MARINE TECHNOLOGY REPORTER

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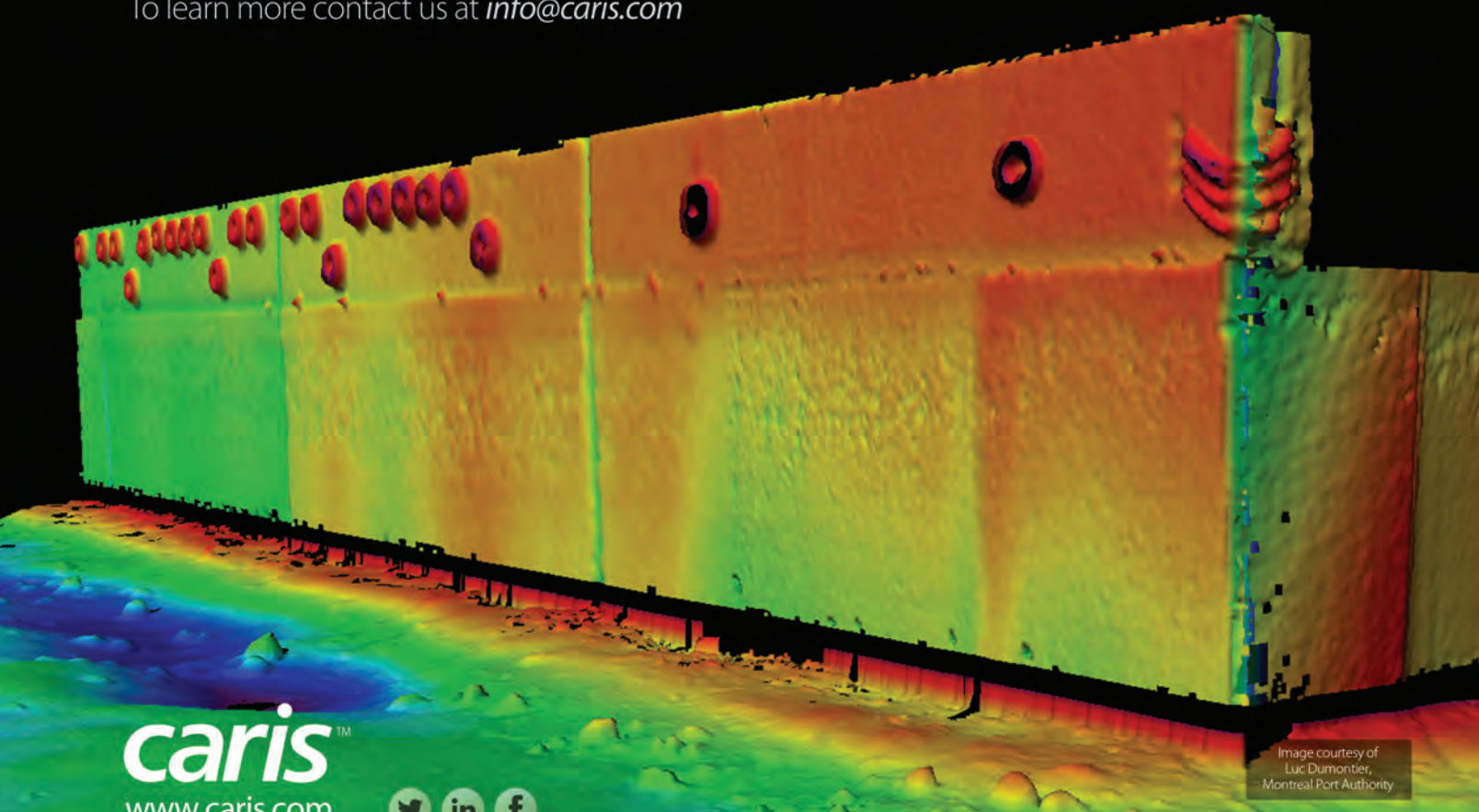

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By MacArtney

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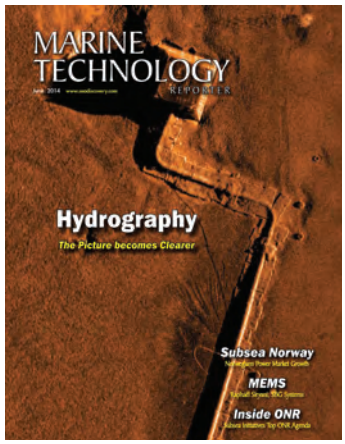

Image: Sonardyne

On the Cover

Sonardyne last month released some amazing imagery from its Solstice Side Scan Sonar mounted on a Bluefin Robotics Bluefin-12 AUV. Story starts on page 42.

MEMS

US Navy

Training & Education

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Credit: Skandi Singapore. Image courtesy of DOF Subsea

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Credit: FORCE

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Photo courtesy National Oceanography Center

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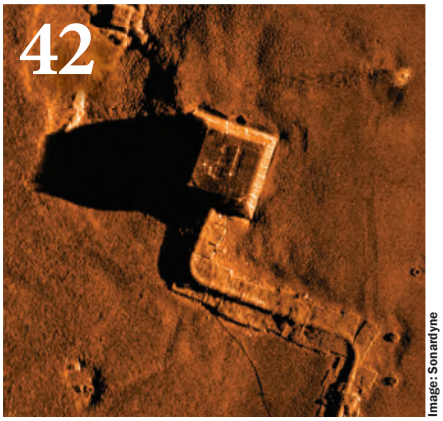

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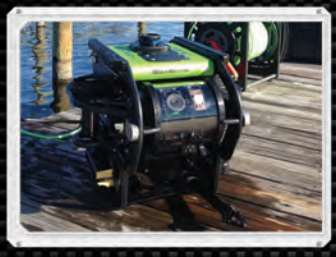

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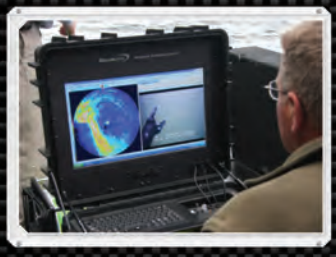

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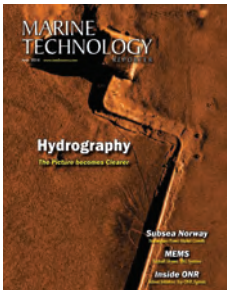

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NEW YORK
118 E. 25th St., New York, NY 10010
Tel: (212) 477-6700; Fax: (212) 254-6271

FLORIDA
215 NW 3rd St., Boynton Beach, FL 33435
Tel: (561) 732-4368; Fax: (561) 732-6984

PUBLISHER
John C. O'Malley
jomalley@marinelink.com

Associate Publisher & Editor
Gregory R. Trauthwein
trauthwein@marinelink.com

Web Editor
Eric Haun
haun@marinelink.com

Contributing Editors
Capt. Edward Lundquist, USN (Ret.)
Claudio Paschoa

Production Manager
Irina Tabakina
tabakina@marinelink.com

Production & Graphic Design
Nicole Ventimiglia
nicole@marinelink.com

Sales & Event Coordinator
Michelle Howard
mhoward@marinelink.com

Manager, Public Relations
Mark O'Malley
momalley@marinelink.com

Manager, Information Technology Services
Vladimir Bibik
bibik@marinelink.com

CIRCULATION
Kathleen Hickey
mtrcirc@marinelink.com

ADVERTISING
Vice President, Sales and Marketing
Rob Howard
howard@marinelink.com
Tel: (561) 732-4368 • Fax: (561) 732-6984

Advertising Sales Manager
Lucia M. Annunziata
annunziata@marinelink.com
Tel: (212) 477-6700 • Fax: (212) 254-6271

Mike Kozlowski
kozlowski@marinelink.com
Tel: (561) 733-2477 • Fax: (561) 732-9670

Japan
Katsuhiro Ishii • *amskatsu@ dream.com*
Tel: +81 3 5691 3335 • Fax: + 81 3 5691 3336

Gregory R. Trauthwein
Associate Publisher & Editor
Email: trauthwein@marinelink.com

Last month I dispatched **Eric Haun**, our web and MTR contributing editor, to the scenic west coast of Norway for a "Subsea Norway" tour, a week filled with visits to some of the largest and most powerful subsea companies on the planet (read Statoil, DNV GL, FMC, etc.) as well as a large number of small and innovative organizations, the type of organizations that make up the backbone of the subsea market. Traditionally I would never miss an opportunity to travel to and through Norway, as it is one of my favorite countries in the world, professionally and personally. But a hectic travel schedule and the need to see the country and its subsea industry players with a fresh perspective fell in Eric's favor. Starting in this edition and continuing through September, Haun delivers insightful overviews on the subsea trends in and around Norway, including a special "Subsea Norway" feature focus in the coming **MTR100** edition scheduled for publication in the July/August edition.

Speaking of the MTR100, our editorial team has been busy for months collecting and collating applications for this, our Ninth Annual MTR100. As many of you know, the MTR100 has evolved and taken on a life of its own, a showcase for 100 innovative companies and organizations in this space. While the deadline is drawing closer, I encourage you to visit our newly designed website at **www.MarineTechnologyNews.com** and register your company for consideration for inclusion in the 2014 MTR100. While I cannot guarantee that your efforts will be rewarded with publication in the July/August edition, I can guarantee that if you don't apply, you will not be considered, as "applying" is requirement number one. Take a few moments to fill out the information at **http://mtr100.seadiscovery.com/**, or simply email to me your details at trauthwein@marinelink.com and we will ensure that your details are entered into the system.

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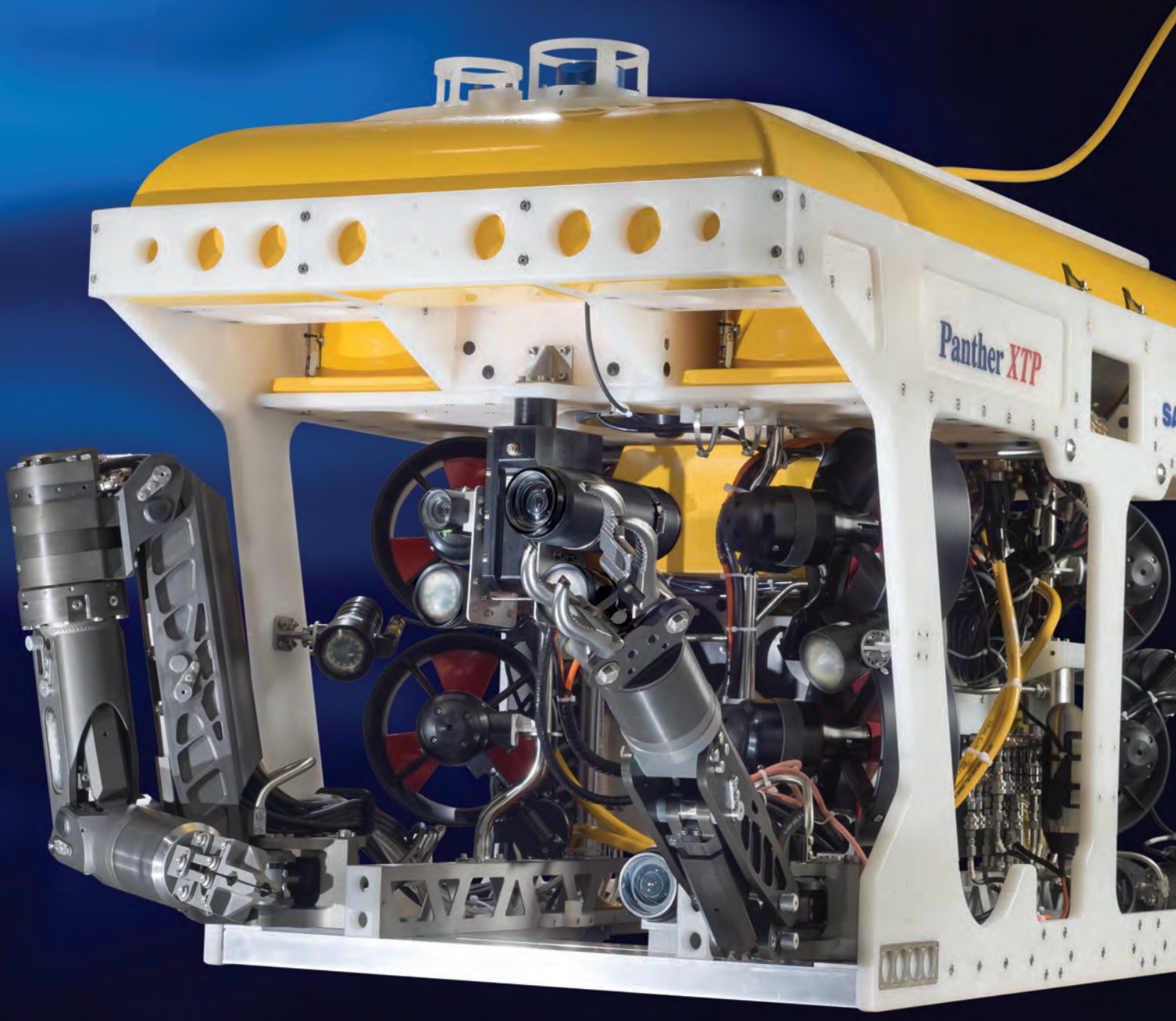

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Image courtesy of DOF Subsea

Several Contracts for *DOF Subsea*

DOF Subsea has been awarded several contracts totaling approximately $79.8m, including orders for work in Asia Pacific, North Sea and North America.

By Eric Haun

"In the Atlantic region we have achieved repeat business with important clients and have established new client relationships," said DOF Subsea CEO, Mons S. Aase. Maersk Oil UK contracted DOF Subsea to perform removal and replacement with related survey work for the Dumbarton Drill Cluster Center (DCC) flexible production riser at the Global Producer 3 FPSO located in the U.K. sector North Sea. The work secures utilization for chartered-in vessel Normand Reach. Additionally, Statoil awarded DOF subsea a call-off under an existing survey frame agreement for MBE and AUV survey services in the North Sea. Teekay awarded DOF Subsea a contract for turret mooring and riser installation on the Gina Krogh FSO in. Onshore engineering will commence in the second half of 2014, with offshore marine operations likely to be executed in May-June 2016 using two construction/anchor handler vessels. DOF Subsea's Asia Pacific contracts include IMR services and subsea installation work, commissioning the vessels Skandi Singapore, Skandi Hercules and Skandi Hawk.

As for the North America region, DOF Subsea said it has completed a long-term pipeline survey project support with the Skandi Inspector, and the vessel will now mobilize for another client for a 30-day commitment prior transiting to Canada for an approximate 80 days commitment. Aase said he sees growing potential for DOF Subsea in the North America, particularly in the U.S. market.

In addition to the use of DOF Subsea vessels, the contracts will give work to the company's onshore engineering and project management.

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Subsea: *Standardization is the New Innovation*

By Eric Haun

As one of the world's most technologically innovative industries, the highly specialized subsea sector is not typically known for standardized operations. But that is changing.

Companies like Statoil, the world's second largest subsea operator, have traditionally achieved success by pushing the boundaries to what is possible under water, frequently going "longer, deeper and colder."

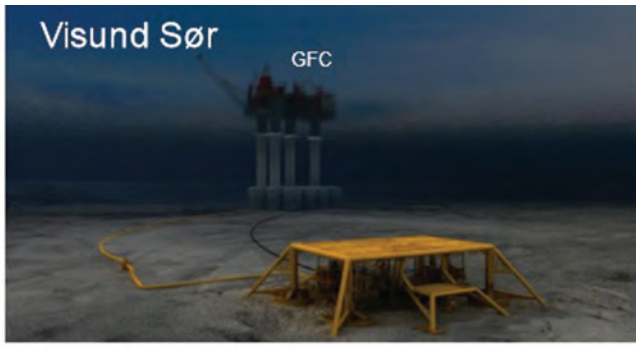
But as the complexity of global subsea projects grows, so too does the bill for contractors, suppliers, operators, engineers, researchers and just about everyone involved in subsea projects. Many believe that this doesn't have to be the case. According to some of the leading companies in Norway's vibrant subsea cluster, including Statoil, standardization is an effective way to generate cost savings in even the most complex projects.

