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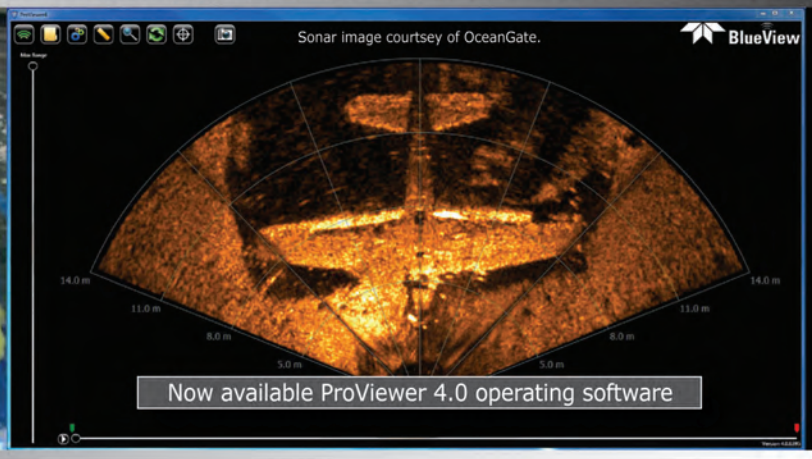

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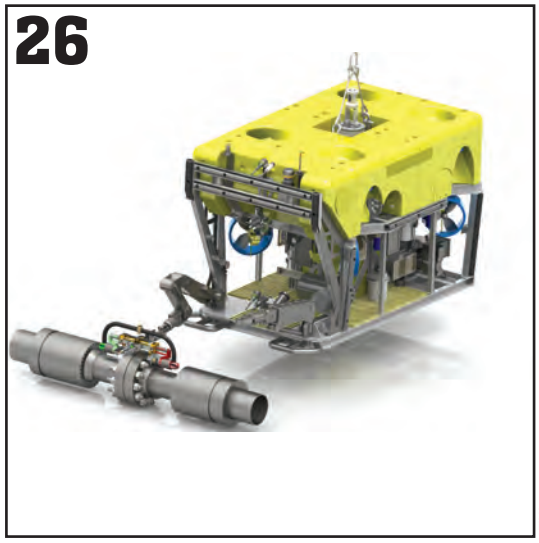
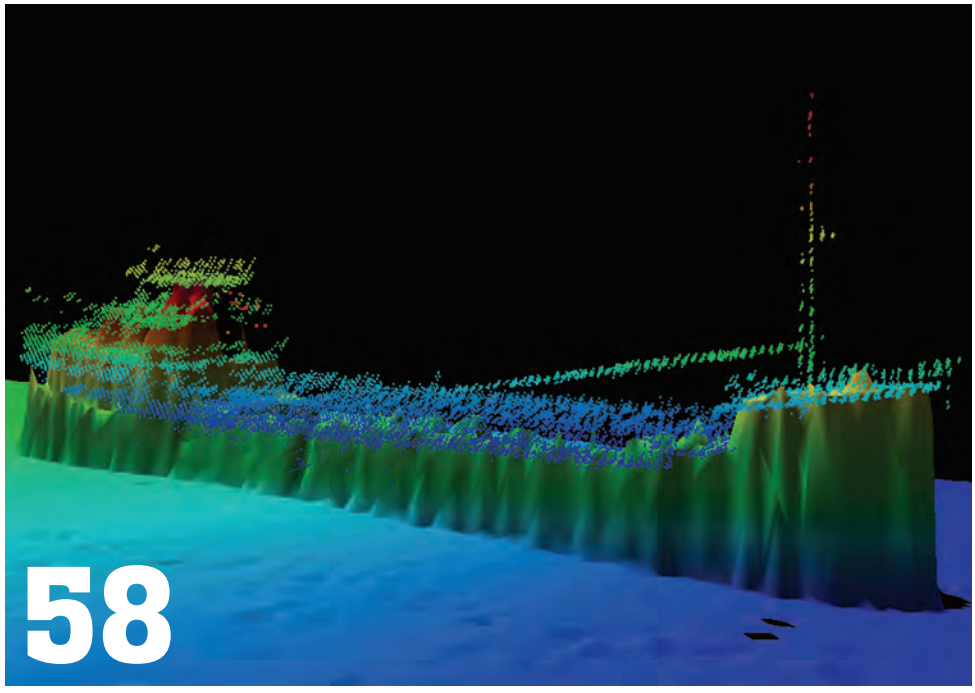


