea to study the largest underwater canyons in the world and help protect unique ecosystems from overfishing and destructive fishing methods like trawling. During the second leg, scientists on board the Esperanza will use the submersibles and acoustic monitoring equipment to document the marine habitats and wildlife threatened by Shell's plans for exploratory drilling this summer.

USS Midway hull integrity improvements completed

Phoenix International Holdings, Inc. (Phoenix) recently completed a multi-year effort to improve the hull integrity of the museum ship USS Midway (Midway) in San Diego, California. The project involved divers wet welding steel patches over hull openings to limit the amount of water intrusion into the ship's hull. When compared to the impact and cost of dry-docking Midway, the Phoenix method of performing work underwater allowed museum operations to continue uninterrupted while avoiding the tremendous expense and disruption of placing Midway in dry-dock.

Shale gas unlikely to be the solution to the UK's future energy needs

Over recent years, the UK has become ever more dependent on the import of gas to supply our energy needs, presenting risks for our future energy security. In a presentation to the annual international conference of the Royal Geographical Society (with IBG) in Edinburgh, Professor Mike Bradshaw, Department of Geography, University of Leicester, argued that a "perfect storm" of multiple failures is developing around the UK energy policy.



Pisces submersible

The Aquarius Reef Base includes the Aquarius undersea laboratory, an ocean-observing platform with access to real-time data via the Internet, and a shore-based field station. Aquarius is the world's only operating undersea research laboratory. It sits in about 60ft of water within a sandy expanse at the base of Conch Reef, some 4mi from shore off Key Largo. It is situated within a specially designated research-only zone within the Florida Keys National Marine Sanctuary. Through saturation diving techniques, Aquarius allows scientists to live and work underwater 24hrs/day for 1 to 2 week missions. This enables them to conduct research and surveys, test equipment, or undertake *in situ* experiments that would be difficult, if not cost and time prohibitive, if diving from the surface. Since 1993, the Aquarius undersea lab has supported more than 115 missions, producing over 300 peer-reviewed scientific publications along with numerous popular science articles and educational programs. The program also supports one of the longest running and detailed coral reef monitoring programs in the world and works closely with NOAA and the

Florida Keys National Marine Sanctuary to ensure that the research undertaken meets priorities for science to help make management and conservation decisions.

The Pisces V and Pisces IV are three-person, battery-powered, submersibles with a maximum operating depth of 2,000m (6,280ft). They are currently operated by the Hawaii Underwater Research Laboratory (HURL). These vehicles allow scientists to observe the deep sea through multiple view ports, video records, instrument placement, sample collecting, and environmental monitoring. The submersibles are launched and recovered with a specialized A-frame on the aft deck of their primary support vessel, the R/V Ka'imiakai-o-Kanaloa. A typical dive lasts from 6 to 10hrs, "hatch to hatch."

HURL has the unique advantage of having access to two deep-diving submersibles at the same time. This allows one submersible to conduct science dives while the other remains in "ready" status in case of an emergency. For example, if the working sub were to get stuck at the bottom of the ocean or trapped in abandoned fishing nets, the second sub would be loaded onto a Coast Guard cutter and rushed to the site where it could work to free the first sub. While a typical dive lasts for less than 10hrs, both submersibles have emergency life support for three people to remain onboard for 5 days. Alternatively, some research projects might benefit from the use of two submersibles simultaneously.

For more information, visit aquarius.uncw.edu or www.aquariusreefbase.org.



Aquarius Reef Base (Photo Stephen Frink)



New human-powered submarine world speed record set

During the inaugural European International Submarine Races (eISR) that took place in the UK at QinetiQ's Haslar base at Gosport in Hampshire in June, a Canadian team set a new human-powered submarine world speed record.

École de Technologie Supérieure of Quebec team's submarine Omer 8 travelled at 3.6 m/s (7.03kts) over a 13m section of the course, barely inching ahead of Florida Atlantic Universities submersible Talon 1.

The race was held in a 60m by 120m pool, with both a speed section and a slalom. Submarines had to demonstrate both speed and maneuverability, with each team's overall score calculated on how the sub performed on different tasks. While Omer 8 won the speed round, FAU's Talon 1 took the prize for agility and the University of Michigan's Wolverine won for innovation.

The submarine race is a contest that began in 1989 and has grown to include the participation of universities, colleges, corporations, research centers, high schools, and privately sponsored teams from North America and Europe. The inaugural run of the eISR was only open to university students. Teams consist of student athlete/engineers that wear scuba gear as the subs are "wet," or filled with water, to provide propulsion and navigation as the subs run submerged along a 175m measured course against the clock.

The six-team competition included the University of Michigan, Florida Atlantic University, Texas A&M University, École Polytechnique de Montréal, École de Technologie Supérieure Quebec, and University of Bath, UK.

The goal is to design an underwater vehicle that can be powered successfully by scuba-clad teams without malfunctioning, crashing into the timing gates or safety net, popping to the surface, or simply failing to move through the water. The principal objective is education – encouraging innovation in the use of materials, hydrodynamic design, buoyancy, propulsion, and underwater life support.

The races were originally launched by FAU Ocean Engineering in 1989 off the Riviera Beach coast.

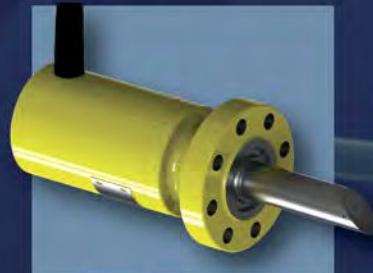
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Lng_sales@teledyne.com

Western
Headquarters

Daytona Beach , FL USA
+1 386 236 0780



Calvin Andrew Gongwer, 25 June 1915 – 20 March 2012

The ROV industry lost an esteemed pioneer and the scientific community a true genius upon the death of Cal Gongwer in March.

The inventor, entrepreneur, athlete, designer, and president and chief engineer of Innerspace Corporation passed away quietly at home at 96 years of age. The cause was heart failure secondary to advanced age.

Born in Portland, Oregon to a hydroelectric engineer and his wife, Calvin spent his childhood and formative years near hydroelectric projects in both the Pacific Northwest, where his father was chief engineer on the construction of the Cushman No. 2 Dam near Hoodspur, Washington and in the Southern U.S. at the TVA.

After graduation from Stadium High School in Tacoma, Washington, he earned a B.S. in Mechanical Engineering from Columbia University in 1937 followed by a Masters in Aeronautical Engineering from Cal Tech in 1939.

His first job was as a researcher in the engine division of GM Labs in Detroit. It was there that he met the love of his life, Penny, then a recent graduate RN from The Henry Ford Hospital.

He spent the war years in New London, Connecticut working on methods for anti-submarine warfare. During this time, he was invited to join the Manhattan Project, but declined so as to be near his wife who was recovering from a serious illness.

After the War, he worked at the Azusa, California plant of Aero-Jet General where he invented Alclo Propellant, allowing for the safe and uniform ignition of solid rocket motors.



He also headed its hydrodynamics division before leaving to form Innerspace Corporation in 1960.

Innerspace began with the production and sale of the "Aqueon," probably Cal's most eloquent invention and design. A human-powered swimming machine with which he swam frigid Lake Tahoe alone and then the Catalina Channel towing a man on a paddle board. Both of these swims were made in his early 50s.



Gongwer with Mini-Sub

In the early-mid '70s, he responded to the need of Ametek-Straza for an improved thruster for an unmanned marine vehicle. The result was the 1002 Turbine Thruster, still an icon of the ROV industry.

Throughout his life, he was granted scores of patents and professional and academic awards, including but not limited to:

- The Egleston Award from the Columbia Engineering School Alumni for a lifetime of notable achievements.
- The Henry R. Worthington Medal from the American Society of Mechanical Engineers for his important contributions to the understanding of cavitation and stall in pump impellers.
- The MTS Compass Award (Sea Technology magazine)
- MTS Fellow Award

It was said: **"He not only knows what the water will do, he knows what it is thinking."**

Cal Gongwer was preceded in death by his wife Penny and two daughters Judy and Jeanne. He is survived by his son Bob (Genny), four granddaughters, and three great-grandchildren.

"Cal was a long-time friend of mine and supporter of ON&T," says publisher Dan White. "The world will miss his genius and great sense of humor."

ON&T thanks Bob Gongwer for the information and photographs. Our thoughts are with Bob and the family.



Gongwer with his human-powered swimming machine. Shown with his wife Penny and LA County Scuba instructor Flip Fliedner

Largest research expedition of its kind near the site of Deepwater Horizon Incident

Scientists have embarked on a 3-week expedition aboard the R/V Walton Smith in the Gulf of Mexico (GoM) to understand how surface ocean currents near the site of the Deepwater Horizon influence the fate and transport of oil/dispersants, like those from the 2010 spill. In other words, they will investigate where pollutants travel and how fast they get there. This experiment is an essential step in understanding the elusive surface ocean currents that transport pollutants.

This unprecedented expedition marks the first time that a study of this magnitude will map the relatively unknown surface currents in the GoM. In the past, only a handful of monitoring devices were set adrift along the currents. This summer, more than 300 custom-made buoys, known as "drifters", will be released during the Grand Lagrangian Deployment (GLAD).

"In the aftermath of the Deepwater Horizon oil spill, it became clear that understanding the various scales of

oceanic currents and flows lies at the very heart of being able to improve our understanding and prediction of oil spills," explained Dr. Tamay Özgökmen, University of Miami (UM) professor and director of the Consortium for Advanced Research on Transport of Hydrocarbons in the Environment (CARTHE), a project funded by the Gulf of Mexico Research Initiative (GoMRI). "In this case, we are like detectives uncovering clues and following the 'trail' to find out exactly where pollutants might go."

UM professor and chief scientist Brian Haus will oversee the release of drifters from UM's 96ft catamaran, the R/V Walton Smith. "The drifters will collect a wealth of oceanic information that will be plugged into predictive models to help us better understand the role of near-surface ocean flows in spreading and dispersing materials in the marine environment," said Haus.

The GLAD experiment is one of two inaugural CARTHE research expeditions this summer. Haus leads the drifters' deployment, while Dr. Brad Rosenheim of Tulane University led sediment and



water sampling along select Florida Panhandle beaches aboard the RV Pelican earlier this summer. Data from Rosenheim's experiment will help scientists confirm the presence or absence of oil and the type of weathering that has occurred to the oil in both the sedimentary and shoreline water environment.

For a few months following the GLAD experiment, the drifters will continue to drift along the GoM currents. All CARTHE data derived during the project will be shared with the U.S. Coast Guard to improve their search and rescue operations.

For more information, visit www.rsmas.miami.edu.

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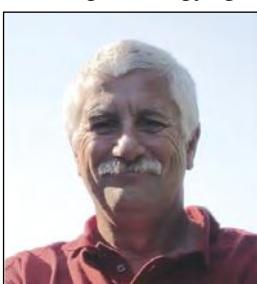
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Dr. Mark Fonseca joins CSA International, Inc., expands coastal science services

CSA International, Inc. (CSA) is pleased to announce that Dr. Mark Fonseca has joined our firm, significantly expanding our Coastal Restoration, Coastal and Ocean Sciences, and Hazard Planning business lines. Dr. Fonseca is internationally recognized in basic and applied studies of marine and estuarine ecology with a focus on ecosystem restoration and management. He specializes in seagrass ecosystems, and he is particularly recognized for his experience and knowledge in the restoration of seagrass and other coastal ecosystems. His experience includes studies of fluid mechanics, biomechanics, population and disturbance ecology, plant photophysiology, restoration methodology, spatial modeling, hydrodynamic modeling, landscape ecology, geostatistical analysis,



sis, and, to some degree, economics.

CSA provides professional, experienced services to assess, enhance, rehabilitate, and

monitor marine habitats damaged and/or at risk from proposed actions, accidents, and natural events. Primary objectives of restoration activities include accelerating habitat recovery and reducing liability for lost ecological services associated with natural resource damage. Other CSA comprehensive projects include biological, geological, chemical, and physical oceanographic data collection; reef and hard bottom surveys; environmental assessments and impact statements; biological impact and compliance monitoring; marine habitat mapping; site clearance surveys; hydrographic and bathymetric surveys; data and literature reviews; various types of permitting; and other environmental services associated with beach restoration, borrow areas, ocean dredged material disposal sites, other dredging studies, and marine mining projects.

For more information, visit www.csaintl.com.

MATE Center's international student ROV competition results

More than 50 student teams from the U.S., Canada, Hong Kong, Macao, Taiwan, the UK, Russia, and Egypt participated in the Marine Advanced Technology Education (MATE) Center's 11th annual student underwater robotics competition, held last month in Orlando.

At MATE's remotely operated vehicle (ROV) competition, which took place at the YMCA Aquatic Center, students maneuvered ROVs that they designed and built to handle underwater tasks associated with the exploration of World War II shipwrecks.

Competitors included student teams representing middle schools, high schools, home schools, community colleges, universities, after-school clubs, and outreach programs. They competed in either the RANGER or EXPLORER class, depending on the sophistication of their ROVs and the mission requirements.

There were three top winners in each class and a host of other awards.

In the EXPLORER class, the overall first place winner was Far Easter Federal University of Vladivostok, Russia. With 260 points out of 300 possible, the team also won the award for highest mission score.

As it did last year, Purdue University of West Lafayette, Indiana captured second place. The team was also recognized with the "Sharkpedo" award for innovation, originality, and "thinking outside of the box;" team member Seth Baklor earned one of two EXPLORER class "Engineering MVP" prizes for the second year in a row.

Last year's first place winner, Jesuit High School, took third place this year. The Carmichael, California-based team also won the award for best poster presentation.

Students from Ozaukee and Oostburg High Schools of Fredonia, Wisconsin combined to form the team that won overall first place in the RANGER (intermediate) class. The team also had the highest mission score, earning 300.1 points. (Their better-than-perfect score included bonus points.) Team member Eric Hartnett won one of three "Engineering MVP" awards in the RANGER class.

Second place went to Palos Verdes High School of Rancho Palos Verdes, California.

The Geneva School of Orlando, Florida, earned overall third place as well as the award for top technical report.

For more information, visit www.materover.org.

Obama Administration moves forward with additional steps to implement new 5-year offshore oil & gas leasing program

As part of the Obama Administration's all-of-the-above energy strategy to expand safe and responsible domestic energy production, the Bureau of Ocean Energy Management (BOEM) issued a Call for Information and Nominations, requesting stakeholder input regarding eight planned oil and gas lease sales scheduled in the Central and Western Gulf of Mexico (GOM) over the next five year period – an important step in implementing the new offshore oil and gas leasing program that the Department of the Interior released.

Consistent with the President's direction, Secretary of the Interior Ken Salazar announced that the Proposed Final Outer Continental Shelf (OCS) Oil and Gas Leasing Program for 2012-2017 makes all areas with the highest known resource potential available for oil and gas leasing in order to further reduce America's dependence on foreign oil. It scheduled 15 potential lease sales for the 5 year period, including 12 in the Gulf of Mexico and 3 off the coast of Alaska.

The Call helped BOEM determine the specific configuration of eight Western and Central GOM lease sales, including terms of the sales. The Call asked interested parties for information related to the potential leasing and development of these areas, including information about geological, environmental, and biological conditions as well as archaeological resources and socioeconomic factors and potential concerns about conflicts with other uses of these offshore resources.

For more information, visit www.boem.gov.

Liquid Robotics and Schlumberger form oil & gas joint venture

Liquid Robotics and Schlumberger have created Liquid Robotics Oil & Gas, an innovative, new company providing environmental measurement services and products to oil & gas companies operating offshore worldwide.

Liquid Robotics Oil & Gas combines Schlumberger's technology resources, metrology capability, and worldwide presence with Liquid Robotics' groundbreaking autonomous marine vehicle technology – the Wave Glider – to provide state-of-the-art marine sensing services.

"I am very excited about our joint venture with Schlumberger and the opportunity to expand the Wave Glider's role in the oil and gas market," said Bill Vass, chief executive officer of Liquid Robotics. "By teaming with Schlumberger, we can greatly accelerate the availability and worldwide deployment of innovative oil and gas solutions. Together, we are changing the economics and risk profile of worldwide ocean measurement."

The joint venture will offer a family of ocean-based measurement and surveillance services. They include continuous real-time measurement solutions for applications including containment loss detection (seep/spill detection), meteorology/oceanography (METOC) surveillance, and communications gateway services. Delivered securely and on-demand, these services help customers meet the increasing demands that come from operating in challenging environments.

For more information, visit www.liquidr.com.



Triton Submarines in search for giant squid in Japan

Triton Submarines (Triton) is working on a project funded by NHK, the Japan Agency for Marine-Earth Science and Technology and the Discovery Channel to capture video of the storied but elusive giant squid. Triton is running dive operations utilizing a Triton 3300/3 and two other submersibles. The goal is to obtain rare video footage of the mystical creature at depths

ranging from 1,500 to 3,000ft.

The expedition will film in several locations near Japan's coast in an effort to film a variety of deep-water predators. The filmmakers hope to film the giant squid at the expedition's final location in Ogasawara, about 550mi south of Sagami Bay, where diving is currently taking place.

The submersibles have been fitted with special infrared and low light cameras developed by NHK to allow filming in near pitch-black conditions. Giant squid are extremely light sensitive, so traditional underwater filming equipment that relies on powerful lighting cannot be used. A variety of scientific instruments, including CTDs and suction sampling equipment, has also been added to each submersible. The integration was greatly simplified and enhanced because of the built-in versatility and expandability of the electrical and PLC-based control and monitoring systems in the Triton 3300/3.

For more information, visit www.tritonsubs.com.

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Significant dynamic positioning in ice research project gets green light

The final piece of a CAD \$8.5 million research project to improve DP operations in ice fell into place when the Government of Canada announced a contribution of \$3.2 million to the project from the Atlantic Innovation Fund, administered by the Atlantic Canada Opportunities Agency. Led by long-time Kongsberg Maritime simulator customer CMS – the Centre for Marine Simulation (Fisheries and Marine Institute of Memorial University) – the 5-year research project aims to improve the safety and efficiency of oil and gas operations in ice environments by improving dynamic positioning (DP) system technologies for operations in ice. Central to the collaboration is the National Research Council of Canada's Ocean, Coastal, and River Engineering facilities in St. John's, Newfoundland. Principal study investigator, Dr. Jim Millan, is well known internationally for his team's work with DP and hull-ice interaction, both of which have paved the way ahead for the current project.

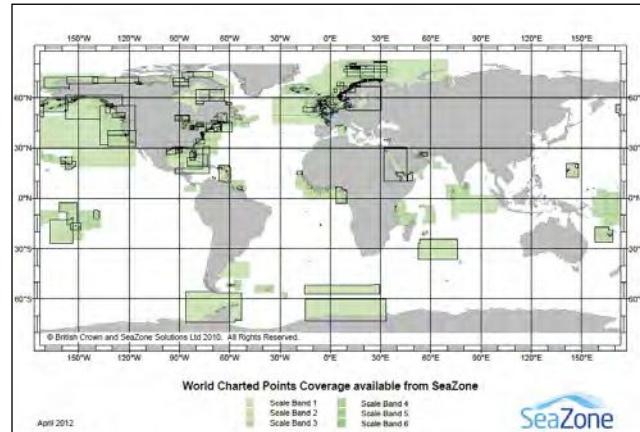
Wärtsilä to supply dual-fuel engines for China's first LNG-powered tugs

Wärtsilä, the marine industry's leading solutions and services provider, is to supply the main engines for two environmentally sustainable tugs being built for CNOOC Energy Technology & Services Limited (CETS), a subsidiary of the state-owned China National Offshore Oil Corp. (CNOOC). The vessels are the first in a planned series to be fuelled by liquefied natural gas (LNG) and will be the first tugs in China ever to be operated on gas. These will also be the first tugs globally to take advantage of the dual-fuel benefits offered by the Wärtsilä DF engine technology. The strategy of CNOOC is aimed at achieving more clean energy in its operations, and the Wärtsilä dual-fuel engine solution fits this profile perfectly. The low emission levels made possible by this technology are particularly beneficial for vessels operating close to population centers, as tugs frequently are, while the high fuel efficiency enables lower operating costs. These 6,500bhp tugs will operate along China's coastline and be fuelled from the company's own bunkering terminals.

Research and markets announces the addition of the "Shipbuilding & Repairing" report

The U.S. shipbuilding and repair industry includes about 600 companies with combined annual revenue of about \$17 billion. Major companies include the shipbuilding division of General Dynamics, Huntington Ingalls (formerly a unit of Northrop Grumman), BAE Systems Ship Repair, Bollinger Shipyards, the inland barge division of Trinity Industries, and VT Halter Marine (a subsidiary of Singapore Technologies Engineering). The industry is highly concentrated: the largest 50 companies account for about 90 percent of revenue. Demand for military shipbuilding is largely determined by the U.S. military budget and, to a much lesser extent, the military spending of foreign governments allied with the U.S. Commercial shipbuilding demand is determined by international and domestic trade, the health of the global economy, and rate of fleet replacement due to age or obsolescence. Small companies usually specialize in the building and repair of small commercial vessels. Large companies tend to offer a wide range of building and repair services for both commercial and military vessels and enjoy economies of scale in purchasing, design, and manufacturing.

SeaZone HydroSpatial 2 | base now available for 40% of the world's ocean



HydroSpatial 2 | Base is the foundation layer in the new generation HydroSpatial 2 family – and are the first product to be released. It is the definitive marine reference map incorporating large-scale, authoritatively sourced, marine geographic datasets. The content is processed to form a continuous vector layer dataset with a well-structured and defined feature and attribute model, providing the best possible marine mapping experience.

HydroSpatial 2 | Base is a consistent and seamless marine base map that is equally applicable to an offshore renewables project in the Americas, an energy project in Africa, or a Marine Spatial Planning project in Europe. Where ever your project is – SeaZone can probably support your data needs.

SeaZone's new HydroSpatial 2 product range sets new benchmarks for ease of use and global coverage for marine spatial planning, site selection, engineering design, installation, and maintenance.

It meets the requirements for a globally consistent product containing a comprehensive, but not exhaustive, set of features to support marine planning decisions. In some cases it will be all you need, however, it can be used in conjunction with your own data or data from other SeaZone products.

HydroSpatial 2 | Base has been developed as our customers have told us they wanted the benefits of our flagship product, SeaZone HydroSpatial, worldwide. As a result, we have gone right back to the beginning and re-engineered the product from the bottom up. A daunting challenge, but the benefits include an enhanced data model, allowing for intuitive feature filtering, and geo-processing and spatial analysis to create customized data outputs and map views. It is available for regions where content is captured to scales greater than or equal to 1:1,500,000. That equates to around 82,000 tiles around the world or 40% of the World's ocean.

HydroSpatial 2 | Base includes a feature catalog that is a new innovation that enables the user to get more out of our data. The feature catalog is a reference of all the objects in HydroSpatial 2 | Base, and it can be browsed and searched to find a given feature and its associated definition. It has a simple aim – to ensure that everyone using our marine mapping products understands what the objects refer to and what attributes of that object can be queried.

For more information, visit www.seazone.com.

Preliminary contract signed with Irving Shipbuilding for the arctic offshore patrol ships

The Honourable Peter MacKay, Minister of National Defence, on behalf of the Honourable Rona Ambrose, Minister of Public Works and Government Services and Minister for Status of Women, welcomed the signing of a preliminary contract with Irving Shipbuilding Inc. as part of the Arctic Offshore Patrol Ships (AOPS) project being implemented under the National Shipbuilding Procurement Strategy (NSPS).

This preliminary \$9.3-million contract will enable Irving Shipbuilding Inc. to review the existing AOPS design and specifications and create an execution strategy for the AOPS project. The AOPS will provide the Royal Canadian Navy with the flexibility to operate in Arctic and other offshore environments year-round, asserting and enforcing Canadian sovereignty, including domestic surveillance, search and rescue, and supporting other government departments.

"We have entered into a long-term



MacKay. "Canada has the longest coastline of any nation on Earth and these new ships will allow the Royal Canadian Navy to enforce Canada's northern sovereignty."

The National Shipbuilding Procurement Strategy—the largest procurement sourcing arrangement in Canadian history—is expected to create thousands of high-value jobs in shipbuilding and related industries across the country. The NSPS is about undertaking major ship procurements in a smarter, more effective way—a way that sustains Canadian jobs, strengthens the marine sector, and provides the best value for Canadian taxpayers.

For more information on NSPS, please visit www.tpsgc-pwgsc.gc.ca.

Amels 212 receives first green passport

The brand new Amels 212 has become the first superyacht in the world to be awarded a "Green Passport" from Lloyds Register.

The "Green Passport" – or "Inventory of Hazardous Materials" – was devised as a result of the Hong Kong International




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Convention of Safe and Environmentally Sound Recycling of Ships 2009. Qualification for the "Green Passport" requires the builder to put together a highly detailed list that identifies and locates all the materials that have been used in the yacht's construction.

The initiative for putting the yacht forward for the Green Passport came from OCEAN Management, a division of OCEAN Independence. The company's project and management director, Daniel Küpfer, said, "It is time to monitor the life-cycle of a ship from 'birth to grave.' We also feel that this may enhance the resale value as this passport is set to become compulsory for superyachts in the future."

Amels project manager, Sjoerd van den Broek, commented, "Fulfilling all the requirements for the Green Passport has

entailed a very large effort from Amels over the past 3 years and also for all the suppliers and contractors involved in building the Amels 212. Hopefully, she will sail for more than a hundred years, but at the end of her life on the sea, her materials can be recycled in a controlled and environmentally responsible manner."

With annual growth of 10% over the past 4 years, Amels is the largest superyacht builder in the Netherlands. Already, 2012 has been a busy year, with three new-builds and two refits successfully delivered on time and another nine new construction projects underway.

For more information, visit www.amels-holland.com.

exactEarth joins the OGC

exactEarth Ltd., a leading provider of global maritime vessel data, is pleased to announce its acceptance as a member of The Open Geospatial Consortium (OGC). As exactEarth accelerates its technological advancements in the delivery of its Satellite AIS (S-AIS) data, membership in the OGC is an important step toward developing new geospatial solutions to meet a growing and diverse customer need.

exactEarth recognize that interoperability can be a bottleneck, hampering the integration of new data sources, such as S-AIS, and slowing acceptance and market expansion. Open standards, championed in the geospatial arena by the OGC, break down these barriers, and exactEarth is keen to be actively involved in this area to shape the future direction of geospatial data distribution to ensure its customer needs and market requirements are catered to.

"We are seeing a rapid expansion in the use of Satellite AIS data," said Graham Stickler, senior director of global marketing at exactEarth and a previous OGC working group chair. "As we explore new ways to provide these data to our customers, it is clear that interoperability is a key requirement. We believe being involved in the OGC will help us form new partnerships and open new lines of communication with our customers, fostering even greater use of our data. We look forward to being an active force in helping to define future standards and methods for use in the Maritime Industry in particular."

For more information, visit www.exactearth.com.

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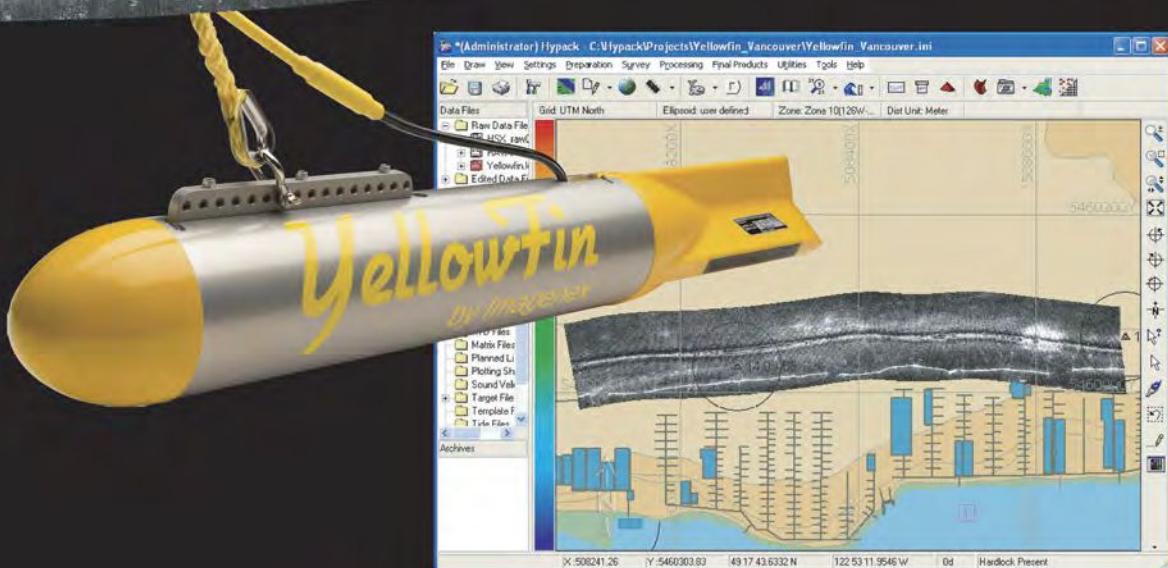
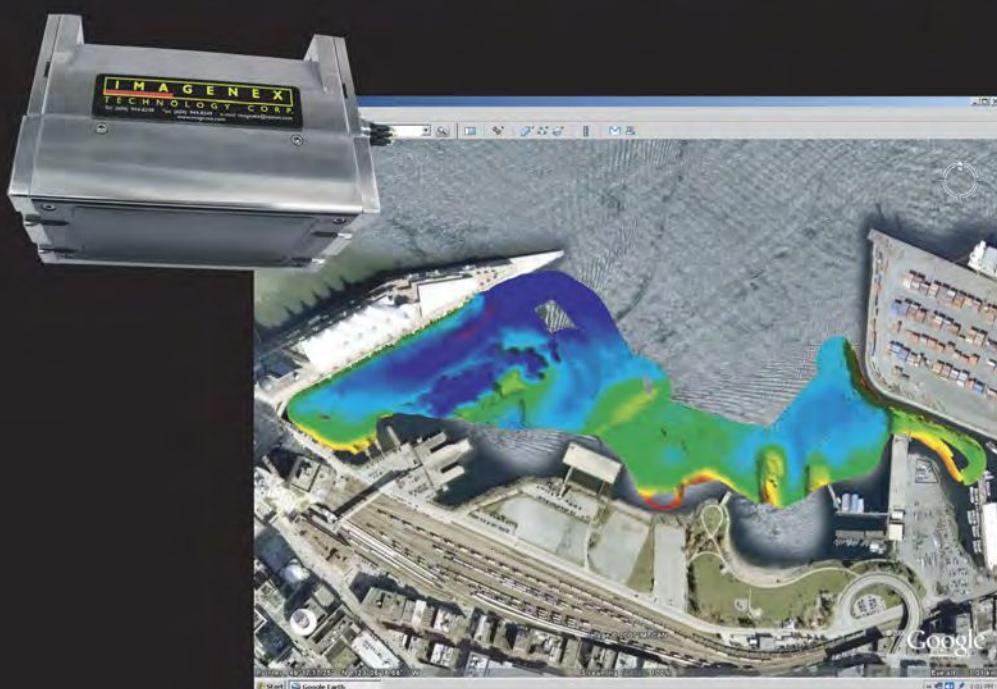
View with WIDE-i SeaCam® shows cable wrapped around shackle.

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Optimizing Acoustic Positioning for Mapping and Survey

By Ralph Gall, Technical Sales Manager at Sonardyne Inc.

Hydrographic surveys and seafloor mapping projects are challenging tasks involving the deployment of a wide variety of sensor technologies and subsea vehicle platforms. Regardless of the vehicle or sensor, the common link between them is that they all require accurate underwater positioning – a vital role traditionally fulfilled by underwater acoustics. If the position of the sensor is not accurately known at all times, the valuable data it has collected will be of little use to those who have invested time, money, and effort gathering it. One of the most popular positioning techniques is Ultra-Short BaseLine (USBL) and, with careful system configuration and survey planning, it has the capability for delivering remarkable positioning performance.