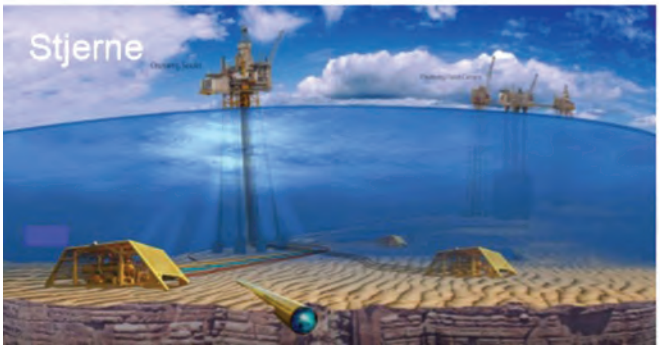
Standardization does not necessarily mean innovation is stifled. Rather, instead of spending costly engineering hours working toward the next grand, over-over-the-top subsea solution, industry leaders are striving for smart, simple answers to some of the sector's largest challenges. This means innovation comes in the form of quick and effective, yet less costly, solutions that do not sacrifice quality.

Statoil's Fast Track work process, for example, adds "simple, standard and cheaper" to "longer, deeper and colder," said Torger Rød, Statoil's SVP for Subsea, Pipelines and Cessation. The program essentially fuses tailored innovations with standardized solutions to develop and begin subsea production within a 30-month timeframe.

Under this accelerated method, product specifications are simplified, existing designs are reused when possible and concepts are chosen from a preexisting catalog, eliminating the concept selection phase, Rød explained. With Fast Track, the company reports a 40% shorter execution time, a low breakeven level of $40/boe and average IRR (nom) greater than 25%.

Statoil currently has six Fast Track projects in operation off Norway, with six more on the way.





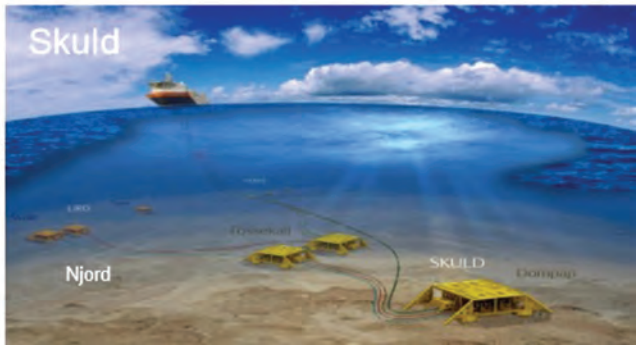


Image courtesy of Statoil

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Subsea Risk Management *in Real Time*

By Eric Haun

A newly established research center on Norway's west coast hopes to improve subsea operation and maintenance by bringing risk management into real time. Integrated Well and Subsea Instrumentation (IWSI) is the latest development from independent technology research institute Christian Michelsen Research AS (CMR), which aims to establish an arena for subsea and well instrumentation research and development to find real time risk management solutions for reduced cost and improved safety – on the Norwegian continental shelf and internationally.

Working in collaboration with the University of Bergen, University of Stavanger, Bergen University College, IRIS and SINTEF, CMR is leading a group of 25-40 masters and 11-15 doctoral students to engineer solutions for improved sensor data and validity analysis and integration under water.

"The idea is to give decision makers the tools to make better decisions," said CMR's technology director, Sveinung Botnen. For this initiative, that means helping subsea workers better understand the situation as they are actually operating, whether it is for reservoirs, wells, processing or transport.

Botnen said CMR's vision is "to achieve safe subsea production at optimum regularity and cost through real time information based on asset management."

IWSI addresses both today's aging subsea systems as well as the next generation of subsea systems, especially as work processes will be challenged by more complex projects in harsher environments, Botnen added.

As improved sensors, tools and models are developed by the center, data relating to reservoir and production management, subsea control and safety systems, flow assurance management and integrity management will be used to provide real time performance and risk management, and then visualization and decision support, which Botnen believes offers many advantages. If workers can better gauge the conditions in which they operate, higher levels of efficiency and safety can be achieved.

The initiative is backed partly by the industry and partly by the Norwegian Research Council and has garnered support and partial funding from NCE Subsea, as well as letters on interest (LOI) from high-profile subsea players, including Petrobras, Statoil, OneSubsea and Aker Solutions.

CMR's approved budget for 2015-2023 is $33.6m.

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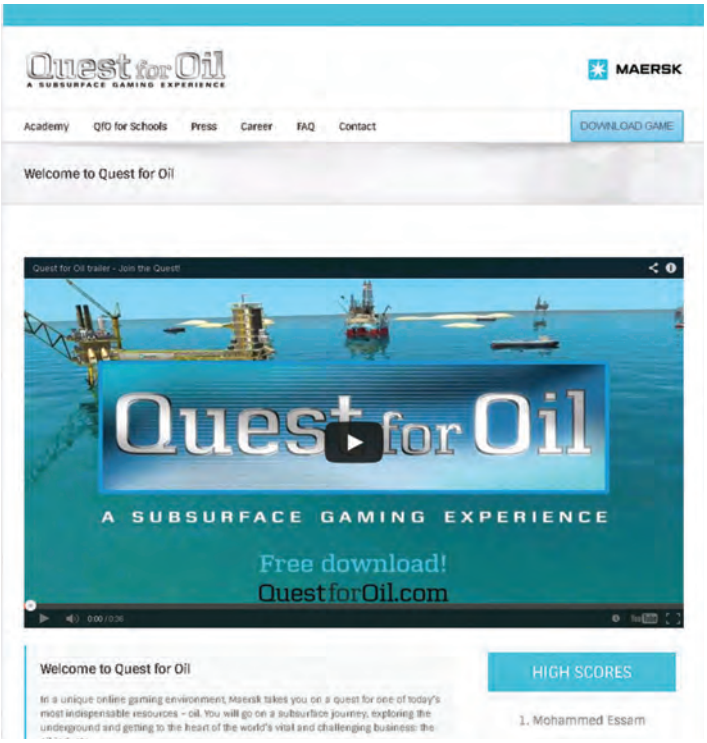


The Maersk Group launched a computer game and teaching materials, available for free, to help teach students about oil exploration and oil production for Danish secondary schools, technical colleges and higher preparatory examination courses. The oil exploration game, which provides an insight into the global oil industry and the various elements of oil exploration, drilling and production through the oil fields in the North Sea and Qatar, has already had more than 340,000 players via **www.QuestforOil.com**.

Quest for Oil combines knowledge of geography, physics and earth science, which has attracted the attention of teachers. The Maersk Group launched an educational package targeted at students and teachers in these particular subjects. Several Danish secondary schools have already signed up for the package.

"We have experienced great interest in the Quest for Oil game, and on the request of several high schools we are now launching an educational package. We are pleased that a significant number of students and teachers find oil exploration and oil production interesting, and the educational package will contribute to sharpening student's understanding in this field of education," said Birgitte Henrichsen, Head of Group Communication and Branding, the Maersk Group.

The educational package has been developed in close collaboration with teachers from secondary schools in Denmark, who have also participated in ongoing testing of the materials. These include, besides the game itself, a booklet, a teacher's guide as well as a student's guide and assignments. The package can be used in a 90-minute lesson or form part of a project day.

The materials can be downloaded via www.QuestforOil.com and used immediately. The app can be downloaded from the App Store in May 2014.

The Maersk Group has also experienced international interest in Quest for Oil. In summer 2014, an edition targeted at American high schools will be launched and further versioning of the educational package have already been planned.

The Quest for Oilsite was launched June 2013, and to date more than 340,000 unique users have visited the site, more than 182,000 game sessions have been initiated and each gamer spends about 31 minutes per game. The game was produced by FRND, Quartz+Co og Serious Games Interactive.

New Subsea Report

on Tech, Safety and Trends

DNV GL issued the report 'Subsea – Technology Developments, Incidents and Future Trends' on behalf of the Norwegian Petroleum Safety Authority. "The ongoing increase in technology enhancement and the number of worldwide subsea field developments will demand greater focus on a number of issues. The report aims to raise awareness and share knowledge within safety, industry cooperation, degradation mechanisms, failure modes, monitoring, integrity management and incident-related information," said Bjørn Søgård, DNV GL's segment director for subsea technology.

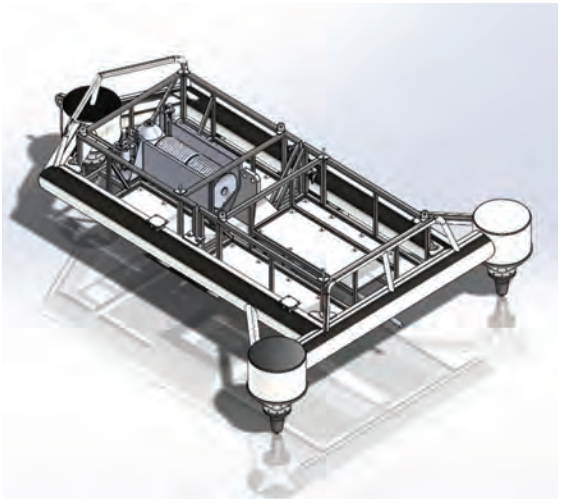
"Experience from both the North Sea and globally shows that the use of subsea facilities, like all other offshore oil and gas activities, may have the potential to cause major accidents. This, along with the great number of new entrants and the increasing complexity of subsea installation solutions on the Norwegian Continental Shelf, has prompted the Norwegian Petroleum Safety Authority to commission this study," said Trond Sundby, principal engineer at the Norwegian Petroleum Safety Authority.

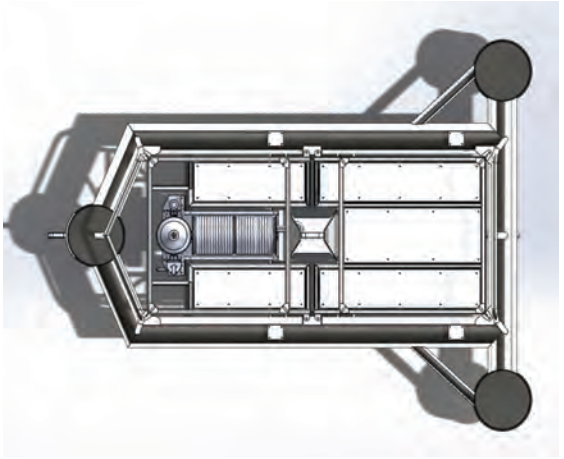
The number of installed subsea XTs is currently about 800 on the Norwegian Continental Shelf and approximately 5,000 globally. These numbers are forecasted to increase.

The report describes the current status of the industry and future trends. Mechanisms related to degradation and ageing and the effect these have on the robustness in operation are also described.

FORCE:

Tidal Project Begins Construction on Subsea Platform





Understanding the Bay of Fundy's powerful tides is getting easier thanks to a new advanced sensor platform being built for the Minas Passage. Simon Melrose, the platform project manager for the Fundy Ocean Research Center for Energy (FORCE), speaking at the Nova Scotia Energy Research and Development Forum, announced construction contracts for a new underwater platform designed to measure the tide in real time via cable connection – a breakthrough for Nova Scotia's tidal energy efforts.

"To harness the enormous power of the Bay of Fundy, we have to understand it," said Melrose. "That's why we're building an underwater platform that will give us a clearer, moment-by-moment picture of the tidal currents at the FORCE site."

"The platform builds on the successful deployment last year of the first subsea cable ever laid in the Minas Passage - a task that proved we can work in the world's most challenging tidal site," said Tony Wright, GM, FORCE.

The platform will be connected from sea to shore by a three km subsea data cable installed in 2013 and is expected to record vital information on the tides, current flow and water quality.

It is part of FORCE's Fundy Advanced Sensor Technology (FAST) program. The FAST program is designed to monitor and characterize the FORCE site with a recoverable platform that uses a variety of onboard sensing equipment.

Some of the Nova Scotia companies involved include:

- *Open Seas Instrumentation Inc., based in Musquodoboit Harbor, who are designing and building the platform,*
- *EMO Marine Technologies Ltd., based in Eastern Passage, who are designing and building the communication system that will bring the data ashore over the fiber optic data cable, and*
- *Mackenzie Atlantic Tool and Die Ltd., also based in Musquodoboit Harbor, who are building the specialized stainless steel housing for the equipment.*

www.fundyforce.ca
www.QuestforOil.com

AUVs are Central to Lisbon Security Program

Two Autonomous Underwater Vehicles (AUVs), specifically developed for the SUPPORT (Security UPgrade for PORTS) project, an integrated four-year research and development project, partially funded by the European Commission's FP7 Security Research Program, were demonstrated at the Port of Lisbon on May 22. Coordinated by BMT Group Ltd. (BMT), SUPPORT has been exploring the use of AUVs to help address the issue of underwater threats in ports, reaping from the expertise which was drawn from the recent SHOAL project. In partnership with Bristol Robotics Laboratory and SonarSim, BMT has designed a cost effective prototype which utilizes intelligent algorithms and behavior in order to leverage as much as possible from low-cost sensors.

"A common issue with security solutions and AUVs is the high cost of systems, therefore it was important for us to look at ways of designing a low cost solution which could help improve overall port security," said Luke Speller, Senior Research Scientist at BMT Group.

"A distinct differentiator is the AUV's ability to multitask. Not only will it be possible for the AUV to provide 24-hour surveillance and monitor port infrastructure for particular threats such as UIEDs (Underwater Improvised Explosion Devices), ports around the world could potentially use this intelligent machine to monitor pollution, conduct radiation testing or inspect the hull of a ship."

www.supportproject.info

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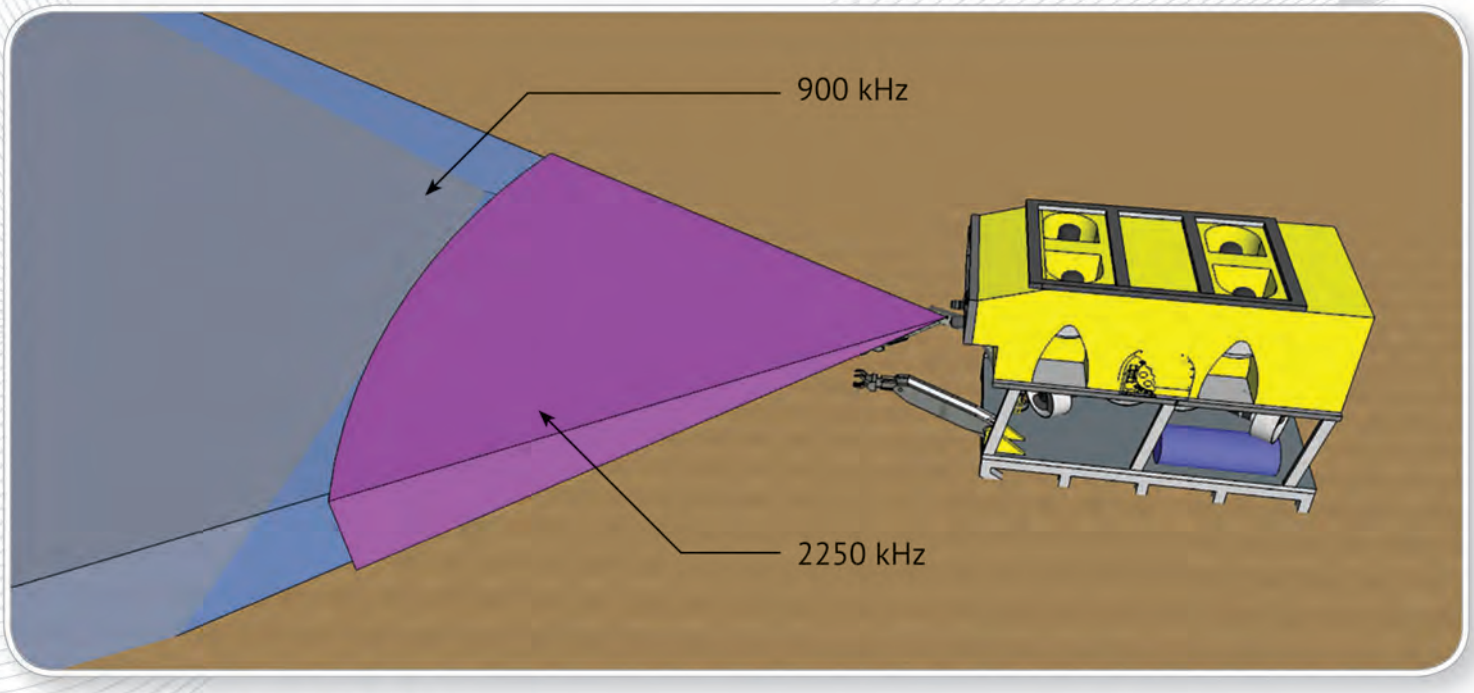