ATIVA



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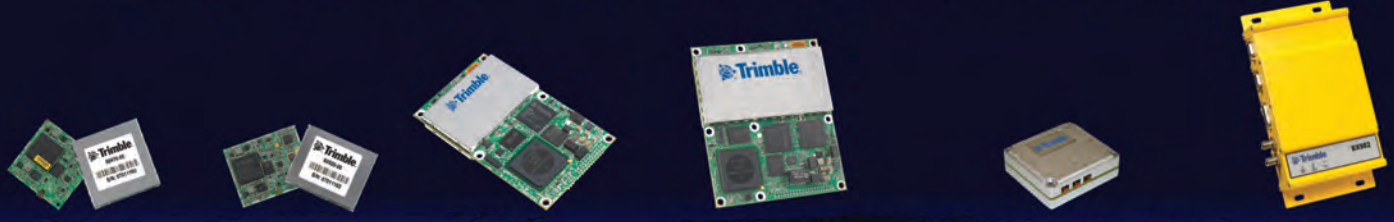

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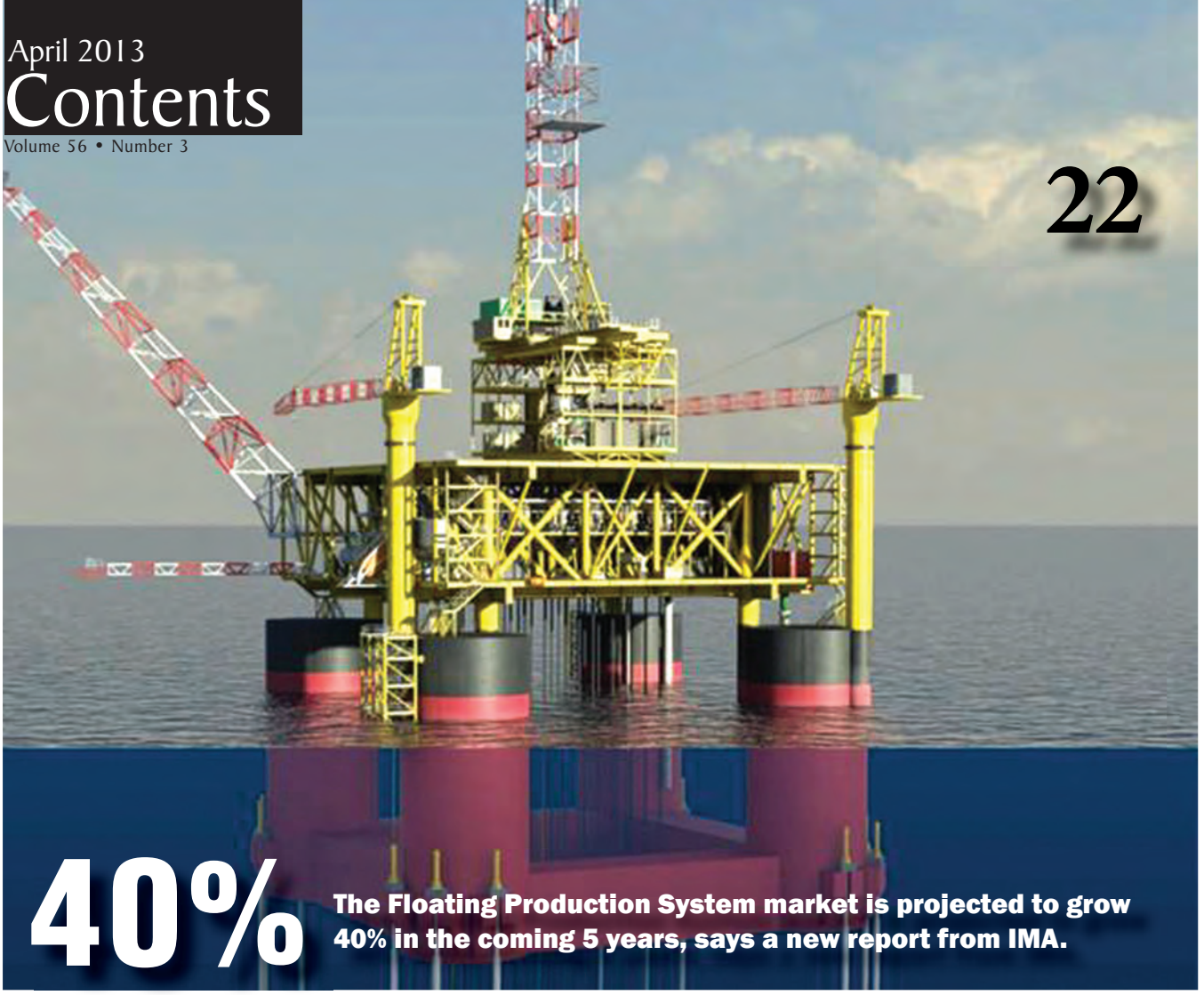

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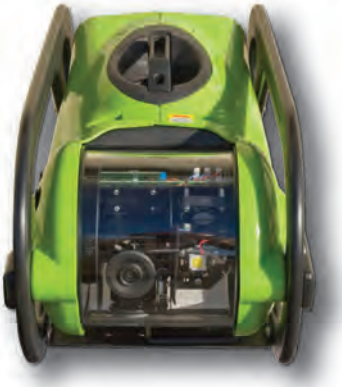
40% **The Floating Production System market is projected to grow 40% in the coming 5 years, says a new report from IMA.**