USBL positioning

USBL uses a vessel-mounted transceiver to measure the range and bearing of an underwater target equipped with an acoustic transponder. Range is determined by knowing the precise time taken for the acoustic signal to travel from the vessel to the target and back again. Bearing is calculated by knowing the discreet difference in phase between the reception of the signal at each separate transducer contained within the transceiver. This allows the system to determine a time-phase difference for each transducer and, therefore, calculate the angle of the arriving signal.

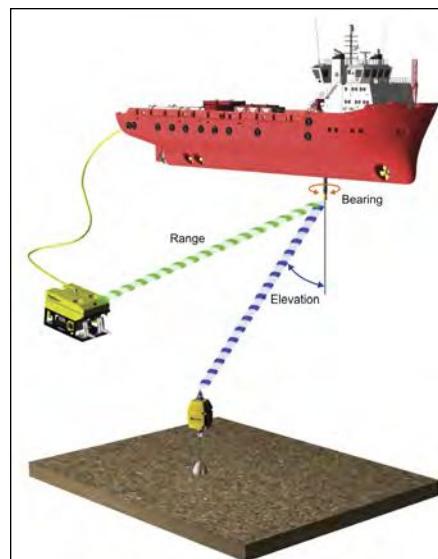
Signal to noise

Positioning quality is hugely affected by the level of signal from the target being tracked compared with the background noise level seen by the transceiver below the vessel. This is measured as the signal-to-noise (SNR) ratio with a low value resulting in imprecise positioning performance.

Noise from ROVs, thrusters, and machinery onboard varies

tremendously from vessel to vessel and tends to increase in heavier weather conditions, therefore choosing the right transceiver for the vessel and application is critical. Sonardyne's own range includes transceivers that are optimized to reject vessel noise while maintaining precise tracking at all elevations.

Choosing the right transponder is equally important. The higher the output power, the greater the SNR. This either improves the system perfor-



Ultra-Short BaseLine positioning systems calculate the position of a subsea target by measuring the range and bearing of a transponder from the vessel



An ROV-mounted transponder – choosing the right transponder can improve system performance or increase the operating range

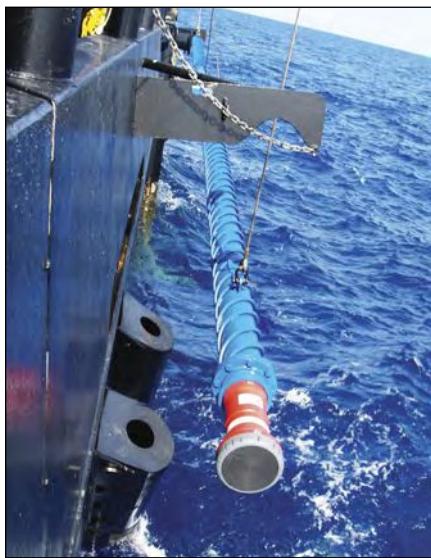
mance or increases the operating range. Increasing the output power reduces battery life, so choosing a transponder that has sufficient output power to ensure low random errors while providing sufficient battery life for the project requires careful consideration from the end-user.

Elevation

When a transponder is under the vessel, the estimation of depth is extremely good, provided the average sound velocity (SV) through the water column is accurate. When the transponder is at higher elevations, the bearing estimation remains very good, but the elevation estimation degrades. However, this can easily be mitigated by using depth aiding, for example, by configuring the USBL system to use the depth sensors fitted to most transponders.

Refraction

USBL systems measure both the range and direction to a transponder. The range measurement can be affected by changes in the SV throughout the water column. Refraction causes the signal path to bend as the sound speed changes, which means that the measured distance will have a bias error. This is a particular issue when tracking a transponder at a high elevation angle and over long range, as the time the signal spends in each sound speed layer will vary according to the angle at which it meets that layer.



A combined USBL transceiver & AHRS ready for operation on an over-the-side deployment system

When tracking a transponder below the vessel, refraction is minimal so an average sound speed can be used with little problem. Refraction does not affect the estimate of horizontal direction, however, it does cause the estimated elevation of the transponder to be in error, since the USBL system is measuring the direction of arrival at the transceiver and not the true direction to the transponder. When operating at high elevations and long ranges, for example when tracking a towfish at a long layback, depth aiding will reduce both the random and systematic errors that arise.

In addition, if an SV profile is available, then the USBL system can correct for the systematic refraction errors. It is important, however, when using SV profiles to be aware that profiles can change within the operating area. SV profiles can change significantly at different stages of the tide and between day and night. Using an inaccurate SV profile can cause greater errors than just using an average sound speed figure.

Reference sensors

USBL systems need to remove the effects of vessel motion; for this they use heading, pitch, and roll motion sensors. The quality of these can vary dramatically from vessel to vessel with low-grade sensors introducing random error and bias. The better the sensor and installation, the better the performance of the total system. It is important to make sure that the accuracy of the sensor installed is appropriate to the accuracy required and the water depth. If operating mainly below the vessel, then pitch and roll are critical. If more out to the side (e.g., towfish tracking), heading sensor accuracy is more critical.

To avoid alignment errors commonly encountered with separate roll, pitch, and heading sensors, it is recommended that a premium, quality, “all-in-one” Attitude Heading and Reference System (AHRS) is used. Positioning performance can be further optimised by co-locating the AHRS with the USBL transceiver and directly interfacing the two instruments, an approach that Sonardyne is now able to offer with its Ranger USBL and Lodestar AHRS products. The main advantage is that they are directly connected, enabling raw USBL range and bearing data to be simultaneously processed with the Lodestar’s attitude data. This integration achieves a tightly compensated solution that enables a system accuracy of 0.1% of slant range to be achieved.

USBL transceiver deployment

The deployment arrangement of the USBL transceiver is an often overlooked aspect of survey planning. Ideally, it should be rigidly mounted to the vessel and lowered to a depth several

meters below the keel away from any weather or vessel-induced aeration.

A well-engineered, through-hull, hydraulically controlled deployment system is preferable; however, it is not always practical to install such a permanent solution, and other alternatives are required. Many operational installations have shown that if care is taken, then moon pool and temporary over-the-side deployment systems can be very accurate.

Verifying system accuracy

The key to unlocking the best performance is to ensure the USBL system is correctly calibrated. This process determines the precise misalignments and offsets between the acoustic transceiver and the vessel’s own attitude and often separate heading sensor. Only unbiased ranges and GPS coordinates are used to determine the position of a transponder deployed on the seabed around which the vessel sails. The transponder position is then compared to the USBL-derived positioning and used to estimate the systematic biases. The more care and attention paid to this process, the more accurate a system will be.

Calibration can be a time-consuming exercise as it ideally requires deep water and can involve many hours of vessel manoeuvres. However, it is important to understand that the process is also critical to the paying client as an “accuracy verification survey.”

Because of their versatility, USBL systems are routinely moved from vessel to vessel to support a wide range of projects. Each move requires re-calibration and, hence, more time and cost. This can be avoided using a transceiver with an integrated attitude and heading reference system, such as Sonardyne’s new GyroUSBL product. The unit only requires an initial straight-out-of-the-box calibration when first deployed. Thereafter, it can be installed on different vessels without the need to perform a re-calibration. This reduces vessel delays and generates cost savings for owners.

Accurate underwater positioning of subsea sensor platforms and vehicles is vital when undertaking hydrographic mapping surveys – without it, the data would be erroneous. Careful planning and configuration of a USBL system is critical. Choose the appropriate transceiver for your vessel, the right transponder, the correct deployment method and verify the accuracy of your total system. Follow these steps to unlock the maximum performance from USBL.



USBL systems are capable of tracking ROVs to ranges beyond 6,000m

NOAA's global coral bleaching prediction and monitoring get major upgrades

NOAA announced a major advance in the ability to predict mass coral bleaching – providing the probability of bleaching up to 4 months into the future – with a newly developed global seasonal outlook system. Using the new seasonal ecological forecast system, unveiled at the International Coral Reef Symposium in Cairns, Australia, NOAA's Coral Reef Watch does not anticipate any large-scale coral bleaching events in the Northern Hemisphere through October 2012. Every week, the new system uses 28 runs of NOAA's latest climate model to warn coral reef managers, scientists, stakeholders, and the public of large-scale bleaching events. It builds upon the first global seasonal bleaching outlook system, released by NOAA in 2008. The new system uses sea surface temperature forecasts from NOAA's operational climate forecast system, the same system used for predicting El Niño and seasonal temperature and precipitation forecasts. Coral bleaching occurs when stress, usually high temperature, causes corals to expel their symbiotic algae (zooxanthellae) and, if prolonged or particularly severe, may result in coral death.

Venezuela ends shark finning, creates protected area

Venezuela set forth a series of measures to protect sharks within its waters. Most significantly, commercial shark fishing is now prohibited throughout the 3,730sq.km (1,440sq.mi) of the Caribbean Sea that make up the popular Los Roques and Las Aves archipelagos, whose pristine beaches and coral reefs make it a diving and fishing attraction. Scientists have identified Los Roques, located about 128km (80mi) off the Venezuelan coast, as an important breeding ground and nursery for populations of several species of sharks, including the lemon shark and the Caribbean reef shark. The new regulation also prohibits the practice of shark finning (cutting off the fins and dumping the body overboard at sea) and mandates that all of these animals caught in Venezuelan waters must be brought to port with their fins naturally attached. Sharks are highly susceptible to overfishing because of biological characteristics such as long life, low birthrate, and few offspring. It is estimated that up to 73 million are killed annually for their fins, primarily due to increased demand for shark fin soup.

Ocean engineer heads UVIC's world leading ocean observatory initiative

The oceans are changing so fast that it is vital that scientists and governments around the globe work together to better understand them, says the new head of the University of Victoria organization that manages the world-leading VENUS and NEPTUNE Canada subsea networks. "There's much we don't know yet about the oceans, which are home to over 90% of life on the planet," says Dr. Kate Moran. "What we do know is that massive changes like what we're beginning to see have previously caused mass extinctions." Moran, an internationally renowned ocean engineer, took over as president and CEO of Ocean Networks Canada (ONC) for a 5 year term on 1 July. She replaces founding president and CEO, Dr. Martin Taylor, who retired on 30 June. ONC is a non-profit agency created by UVic in 2007 to develop and manage the Ocean Networks Canada (ONC) Observatory, made up of the VENUS and NEPTUNE Canada networks. The observatory uses innovative engineering, data communication, and sensor technologies to gather real-time data and images from the ocean depths. ONC also manages the ONC Centre for Enterprise and Engagement, which promotes commercialization and outreach opportunities arising from observatory research.

NOAA collects 50 metric tons of debris off Hawaiian Islands



NOAA divers cut a Hawaiian green sea turtle free from a derelict fishing net during a recent mission to collect marine debris in the Northwestern Hawaiian Islands. Credit: NOAA

NOAA Ship Oscar Elton Sette arrived back in its homeport of Honolulu on Saturday after a month in Papahānaumokuākea Marine National Monument. The team of 17 scientists collected nearly 50 metric tons of marine debris, which threatens monk seals, sea turtles and other marine life in the coral reef ecosystem, in the Northwestern Hawaiian Islands (NWHI). NOAA has conducted annual removal missions of marine debris in the NWHI since 1996 as part of a coral restoration effort.

"What surprises us is that after many years of marine debris removal in Papahānaumokuākea and more than 700 metric tons of debris later, we are still collecting a significant amount of derelict fishing gear from the shallow coral reefs and shorelines," said Kyle Koyanagi, marine debris operations manager at NOAA Fisheries' Pacific Islands Fisheries Science Center and chief scientist for the mission. "The ship was at maximum capacity and we did not have any space for more debris."

This year, marine debris was collected from waters and shorelines around northern most islands and atolls: Kure Atoll, Midway Atoll, Pearl and Hermes Atoll, Lisianski Island and Laysan Island. Approximately half of the debris was comprised of derelict fishing gear and plastics from Midway Atoll's shallow coral reef environments, where the team also completed a 27-day land-based mission prior to loading debris on the 224ft. NOAA Ship Oscar Elton Sette.

As part of this year's mission, the NOAA team did look for debris from the 2011 tsunami in Japan, however, no debris with an explicit connection to the tsunami was found. Scientists monitored marine debris for radiation in partnership with the Hawaii Department of Health out of abundance of caution and to gather baseline data from the NWHI.

A portion of the funding for this year's marine debris removal activities was provided as part of the legal settlement collected by NOAA's Damage Assessment, Remediation and Restoration Program from a July 2005 ship grounding at Pearl and Hermes Atoll in the Monument. Additional support was provided by NOAA's Marine Debris Program, NOAA Fisheries' Pacific Islands Fisheries Science Center and Papahānaumokuākea Marine National Monument, as well as other partners including U.S. Fish and Wildlife Service, the State of Hawaii, U.S. Coast Guard, Schnitzer Steel, and Covanta Energy.

For more information, visit www.noaa.gov.



Gardline upgrades with Sonardyne – from First to 6G®

Leading marine contractor Gardline Geosurvey has selected Sonardyne International's Ranger 2 USBL tracking system as part of a multi-vessel upgrade program. By equipping its survey vessels with Sonardyne's latest generation acoustic technology platform, Gardline will now benefit from Ranger 2's ability to track multiple subsea targets over long ranges and with the highest level of positioning accuracy.

Specializing in geophysical, hydrographic, environmental, oceanographic, and geotechnical surveys, Gardline's decision to switch to 6G is further recognition of the performance gains and operational savings that the new technology offers. As a result, the company decided to upgrade and replace equipment on five of its vessels to the latest Ranger 2 USBL specification. Four of the vessels were equipped with Sonardyne's first generation USBL system, while a fifth had a non-Sonardyne USBL system installed.

A survey-grade USBL acoustic positioning system, Ranger 2 is designed for deep water, long-range tracking of underwater targets and position referencing for dynamically positioned (DP) vessels. It builds on the simplicity and performance of Sonardyne's original Ranger system by adding support for 6G® technologies that are proven to increase the efficiency of survey operations, reduce vessel delay, and improve the total cost of ownership.

For more information, visit www.sonardyne.com.

Fugro Geos environmental and marine monitoring system for new Usan FPSO

A new environmental and marine monitoring system has been designed and commissioned by Fugro GEOS for Total's new-build Usan FPSO in Nigeria. The real-time meteorological and marine data essential for safe offshore operations are provided by sensors located on a surface Wavescan buoy along with a range of instrumentation onboard the facility.

Fugro's system acquires and processes data and distributes them in real-time via displays in both the radio room and the onboard central control room; it is also interfaced with the FPSO's DCS (distributed control system).

Real-time metocean data provided by the system include wind, temperature, humidity, pressure, cloud, visibility, precipitation, and vessel motion while sensors on the Wavescan buoy provide marine parameters such as waves, current profiles, and sea temperature.

For more information, visit www.geos.com.

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ROV aids Antarctic krill research

A specially modified Falcon remote operated vehicle has been supplied by ATSA Defence Services to the Antarctic Climate and Ecosystems Cooperative Research Centre (ACE CRC) for research into sea ice algae. The vehicle will be jointly operated by researchers from ACE CRC and the Australian Antarctic Division (AAD).

To meet the research specifications required, the Falcon ROV carries a special black finish, single-function, three-jaw manipulator arm and a fiber optic upgrade to accept additional sensors.

ACE CRC says new methods and technologies are needed to answer the questions of how the winter sea ice extent affects biological productivity off East Antarctica and how sensitive krill populations are to potential future changes in sea ice extent.

The ATSA engineering team also spent 4 days training ACE CRC and AAD staff in the fibre optic system as well as monitoring the Falcon's performance in ATSA's test tank.

For more information, visit www.atsa.com.au.

First seabed sonar to measure marine energy effect on environment and wildlife

UK scientists will measure the effect on the marine environment and wildlife of devices that harness tide and wave energy using sonar technology that has, for the first time, been successfully deployed on the seabed.

Renewable energy from tidal currents can be generated using turbines in the tidal flow, and wave energy can be captured in a number of different ways. FLOWBEC (Flow and Benthic Ecology 4D) is a 3-year, £1.2 million project that brings together a consortium of researchers to investigate the effects of such devices by monitoring environment and wildlife behavior at UK test sites, the first of which is the tidal energy test area of the European Marine Energy Centre (EMEC) in Orkney.

FLOWBEC is a National Oceanography Centre (NOC)-led project, which is funded by the Natural Environment Research Council and Defra (the Department for Environment, Food and Rural Affairs). It brings together scientists from the Universities

of Aberdeen, Bath, Edinburgh, Exeter, and Plymouth; Queens University Belfast; Plymouth Marine Laboratory; Marine Scotland Science; the British Oceanographic Data Centre; EMEC; and one of the world's leading tidal turbine developers, OpenHydro Ltd.

The researchers from the Universities of Bath and Aberdeen, together with the expert acoustic and technical teams at Marine Scotland Science, have combined two state-of-the-art sonar systems on a seabed frame placed within 25m of an OpenHydro structure. This monitors fish and diving seabirds that pass through or feed within the location. In particular, the study is assessing how fish and seabirds interact with the installation.

For the first time these sonars – which are normally mounted on a ship as separate units looking down at the seabed – have been adapted to operate autonomously in combination for several weeks, while facing upwards. Collecting the data in this way allows imaging of a full "acoustic curtain" along the tidal flow and around the turbine in a highly challenging environment.

For more information, visit noc.ac.uk.

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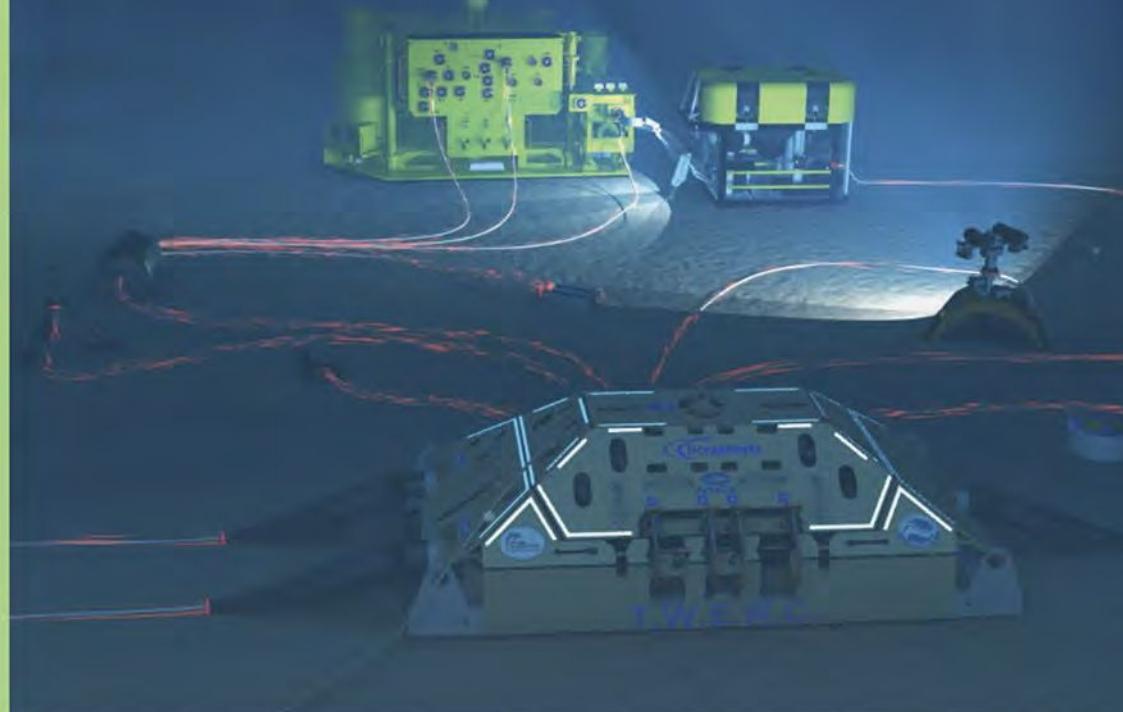
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- Scientific ocean observing systems
- Tsunami and seismic warning systems
- Pipeline and infrastructure security monitoring

Breakthrough, Non-destructive Testing Technology to Monitor Flexible Pipelines

By Stewart Duthie, Business Development Manager, Flexlife

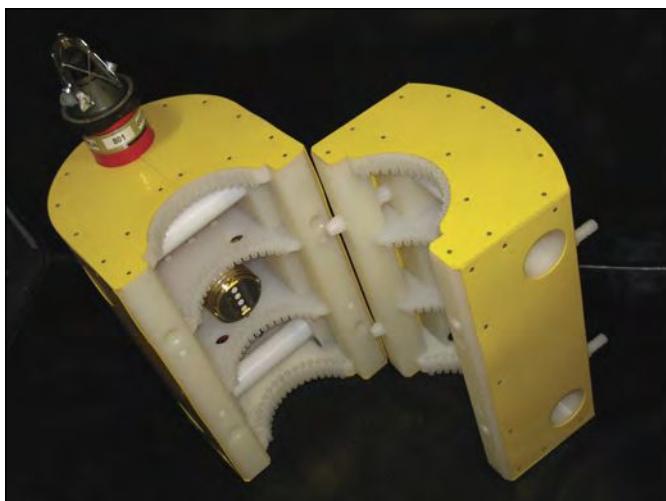
The increasing utilization of Floating Production Systems to exploit hydrocarbon resources in ever deeper waters and harsher environments has led to greater use of unbonded flexible pipes in oil and gas field development. The effective integrity management of these complex, composite structures presents unique challenges, requiring innovative inspection, monitoring, and repair techniques.

Subsea project and integrity management specialist Flexlife has adapted its unique flexible pipe NDT inspection technology in order to provide operators with a permanent monitoring system intended to give immediate notification of any loss of outer sheath integrity.

Based on the company's patented ultrasonic scanning system for flexibles (winner of the 2011 Pipeline Industries Guild award for Significant Contribution to Subsea Pipeline Technology), the FlexGuard system comprises individual subsea pods that are mounted on individual risers. The pods communicate acoustically or electronically to a deck-mounted topside receiver unit, which, in turn, interfaces with the host vessel's Ethernet to telemeter data to shore for remote processing.

Successful inspection track record

Flexlife's scanning technology was initially developed in order to be able to scan through the complex internal structures of unbonded flexible pipe, *in situ* and without interruption to production. The technology addresses a number of problems associated with the most common failure/replacement mode of flexible pipes in that it can be used to determine annulus condition (i.e., flooded or not) as well as the extent and specific location of flooding. This can be used to accurately determine if the annulus is filled with permeated water or seawater, which has a significant effect on the service life of dynamic risers.



Flexlife's permanent NDT monitoring solution FlexGuard



Flexlife's new repair solution FlexGel

Once an annulus has flooded, the scanning tool can scan and measure very accurately the armour wire thickness. This can be used around the site of the breach to inspect for wire thinning or snapped wires – which, in the past, has proven to be extremely difficult to do. The data can then be used in fatigue life calculations using actual condition of the wires in the calculations, eliminating engineering assumptions.

The benefits of this technology are that operators can know the exact condition of their riser and, if flooded, the wire thickness. As a result of using live data, the lifespan of flexible pipes can be safely extended and the risk of major leakage of hydrocarbons and associated environmental, personnel, and production impact greatly reduced.

System specifications include current operating depth to 3000s and the ability to scan risers between 4in. OD and 21in. OD. The technology has been accepted by UK HSE and Norwegian equivalent, Petroleum Safety Authority, as helping operators reduce risk of major leakage of hydrocarbons and associated impacts.

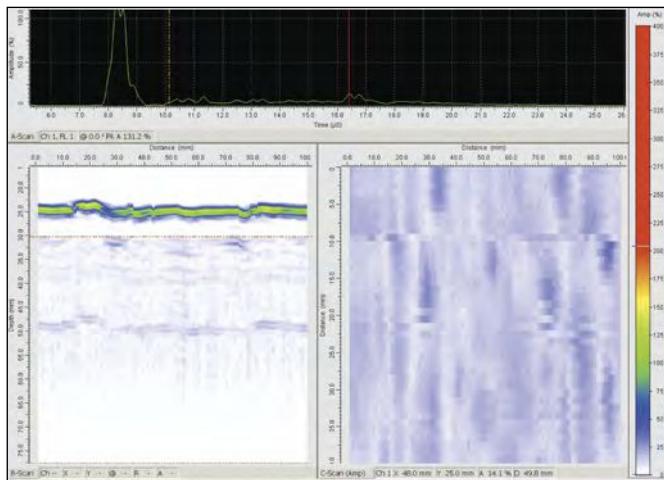
The flexible pipe scanning technology has been extensively used since 2009, with over 70 risers scanned to date.

Innovative riser, permanent monitoring

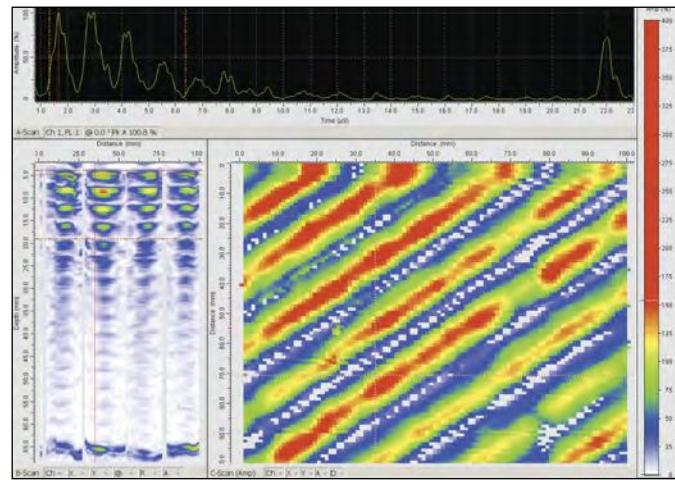
The new riser monitoring system, FlexGuard, incorporates this scanning inspection technology in the form of a collar permanently fitted to flexible risers. The subsea riser monitoring tool provides the operator with instant, continuous access to the condition of any riser remotely from any location in the world – ensuring a failsafe early warning system and providing major cost and safety benefits.

It utilizes the latest ultrasonic and subsea communications technology and is able to wirelessly, either on command or at scheduled weekly inspection times, provide the status of the flexible pipe's annulus and underlying armour wires. FlexGuard can be fitted either during installation or by retrofit by diver or ROV onto any flexible riser asset already in use in the field, offering permanent monitoring for corrosion/breaches.

Pipeline Monitoring



Scan of riser with no flooding in the annulus



Scan of a riser with a flooded annulus

The data are collected topside on the host vessel by an over-boarding Dunker that is connected by an umbilical cable. This Dunker module communicates acoustically with each associated FlexGuard Pod (each of which has a unique acoustic signature) and carries the data topside to a dedicated surface interface unit that converts the signal into an Ethernet protocol for onward transmission via host vessel satellite communications.

The system offers a number of significant benefits in that it does not require regular personnel mobilization offshore in order to test the annulus condition of risers, and the increased frequency of scanning provides an immediate notification of any loss of outer sheath integrity. Furthermore, the system does not require vent port communication in order to function effectively, and it is suitable for risers that terminate below sea level, traditionally a problematic configuration to monitor.

Over time, the system will provide an extensive data set that will assist operators in complying with the most rigorous regulatory requirements. It should also strengthen the case for life extension if, as is often the case, a field's life extends beyond initial design parameters.

There are currently around 3,000 risers in service, with the number forecast to rise to 5,000 by 2015. Around 35% of risers suffer some form of outer sheath damage according to recent market surveys of operators. Once seawater breaches the outer sheath, corrosion rapidly follows and leads to premature failures.

The next step – repair work

As well as offering technology that will identify corrosion or give a clean bill of health to undamaged flexibles, Flexlife is working to devise solutions for instances where infrastructure has been damaged. As a result, a further new product, FlexGel has been developed. The oil-based gel is non-soluble in water and has a density that can be adjusted depending on the application. It was devised to halt corrosion of damaged areas of flexible risers or umbilicals within caissons.

The patented substance can be pumped into a caisson to completely encapsulate a riser with an annulus breach, displacing seawater and preventing further corrosion in the structural tensile armor wires of the flexible pipe, increasing the possible lifespan of the riser.

It is not uncommon for the outer sheath of flexible risers and umbilicals to be damaged either during installation or even by regular friction caused during operation. If the problem is not addressed, it can lead to rapid corrosion of tensile

armor layers and premature pipe failure. The enclosed area inside a caisson is particularly problematic because there is restricted access for inspection and damage often occurs around the splash zone level where oxygenated seawater can cause accelerated corrosion.

The advantage of FlexGel is that it can be deployed from topside or subsea without the need for costly intervention by rope access or diving teams and the associated health and safety risks of those types of operation.

Once it is in place, Flexlife carries out predictive engineering and testing of the flexible, setting a benchmark for continued operation and allowing the pipe to remain in safe service rather than having to be changed out at considerable expense.

As well as being used to prevent further corrosion in cases of known damage, FlexGel can also be installed just after riser pull in as a preventative solution.

Conclusion

Flexlife was established to address some of the most common issues facing the subsea sector, and thorough in-house investment in R&D now has a range of solutions to identify, repair, and prevent problems in flexible pipe with no impact on production.

Having established a track record in the UK and Norwegian sectors of the North Sea and in West Africa, the company's next step is working with operators in Gulf of Mexico and Brazil to provide NDT solutions.

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



Schematic showing the FlexGuard monitoring process

OPT and Lockheed Martin to develop wave energy project in Australia

Ocean Power Technologies, Inc. (OPT), a leading wave energy technology company, and Lockheed Martin have entered into a teaming agreement with the goal of developing a 19MW wave-energy project in Portland, in the state of Victoria, Australia. This is one of the largest wave-energy projects announced to date, and leverages a grant from the Commonwealth of Australia. For the project, Lockheed Martin will assist with the design of OPT's PowerBuoy® technology, lead the production and system integration of the wave-energy converters, and support overall program management. Lockheed Martin and OPT have been collaborating since 2004, first on the development of an Advanced Deployable System for the U.S. Navy and most recently to design and launch utility-scale wave energy converters off the coast of Reedsport, Oregon.

FoundOcean wins RenewableUK Award

FoundOcean has won the Large Project Award at the inaugural RenewableUK Energy Awards 2012. Together with Offshore Design Engineering Ltd, REpower, and Vattenfall, the companies were recognized for their exceptional achievement in constructing the Ormonde Offshore Wind Farm project. RenewableUK is the body representing the wind and renewables industries. To execute a project successfully the unexpected must always be expected and it was FoundOcean's 45 years' experience of sub-sea and offshore foundation grouting that could accommodate this – minimizing delays and enabling the rapid grouting of the structures. Maria McCaffery, chief executive of RenewableUK, is quoted as saying, "We created these Awards to recognize and celebrate excellence in the wind and marine energy industries. The extraordinarily high caliber of the winners, and indeed of all those nominated, shows there is a great deal to celebrate...The RenewableUK Energy Awards pay tribute to these inspiring examples of tenacity and success."

Vestas wins 216MW offshore order in Belgium

Vestas has received a 216MW offshore order in Belgium for the Northwind Offshore Wind Farm. The project is planned for construction on the Bank Zonder Naam off the coast of Zeebrugge in Belgium. The order includes supply, installation, and commissioning of 72V, 112 to 3.0MW wind turbines, along with a 15-year service and maintenance agreement. The project is scheduled to be completed in the second quarter of 2014. Northwind NV, owned by the Colruyt Group and Aspiravi Offshore, is headed by Frank Coenen, CEO, who was also involved in the very successful construction of the Belwind Bligh Bank 1 Offshore Wind Farm, for which Vestas also supplied the turbines. Frank Coenen sees this new agreement with Vestas as a natural next step in the collaboration and partnership between the two companies. Vestas has installed turbines in 69 countries, providing jobs for approximately 20,000 people at its service and project sites, research facilities, factories, and offices around the world.

Turbine installation complete at Sheringham Shoal



Photo credit: Alan O'Neill / Statoil

The final blade of the 88th and last wind turbine at the Sheringham Shoal Offshore Wind Farm was bolted into place, marking one of the few remaining milestones in the construction of this 317MW project in the Greater Wash off the coast of North Norfolk.

The team onboard jack-up Seajacks Leviathan completed the installation of the last turbine, and the vessel has demobilized and left the field for her next project. The Leviathan has worked in tandem with second jack-up vessel, GMS Endeavour, for the past 5 months, completing the erection of the Siemens 3.6MW turbines.