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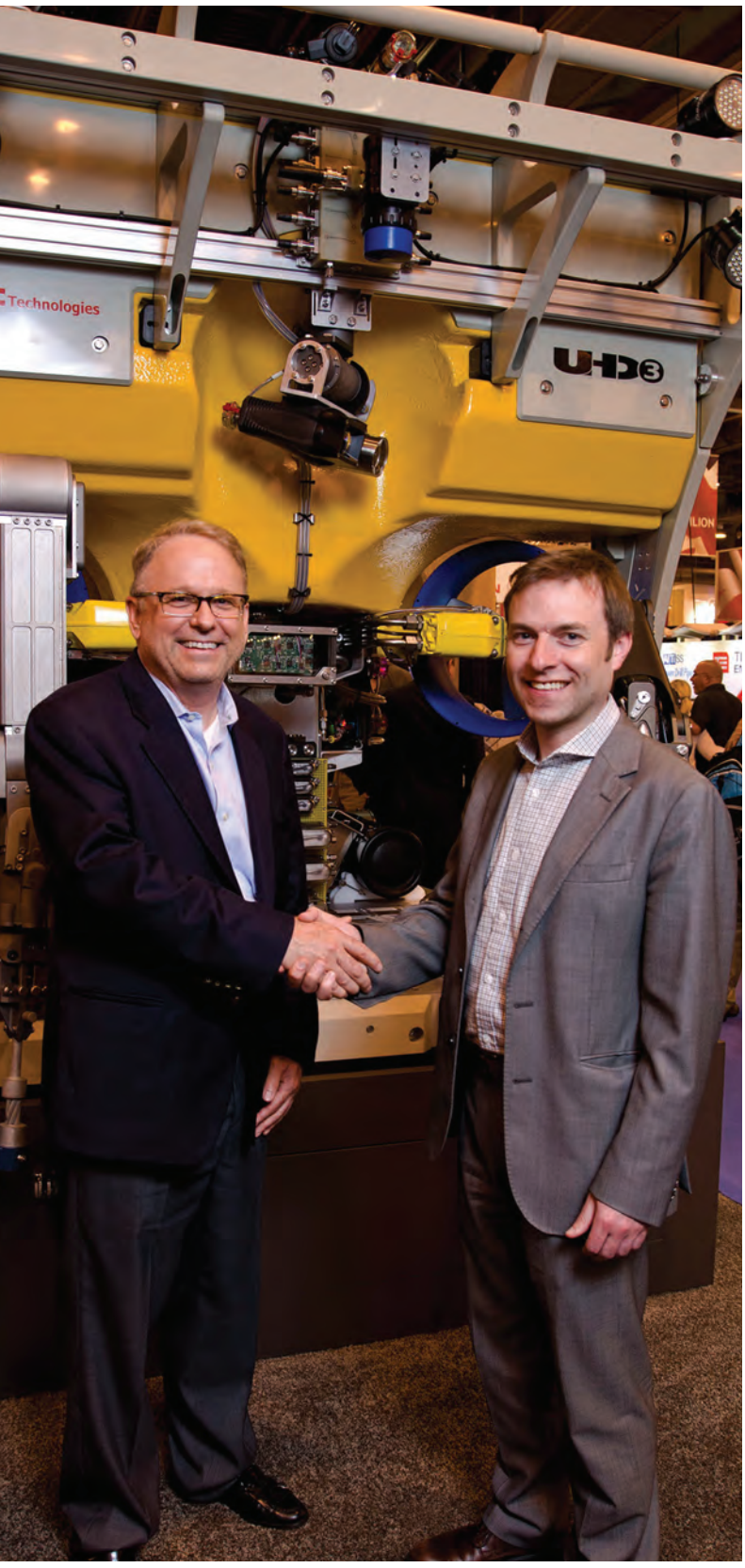

ROVOP *Expands ROV Fleet*

ROVOP is set to take delivery of five new remotely operated vehicles (ROVs), representing an investment of $28m. The ROVs include two UHD-IIIs, which are heavy-duty work-class vehicles, as well as three HD work-class systems. All ROVs are being supplied by FMC Technologies Schilling Robotics. Both of the UHD-III systems are to be deployed on the Ceona Amazon which is one of global oil and gas subsea construction specialist Ceona's newbuild multiple lay vessels. The ROVs will include Ennsub-designed ultra-deepwater launch and recovery systems (LARS) which will be fully integrated into the vessel and will enable operations in harsh environment conditions through the use of active heave compensation and heavy-weather deployment capabilities.

ROVOP's latest investment in its ROV fleet comes less than three months after the independent company, which is dedicated to providing ROV services and equipment to the subsea sector, took delivery of four new hydraulic work class systems.

Steven Gray, managing director at ROVOP, signed the contract with Tyler Schilling, president of FMC Schilling Robotics, at the Offshore Technology Conference (OTC) in Houston.

"Our investment in a further five ROVs allows us to meet strong demand from our customers," said Gray. "The market is recognizing that ROVOP's combination of the most advanced technology and our industry-leading personnel and customer service represents a genuine step change in what operators can

Tyler Schilling (left), president at FMC Technologies Schilling Robotics, and ROVOP managing director, Steven Gray, sign ROV contract at OTC.

MacArtney Upgrades MMT FOCUS-2 Systems

MacArtney performed an upgrade of two FOCUS-2 ROTV systems (left) belonging to Sweden's MMT. Both vehicles have been fitted with new equipment to carry out geophysical survey missions for clients within oil, gas and renewable energy industries. Complementing the side scan sonar and sub bottom profiler already onboard, the MMT FOCUS-2 systems have been fully equipped with a multi beam echo sounder, an inertial navigation system and a doppler velocity log.

expect from their ROV service. The capability, efficiency and reliability of our service are leading the ROV industry and we are delighted to be able to expand our fleet.

"The UHD-III is the most advanced and versatile 250-hp ROV on the market and through its highly-intelligent management system, it offers the best performance for the most difficult deepwater tasks including the highest thrust performance for ultra-heavy duty tasks. It also builds on the commitment that ROVOP and Ceona share to use technology, operated by the most experienced personnel, that offers a game changer for the subsea construction sector."

Among many of the other UHD-III features is that with its ISOL-8 auxiliary pump of 150-hp capacity for intervention applications, the vehicle delivers combined pressures and flows that cannot be achieved with conventional ROV systems. This enables ROV compliance with API Standard 53 which requires a secondary intervention method on blowout preventers to close rams in less than 45 seconds and, as such, offers considerable cost reduction for secondary BOP intervention. Delivery dates on the remaining four ROVs are all during 2014.

Study: *Rising Sea Level Puts 150 Million at Risk*

For 150 million people living in coastal areas around the world, rising sea level will become a genuine threat, according to a new study which found evidence the sea level has been rising over the past 200 years – and continues to rise.

Ocean warming and glaciers/ice sheets melting are the causes of the sea level rise, said Dr. Svetlana Jevrejeva from the U.K.'s National Oceanography Center (NOC), who coauthored the scientific research paper "Trends and acceleration in global and regional sea levels since 1807," which examines tide records from 1807 onward to determine global sea level changes.

"There is a huge inertia in the climate system, so even if we stop the warming of our planet now – if we stop emitting greenhouse gases into the atmosphere today – the global sea level will continue to rise for the next few hundred years," Dr. Jevrejeva said. "We are facing a colossal challenge – to deal with carbon emissions as soon as possible."

With about 150 million people living within one meter of high tide globally, sea level rise is one of the most damaging aspects of a warming climate. The vulnerability of extensively populated coastal areas, the threats to infrastructure, and population migration are major concerns for society, Dr. Jevrejeva said.

"Fifteen of the world's 20 megacities, with populations of more than 10 million, are sensitive to sea level rise and increased coastal storm surges. Soon we will have to make very hard decisions in the U.K. and globally: which coastal area is going to be protected and which could be abandoned? It means that as a civilization we are not able to protect some of our cultural heritage, unique beaches and cliffs."

"Trends and acceleration in global and regional sea levels since 1807" was published in the Global and Planetary Change journal and coauthored by Dr. Jevrejeva and JC Moore from the Beijing Normal University in China, A Grinsted from the University of Copenhagen in Denmark, AP Matthews from NOC and G Spada from the Dipartimento di Scienze di Base e Fondamenti, Università degli Studi "Carlo Bo" in Urbino, Italy.

The study looked at global sea level reconstruction based on 1,277 tide gauge records dating from 1807 to 2010. Tide gauge observations suggest that sea level rose by 6 cm during the nineteenth century, 19 cm during the twentieth century, and the sea level has continued to rise this century.

To understand the past sea level rise the researchers used the historical tide gauge records collected by the Permanent Service for Mean Sea Level (PSMSL), based in Liverpool at the National Oceanography Center. Established in 1933, the PSMSL has been responsible for the collection, publication, analysis and interpretation of sea level data from the global network of tide gauges.

WaveWalker Wins

An innovative walking jack-up platform WaveWalker 1 was presented with the Product and Equipment Innovation Award at the Ground Engineering (GE) Awards ceremony in London last month. WaveWalker 1, developed by Fugro and Van Oord, is an eight-legged 'walking' jack-up barge (self-elevating work platform - SEWP) designed especially for marine operations in rough seas, surf zones, beaches and other intertidal locations where operation of traditional SEWPs is uneconomic.

As well as operating safely whilst elevated, its bi-directional movement allows it to move and relocate without floating. WaveWalker 1 can considerably boost productivity in tasks such as geotechnical site investigations, drilling, trenching, pipeline and cable-laying, blasting and other marine and underwater work. In January 2013 WaveWalker 1 began its first project, where it undertook drilling and rock blasting works in the outer channel to the port of Suape in Brazil, and more than proved its worth.

The GE Product and Equipment Innovation Award is for a product or item of equipment aimed at the ground engineering or geotechnical market which has delivered improved performance or made a technique or idea possible. The entries were required to provide evidence of how their product led to increased performance, durability, safety or productivity during a project or process. Research strategies that led to the development of the product and its sales success to date were also taken into account. Key criteria included: innovative design, ability of product/equipment to fill a gap in the market; ability to deliver cost and performance benefits; and commercial potential for use on other projects/applications.

WaveWalker 1 is currently on location in the U.K. preparing for her next contract due to start in July 2014.

Divers Guilty of Raiding Historic Shipwrecks

The Maritime and Coastguard Agency announced that two divers from Kent have pleaded guilty to not declaring valuable items from shipwrecks off the U.K. coast.

David Knight and Edward Huzzey, both from Sandgate, admitted to 19 offences between them, contrary to section 236 and section 237 of the Merchant Shipping Act 1995.

Items were taken from shipwrecks off the Kent coast, with the first known objects removed in 2001. The shipwrecks targeted included German submarines from World War I and an unknown 200 year old wreck carrying English East India Company cargo.

The items included eight bronze cannons, three propellers from German submarines, lead and tin ingots, along with various other artifacts. It's thought the combined value of the items is worth more than $420,000.

MCA said it is aware from diary entries that Knight and Huzzey used explosives and sophisticated cutting equipment to free wreck material.

Sentencing has been scheduled for July 2, 2014.

CMRE to Host *AUV and Robotics Competitions*

From September 20 to October 3, 2014 the NATO Center for Maritime Research and Experimentation will host the Student Autonomous Underwater Vehicle Challenge - Europe (SAUC-E) for the fifth year in a row, and for the first time the euRathlon sea robotic competition.

The NATO Center for Maritime Research and Experimentation (part of the NATO Science and Technology Organization) confirms and increases its commitment to foster a new generation of robotic engineers.

In September 2014, in addition to the Student Autonomous Underwater Vehicle Challenge - Europe (SAUC-E) hosted for the fifth year in a row in CMRE's sheltered harbor, the first euRathlon sea robotic competition will be held the following week. Each year SAUC-E challenges multidisciplinary University teams (consisting at least of 75% students members) to design and build Autonomous Underwater Vehicles (AUVs) capable of performing realistic missions. The students' AUVs must perform a series of tasks autonomously facing real life conditions such as limited visibility in the sea, with no control, guidance or communication from a person or from any offboard computer including GPS systems. This ninth edition will be held from September 20-26, 2014.

The following week, from September 29 to October 3, 2014, for the first time CMRE will also host the euRathlon sea robotic challenge. The challenge is the second event of the euRathlon project, a three-year effort, funded by the European Commission, where robots and their teams of designers go head-to-head in a series of demanding outdoor scenarios that mimic the real challenges of a disaster situation. In 2015 the final Grand Challenge will feature all three elements (land, sea and air) to respond to a mock disaster scenario inspired by the Fukushima accident.

Competition scenarios for euRathlon 2014 have been designed to lead up to the Grand Challenge and will consist of five different marine scenarios: "long range autonomous underwater navigation," "environmental survey of the accident area," "leak localization and structure inspection," "interaction with underwater structures" and a "combined scenario." Teams and their robot vehicles may compete in one or more scenarios. All scenario tasks can be undertaken by a single AUV. However, in some scenarios a team can compete using only an Unmanned Surface Vehicle (USV), or a combination of USV and AUV.

Raphaël Siryani, CO-founder,

SBG Systems

Raphaël Siryani, Co-Founder
SBG Systems

SBG Systems is a leading French supplier of MEMS-based inertial motion sensing solutions. For insights of the future and direction of this niche, MTR reached out to Raphaël Siryani, co-founder of SBG Systems, for his insights.

By Greg Trauthwein

For those readers not familiar with SBG Systems, please give to us a concise overview of the company, and precisely its position in the subsea industry?

The company provides a wide range of inertial solutions from miniature to high accuracy. SBG Systems products address aerospace, ground, marine and subsea industries with specific features for each market such as subsea enclosures, DVL / INS integrations and delayed heave measurements. Our products are completely designed and manufactured In-house from the IMU to the final fully featured Inertial Navigation System (INS).

With more than 30% of turnover in the marine and subsea industry, SBG Systems has become a major supplier of motion reference units and inertial navigation systems since its creation in 2007.

Looking specifically at the subsea sector in relation to your business, what do you see as the big trends that are driving business today and in the next five years?

The subsea market has some specificities compared to the marine (surface) market. Indeed, for an AUV that either needs an INS for navigation or for surveying tasks, the power consumption as well as the system size has to be taken into account in addition to the required high level of accuracy. Reducing the power consumption for the navigation system will maximize the mission time thus reducing operating costs. Another example, with a surface vessel, if you just need a low accuracy position, you will basically use a low end GPS receiver that costs a few hundred dollars. For a subsea vehicle such as a ROV that only needs a rough underwater position, you will have to spend thousands of dollars to have a super accurate position.

We think that providing a cost effective solutions for low accuracy underwater navigation is a key point for ROV while for AUV, a small sized, low power but accurate device is a

must have. Our last developments have been made with these requirements in mind, and with the Ekinox series we start to address the low cost underwater navigation market.

There is still a long way to go before offering low power, small sized and cost effective INS with gyro compassing that is a mandatory feature to completely cover subsea market needs.

Subsea Science, Defense and Offshore Energy are the big drivers in the subsea sector. Please discuss the importance of each to your business?

For SBG Systems, the offshore market is clearly driving our subsea business. This market is constantly looking at new solutions with increased accuracy or better prices. For this market, the main concern is always the system reliability and availability.

In addition, offshore / energy customers want a straightforward integration with a very responsive support. At SBG Systems, we do our best to provide a very high quality support with free of charge support, updates and improvements.

Subsea science is our second most important market as new technologies enable new research projects. The ratio between the cost, the accuracy, the size and the power consumption is a very important factor for this market.

Finally, the marine defense industry is a promising market for SBG System as the need to offer smaller and lower cost solutions such as divers navigation is more and more important.

In your opinion, what are the top two or three technical drivers that have had the most dramatic impact on your products, your business in the past five years, and why?

Clearly to provide an accurate subsea Inertial Navigation System, you need good gyroscopes and accelerometers. In the last past five years, MEMS technology has dramatically improved and can now easily compete with FOG based gyroscopes on some parameters such as the angular random walk (noise at 1 second) and the bias instability. Low noise

and good bias instability are key parameters to provide stable roll / pitch and position measurements that is mandatory for subsea navigation or multi-beam sonars.
In addition, MEMS technology offers very high MTBF as well as lower power consumption that are very useful for surveying applications where the Inertial Navigation System could operate 24 hours per day.