R&D

Noise

Offshore Awards

SeaBotix



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Little Benthic Vehicles

VIEW:

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Brazil takes center stage of this edition of *Marine Technology Reporter*, our Annual Offshore edition. While many of you are already active or actively pursuing opportunities in Brazil's subsea business, the country remains a conundrum for many, as the process to establish a business there is often long, arduous and expensive. Here and around the world, the offshore energy business has been a major driver of the world economic recovery. To help put things in perspective I share with you an exclusive report authored by Jim McCaul of IMA. For those of you not familiar with McCaul's work in this sector, he is an offshore Floating Production System guru of sorts, producing his *Floating Production System Report* for more than 15 years. You can read the full story starting on page 22, or for those in need of the full-style 226-page report, you can Email McCaul at **imaassoc@msn.com**. But there are several key takeaways:

- **40%**: IMA forecasts the Floating Production System Sector will grow 40% between 2013 and 2017, a projected need of 124 to 190 additional production floaters in this timeframe.

- **77**: The number of production floaters on order, which is an all-time high.

- **55**: Brazil is the largest location in terms of floating production systems in operation with 55, including 35 FPSOs, 18 production semis and two FSRUs.

That last factoid is a perfect segue to a pair of articles in this edition from Claudio Paschoa, *MTR's* contributing editor located in Rio de Janeiro. This month Paschoa takes *MTR* on a stroll through the hallways and research labs of CENPES, which is Petrobras' in-house R&D center, home to 238 PhD researchers, 496 MSc researchers and nearly 1,900 employees throughout 227 laboratories. As Petrobras is the driver to Brazil's offshore oil and gas business, CENPES is a driver of Petrobras' massive investment in the technologies to ensure efficient and safe production. Paschoa's second story is a shift in gears, from a global corporate behemoth (Petrobras) to ATIVA, a small, five-person subsea solutions company founded in 2006. In reading the story I think that many *MTR* readers will relate, as it is the story of two innovative people with an innovative idea, that have invested, grown the business and are now looking for additional investment to grow further faster. As partnering with a local company is often the quickest means to penetrate the Brazilian market, perhaps one or more of you will find yourself intrigued by the ATIVA story.

MARINE TECHNOLOGY REPORTER
www.seadiscovery.com
Vol. 56 *No. 3*
ISSN 1559-7415
USPS# 023-276
118 East 25th Street,
New York, NY 10010
tel: (212) 477-6700;
fax: (212) 254-6271

Marine Technology Reporter ISSN 1559-7415 is published monthly except for February, August, and December by New Wave Media, 118 E. 25th St., New York, NY 10010-2915. Periodicals Postage at New York, NY and additional mailing offices.

POSTMASTER: Send address changes to Marine Technology Reporter, 850 Montauk Hwy., #867, Bayport, NY 11705
Postmaster send notification (Form 3579) regarding undeliverable magazines to Marine Technology Reporter, 850 Montauk Hwy., #867
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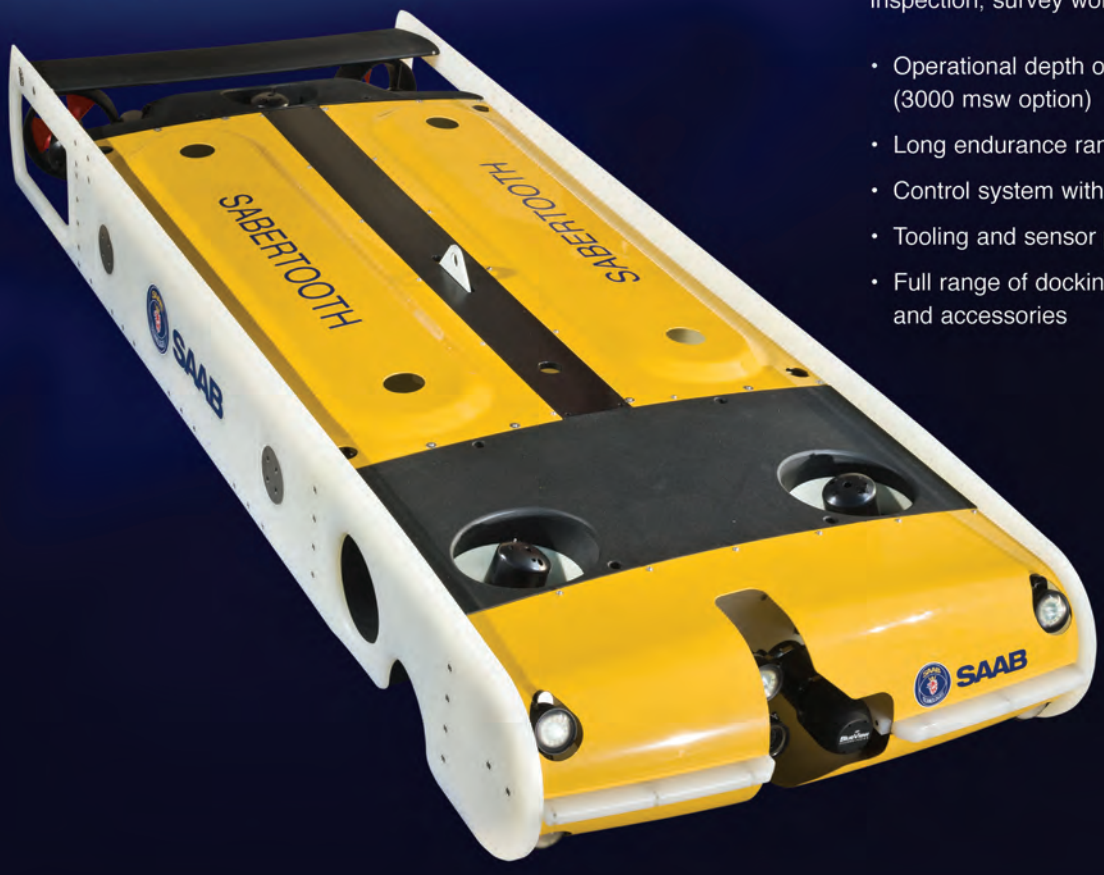