With 88 turbines in place and 46 turbines now connected and able to deliver electricity to the national grid, the wind farm is on track to be fully operational this year. The wind farm has been generating electricity since August last year when the first turbine began producing power.

Scira general manager, Einar Strømsvåg, said the remaining turbines are in various stages of mechanical and electrical completion, commissioning, or testing before they can start generation.

Commissioning involves systematically assessing each part of the wind turbine and the electrical infrastructure, manual inspection and certification, followed by longer trial runs before being signed over to the operations team.

Work will also continue on the cable burial prior to full hand over to operator, Scira Offshore Energy. International energy leaders Statoil and Statkraft own the wind farm through joint venture company Scira, while Statoil has been the project manager throughout construction.

It has been a busy period at Sheringham Shoal, with work on the termination of all the infield cables also now complete. This work has involved connecting the cables so that they are ready to transmit power once each turbine becomes operational. The placement of scour protection around the foundation bases is in the final stages, meaning more vessels will soon leave the site.

"The completion of every construction stage is the culmination of a huge amount of effort and coordination, but the end of the turbine installation phase is a particularly visible and symbolic milestone," Mr Strømsvåg said.

An official Sheringham Shoal opening event for stakeholders will be held in the project area in September when full operation is underway.

For more information, visit www.statoil.com.

Aquamarine Power wins innovation award

Wave energy developer Aquamarine Power was honored with a major award for innovation in recognition of its cutting-edge Oyster wave energy technology.

The company won first prize in the Product and Innovation category at the inaugural RenewableUK Energy Awards, which were held in London.

Earlier this month, operational testing of Aquamarine Power's second-generation Oyster 800 wave energy machine commenced at the European Marine Energy Centre near Stromness in Orkney when the machine produced first electrical power to the grid.

Last month, Aquamarine Power was also honored with a major European Commission environment award at the European Business Awards for the Environment.

For more information, visit www.aquamarinepower.com.

Wave and tidal energy action plan

A marine energy action plan, developed by the wave and tidal power industry in Scotland to accelerate electricity genera-

tion from the sea, has been unveiled.

The plan outlines progress made since the launch of the 2009 Marine Energy Road Map and makes recommendations to help improve access to finance, grid development, infrastructure and supply chain, the planning regime, and engagement with Europe to ensure Scotland and other nations seize the huge potential for clean energy from the world's seas and oceans.

The blueprint from the industry-led Marine Energy Group (MEG) has been launched ahead of First Minister Alex Salmond, welcoming political leaders and ministers to the 18th British-Irish Council summit in Stirling, where support for wave and tidal power is on the agenda.

For more information, visit www.scotland.gov.uk.

Fugro's European offshore survey experience for Cape Cod

Fugro brings European offshore survey experience to lead the way on America's first offshore wind farm.

Fugro, a leading global geoscience survey company, has commenced a major geotechnical and geophysical sur-

vey operation for America's first offshore wind farm, Cape Wind. The wind farm will be situated on Horseshoe Shoal in Nantucket Sound, and once operational, is predicted to provide three quarters of the electricity needs of the Cape and Islands.

Cape Wind president, Jim Gordon, said, "Our geotechnical program this summer on Horseshoe Shoal begins our detailed design, engineering, and construction phase, and, with Fugro's help, will allow us to optimize our project to ensure that Cape Wind will deliver its important clean energy benefits over its design life."

The offshore program will involve up to 50 scientists, engineers, archaeologists, and geologists using specialized vessels. Fugro, as the lead Cape Wind contractor for the project, brings to the table an impressive offshore wind site investigation track record, having performed similar work for a majority of the offshore wind farms built in European waters.

For more information, visit www.fugrorenewables.com.



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Cape Wind begins major offshore operations

Cape Wind has commenced a major geotechnical and geophysical survey operation as part of its construction design and engineering process and initial mobilization of the project on Horseshoe Shoal in Nantucket Sound.

This multi-million dollar offshore program will continue through September / October, involving up to 50 scientists, engineers, archeologists, and geologists using specialized vessels.

Fugro is the lead Cape Wind contractor undertaking this effort. Fugro is a leading global, geotechnical survey firm that has performed similar work for a majority of the offshore wind farms built in European waters. Fugro's U.S. east coast operations are based in Norfolk, Virginia.

Cape Wind president, Jim Gordon, said, "Our geotechnical program this summer on Horseshoe Shoal begins our detailed design engineering and construction phase and will allow us to optimize our project to ensure that Cape Wind will deliver its important clean energy benefits over its design life."

Fugro will be assisted by Massachusetts contractors, including New Bedford-based Fathom Research who will work together with the University of Rhode Island to conduct sediment analysis. Also involved are Waltham-based ESS Group, which is providing environmental engineering services and overseeing the marine mammal monitoring program to minimize any disturbance to marine mammals from the project activities on Horseshoe Shoal.

For more information, visit www.capecwind.org.

Largest ever bird survey undertaken on Dogger Bank

After 2.5 years of ongoing aerial and vessel operations, Forewind, development partner for the Dogger Bank offshore wind zone, has concluded the first phase of the most comprehensive offshore bird and marine mammal survey ever undertaken.

Carried out by environmental specialists from Gardline Environmental and HiDef Aerial Surveying, the extensive surveys were commissioned to

enable Forewind to gather vital information about the species and numbers of bird and marine mammal species, their distributions, and seasonal variations across the 8,660km² zone. The information will be used to help Forewind plan the layout and design of the offshore wind development proposed for Dogger Bank.

Beginning in January 2010, the vessels have surveyed more than 40,000km in transects, while trained observers recorded their findings using the industry-accepted collaborative offshore wind research into the environment (COWRIE) methodology. This involved recording birds sitting on the water and their distance from the boat as well as recording snapshots of birds flying to the front or side of the vessel at 1min intervals.

The aerial surveys also covered more than 180,000km in transects, with a bank of four digital video cameras attached to an aircraft recording all objects within a 200m wide swathe.

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

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Applied Acoustics' Easytrak to be installed on U.S. Navy vessels and helicopters

A contract for the supply of underwater tracking systems to be used by the U.S. Navy in mine clearance operations has been awarded to Applied Acoustic Engineering Ltd. of Great Yarmouth, UK by ATLAS North America (ATLAS NA), a wholly owned subsidiary of Atlas Elektronik GmbH of Bremen, Germany. The Applied Acoustics' military grade Easytrak USBL tracking system will be integrated into the SeaFox™ mine neutralization system supplied by ATLAS NA under contract to Lockheed Martin Corporation. The SeaFox™ system addresses an urgent operational need from U.S. Navy Central Command for more effective mine countermeasure systems to be installed on its Avenger-class ships and MH-53 Sea Dragon helicopters. Seafox™ is an expendable, remotely operated underwater vehicle containing an explosive warhead used to neutralize the target mine. The Seafox™ vehicle is guided to the target from the parent ship or helicopter using a combination of Applied Acoustics' Easytrak and the vehicle's own onboard sonar. Easytrak utilizes a multi-element, single transducer to send and receive acoustic signals underwater from which range, bearing, and depth information can be determined. The Applied Acoustics' contract to supply Easytrak USBL systems for the advanced SeaFox™ mine disposal vehicles to be used by the U.S. Navy follows its earlier success supplying the Royal Navy's Hunt and Sandown class mine counter measure vessels and similar contracts with other European naval forces.

Imtech Marine to power Turkish navy submarine rescue vessels

Imtech Marine announces that Elkon (Istanbul), member of Imtech Marine, signed a contract for the design and supply of the complete electrical systems to power three Turkish Navy auxiliary vessels. The vessels, consisting of one Submarine Rescue Mother Ship (MoShip) and two Rescue and Towing Ships (RATships) will be built by Istanbul Shipyard in Tuzla, Turkey and are scheduled to be delivered to the Turkish Navy by mid-2015. Elkon is contracted by Istanbul Shipyard to design, supply, and commission the complete package of electrical systems. The supply range involves major components of the power generation; power distribution and propulsion systems; and integrated vessel management system, including power management and machinery monitoring and control. Electrical engineering and onboard installations, integrated logistic support, and ships' engine room and bridge consoles are also part of Elkon's scope. Elkon, Turkish maritime technical service provider, is a member of Imtech Marine since 2010. The core of its activities consists of electrical and automation system integration, including complete onboard electrical installations. Elkon has a renowned reputation and excellent relationships with the Turkish Navy and shipyards.

U.S. Navy sending unmanned SeaFox vehicles to Persian Gulf

To help counter the threat of an Iranian blockage of the Strait of Hormuz, the U.S. Navy has sent a fleet of SeaFox™ vehicles to the Persian Gulf. The unmanned vehicles, weighing in at less than 100lbs each, contain an underwater camera and sonar that send back live images to the operator via a fiber optic cable and receive control information. Traveling at up to 6kts, the \$100,000 SeaFox™ is guided on a suicide mission to destroy mines and other obstacles. It can be launched from Navy ships or even helicopters.

Textron Systems to build U.S. Navy ship-to-shore connector



Textron Marine & Land Systems (TM&LS), an operating unit of Textron Systems, a Textron Inc. company, announced that its team has been selected by the U.S. Navy for the Ship-to-Shore Connector (SSC) program. The SSC will replace the Landing Craft, Air Cushion (LCAC), providing a modernized means for the U.S. Navy and Marine Corps to land at more than 80% of the world's shorelines for the next 30 years.

The approximately \$213 million fixed-priced, incentive-fee contract is for the detailed design and construction of an initial SSC Test and Training Craft, with work to be completed by February 2017. The contract includes options for up to eight production craft to be delivered by 2020 worth a total potential value of \$570 million. With its amphibious lift requirement, SSC will provide the surface assault portion of the U.S. Joint Expeditionary Maneuver Warfare tactical plan with the capability to project and sustain military operations from the sea, independent of tides, water depth, underwater obstacles, or beach gradient.

The Textron team, including aluminum manufacturing and performance expert Alcoa Defense and command, control, and navigation systems industry leader L-3 Communications, brings together more than 55 years of experience in Air Cushion Vehicle (ACV) engineering, design, specialty materials, systems integration, manufacturing, high-rate production, and service life extension with the only facility in the world that has successfully produced 10 SSC-like craft per year – Textron Marine & Land Systems' shipyard. Sited in New Orleans, Louisiana near the Gulf of Mexico, the 600,000sq.ft shipyard is designed to optimize the production of ACVs, allowing these craft, once finished, to move mission ready from assembly line to open water.

"Our team was formed from the very beginning to deliver to the U.S. Navy the lowest risk SSC — a highly capable, high performing vessel delivered within budget, at weight, and on schedule, and maintained for its entire service life," stated Fred Strader, president and chief executive officer of Textron Systems. "Our experienced team is eager to get to work building air cushion vehicles once again in our shipyard and supporting the U.S. Navy in every way we can."

For more information, visit www.lowriskssc.com.

ONR sensor hunts down more than 600 suspect boats

A new sensor and software suite sponsored by the Office of Naval Research (ONR) recently returned from West Africa after helping partner nations track and identify target vessels of interest as part of an international maritime security operation.

Researchers deployed the system, called "Rough Rhino," aboard U.S. aircraft, ships, and partner nation ships operating in waters off the coast of Senegal and Cape Verde. Sailors and Coast Guardsmen could access and control the sensors both afloat and ashore as well as share information in a real-time common operating picture.

"It provides a comprehensive maritime domain awareness picture for dark, gray, and light targets—vessels that range from no electronic emissions to those that cooperatively report their name and positions," said Dr. Michael Pollock, ONR's division director for electronics, sensors, and networks.

Rough Rhino was responsible for finding targets during the most recent 2-week African Maritime Law

Enforcement Partnership (AMLEP) operation. The primary missions are aimed at assisting and building the host nation's capability to interdict and counter narcotics, human trafficking, and illegal fishing.

On any given day, the distributed intelligence, surveillance, and reconnaissance (ISR) system tracked more than 600 targets, identified vessels of interest, and culminated in 24 boardings by Gambian, Senegalese, and U.S. maritime security teams. For future operations, Gambia and Senegal will continue to work with African partner nations to build and maintain maritime security and safety.

For more information, visit www.navy.mil.

Alion awarded contract to support Navy's "Team Submarine"

Alion Science and Technology, a global engineering, R&D, IT, and operational solutions company, has been awarded a contract valued at up to \$542 million to provide technical and management expertise to support the U.S. Navy's submarine force. The contract,

issued by the Naval Sea Systems Command, covers a full range of services to the Team Submarine Program Offices, including engineering, logistics, program management, and business and financial management.

Team Submarine unifies submarine-related organizations across the Navy to focus on strategies and solutions for undersea warfare research, development, and acquisition.

"The U.S. undersea forces are crucial to the nation's security strategy," said Rod Riddick, Alion senior vice president. "Alion's experts have been supporting the submarine force for decades, so we fully understand the environment in which they operate. This means we can implement solutions that can make the undersea fleet faster, quieter, safer, and more powerful, while meeting the Navy's financial goals."

The contract supports the acquisition, development, and maintenance of submarines, sensors, combat systems, weapons, and payloads. The period of performance runs through June 2017.

For more information, visit www.alionscience.com.

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World's largest international maritime exercise underway

Military leaders from 22 nations formally launched Rim of the Pacific Exercise (RIMPAC) 2012 on July 2. RIMPAC is hosted biennially by U.S. Pacific Fleet in and around Hawaii.

U.S. and international speakers at the opening press conference included Adm. Cecil D. Haney, Commander of the U.S. Pacific Fleet; Vice Adm. Gerald R. Beaman, Commander of the U.S. Third Fleet; Japan Maritime Self Defense Force Rear Adm. Fumiaki Kitagawa, Commander of Escort Flotilla Three; and Royal Canadian Navy Rear Adm. Ron Lloyd, Chief of Force Development.

"The theme of capable, adaptable partners resonates here in what is the world's largest international maritime exercise," Haney said.

Haney said 22 nations, 40 ships, 6 submarines, more than 200 aircraft, and 25,000 people are participating in RIMPAC 2012. The exercise is designed to enhance the tactical capabilities of participating units in major aspects of maritime operations at sea. RIMPAC 2012

is the 23rd in the series, which began in 1971. It is the world's largest international maritime exercise.

RIMPAC, as well as the cooperation and interoperability it fosters, "is critical to ensure the safety of the sea lanes and security of the world's oceans," said Haney, who was flanked by representatives of the participating nations during a pierside press conference.

Haney noted that this year's RIMPAC is unique with a number of exercise firsts:

- The naval and air functional component commands in RIMPAC are being led by international partners;
- Includes a humanitarian assistance/disaster relief (HA/DR) component;
- The U.S. Navy will demonstrate its "Great Green Fleet" approach with some surface warships and aircraft functioning on biofuel blends.

Beaman said the HA/DR portion of the exercise is a 5-day exercise that involves Hawaii disaster responders as well as more medical personnel than have participated in past RIMPACs. He also highlighted the international leadership roles throughout the exercise.

Integrated ship protection system

FarSounder has recently sold an FS-SPS Ship Protection System to a European customer. For this yacht customer, FarSounder will be providing navigation while underway, diver detection while at anchor, and outputting information into a third-party command and control security platform.

FarSounder is also providing a full user interface for controlling, configuring, and analyzing the diver detection capabilities of the system. The user interface includes target track information as an overlay on top of nautical charts. It also includes a waterfall display for aiding in human verification of track data.

The FarSounder FS-SPS Ship Protection System continues to be a favorite for private yacht owners who demand the best solutions for ensuring the safety of their family and guests while onboard their home-away-from-home. The system provides detection, classification, and alarms of underwater threats.

For more information, visit www.farsounder.com.

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Digital Maps Improve Polar Ice Navigation

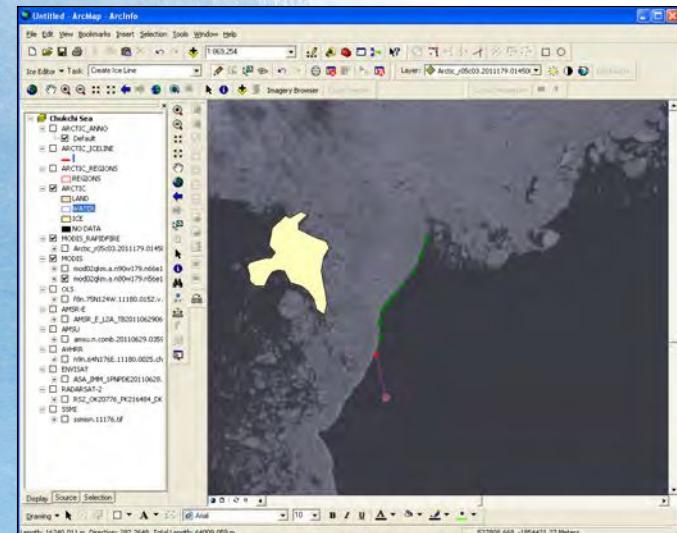
By Barbara Shields, Esri Writer

The Arctic polar ice cap is thinning and shrinking. This creates longer navigation seasons, which opens routes for commerce; makes natural resources more accessible for drilling; and provides opportunities for shorter, more efficient voyage routing – all of which lead to increased ship traffic in icy arctic waters. Ship commanders operating near, through, and beneath sea ice rely on ice data supplied by the National Ice Center (NIC).

NIC is a cooperative partnership between the U.S. Navy, the U.S. Coast Guard, and the National Oceanic and Atmospheric Administration (NOAA). Residing in the NOAA Satellite Operations Facility in Suitland, Maryland, NIC is tucked into a corner of a striking post-modern structure bedecked with satellite dishes. In an operations room, a staff of 15 to 18 ice analysts (most of whom have a background in meteorology) study and interpret ice images. They are supported by small teams of cryogenics scientists and geographic information system (GIS)/IT technicians. They use ArcGIS software from Esri, a GIS software and services provider based in Redlands, California.

NIC experts analyze data from satellite imagery and other sources to assess, on a daily, weekly, and biweekly basis, sea ice conditions in the Arctic, the Antarctic, the Great Lakes, and Chesapeake Bay. They decipher the types of ice at the poles based primarily on images from a diverse number of satellite missions, such as SCA, RADARSAT-1 and 2, ESA Envisat, and NASA Terra and Aqua. Making sense of ice data is very different from deciphering land use because images of sea ice do not have many traditionally recognizable features, so interpretation requires different skills. Rather than vegetation, rivers, and human development, ice analysts look for visual clues indicating characteristics such as ice concentration, stage of development (age), and ice form (floe size).

More than 95% of the data used in sea ice analyses is derived from polar-orbiting satellites. Every day, the center receives approximately 6,000 images, or roughly 160 gigabytes of data, which automated routines migrate into GIS-ready files. These images are cataloged and made available to the individual analysts through a custom imagery browser application. They load their imagery selections into an



Tracing the Ice Edge in SIPAS

ArcGIS extension called the Satellite Image Processing and Analysis System (SIPAS). The majority of the analysts' work takes place in this environment.

This extension makes the workflow more efficient. The analyst opens SIPAS, zooms to a polar sector, selects imagery from the Image Browser, and sets to work. The analyst examines and compares images and then selects the most appropriate source for determining the significant characteristics of the ice for that particular location. Next, the analyst carefully digitizes the edges of the various ice types (defined by thickness; floe size; and age – first year, second year, or older) to delineate each from different types of ice nearby and from the open sea. Features such as fractures, leads, and polynyas (FLAP) are also captured. A fracture is a break or rupture in close-packed ice; a lead is a fracture or passageway through sea ice that is navigable by surface vessels; and a polynya is a non-linear area of open water enclosed by ice. All these descriptors characterize the ice and surrounding waters. With this information, the ship's master knows about conditions and risks that lie ahead and can make informed decisions about how, or if, to proceed.

SIPAS is designed to allow analysts to focus on the critical and difficult task of understanding the ice conditions they see by freeing them from other concerns. For example, pre-configured constraints built into the attribute coding tools help assure quality of the data. Map topology rules are in place so that splinters or overlapping polygons are not created. Additional quality checks verify that an area's delineated regional boundary edges and attributes match polygons already created in neighboring regions. Digitized polygons are directly input to NIC's enterprise geodatabase.

"A great majority of NIC ice information products are created using the ArcGIS SIPAS editor," explained Mark Denil, GIS analyst at NIC. "This editing environment handles most of the data shuffling, processing, and housekeeping operations for ice analysts, allowing editors to concentrate on interpreting ice conditions."



NIC NOAA Building

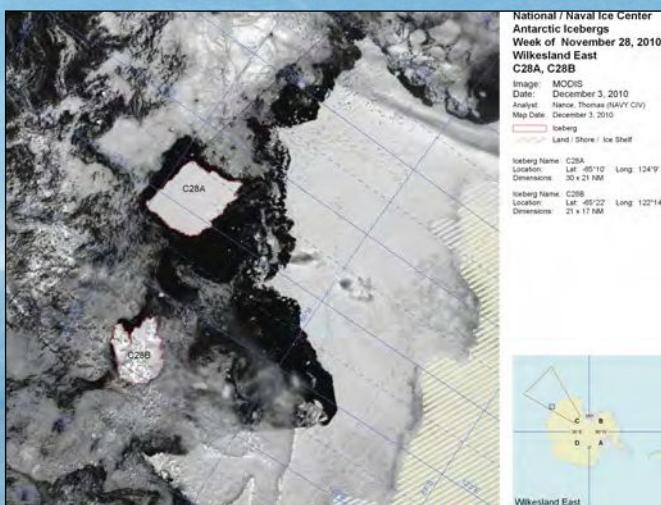
Ocean Mapping & Survey

In addition to mapping sea ice, NIC also names, tracks, and reports weekly on large icebergs in the Southern Hemisphere. An iceberg must be at least 10nmi. across to receive this attention, so these are really more ice islands than bergs. Still, NIC tracked 41 of these through 2011 and has tracked 223 since 1973. Iceberg tracking is one of the few NIC analysis activities not handled through SIPAS; it has its own ArcGIS software-based data creation and mapping tool.

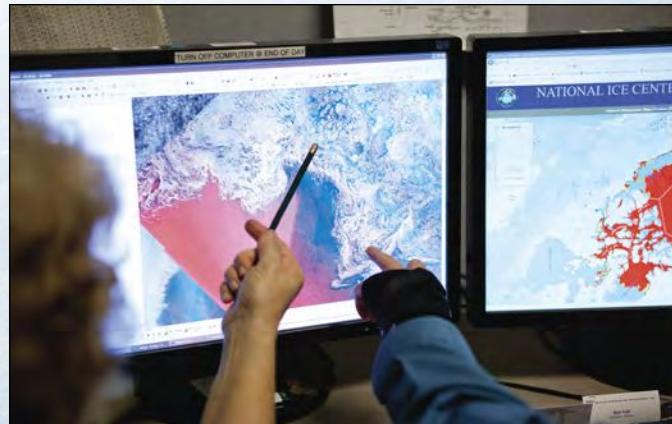
NIC usually generates between 70 and 80 standard output products each week that are used by the U.S. Navy as well as by organizations interested in cargo shipment, oil and gas exploration, fishing access, and scientific study. Almost all of these products are made available to the public via the NIC website. In addition to these automated products, NIC also creates ice analysis maps and reports upon request in support of a variety of special operations. Special support products are made available directly to the requesting customer through a variety of avenues.

Technology has enabled NIC to generate high-quality products on demand and get them out quickly. A consumer visiting the NIC website can, with a few clicks, access maps and data through interactive map interfaces and/or download data in formats such as shapefile, geodatabase feature class, raster layer, PDF, KML, and movie loop. Since many NIC data consumers operate in remote regions with very low bandwidth capabilities, the website provides options for selecting high- or low-bandwidth interfaces. With either option, the user can search and query the data by date and area of interest. A calendar tool facilitates access to historical data so users can see how the ice has changed during the last 40 years. The site also has interactive user help and allows the user to provide feedback.

Because NIC has been keeping track of polar ice since 1972, it has built a baseline for evaluating change. In the early days, NIC produced all its global ice condition charts using hard-copy cartography techniques for dissemination by fax. Starting in 1996, however, NIC began making its historical data more useful for environmental research and studying ice-related climatology by digitizing the archives of older paper-based charts, reconfiguring its data so it could be used for digital analysis.



NIC image-based location chart for two Antarctic icebergs. This is a sample of the standard products available on the NIC website.



In 1999, Semeon Sertsu, the center's director of information technology, committed NIC to using GIS because it had the greatest capacity to meet the center's needs. "It was worth the effort, because today ArcGIS is providing us with wonderful data management, image analysis, output, and dissemination capabilities," said Sertsu. "It is delivering more than I had originally imagined. For instance, we have a GIS tool that can perform a routine in about 30s that once took us a week to do."

The analyst team includes U.S. Navy civilian employees and enlisted men and women. Most come to NIC with no previous GIS experience, but they find they can easily step up to the workflow requirements because imagery handling and data generation is integrated in a unified and accessible ArcGIS software environment. This means users no longer need to learn to use and integrate multiple types of imagery viewing and data generation software and tools.

Professionals, such as ice analyst Brian Jackson, are assigned to analyze a specific area. Using the graphic, menu-driven Image Browser, Jackson selects the best satellite imagery and brings it into the SIPAS work environment. He then manually analyzes the images using heads-up digitizing to draw boundaries of specific ice types. "It easily manages the data," said Jackson. "I don't have to transfer data between systems. I can draw a line in ArcGIS and share it in the exact same file so there is no loss of clarity. One aspect of the software that I particularly find amazing is that I can be working on an arctic polar section, click an icon, and within 20 seconds access Antarctic real-time satellite data, within the same desktop environment."

Although Jackson sees polar regions changing, he will not venture an opinion as to whether this is caused by climate change nor will anyone else at NIC. They leave this to the scientific community. However, they did comment that there are notable changes in the northern sea route (along the Asian coast north of Siberia), which in 2011 was open for 4 weeks – the longest period in NIC's 40 years of analysis. This creates opportunity for surrounding nations to develop shipping, fishing, and natural resource enterprises.

Sertsu has been working with a collaborative committee to get nations located around the poles to share their polar data for collaboration. "Nobody knows their own backyard better," he said. "If nations agree to this idea, they will have a comprehensive polar map. Working together on such a map may well lead them to work together as a global community to address polar ice cap concerns."

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OFFSHORE INDUSTRY

Global oilfield services expected to reach \$200B by 2016: GBI

The global oilfield services market has witnessed considerable growth in recent years due to an increase in exploration and production activity and in activity in the offshore areas of the world, according to GBI Research. The global oilfield services market was about \$142 billion in 2008. However, due to the global economic slowdown, the market saw a negative growth, leading to a decrease in the overall market size.

The global oil field services market was expected to be about \$138.6 billion in 2010, following some activity growth after the 2009 recession. But with increased E&P activity and increased demand for oilfield services, the global market for oilfield services is expected to increase in the future, growing to about \$200 billion by the end of the forecast period in 2016.

World energy demand should increase 40% by 2040: Statoil

Norwegian energy company Statoil predicts global energy demand should increase 40% by 2040 and demand for fossil fuels should lead the way.

"Demand will increase for all types of energy," Statoil chief economist Klaus Mohn said in a statement. "At the same time, we expect continued progress for energy efficiency, amounting to a 40% reduction in energy use per dollar of real gross domestic product."

Statoil, in its annual energy forecast, said the economy should become more green long term, but fossil fuels will still dominate the global energy sector.

By 2040, fossil fuels should account for around 73% of the global energy mix, compared with 81% for 2010, the company said.

Alaska senators petition President Obama for national Arctic strategy

Making the point that the United States is the only Arctic nation lacking a formal strategy on the Arctic, U.S. Senators Lisa Murkowski and Mark Begich are calling on President Obama to create an overall U.S. strategy for the Arctic.

In a letter to the President, Alaska Sens. Begich and Murkowski stress that now is the time for the United States to

develop an expanded policy that ties together all of the policies and visions of the multiple U.S. Federal agencies responsible for with energy and other development opportunities in the Arctic.

Developing an American Arctic strategy is especially timely now, with the hope for offshore oil and gas exploration in Alaska's Arctic this summer, the number of cargo ships transiting the Bering Strait are increasing to new record highs, and America's indigenous peoples are justifiably concerned with the impacts of these developments and changing conditions on their subsistence ways of life," the senators write.

Senators Murkowski and Begich point out that the national strategies of other nations identify future Arctic needs and priorities, goals, and objectives around areas such as energy development, marine resources, needs for infrastructure, and vessel monitoring. However, agencies have been working on various aspects of U.S. Arctic development and protection with little coordination, they added.

Britain's oil, gas production seen down further in 2012: industry group

Britain will pump fewer barrels of oil this year than last, predicts Oil & Gas UK. The downgrade forecast is blamed largely on a leak at the Elgin-Franklin platform in March, which shut off production at a field that accounts for 3% of the country's production, and the continued closure of the Rhum gas field due to European Union sanctions against Iran, whose national oil company owns 50%.

"It is expected that production in 2012 will struggle to approach last year's," Oil & Gas UK said in its recently published annual economic report. The forecast backtracks on the organization's view in February that Britain's output would rise marginally by around 50,000 barrels of oil and gas equivalent per day (boe/d) in 2012, after slumping 19% last year compared to 2010, its biggest fall on record. Britain's oil and gas production has been in decline since peaking at 2.7 million boe/d in 1999.

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Industry unhappy with U.S. Interior Department's 5-year lease plan

The U.S. Interior Department's final proposed 2012-2017 schedule for offshore lease sales drew little support from oil and gas groups, which is growing increasingly impatient with the Obama administration's energy policy.

The plan, which includes 12 proposed sales in the Gulf of Mexico and three offshore Alaska, was submitted to Congress for 60 days for review and recommendations, after which Interior Secretary Ken Salazar can make it final.

"This program will make all the high-potential areas available," Salazar told reporters. "This is a good plan. It's a smart plan. It's aggressive."

Oil and gas groups clearly do not agree with Salazar's conclusions, pointing out, for one, the plan includes no new areas for leasing and that the administration has adopted a "cautious approach" in Alaska, allowing for more delays.

"This deeply disappointing 'no new access' plan does not reflect the comprehensive, 'all of the above' energy policy touted by the administration, nor does it keep pace with the energy policies of foreign nations that are expanding their offshore access to develop badly needed oil and gas," said Randall B. Luthi, president of the National Ocean Industries Association.

Erik Milito, the American Petroleum Institute's upstream and industry operations group director, noted: "This plan pushes back the 2015 Beaufort lease sale, where leasing has already occurred, and makes more areas off limits than it makes available."

And though the International Association of Drilling Contractors (IADC) welcomed the 15 sales in the 2012-2017 plan, IADC "greatly regrets" that due to a history of congressional and presidential moratoria, most of U.S. waters, unlike other coastal nations with active offshore programs, remain closed to exploration and development.



Lisa Murkowski



Oil majors to increase production 20% by 2020: Wood Mackenzie

Global oil majors will grow production by 20% by 2020 after a decade of zero growth as they ramp up exploration, research firm Wood Mackenzie concluded in a recent study. The report showed BP, Shell, ExxonMobil, Chevron, ConocoPhillips, Statoil, Eni, and Total will increase their production from 8 to 10 Bboe/d by the end of this decade.

According to Wood Mackenzie estimates, the group has replaced only half of its production with new discoveries over the last decade. The group's share of global exploration spending has decreased to 30% from 40% over the past 10 years. This year, the weighted average is 15% higher than last year, which should at least arrest the decline in market share.

Joint industry project investigates side effects of enhanced recovery

A research project is under way in northern Scotland is aimed at improving treatment for oil separation and produced water associated with enhanced oil recovery (EOR) techniques. The work is being performed at test facilities in Orkney, operated by UK-based Opus under a joint industry project supported by BP, Shell, Statoil, Total, and Wintershall and supervised by technology management consultants OTM.

The study is examining the impact of EOR on fluid separation efficiency and will research ways to reduce any resulting environmental impact.

Large quantities of water are produced along with hydrocarbons during extraction, and water production volumes rise as oil and gas fields reach maturity. According to Opus, produced water has to be managed efficiently to reduce the potential risk to the marine environment.