However, MEMS gyroscopes have startup bias and total bias stability (over temperature) that are an order of magnitude greater than good FOGs gyroscopes. For some applications such as gyro compassing, MEMS gyroscopes are still not stable enough, but in almost all other situations this technology offers key advantages over FOG devices.

Next evolution in MEMS inertial sensors will certainly open up new opportunities with decreased size, power consumption and price over they FOGs counterpart.

The subsea market needs most of the time real-time outputs and the computational power is a key parameter to runs very complex mathematical algorithms.

In the last past 10 years, the computational resources of low power microprocessors have dramatically increased. As a result, our latest Ekinox series has enough computational power to run the same algorithms as a desktop computer while consuming less than 1 W.

Staying on the technology theme, are there any emerging or maturing technologies out there today that – when and if they develop as expected – will drive your business further, faster?

Cold Atoms Inertial Sensors seems to be a very promising technology to provide quite cost effective solutions but much more accurate than RLG or FOG devices. In 2016, a British submarine will demonstrate a one-axis accelerometers working on this principle with an improvement of 1,000x over current solutions. There is still a very long way to go before this technology could be used for industrial applications but theoretically, it should enable cost effective subsea navigation in the short term.

Please give us an overview of your typical customer, and specifically, point to how your customers changing needs have driven innovation in your company in recent years.

In the subsea market, our customers are looking at cost effective alternative to address medium accuracy but robust subsea navigation. The typical need is to combine an Ekinox with a DVL, a Depth Sensor and eventually other positioning devices such as USBL. From the beginning of the Ekinox development, we have taken this requirement into account to finally offer a reliable underwater navigation that fill the gap between a basic DVL + magnetic compass solution and a FOG based INS + DVL.

We also provide accurate roll and pitch measurements for the offshore market where large structures need to be monitored to either study fatigue or help operators during the maintenance or the construction. This market has clearly contributed to develop the Ekinox subsea enclosure.

Our miniature IG-500 sensors are used to provide roll, pitch and heading even in magnetic disturb environments for small sized AUVs and ROVs without increasing the cost or the power consumption of the final solution.

We have put a lot of efforts to develop very advanced algorithms that copes with magnetic interferences just for this specific market.

In the marine market, the main application for the Ekinox is multi-beam sonars as we offer a full featured, packaged and cost effective solution with the Ekinox-D (that embeds a dual GPS antenna RTK receiver). To better address this market, we have developed cutting edge algorithms to provide very accurate real-time and delayed heave measurements. The compatibility with existing surveying equipment (sonars, surveying software, …) is also very important for our customers. Finally, the IG-500 (our miniature line of products) is widely used to monitor the sea state with roll, pitch, heading and heave measurements. The small size, low power consumption and price are key parameters for buoys manufacturers.

Almost all the technologies we have developed have been directly driven by our customers needs. Our products all share the same basic principle but to really address a market, you have to know its specificities and to listen at your customers needs to offer a full-featured and straightforward solution.

Can you discuss how SBG has invested in its company, its people and its products in recent years?

SBG Systems has been cofounded by three engineers

with one goal: to offer cutting edge inertial technologies. Research and Development lie at the heart of the company with more than 40% of the turnover being invested in products development or to research new technologies. More than one employee over two is closely related to R&D and this effort will continue as the company grows.

In 2009 SBG Systems has introduced its first miniature motion sensor after three years of R&D. Since then, each year new products or technologies have been introduced. In 2013, the Ekinox series was a milestone for the company with a subsea enclosure launched in 2014. In only four years, the accuracy has been improved by a factor of 10 with all famous features needed by the subsea and marine markets such as delayed / real-time heave, DVL, Ethernet, web page configuration, sonar compatibility. We are eager to strengthen our position in the subsea and marine markets in 2014 with the introduction of new exciting products and technologies.

SBG SYSTEMS

Raphaël Siryani is Chief Marketing Officer and co-founder of SBG Systems. He has been in the Inertial field since 2006 and more specifically in marine / subsea industry since 2009. He has a Master of Science in embedded systems that has allowed him to be in charge of embedded firmware designs, hardware designs and MEMS sensor tests, characterization and calibration.

Adm. Matt Klunder, U.S. Navy Chief of Naval Research

ONR & The Culture of Innovation and Invention

MTR sister publication Maritime Reporter & Engineering News recently had the honor to interview Rear Adm. Matt Klunder, U.S. Navy Chief of Naval Research. Here we share select responses that are pertinent to the subsea sector.

By Capt. Edward Lundquist, U.S. Navy (Ret.)

What are your near term, mid-term and long term science and technology (S&T) objectives?

It's critical that our Sailors and Marines never go into a conflict as a fair fight. Whether it's a near-term threat we're trying to address, or a long-term leap-ahead technology, we need to make sure that we're investing in cutting edge technologies that are going to give our Sailors or Marines that decisive technological advantage. Across everything we do, we have to stay under that big umbrella called "affordability." It's no longer good enough to develop an incredibly impressive capability. It's got to be affordable. Our vision is to deliver hugely effective capability with affordability.

You can look at our strategic plan and see all of the areas we're focusing on, but there are a few that are most important to us. First is the undersea domain, including manned and unmanned vehicles with autonomy, persistence and endurance, and modular payloads that can be changed as the mission dictates, along with the ability to net all those together for communications and information flow. .

Another important area is that we need to understand the electromagnetic spectrum, and optimize how to move and protect that data.

And then we get into electronic warfare. We need to make sure that that data is protected as we're sending it out, and it's protected as it comes back.

The fourth area is directed energy, not only from the capability it provides—with lasers, electromagnetic rail guns, or high-powered microwaves—but also the affordability. We're talking about systems where you can shoot a round a pulsed-energy for less than a dollar, and create the effect you want. That's compelling to me and that's a focus that we have at ONR.

Finally, the fifth one really comes back to people. With all the great technology I just described, it's only as good as the people behind it. So we need to train our people to handle all those new technologically impressive systems. So we're focusing on live virtual constructs, where live operational units integrate fully with virtual constructive units or avatars to create an optimized training scenario that's very affordable.

So what's your metric on affordability?

We start with the equation: what is the threat potentially coming at us with, and what does it cost; and do I have an effective defensive system for that, and is it more affordable that what it has to defeat. Some people call it "flipping the cost curve on your adversaries."

There are a lot of ideas out there, from academics, military people, or companies. If they think they have some science or technology that can contribute to the Navy-Marine Corps mission and to defense, how might they be able to bring that in?

The *normal* process is through our broad area announcements—or BAAs—that we'll release through our web site to all the performers and they can come in and provide us with white papers and ideas. But we have also started open forums here at ONR where we sit around and talk about these

U.S. Navy photo by Mass Communication Specialist 2nd Class Sean Hurt

Rear Adm. Matthew Klunder speaks to attendees of the 26th annual Surface Navy Association National Symposium. Klunder spoke about up-and-coming warfighting technologies. This year's SNA Symposium focuses on "Surface Warfare-Warfighting First" and top Navy leadership will stress investing in Sailors and systems to ensure our continuing advantage; ensuring surface warfare remains the center of the Navy's ability to deliver prompt, sustained combat power over time; and training persistent, capable surface forces--the key to combat readiness and prevailing in conflict.

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issues. The first one we had back in January was on autonomy. It was hugely successful. We're probably going to do our next one on information/C4I, and we think that's probably appropriate for the time, based on our focus on the electromagnetic spectrum and cyber. We want to share what we're focusing on. And we want to know "what are you focusing on?" We have a general discussions in the morning, and one-on-one opportunities in the afternoon to present a proposal, a white paper, or do a poster board. We have a large Tech Expo every two years, but now we're allowing these focus area forums to happen with the general, technical, research community about once every 3 to 4 months.

You had mentioned underwater systems and connectivity. How are we making it so that our underwater systems and distributed underwater sensors can communicate?

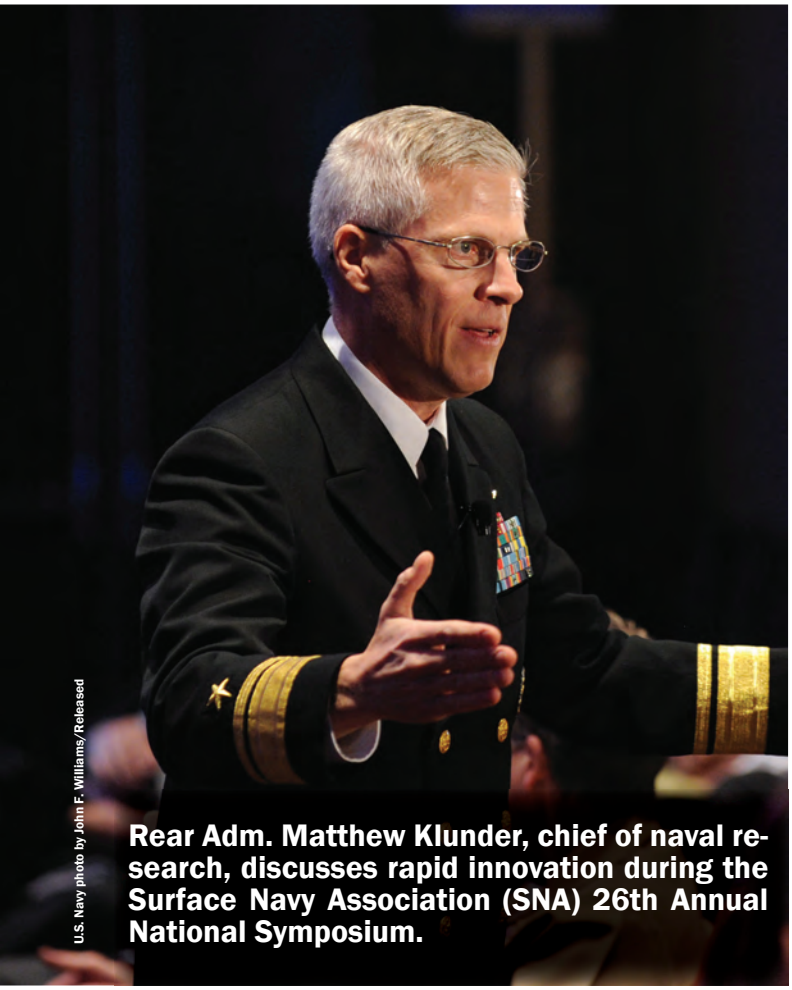
We're looking at all sorts of different mediums to move data in the undersea domain. I will tell you that we have successfully done it—I can't say the ranges or the times—but I'll just tell you we've done it. I'm feeling more and more confident as we understand the dynamics of the water and all those kind of obstacles underneath the water, that we've got a pretty good understanding on how we can move that data in real time. And it's not only, it's through the water medium, but it's also through the air-sea interface medium as we might port it up to airborne assets or to a maritime operational center. You may want just one vehicle out there all alone, which has advantages, but we think there are advantages in being able to distribute in a netted kind of way of those undersea vehicles and sensors.

You mentioned the air-sea boundary. What kinds of progress are we making, or what's new and exciting about our understanding of the atmosphere and the ocean so that we can be masters of those domains.

We'll never be the "masters" because Mother Nature still holds that in her precious hands. But ocean science is part of our heartbeat here. The Arctic used to be described as a frozen maritime desert, a lot of ice but not a dynamic environment. In the last few years, however, the Arctic has become

Rear Adm. Matthew L. Klunder, Chief of Naval Research, introduces CHARLI-2 from Virginia Tech's Robotics & Mechanisms Laboratory during the Office of Naval Research (ONR) 2012 Science and Technology Partnership Conference.

U.S. Navy photo by John F. Williams



U.S. Navy photo by John F. Williams/Released

Rear Adm. Matthew Klunder, chief of naval research, discusses rapid innovation during the Surface Navy Association (SNA) 26th Annual National Symposium.

Rear Adm. Matthew Klunder, Chief of Naval Research, meets with squadron personnel assigned to Scientific Development Squadron (VXS) 1 of the Military Support Division at the Naval Research Laboratory. VXS-1 supports the naval research enterprise by conducting manned and unmanned airborne science and technology operations.

extremely dynamic and unstable. We are heavily involved in trying to understand that dynamic and potentially *forecast* that dynamic. And while I'm inside that dynamic, how do we understand and monitor in real time the limitations to communication, to movement, etc. We've been able to look at it from all angles of the domain—from airborne platforms; pre-positioned ice sensors; and undersea vehicles that are beneath the first year sea ice—now we're netting all those together in a real time way and looking at that constellation of data regularly. We want to understand it better, we want to be able to forecast it better, and then we want to be able to operate up there better.

Can you tell me a little about the Transition Insertion Program (TIPS) and the Rapid Innovation Fund (RIF), and how small businesses get engaged?

We depend on small businesses—not only for the TIPS program and the RIP program, which are very powerful, but even in some of our large prototypes. The electromagnetic railgun system that we designed and developed down in Dahlgren had eighty small businesses involved in that effort. It could be through metal science, it could be through mechanical engineering work – that's 80, in just that one program alone. And that's a pretty big program. The smaller TIPS kinds of insertion programs have done some tremendous things for us. It could be in propulsion, advanced energy management, or battery storage

Science, Technology, Engineering and Math (STEM) programs are big today, but ONR has been promoting STEM for a long time.

STEM is hugely important to us. About half of the engineers and scientists at our laboratories and our warfare centers will be eligible to retire in the next 10 years. That's almost 50 percent of our workforce. The "greying" of the science and engineering community—especially in information technology, cyber, ocean and nuclear engineering, those areas

that are very important to the Navy and the Marine Corps—means we have to strengthen the pipeline of young people coming into these STEM areas. We are going to start to really focus on middle school to high school in the pipeline. Our SeaPearch program captures that 7th to 8th grade into high school. You build from there. The next step would be a high school internship at one of the labs, such as NRL, Dahlgren, or Carderock. Then we get them interested in an undergraduate program in one of the STEM disciplines, and they might come into a summer internship as an undergrad. And then there we've got a progression. We will be developing young people with skills and aptitudes for STEM disciplines that we need in the future.

Texas A&M University at Galveston

Preparing Engineers for Lucrative Ocean Related Careers

In 2010, Blake Sanchez saw a billboard that changed his life. "Four years ago, I saw a billboard for Texas A&M at Galveston," Sanchez said. "It was advertising marine programs, and the ocean engineering one caught my eye. I decided to look into it, because the campus is located on the coast only a few miles from the oil and gas capital of the world." After seeing the billboard, he took a chance, applied to Texas A&M at Galveston and never looked back.

In a 2013 article, the *Houston Chronicle* reported that ocean engineering was ranked number five in the top five most profitable bachelor's degrees in Texas based on annual salaries for graduates from 2011. For more than 40 years, the Galveston campus of Texas A&M has been preparing generations of students for ocean and coastal engineering careers. With degrees in offshore and coastal systems engineering, graduates design marine structures for ocean environments and oversee coastal process projects. As offshore engineers, they produce and maintain hardware for offshore oil platforms, breakwaters, sea walls and bulkheads. As coastal engineers, they direct beach nourishment and shore protection projects.

Sanchez claims he wants to be a well-traveled and seasoned professional engineer one day. "I want to get involved with subsea hardware," Sanchez said. "Seafloor technology is rapidly becoming complex, and I want to be part of the deep water curve. My goal is to always stay relevant and never stagnate; this field is perfect for my pursuits."

In May 2014, as he stepped across the commencement stage to receive his degree, he was on the way to realizing his dream. Sanchez has already had a job offer from Aker Solutions, a subsea engineering company and a query from McDermott International engineering firm.

Ken Bailey, the university's career counselor said prospects for graduates like Sanchez are good. "In the 12 years I've been associated with the university, there's always been a demand for our engineering graduates," he said. "The offshore and coastal sectors are hungry for engineers, and they pay well.

"Our graduates have been employed by Chevron, Keiwit Offshore, Heerema, Hercules Offshore, Wood Group, Technip and Oceaneering to name a few," Bailey said. "In 2013, 92% of our graduates with this degree had jobs, or were accepted into graduate programs before they graduated and the last graduate was hired shortly afterward by Keiwit Offshore. According to Bailey, as of Spring 2013, the entry-level offshore coastal engineering salary ranged from $70,000 to $90,000 per year.