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Student Teams Prep for Indianapolis and the

National SeaPerch Challenge

Underwater Robotic Championships

In only a few weeks, SeaPerch, a national educational outreach program using underwater robotics, sponsored by the Office of Naval Research (ONR), will hold its 2013 National SeaPerch Challenge. Hosted by the Indiana State Regions this annual competition will take place on the campus of Indiana University Purdue University Indianapolis (IUPUI) on Saturday, May 18, 2013, at the University's Natatorium housing the Olympic pool. There the top 100 winning teams from regional competitions held across the nation will gather to assess how their SeaPerch underwater robots will fare in competition among their peers through a series of underwater challenges and a juried poster presentation to determine the 2013 middle school and high school National Champions. This is the third year for the National SeaPerch Challenge, and the first year for Nationals to be held in Indianapolis.

SeaPerch is an innovative K-12 underwater robotics program that trains teachers and group leaders to inspire their student teams to build their own SeaPerch Remotely Operated Vehicles (ROV's) following a curriculum consistent with national

"With guidance from AUVSIF and with ONR's commitment to SeaPerch, which introduces K-12 students to STEM through underwater robotics, the program has grown exponentially, reaching over 70,000 students to date," said Susan Nelson, Executive Director of SeaPerch.

THE FUTURE IN MOTION

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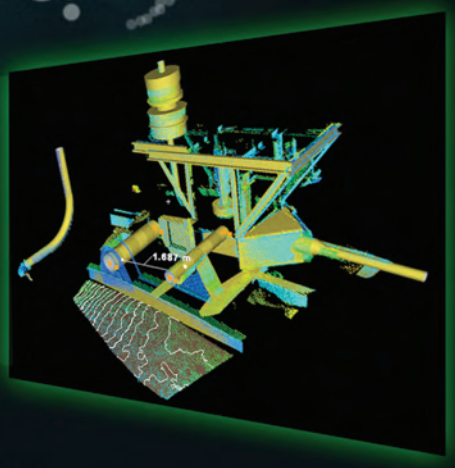

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standards supporting Science, Technology, Engineering and Mathematics (STEM) subjects with a marine engineering-based theme. The program promotes hands-on learning of engineering concepts, problem solving, teamwork, design skills and introduces students to potential and exciting careers in naval architecture, marine, ocean and naval engineering. Now in its sixth year SeaPerch is administered by the Association for Unmanned Vehicle Systems International Foundation (AUVSIF). "With guidance from AUVSIF and with ONR's commitment to SeaPerch, which introduces K-12 students to STEM through underwater robotics, the program has grown exponentially, reaching over 70,000 students to date," commented Susan Nelson, Executive Director of SeaPerch. Over 6000 trained teachers and mentors are also committed to support student learning through this stimulating and fun hands-on activity by following an established academic curriculum to discover the excitement of STEM as a potential future career path. The program reaches a diverse population, so participants in the Challenge will be students across the country, from inner city Baltimore to rural Mississippi to Native American reservations in Minnesota to the islands of Hawaii, who have been introduced to STEM through SeaPerch.

Building on the success of last year, on Friday evening, May 17, the opening event will be the Welcome Party for the teams from that evening in the Natatorium with light refreshments available. This will be a great opportunity for all to meet and mingle. Team leaders should also plan for their teams to bring their SeaPerch ROV as we will be open for check-in and compliance checks in order to reduce congestion the next morning.