The joint project will undertake a desktop review of EOR technologies to improve understanding of current methods and to identify other concepts suitable for testing. Detailed field and laboratory trials will then be performed at Flotta, Orkney, including bulk separation and produced water tests to investigate the effect that each EOR method has on specific produced water treatment technologies.

Phase 1 of the project, due for completion in October, will focus on polymer flooding. Adding polymer to water makes it thicker and more viscous, helping to drive more oil toward the wellhead – but the resultant produced water can also be a prime cause of separation difficulties.

Other EOR techniques that may be considered are Alkali-Surfactant-Polymer



Harvey Gulf acquires Bee Mar LLC assets, including 10 supply vessels

Harvey Gulf International Marine has signed an agreement with Bee Mar, LLC to purchase all of Bee Mar's vessels and assets, said Shane Guidry, Harvey Gulf's chief executive officer.

The purchase will include 10 offshore supply vessels, which will increase Harvey Gulf's fleet to a total of 32 vessels, with 24 deepwater, new generation offshore support vessels and eight deepwater towing vessels.

Upon closing, Harvey Gulf will have operations in the U.S. Gulf of Mexico, Alaska, Mozambique (Africa), Israel, and Saudi Arabia.

Founded in 1955, Harvey Gulf International Marine is a marine transportation company that specializes in towing drilling rigs and providing offshore supply and multi-purpose support vessels for deepwater operations in the U.S. Gulf of Mexico.

(ASP) flooding and carbon dioxide (CO₂) injection. ASP is used to inject chemicals into the well to interact with the water and free trapped oil, making it easier to recover. CO₂ is also pumped in to assist displacement of oil from a reservoir.

UAE spending \$40B on oil and gas projects through 2014

The UAE is spending \$40 billion on oil and gas projects between 2010 and 2014, becoming the largest investing country in the field in the Persian Gulf region during the period.

With this, the UAE ranks first in the Gulf Cooperation Council (GCC) region where the value of oil and gas projects between 2010 and 2014 totals \$75 billion, according to Mohammed Sahoo Al-Suwaidi, chief executive officer of Abu Dhabi Gas Industries Ltd.

Al-Suwaidi was quoted by UAE's official news agency, Wam, as saying that the Habshan-Fujairah pipeline to export Abu Dhabi's oil to the world bypassing

the Strait of Hormuz will be operational on the end of the current month.

The UAE is the world's third biggest oil exporter.

"The construction of the pipeline has been completed and the construction of some of its facilities is being finalized in the meantime," he said.

Al-Suwaidi also announced plans by the government of Abu Dhabi to build an LNG (liquefied natural gas) bunker station in Fujairah to meet 15% of the UAE's increasing demand on gas as a result of industrial expansion.

Through these projects, Abu Dhabi seeks to provide gas supplied to Khalifa Industrial Zone Abu Dhabi (Kizad) and Industrial City of Abu Dhabi (ICAD) as well as to cities in the northern regions.

Al-Suwaidi said that between 75% to 80% of the current domestic demand on gas is met by the Abu Dhabi National Oil Company (ADNOC) through its operating companies and the remaining 20% is provided by Dolphin Energy Ltd. from the Qatari Ash-shamal Field.

Capital project delays and budget overruns could cost trillions

Delays and budget overruns on much-needed capital projects for the oil and gas and utility industries could cost companies in those industries trillions of dollars in lost investments, Accenture research shows.

As part of the research, Accenture surveyed 61 energy executives from 21 countries who have responsibility for capital projects of at least \$1 billion. Using conservative assumptions based on its research, Accenture estimated that the potential overspend across the whole capital budget of the energy industries could be approximately 13%, which translates to \$5 trillion overspend on \$38 trillion for global investments forecast by the International Energy Agency.

Among the findings that helped shape Accenture's assumptions: Only 34% of respondents said they had delivered to within 25% of their approved budget for all projects, and fewer than a third (32%) said they delivered to the approved schedule.

When asked to identify challenges to getting projects launched on time, respondents most often cited regulatory requirements (cited by 49%) and workforce skills availability (25%).

"The increasing size and complexity of today's major projects has added to the scale of challenges for energy companies globally," said Jean-Marc Ollagnier, group chief executive of Accenture's resources operating group.

Underwater Centre secures largest contract to train Russian divers

A leading commercial diver and ROV training facility based in the Scottish Highlands and Australia has secured its largest contract, worth \$1.3 million to train Russian saturation divers. The Underwater Centre, which has facilities in Fort William and Tasmania, was awarded the contract to train 17 divers by MRTS, one of Russia's largest construction contractors in the fuel and energy industry. They spent a total of 9 weeks at The Underwater Centre's Beauty Point facility in Tasmania, where they undertook a variety of courses, all of which were taught in Russian.

Due to increasing consumption of oil and gas in the Asia-Pacific region, the inflow of capital into the Russian oil and gas industry is expected to increase, along with the volume of exploration work. This training is part of the investment MRTS is making to ensure they are well placed to take advantage of the increased demand that will result. It is intended to help them reach the level of safety and competency that is expected from international diving operations.

"Oil and gas firms in Russia are currently facing a skills shortage due to the rapidly increasing amount of exploration work underway at the moment. By investing in the training of our divers in saturation diving, we are addressing this need for experts in maintenance and repair activities vital to maintaining Russia's subsea infrastructure," MRTS managing director Alexander Kolikov said.

The men, already experienced air divers, were trained on saturation procedures and techniques and will receive the ADAS Closed Bell certification on completion of training. They also completed an air course (Recognition of Prior Learning Experienced Candidate Assessment Course) prior to the saturation diver training, allowing them to complete the ADAS surface supplied diving examinations and gain their ADAS certification, an internationally-recognized qualification.

Saturation divers live in a chamber for up to 28 days, which is pressurized to the same pressure of the sea at the depth that they will be working at. Living and working at pressure means that they can be transported quickly and efficiently to the work site under the water without decompression stops, allowing divers to work to much greater depths and for much longer periods of time.



BP suspends \$1.5B oilfield Liberty project offshore Alaska North Slope

Cost overruns and technical setbacks have led BP to suspend its \$1.5 billion Liberty offshore project in Alaska. The project has undergone a series of technical problems. Liberty is located 4mi off the northern coast of Alaska in Foggy Island Bay, Beaufort Sea.

Dawn Patience, BP Exploration (Alaska) spokesperson, was quoted by Reuters as saying that an 18-month company review concluded that the Liberty project, a field with about 100 MMbbl of recoverable oil, should not go forward as planned.

"We are not going to pursue Liberty in its present form. The project, as it's designed right now, doesn't meet BP's standards," Patience said.

U.S. Bureau of Ocean Energy Management spokesman John Callahan

said the company has informed federal regulators that it is seeking to redesign the development.

A review by BP found that the Liberty project, scheduled to produce 40,000 bbl/d, would have cost more than \$1.5 billion and would have taken several years to begin production.

China to increase gas imports and output to meet ballooning demand

With China's natural gas consumption set to almost triple over the next 8 years, the Asian giant will draw from all available sources to keep up with demand, expects energy industry analyst GlobalData. According to the company's latest research, China's natural gas consumption was 131.7 billion cubic meters (bcm) in 2011, already a steep rise from the 2000 figure of 24.5bcm. However, consumption levels are predicted to soar

even higher to reach 375bcm by 2020, thanks to the country's desire to increase the share of natural gas in its energy mix.

China has substantial natural gas reserves of its own, but demand has already outstripped production, making imports essential. In 2011, China consumed about 131.7bcm of natural gas, though it only produced 100.9bcm, a disparity that will only grow in the future, according to GlobalData.

Accordingly, major Chinese National Oil Companies (NOCs) are actively involved in the partial or full acquisition of overseas assets in an attempt to guarantee long-term national gas security.

The importation of LNG is also set to be an important strategy in fulfilling China's natural gas needs. In 1998, it approved its first LNG project in the Guangdong province to meet the energy shortages in the country's southeastern coastal area.

By the end of 2011, five LNG terminals were operating in China, with a total regasification capacity of around 1 trillion cubic feet (tcf). This will climb to 2.8tcf by the end of 2016 at an annual average growth rate of 19.7%, due to the introduction of a further 11 terminals. Also, in March, the Chinese government announced a new shale gas development plan, one of the stated aims of which is to produce 6.5bcm of natural gas by 2015.

Drilling activity on UK continental shelf increases 64% during Q2

Offshore drilling activity on the UK continental shelf (UKCS) rose 64% during the second quarter of 2012 compared to the same period last year, according to recent industry figures released by Deloitte.

The report, which documents drilling and licensing across Northwest Europe between 1 April and 30 June, shows 18 exploration and appraisal wells were drilled on the UKCS during the period. This also represents a 64% increase from the first quarter of 2012.

The number of field start-ups occurring in the first half of 2012 also shows positive signs for the industry. So far in 2012, across the North Sea, eight new fields have come onstream. This is higher than the total number of field start-ups seen during 2011 and more than double those seen in 2009 and 2010.

Meanwhile, with deal activity – where oil and gas fields are bought and sold – in the UK also rising 47% this quarter, compared to last year's second quarter, and an increase in field development approvals and start-ups, the outlook for the UK oil and gas industry looks positive.

Subsea 7 wins UK North Sea supply contract
 Subsea 7 received a \$95 million contract from an international oil and gas operator to supply equipment in the UK Central North Sea. Under the terms of the contract, the company will undertake project management, engineering, procurement, fabrication, and installation of a 7.5km pipeline bundle. The bundle will contain an 8in. production pipeline, a 6in. gas lift pipeline and controls systems. It is expected to be tied back to a single production well and an existing subsea manifold and platforms. Subsea 7 began engineering and project management work in June, with offshore operations scheduled to begin in 2014. Fabrication will take place at the company's Wick facility in Scotland.

Talisman contract lifts EnerMech to new level
 Mechanical engineering group EnerMech was awarded a contract to manage the UK North Sea offshore crane assets of Talisman Energy (UK) Ltd. The 5-year contract, with two additional 1 year options, is the Aberdeen-based mechanical engineering group's largest single contract award and includes the operation, maintenance,

engineering, and inspection of more than 30 offshore cranes located across Talisman's 11 UKCS offshore installations. EnerMech will manage offshore crane operators and mechanics, while an onshore management team will provide project management and

technical support. Engineering teams in Aberdeen and Bristol will deliver structural, hydraulic, mechanical, and instrumentation services to the contract. Around 50 new positions will be created at EnerMech, and a number of people will transfer from the current contract holder, pushing EnerMech's total workforce to just under 1,200.

Technip to build, install Prelude subsea network
 Technip will install subsea equipment connected to Shell's Prelude Floating Liquefied Natural Gas (FLNG) facility in the Browse basin off northwest Australia. The vessel will be moored 124mi offshore in a water depth of 787 ft. Technip's scope covers project management, fabrication, transport, and installation by reeling of 12in. corrosion-resistant alloy clad rigid flowlines; onshore fabrication of pipeline end termination, flowline appurtenances, and rigid spools; transport and installation of subsea equipment, including manifolds, umbilical termination assemblies, rigid spools, and flying leads; and management of interfaces with the hook-up and commissioning of the FLNG facility, including on-time transport, installation, and handover of the flexible risers and umbilical.



EnerMech managing director Doug Duguid and UK manager Stuart Smith observe crane technician Ryan Nicol

STATS completes tricky pipeline tie-in at Troll A

Specialist engineering company, STATS Group, has completed an 18month design, manufacturing, and installation project to enable the tie-in of a fifth pipeline on Statoil's Troll A Platform. Located off the west coast of Norway, the platform utilizes a system of seal tubes to tie-in risers that are run down the inside of a dry concrete leg. The seal tubes were concreted in place at the base of the riser leg on the gravity base structure in 1991. There are seven seal tubes – four designed for large bore pipe up to 36in. –and three designed for smaller diameter pipe up to 20in.



Enabling tie-in of fifth pipeline

When the platform was commissioned in 1995, three pipelines were pulled-in through the seal tube system – two 36in. pipes for the export to Kollsnes and one 20in. for an import line. In 1997, a fourth pipeline

was tied-in. This time the line was 16in. which utilized the second smaller seal tube. However, the seal cartridge was revised to utilize a compression seal rather than the inflatable seal used in the first three operations.

Statoil approached STATS to perform an engineering study to identify the procedures and apparatuses required to perform another pipeline tie-in using one of the remaining unused seal tubes. The pipeline is a new 62.5km, 36in. pipeline (P12), which is to be installed between Troll A and Kollsnes in Norway.

STATS primary role was to design, manufacture, and install the engineering interfaces on Troll A to allow the new pipeline to be pulled-in through the existing seal tube arrangement in the gravity base structure 300m below sea level, while still providing full isolation between the inside of the platform leg (at ambient) and the seawater pressure outside (30 Barg).

"The project was challenging as many of the original interfaces no longer complied with current standards and risk assessments, and we developed a range of new tools that would provide safe isolations for the pull-in," said Pete Duguid, STATS Group chief executive officer.

STATS designed a 36in. temporary anchor as the mechanism by which any axial forces generated by the 36in. pipeline was transmitted into the seal-tube and, in turn, into the gravity base structure. This system stops the differential loading from the water pressure acting on the pipeline forcing the pull head into the platform, which, in turn, could damage the seal tube. Additionally, the 36in. Seal Cartridge is a unique interface that provided the seal between the P12 pipeline and the seal tube outer casing. STATS also designed and manufactured the Grout Bung, a subsea-installed isolation tool, which provided an external seal between the 36in. P12 pipeline and the 50in. Troll A seal tube outer casing.



The 36in. Seal Cartridge

Gulf of Mexico

Anadarko agrees to joint venture arrangement for Lucius project

Anadarko Petroleum Corp. signed a joint venture capital carry agreement involving the Gulf of Mexico Lucius development project. Under the terms of the agreement with an unidentified party, Anadarko will be carried for \$556 million, which is estimated to represent 100% of its expected capital obligation through the anticipated date of first production at Lucius.



In exchange, Anadarko will convey a 7.2% working interest in Lucius and will continue as operator with a 27.8% working interest. The agreement is expected to close during the third quarter of 2012, with an effective date of 1 January 2013, subject to a variety of approvals.

Lucius development is approximately 230mi offshore in 7,200ft of water. It includes portions of Keathley Canyon blocks 874, 875, 918, and 919.

The project is being developed using a truss spar floating production facility that is currently under construction. The spar is being built with the capacity to produce more than 80,000bbl and 450MMcf/d of natural gas.

Noble Energy to stop Deep Blue appraisal activity in U.S. Gulf

Noble Energy Inc. said it will stop additional appraisal at its Deep Blue prospect in the Gulf of Mexico, recording \$118 million in costs in the second quarter related to exploring the area. Exploration at Deep Blue restarted after a deepwater drilling moratorium was lifted.

Hydrocarbons were found in the prospect after initial spudding in 2009. The company recorded \$664 million in operating expenses in the first quarter.

The company said production at its Galapagos development – one of the first development projects to start in the U.S. Gulf after the moratorium – has increased more than 30% from its previous forecast.

"Galapagos is our second major project to start in the past 8 months and will provide significant production and

cash flow growth," Noble's Chief Operating Officer David L. Stover said. The company's net production at Galapagos was 13,000bbl and 8MMcf/d of natural gas per day.

Chevron awards Pacific Drilling 5-year contract for Gulf operations

Pacific Drilling's new ultra-deepwater drillship was awarded a 5-year contract by Chevron for operations in the Gulf of Mexico. Construction on the rig, known

as Pacific Sharav, started in March 2012, and delivery to the Gulf is expected in the fourth quarter of 2013 upon completion.

The Luxembourg offshore drilling company said maximum contract revenue is forecast to be about \$1.07 billion, bringing Pacific Drilling's total contract backlog as of 22 June to about \$3.2 billion. The drillship, which will be the third Pacific Drilling ship used by Chevron, will be capable of operating in water depths of up to 12,000ft.

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DP3 drillship order strengthens Enesco ultra-deepwater fleet

Given rising customer demand, Enesco plc has exercised one of two options for an additional advanced-capability DP3 ultra-deepwater drillship based on the Samsung GF12000 hull design. The vessel, ENSCO DS-9, will be the seventh Samsung DP3 drillship in the Enesco fleet, extending the benefits of Enesco's fleet standardization strategy. It will be built at the Samsung Heavy Industries, Co. Ltd. (SHI) Shipyard in South Korea, with delivery scheduled for the fourth quarter of 2014.

In early April, Enesco announced its order for ENSCO DS-8, the first drillship based on the GF12000 hull design. This fleet expansion will extend Enesco's advantage of operating the newest ultra-deepwater fleet among global drilling contractors.

Including commissioning, systems integration testing, project management, and spares, the construction cost is expected to be comparable to the amount recently announced for ENSCO DS-8 of approximately \$645 million. Like ENSCO DS-8, the new unit will have advanced capabilities to meet the



demands of ultra-deepwater drilling in water depths of up to 12,000ft and a total vertical drilling depth of 40,000ft, plus retractable thrusters; enhanced safety and environmental features; improved dynamic positioning capabilities; and advanced drilling and completion functionality, including below-main-deck riser storage, triple fluid systems, offline conditioning capability, and enhanced client and third-party facilities.

The new drillship is based on the proprietary Samsung GF12000 hull design measuring 755ft in length and 125ft in width. It will offer a payload in excess of 22,000tons (metric) and a 1,250ton hoisting system.

Partners secure Noble's Homer Ferrington rig for Israel wells

Noble Drilling has accepted a letter of award for use of the semi-submersible Noble Homer Ferrington for a drilling program offshore Israel.

Modiin Energy will execute the drilling contract on behalf of the Gabriella license partners, including Adira Energy and Brownstone Energy.

According to Adira, the aim was to secure the rig for a minimum of 75 days to drill at least one well and one side track.

"We are excited that we have been able to secure a high-quality rig, given the global shortage of semi-submersible rigs," said Jeffrey E. Walter, Adira's chief executive officer. "The additional benefit to Adira is that the memorandum of understanding enables Modiin Energy, our 70% partner, to sign the rig contract and take the financial obligation for the consortium. The MOU further ensures that all the partners are committed to drill this well."

In exchange for its financial obligation, Adira has granted Modiin a 15% option to participate in Adira's other high-quality oil potential block – the Yitzhak license.

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Rigs & Vessels



The seismic service vessel *Polarcus Adira*

Polarcus takes delivery of new Arctic-ready seismic vessel

Polarcus Ltd. has taken delivery of the Polarcus Adira seismic service vessel. It becomes the eighth 3D seismic-capable vessel in Polarcus' fleet.

It was built at Ulstein Verft in Norway and, following a short shake-down, will commence operations on charter for TGS-NOPEC Geophysical Co. ASA.

Polarcus Adira is an Arctic-ready vessel designed and built for operations in Arctic waters. She carries the ICE-1A and Winterized Basic notations from DNV and can operate in first-year ice up to 3.28ft thick without the assistance of icebreakers.

The vessel is a 3D 12 to 14 streamer seismic research platform that is 302ft long and 69ft wide. The ship has a towing pull of 82tons in seismic operations and a maximum speed of 17kts.

Polarcus offers contract seismic surveys and multi-client projects worldwide and employs over 500 professionals.

SAL heavy-lift vessel MV Lone now with DP Class II certification

The MV Lone has completed her upgrade from DP Class I to DP Class II. The heavy-lift vessel, which is part of the SAL fleet, was upgraded in December in the dry-dock of the German shipyard Norderwerft (Sietas Group) in Hamburg. With her service capability and speed of 20kts, the MV Lone is equipped to undertake ambitious projects within the oil and gas industry as well as offshore wind farms.

SAL, which belongs to the Japanese K-Line Group and is one of the leading international carriers specializing in the transportation of heavy-lift cargos, owns the MV Lone and her twin MV Svenja, which has a DP class I capability. These two vessels, with a combined crane capacity of 2,000tons, both feature a high transit speed of up 20kts and can claim to possess the largest lifting capability for this type of vessel in the world.

Dynamic positioning (DP) is the automatic control of the vessel in its three

axes of freedom – surge, sway, and yaw. A DP Class II certification, which the MV Lone now holds, means that a loss of position will not occur in the event of a failure of any single piece of critical equipment, thanks to the equipment specification of the vessel. During offshore installations where workers on platforms and other ships are involved, guaranteed under all but exceptional circumstances, ensures maximum safety for personnel and equipment.



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Hess to invest \$200M per year in Indonesia until 2018: officials

U.S.-based Hess Corp. will invest \$200 million per year in Indonesia in the next 6 to 10 years, senior officials said. Hess' investments would cover the development of the Ujung Pangkah block in Gresik, East Java and exploration activities, including at the Semai V block in West Papua.

The company had been given a maximum of 6 years for exploration within the blocks or their contracts would be terminated. If the results were good, the company would invest further to exploit the blocks.

Hess has been the operator of the Ujung Pangkah block since 2007, where it controls a 75% stake along with the 25% stake owned by Kuwait Foreign Petroleum Exploration Co. (Kufpec).

At the Semai V block, Hess explores through a consortium with state oil and gas firm PT Pertamina and Shell Exploration Co. BV. The consortium won the concession by presenting a signing bonus of \$40 million.

The block is thought to be extremely valuable because it is predicted to have potential reserves of 8tcf of natural gas.

Eni joins KrisEnergy, Neon Energy in exploring offshore Vietnam

Italy's Eni has signed an agreement with KrisEnergy and Neon Energy regarding two offshore Vietnam exploration blocks in the Gulf of Tonkin.

The agreement involves blocks 105-110/04 and 120 and two basins, the Song Hong and Phu Khanh, which are mainly gas-containing based on recent drilling. Near-term plans call for 3D seismic and two exploration wells.

If approved by the Vietnamese authorities, Eni would have 50% and be operator with KrisEnergy and Neon, each holding 25%. The two blocks cover 6,023 sq.mi.

Petroceltic Italia wins Adriatic exploration licenses offshore Italy

Petroceltic International's wholly owned subsidiary Petroceltic Italia has received two exploration licenses in the central Adriatic Sea, offshore Italy.

Licence B.R 270 covers an area of 144.5sq.km and B.R 271 covers an area of 327.1sq.km. Both licences will run for 6 years from the date of the award.

Brian O'Cathain, Petroceltic chief executive, said the award is indicative of the government's desire to re-activate offshore Italian exploration and production in line with the recently announced review of the national energy strategy

by Italy's Corrado Passera.

"Petroceltic is committed in all of its operations to act responsibly and with due care to the environment and local stakeholders, and we look forward to continuing to work with the Italian authorities to explore these prospective licences," O'Cathain said.

The Ministry of Economic Development is currently considering three other adjacent exploration permits, located in water depths of 30 to 150m, which were submitted by Petroceltic for the area. Petroceltic intends to obtain

additional geophysical data to obtain high-grade prospects for future exploration drilling programs.

Norway planning to offer up to 86 blocks, mostly in Arctic waters

Norway plans to award oil and gas exploration drilling permits in up to 86 blocks next year, mostly in the Arctic region where exploration is booming after recent large discoveries.

The Norwegian Petroleum and Energy Ministry said it was offering 72 blocks in the Barents Sea and 14 blocks in the Norwegian Sea in its 22nd licensing round, scheduled to be completed by the summer of 2013.

"We have seen very strong interest in the Arctic... and the oil industry is clearly moving north," said Minister of Petroleum and Energy, Ola Borten Moe.

Lundin Petroleum spuds Malaysia's Tiga Papan 5 well

Lundin Petroleum has begun drilling at the Tiga Papan 5 well offshore Sabah in east Malaysia. The well, located in blocks SB307 and SB308, will target mid-Miocene aged sands of the Tiga Papan Unit, previously tested in 1982, with the original discovery well that flowed at a cumulative rate of 5,631 bbl/d.

The well will be drilled with the Offshore Courageous rig in a water depth of approximately 50m to a depth of 1,671 m subsea. If the results of the test are encouraging, the company will side track the well into the same fault block as the original discovery well to test the down dip extension of the pay zones.

Lundin Petroleum, through its subsidiary Lundin Malaysia, owns a 42.5% interest in the blocks, and partners Petronas Carigali and NIO Petroleum own 25% and 32.5% interests, respectively.

Success at Shimshon well in the Mediterranean Sea: Operator ATP

ATP Oil & Gas Corp. and its wholly owned subsidiary ATP East Med B.V. announced success at the Shimshon well in the Levant Basin of offshore Israel. The Shimshon well encountered more than 62ft of natural gas pay in the Bet Guvrin sands. The Shimshon well is in a water depth of 3,622ft and was drilled to a subsea depth of 14,445ft. ATP operates with a 40% working interest. Other owners are Isramco Negev 2 LP (39%), Naphtha Exploration Ltd. Partnership (10%), INOC Dead Sea LP (10%), and I.O.C.-Israel (1%).



Total E&P Absheron confirms Caspian Sea gas discovery

Operator Total E&P Absheron has confirmed the presence of gas and condensate at the Absheron offshore block located in the Azerbaijan sector of the Caspian Sea.

The Absheron X-2 well, located around 100km southeast of Baku, was drilled in 474m of water depth and reached a total depth of 6,874 m.

"This declaration of commerciality is the result of the success of our more aggressive exploration program and our desire to bring discovered hydrocarbons rapidly into production," said Yves-Louis Darricarrère, Total S.A. president of the exploration and production.

The company tested the hydrocarbon bearing intervals at 960,000m³/d of non-associated gas, while nearly 400m³/d of a 42.5° API condensate was also produced.

Total E&P Absheron said the well results indicate gas resources of 150 to 300 billion cubic meters and 5 to 10 trillion cubic feet of non-associated gas, with condensates in the Balakhany and Fasila formations on the northern compartment of the structure.

The operator plans to drill a side track toward the northern part of the structure apart from other wells, while a 3D seismic campaign will be undertaken in 2013.

Total E&P Absheron holds a 40% equity stake in the Absheron license, whereas its partners Socar and GDF Suez hold a 40% and 20% interest, respectively.

Production

Exxon starts production from the Kizomba Satellites in Angola

Mobil Corp. said that its subsidiary, Esso Exploration Angola (Block 15) Limited (Esso Angola), has started production from the Kizomba Satellites Phase 1 project offshore Angola.

The Kizomba Satellites initial phase is expected to ultimately produce 100,000bbl/d, and recover a total of approximately 250MMbbl from the Mavacola and Clochas fields, located 95mi off the coast of Angola in water depths of about 4,500ft.

Phase 1 of the project will develop 18 wells with subsea tiebacks to the existing Kizomba A and B floating, production, storage, and offloading (FPSO) vessels, optimizing the capabilities of on-block facilities to increase current production levels without requiring an additional FPSO vessel.

ExxonMobil was awarded Block 15 in 1994 and, to date, has discovered a total of approximately 5Bboe. First oil was produced from Block 15's Xikomba field in 2003, followed by startups of Kizomba A in 2004, Kizomba B in 2005, and Kizomba C in 2008.

In addition to Esso Angola (operator, 40% interest), other co-venturers in

Block 15 are BP Exploration (Angola) Ltd. (26.67%), Eni Exploration Angola B.V. (20%), and Statoil Angola Block 15 AS (13.33%). Sonangol is the concessionaire.

OGX defines production level per well in Brazil's Tubarão Azul Field

Brazilian oil and gas company OGX said that after almost 5 months of extended well test operations in the Tubarão Azul Field, previously known as the Waimea Accumulation, the company has defined an ideal flow rate of 5,000boe/d per well for the first two wells, not including the impact of any water injection operations.

The Tubarão Azul Development Plan was filed on 1 June, 2012 with Brazil's National Petroleum, Natural Gas and Biofuels Agency (ANP).

Since the beginning of the test, wells OGX-26 and OGX-68 were tested with flow rates ranging between 4,000 to 18,000bbl/d, yielding a better understanding of the reservoir model and indicating the necessity of replacing the centrifugal submersible pump in OGX-26 with another pump with different features in order to adjust the pumping capacity of the well beyond the ideal flow rate.

During the last 5 days of the test, given the stop in production from well OGX-26 to allow for the replacement of the pump, production unit FPSO OSX-1 was producing 7,400boe/d from OGX-68 and was showing satisfactory levels of pressure in the reservoir, OGX said.

Within the next 12 months, two producing wells and two injection wells will be connected to the FPSO OSX, allowing for a steady increase in oil production at the Tubarão Azul Field. In addition to water injection, the company plans to use technologies such as chemical hydraulic fracturing and other well-known industry techniques to optimize production.

OGX said it remains confident it will recover 110MMboe at the Tubarão Azul Field, especially because throughout the test the company identified natural fractures in the reservoir connecting OGX-26 and OGX-68.

"All these decisions have been taken to ensure sustainable exploitation at the Tubarão Azul Field and in accordance with industry best practices," said Paulo Mendonça, OGX's chief executive officer.

FPSO production units OSX-2 and OSX-3 are at an advanced stage of construction in Singapore, OGX added.

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Essar finishes \$191M development for ONGC 200km offshore Mumbai

Essar Projects has completed the \$191 million D1 development project located 200km off Mumbai, India for the Oil and Natural Gas Corp. (ONGC). The development and handover to ONGC is set to help increase the D1 field production to 35,000bbl/d.

Under the contract, Essar was directed to engineer, procure, construct, install, and commission the three unmanned four-legged fixed Jacket SMART Platforms – D1B, D1C and D1D – in water depths of approximately 90m.

The platforms were also connected to the FPSO through a pipeline end manifold (PLEM) through 30km subsea pipelines, which were also laid by Essar Projects.

"Executing the prestigious ONGC project on schedule was a strategic objective for Essar Projects Limited," said Alwyn Bowden, Essar Projects president and chief executive officer.

An Essar Offshore Subsea Ltd.-led consortium received the 24-month fast track contract in May 2010. CUEL Yard in Laem Chabang, Thailand fabricated jackets for each of the three platforms, while three decks were fabricated at the Profab Yard in Batam, Indonesia.

Rosebank project in the United Kingdom enters design phase

Chevron Corp. said its UK subsidiary has entered front-end engineering and design (FEED) on the Rosebank oil and gas project in the West of Shetland region.

"The Rosebank project is another important step forward in our strategy to grow profitably in core areas of our upstream business," said George Kirkland, Chevron's vice chairman. "Chevron has extensive deepwater capabilities, and the Rosebank project fits well in our portfolio."

The Chevron-operated Rosebank project is located approximately 80mi northwest of the Shetland Islands, in water depths of approximately 3,700ft. The project will include an FPSO vessel, production and water injection wells, subsea facilities, and a gas export pipeline.

"Rosebank is an important project for Chevron and the West of Shetland region, which holds a significant portion of the UK's undeveloped oil and gas resources," said Brenda Dulaney, managing director, Chevron Upstream Europe.

The Rosebank field, discovered in 2004, is estimated to contain total potentially recoverable oil-equivalent resources of 240MMbbl. The Rosebank develop-

Wartsila Hamworthy wins major Santos Basin inert gas contract

Wartsila Hamworthy, a global leader in environmental and liquid cargo handling solutions for the marine and oil and gas markets, has underscored its technical prowess in the offshore sector by winning the contract from Brazilian shipyard Ecovix-Engevix Construções Oceanicas S.A. to deliver inert gas generator units to eight FPSOs in the Santos Basin.

Six of the units will be deployed for the Tupi fields, with the other two being utilized for the Guara field. The first two units will undergo full-scale testing at the factory in Moss prior to delivery starting as soon as the end of December this year, through the end of January 2015.

"Having successfully supplied inert gas systems during the last few years to the FPSOs Goliat, USAN, Pazflor, AKPO, and, most recently, to BP's QUAD 204 FPSO, this latest contract – by far our largest yet – puts us firmly at the forefront of the industry," said Odd Ivar Lindlov, Wartsila Moss Offshore business unit director.

"We draw on the experience gained during deliveries to Petrobras FPSOs stretching back more than 14 years, and we have developed a reputation for supplying reliable and technically astute solutions to the offshore market."