Beyond salary, Sanchez is proud of the benefits of his degree. "The biggest value for my career is the name and backing of Texas A&M," he said. "People know the good reputation of the university. With this degree, you can literally work anywhere in the world. I want to be based in Houston, but I'd love to go to Singapore, Dubai, Australia or wherever the work is."

Sanchez says he worked hard to get to this point and along the way, the greatest lesson he learned started with a frustrating challenge. "When I was a sophomore, I got kicked in the face here," he said. "Statics was daunting and overwhelming at first, but midway through the class, everything snapped into place. When I got the A, I realized I can do this. That carried through my entire collegiate career, and I know it's going to carry through my entire professional career. Now, I can better solve any problem in life, whether it's a technical or personal situation. My professor, Dr. Sweetman, challenged me to do my best.

Educating Engineers

Dr. Bert Sweetman, head of the Galveston engineering department, is not just in the business of educating engineers. "We're expanding brains, and teaching students to think as engineers. At present, our entire faculty has industry experience that provides students with real-world skills to obtain a professional stable job for the rest of their lives — a job that may afford them a degree of wealth."

Sweetman said the university's offshore and coastal systems engineering curriculum is cutting edge to comply with latest industry standards. "The oil industry is exciting, progressive and high tech," Sweetman said. "Both offshore and coastal engineering are about waves and wind; physics and economics. In most other programs ocean engineering is a graduate degree. We are unique in that we offer a master's level education for a bachelor's degree related to the ocean.

Dr. Bert Sweetman

Blake Sanchez

Sweetman said the only durable assets of any academic institution are its faculty and good reputation. “We have both in our joint teaching/research model,” he said. “Students receive world-class teaching on our Galveston campus and benefit from engineering research. My doctoral students are getting degrees at Texas A&M in College Station and our professors have joint appointments on both campuses. Our campuses complement each other.”

When Sean Musick graduated from Texas A&M Galveston in 2007, he also had great potential for successful career. “I chose the right place for my career plans,” he said. “It had resources of a major university and class size of a small campus.”

Musick started his career as part of structural engineering evaluation team. His work took him to Trinidad and Tobago; Nigeria and the United Kingdom. “The job was well worth my time, and I have learned a lot” he said. “I started out in equal range with my peers, but learned I was better suited for the job than engineers who came out of other programs. All I had to do was understand the scope of the project, whereas counterparts from other schools had to be trained on basic terminology in understanding offshore oil and gas structures and principles.

Today as corporate quality manager for Wood Group Mustang Engineering, Musick says the perseverance taught him was a key factor, “You can make a great career and honest living in engineering. Aggies persevere. We’re willing to go the extra mile.”

Musick’s boss, Don Leinweber vice president of corporate services, agrees that Aggies go the extra mile. “Mustang endeavors to be a client’s first choice for engineering, procurement and construction services related to onshore, offshore, pipeline, automation and process plants worldwide,” Leinweber said.

“We look for people who are self-motivated and not afraid to work. Our recruiters have found that many Aggie graduates from Galveston are better prepared than those from other programs. We get more leadership DNA and service-oriented professionals in these Aggies we hire. We hear so much positive feedback about recruiting Galveston students like Sean. A&M just does it right.”

C-MAR DP Training in Brazil

Image above: Kongsberg shipboard DP2 station.

By Claudio Paschoa

The modern offshore maritime industry relies on a variety of DP vessels, from OSVs to Drillships and tankers, almost all vessels serving the oil and gas industry need to be DP capable in order to safely operate offshore. The growth experienced in Brazil due to the uncorking of huge deepwater pre-salt plays has caused a steady demand for new ships, rigs and vessels, maritime officers and DP operators in the country. MTR's correspondent in Brazil talks to Mauricio Santos, C-MAR Country Manager, about the reality of DP training in Brazil.

C-MAR is a global provider of manpower, engineering and support services to the maritime and offshore sectors. The C-MAR Group owns and operates DP training centers in London, Croatia, Mumbai, Singapore and Brazil, offering basic and advanced courses for DP operators in accordance with the curriculum set by the Nautical Institute (NI) as well as tailored courses for shore based personnel involved in dynamic positioning. C-MAR also provides DP Maintenance Courses at some of its global facilities.

As a provider of NI accredited courses, C-MAR offers high standards of DP training and technical services to the offshore and maritime industries. C-MAR's DP training center in downtown Rio de Janeiro offers Converteam and Kongsberg DP simulators for its students, which hail from all over Brazil and South America. All courses provide practical and real experiences based on the extensive, combined knowledge and expertise from C-MAR's experienced instructors. All DPC instructors have more than five years' experience in the operation of DP vessels, covering dive support, IMR, anchor handling, platform supply and drilling operations vessels. C-MAR DP Centers also provide technical services to the marine industry in the form of consultancy for the design and operation of DP vessels, Failure Mode Effect Analysis and Audits to IMCA guidelines.

Santos hosted a tour of the training center and explained how the training scheme is organized. "The Basic course lasts four days and is introductory level, covering the basics of all areas of DP. Upon completion of the course our students are apt to start simulator exercises in one of our DP's simulators, students are required to complete 30 days of seagoing familiarization after the basic course."

Students at C-MAR's training center in Rio come from all over Brazil and South American countries belonging to Mercosul (Free Trade agreement between some South American

countries). “The extensive simulator training in the advanced course is done using Converteam’s DP systems, students are also required to complete 30 days of familiarization at sea upon completion of the basic course,” Santos said.

Santos has been with the company for more than four years, and he explained that the C-MAR’s DP training course began almost a decade ago in a small office in Macaé, a city in the northeast of the state of Rio de Janeiro, which is the main O&G hub for the Campos Basin. With the success of the course it relocated to the current suite of offices in Rio.

“We train between 300 and 400 DPOs per year, with a maximum of eight students per week in the basic course and four students per week in the advanced course,” said Santos. A DP Maintenance Course is also offered at the Converteam training facility in Macaé and also has a four day duration, targeting individuals who may be required to perform, or assist in, the maintenance of a vessel’s Dynamic Positioning System. The course includes System elements, Interfacing, Monitoring and Documentation, normally this course is taken by electronics technicians who will do maintenance and repair of the systems aboard a vessel. DP systems are highly complex and are made up of an array of GPS transmitters/receivers, sensor and control hardware and power modules, usually located below a vessel or ship’s bridge, and these are connected to the DP main and backup modules located on the bridge.

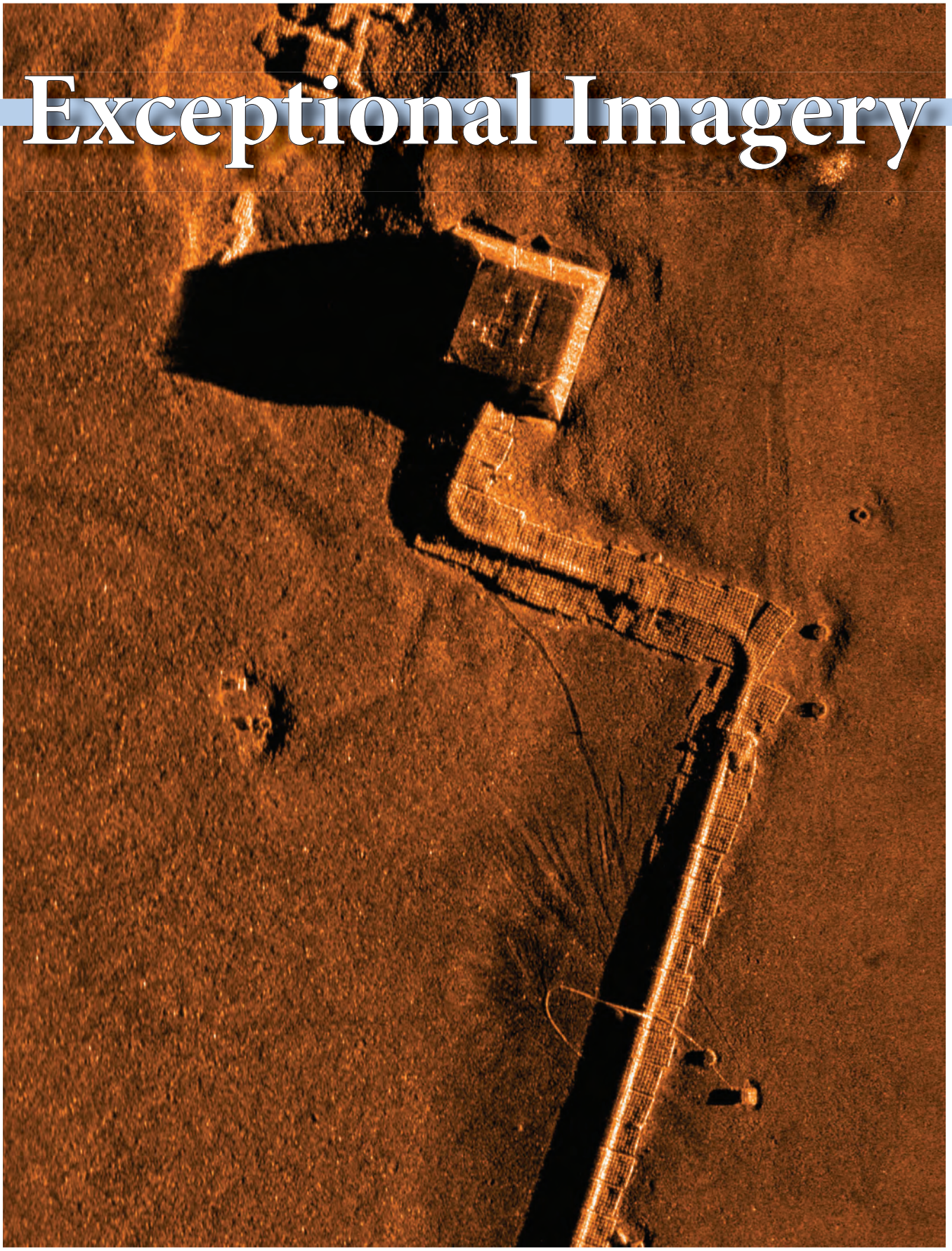
“The DP courses are now administered in English and this sometimes causes problems for students that do not have a advanced level of English, so many times teachers need to explain things in English and follow up in Portuguese, which sometimes causes courses to be extended by a day or two. It’s important for prospective students to hone their English skills before signing up for any of our courses,” said Santos. The Nautical Institute has full oversight over the DP courses to the point where courses are filmed and the NI can check on classes in real-time. “Since all classes are filmed, the NI can patch in at any time and check on the class’ development, what is being taught and what difficulties the students are having. It’s common for post-accident investigators to check on the class videos to see if the DPO who had the accident had similar problems during simulations. What happens during simulator training here is reflected on real-life situations offshore,” said Santos.

Credit: Claudio Paschoa

Mauricio Santos, C-MAR Country Manager at the Rio de Janeiro training center.

With the continuing growth of the oil and gas industry in Brazil, there has also been a major growth in shipbuilding and ship, vessel and rig leasing. This has significantly increased the demand for Brazilian DP operators since main contractor Petrobras requires specific levels of local content on each ship or vessel it hires. “We are experiencing a continuous growth in the Brazilian offshore market, and in the near future we may need to expand our training facilities in order to accommodate the influx of prospective DPO’s. Looking at the future, it is quite clear that the offshore growth in Brazil will continue at least for another decade. With the complex nature of drilling for and producing deepwater pre-salt oil and then in some cases transferring this oil from FPSOs to export tankers offshore, there is no doubt that the demand for DPOs will continue to grow and C-MAR will need to adapt accordingly. I believe we are well prepared to tackle this demand at C-MAR,” said Mauricio.

Exceptional Imagery



Bluefin Robotics AUV with Sonardyne Solstice

Following the integration of Sonardyne International Ltd.'s Solstice Side Scan Sonar with a Bluefin Robotics Bluefin-12 Autonomous Underwater Vehicle (AUV), the results of recent payload testing have produced exceptionally high quality imagery, according to the companies involved and attested by the photo gracing this month's cover and to the left.

The most recent trials of the Bluefin-12 AUV with integrated Solstice were conducted from Bluefin Robotics' headquarters in Quincy, Massachusetts, where the AUV was deployed from Bluefin's vessel, the R/V Resolution, to perform short missions around the Boston Harbor area in approximately 15m of water. Each mission consisted of legs of 500m, during which the AUV flew in a pattern commonly known as 'mowing the lawn.'

"We are pleased with how quickly we were able to integrate the sonar and collect high-quality data," said Will O'Halloran, Marine Operations Manager at Bluefin Robotics. "The imagery is some of the best I have seen in my 10 years of operating AUVs and reviewing data sets. The Solstice sonar is an excellent payload option for our clients who want exceptional imagery from low-logistics, rapidly-deployable AUVs."

"A pipeline end manifold (PLEM) surveyed during the trial provided an excellent target to show the resolution and contrast performance of Solstice. This PLEM consists of a large square template, pipe and mattress protectors; you can see where the individual elements of the mattress are clearly resolved in the imagery," commented Nick Swift, Sonardyne's Business Manager for Maritime Security. "This imagery is further proof of Solstice's exceptional image quality and is thanks to advanced processing techniques, inbuilt technologies and a unique array design for minimizing multipath effects."

www.sonardyne.com

Solstice surveyed this pipeline end manifold (PLEM) during the trial. It provided an excellent target to showcase the resolution and contrast performance of the side scan sonar.

Santa Maria: *Has the wreck been found off of Haiti*

Underwater explorer Barry Clifford said he found sunken off Haiti what he thinks is the wreck of Santa Maria, Christopher Columbus' long lost flagship from his first journey to the Americas.

Clifford, working for an operation funded by the History Channel, claims he led a team that found and investigated the wreck in the exact area where Columbus said the Santa Maria ran aground more than 500 years ago on a reef off Haiti's northern coast, 10 to 15 feet beneath the water's surface.

Clifford and his team used sonar scanning and metal detection devices to examine the ship's remains. Most of the ship is intact and excavation will be possible with assistance from the Haitian government, Clifford said.

While Clifford is reportedly confident that the wreck is the Santa Maria, it is now up to archeologists to study the wreck to determine if it is the Santa Maria. Clifford's crew photographed the wreck in 2003, and those pictures, along with data gathered by computer and other recent dives, have assured Clifford that the wreck is Columbus'.

The ship is the correct size (117 ft. long), Clifford said, and stones found at the wreck site that match the type in Spain where the Santa Maria was built were found at the site, CNN reported. Santa Maria was the largest of Columbus' small fleet that set sail from Spain in August 1492 under the sponsorship of King Ferdinand II and Queen Isabella I. The ship reportedly ran aground in December off the coast of Haiti.

(Library of Congress photo)

Cruise Ship Data to Assist Scientists

(Photo courtesy: Celebrity Cruises)

Celebrity Equinox becomes the third Royal Caribbean vessel to feature technology that helps scientists understand effects of climate change. Celebrity Equinox completed its scheduled dry-dock in Cadiz, Spain, and joined Royal Caribbean's Allure of the Seas and Explorer of the Seas in a program that tracks ocean circulation dynamics and measures atmospheric and oceanographic conditions, on repeated journeys. While Royal Caribbean ships are known as a vacation destination, not as well known is the scientific research conducted on several of these ships by the University of Miami's Rosenstiel School of Marine and Atmospheric Science. The scientists record ocean temperature, salinity and chlorophyll concentration, as well as properties of the ocean's surface, such as reflectance and absorbance. In addition, they measure meteorological properties, such as wind speed, wind direction, barometric pressure and humidity. These data help scientists monitor, understand, and forecast climate change and its effects on marine ecosystems, such as coral reefs. "These data are proving to be of invaluable assistance in calibrating and verifying the American and European satellites monitoring climate change throughout the ocean," said Dr. Peter B. Ortner, Director of the Cooperative Institute for Marine and Atmospheric Studies at the University of Miami Rosenstiel School of Marine and Atmospheric Science.

Funded in part by RCL's Ocean Fund, The University of Miami's OceanScope equipment on Explorer of the Seas has tracked ocean circulation dynamics since 2000, in the North Atlantic basin that the ship sails through while on Bermuda and Caribbean routes from the U.S. Northeast. The Allure of the Seas lab tracks these conditions through the Eastern and Western Caribbean, and has done so since 2012.