Competition day, Saturday, May 18, will begin at the Natatorium with the required check-in's followed by an opening ceremony, photographers and videographers recording the events, local media in attendance, and again this year, live streaming of the day's activities for the benefit of classmates, friends and parents back home across the country. A juried poster competition is planned for both middle and high school teams to introduce their graphic displays and deliver oral presentations about their design philosophy, construction challenges and answer questions posed by the judges. The pool's technical competition events will consist both of an Obstacle Course and an entirely new Deep Water Transfer challenge. Specifications for these underwater events are posted on the SeaPerch website, www.seaperch.org, so teams may build their own for practice prior to the national competition. Nearly 100 judges and volunteers are expected to cover the poster and the pool competitions and help in various capacities during the day's

The National SeaPerch Challenge challenges student teams to not only build and operate subsea vehicles, but to prepare presentations and explain methodology.

activities. Team Entry Rules as well as Competition Event Rules, specifications and rubrics are posted separately on the SeaPerch website.

On Saturday evening a gala Awards Banquet will be held at the J W Marriott, the official team hotel, for approximately 800 attendees where the presentation of the awards will take place. Trophies will be awarded for the first three places in each event for middle, high and open class as well as the awarding of the Technical Director's choice for design innovation. Featured speakers are invited to observe the competition during the day and to address the students that evening at the banquet about the importance of STEM to their future careers. Corporate sponsors, state and city representatives, ONR, US Navy and US Coast Guard personnel who are attending the banquet, will also be invited to judge the various competitions and to interact with the students during the day's activities. In addition to the 100 teams of students and their leaders, classmates, parents, friends, volunteers, judges, VIP's, speakers and committee members will make up the projected total attendance of 800 in Indianapolis.

The next day, Sunday, May 19, teams will have an opportunity to explore on their own the many and varied educational opportunities available within the city limits of Indianapolis. Our hosts, Indiana State Regions, will provide ideas for the day's activities including visits to parks, historic sites and museums all within easy walking distance of the hotel.

All students will receive National SeaPerch Challenge T-shirts and SeaPerch medals for their participation in the National Challenge as well as an event bag filled with items provided by the SeaPerch program, corporate sponsors, our Indiana hosts and AUVSIF. Additionally, Certificates of Participation and Appreciation are posted on the SeaPerch website both for student participants and for teachers and advisors to download following the National Challenge.

New this year, The National SeaPerch Challenge will collaborate with NTMA's 2013 National Robotics League (NRL) Championships, also to be held on the IUPUI campus on May 17-19, 2013, the third year in a row its National Champion-

The Office of Naval Research is a strong supporter of the National SeaPearch Challenge, generously donating expertise and time in helping to foster an interest in science and engineering among young people.

ship will be held in Indianapolis. The NRL is a student-designed robot combat competition intended to introduce a new generation of Americans to the advanced skills and sophisticated technology that mark manufacturing today. The collaboration is more of an exchange, which will allow for interaction among the participants during the overlapping two days of national championships. "The SeaPerch Program and the NTMA are excited about this opportunity to provide an exchange forum for these simultaneous events allowing the student participants of both to visit each other's championships, interact with their peers and learn about different robotics platforms as they observe each other's skills in the heat of battle," added Nelson.

National SeaPerch Challenge sponsorship opportunities are still available for individual, local and corporate funding, details of which are posted on the SeaPerch website, www.seaperch.org. Also, we are always in need of volunteers and judges. Should you be interested in participating as a volunteer or judge on May 18, please click on the following link: http://www.regonline.com/builder/site/Default.aspx?EventID=1149740.

For More Information

Visits: **www.seaperch.org**

or contact:

Phil Kimball, Program Director
Tel: 201-310-2607
Email: pkimball@seaperch.org

Please also visit the AUVSIF website at **www.AUVSIF.org** to learn more about the Association for Unmanned Vehicle Systems International Foundation, which promotes the development of aerial, land-based and subsea robotic systems.

While winners are rightly rewarded, the true spirit of the National SeaPerch Challenge lies in the participation, and the the recognition by the next-generation of the potential to be found in science and engineering pursuits.

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Safety Innovations

A Chet Morrison diver works on a subsea project.

Recent trends toward closer collaboration between operators and contractors—who after all share an interest in avoiding incidents and promoting safe operations—are a good sign for the industry. But it takes the right kind of partners to benefit from the arrangement—an operator must be willing to include its contractor partner in the early stages of engineering and risk assessment, and a contractor needs to have the expertise to advise and support the client effectively. When done well, these kinds of collaborations have the potential to deliver safer and more innovative technologies that benefit everyone. A recent subsea P&A project involving Chet Morrison Contractors and Helix ERT provides an example of an operator/contractor partnership that resulted in a win-win situation for both companies and for the industry as well.