Each of the units, measuring 7.5 meters by 6m by 7.5m and with a weight of about 45tons, will be installed on the utility module on the FPSO inside a dedicated compartment. Each will be of the dual fuel type and the eight skids will be delivered complete with a control system, a diesel and gas fuel system, and power distribution (including VSD starters). Each skid will include two 100% systems, providing the required redundancy.

The eight FPSOs are currently under construction in Rio Grande do Sul State. Wartsila Hamworthy also recently won a contract to supply its flare gas recovery packages to four FPSOs for the same pre-salt fields off Santos, Brazil.

ment is a joint venture between Chevron's subsidiary Chevron North Sea Ltd., with a 40% equity interest; Statoil (U.K.) Ltd. (30%); OMV (U.K.) Ltd. (20%); and DONG Exploration & Production (UK) Ltd. (10%).

Ghana and its partners to invest \$20B in oil fields: Bloomberg

Ghana and its partners on the Jubilee oil field, which include Tullow Oil plc. and Anadarko Petroleum Corp., will invest an estimated \$20 billion over the next 10 years to develop newly discovered oil fields, according to Bloomberg news.

"We will raise the money in collaboration with our partners," Nana Boakye Asafu-Adjaye, chief executive officer of the Ghana National Petroleum Corp., told Bloomberg. "We have made clusters of discoveries, and these need

to be developed."

Jubilee, which began production in 2010, is operated by London-based Tullow, which also owns 35.5% of the field. Anadarko and Kosmos Energy, both based in the U.S., each hold 24.1% and GNPC 13.6%. Sabre Oil & Gas Ltd. holds 2.7%.

By 31 May, Jubilee had produced 35MMbbl, Bloomberg reported. Output from the Jubilee oil field is now at 63,000bbl/d, with production expected to reach an average of 90,000 bbl this year, according to Tullow.

New discoveries in the Deep Water Tano Block include Tweneboa and Enyenra as well as other clusters of discoveries such as Mahogany, Teak, Akasa, and Banda. Following Jubilee's start up oil became Ghana's third-biggest export, after gold and cocoa, last year.

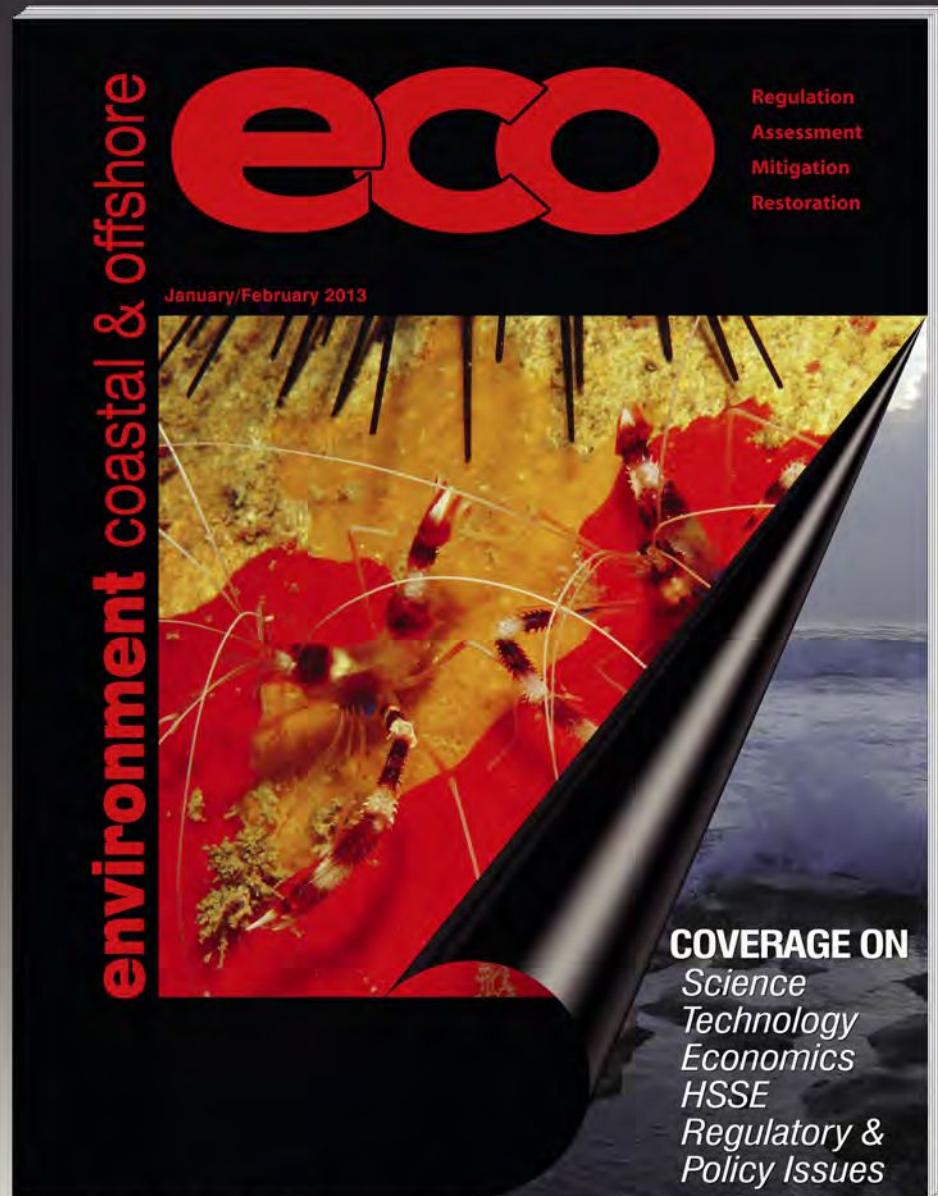


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2022

Software system shows U.S. Gulf infrastructure



InterMoor, an Acteon company, has launched MoorVision, a software system that provides clear, up-to-date photos of the infrastructure in any defined area in the Gulf of Mexico using Google Earth.

The first step for drilling with a moored mobile offshore drilling unit (MODU) in the U.S. Gulf is to secure a permit, and this involves evaluating the risk of damaging existing infrastructure. Difficulties in obtaining accurate well, pipeline and platform production data can make this a labor-intensive and time-consuming process.

The MoorVision system helps to cut the time and effort required to gather the necessary information by accessing and presenting publicly available information from the Bureau of Ocean Energy Management Regulation and Enforcement (BOEMRE). It will also facilitate the risk assessment process recommended in the American Petroleum Institute's Gulf of Mexico MODU Mooring Practice for Hurricane Season.

MoorVision enables users to: query the BOEMRE's public-domain Gulf infrastructure database; collect and compile infrastructure data, including well production, pipeline flow rates and reported metering rates within a 15-nautical-mile radius; generate a Google Earth visualization file; and import the data to the consequence assessment workbook developed by the American Bureau of Shipping for the MODU Mooring Strength and Reliability Joint Industry Project.

MoorVision is available to the public on InterMoor's website at www.intermoor.com.

Markleen unveils MultiSkimmer MS 50 with debris tray

Markleen has introduced the MultiSkimmer MS 50 with a debris tray, launched on the Norwegian coast. Operations with this skimmer are so far proving highly successful, according to the company.

Working in polluted areas with debris represents a big challenge for standard skimmers as pumps tend to become jammed by floating solids. With this in mind, and in response to its customers' requirements, Markleen has designed this special and unique hydraulic tray system, which allows the skimmer to keep on working even in the most contaminated areas.

The Markleen MultiSkimmer MS 50 is a robust, compact skimmer used for recovering all types of oil. Diesel oil, grease and emulsions are quickly and efficiently recovered with a minimum of water content. All components used in the skimmer unit are robust and water and oil resistant. The Markleen

MultiSkimmer MS 50 features a mechanical debris collection tray made of aluminum, which collects small floating solids from the water.

The Markleen Multiskimmer MS 50 features a German-manufactured Vogelsang rotary lobe pump, which is suitable for use with high viscosity oils. The skimmer is also equipped with hydraulic thrusters that enable it to be maneuvered into the oil. The skimmer cartridge and pump can be removed without the use of tools for use in other applications and for maintenance and cleaning.

The Markleen Multiskimmer MS50 offers the advantages of being three skimmers in one, covering a wide range of viscosities, recovering oil with a low water content and being easy to transport.

Lightweight diverless system offers direct control

T.D. Williamson (TDW) announced the successful development and field deployment of the Subsea 1200RC Tapping Machine, its new compact remote-controlled subsea hot tapping machine. The system, which is extremely lightweight, allows hot tapping to be carried out from the safety of a diving support vessel (DSV) or platform, resulting in significant safety benefits and improvement in operational control.

Subsea hot tapping of pipelines is performed for a variety of reasons, including tie-ins, pipeline repair, insertion of instrumentation, facilitating chemical injection, or providing access for temporary isolation tools. The full process, which involves installing the hot tap assembly, performing the tap, and recovering the hot tap machine, has invariably necessitated diver assistance. This has meant that the potential for subsea hot tapping was inevitably shaped by human factors, namely the limits of where divers can operate.



The demands of deep water and the risks in shallow water have necessitated development of a completely diverless, remote-controlled system. Responding to these demands, TDW has developed the Subsea 1200RC Tapping Machine, a remote-controlled hot tap machine.

USSI ships optical seismic array for oil, gas exploration

U.S. Seismic Systems, Inc., an Acorn Energy, Inc. company, said it has built and shipped an Ultra High Sensitivity fiber optic-based marine seismic array for oil and gas exploration.

The system was purchased by an international service provider and is intended for use as a marine array to aid in the collection and interpretation of data in the hostile environment of deep sea oil and gas operations.

"Taking this cutting edge technology from R & D to order fulfillment is an exciting series of events for any company, and Acorn Energy has given us all the tools necessary to make this happen," said Jim Andersen, president of USSI. "The oil and gas industry continues to adopt new technology to meet the world's increasing demand for energy and by deploying our cutting edge technology they now have one more arrow in their quiver."

The contract, valued at over \$800,000, is the first completion of a cycle that starts with testing, evaluating, and finally sales and shipment. USSI is moving forward on this identical cycle with a number of its customers, the company said.

For more information visit www.ussensorsystems.com.

Oilfield Equipment**AMPOL adds Tornado Tank Cleaning System to service range**

American Pollution Control Corp. (AMPOL), a leading oil spill response and total environmental solutions provider based in New Iberia, Louisiana, has added the Tornado Tank Cleaning System to its service range, said president and chief executive officer Kirk Headley. The system is an addition to the sand-blasting, coating, and painting equipment services offered by AMPOL.

The Tornado is a modern tank cleaning system that uses three stages of filtration to clean fuel and remove accumulated sludge – micro-organisms, water, and sediment. While most tank cleaning units simply polish fuel without the ability to access the source of the problem, the Tornado System eliminates future problems and additional costs for removal, disposal, and replacement of contaminated diesel fuel.

The Tornado achieves the sludge removal in three filtration stages: gross particulate removal, fine particulate removal, and water removal. Approximate cleaning time ranges from 45mins for a 50gal. fuel tank to 10-to-15hrs for a 10,000gal. fuel tank.



"At AMPOL, we strive to improve clients' profitability as well as their satisfaction," said Headley. "We are proud to provide the Tornado System, a new business offering and sales tool that also happens to be the only one of its kind in the Gulf region."

For more information on AMPOL products and services, visit www.ampol.net.

Software to be used on jack-up projects in the Caspian Sea

VolgogradNIPImorneft has implemented AVEVA Marine for jack-up plat-

form projects in the Caspian Sea, AVEVA said. In addition to the AVEVA software, the contract includes a full range of services for implementation and training, the company said.

Because VolgogradNIPImorneft Institute works on complex projects, so it selected a 3D engineering design solution that met the needs of a marine environment as well as specific design standards such as detailed piping design. It was using two divergent systems which were very inefficient, and access for all project designers to work on the same model was a huge challenge.

AVEVA Marine effectively addresses these issues. It enables concurrent, multi-location engineering and will help VolgogradNIPImorneft Institute to attract new contractors to work on projects.

"By implementing AVEVA Marine and adopting AVEVA's Integrated Engineering & Design approach, they will improve project efficiency and reduce costs through a single managed information model," said Evgeny Fedotov, AVEVA's senior vice president for Russia, India and Middle East.

To learn more about AVEVA Marine, visit www.aveva.com/marine.

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FLNG – Huge Growth Planned Through 2018

By Lucy Miller, Douglas-Westwood

Douglas-Westwood (DW) has been tracking the FLNG sector, its vessel designs, and concepts for 3 years and presents forecast capital expenditure for the next 7 years in the latest edition of its "The World FLNG Market Report." DW's forecasts capital expenditure over the period 2012 will total \$29 billion.

There are two main sectors that form the FLNG industry:

- Floating Liquefaction – a specialized Floating Production, Storage, and Offloading vessel with LNG liquefaction topsides (LNG FPSO). Other hull types such as semi-submersibles and Spars have been suggested.

- Floating Regasification – this can takes place on a vessel located either offshore or alongside. There are two main types of floating regasification vessels: Floating Storage and Regasification Units (FSRUs), which remain stationary on location, or Regasification Vessels (RVs), which can also act as LNG carriers.

It is important to note that, at present, there is no industry standard definition of FLNG. Many sources that refer to FLNG simply mean LNG FPSOs, while others consider FSRU as an umbrella term to include all types of Floating Regasification vessels.

Parties looking to progress FLNG developments include both the vertically integrated majors such as Shell and smaller independent service providers, including Flex LNG, Höegh, BW Offshore, and SBM).

Floating Liquefaction

The key drivers of the floating liquefaction sector are the desire to monetise stranded offshore gas fields and the relative costs of an onshore liquidation terminal. A modular design allows the FLNG vessel to be built in lower-cost environments and be towed to location. Positioning the liquefaction facility on field reduces the requirements for costly upstream facilities and long pipelines to shore, which would be required for an onshore development.

While principally aimed at offshore gas reserves, floating liquefaction has also been considered for onshore fields, with projects in Papua New Guinea and Western Canada in development.

Design Challenges

The vast majority of systems on a floating liquefaction vessel will be the same or similar to those used on conventional oil-producing FPSOs. There are, however, various equipment designed or adapted specifically for these vessels:

- The insulated storage tanks, which need to utilize a specialised LNG containment system that is sloshing resistant.
- Topsides modules that include gas pre-treatment and liquefaction processing equipment.
- Offloading cryogenic liquid offshore in difficult sea conditions is a potentially hazardous task. Much research has been put into the development of safe and efficient offloading systems for LNG FPSOs.

Prelude Development

Shell is currently developing two floating liquefaction design concepts: a large-scale generic facility expected to be able to produce around 3.6mmtpa of LNG and a smaller facility of around 2mmtpa.

In July 2009, it was announced that Samsung Heavy and Technip had won the contract to design and construct up to 10 of Shell's 3.6mmtpa units, the first of which will be used Australia from 2017 on the Prelude development.

Other possible locations for both sized vessels include Egypt, West or East Africa, Indonesia, Iraq, and Venezuela.

Containment System

Shell will utilize an adapted version of GTT's membrane design that is used on a large number of LNG carriers and regasification vessels.

In this membrane system, prismatic-shaped LNG tanks are fully integrated into the hull and effectively form an inner hull within which the containment system fits.

By introducing two rows of tanks, the liquid motions in the tanks are significantly reduced and resonance between the liquid motion and ship motion is avoided. This reduces the risk of sloshing-related damage to an absolute minimum.

Liquefaction Processing Technology

The Prelude vessel, measuring 488m x 74m, will be the world's largest offshore floating structure.

Prelude's liquefaction process trains will use Shell's Dual Mixed Refrigerant (DMR) technology. The design makes use of two compressor strings, which ensures that if one compressor fails, the whole train does not stop – it can continue running at a reduced capacity. The first application of this technology in a baseload LNG terminal was the Sakhalin II project in Russia.

Prelude Statistics

Size:	488m x 74m
Displacement:	600,000tonnes
LNG Capacity:	3.6mmtpa
Condensate Capacity:	1.3mmtpa
LPG Capacity:	0.4mmtpa
Storage:	220,000m ³
Field (s)	Prelude, Concerto, Cruz
Water Depth:	250m

Leasing

Under Prelude's business model, Shell, the feedstock owner, will operate the floating liquefaction vessel and be responsible for obligating any contractual arrangements with offtakers. While this is likely to form the business model for large integrated companies such as Shell, other operators are looking to leasing in order to spread risk.

Under the leasing model, the owner of the LNG FPSO does not own any rights to the feed gas or the LNG as it is processed, liquefied, and stored. Instead, the leasing contractor receives a fee for providing the services.

Floating Liquefied Natural Gas

Leasing is extremely common in the conventional FPSO sector, and there is considerable scope for crossover within the FPSO and floating liquefaction leasing sectors. Companies involved in both sectors include BW Offshore, SBM Offshore, and Teekay.

Leased LNG FPSO designs differ from Prelude in the following ways:

- Smaller physical size
- Smaller liquefaction capacity – Most of the designs range between 2 and 3mmtpa. This compares to Prelude's 3.6mmtpa of LNG, plus condensate and LPG.
- Simpler liquefaction technology – Nitrogen expander or single mixed refrigerant compared to Shell's double mixed refrigerant.

Correspondingly, these vessels are expected to have lower capital cost than Prelude, which has been estimated at around \$3 billion.

Floating Regasification

Floating regasification vessels are the most developed form of floating LNG systems and there are currently nine such facilities in operation worldwide. These are located in Argentina, Brazil, Dubai, Kuwait, the UK, and the U.S. An additional one in the US Gulf of Mexico is being decommissioned.

Floating regasification is proving popular with LNG developers for the following reasons:

- Shorter lead times – The construction times for floating regasification vessels are considerably shorter than for onshore terminals.
- Temporary fixtures – Floating regasification vessels can be used as temporary terminals, either as an initial phase before the start-up of an onshore terminal or for periods of peak demand. These vessels can easily be moved from one location to another.
- Cost – For small- to medium-sized volumes, floating terminals are often cheaper than the equivalent onshore development.

The floating regasification market is set to increase rapidly over the next decade as more countries utilize the technology. The cost and construction time advantages are proving alluring even in countries such as India and China, which have traditionally favored onshore development solutions. Indonesia, with its stranded gas fields and rapidly growing cities, is a focus for both floating liquefaction and regasification terminals.

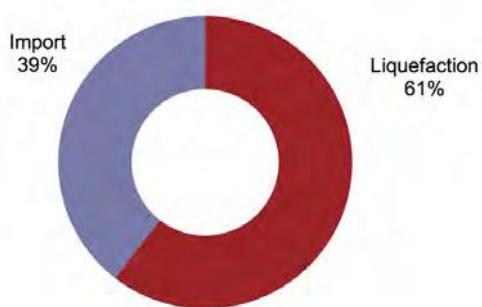


Figure 1 : FLNG capital expenditure by type

Market Forecast

Historically, the global FLNG market has only consisted of import terminals; however, this is expected to change over the next 7 years. As Capex associated with a floating liquefaction vessel is more than triple that of a typical floating import terminal, liquefaction vessels are expected to dominate the global Capex of \$29 billion forecast over the 2012–2018 period (Figure 1).

Asia, which is a focus area for both floating liquefaction and regasification, is expected to account for a third of the forecast Capex (Figure 2). There are two key floating liquefaction projects in this region – Petronas' FLNG and Inpex's Abadi development. Both projects are in the early stages of development, with the former undergoing FEED studies. Start-up, is therefore, likely to fall towards the end of the period.

Many Asian countries are considering floating regasification vessels in order to import gas to rapidly growing cities. China, which has traditionally advocated onshore terminals, is considering positioning a series of vessels along its coastline. Future floating regasification Capex from this region is likely to come from countries such as Bangladesh, China, India, Indonesia, Pakistan, Sri Lanka, and Vietnam.

Australasia is currently the only region in the world with an approved FLNG liquefaction project – Shell's Prelude floater. Offshore gas fields and deep subsea trenches such as the Timor Sea Trench make this region a key focus area for floating liquefaction project developers.

About the Author

Lucy Miller has conducted market analysis on a variety of DWL's commissioned research projects for clients in the oil and gas sector, as part of commercial due-diligence and published market studies. As the lead author of Douglas-Westwood's published market studies "The World FLNG Market Report" and "The LNG Market Report" Ms. Miller has considerable knowledge on the sector. She has also completed a number of LNG-related research projects for clients, including equipment manufacturers & suppliers and major contractors. Her analysis has been quoted by Bloomberg, Citigroup, Upstream, Penn Energy, and World Oil, among others. Lucy has a background in the offshore oil and gas sector and previously worked for FoundOcean Ltd. She has a degree in Economics and Geography from the University of Leicester.

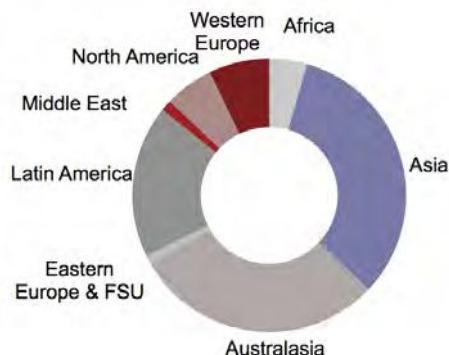


Figure 2 : FLNG capital expenditure by region

CSA completes sea trials of its new USV



The Unmanned Surface Vessel (USV) is the latest tool in CSA's scientific equipment pool, providing the company with a unique capability for performing a

wide variety of surveys in hazardous, remote, sensitive, and shallow water areas. The USV can be pre programmed or controlled remotely to perform survey transects, while recording and/or streaming data back to its command center. The vehicle has the payload, power, and data bandwidth to carry a variety of sensors – supporting both scientific and geophysical surveys.

"CSA has utilized USV technology in the past to collect data in areas traditional vessels could not access," stated Kevin Peterson, CEO of CSA. "This technology allows us to reach areas and collect data in a precise, safe, and efficient manner unlike any other marine asset available today."

In its base mode, the vehicle will be outfitted with a survey-grade echosounder, side-scan sonar, and multi-beam sonar. However, it can be reconfigured with additional sensors for survey-specific requirements.

For more information, visit www.csaintl.com.

Subsea Vision targets FPSO market with Cougar XT Compact

Subsea Vision has taken delivery of a Saab Seaeye Cougar XT Compact, the low-profile powerful ROV specially designed for working in high current areas and where access is restricted.

Subsea Vision's immediate target market for the Cougar XT Compact is the North Sea oil and gas industry. Further applications for the leaner Cougar are within the wind and tidal renewable markets where strong shallow water currents are a particular problem.

It means that Subsea Vision, the specialist ROV supplier, can now offer an enhanced service to FPSOs. Utilizing their ROV systems from the client's vessel or platform saves clients from contracting expensive ROVSVs and holdback tugs. With the Cougar's exceptional power, it can free-swim with ease to reach the furthest points on an FPSO or clients' subsea assets from a single launch point. Complete with a combined HP water jetting and hydraulic skid, Subsea Vision can offer a diverse

range of subsea services.

This follows industry projections that the demand for FPSOs is set to double by 2015 as companies seek new areas for exploration and production.

"The Cougar XT Compact will be able to work for longer periods in strong tidal areas, and Subsea Vision will be able to offer larger tooling packages, such as pipe tracking systems and manipulator / hydraulic skids for light work-class operations," says Subsea Vision's Chris Bryant.

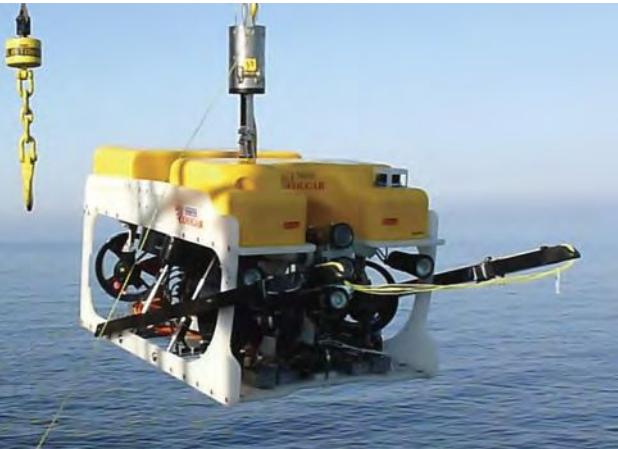
The unrivalled power and maneuverability of the Cougar XT Compact comes from its six thrusters: four vectored horizontal and two vertical, each with velocity feedback for precise control in all directions and interfaced to a fast-acting control system and solid-state gyro for enhanced azimuth stability.

To create a compact version and minimize the effect of current, Saab Seaeye engineers set about reducing the frame size, buoyancy, and weight to create a compact design that has the highest thrust-to-weight ratio in its class.

Subsea Vision's Cougar XT Compact comes with dual fiber optics that will, says Chris Bryant, bring unprecedented video quality and multichannel flexibility for integrated tooling options and a dedicated fiber optic link for client-specific tooling.

As an accredited Saab Seaeye training center, Subsea Vision's aim is to expand knowledge of Saab Seaeye ROV systems and build confidence in fault finding and maintenance to the operators, both offshore and onshore. Training is undertaken at the company's classroom and workshop or client premises.

For more information, visit www.subseavision.co.uk or www.seaeye.com.



**Unique System FZE
in the Middle East**

Unique System FZE, a Unique Maritime Group company, now represents and supports the Kongsberg range of multibeam echosounder and swath bathymetric systems exclusively across the Middle East region.

The Kongsberg Maritime – Norway is the largest manufacturer of multi-beam echosounder, and the EM Series has been the model of choice for multi-beam echo sounding requirements in the Middle East.

The EM MBES series is extremely high-resolution with dynamically focused beams and provides full swath width accuracy to the latest IHO standards. Unique System has many years of experience supporting Kongsberg EM multibeam systems. Some key clients of EM multibeam echosounder include ADNOC, Dubai Municipality, Fugro Survey Middle East, General Commission for Survey-Saudi Arabia, Horizon Surveys FZC, Huta Marine-Saudi Arabia, King Abdul Aziz University – Saudi Arabia, Military

Survey Department-UAE, NPCC-UAE, Oceanking Surveys, Quest Veritas Geosciences FZC, Royal Navy of Oman, UPDS (Doha Municipality) - Qatar.

These EM multibeam echosounder system has been utilized in various projects & applications especially for hydrographic survey, coastal surveys, hydrographic charting, offshore engineering applications, pre & post dredging survey, survey trainings etc.

In addition Unique System has Eight Kongsberg EM MBES Systems in its rental pool and has trained engineers for supporting clients in the Middle East region.

For more information, visit www.uniquegroup.com.

Phoenix purchases Bluefin-21

Bluefin Robotics, the leading provider of free-flooded, modular Autonomous Underwater Vehicles (AUVs) and related technologies announced today that the company has sold a Bluefin-21 system to US-based Phoenix International Holdings (Phoenix), an experienced marine services contractor which provides

underwater engineering and operational solutions, including deep ocean search and recovery operations, to customers around the globe. Among many other successes, Phoenix is accredited with recovering both flight recorders from Air France 447.

Bluefin will deliver an off-the-shelf, 1,500m depth-rated Bluefin-21 AUV system to meet several immediate requirements and upgrade the system to a depth rating of 4,500m during its next availability—a testament to the system's design flexibility and modularity. The system boasts Bluefin's field-swappable batteries, a top-tier integrated inertial navigation solution with Doppler and acoustic baseline aiding, and a state-of-the-art survey payload suite including side-scan sonar, sub-bottom profiler, multibeam echosounder, and a digital camera. Bluefin's intuitive user software interface, the Operator Tool Suite, will also be provided for mission planning, mission monitoring, and post-mission analysis.

For more information, visit www.bluefinrobotics.com.

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Fugro Salt Subsea takes delivery of trencher

Fugro Salt Subsea took delivery of the first of their two state-of-the-art High Performance Q1400 Trenching Systems from manufacturer Soil Machine Dynamics Ltd (SMD). The second system is due for delivery in September 2012.

The Q1400 Trenching System will undertake comprehensive offshore acceptance trials in both jetting and chain cutting modes as part of the delivery schedule from SMD and then commence its first contract on the LINCS wind farm off the Lincolnshire coast.

The uniqueness of the Q1400 system is the common trenching control module and separate tracked jetting and chain cutting skids with a customized launch and recovery system rated to sea state 6. This is coupled with a deck transfer skidding system to enable mode changes at sea safely within a 4hr period.

This will be a milestone event for Fugro where the combination of several service lines will combine to deliver a new integrated service to clients in both the Oil & Gas, the renewable, and



power generation markets.

Fugro Salt Subsea Ltd will lead this new business utilizing the core skills from Fugro Group. The new trenching business is born out of 18 months of market evaluation and system design resulting in the Q1400 trenching system. Fugro Salt believe the Q1400 system is capable of delivering reduced trenching costs for client projects owing to its superior power and performance that will reduce the overall time required for the trenching spread to be on location.

For more information, visit www.fugro.com.

Exocetus Development to purchase all rights to ANT littoral liders

The CEO of Exocetus Development LLC, Dr. Joe Imlach, announced that they have entered into a purchase agreement to acquire the assets, intellectual property (two patents and one pending) and technology for the Littoral Glider from ANT (formerly Alaska Native Technologies LLC).

These gliders were developed under funding from the Office of Naval Research one during a 6-year period. Eighteen of these gliders were delivered to the U.S. Navy during this period to be used as demonstration units for potential U.S. customers – both military and research institutions. To date, this glider model has more than 4,500hrs of at-sea operation.

The Exocetus glider has been renamed the Exocetus Coastal Glider and will be manufactured in the Exocetus facility at 1444 East 9th Avenue, Anchorage, Alaska.

The initial primary market for these Exocetus Coastal Gliders are coastal regions where conditions of hypoxia are prevalent during the warm months. There are more than 200 regions of

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eutrophication and hypoxia throughout the coastal areas of the world. Another near-term market for the Exocetus Coastal Glider will be for research institutes studying ocean acidification.

Dr. Imlach also announced that KRK Consultants, Ltd. of San Diego, California will be responsible for worldwide sales of the Exocetus Coastal Gliders. Mr. Ray Mahr, president of KRK, has established a network of international agents to market and sell Exocetus Coastal Gliders in countries where agents are now well established. Agents have been signed in Japan, the UK, the Republic of Ireland, Germany, Korea, Mexico, Central America, and India. New agents are being sought in Canada, China, Taiwan, South East Asia, South America, Australia, France, Scandinavia, Russia, and the Mediterranean Sea area.

For more information, visit www.exocetus.com.

Pressure-tolerant ROV tested in deep Atlantic

A pressure-tolerant ROV named Erno2 and designed by Enitech (headquartered in Rostock, Germany) was

successfully tested within the framework of the “Pressure-tolerant deep-sea systems” project of Germany’s Federal Ministry of Economics and Technology (BMWi). Driven by electric thrusters, the light vehicle easily maneuvered above the seabed, streaming live video from over 4,000m deep with its three video cameras and LED lights.

The actual robot was attached to its tether management system (TMS) during the 2hr descent into the deep. It left the TMS 20m above the seafloor and continued its journey being remotely controlled. A video- and data-link allowed the engineers to navigate the vehicle and monitor its behavior. Both the TMS and the ROV were powered with batteries that can be recharged during the mission, so the ROV’s stay on the seafloor is, in theory, unlimited.

Less than 1m wide, the 420kg Erno2 is a relatively small ROV. All Erno2 equipment takes up only a half of the standard 20ft container, making Erno2 one of the world’s smallest deep-sea ROVs. Operating depths of 6,000m are possible due to the vehicle’s pressure-tolerant construction.

To withstand the extreme pressure,

all important ROV subsystems – the motor, the lights, and all the sensitive electronics – are, instead of pressurized encapsulations, protected with elastic silicon molds. This new technique, developed at Enitech, is set to replace the oil-filled containers that were previously used for pressure compensation and is to become the enabling technology for compact, lightweight, robust, and cost-effective unmanned deep-sea vehicles.

Enitech experts have been working on this deep sea technology since 2000. After developing pressure-tolerant thrusters and power supply systems for AUVs like DeepC and SeaOtter MKII (Atlas Elektronik, Bremen), Enitech GmbH came up with their own vehicle – the Erno2 – that was now successfully tested in on several deep-sea missions.