New Water Column Logging Routine

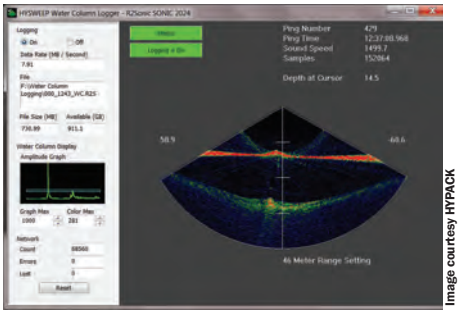


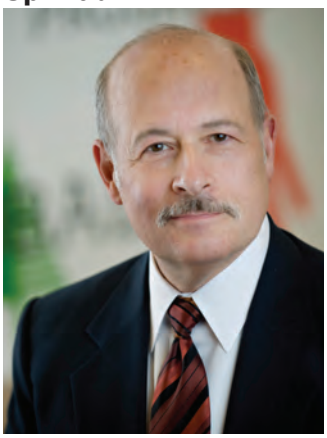
Image courtesy HYPACK

The HYSWEEP Water Column logger is a new program that collects and logs the enormous amounts of water column data provided by multibeam sonars. HYSWEEP Water Column enhances the already multibeam and backscatter collection capabilities of HYSWEEP. It will allow users to ensure that hard targets, such as wrecks, are fully detected, and to confirm the least depth in the water when fine features such wires or masts may be missed otherwise, HYPACK said, adding, this data is also useful for evaluating underwater gas seeps and remotely monitoring undersea oil spills. Some key features include:

- The Water Column Display provides constant updates allowing surveyors monitor data quality, start and stop logging on demand and to target features and anomalies. Targets are fully geo-referenced.
- For reliability, network traffic and data logging is closely monitored to alarm users of problems that may occur when working with large data transfer (multiple gigabytes per minute). For example, a low disk threshold can be entered to show an alarm when disk space is getting low.
- Data is written to support Third party software data processing support.

www.hypack.com

Spinrad



Ashton spearheads ASV U.S. growth

Hall of NOC

Spinrad Named NOAA Chief Scientist

MTS President-elect Dr. Richard (Rick) Spinrad will be stepping down from his MTS position as he is named chief scientist of the National Oceanic and Atmospheric Administration (NOAA). President Barack Obama announced the appointment May 8, 2014. Dr. Spinrad's appointment was announced among that of several others also nominated to key positions. President Obama said, "I am honored that these talented individuals have decided to join this administration and serve our country. I look forward to working with them in the months and years to come."

Dr. Spinrad will bring over 35 years experience in marine science, policy and operations to his new position. Currently he serves as Vice President for research at Oregon State University. While serving as Technical Director for the Oceanographer of the Navy, and leading NOAA's National Ocean Service and Office of Oceanic and Atmospheric Research, he received recognition from the Secretary of the Navy, and Presidents George W. Bush and Barack Obama for his efforts.

Chet Morrison Names New Team

Jerome Shaw has been named Vice President of Marine Construction for Chet Morrison Contractors, LLC. Shaw's experience includes more than 20 years in the oilfield marine service lines where he built operational expertise in pipeline and diving operations, as well as marine fabrication and construction. He previously served as HSEQ Director, where he successfully integrated individual safety representatives within each of the company's business units. As Vice President of Marine Construction, Shaw will be responsible for the strategic planning, management and operations of the division. He takes over for Brett Blanchard, who has been named to Chet Morrison Contractors' Board of Managers, where he will continue to provide vital leadership and experience.

Replacing Jerome Shaw as HSEQ Director is Bo Ristic, who previously served as Executive HSEQ and Business Development Manager for Triton Diving Services. Ristic has more than 15 years experience managing complex projects and developing HSEQ action plans. He began his career as a diver and has since gone on to manage complex special projects for major clients around the world.

ASV Expands, Appoints Ashton

Autonomous Surface Vehicles (ASV) announced its plans to break into the North American Unmanned Marine Systems industry, a move that comes as the result of success in the European and Asian markets where ASV has established itself as a leading Unmanned Surface Vehicle (USV) supplier.

ASV will look to serve all areas of the U.S. USV market. ASV currently provides unmanned systems to International Defense, Oil and Gas and Science and Research industries and has done so over the past three years. In 2014, ASV completed a two phase Marine Target Drone program with South Korea, built and operated the world's first Unmanned Oil and Gas work boat and completed the commissioning of its Long Endurance Unmanned Marine Vehicle for Oceanographic research.

To aid this transition into the U.S., ASV appointed Duane Ashton as Director of Unmanned Systems Business Development. Ashton will also work with ASV sister company C&C Technologies, Inc. Together, ASV and C&C are leveraging their respective successes in unmanned systems and global survey operations to forge the move into the U.S. Unmanned Systems market.

Ashton recently transitioned from the U.S. Navy's Unmanned Maritime Systems Program Office, bringing with him more than 20 years of U.S. Government management experience involving the acquisition, design, operation and maintenance of complex engineering systems.

NOCs to partner the IMarEST

The National Oceanography Center (NOC) announced a two-year partnership with the Institute of Marine Engineering Science and Technology (IMarEST), a partnership which will allow NOC to share its expertise and have input into the Institute's Special Interest Groups (SIGs).

Maxwell

Knight

MacArtney Grows in N. America

Steve Hall, from NOC's International & Strategic Partnerships, said: "NOC values being able to work with a highly regarded international Professional Body to jointly address the great challenges facing the ocean, to benefit from a closer working relationship with marine professionals in industry, and to encourage more people to consider a future in marine science, engineering and technology. IMarEST also provides an opportunity for our staff to seek accredited professional status, which will improve their career prospects and their understanding of the requirements of the broader marine sector."

The partnership will build on NOC's existing work with IMarEST which sees them consulting on both government and international bodies including the Intergovernmental Oceanographic Commission (IOC) and International Maritime Organization (IMO), he added.

IMarEST's Chief Executive, David Loosley, said: "We are pleased to be working closely with the National Oceanography Center. A partnership such as this enables us to further enhance the IMarEST's global technical voice by increasing relevant technical expertise for our Special Interest Groups for the benefit of all of our members and corporate marine partners around the world."

InterMoor UK Expand with Maxwell, Knight

InterMoor, an Acteon company, appointed Lesley Maxwell as group human resources manager and Nick Knight as business development manager for InterMoor Marine Services Ltd.

Maxwell has more than 20 years of international experience as a senior manager in management consulting and human resources roles across different sectors including oil and gas and will be based in Aberdeen, U.K. Knight has been appointed business development manager for InterMoor Marine Services Ltd. Knight, who will also be based in Aberdeen, U.K., comes to InterMoor from Viking SeaTech where he was operations supervisor. Knight has more than 12 years' experience in marine engineering.

MacArtney Bolsters N. American Sales

MacArtney announced an initiative to bolster its North American system sales focus, spearheaded by the hiring of Shan-

AUVSI Elects Board Members

The Association for Unmanned Vehicle Systems International (AUVSI) announced its newly elected Board of Directors during its annual Unmanned Systems 2014, which took place in Orlando, Fla., May 12-15, 2014. Newly elected directors for the 2014-2017 term are David Agnew, Neil Hunter, Leonard Ligon, Paul McDuffee, Ben Miller and Suzy Young.

The new term of office for the board of directors starts at AUVSI's Unmanned Systems 2014, where more than 6,000 attendees from 55 countries will see 600 exhibits and participate in 100+ educational sessions, showcasing the present and future capabilities of unmanned systems and robotics technology. Returning members include:

Officers

John Lademan, Chairman
Ralph Alderson,
Executive Vice Chairman
John Burke, First Vice Chairman
Gen Fraser, Treasurer
Peter Bale, Immediate Past Chairman

Directors

Heather James
Michelle Kalphat
Chad Partridge
Steven Pennington
Dave Seagle
Dallas Brooks
Mark Gordon
Rand LeBouvier
Stewart Moorehead
Stephen Newton
David Place
Heather James
Michelle Kalphat
Chad Partridge
Steven Pennington
Dave Seagle
Dallas Brooks
Mark Gordon
Rand LeBouvier
Stewart Moorehead
Stephen Newton
David Place

non Lewis, as System Sales Manager, and appointment of long-standing MacArtney ocean science expert, Andrew Ziegwied, as Vice President of Ocean Science and System Sales. MacArtney said it has seen significant growth in sales of its complete systems, especially, winch and handling systems for ROV, subsea and scientific applications.

CWind Announces New Chairman of the Board

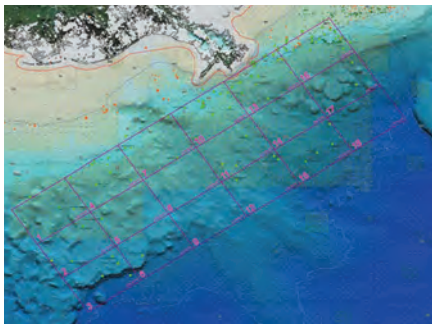
CWind announced that Chris Randle, formerly of Siemens Wind Power, has been appointed as Executive Chairman of the Board of Directors. Andy White, Non-Executive Director of CWind & Chairman of CTruk Group (The parent company of CWind) said Randle joined CWind with effect from April 28, 2014, taking over for White as Executive Chairman.

SUBSEA 20/20, EvoLogics Strike Deal

SUBSEA 20/20, Inc. was named an authorized sales agency for EvoLogics underwater communication and positioning systems. In support of the new partnership, SUBSEA 20/20 principal, Eric Munday, completed a technical sales training program at EvoLogics headquarters in Berlin, Germany. In doing so, SUBSEA 20/20 becomes the first factory-trained agency for EvoLogics in North America. Munday received in-depth technical training in EvoLogics underwater acoustic modems and USBL positioning systems and is now able to offer consulting in system configuration and selection.

NCS Subsea, Partners Begin Geohazard Survey Project

NCS SubSea and partners secure industry underwriting for SAFE-BAND with the first multi-client geohazard ultra-high-resolution 3D (UHR3D) survey in the Gulf of Mexico. The first phase of acquisition starts June 1, 2014. NCS Subsea, GeoTrace and SpecPartners announced



Courtesy NCS Subsea

the start date for a multiphase large scale innovative project called SAFE-BAND. It will be the first multi-client geohazard survey on a regional scale utilizing Ultra-High-Resolution 3D Seismic (UHR3D).

DOF Subsea Wins AUV Survey Deal

DOF Subsea Norway AS won a call-off on an existing survey frame agreement with Statoil Petroleum AS for Multibeam Echosounder (MBE) inspection and AUV survey services in the North Sea. The call-off has a firm period of approximately 50 days in addition to optional services and will be performed during summer season 2014. The scope of work includes vessel-based MBE pipeline inspection in shallow waters, deep water AUV pipeline survey, as well as AUV coral mapping. Project execution will be handled by DOF Subsea's operating center in Bergen, Norway. The offshore support and ROV vessel, Libas, will be mobilized for execution of the call-off. Libas is chartered from Lgo and can potentially undertake other commitments for DOF Subsea.

Fugro Leads UK Carbon Capture Project

Fugro GEOS, in partnership with Sonardyne, is leading a three-year, all-British project for the Energy Technologies Institute (ETI) to develop a carbon dioxide (CO2) monitoring system using marine robotics. Valued at $1.6 million in the first year, the project aims to provide assurance that CO2 stored deep below the seabed in Carbon Capture and Storage (CCS) sites is secure. The safety of such a method is of paramount importance, with

Nautronix Wins Ceona Support Contract

Nautronix won a five-year frame contract by SURF and subsea contractor Ceona with an initial one-year call-off for the supply of survey services to support its newbuild DP3 subsea construction vessel, Polar Onyx. The contract includes the initial survey support and mobilization of the vessel in Europe before the vessel commences a minimum of one year's work in Brazil as a PLSV for Petrobras. Nautronix will supply personnel and equipment to provide survey services on the vessel.

(Image by: Rene van der Kloet)

Polar Onyx fully fitted before sailing to Brazil

feasibility studies currently underway in the U.K. and overseas on a number of CCS projects. A consortium of British multidiscipline partners will examine the requirements for the Measurement, Monitoring and Verification (MMV) system. The project will result in the construction of a technology demonstrator with sea trials; a comprehensive review at the end of the three year period; and a solution to a legislative requirement to monitor potential CO2 leaks and their effect on the environment.

TE Connectivity Acquires SEACON

TE Connectivity Ltd. signed a definitive agreement to acquire the SEACON group, a leading provider of underwater connector technology and systems, for $490m in cash. The SEACON group serves the military marine and subsea sectors for remotely operated vehicles (ROV) / autonomous underwater vehicles (AUV), oil and gas, environmental and oceanographic applications.

According to Tom Lynch, TE Connectivity Chairman and CEO, "The acquisition of the SEACON group expands TE's position as a leader in connectivity solutions for harsh environments and significantly strengthens our position in the high-growth oil and gas industry."

Photo courtesy SEACON

SeaBotix vLBV Sales Reach 100 Systems

SeaBotix Inc. announced 100 sales of its vectored Little Benthic Vehicle ROV (vLBV). The vLBV was launched in 2011 to offer a small, easy-to-deploy, compact ROV with adjustable angle (vectored) thrusters in order to complement and advance the capability of the SeaBotix ROV range in the offshore environment. The 100th SeaBotix vLBV system will be delivered to the Center for Earth Observation Sciences (CEOS) at the University of Manitoba, Canada, a purchase funded by The Canada Foundation for Innovation project and sold through MacArtney Underwater Technology Group's Ocean Science Department as part of a consolidated delivery of scientific subsea equipment. The 300m (1,000 ft.) capable vLBV is tested and rated for operations in subzero conditions and will be used for bio-optical studies under ice in the Arctic.

Fugro

Expands Fleet

Fugro is expanding its survey fleet in the Gulf of Mexico (GoM) to include a new AUV, Echo Surveyor VII, and a new vessel, R/V Fugro Americas. "Both these impending launches indicate our strong capabilities and commitment to our clients in the GOM and internationally," said Melissa Jeansonne, Vice President, Fugro GeoServices, Inc. "Both the Fugro Americas and Echo Surveyor VII will join the current fleet later in the year. We already operate three AUVs in the GoM – one Hugin (Echo Surveyor II), and two Bluefin (Echo Mapper); and our new multi-purpose Fugro Americas vessel enables us to have three vessels capable of operating AUVs in the Americas. As well as providing improved multibeam swath coverage, The Echo Surveyor VII will support the acquisition of sidescan sonar, sub-bottom profiler and CTD profiler data, and will carry various environmental sensors to meet a wide range of offshore survey demands. With its tight turning circles that greatly reduce the time between survey lines, it will offer clients a wide range of features including an increase in depth rating to 4500 meters. Being fully airfreight portable, Echo Surveyor VII will also allow rapid mobilization. Fugro Americas is a state-of-the-art multi-purpose vessel well suited for high resolution geophysical surveys and seafloor mapping. "We are extremely proud of the Fugro Americas and look forward to her arrival in service," said Jim Grady, Asset Manager, Fugro GeoServices, Inc. "At 193 feet she is bigger and faster than our current vessels in the GoM, has more berths as part of our purpose-built design, and is both quiet and fuel efficient. SOLAS classed, she is capable of undertaking seismic, conventional, AUV and geotechnical surveys."

Image courtesy SeaBotix

The system will be delivered complete with a range of scientific tools including Spectral Radiance and Irradiance sensors, CTD probe, Tritech MicronNav USBL tracker, two color cameras, grabber and additional inverted Valeport VA500 altimeter for assisting in measurement of depth under ice.

EIVA: Loading up for a Growing Market

EIVA said that it ended the financial year 2013 with a satisfactory result, even though initiatives such as increased R&D activities and relocation to larger production facilities have affected the figures. EIVA published its annual report, which the company said presents a satisfactory result despite the fact that EIVA has invested heavily in preparing the company for the future possibilities in the offshore industry. A revenue growth of 14% percent, ending the year at $14.9 million, testifies to this together with a net profit ratio of 9.7%.

Photo: EIVA

"In recent years, we have experienced increasing demand for our software and hardware solutions. In 2013, we chose to focus our efforts on tuning up R&D activities and relocating to new offices with larger production facilities, thus realizing future growth plans," said Jeppe Nielsen, CEO, EIVA.