Operator Helix ERT hired Chet Morrison Contractors to provide well plugging and abandonment and diving services on a 2012 4-well Subsea P&A project in the VR, SMI and HI fields. While thorough job planning and risk assessments were performed prior to mobilization, there are always unanticipated challenges once work begins on site. It was at the first location of the project when it was discovered that the bottom profile and specifics associated with the subsea tree would require longer jet time and unwanted risks for the Chet Morrison divers. Together the teams evaluated options, one of which was using existing subsea cutting methods--meaning more

SHARC can be deployed by Chet Morrison's 240 foot, 4-point DSV Joanne Morrison, thus avoiding the higher cost of larger spreads.

resources, time and costs. Because the team from Chet Morrison, led by Well Services Vice President Bobby Lott and Diving Operations Manager Kevin Lord, was working together to perform both work scopes, they were able to offer an alternative option they believed could provide a far better solution. The Chet Morrison team proposed a plan to use a prototype subsea abrasive cutter they developed, and Helix ERT agreed to let them try it on the project.

Chet Morrison's prototype subsea abrasive cutter worked well, proving to be a more efficient way to cut the casing stubs while also eliminating the need for hand jetting the hard bottom. Not only did the method decrease dive time and increase productivity, but by utilizing a smaller

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equipment spread the operators benefited from multi-million dollar cost savings. The incident-free project was a success for both Helix ERT and Chet Morrison Contractors. “Even with my diving background and passion for diving, I would always prefer to remove a diver from the equation when technology exists that can mitigate unnecessary risk,” noted Lord, “In this instance, we were able to keep our divers out of harm’s way and save our customer avoidable costs.”

Following on the success from the Helix ERT project, Chet Morrison Contractors spent many months testing and refining the prototype to develop the new assembly, called “SHARC”—Subsea Hydraulic Abrasive Rotating Cutter. With this innovative new subsea abrasive cutting technology, they’ve eliminated the need for hand jetting and decreased the time divers spend underwater performing cuts themselves. SHARC needs only a diver or ROV to position it over the pipe opening—then operations can be managed from the surface. Another advantage is that SHARC can be deployed by Chet Morrison’s 240 foot, 4-point DSV Joanne Morrison, thus avoiding the higher cost of larger spreads. The DSV Joanne and other vessels in their fleet are also able to provide solutions for overcoming mud suction when pulling the stub (up to 150,000 pounds). While SHARC’s specs are comparable to other abrasive cutters, it is a vast improvement on existing methods. SHARC can make clean, even cuts on pipes 2 inches and larger, handle walls up to 3 inches thick, and can cut any size caisson or jacket leg from surface or subsea to depths up to 500 feet. It’s a whole new option in P&A cutting that reduces unnecessary risks for divers—and one that is the direct result of the close cooperation and communication of an operator and contractor who shared a common commitment to safe execution.

The oil and gas industry is often criticized for a perceived disregard for safety or environmental impact. The truth is that operators and contractors are constantly looking for more efficient, safer and less harmful ways to conduct business. The Chet Morrison/Helix ERT job is a useful example of how operators and contractors can work closely together to identify and solve problems, develop new solutions and produce innovations that benefit everyone. Having a single contractor partner also lowers the risk of error or miscommunication by reducing the number of different parties involved. “Because our diving and well services experts worked together as a team, we were able to ensure accurate communication and maintain our extremely demanding standards for safe operation,” said Ryan Vestal, Engineering Manager Well Services.

Another sign of this trend is the recently formed U.S./Gulf

of Mexico Diving Safety Work Group (DSWG). A first-of-its-kind alliance between operators and contractors for the purpose of advancing safety in Gulf diving operations, DSWG provides a forum for operators and contractors to work together, sharing best practices and lessons learned. Chet Morrison's Kevin Lord is an executive board member of the group, where he works closely with operators and fellow contractors to share information with each other in order to improve safety for the entire industry. Owners and contractors acting together to improve safety and reduce environmental impact may not make the front-page—but considering their impact, maybe they should.

DSV JOANNE MORRISON

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Water	90,000 gal.
Flag	USA.
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Crane	Mantis Model 14010 70-ton Hydraulic Crane
Engines	2 x 645 EMDs C Model
Horsepower	1,500
Main Generators	2x 300 kW
Emergency Generator	375 kw
Sat Generator	275 kw
Winches	2 x SMATCO Double Drum
Wire	4x 6,000 x 1-1/4" Wire
Dynamic Positioning	White Gill Thrusters
Anchors	2 x 17,000 lbs., 2x 15,000 lbs.
Moon-Pool Deployed	4-man 1000' Saturation Diving System (24"d)
HRC:	4-man Hyperbaric Rescue Chamber
Diving Station:	Deep Air/Gas Surface

Floating Production System projected to grow

40% in Five Years

By Jim McCaul, IMA

IMA has just completed an in-depth analysis of the floating production sector. The study profiles the deepwater industry, examines the dynamics driving the sector and forecasts orders for floating production systems between 2013 and 2017. Highlighted below are some key findings in the study.