The ROV was co-financed by the government’s R&D project, so the small company from Rostock can now manufacture commercial products based on the tested components for cost-effective deep-sea AUV and ROV equipment.

For more information, visit www.enitech.de.

The advertisement features a large, dark, rectangular sonar transducer labeled "ARIS EXPLORER 3000". To the left of the transducer is the Sound Metrics logo, which consists of a stylized blue wave icon followed by the text "SOUND METRICS". Below the transducer is a smaller "DIDSON TECHNOLOGY" badge. At the top right, the word "ARIS" is written in large, metallic, 3D-style letters. To the right of the transducer is a vertical panel containing text and a sonar image. The text reads: "Next generation DIDSON Technology in a compact Dual-Frequency Sonar" and "Tire with rope at 3.0 MHz". The sonar image shows a bright, circular pattern against a dark background, representing a detected object.



Ofer deploys FleetBroadband multi-voice service with Station711

Station711, a division of RRsat Global Communications Network Ltd, announced that Ofer Ship Holding has adopted the new FleetBroadband multi-voice capability. The decision was made after a trial period, where Station711 and Inmarsat lead the technical aspects of the new service. The deployment on ZIM CONSTANZA comes just after FleetBroadband's new multi-voice capability became commercially available. The ZIM CONSTANZA is a 4,250TEU container vessel. Station711, an Inmarsat distribution partner, added a Vocality PBX to work alongside the ship's installed JRC-500. FleetBroadband multi-voice is integrated into Inmarsat's core network, ensuring a high-quality voice service. Supporting up to nine simultaneous calls, it allows vessel owners and managers to separate crew communications from operational use, making it easier for crew to make and receive personal low-cost calls away from the bridge. FleetBroadband multi-voice can be accessed on existing FleetBroadband equipment with the same per-minute tariff for both pre-paid and post-paid calls. It also supports the "505" emergency calling capability that connects a vessel immediately to a Maritime Rescue Center.

O3b Networks unveils O3bMaritime

O3b Networks has launched O3bMaritime — a broadband solution capable of providing cruise ship guests and crew with more than 100 times the average Internet access rates at sea. Innovative cruise ship operators will be able to significantly enhance guest satisfaction through fast, affordable broadband connections. In game changing performance unmatched and unrivaled by current and future maritime offerings, O3bMaritime, now less than 1 year from launch, will deliver over 500Mbps in aggregate bandwidth to a single vessel. Guests can surf, download, work, watch, speak and stream in the same way they do on land, unlocking new revenue opportunities for operators and reinforcing best-in-brand service in all aspects of the cruise experience. The only offshore solution to deploy dedicated steerable beams, O3bMaritime will track a ship's course continuously, optimizing performance for the guests onboard. In the competitive world of super and mega-yachts, only O3bMaritime can provide the range of benefits that overwhelm existing satellite based solutions today. O3b's crystal clear voice and 65ms mouth-to-ear latency provides peerless voice quality.

O3b Networks to provide ultra-fast Internet to Royal Caribbean

O3b Networks announced a multi-year, multi-million dollar agreement with Royal Caribbean Cruises Ltd. to provide high-speed, satellite-delivered broadband service aboard the world's largest cruise ship. By summer 2013, more than 8,000 guests, staff, and crew members aboard the cruise industry leader's flagship Oasis of the Seas – under the Royal Caribbean International brand – will be the first to enjoy O3b's enhanced connectivity at sea as if connected to fiber at home or in the office. Royal Caribbean Cruises Ltd. is the first to utilize O3b's new maritime offering O3b Maritime, which delivers the reach of satellite and the speed and latency of fiber at a fraction of the cost of conventional providers. O3b is enabling maritime service providers to offer affordable fiber-like capacity across the Caribbean and ocean regions around the world. Providing unparalleled bandwidth, O3b's steerable satellite beams will provide cruise industry passengers ultra-fast Internet communications throughout their voyage.

Reederei Werner Bockstiegel upgrades to Iridium Pilot™



German shipping company Reederei Werner Bockstiegel has selected Iridium Communications' Iridium Pilot™ to upgrade its shipping fleet with broadband communications. Globecomm Maritime, a long-standing Iridium partner, is offering Iridium Pilot as part of an upgraded "Telaurus se@COMM" communications package and will manage the installation fleet-wide.

Werner Bockstiegel will install the Iridium Pilot platform across its entire fleet of 65 ships. The vessels will receive one dedicated voice line for the captain and two independent crew phone lines. Globecomm's Telaurus se@COMM Wi-Fi service will provide access points to enable crew to use their own laptops and smartphones to stay connected onboard.

Se@COMM-managed communication software, known for advance price notifications and push delivery of e-mail, now includes Wi-Fi access points for prepaid crew e-mail and SMS via a crew member's own notebook or PDA device. Globecomm Maritime, through its local sales agent Nordic-IT Marine Communications, will provide the Iridium Pilot terminals and service plans for the Bockstiegel ships.

Iridium Pilot, powered by the Iridium OpenPort® service, is engineered for enhanced durability to withstand the harshest maritime conditions, all the while packaged in a small, lightweight antenna. It has a fixed, electronically-steerable, phased-array antenna, designed to maintain connectivity in rough seas. Iridium Pilot™ offers broadband connectivity in addition to three independent phone lines, which work simultaneously, with data speeds up to 134kbps. The platform offers a suite of capabilities for vessel telecommunications optimization, which includes a built-in firewall for traffic management and a bulk configuration capability to assist in efficiently managing large volumes of units. Its small form factor, enhanced capabilities and flexible service packages make Iridium Pilot™ an optimal solution for vessels large and small. Iridium Pilot™ maintains the best service program in the industry, the Iridium Global Service Program, and the industry's only standard 5-year limited warranty.

Iridium Pilot will also be compatible with Iridium's next generation satellite constellation, Iridium NEXT, which is scheduled for deployment starting in 2015. Iridium NEXT is the most comprehensive commercial space program underway today. Ship operators installing Iridium Pilot™ can have the confidence that Iridium will support their equipment well beyond 2020.

For more information, visit www.iridium.com.



KVH appoints KB Impuls Hellas S.A. as distributor in Greece

KVH Industries, Inc., announced the appointment of Athens-based KB Impuls Hellas S.A. as its new commercial marine distributor in Greece for KVH's family of TracPhone® and TracVision® products, as well as the mini-VSAT Broadbands satellite communications service. KB Impuls Hellas S.A., a member of the DEMCO Group, was incorporated and licensed by EETT (National Telecommunications Committee) in Greece in 1999 and has already become the dominant satellite communications player in the Balkans and Middle East.

KB Impuls Hellas S.A. is one of the largest service providers in fiber, satellite, and wireless communications solutions in Eastern and Southern Europe. The company is a leading provider of technology and service, offering satellite communications, network services, 24/7 technical support, and best-of-breed solutions (including hardware and airtime). A €20 million teleport, which includes hub equipment for KVH's mini-VSAT Broadband network, is operated from modern facilities in Athens and Lavrio. KVH representatives Achilles Stamatiadis and Andreas Dalmaras will work closely with KB Impuls Hellas S.A. to bring KVH products and services to the Greek market.

The mini-VSAT Broadband service is unique in that it uses ArcLight® spread spectrum technology developed by KVH's satellite technology partner, ViaSat. The spread spectrum technology enables use of antennas as small as 37cm for the Ku-band service and as small as 1m for the combined C/Ku-band coverage. Although significantly smaller, these antennas match the coverage and speed of much larger maritime VSAT antennas using older services based on time division multiple access (TDMA) technology. With onboard equipment as small and affordable as L-band systems, the power of fast, affordable VSAT service is rapidly becoming the preferred option for large segments of the maritime market that were formerly limited to expensive legacy satellite communications services.

For more information, visit www.kvh.com.

Gilat's Wavestream amplifiers selected by Harris CapRock

Gilat Satellite Networks Ltd. announced that its wholly owned subsidiary, Wavestream®, has been selected by Harris CapRock Communications to supply Ku-band solid state power amplifiers for integration into end-to-end VSAT antenna systems onboard its maritime customers' vessels, including those within the cruise market.

As part of the agreement, Wavestream will deliver Harris CapRock 100W Ku-band Block Upconverters (BUCs) and 200W Ku-band BUCs.

Last month, Harris CapRock announced that it signed a 5-year agreement with cruise operator Royal Caribbean Cruises Ltd. to provide communications services onboard its fleet of 34 ships.

Thousands of Wavestream Ku-band products have been shipped worldwide to support a variety of military, defense, and broadcast satellite communications systems. The 100W and 200W Ku-band products are based on Wavestream's patented Spatial AdvantEdge™ technology to provide efficient, high power output in smaller, lighter product packages suitable for fixed and flyaway antenna systems. Each product is designed and tested over a range of frequency and temperature and has a field-proven track record for performance and reliability in some of the most extreme environments.

For more information, visit www.wavestream.com.

Globe Wireless announces release of R6 for Globe iFusion®

Globe Wireless announced their latest software release, R6 for Globe iFusion®, which will be a free upgrade to all existing users. The software will feature the following enhancements: a fixed-multiple voice solution for Fleet Broadband, VSAT auto-recovery tools, and a pre-paid/sponsored e-mail solution.

R6 for Globe iFusion® takes the existing GlobeMobile multiple voice lines, currently on over 1,000FB vessels, and uses it as a VoIP solution. This enables multiple calls using Globe's unique Digital Quality Voice (DQV) technology on both the GSM and VoIP phones over a standard FB terminal. In this release, the Globe iFusion® fixed-multiple voice solution allows up to five inbound and outbound calls over DQV, while the standard circuit switched voice line remains free

at all time for the captain's use or for emergencies.

One of the key features of fixed-multiple voice is the ability to assign international phone numbers from over 60 countries to each phone line onboard, reducing the cost to call the ship from shore as no 870 number is required. Customers who have offices in the UK, Singapore, Italy, etc. can have a local in-country number that will be routed to the vessel, and the vessel will be charged the same rate as if they were making the call from ship to shore. R6 for Globe iFusion® will support up to eight VoIP handsets onboard the vessel and POTS handset plugged directly into the i250. Each handset is configured from shore via Globe iPortal®, allowing a simple name to be assigned, an international inbound number if requested, PIN codes to restrict outbound calls, and split billing for sub-accounts. PINs can be created as needed either fleet wide or per ship. Even pre-pay PINS may be used that are independent or tied to a GlobeMobile GSM account. In the case of a chartered vessel, the charterer would have a unique PIN and all calls will be billed under a sub-account in the customer's invoice each month.

R6 for Globe iFusion® contains additional VSAT features developed to keep VSAT terminals online, requiring less backup L-Band usage. Automated scripts monitor the VSAT system and will attempt to auto-recover the system with no intervention by technicians or crew. If auto-recovery does not work, the Globe iFusion®, via L-Band backup, allows the Globe Wireless VSAT technician remote access to all the core components and systems onboard.

R6 for Globe iFusion® will also include a pre-paid and sponsored e-mail solution that customers have been asking for. Via Globe iPortal® customers will be able to set up sponsored monthly quotas with message size limits, allowing the customer to control how much sponsored e-mail the crew can use. These settings can be configured fleet-wide or specific for each crew member, allowing officers more usage for example or as a bonus for good work. The pre-paid account can be tied to the crew members GlobeMobile GSM account, allowing them to share the pre-paid balance between GSM calls, pre-paid fixed-multiple voice, e-mail, and SMS. Crew members will be able to pick up any fixed-multiple voice handsets, enter a PIN and password, and pay the same rate as the GlobeMobile service. If a

crew member has a GlobeMobile number and uses a fixed-multiple voice line, the end user on shore will see the GlobeMobile number on their phone as the caller ID rather than the vessel's phone number. If there is no GlobeMobile number associated with the crew member, then no number is displayed. These features will be available on VSAT and FB terminals.

For more information, visit www.globewireless.com.

KVH chooses Andesat as mini-VSAT Broadband reseller in South America

KVH Industries, Inc., named Andesat S.A., a leading provider of satellite communications in the Andean region of South America, a reseller for its mini-VSAT BroadbandSM service and TracPhone[®] V-series satellite communications systems. In addition to managing a mini-VSAT Broadband hub at their teleport in Santiago, Chile,

Andesat will now provide TracPhone V-series systems and mini-VSAT Broadband service to its distribution partners in Chile, Argentina, Uruguay, Paraguay, Bolivia, Peru, and Ecuador.

The mini-VSAT Broadband service is unique in that it uses ArcLight[®] spread spectrum technology developed by KVH's satellite technology partner, ViaSat.

The spread spectrum technology enables use of antennas as small as 37cm for the Ku-band service and as small as 1m for the combined C/Ku-band coverage. Although significantly smaller, these antennas match the coverage and speed of much larger maritime VSAT antennas using older services based on time division multiple access (TDMA) technology. With onboard equipment as small and affordable as L-band systems, the power of fast, affordable VSAT service is rapidly becoming the preferred option for large segments of the maritime market that were formerly limited to expensive legacy satellite communications services.

Since launching the mini-VSAT Broadband service in late 2007, KVH has fielded one of the world's broadest Ku-band VSAT networks, using 14 Ku-band satellite transponders to provide a seamless web of multimegabit coverage. The service will soon cover 95% of the Earth, including all of the oceans bordering southern South America, with the addition of coverage from three overlayed, global C-band transponders and a unique dual-mode TracPhone system that seamlessly switches between C- and Ku-band frequencies. In most regions, vessels enjoy redundant coverage to assure robust connectivity.

For more information, visit www.kvh.com.

LuxSpace awarded multi-year contract with EMSA

LuxSpace Sarl, an affiliate of OHB AG and partner of Orbcomm Inc., announced the award of a multi-year framework contract with the European Maritime Safety Agency (EMSA). The framework contract is funded for up to 500,000 euro (US \$625,000) for the first year plus options for an additional 2 years with funding levels yet to be determined.

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LuxSpace will provide satellite-based Automatic Identification System (SAT-AIS) data used for ship tracking and other maritime navigational and safety efforts to EMSA for designated regions and specific maritime projects.

Headquartered in Lisbon, Portugal, EMSA is one of the largest consolidators of AIS data and is responsible for maritime safety, pollution, and security onboard ships for the European Union and its member states. The contract award was the result of a competitive bid among providers of space-based AIS data service. EMSA determined that the AIS service provided by LuxSpace was superior, stating the bid "was the most advantageous in regards of quality price ratio."

Satellite AIS data will be supplied through Vesselsat 1 and 2 owned by LuxSpace and operated within the Orbcomm 2nd generation AIS satellite network, consisting of 18 additional satellites, of which the first ones will be started in later 2012.

For more information, visit www.luxspace.lu.



Kemilinks integrates IsatData Pro into fuel monitoring solution

SkyWave Mobile Communications announced the first deployment of IsatData Pro by Kemilinks International Pte Ltd, a developer of web-based and client server applications for asset tracking, monitoring, remote telemetry solutions, and Long Range Identification and Tracking (LRIT) data center services. By integrating the IsatData Pro satellite service with Kemilinks' proprietary Fuel Monitoring System, the cost of maritime M2M applications requiring higher bandwidth is no longer a problem.

Kemilinks' Fuel Monitoring System is built to interface with any flow meter model and other sensors such as engine control panel, anemometer, GPS, etc. to capture data regarding engine RPM,

engine load, propeller pitch, propeller load, and rudder angle. Data can be collected, and graphical trending reports can be analyzed at the vessel's corporate headquarters to determine the best ways to maximize efficiency.

By incorporating SkyWave's IsatData Pro with the Fuel Monitoring System, Kemilinks' solution meets the increasing demand for more detailed information in M2M applications and

allows businesses to share more data across diverse operations, via e-mail, electronic forms, and workflow information.

IsatData Pro offers a significant increase in payload capacity, delivering up to 10,000bytes of information to the device and up to 6,400bytes from the device.

For more information, visit www.skywave.com.

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Batelco signs agreement with GBI

Batelco has signed an agreement with Gulf Bridge International (GBI) to connect Bahrain through international capacity on GBI's new cable system. Batelco is the landing partner in Bahrain for the new cable system as part of an agreement signed between the two major companies. The GBI Cable System, which utilizes the latest fiber optic cable technology, connects all the countries of the Arabian Gulf region via a core ring and provides onward connectivity to Europe and Asia. With a design capacity of up to 10Tbps per second, the GBI Cable System has the capability to meet the rapid growth in demand for traffic originating and terminating in the Arabian Gulf. The launch of the GBI Cable System ensures telecom operators and other communications companies, both in the region and globally, benefit from greater choice, value, diversity, and resilience. The launch of the new GBI cable system enhances Batelco's networks and capabilities. Batelco has previously invested in several international cable systems as well as terrestrial connectivity in addition to a satellite earth station to provide international voice, data, and Internet services across the Kingdom. Such network resilience and diversity is considered best practice in the telecommunications industry globally and has served Batelco well in the past, minimizing disruption to telecommunications services when faced with damage to one of the cable systems.

TenneT welcomes proposal to accelerate German offshore grid

German grid operator TenneT released a statement welcoming a proposal by Phillip Rösler, the German Federal Minister for Economic affairs, and Peter Altmaier, the Minister for the Environment, to introduce new liability arrangements and a new system for offshore grid development. The two Ministers presented a proposal aimed at accelerating the development of wind farms off the German coast by introducing new liability arrangements and a long-term offshore grid development plan. TenneT issued a warning in November 2011 that the existing preconditions were out of step with the development of offshore wind energy, and presented its own package of measures to accelerate the process. Offshore wind energy plays a key role in the transition to a sustainable energy supply. The German government wants to construct offshore installations with a total capacity of 13GW and connect these to the grid by 2022, and TenneT wishes to contribute to realization of this objective by ensuring that these wind farms are built and connected to the grid in time. In the North Sea alone, offshore wind farms with a total capacity of 11GW will be constructed. TenneT has already concluded contracts for the realization of grid connections with a total capacity of 5.5GW (i.e., half of the planned capacity to be constructed in the North Sea). The electricity transmission operator has invested approximately 6 billion euro in these projects, making it the largest investor in Germany's energy transition.

NKT develops world's largest submarine power cable



NKT Cables has engineered, developed, manufactured, installed, and commissioned a 245kV three-core high-voltage submarine cable. With a diameter of 270mm, it is the largest submarine cable in the world.

The cable route is approximately 24.5km, connecting the GIS station at Grenaa with the offshore transformer platform at the Anholt offshore wind farm.

NKT delivered the cable as part of a turn-key project. The submarine cable has been engineered, developed, and manufactured at NKT Cables' new factory in Cologne. The cable laying and installation offshore was a co-operation between NKT and JD Contractor. Installation and site commissioning test was professionally handled by the NKT Cables installation department.

The Anholt Offshore Wind Farm will be the largest in Denmark with an installed capacity of 400MW. The wind farm is scheduled for completion by the end of 2013.

For more information, visit www.nktcables.com.

Japan-U.S. Cable selects Ciena for 100G upgrade

Ciena® Corporation announced that the Japan-U.S. Cable Network is upgrading its trans-Pacific submarine network, which spans close to 23,000km from the U.S. to Japan, with Ciena's market-leading coherent 100G technology. Expected to be in service in early 2013, the upgraded network will bring 5Tbps of additional capacity to a crucial global network route connecting North America and northern Asia. As the first direct coast-to-coast 100G trans-Pacific submarine network, this will allow Japan-U.S. Cable customers to enjoy the benefits of increased bandwidth and support rapidly increasing capacity demands.

The Japan-U.S. Cable is made up of more than 26 consortium members, including leading global service providers such as Verizon Business, AT&T, BT, Sprint, CenturyLink, KDDI, NTT, Cable & Wireless Worldwide, Tata Communications, SingTel, Softbank Telecom, France Telecom, Level(3), AboveNet, KT, Starhub, PCCW, and Telstra.

Ready for service in 2001, the Japan-U.S. Cable Network includes two landing stations in California, one in Hawaii, and three in Japan. To provide the 100G service, Ciena's 6500 Packet Optical platform with WaveLogic™ 3 coherent optical processors will replace existing 10G optical equipment at each

landing station.

WaveLogic™ 3 optimizes the Japan-U.S. submarine cable network to achieve capacity and reduced latency over trans-Pacific submarine distances while improving the overall economics of the network.

Ciena's WaveLogic™ coherent technology enables unobtrusive 40G/100G upgrades to existing submarine networks with only the addition of new terminal equipment, significantly extending the life of existing cable plants and further lengthening its lifespan. Beyond scaling bandwidth and lowering costs, WaveLogic-powered networks can be programmed to quickly respond and adapt to changing requirements for capacity, reach, and latency.

For more information, visit www.ciena.com.

SEAIOCMA extended until 2017

Global Marine Systems Ltd, ASEAN Cablesip Pte Ltd (ACPL) and Indian Ocean Cablesip Pte Ltd (IOCPL) have renewed their submarine cable maintenance contracts in South East Asia and

the Indian Ocean. Cable owners have given their approval to extend the existing service until 31 December 2017.

The South East Asia and Indian Ocean Cable Maintenance Agreement (SEAIOCMA) provides submarine cable maintenance spanning an area between Djibouti in the west, Perth in the South, Guam in the East, and the northern tip of Taiwan. The agreement provides for repair and reinstatement of submarine cables that carry international telecommunications traffic in the event of cable damage by ship anchors, fishing, tsunami, and earthquake. Ships based in Singapore, the Philippines, and India are on standby ready to respond within 24hrs in the event of a disruption to telecommunications traffic.

This agreement was first signed in 1986, with uninterrupted service provided by Global Marine and ACPL throughout. It is testament to the respective capabilities and quality of service that the major telecom carriers have elected to extend this 26 year relationship for another 5 years. The cable ships based in Singapore and the Philippines will be

upgrading their ROVs in 2013 to provide 3m burial capability. In addition, the Singapore vessel will be re-flagged to address regulatory change in Indonesia.

For more information, visit www.globalmarinesystems.com.

GlobeNet to build extension to Colombia

GlobeNet is extending its subsea network to Colombia, thus creating an express route from its future landing on Colombia's Atlantic coast to Miami, Florida.

As a direct extension from its existing subsea cable system connecting the U.S., Venezuela, Brazil, and Bermuda, this new express route addresses increased demand for high capacity while providing the lowest latency route from Colombia to Brazil. This new route complements GlobeNet's existing ring-protected International capacity service to Colombia.

UNE EPM Telecomunicaciones, the largest Internet provider and a leading full-service telecom operator in Colombia, has signed a long-term

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- Single crystal probe to avoid 'V-beam' error.
- Can be calibrated for all metal types.

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- Supplied in a Peli case.
- Protective membranes to prevent probe wear.
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agreement with GlobeNet to become the anchor tenant on the new subsea route.

This subsea extension to the GlobeNet submarine cable system is based on the latest in ultra-high capacity network architectures supporting 10Gbps/40Gbps/100Gbps DWDM technologies. The new build is scheduled for completion in 2013.

For more information, visit www.globenet.net.

GBI and Mada announce capacity sale agreement

Gulf Bridge International (GBI), the Middle East's first carrier neutral submarine fiber optic cable operator, and Mada Communications, Kuwait's leading wireless service provider offering wireless broadband, Internet, and intranet communication services, announced the signing of a capacity sale agreement.

The GBI network is the region's newest and most advanced cable system as well as being the Middle East's most geographically comprehensive network. These dynamic features will allow Mada to provide improved Internet services, making it a pillar in Kuwait's network of communications. GBI will facilitate Mada's ability to achieve their corporate vision of excelling to the global platform of advanced technologies and communications.

The GBI cable system connects all Gulf countries with onward connectivity to Europe and Asia. The system is designed around a core ring, which can re-route traffic thereby increasing resilience. With a design capacity of up to 10Tbps on certain cable sections, the GBI cable system will have the capability to meet the rapid growth in demand that has been forecast for traffic originating and terminating in Gulf.

For more information, visit www.gbiinc.com.

Telkom poised to reap benefits of WACS

Telkom South Africa is the latest carrier to tout the benefits of the new West African Cable System (WACS) linking Southern Africa and Europe, which entered service on 11 May.

In a statement, Telkom said that the introduction of WACS into Telkom's submarine cable portfolio will complete the company's second ring of capacity around the African continent. The SAE-3/WASC/SAFE (S3WS), EASSy, and SEA-ME-WE-3 cables already form

a ring around Africa. With the introduction of WACS, together with EASSy and EIG, a high-capacity ring between South Africa and Europe has now been formed.

Equipped with extensive undersea cable development and maintenance experience as well as the availability of the necessary facilities, Telkom was given the responsibility of landing WACS in South Africa, the company's statement said.

Since the landing of the cable in April 2011, a new cable landing station has been established in Yzerfontein, north of Cape Town. The cable landing station is owned, operated, and maintained by Telkom; however, the costs of the facilities will be shared by the WACS Consortium parties using the station.

Telkom now operates submarine cable gateways at Mtunzini, Melkbosstrand, and Yzerfontein, providing South Africa with three international fiber gateways to minimize the risk of complete isolation in the event of a natural disaster or cable outage.

The commercial availability of WACS provides Telkom with significant capacity at each of the three cable gateways into and out of the country, making it possible to offer more diverse, redundant, high-capacity global service solutions.

Designed to support present and future Internet, e-commerce, data, video, and voice services, the capacity of the entire system is 5.12Tbps. The system makes use of dense wavelength division multiplexing (DWDM) technology, which enables the transport of multiple wavelengths over a single fiber pair as well as multiplication of capacity.

The initial capacity of WACS is over 500Gbps and is upgradable at any stage of the project life span. The robustness of the design will also enable the system to accommodate the latest developments in submarine fiber optic technology.

For more information, visit www.telkom.co.za.

Seaborn Networks closes second funding round

Seaborn Networks, the developer and operator of the first direct submarine cable between the U.S. and Sao Paulo, Brazil, announced that it has secured its second round of financing.

This investment will enable Seaborn Networks to expand its sales and marketing efforts, hire additional headcount, apply for landing licenses in the U.S. and

Brazil for Seabras-1, and undertake additional project development steps.

In a related announcement, Seaborn Networks announced that it has engaged global investment banking firm Jefferies & Company, Inc. as its exclusive financial advisor for the project financing of Seabras-1, Seaborn Networks' submarine cable system.

Seabras-1 is a new 32Tbps submarine cable that will be the first direct route between Sao Paulo, Brazil and the U.S., thus enabling the fastest route possible for carriers, content providers, and other entities focused on reducing latency and improving route diversity. The system also will have a branch that lands in Fortaleza, Brazil.

For more information, visit www.seabornnetworks.com.

Sidera to acquire capacity on Seaborn's U.S.-Brazil cable

Seaborn Networks announced that Sidera Networks will be making a long-term capacity purchase on Seaborn's U.S.-Brazil submarine cable system.

Seaborn Networks' cable system, Seabras-1, is a new 32Tbps submarine cable that will be the first direct route between Sao Paulo, Brazil and the U.S. The system also will have a branch that lands in Fortaleza, Brazil. Seaborn plans for the Seabras-1 system to be ready for service in the fourth quarter of 2014.

By acquiring capacity on Seabras-1, Sidera will extend its low-latency, fiber optic network to Sao Paulo, Brazil, the largest financial services center in Latin America.

Sidera Networks already connects the major metropolitan cities on the East Coast of the U.S., as well as Chicago, Toronto, and London. Expanding to Sao Paulo is a natural next step, as it represents the ninth largest city in the world (and the largest in South America) by GDP according to PricewaterhouseCoopers and is an important global city with an ever-increasing financial services industry. Seaborn Networks' Seabras-1 is the first submarine cable system to connect Sao Paulo to the U.S. without multiple hops along the route, thus enabling the fastest route possible for financial services firms and other businesses focused on reducing latency and improving route diversity.

For more information, visit www.seabornnetworks.com or www.sidera.net.

Reliance extends Falcon to Iraq

Reliance Globalcom has launched the Al-Faw Cable Landing Station (CLS) in Iraq, built in alliance with the Iraqi Telecommunications and Post Company (ITPC).

With this development, Reliance Globalcom said it is now the first private subsea service provider to activate submarine capacity and directly connect Iraq seamlessly to the countries in Middle East, Asia, Europe, and North America. Built with an initial design capacity of 680Gbps with two diverse routes, Reliance Globalcom has initially lit 50Gbps on each route in order to cater to the existing market demand. The two diverse routes are integrated into the Falcon network, thereby offering a resilient network.

Considering the low broadband penetration in Iraq, the Falcon landing provides a significant milestone towards establishing direct connectivity from Iraq to the rest of the world and will help boost the nation's telecom sector. Consumers can now enjoy better quality in broadband services and higher Internet speeds.

Subsea Telecom

The Al-Faw CLS will connect Iraq to all key Middle East countries — Oman, Iran, Kuwait, Saudi Arabia, Qatar, Bahrain, UAE, Yemen, and Egypt — through Reliance Globalcom's Falcon submarine cable. Falcon's interconnection with Reliance's FEA cable ensures further seamless connectivity and diversity to major global destinations on the Reliance Globalcom network, including London, New York, Mumbai, Hong Kong, etc.

For more information, visit www.relianceglobalcom.com.

TIME dotCom joins APG project

TIME dotCom Berhad has entered into a construction and maintenance agreement of the Asia Pacific Gateway (APG) submarine cable system connecting Malaysia to Korea and Japan.

As part of the Group's global bandwidth business strategy, TIME's wholly owned subsidiaries and global bandwidth business arms, Global Transit Communication Sdn Bhd and Global Transit Limited, collectively known as Global Transit, will be administering the APG on behalf of the Group.

The APG is a 10,000km international fiber optic cable system that will link Malaysia to Korea and Japan with seven branches to other Asian countries. The cable system is scheduled to be ready in the third quarter of 2014.

APG is geographically well spread to bridge international capacity hubs such as Japan, Hong Kong, Singapore, Taiwan, and Korea as well as connecting emerging markets such as Vietnam and China where demand for capacity is multiplying yearly. This effectively makes the APG the most strategic and widespread Asian cable system.

Demand for bandwidth from Indo-China and South East Asia is growing at a compound annual growth rate of 44%, from around 2,862Gbps in 2011 to an expected 24,000Gbps in 5 years.

By adopting 40Gbps optical transmission technology, the total design capacity of APG is at 54.8Tbps. APG is designed protected for 100Gbps technology upgrades to meet dynamic traffic requirements in the future, giving TIME an opportunity to increase its capacity allocation as and when the needs arise.

For more information, visit www.time.com.my.

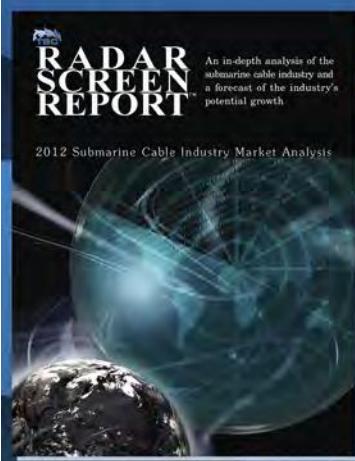
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- A listing of 200 submarine, fiber optic, & power cable projects under contract during 2011 or planned for the future



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Global Marine Energy completes LINCS installation

Global Marine Energy Ltd. has successfully completed its portion of the cable landing and nearshore cable works related to the export cable at the LINCS offshore wind farm.

The LINCS offshore wind farm is located off the east coast of the UK and is a joint venture between Centrica (50%), DONG Energy, and Siemens Project Ventures. LINCS is immediately adjacent to the Lynn and Inner Dowsing wind farms, two of Centrica's renewable projects completed and made operational in 2009. Once operational, the LINCS site will have an installed capacity of approximately 270MW.

Global Marine Energy installed the approximately 8km of 132kV subsea power cable utilizing the cable barge Nautilus Maxi, which had been modified to meet the unique requirements of the project.

By the end of 2012, the LINCS wind farm is expected to be operational and will power the annual electricity requirements of approximately 200,000 households, making a significant contribution towards the 2020 UK carbon reduction targets.

For more information, visit www.globalmarinesystems.com.

Agreement to build Germany-Norway cable

Statnett, TenneT, and KfW have agreed to develop an electricity interconnector between Germany and Norway with a goal to have it operational by 2018. The project is key to further development of the North-European power grid and of high priority to the partners.