EIVA continues to introduce new initiatives in 2014. In January, the ScanFish Katria was introduced. It is the fourth model in the ScanFish III range and is specially designed for wide-sweep magnetometer surveys. It has contributed further to the vast success of the ScanFish III range, and today more than 30 units have been sold since the first model was introduced in 2012.

In March, a webshop was launched, facilitating the procurement process on low-involvement products. March also saw the launch of a new buoy product range, which already has been subject to high interest in the market.

By the end of 2014, version of 4.0 of the popular NaviPac, one of the products in the EIVA NaviSuite, will be released, offering users a completely updated and improved software tool.

MMT Wins Statnett Survey Work

MMT was awarded the SK4 & NorNed protection survey contract by Norway's Statnett. This contract is divided into two separate projects and includes detailed high-resolution offshore ROV surveys and cable tracking. MMT has also been contracted for a geophysical and geotechnical survey of a cable corridor in Gandsfjorden, Norway.

This year´s survey campaign for Statnett was granted to MMT. The aim of the offshore survey is to provide Statnett with a Terrain Model (DTM) of the cable and associated trench and berms (where present), as well as a DTM of all engi-

Photo: MMT

Multipurpose vessel Stril Explorer

neered crossings including all installed protection. The survey will also provide the location and depth of burial of the cable. The SK4 cable protection survey is performed for both Statnett and Energinet.DK. MMT said it has previously performed detailed pre-lay survey for the SK4 cable and have a comprehensive knowledge of the conditions in order to achieve an efficient and safe survey for Statnett. The cable tracking operations will be conducted from the DP2 vessel Stril Explorer using the WROV Supporter mounted with a TSS. The survey will begin with the SK4 cable tracking operation from approximately 10 m water depth offshore Denmark to the Norwegian landfall at Kvivika. The ROV will be fitted with a multibeam echosounder, side scan sonar and a TSS cable tracker and a high definition video system.

Following the SK4 operation the NorNed cable will be surveyed on Statnett´s ownership of the NorNed cable. The survey will provide location and depth of burial of the cable, identify and analyses any exposed, freespanning and shallow burial sections of cable, identify possible damage, locate debris and produce a bathymetric and cable burial difference model from existing survey data.

DOF Subsea Wins Maersk Oil Contract

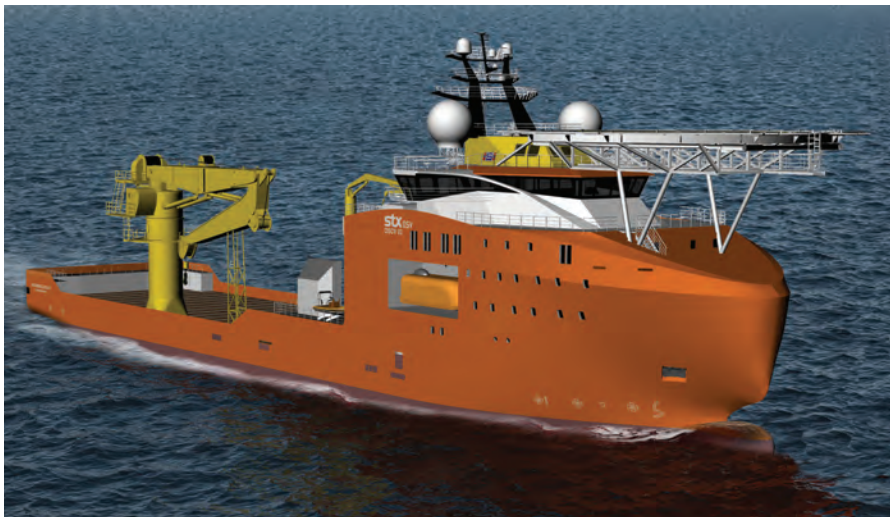
DOF Subsea UK Limited, a provider of integrated subsea solutions, has been awarded a contract by Maersk Oil UK to undertake replacement of the Dumbar-

Kraken Sonar System to DRDC

Kraken Sonar Systems said it has completed Sea Acceptance Testing of an AquaPix Interferometric Synthetic Aperture Sonar (INSAS) system for Defense Research and Development Canada (DRDC). Kraken delivered a dual-sided AquaPix INSAS2 system complete with an Embedded Real-Time INSAS signal processing engine and two DataPod Removable Data Storage Modules. The $500,000 system was integrated into DRDC's Arctic Explorer class Autonomous Underwater Vehicle (AUV).

AquaPix is designed to provide seabed imagery with a constant along-track / across-track resolutions better than 3cm x 3cm out to a range of greater than 250m per side of an underwater vehicle (a swath in excess of 500m). It also simultaneously produces 3D bathymetric data with bin resolutions better than 10cm x 10cm and depth accuracy in compliance with IHO special order requirements.

AquaPix INSAS2 system integrated into DRDC's Arctic Explorer AUV.


DOF Subsea

ton Drill Cluster Center (DCC) flexible production riser at the Global Producer 3 FPSO located in block 15/20 of UK sector North Sea. The work will take place at a water depth of 140m.

Engineering work associated with the project has already commenced with the offshore works scheduled to begin in July 2014.

DOF Subsea's long term chartered construction support vessel, Normand Reach, will support the replacement of the DCC Production Riser.

The scope of work includes all activities associated with the existing riser recovery, existing buoyancy removal, new buoyancy installation, new riser re-installation and all associated surveys. The work will involve a significant, dedicated project team drawn mostly from DOF Subsea's pool of highly skilled personnel.

DOF Subsea will also provide all project management and engineering support from its Aberdeen base, as well as a team to support riser pull in operations on board the Global Producer 3 FPSO.

EdgeTech Seminar

EdgeTech, a company in high resolution sonar imaging systems and underwater technology, will be holding its annual sonar training seminar in New Bedford, Massachusetts September 23-25, 2014. The course will cover sonar theory, operational training, system maintenance and post processing data for all of EdgeTech's standard side scan sonar, sub-bottom profiling and combined systems. The three-day seminar includes 2.5 days of classroom instruction and half a day at sea.

Unique Maritime, OEG Sign JV Agreement

Joint venture OEG Unique to provide offshore equipment in Middle East

Unique Maritime Group announced a joint venture agreement with OEG Offshore (OEG), to offer the rental and sale of offshore equipment in the Middle East region. The new joint venture company, OEG Unique, which will be based in UAE & Qatar, will provide local access to OEG's full range of over 200 individual certified designs of DNV 2.7-1 certified Cargo Carrying Units (CCUs) and A60 modules across the GCC countries.

Delta SubSea Tooling Solutions Division

Delta SubSea (DSS) launched DSS Tooling Solutions , a new business line to complement its structure and to provide clients with a turnkey integrated service. DSS Tooling Solutions will provide competencies in ROV, remote intervention systems, subsea robotics and special tooling. DSS Tooling Solutions will work in close cooperation with clients to provide solutions to the most unconventional challenges. With services ranging from engineering and manufacturing to assembly, testing, training, operation and maintenance, DSS Tooling Solutions is an integrated provider for remotely operated solution for the offshore oil and gas industry. Direct control of highly sophisticated technologies, internal research and development, design and manufacturing capabilities, will allow DSS to provide the most reliable and innovative tools to carry out complex remote operations in any deepwater environment.

VectorNav Launches VN-300

VectorNav Technologies introduced the VN-300 Dual Antenna GPS-Aided Inertial Navigation System (GPS/INS). The follow-on product to the VN-100 IMU/AHRS and VN-200 GPS/INS, the miniature VN-300 enables a wider range of applications through the incorporation of GPS compassing techniques.

The VN-300 can be used in a variety of industrial and military applications and is well suited for size, weight, power and cost (SWAP-C) constrained applications such as unmanned vehicle systems; antenna, camera and platform stabilization; heavy machinery monitoring; robotics; and primary or secondary flight navigation among others.

Incorporating the latest MEMS sensor technology, the VN-300 combines 3-axis accelerometers, 3-axis gyros, 3-axis magnetometers, a barometric pressure sensor, two GPS receivers, as well as a low-power micro-processor into a rugged aluminum enclosure about the size of a matchbox. When in motion, the VN-300 couples the position and velocity measurements from the onboard GPS receivers with measurements from the onboard inertial sensors to provide position, velocity and attitude estimates of higher accuracies and with better dynamic performance than a standalone GPS receiver or Attitude Heading Reference System (AHRS). The dual GPS receivers incorporated into the VN-300 also provide the added benefit of accurate True North heading measurements when the sensor is stationary through the use of GPS compassing techniques. The VN-300 is suited for applications that require a highly accurate inertial navigation solution under both static and dynamic operating conditions, especially in environments with unreliable magnetic heading and good GPS visibility.

VN-300 Features:

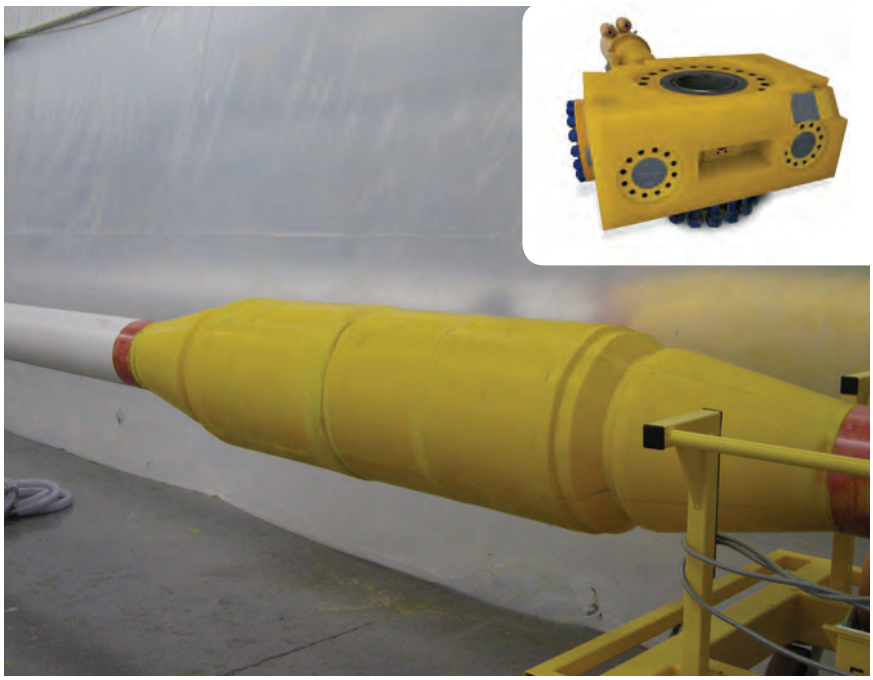
- *The VN-300 has favorable size, weight, and power requirement characteristics*
- *With Development Kits priced around $5,000, the VN-300 is competitively priced*
- *The GPS compass feature coupled with the GPS/INS capabilities on the VN-300 enables applications that require high accuracy position, velocity, and attitude measurements under both static and dynamic operating conditions.*
- *The algorithms on board the VN-300 enable applications to seamlessly transition between static and dynamic operations without having to collect extended stationary measurements or perform specific dynamic maneuvers in flight for attitude alignment.*
- *The VN-300 incorporates a "True INS Filter" that does not force any requirements on alignment of the sensor to the velocity direction of a platform or specify the orientation of the sensor for initial alignment.*

"The VN-300 is unique in that it provides a complete, high performance GPS-aided navigation solution under both stationary and moving conditions, all in a miniature and cost-effective package," said John Brashear, President, VectorNav. "By addressing some of the most difficult issues users face when trying to integrate an inertial navigation system, the VN-300 will enable an unprecedented number of applications."

e: sales@vectornav.com

Trelleborg Launches

Thermal Insulation Portfolio



Trelleborg's offshore operation announced it has consolidated its range of high performance thermal insulation materials to house them all under one brand – Vikotherm, which was presented last month at OTC in Houston. "As subsea environments become increasingly more demanding; going deeper and further than ever before, temperatures and hydrostatic pressure become much greater," said Ben Wait, customer group manager with Trelleborg Offshore and Construction. "As a result, the demand for more sophisticated products which can cope with these harsher environments is growing. And this is certainly the case with our thermal insulation materials; so we've taken the strategic decision to group all of our solutions together to allow for easier product selection and ensure that all customer needs can be met in one place."

All solutions in the Vikotherm range are designed for maintained flow rates, optimum productivity, reduced costs and protection against wax and hydrate formations.

Two of the featured products in the portfolio include the R2 and S1 materials. Vikotherm R2consists of a three-layer coating system which provides protection against corrosion and hydrogen induced stress cracking (HISC). Similarly, its seawater, impact and creep resistance means that it offers thermal insulation properties. The material is suitable for jumpers and spool pieces, tie in spools, manifolds, subsea trees, risers and flowlines, joints, insulation covers and many more applications.

With the capability to be applied in any geographic location, this material can operate in temperatures ranging from -49°C to +155°C /-56°F to +311°F, and depths as low as 3,000+m / 9,843+ft. In addition, being almost entirely maintenance and absorption free, the R2 allows for undisturbed, optimal high pressure and temperature flow performance.

In addition, the Vikotherm S1 is based on non-syntactic silicone technology, and the manufacturer maintains that it is ideal for risers and flow lines, subsea trees, pipeline end manifolds, pipeline end terminations and more, with operating temperatures of -40°C to +135°C/-40°F to +275°F and depths of 3,000+m/9,843+ft. Other solutions in the Vikotherm range include epoxy syntactic foam, E1 and E2; non-mercury catalyzed polyurethane, P7; syntactic polypropylene tape, PT and non-mercury syntactic polyurethane, G3.

www.trelleborg.com/vikotherm

Never-before-seen Views with Subsea Camera

A new camera developed by Battelle aims to reduce the time, effort and expense needed to create complete 360-degree viewpoints in the depths of the ocean or in other hard to reach places. The HorizonVue M360 Deep combines Battelle's history in maritime engineering technology with RemoteReality's specialized optic designs and software to create a unique instrument capable of providing continuous 360-degree video feed at the ocean's surface or depths of up to 10,000 ft., the manufacturer said. Intended for use by the ocean science community, it can be installed on underwater robots, ROVs, submarine periscopes or other stationary observation platforms. The camera also could be used by the oil and gas industry for enhanced underwater awareness in harsh environments.

Current technologies rely on multiple cameras including those that can pan, tilt and zoom. For example, Google trucks drive down the street with numerous cameras that capture images which are then "stitched" together to create the panoramic view, which takes time. During the Gulf Oil spill, underwater footage was captured by ROVs with multiple cameras. The HorizonVue M360 Deep can perform all these activities with just one camera and is lighter, smaller and uses less power than others on the market. An acrylic housing protects the camera so that it can withstand 5,000 pounds of pressure per square inch.

www.battelle.org

Courtesy: Battelle

The LUXUS Dropplate

MacArtney introduced the LUXUS Dropplate, an underwater camera platform enabling marine operators to perform underwater investigations by means of three LUXUS Power LED lights and any LUXUS camera. Manufactured from high density polyethylene with a frame shielding the onboard cameras and lights from impacts on the seafloor, the LUXUS Dropplate provides the ruggedness and stability needed for performing any basic visual inspection task in harsh underwater environments.

The LUXUS Dropplate does not require a specific handling system and can be readily deployed from a small boat or basic vessel of opportunity. Efficient operation of the onboard camera and light equipment is achieved using a LUXUS Multi Media Controller and a Kevlar TV cable, while integrated lifting handles make for easy deployment and recovery of the system. A small MacArtney hand winch can also be used.