Growing Inventory of Floating Production Systems

There are now 264 floating production systems in operation. The number of units is 25% greater than five years ago, almost 85% higher than 10 years back and triple the number of units 15 years ago. Most of the growth has been in the number of Floating Production, Storage and Offloading Vessels (FPSOs). This figure has increased by 114 units over the past 15 years.

FPSOs now account for 63% of the existing systems. The balance is comprised of production semis, tension leg platforms, production spars, production barges and floating regasification/storage units. In addition to floating production systems, another 102 floating storage/offloading units (FSOs) are in service.

3D Model of TLP
Hyundai Heavy Industries (HHI) received a letter of award for a $1.3B order for a floating production unit (FPU) and a $700m order for a tension leg platform (TLP) from Total E&P Congo. HHI will carry out engineering, procurement, supply, construction, and commissioning for the two offshore facilities to be deployed in Moho Nord field, 80 km off Republic of the Congo's coast. The 14,600-ton vertically moored floating TLP will be used to extract oil and natural gas, and transport those to the floating production unit.

55

Brazil is the largest location in terms of number of floating production systems now operating. There are now 55 FPSs in service offshore Brazil. The figure includes 35 FPSOs, 18 production semis and 2 FSRUs

Brazil is the largest location in terms of number of floating production systems now operating. There are now 55 FPSs in service offshore Brazil. The figure includes 35 FPSOs, 18 production semis and 2 FSRUs. West Africa is second largest with 48 FPUs in service, followed by the Gulf of Mexico (47 units), Northern Europe (39 units) and Southeast Asia (27 units).

Backlog of Production Floater Orders

The number of production floaters on order is at an all-time high. The current order backlog consists of 77 production floaters – 44 FPSOs, seven production semis, five TLPs, five spars, four FLNGs and 12 FSRUs. Delivery of the equipment will grow the production floater inventory by 29%.

In the backlog are 46 units utilizing purpose-built hulls and 31 units based on converted tanker hulls. Of the production floaters being built, 46 are owned by field operators, 31 are being supplied by leasing contractors. Brazil continues to dominate orders for production floaters – 26 units are being built for use offshore Brazil, 34% of the order backlog.

Planned Projects

The number of planned floater projects

continues to grow. 248 projects potentially requiring a floating production or storage system are now in the planning stage. A year ago, 216 projects were being planned. Five years ago, the figure was 134 projects.

Brazil is the principal location for new floating production projects. The huge pre-salt oil reserves offshore Brazil have been generating deepwater finds at a rapid pace. Africa is in second place in terms of planned floater projects, followed by Southeast Asia, Gulf of Mexico and Northern Europe.

The growth in number of planned projects reflects the huge increase in deepwater drill equipment over the past decade. More than 150 drillships or deepwater semis have been ordered since 2003, removing a bottleneck that constrained exploration and development in deepwater. The result has been a dramatic increase in floater projects in the planning pipeline.

Five Year Forecast

Our analysis indicates a requirement for 124 to 190 additional production floaters between 2013 and 2017. The most likely figure is 160 orders – which would be 40% greater than the number of orders over the past five years.

FPSOs are expected to account for around 70% of future production floater orders. The remaining 30% will be production semis, spars, TLPs, FLNGs and FSRUs. Around 60% of FPSO orders will be placed by leasing contractors, 40% by field operators. Modification and redeployment of existing FPSOs will satisfy around 20% of future FPSO requirements.

Capital expenditure to procure this equipment is projected to be in the range of $90 to $130 billion over the next five years

Terms Used:
FPSO – Floating Production, Storage and Offloading Vessel
FSO – Floating Storage and Offloading Vessel (no production plant)
FSRU – Floating LNG Storage and Regasification Unit
FLNG – Floating LNG Liquefaction Plant
Semi – Production Semisubmersible
TLP – Tension Leg Platform
SPAR – Production Spar (cylindrical shape)
FPS – Floating Production System (all types)

3D Model of FPU

A part of HHI's $1.3B order is a 62,000-ton FPU, measuring 250 m in length, 44 m in width, and 18 m in depth, will process the received oil and gas, and send the products to onshore plants via subsea pipelines. The FPU has a production capacity of 100,000 barrels of oil and 2.5 million cubic metres of natural gas per day. The TLP and FPU will be installed at the Moho Nord field in the first half of 2015 and 2016 respectively.

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The number of production floaters on order is at an all-time high. The current order backlog consists of 77 production floaters – 44 FPSOs, seven production semis, five TLPs, five spars, four FLNGs and 12 FSRUs.