Statnett is the Norwegian Transmission System Operator (TSO) and owner of the transmission grid. TenneT is one of four German TSOs. KfW is the German Bank for development and reconstruction.

The three parties have agreed to join as equity partners in a project set up to develop and construct a subsea interconnector between Germany and Norway, with Statnett holding 50%, KfW at least 25%, and the remaining interest held by TenneT.

The cable will contribute to further integration of the North-European power markets and strengthen the

Power Cables

North-European power grid, hence buoying the ambitions for increased renewable energy production in the whole region and thereby the EU's climate and energy goals.

The interconnector between Germany and Norway, with a planned capacity of up to 1400MW, is expected to be completed by 2018 in the anticipation that the project will receive all necessary licenses during 2013 and that we will be able to team up with suppliers to provide the necessary capacity in all relevant markets.

Leading up to the agreement, the authorities have been active in securing a predictable framework, with regard to both regulations and financing.

For more information, visit www.statnett.com, www.tennet.org, or www.kfw.de.

Reef Subsea awarded contract for cable installation and burial

Reef Subsea AS announced that its subsidiary company, Reef Subsea Power & Umbilical Ltd., with offices in Stockton on Tees and Aberdeen, has been awarded a major contract with Gwynt y Môr Offshore Wind Farm Limited, worth approximately £40m. It will see Reef Subsea Power & Umbilical assist with engineering, project management, ROV, and survey operations linked to the subsea installation and burial of all infield array cables for Gwynt y Môr, located 13km off the North Wales coast in Liverpool Bay.

The wind farm will have an installed capacity of 576MW and is designed to be ultimately integrated into the UK National Grid in 2014. Reef Subsea Power & Umbilical (RSPU) has been tasked with installing and burying the 161 infield inter-array cables. Works scope also covers connection to the two offshore sub-stations.

For the project, Reef Subsea Power & Umbilical will provide project management, ROV, survey, and engineering services and will deploy one of its installation and burial spreads, which will be on contract throughout 2013. The vessel and the project team selected for Gwynt y Môr will be equivalent to those that successfully completed similar achievements over the last few years for Greater Gabbard and other UK wind farms.

RSPU will utilize an installation and

burial spread, which will also be designed for future OWF developments calling for increasing maximum bend radius of infield inter-array cables. Hence, RSPU will be well positioned for the UK Round 3 Tenders to come as well as for other large OWF developments in the North European waters.

In addition to winning the Gwynt y Môr contract, Reef Subsea Power & Umbilical Ltd has recently received its certificates from Det Norske Veritas (DNV) for its accreditation in management, environment and health and safety systems ISO 9001, ISO 14001 and OHSAS 18001, respectively.

For more information, visit www.reefsubsea.com.

Statnett, National Grid plan world's longest power cable

Statnett and National Grid have signed an agreement to confirm their plans to develop an electricity interconnector between Norway and the UK with a goal to have it operational by 2020. The North Sea Network (NSN) project is a key to further development of the North-European power grid and of high priority to the companies.

Following 3 years of joint feasibility and development work, Statnett and National Grid International have signed an agreement to confirm their intention to continue work to facilitate an investment decision for the construction of a submarine interconnector between Norway and the UK. The two parties are currently performing a joint seabed survey along the planned route and will now focus on obtaining the necessary regulatory and environmental agreements and concessions as well as preparing for the procurement of some 700km of cable and two converter stations. A key milestone will be the submittal of the Norwegian Trade Concession Application to the Norwegian Ministry in the first half of 2013.

The interconnector will contribute to further integration of the North-European power markets and strengthen the North-European power grid, hence buoying the ambitions for increased renewable energy production in the whole region and thereby supporting the EU's 2020 goals. The interconnector is a cornerstone in the network development plans for the countries

Power Cables

3D view of the subsea scene during the operation, resulting in confident decision making.

Furthermore, using CodaOctopus' proprietary USE™ (Underwater Survey Explorer) software with its "augmented reality" capabilities, it was possible to overlay a computer-generated image of the planned siting of the cable onto the sonar view to confirm the cable was being laid on target. Work is on-going, but early results indicate that this approach has led to a major increase in productivity.

For more information, visit www.codaoctopus.com.

Rhenus Midgard handles cable logistics project for Nexans

Rhenus Midgard delivered approximately 30km of submarine power cables to its port facility in Nordenham in May on behalf of Nexans, then stored and trans-shipped them. The submarine power cables will link up one section of the 111 wind turbines at the Anholt offshore wind park, the largest in Denmark. Rhenus Midgard has been

able to expand its logistics services in the offshore sector as a result of this project.

The submarine cables, which weighed almost 1,000tons, reached the port of Nordenham by freight train. Rhenus handled one section of the rail transport services, which set off from the production site in Hanover, using the NIAG railway services company; it is part of the Rhenus Group.

After unloading the items, Rhenus employees stored the materials in what are known as two cable beads made of iron, before they were loaded onboard the STEMAT 82 cable-laying pontoon at the end of May. The cables were cut on the cable-laying vessel, and the individual lengths were laid on the seabed.

Once it has been completed, the Anholt wind park, which is located off the Danish coast, is set to provide 400MW of electric power and will generate enough power for about 400,000 households. That corresponds to 4% of Danish electricity consumption.

For more information, visit www.rhenus.com.



Source: DONG Energy A/S

surrounding the North Sea basin and of high priority to the companies. The interconnector between the UK and Norway, with a planned capacity of up to 1,400MW, is expected to be complete by 2020. When completed, it will be the world's longest subsea power cable.

For more information, visit www.nationalgrid.com or www.statnett.com.

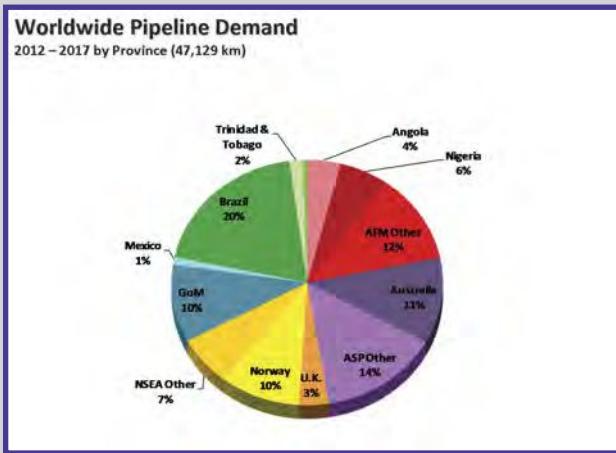
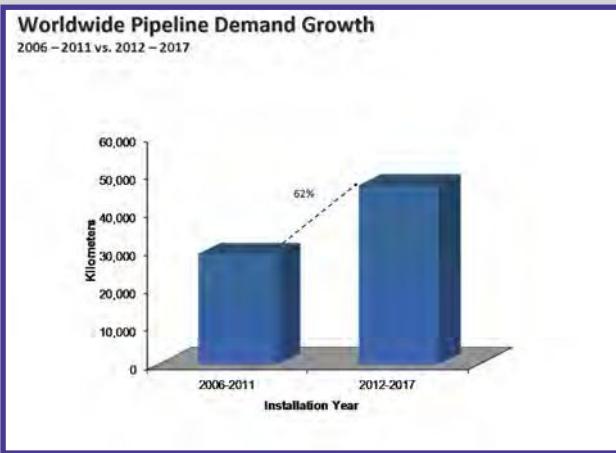
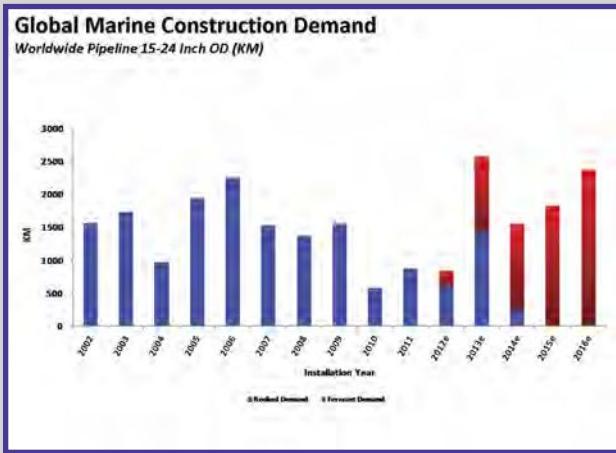
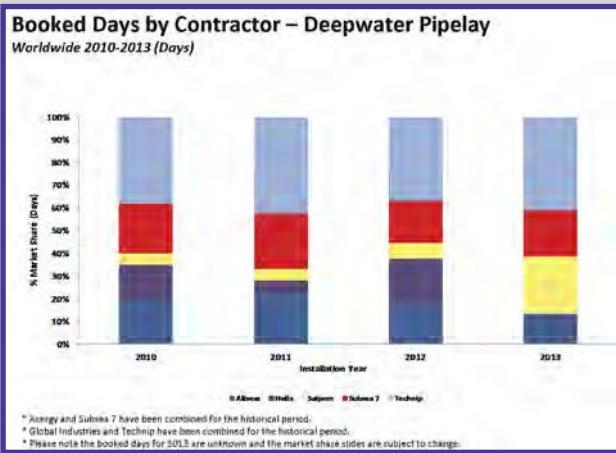
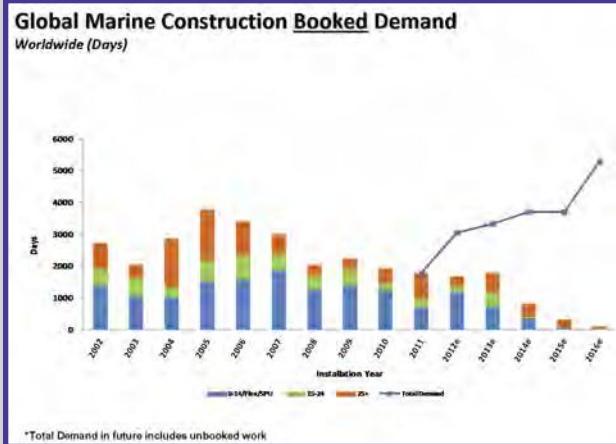
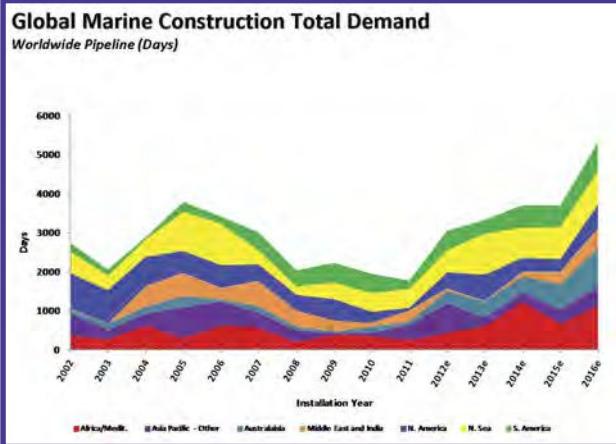
Echoscope assists Deep BV in cable laying

CodaOctopus and their agent in The Netherlands, Nautikaris BV, have recently been involved in a project for Deep BV Hydrography and Geophysics, providing positioning and survey services for the installation of a power cable at the Thornton Bank Wind Farm off the Belgian coast.

This is a significant development for the Echoscope®, as this is the first time the sonar has been used to monitor the touchdown of a cable into a trench on the seabed. Using Echoscope® the operator was able to visualize in real time the cable's catenary and touchdown point in three dimensions as it was being laid. This proves the valuable application of the Echoscope®, in deep sea cable laying. Additionally, it was also used to visualize and monitor the pull-in of the cable into the J-tube. This gave the operator an immediate

Offshore At-A-Glance

Quest Offshore Activity Report



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Gulf of Mexico Data

Current Deepwater Activity

Operator	OCS Area	Block	Lease	Rig Name	Prospect Name	Water Depth (ft)
Shell Offshore, Inc.	WR	508	G18730	NOBLE DANNY ADKINS	Stones	9,553
Petrobras America, Inc.	WR	206	G16965	PRIDE DEEP OCEAN MENDOCINO	Cascade	8,143
Shell Offshore, Inc.	AC	857	G17565	H&P 205	Great White	7,815
ExxonMobil Corp.	KC	918	G32654	T.O. DEEPWATER CHAMPION		7,381
Shell Gulf of Mexico, Inc.	MC	391	G26252	T.O. DEEPWATER NAUTILUS	Appomattox #3	7,157
ExxonMobil Corp.	KC	919	G21447	MAERSK DEVELOPER	Hadrian	7,123
Union Oil Co. of California	WR	677	G18753	T.O. DISCOVERER INSPIRATION	Saint Malo	7,040
Chevron USA, Inc.	WR	758	G17015	T.O. DISCOVERER CLEAR LEADER	Jack	6,960
BP Exploration & Production, Inc.	GC	744	G15605	T.O. DEVELOPMENT DRILLER II	Atlantis	6,523
Statoil Gulf of Mexico LLC	KC	698	G33343	T.O. DISCOVERER AMERICA	Bliokp	6,313
Union Oil Co. of California	WR	98	G21841	PACIFIC SANTA ANA	Coronado	6,127
Noble Energy, Inc.	MC	948	G28030	ENSCO 8501	Bob	6,060
BP Exploration & Production, Inc.	MC	778	G14658	THUNDER HORSE PDQ	Thunder Horse South	6,040
BP Exploration & Production, Inc.	KC	292	G25792	SEADRILL WEST SIRIUS	Kaskida	6,031
Anadarko Petroleum Corp.	WR	51	G31938	ENSCO 8505	Shenandoah	5,838
Murphy E&P Co.	MC	734	G21778	T.O. DEEPWATER PATHFINDER	Thunderhawk	5,712
BP Exploration & Production, Inc.	GC	743	G15607	T.O. DEVELOPMENT DRILLER III	Atlantis	5,414
Eni US Operating Co. Inc.	MC	252	G21164	DIAMOND OCEAN VICTORY	Macondo	5,229
Chevron USA, Inc.	WR	29	G16942	T.O. DISCOVERER INDIA	Big Foot	5,187
Hess Corp.	MC	726	G24101	STENA FORTH	Tubular Bellsicies	4,608
BHP Billiton Petroleum (GOM)	GC	654	G20085	GSF C.R. LUIGS	Shenzi	4,337
Cobalt International Energy LP	GB	959	G30876	ENSCO 8503	North Platte	4,334
Chevron USA, Inc.	GC	640	G20082	T.O. DISCOVERER DEEP SEAS	Tahiti 2	4,292
Apache Deepwater LLC	GC	867	G33858	ENSCO 8502	Palmer	4,260
BHP Billiton Petroleum (GOM) Inc.	GC	507	G22970	T.O. DEVELOPMENT DRILLER I	Ness	4,028
ATP Oil & Gas Corp.	MC	941	G16661	NABORS 202	Mirage	4,000
Shell Offshore, Inc.	MC	809	G05868	H&P 204	Princess	3,797
Anadarko Petroleum Corp.	EB	602	G14205	WIRELINE UNIT (L.J.#3)	Nansen	3,678
Shell Offshore, Inc.	GC	248	G15565	NOBLE DRILLER	Glider	3,440
Eni US Operating Co. Inc.	GC	298	G08876	ENSCO 8500	Allegheny (south)	3,308
Shell Offshore, Inc.	MC	807	G07958	NOBLE BULLY 1	Mars B	3,003
Shell Offshore, Inc.	GC	158	G07995	H&P 202	Brutus	2,985
W&T Energy VI, LLCC	MC	243	G19931	NABORS SUPER S.D. XIX	Matterhorn	2,816
Deep Gulf Energy LP	GB	506	G26664	NOBLE JIM DAY	Danny 2	2,815
LLOG Exploration Offshore, LLC	MC	503	G32334	NOBLE AMOS RUNNER	WhoDat	2,642
Shell Offshore, Inc.	GB	427	G07493	NOBLE JIM THOMPSON	Cardamom	2,720
Hess Corp.	GB	260	G07462	NABORS S.D. XVI	Baldpate	1,646
Stone Energy Corp.	VK	989	G09771	HYDRAULIC WORKOVER UNIT	Pompano	1,295
W&T Energy VI, LLC	VK	823	G16549	SUNDOWNER I	Virgo	1,130
McMoRan Oil & Gas LLC	VK	738	G15431	WIRELINE UNIT (N.O. #2)	VK 738	809

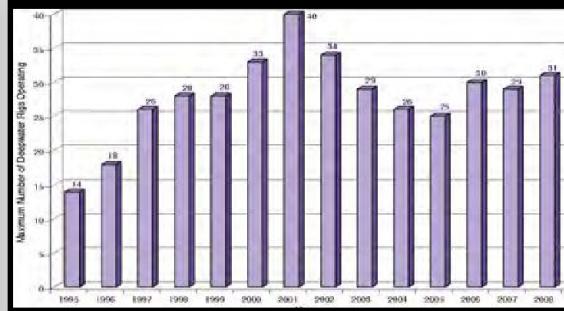
Deepwater prospects with drilling and workover activity: 40

Current Deepwater Activity as of Monday, 16 July 2012

Activity by Water Depth

Water Depth (m)	Active Leases	Approved Applications	Active
0 to 200	1,712	34,370	2,928
201 to 400	118	1,113	20
401 to 800	267	843	10
801 to 1,000	396	548	9
1,000 & above	3,310	1,755	26

Rig Activity by Year



Activity by water depth information current as of Monday, 16 July 2012

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

Monthly Stock Figures & Composite Index

Industry Company Name	Symbol	Close Mid-July	Close Mid-June	Change	Change %	High 52 week	Low
Diversified, Production Support, and Equipment Companies							
Baker Hughes, Inc.	BHI	39.46	40.15	-0.69	-1.7%	81.00	37.08
Cameron Intl. Corp.	CAM	43.95	44.90	-0.95	-2.1%	58.50	38.38
Drill-Quip, Inc.	DRQ	69.79	61.21	8.58	14.0%	77.12	47.40
Halliburton Company	HAL	28.97	29.08	-0.11	-0.4%	57.77	26.28
Tenaris SA	TS	35.93	33.10	2.83	8.5%	47.82	23.29
Newpark Resources, Inc.	NR	6.32	5.44	0.88	16.2%	10.62	5.19
Schlumberger Ltd.	SLB	66.32	66.28	0.04	0.1%	95.53	54.79
Superior Energy Services, Inc.	SPN	19.69	19.49	0.20	1.0%	42.87	17.54
Weatherford International, Inc.	WFT	11.99	12.67	-0.68	-5.4%	22.76	10.85
Deep Down, Inc.	DPDW	0.06	0.05	0.01	20.0%	0.29	0.05
FMC Technologies	FTI	40.47	43.07	(2.60)	-6.0%	55.19	34.46
Total Diversified, Production, Support and Equipment.....	362.95	355.44	7.51	2.1%	549.47	295.31	
Geophysical / Reservoir Management							
Dawson Geophysical Company	DWSN	24.55	22.67	1.88	8.3%	42.23	20.29
Mitcham Industries, Inc.	MIND	16.36	17.12	-0.76	-4.4%	26.76	9.52
Compagnie Gnrale de Gophysique-Veritas	CGV	26.30	24.62	1.68	6.8%	36.93	15.08
Total Geophysical / Reservoir Management.....	67.21	64.41	2.80	4.3%	105.92	44.89	
Offshore Drilling Companies							
Atwood Oceanics, Inc.	ATW	41.45	33.42	8.03	24.0%	48.91	30.64
Diamond Offshore Drilling, Inc.	DO	63.51	59.92	3.59	6.0%	73.15	51.16
ENSCO International, Inc.	ESV	49.10	43.33	5.77	13.3%	59.90	37.39
Nabors Industries, Inc.	NBR	13.19	12.80	0.39	3.0%	27.63	11.05
Noble Drilling Corp.	NE	34.47	31.25	3.22	10.3%	41.71	27.33
Parker Drilling Company	PKD	4.67	4.58	0.09	2.0%	7.62	3.60
Rowan Companies, Inc.	RDC	34.18	31.29	2.89	9.2%	40.76	28.13
Transocean Offshore, Inc.	RIG	46.50	42.30	4.20	9.9%	65.39	38.21
Total Offshore Drilling.....	287.07	258.89	28.18	10.9%	365.07	227.51	
Offshore Contractors, Services, and Support Companies							
Helix Energy Solutions Group, Inc.	HLX	17.00	15.68	1.32	8.4%	21.65	11.57
Gulf Island Fabrication	GIFI	30.47	26.64	3.83	14.4%	36.00	19.55
McDermott International, Inc.	MDR	11.56	10.54	1.02	9.7%	21.69	9.04
Oceaneering International	OII	50.00	48.42	1.58	3.3%	57.16	31.77
Subsea 7 SA	SUBCY.PK	20.02	20.37	-0.35	-1.7%	27.52	16.82
Technip ADS	TKPPY.PK	26.29	24.76	1.53	6.2%	29.90	17.52
Tetra Technologies, Inc.	TTI	6.88	6.59	0.29	4.4%	13.45	6.09
Cal Dive International, Inc.	DVR	1.83	2.39	(0.56)	-23.4%	6.21	1.50
Total Offshore Contractors, Service, and Support.....	164.05	155.39	8.66	5.6%	213.58	113.86	
Offshore Transportation and Boat Companies							
Seacor Holdings, Inc.	CKH	90.89	84.33	6.56	7.8%	109.50	75.04
Gulfmark Offshore, Inc.	GLF	35.87	33.45	2.42	7.2%	56.41	30.03
Bristow Group	BRS	43.46	38.60	4.86	12.6%	52.89	37.92
PHI, Inc.	PHII	25.65	23.81	1.84	7.7%	27.33	16.95
Tidewater, Inc.	TDW	47.45	45.23	2.22	4.9%	63.27	38.80
Trico Marine Services, Inc.	TRMAQ.PK	0.04	0.04	0.00	0.0%	0.15	0.01
Hornbeck Offshore	HOS	39.92	33.48	6.44	19.2%	43.83	19.80
Total Offshore Transportation and Boat	283.28	258.94	24.34	9.4%	353.38	218.55	

Monthly Stock Figures & Composite Index

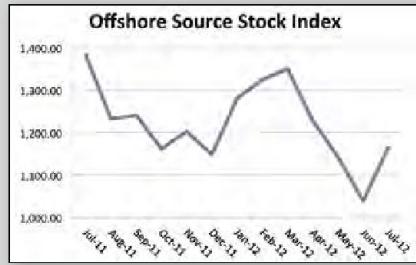
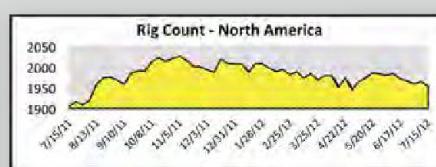
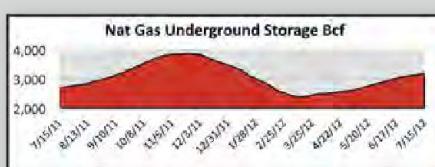
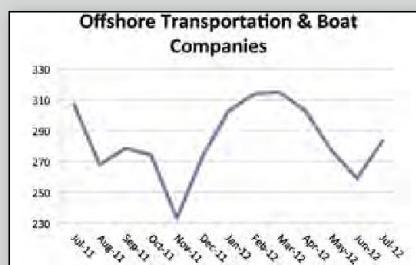
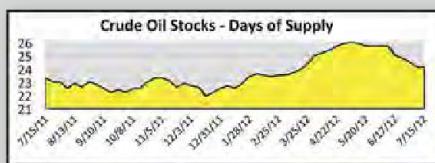
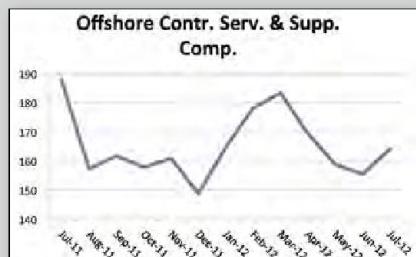
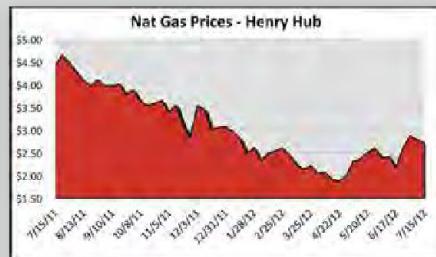
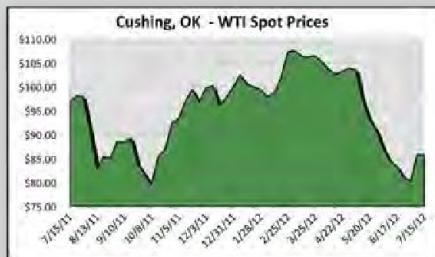
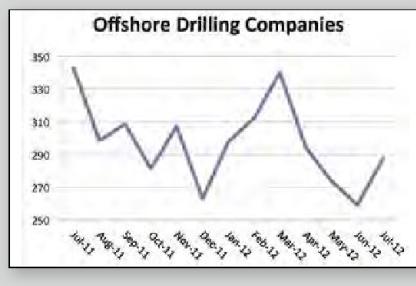
Industry	Close Mid-July	Close Mid-June	Change 7.51	Change % 2.1%	High 549.47	Low 295.31
Diversified, Prod. Support & Equip. Comp.						
	Total Diversified, Production, Support, and Equipment	362.95	355.44	7.51	2.1%	549.47 295.31
	Total Geophysical / Reservoir Management	67.21	64.41	2.80	4.3%	105.92 44.89
	Total Offshore Drilling	287.07	258.89	28.18	10.9%	365.07 227.51
	Total Offshore Contractors, Service, and Support	164.05	155.39	8.66	5.6%	213.58 113.86
	Total Offshore Transportation and Boat	283.28	258.94	24.34	9.4%	353.38 218.55
	Total Offshore Source Index	1,164.56	1,093.07	71.49	6.5%	1,587.42 900.12

DISCLAIMER

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

Oil & Gas Industry Trends

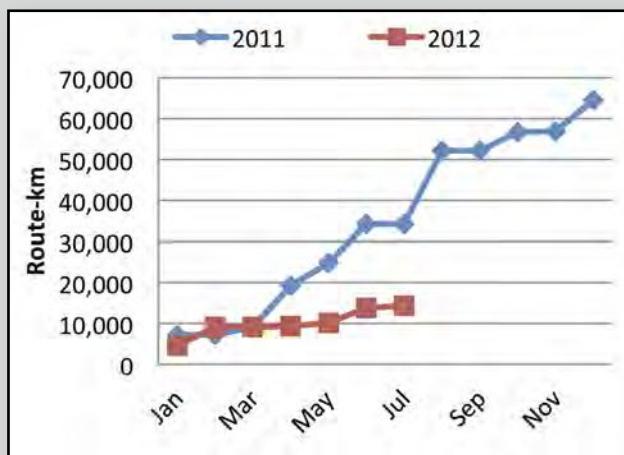
Monitoring the pulse of the U.S. Offshore Oil & Gas Industry



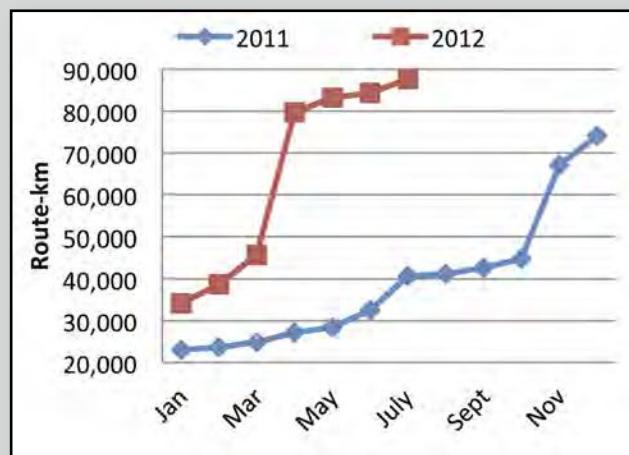
- Positive trend, at least 3 weeks
- Changing trend, less than 3 weeks
- Negative trend, at least 3 weeks

Subsea Telecom & Power Cable Data

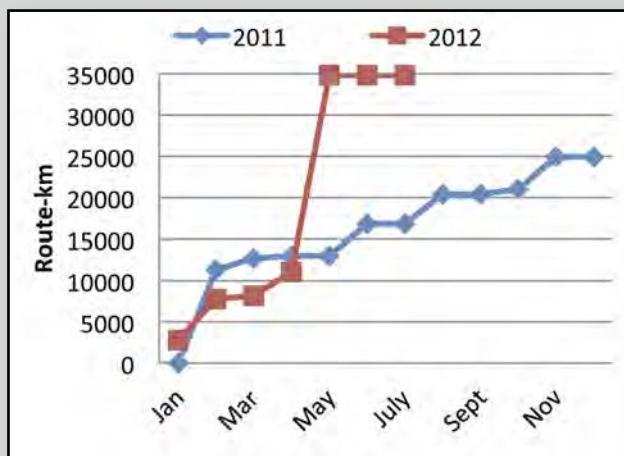
FO Cable Awards by Month



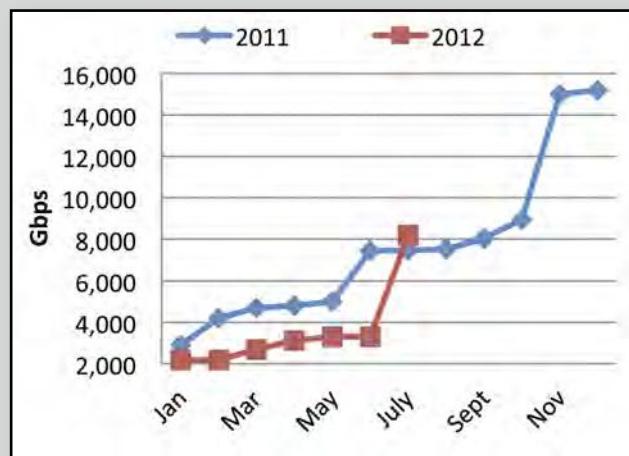
FO Cable Announcements 2011



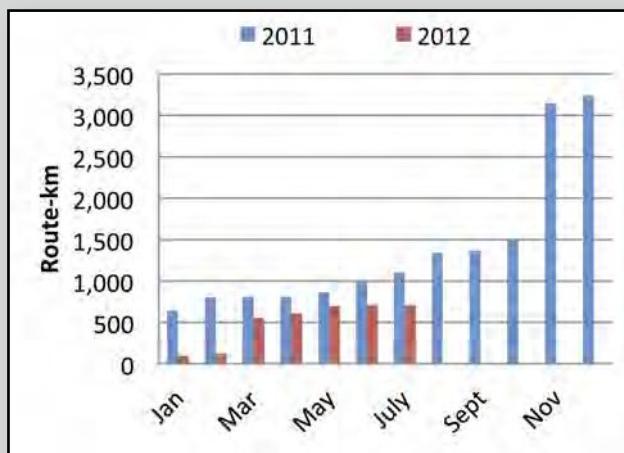
Submarine FO Cables Entering Service 2011 in route-km



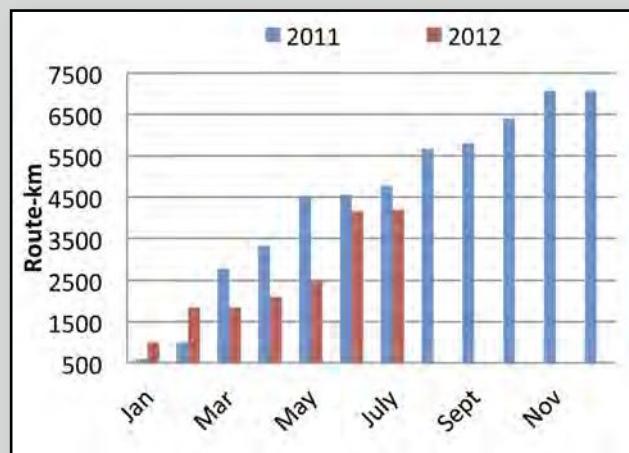
Upgrades of Existing Cable Systems in Gbps



Submarine Power Cable Awards 2011 in route-km



Submarine Power Cable Announcements 2011 in route-km



FLASHBACK

A look back at the pioneering days of the ocean and offshore industries



Industry briefs torn from the Ocean News Archives

Comex has introduced the latest of their innovative submersibles, the Remora 2000, combining the functions and instrumentation of an oceanographic subsea vessel with the built-in amenities and eye-catching design of a recreational submarine.