The LUXUS Dropplate is primarily targeted towards oceanographic and basic inspection applications. The system provides a flexible, off-the-shelf alternative to custom built towed systems and traditional drop cameras. This versatility in applications, coupled with minimal deployment and handling requirements, make the LUXUS Dropplate an extremely flexible and cost effective solution. The LUXUS Dropplate can be supplied as a plug-and-play solution complete with cameras, lights, controller, cable and winch system.

www.macartney.com

WFS: Improved Subsea Video Camera

Courtesy: WFS Technologies

WFS Technologies launched Seatooth Video, the new edition of its subsea wireless video camera. Seatooth Video is an upgraded version of WFS' previous Viewtooth product enhanced with the latest Seatooth S300 technology. The new subsea wireless video camera exceeds the underwater wireless video streaming capabilities so far known in the subsea industry, WFS said. A solution for subsea construction and IRM activities, Seatooth Video removes the need for a second monitoring ROV, provides a second perspective on complex tasks and helps ensure that operations are completed without the risk of ROV umbilical snags. The camera is capable of providing wireless video streaming at a range of up to 4.5m, at 4,000m water depth, in H.264 CIF (352x288) with up to 10 frames-per-second. The control module integrates with ROV Ethernet port and the output files are .asf format. The wireless video system also integrates with other standard subsea cameras, and an optional primary battery may last up to 10 year in standby mode. Seatooth Video ON/OFF mode is controlled by a ROV mounted Seatooth S300, by an internal real time clock or an external trigger (digital input to video). Options include wireless network control of external lights and an external antenna with lead for up to 6m range. According to WFS Technologies, Seatooth Video reduces the time required to complete hot stabs and other complex operations and provides a remote monitoring of subsea equipment and inspections. Seatooth Video is suitable for monitoring subsea deployment, intervention and recovery, in monitoring complex maintenance and repair projects, in ROV pilot training, in quality control and decommissioning-monitoring P&A of subsea wells. Seatooth Video is available in three versions: Fixed Perspective with integrated lights, Pan-Tilt-Zoom enabling wide area coverage and the ability to zoom in on detail and the third option of plugging in a third-party subsea camera.

www.wfs-tech.com

GPRS Enabled Security Camera from OSIL

OSIL offers a new quad band GPRS camera system to the marketplace for site security and asset management. The static, low power system is capable of sending a still color (2 megapixel) image via MMS, email or by FTP to a browser or to a customized website. Pictures can be taken on demand when the camera is sent an activation trigger/request by SMS, telephone, email or web browser, in addition to regular pictures take on a timed schedule, or when the optional motion-activated PIR sensor is triggered.

The camera is housed in a vandal proof IP67 enclosure that can be equipped with a variety of interchangeable lenses to suit various applications (narrow, wide angle, low light, normal light). The camera can be setup wirelessly using the integrated Bluetooth communication, and there is an internal GPS sensor that allows for location tracking, making installation/configuration easier in hazardous/hard to reach areas.

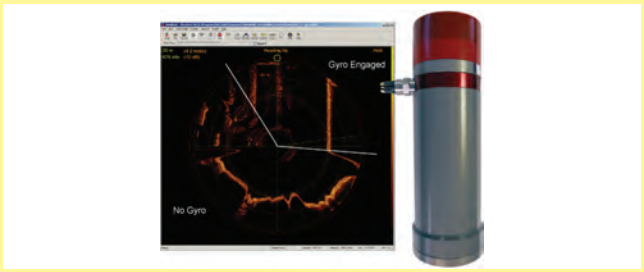
The camera is powered by a 12v lead acid battery which can be linked with a solar panel backup/trickle charge. The power consumption of the system is less than 200mW when idle, and an early low power warning is sent automatically by SMS or email allowing for on-site maintenance to be scheduled in advance. The camera has a backup internal storage for up to 100,000 images and can be linked with additional analogue sensors or networks.

www.osil.co.uk

Sonar Image Stabilization – A Powerful Tool

The Imagenex Model 881L-GS sonar, which employs a low drift gyroscope as well as a magnetic compass, is designed to be capable of correcting for orientation changes at a rate in excess of 500 degrees per second, which allows it to compensate for sudden turns and inadvertent bumping or jarring. Therefore, scan lines are displayed without blurring, compression or smearing effects in all modes of operation, be it polar, sector or North-up. The North-up mode references the sonar image to true north when using an appropriate variation input. Regardless of platform heading changes, the sonar is able to keep the target continuously at the center of the scanning sector. Positional changes of aspect relative to the target are easily compensated by clicking the "Set Gyro Reference" button on the screen.

www.imagenex.com



Kongsberg Autonomous Camera Systems for OOI

The Kongsberg Maritime Camera group delivered the first set of cabled IP Digital Still Camera Stations (CAMDS) to the University of Washington. Designed for real-time imaging via the cabled observatory's Internet connection, the regional CAMDS systems will be deployed as part of the OOI at methane seep and hydrothermal vent sites deep in the ocean. They will capture images of the evolving vents and the bacterial and animal life that grows around them. Each system consists of a HD Digital Stills Camera mounted onto a Pan and Tilt Unit. Also included are LED Lamps, a Dual Laser Reference Unit, Junction Box and frame work. All components including the connectors are made of titanium so the unit can be deployed at a depth of up to 3,000m for up to a year without maintenance.

www.km.kongsberg.com

Bowtech Release New Tooling Camera Range

Bowtech Products released the sixth generation of its color and monochrome tooling cameras with 720 TV lines with improved light sensitivity. As part of Bowtech's continual product improvement strategy, the monochrome LCC-700 has been superseded by the LCC-720 and the color L3C-650 is superseded by the L3C-720. These sensitive, higher resolution cameras are manufactured in a Titanium housing with Sapphire glass ports and are rated for use to 4,000 meters ocean depth (with a 6,000-meter option). They have proven extremely popular with customers with 1,000s of cameras from this range delivered for use in many underwater industries and applications.

www.bowtech.co.uk

Imenco and High Resolution Subsea Digital Imaging

Imenco challenges established standards with the introduction of an all-digital system that it says will have considerable ramifications in the way the subsea industry carries out inspection tasks. The solution, and all of Imenco's future systems, will be run with Ethernet using the latest TCP/IP Standard. With the 'PC' inside the camera rather than on the surface, customers will be able to tailor how they use the subsea system to meet their own specific demands using Apps supplied by Imenco or written specifically for their need. Imenco has designed and written the software providing greater control over the image, lower latency and the ability to deliver potential communications activity currently unachievable in the subsea arena. The most exciting element is that subsea devices will be able to automatically 'talk' to each other.

www.imenco.com

Axis: New Security Cameras

The AXIS Q60-S PTZ Dome Network Cameras in nitrogen-pressurized stainless steel casings can resist the corrosive effect of sea water and cleaning chemicals, and withstand high-pressure steam cleaning. Pressurized nitrogen prevents internal condensation. Axis Communications launched three outdoor-ready, marine-grade stainless steel cameras that enable 360° coverage of wide areas in resolutions up to HDTV 1080p and great zoomed-in detail with up to 36x optical zoom. AXIS Q60-S cameras, with SAE 316L stainless steel and a nylon clear dome cover, can operate in -30°C to 50°C (-22°F to 122°F). They have IP66, IP6K9K, NEMA 4X and MIL-STD-810G 509.5 approvals, ensuring protection against dust, rain, high pressure/steam jet cleaning, snow, ice and salt fog.

www.axis.com

... Worth 1000 Words ...

This illustration gives a light-hearted insight into the mystery of working offshore. Whether you're a hydrographic surveyor, diver, ROV pilot or part of the marine company, we want to show that teamwork is the key ingredient to a successful trip.

Hardide Coatings

Hardide Coatings completed its first application for a remotely operated vehicle (ROV) for Seatronics with exceptional test results, the company claims, resulting in improved performance. Since using the coating on a critical part of the thruster system, the Predator ROV manufactured by Seatronics reportedly has increased in performance and power, with critical wear issues also improved. David Currie, Managing Director at Seatronics, said: "The Observation-class ROV sector is a growing market for us and we want to make the Predator as maintenance-free as possible. The Hardide coating solved the wear issues we were facing and increased the performance of the ROV. Using the Hardide coating on the Predator was like tuning a car to get more miles per gallon and getting F1 performance." Seatronics manufactures the Predator ROV mainly for the oil and gas market to support operations using a diver or larger ROV to provide backup and support.

www.hardide.com

Free Annual Calibration

Tritex NDT Ltd. is offering free annual calibration for the life of its range of products, including the Multigauge 3000 Underwater Metal Thickness Gauge. The gauge is used to measure metal thickness to determine levels of corrosion, without having to first remove coatings. Only the metal substrate is measured due to the Multiple Echo technology used. The Multigauge 3000 is a simple, robust underwater thickness gauge designed to survive harsh conditions that exist in the offshore and underwater environment. The bright red 10mm LED display ensures the measurements can be seen by the diver, even in poor visibility. The gauge is hand held and only one probe type is required.

www.tridexndt.com

New Submersible Pressure Sensor from AST

The Model AST 4530 Liquid Level Transmitter from American Sensor Technologies, Inc. (AST) is designed to measure the level of harsh liquids such as slurries, salt water and oil in vented tanks or containers. Constructed with PVDF material and a PTFE diaphragm, the AST 4530 submersible pressure sensor features a submersible PVDF cable, cord grip and housing as well as a conduit connection for turbulent installations such as process plants, salt water holding tanks, on board ships, turbulent tanks and rail cars. Sensors are certified to Class I Div 1, Groups C and D for use in intrinsically safe areas with an approved barrier.

The PVDF liquid level transmitter is not affected from lid angle or proximity to tank wells, AST said. In comparison to ultrasonic and radar sensor technologies, the AST4530 Liquid Level Transmitter will not have an offset in output due to foaming, reflectivity as well as lid angle or proximity to the tank wall. In plastic tanks, a metal plate is not required to be installed under the transmitter. Vapor and condensation will not affect the reading or survivability, as the transmitter is vented through the cable to the outside of the tank or container. For marine and water processing applications, it offers the advantage of not requiring sacrificial anode to reduce corrosion over time. It will also survive longer than standard submersible transmitters in applications where bacteria can attack metal.

www.astsensors.com

Sonardyne System to Monitor North Sea CO2 Leaks

Sonardyne International is taking part in a new Energy Technologies Institute (ETI) project within the Carbon Capture Storage (CCS) program to develop a Carbon Dioxide (CO2) marine and shallow subsurface monitoring system for underground CCS sites in the North Sea. The system will monitor for any CO2 leakage from saline aquifers and offshore storage sites such as oil and gas fields, both active and depleted. The development of a U.K.-based North Sea CCS industry is an important element in the government's initiative to significantly cut greenhouse gas emissions by 2050, mitigating against high future energy costs and for developing high value, low carbon industries. Other members of the Consortium are lead participant Fugro GEOS Ltd., the National Environment Research Council (NERC – as represented by the National Oceanography Centre and British Geological Society), Plymouth Marine Laboratory and the University of Southampton.

Using technologies already proven in the offshore and oceanographic industries, combined with new remote sensing technology, the consortium will develop an integrated leak detection system that is capable of both wide area coverage by AUVs/ASVs (Autonomous Underwater Vehicles/ Autonomous Surface vehicles) and continuous automated monitoring of high risk areas. For these sites, the use of Sonardyne's Automatic Leak Detection Sonar (ALDS) has been proposed. ALDS is both an active and passive sonar capable of monitoring more than one billion cubic feet of water for the smallest of leaks. The system is fully automated, offering reliable detection, rapid notification and localization of leaks. It provides continuous 360° coverage, detecting leaks after only tens of seconds.

As the data is gathered from both ALDS, the AUVs/ASVs and other monitoring technologies, it will be relayed to shore using a combination of wireless acoustic and satellite communications and existing reservoir infrastructure acting as surface-to-shore relay stations. Sonardyne's Autonomous Monitoring Transponders (AMTs) will form the core power, data logging and communications backbone for this data sensing and relay. AMT's autonomously acquire acoustic ranges and sensor data is then time-stamped and logged internally for recovery via the integrated high-speed acoustic telemetry modem. This autonomy allows measurements to be made over long periods of time and a wide range of sensors for the detection of CO2 can be interfaced and integrated, providing an ultra-low power platform for up to five years unattended deployment.

www.sonardyne.com

MARINE TECHNOLOGY REPORTER

2014 Editorial Calendar

ISSUE	EDITORIAL	BONUS DISTRIBUTION	AD CLOSE
JANUARY/ FEBRUARY	**Subsea Vehicles: UUVs** **Market:** Harsh Environment Systems: Arctic Ops **Tech:** Scientific Deck Machinery **Product:** Training Resources	**Arctic Technology Conference** Feb. 10-12, Houston **Subsea Tieback** March 4-6, San Antonio	January 21
MARCH	**Instrumentation: Measurement, Process & Analysis** **Market:** Oceanology Intl '14 Technology Spotlight **Tech:** Umbilicals, Cables, Connectors & Power Supply **Product:** Sonar Systems & Seafloor Mapping	**Oceanology International** March 11-13, London	February 18
APRIL	**Offshore Energy** **Market:** Seismic Vessels & Systems **Tech:** Deepwater Positioning, Mooring & Anchoring **Product:** Subsea Pipeline Survey & Inspection	**Offshore Technology Conference** May 5-8, Houston **AUVSI 2014** May 12-15, Orlando	March 27
MAY	**AUV Operations** **Market:** Offshore Renewable Energy: Wind, Wave & Tide **Tech:** Salvage & Recovery **Product:** Remote Sensing & Environmental Monitoring	**Energy Ocean International** June 3-5, Atlantic City	April 24
JUNE	**Hydrographic Survey** **Market:** Comms, Telemetry & Data Processing **Tech:** GPS, Gyro Compasses & MEMS Motion Tracking **Product:** Underwater Imaging: Lights, Cameras, Sonar		May 27
JULY/ AUGUST	**MTR100** Annual Listing of 100 Leading Subsea Companies **Special Report:** Oceans 2014 Preview **Region Focus:** Newfoundland and Labrador, Canada		July 21
SEPTEMBER	**Ocean Observation: Gliders, Buoys & Sub-Surface Networks** **Market:** Research Vessels **Tech:** ROV Tech: Workclass to Micro Systems **Product:** Geospacial Software Systems for Hydrography	**Oceans 2014** Sept. 14-19, St. John's, Newfoundland and Labrador, Canada	August 21
OCTOBER	**Subsea Defense** **Market:** Oil Spill Monitoring & Tracking **Tech:** Seafloor Engineering & Remote Operations **Product:** Fiber Optic and Electrical Connectors	**Clean Gulf** Dec. 2-4, San Antonio	September 25
NOVEMBER/ DECEMBER	**Fresh Water Monitoring & Senors** **Market:** Subea Engineering & Construction **Tech:** Offshore Inspection, Maintenance & Repair (IMR) **Product:** Commercial Diving: Lights, Cameras, Helmets	**Underwater Intervention 2015** New Orleans	November 26

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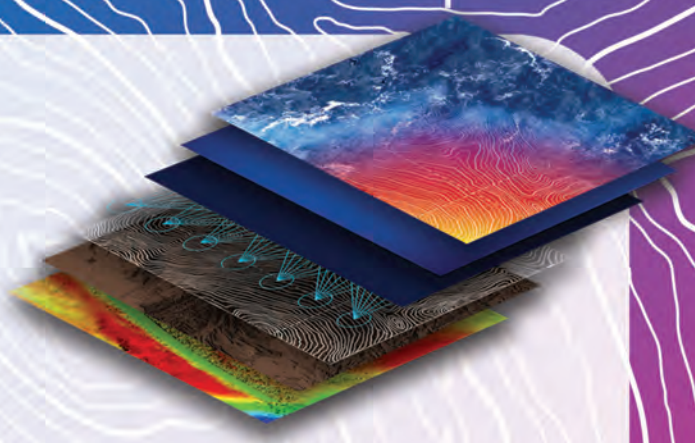
Oi oceanology international™ CHINA

上海国际海洋技术与工程设备展览会
3-5 SEPT 2014, INTEX, SHANGHAI



Concurrent Exhibitions

SC14 Subsea China
3-5 SEPT 2014, INTEX, SHANGHAI

OREC14 Ocean Renewable Energy China
3-5 SEPT 2014, INTEX, SHANGHAI

Asia's Premier Event for Marine Science and Ocean Technology

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Sales Contact

China
Jessica Liu
T: +86 10 5933 9054
E: jessica.liu@reedexpo.com.cn

UK & Europe
Graham Earl
T: +44 (0) 20 8910 7890
E: graham.earl@reedexpo.co.uk

AP & Rest of the World
Judy Zhang
Tel: +86 10 5933 9082
E-mail: judy.zhang@reedexpo.com.cn





www.oichina.com.cn

3-5 SEPT 2014, INTEX, SHANGHAI

Organiser: Reed Exhibitions 励展博览集团

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Host Supporters: CSO Chinese Society of Oceanography; China Ocean Mineral Resources R & D Association; National Ocean Technology Center

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EvoLogics GmbH
Ackerstrasse 76,
13355 Berlin, Germany
tel.: +49 30 4679 862-0
fax: +49 30 4679 862-01
sales@evologics.de
evologics.de

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