March/April 1995

Tennessee Tech University's Tech Torpedo II won the top prize of \$5,000 at the 3rd Annual International Human Powered Submarine Races.

August 1993

July Answer:
TLP Riser Inspection Vehicle
By Tecnomare SpA
1992

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www.deepsea.com

Can you name the product, the company, or the year?

Many companies have contributed to the evolution of the industry. Some continue to forge the path of new technology, others have faded into the annals of history. But all have played a role in setting the milestones that have led to today's achievements.

Print Readers, send your answers by emailing us at ocean-news@tscpublishing.com or fax us at 772-221-7715.

Digital readers, click on the Ocean News Interactive logo here.



The first respondent to answer all 3 questions correctly will receive an ONT Press Photographer T-Shirt.

Answers will be featured in the September Flashback.



Birns Snooperette-UV™ and Aquila-UV™ helmet lights provide new depths of inspection capability



BIRNS, Inc., an ISO 9001:2008 certified industry leader in the design and manufacture of unique lines of high-performance lights, connectors, penetrators, and custom cable assemblies for some of the planet's most demanding environments, has just launched a new line of Ultra Violet (UV) lighting systems for the commercial diving and ROV market. The all-new BIRNS Snooperette-UV™ and the BIRNS Aquila-UV™ bring incredibly versatile new options to a wide range of Magnetic Particle Inspection (MPI) and Non-Destructive Testing (NDT) projects.

BIRNS has been delivering innovations that have

helped shape the technology of the subsea and commercial diving markets since 1954, including the revolutionary BlackBIRN™, the world's first self-contained underwater MPI system that allows a single diver to detect oil leaks and cracks or weld defects in underwater steel structures, and the BlackBIRN II™ for ROV use. With the new BIRNS UV helmet lights, divers can have both hands free while using a powerful UV light to help identify metal fissures and weak areas at depth.

Whether used in ship inspection or for myriad military and offshore oil and gas applications, the new low-voltage BIRNS UV lights have brilliant LED illumination in conjunction with UV lamps, so they operate safely both in and out of the water. Plus, they are ballast-free systems, with instant on/off capabilities, so they're extremely easy and convenient to use. Rated to 3,400m, the BIRNS Snooperette-UV is highly versatile, compact ($\varnothing 76\text{mm}$), and perfect for divers, cameras, and ROVs. The BIRNS Aquila-UV is rated to 200m and features a $\varnothing 60\text{mm}$ (2.4in.) housing with wire-free construction, which combines advanced design characteristics with a streamlined 97mm (3.8in.) profile that makes it simple to relamp in just 30 seconds.

For more information, visit www.birns.com.

New commercial subsea fiber optic connector

SEA CON®'s new commercial subsea fiber optic connector is based on our standard rubber molded connector series and provides a cost-effective solution for single-channel fiber optic requirements in subsea environments. Cable assemblies (single-mode or multi-mode) are terminated at each end with a Cable Connector Plug (CCP), and the Bulkhead Connector Receptacle (BCR) has pigtailed terminated with standard ST connectors.

This connector has a mated pressure rating of 1,000psi (700m) with an insertion loss of 0.5dB typical (1.0dB max) and a mate/de-mate cycle of >20. Easy to

connect, plug, and lock, this new connector is suitable for many harsh environments.

For more information, visit www.seaconworldwide.com.



Schilling UHD ROVs upgrade to Surveyor HD cameras



Bowtech Products Ltd (Bowtech), a market leading manufacturer and supplier of cameras, LED lighting, emergency relocation strobes, connectors, fiber optic multiplexers, and slip rings for use in underwater or hazardous area applications to any ocean depth, has announced that it has in partnership with N-Seatec Subsea Systems B.V. (N-Seatec), its agent in Benelux, won a supply contract with Allseas.

This contract with Allseas involves the supply of Surveyor High Definition (HD) cameras, replacing the existing HD cameras on all their Schilling UHD ROVs. Bowtech and N-Seatec secured the contract, despite tough and aggressive competition. They also won the supply of the associated connectors and various interconnection cables.

Allseas is planning to upgrade all 30 cameras on its existing ROV fleet and has already ordered the first four cameras after testing them on the Schilling UHD ROV at the beginning of 2012.

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

New downhole pigtails on Amphenol KTK connectors eliminate need to wire and solder



Amphenol Industrial, a global leader in interconnect systems, has enhanced its KTK connectors with downhole microD pigtails. These new pigtails, manufactured according to customer specification and direction, eliminate the costly and tedious task of wiring and soldering Amphenol's KTKs to microDs, saving both time and money.

Featuring a bi-directional psi of 20,000, Amphenol's KTK high-pressure downhole connectors for oil and gas downhole tools offer a high-pressure and high-temperature sealed connection standard in the downhole industry.

The enhanced connectors are ideal for the roughest applications that require low maintenance, extreme accuracy, and dependability while remaining flexible and limiting the risks associated with in-hole loss. Fully compatible with Kintec and GE Tensor layouts, Amphenol's well-constructed KTK connectors are ideal for use in MWD (measurement while drilling) systems, LWD (logging while drilling) tools, and downhole batteries.

Because cable assemblies provide service companies crucial information, including the type and severity of downhole vibration, drillstring rotational speed, and smoothness, down-hole temperature, and drill bit torque; durable and consistent connectors that can withstand unforgiving conditions are essential in oil and gas drilling.

Amphenol's KTK downhole connector product line uses machined glass-filled epoxy, a strong thermoset plastic that retains its mechanical properties in extremely high temperatures. The KTK downhole connectors are available in a medium temperature version that withstands temperatures to 170°C and a high temperature version that withstands up to 200°C.

To further extend the component's life and prolong mating cycles, the connectors are designed with gold contacts, a Viton O-ring and solder pot connections.

For more information, visit www.amphenol-industrial.com.

VCT Harbor Scan AUV now available

Vehicle Control Technologies (VCT) is pleased to announce that VCT's HarborScan UUV (Unmanned Underwater Vehicle), equipped with L-3 Klein's UUV 3500 side scan sonar, is now available to the AUV/UUV commercial and military markets. HarborScan has completed extensive acceptance testing with the National Oceanic and Atmospheric Administration (NOAA) and is now considered fully operational.

Coupling ease of use with L-3 Klein's photo-quality side scan sonar imaging, HarborScan is ready to complete disaster response, coastal surveys, environmental assessments, harbor security, mine-like object/IED identification, search and salvage, and hull scanning missions.

HarborScan is a two-man, portable 7.5in. diameter AUV, 98in. in length with a maximum operating depth of 300m. Navigation sensors include GPS, DVL, and INS.

Like all VCT vehicles, HarborScan is controlled by an engineered autopilot designed for stability and angular rate steadiness across the vehicle's entire operational envelope. It also features roll control that improves side scan sonar performance.

HarborScan's open-architecture software provides user-configurable xml-based fault monitoring; detailed, accessible data logging; an easy-to-use software update process; and mission command transmission via acoustic communications and Iridium. The propulsion and control module is field replaceable in about 30minutes.

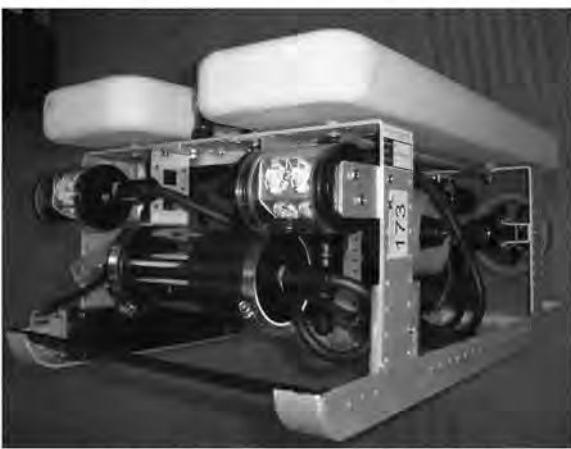
VCT has industry-leading expertise in design, modeling, and simulation of vehicle maneuvering and dynamics as well as hardware and autopilot software for UUVs and towed and tethered vehicles. VCT's product line includes reconfigurable vehicles that can be equipped as either a tow body or a UUV, so customers don't have to invest in two systems to get the benefits of both. With rapid turnaround of vehicle geometry updates and modifications, VCT is responsive to feature and customization requests.

For more information, visit www.L3Klein.com.



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Active repeater for T24 wireless telemetry system extends range and coverage

LCM Systems is pleased to announce the launch of the latest addition to the T24 wireless telemetry system for multiple data acquisition in real time. The T24-AR is a wireless active repeater designed to increase the range and overall coverage of the system, the major benefit being its ability to enable T24 modules to transmit around obstructions.

The T24 itself is a versatile set of products, based around proprietary acquisition devices that can be mixed and matched to provide high-quality remote readings for critical applications. The acquisition modules can provide data to multiple output devices, and the new T24-AR can effectively double the radio range as the messages are repeated once. Without the use of the repeater, the T24 has a range of up to 200m (650ft) and, although the use of multiple repeaters will not increase the range beyond 400m (1300ft), the area of coverage can be extended by combining multiple acquisition modules in strategic positions. The T24-AR acts as a trans-

parent link between these modules and the base station or handheld display.

A number of acquisition modules are available. For strain gauges, there is a five-wire measurement device – the T24-SA – while the T24-VA voltage acquisition accepts 0 to 10V, and the T24-IA accepts 0 to 20mA, suitable for a wide range of sensors with a 4 to 20mA output. This means that a wide range of sensors can be wirelessly monitored, including load cells, inclinometers, accelerometers, displacement LVDT, pressure, temperature, humidity, pH, and shock.

The Repeater is powered either by alkaline D cells or an external power supply and is rated to IP65 and NEMA4 protected. As with all modules in the T24 system, the T24-AR is easy to configure via a PC and the user-friendly Windows package T24 toolkit software.

For more information, visit www.lcmsystems.com.

EdgeTech introduces portable acoustic command system

EdgeTech, a leader in underwater technology, has designed a new portable



acoustic deck box. The Portable Acoustic Command System (PACS) is a highly versatile deck unit that can be used to obtain status information, enable, disable, range-to, and release EdgeTech's low frequency (LF) or medium frequency (MF) acoustic releases and transponders. Capable of working with all EdgeTech, ORE Offshore, and EG&G acoustic releases, PACS provides an easy-to-use interface and the flexibility to work with acoustic frequencies from 9kHz to 25kHz, depending on the subsea acoustic release equipment operated by the customer. The splash proof unit operates on internal lithium ion rechargeable batteries and is back-lit, enabling successful operations in all types of conditions.

For more information, visit www.edgetech.com.

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International:

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Ocean News & Technology

2012 EDITORIAL CALENDAR

January/February 2012

Editorial: Inspection & Light Work Class ROVs, Oceanography & Meteorology
Distribution: NACE • Oceanology International
Deadline: January 15th

Product Focus: Diving Equipment & Buoyancy Materials

March

Editorial: Defense & Naval Systems, Maritime Security, Decommissioning, Plug & Abandonment
Distribution: Decommissioning & Abandonment Summit
Deadline: February 15th
Product Focus: Navigation, Mapping & Signal Processing; Diver Detection Systems

April

Editorial: Offshore Technology
Distribution: Global Marine Renewable Energy • OTC
Deadline: March 15th
Product Focus: Connectors, Cables & Umbilicals

May

Editorial: AUVs & Gliders, UW Imaging & Processing, Aquaculture & Marine Resources
Distribution: UDT Europe • Anti-Submarine Warfare
Deadline: April 15
Product Focus: Cameras, Lights & Imaging Sonars

June

Editorial: Workclass ROVs, Wave & Tidal, Ocean Observing Systems
Distribution: EnergyOcean Int'l
Deadline: May 15th
Product Focus: Subsea Tools & Manipulators

July

Editorial: Offshore Mooring, Subsea Fiber Optic Networks, Company Showcase
Distribution: Offshore Northern Seas • AUVEI
Deadline: June 15th
Product Focus: Tracking & Positioning Systems, Seismic Monitoring

August

Editorial: Ocean Mapping & Survey, Subsea Telecom, Deepwater Pipeline Repair & Maintenance
Distribution: TBA
Deadline: July 15th
Product Focus: Multibeam & Side Scan Sonars

September

Editorial: Coastal Engineering, Environmental Assessment & Monitoring, Offshore Wind
Distribution: MTS Dynamic Positioning • Oceans 2012 MTS/IEEE Hampton Roads
• Ocean Innovation • AWEA/Offshore Windpower
• AWEA/Offshore Windpower
Deadline: August 15th
Product Focus: Buoys & Monitoring Instrumentation

October

Editorial: Offshore Communication, Offshore IRM, OTEC
Distribution: Offshore Communications • Subsea Survey IRM • Clean Gulf
• North Sea Decommissioning
Deadline: September 15th
Product Focus: Acoustic Modems, Releases & Transponders, Marine Communications

November

Editorial: Offshore Vessels, Marine Construction
Distribution: International Workboat
Deadline: October 15th
Product Focus: Workboats, Diving Systems

December

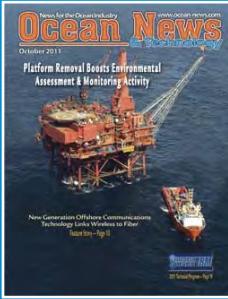
Editorial: Year in Review, Marine Salvage Operations, Commercial Diving
Distribution: Underwater Intervention
Deadline: November 15th
Product Focus: Handling Equipment, Winches & Control Systems, Battery Technology

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Product News

Trelleborg Offshore develops unique range of cost effective IALA navigation aids

Trelleborg Offshore, a leading global manufacturer of polymer and syntactic foam-based solutions for the offshore industry, has developed a complete range of IALA (International Association of Lighthouse Authorities) compliant navigation buoys and lights. A unique alternative to traditional buoys, these new solutions offer the specifier significant total life cost-savings as well as improved reliability.

The comprehensive range, which includes, lateral marks, cardinal marks, special marks, safe water, and isolated danger marks, has been specifically developed by Trelleborg to provide a credible alternative to high maintenance steel hulled and rotationally molded buoys.

Ashley Tasker, vice president of marine at Trelleborg, comments, "Our new and comprehensive range of navigation buoys is constructed with an elastomer hull and an aluminum superstructure to provide a low-maintenance, UV-stable solution which is lighter than steel, but which still offers excellent stability and all round impact damage resistance. The range is also fully IALA compliant and will cover the IALA Navigation Mark Scope."

"Using traditional hulls such as steel and the new plastic, rotationally molded buoys, has plenty of disadvantages, with problems such as maintenance and UV damage common place. We've developed a new solution that combines

the best of both worlds to create a unique and reliable alternative for both ports and harbors and the offshore Marine industry."

Utilizing Trelleborg's proven buoyancy technology, the range features a superstructure of marine-grade aluminum and provides low maintenance over steel and improved impact resistance and UV stability over rotationally molded alternatives. It also features a single float section and can be repainted over time.

The buoy diameters can range between 1.25m to 3m (49.21in. to 118.1in.) and are available in a selection of configurations and colors as well as a choice of power and mooring options.

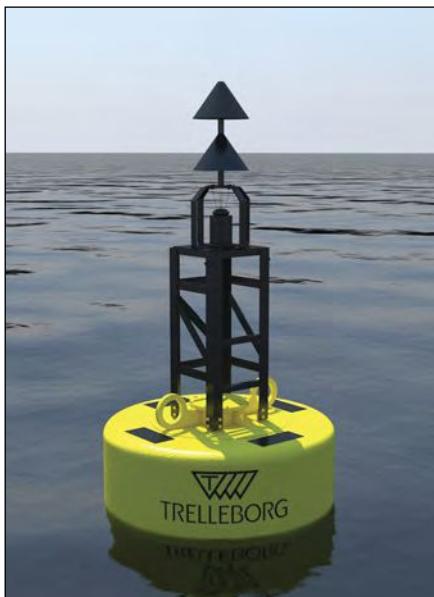
For more information, visit www.trelleborg.com/en/offshore/.

Liquid Robotics, BioSonics team with Cornell researcher to develop revolutionary instrument platform

Visitors to the American Fisheries Society (AFS) annual meeting in Minneapolis-St. Paul, Minnesota this summer will have the first opportunity to view the Wave Glider® DTX-SUB, a device that may represent the future of scientific fisheries data collection. The Wave Glider DT-X SUB is a hybrid machine combining a Liquid Robotics Inc. (LRI) Wave Glider, a wave-propelled autonomous marine robot with a BioSonics DTX scientific echosounder housed in a purpose-built, missile-shaped tow vehicle. This state-of-the-art instrument will be unveiled and on display at the AFS Meeting Trade Show, 19-22 August in BioSonics' booth #69.

The Wave Glider is a new class of persistent ocean vehicle able to harvest the energy in ocean waves to provide essentially limitless propulsion. The vehicle converts ocean wave energy into forward thrust, independent of wave direction, and maintains an average speed of about 1.0. to 1.5kts. The submerged "glider" is tethered to a surface float equipped with solar panels and batteries that power onboard communications, computing, and sensors payloads. The Wave Glider has been designed to withstand large open-ocean waves and strong winds with its low-profile surface float, high-strength tether, and robust submerged glider.

For more information, visit www.liquidr.com.





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- Marine Renewable Energy
- Marine Vehicle Autonomy
- Coastal and Marine Spatial Planning
- Sea Level Rise and Coastal Inundation

Important Dates:

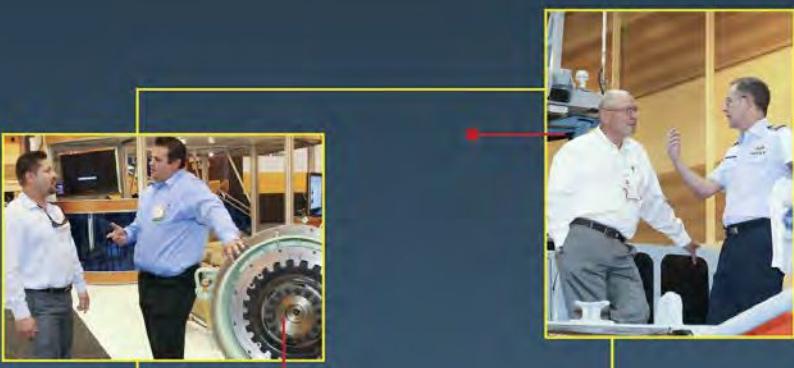
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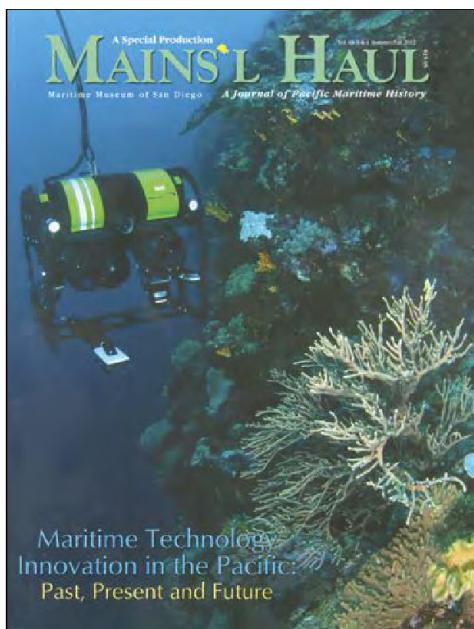
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Media Reviews

Maritime Technology Innovation in the Pacific: Past, Present and Future



In a special production of the Maritime Museum of San Diego's Mains' L Haul Journal of Maritime History (Vol. 48: 3 & 4 Summer/Fall 2012), this issue focuses on "maritime technology clusters" along the West Coast of the U.S. and Hawaii. The issue is a collaboration of the Maritime Alliance and the Maritime Museum of San Diego.

The issue features articles on the history and technology developments in California, Oregon, and Hawaii, with great black and white photos of an earlier era. Articles include the history of the 109-year-old Scripps Institution of Oceanography, Oregon State University, the University of Hawaii, and the Navy bases and labs at Point Loma.

The issue features coverage on the undersea vehicles such as Trieste, USS Dolphin (AGSS-555), Moray, Deep Jeep, NEMO, Deep View, the CURV vehicles, plus ship technology such the FLIP and technology developments such as the Aloha Cabled Observatory (ACO).

Michael B. Jones, president of The Maritime Alliance, writes the concluding remarks. As a non-profit, The Maritime Alliance is the recognized cluster organizer for the San Diego maritime technology community. With over 150 maritime companies and organizations, San Diego is arguably the largest concentrated technology cluster in the U.S.

Copies of this collectable issue can be ordered from the Maritime Museum of San Diego for \$15.95 plus shipping at www.sdmaritime.org or call (619) 234 9153 for more information.

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People & Company News

The board of directors of Murphy Oil Corp. appointed **Steve Cossé** as president and chief executive officer. **David Wood**, the company's current president, chief executive officer, and member of the board of directors, will retire after a 17-year career with the company and resign from his director position. Murphy's board also named **Roger Jenkins**, the company's executive vice president of exploration and production, to the newly-created position of chief operating officer.

Devin International, a subsidiary of Greene's Energy Group, named **Harold Touchet** as operations manager, said Joe Miller, vice president and general manager. Based in Lafayette, Louisiana, Touchet's responsibilities will include the supervision of facility managers, procurement, and profit and loss activities; the oversight of quality management and process improvement activities; and identifying new products for the Devin product line.

Furmanite Corp. promoted three executives to senior leadership roles as part of



Touchet

the company's new, globally unified structure. **Clint Jordan**, **Jay Goodyear**, and **Chad Murray** were named executive vice presidents, each with responsibility to lead one of the three key dimensions of the new worldwide organization. Jordan will lead the geographical dimension of growth through Furmanite's global network of service delivery centers. Goodyear will lead the project execution and manufacturing dimension of growth through a global network of all operations functions and resources. Murray will lead the services dimension of growth through a number of service line teams who will link the company's total global expertise and technology in each service offered by Furmanite. All three executives will be based in the company's Houston headquarters.

Subsea 7 has appointed **Ricardo Rosa** as CFO. He was previously executive vice president and CFO of Transocean. He is a member of the Institute of Chartered Accountants in England and Wales, and has a M.A. from Oxford University. Rosa has dual British and Brazilian citizenship and will be based in London. Rosa succeeds Simon Crowe, who has decided to leave the company to pursue other interests.

Greg Rivalan joined Teledyne RDI as a Field Service Engineer in 2005. Before joining the company, Greg obtained a Master of Science in Signal Processing and Telecommunication while living in France, followed by a Master of Science in Ocean Engineering from Florida Atlantic University. Since 2007, Greg has served as TRDI's Technical Services Supervisor, and supported our Marine Measurements team. Most recently, Greg has been promoted to the position of Application Engineer for our Navigation Product Line where he will put his vast experience to work providing pre-sales application and product integration support to our Navigation customers.

Matt Burdyny joined Teledyne RDI as a field service engineer in 2008, where he put his experience in sensor integration and his Bachelor of Mechanical Engineering degree from the University of Victoria to work supporting our customers with after-sales service and support. Matt has recently been promoted



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from our Field Service team to our Marine Measurements team, where he now serves as an application engineer for our ocean based ADCP applications. Matt will be providing pre-sales technical and logistical support for our customers with unique applications as they work together to stretch the boundaries of how and where ADCPs can be used.

Wave energy developer Aquamarine Power has named **Paul Capell** as its new chairman. He replaces Mervyn Jones who has served as the company's chairman since 2007. An experienced CEO and chairman, Capell has worked extensively in the renewable energy, water, oil and gas sectors and has a 30 year track record in starting, acquiring, building and exiting successful international businesses in the UK and overseas. He will chair Aquamarine Power's Board of Directors which includes representatives from the company's leading shareholders SSE, ABB and Scottish Enterprise.



Burdyny

Calendar

August 28-31, 2012:
Offshore Northern Seas
Stavanger, Norway
www.ons.no

September 11-12, 2012:
MAST Europe
Sweden
www.mastconfex.com

October 8-10, 2012:
MTS Dynamic Positioning 2012
Houston, TX
www.mtsociety.org/conferences

October 9-11, 2012
AWEA/Offshore Windpower
Virginia Beach, VA
www.offshorewindexpo.org

October 14-19, 2012:
MTS/IEEE Oceans 2012
Virginia Beach, VA
www.oceans12mtsieehamptonroads.org

October 21-24, 2012:
Ocean Innovation 2012
Canada
www.oceaninnovation.ca

October 30-31, 2012:
Marine Renewable Energy Technical Conf.
Providence, RI
www.mrec.umassd.edu/event

November 5-8, 2012:
Subsea Survey IRM 2012
Galveston, TX
www.subseasurvey.com

November 6-8, 2012
Oilcomm
Houston, TX
www.oilcomm.com

November 13-15, 2012
Clean Gulf
New Orleans, LA
www.cleangulf.org

November 20-21, 2012
North Sea Decommissioning Conference
Aberdeen
www.decomworld.com

December 3-5, 2012
OTC Arctic Technology Conference
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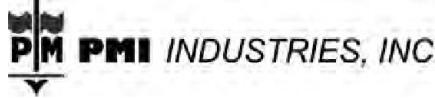
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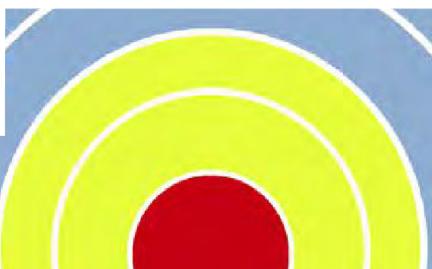
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E-mail: seabird@seabird.com
Website: http://www.seabird.com
Contact: Calvin Lwin, Applications Engineering

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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, tilt/acceleration, compass direction/magnetometer, light levels, acoustic receiving/transmitting. The loggers are used for various researches, including oceanography, fishing gear studies, equipment behavioral monitoring and fish tagging. Data is presented in the application software with a time-stamp for each measurement.

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E-mail: larry.bobbitt@oegoffshore.com
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Email: michael@m-re.com
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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.

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E-mail: info@blueview.com
Website: www.blueview.com
Contact: Beto Campos - Director, Global Com. Sales

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Website: www.imagenex.com
Contact: Steve Cumew

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E-mail: sales@soundmetrics.com
Website: www.soundmetrics.com
Contact: Jeanne Dorsey

Founded in 2002, Sound Metrics Corporation is one of the first manufacturers of high resolution imaging sonars. These units are used in virtually every marine industry by some of the most recognized companies around the world. In addition to being the technological leader in image quality, Sound Metrics has built a reputation for support and for innovative solutions around their customers' applications.

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E-mail: sales@cygnusinstruments.com
Website: www.cygnusinstruments.com
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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 deep-water units for ROVs. Manufacturing to ISO 9002 standards. Approved by classification societies.

UNDERWATER VEHICLES

AUVs

EXOCETUS



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E-mail: sales@exocetus.com
Website: www.exocetus.com
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ROVs



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



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UNDERWATER VEHICLES

ROVs



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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.



SUBSEA TECHNOLOGIES
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Sub-Atlantic

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10642 West Little York, Suite 100
Houston, TX 77041-4014, USA
Tel: +1 713 329 8730, Fax: +1 713 329 8299
E-mail: sub-atlantic.sales@f-e-t.com
Website: www.f-e-t.com/Subsea

Forum Energy Technologies' sub-Atlantic brand manufactures world class ROVs ranging from portable units to light work class systems. Sub-Atlantic also supplies thrusters, hydraulic power units, valve packs, compensators and pan and tilt systems to other ROV manufacturers. Sub-Atlantic is part of the FET subsea group and has facilities in the US and UK and sales offices and agents around the world.



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E-mail: info@videoray.com
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Contact: Brian Luzzi

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UVVs



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Website: www.irobot.com
Contact: Friedrich Rochleder, Sales Account Manager

iRobot designs and builds robots that make a difference. iRobot's family of unmanned underwater vehicles (UVVs), including the iRobot 1KA Seaglider and iRobot 15A Ranger, perform a variety of missions for researchers, oceanographers and military planners including physical, chemical and biological oceanography, persistent surveillance, marine environmental monitoring and other missions.

UNDERWATER VIDEO EQUIPMENT



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Website: www.sharkmarine.com
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Since 1984 Shark Marine Technologies, has been manufacturing Remotely Operated Vehicles and accessories, Winches, Handling & Control Systems, Underwater Cameras and Diver Held Sonar Systems, for operations including surveying, oil and gas, security and defence, search and recovery and archaeological investigations. We also provide on-site operations and consultation, software development and custom manufacturing.



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Contact: Paul Phillips

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3 Which category best describes your business?

(Indicate the primary activity of your organization by placing a 1 next to the category. Place 2, 3 and 4 next to other markets served.)

- | | |
|---|---|
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| B. <input type="checkbox"/> U/W VEHICLES / COMPONENTS | P. <input type="checkbox"/> CONSULTING, DATA SERVICES |
| C. <input type="checkbox"/> NAVIGATION / POSITIONING | Q. <input type="checkbox"/> MARINE ELECTRICAL / ELECTRONICS |
| D. <input type="checkbox"/> RESEARCH & DEVELOPMENT | R. <input type="checkbox"/> COMPUTER SERVICES / SOFTWARE |
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| F. <input type="checkbox"/> OFFSHORE OIL & GAS | T. <input type="checkbox"/> SUBSEA IRM |
| G. <input type="checkbox"/> COMMUNICATIONS / UTILITIES | U. <input type="checkbox"/> OCEAN OBSERVING |
| H. <input type="checkbox"/> SCIENCE, ENVIRONMENTAL | V. <input type="checkbox"/> SHIPPING/ TRANSPORTATION |
| I. <input type="checkbox"/> EDUCATIONAL INSTITUTION / LIBRARY | W. <input type="checkbox"/> SUBMARINE TELECOM |
| J. <input type="checkbox"/> GOVERNMENT MILITARY | X. <input type="checkbox"/> EQUIPMENT RENTAL |
| K. <input type="checkbox"/> GOVERNMENT CIVILIAN | Y. <input type="checkbox"/> MANUFACTURERS' REPRESENTATIVE |
| L. <input type="checkbox"/> MARINE HARDWARE / DECK EQUIP. | Z. <input type="checkbox"/> OTHER (Please specify below) |
| M. <input type="checkbox"/> FISHING INDUSTRY, AQUACULTURE | <hr/> |
| N. <input type="checkbox"/> SURVEY, MAPPING, EXPLORATION | <hr/> |

4 Which category best describes your job function? (check only one)

- | | |
|--|--|
| 1. <input type="checkbox"/> OWNER / EXECUTIVE | 5. <input type="checkbox"/> BUYER |
| 2. <input type="checkbox"/> MANAGEMENT / PROFESSOR | 6. <input type="checkbox"/> SALES |
| 3. <input type="checkbox"/> ENGINEER / SCIENTIST | 7. <input type="checkbox"/> OTHER (Please specify below) |
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- accuracy: up to 0.04 degrees

LBL POSITIONING SYSTEMS

highly accurate, precise and stable performance

- multiple target tracking
- range: up to 8000 m
- accuracy: better than 0.01 m

UNDERWATER ACOUSTIC MODEMS

reliable data transmissions even in adverse conditions

- range: up to 8000 m
- depth: up to 6000 m
- data rate: up to 31.2 kbps
- bit error rate: better than 10^{-10}

NEW!

Sea-Bird

SBE 63 Optical Dissolved Oxygen Sensor



With flow plenum removed



*Integrated with
SBE 37 ODO
MicroCAT*



*With sensor
mount for
use with
SBE 16plus V2
SeaCAT CTD*



Sea-Bird Electronics, Inc.

13431 NE 20th Street, Bellevue, Washington 98005 USA
www.seabird.com

E-mail: seabird@seabird.com

Telephone: +1 425-643-9866

Fax: +1 425-643-9954