The New IMA Study

The new IMA study Floating Production Systems: assessment of the outlook for FPSOs, Semis, TLPs, Spars, FLNGs, FSRUs and FSOs provides details:

- 264 production floaters and 102 storage floaters currently in service and key characteristics of each unit
- 250 production floaters and 103 storage floaters delivered or redeployed since 1996 identifying the builder/conversion yard of each unit
- 77 production floaters, 10 storage floaters and 2 MOPUs currently on order, key features of each unit and the delivery status
- 248 floating production projects in the visible planning cycle, type unit likely to be utilized on the project and the status of project development
- 124 to 190 production floaters forecast to be ordered over the next five years.
- 25 to 35 storage/offloading floaters forecast to be ordered over the next five years

An outline and purchase details are available at **www.imastudies.com**.
Or, contact Jim McCaul: Email: imaassoc@msn.com; tel: +1-202-333-8501

ATIVA *Subsea Solutions 'Made in Brazil'*

By Claudio Paschoa

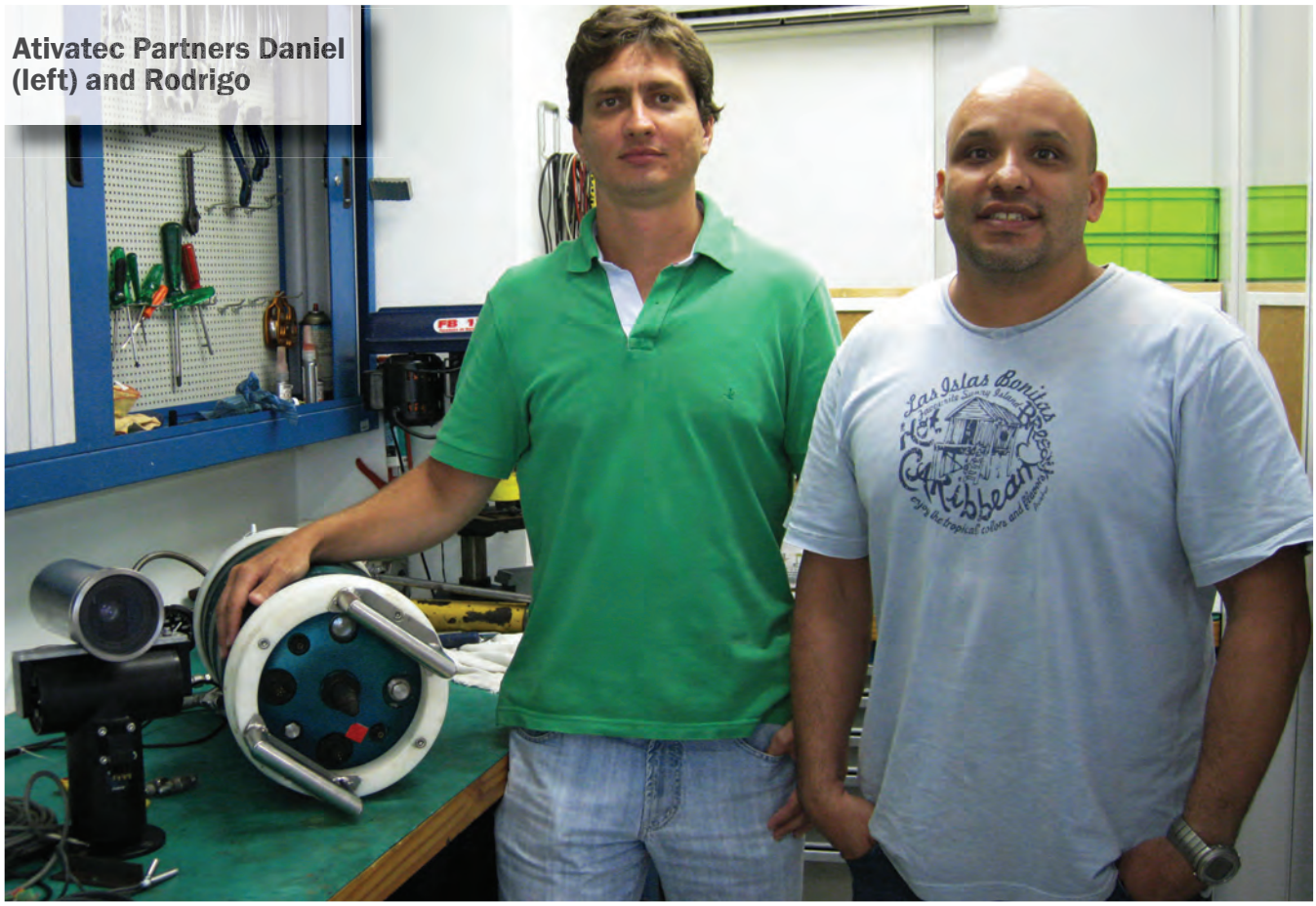
ATIVA is a Brazilian company that develops and provides innovative technologies in Subsea Engineering. ATIVA specializes in developing solutions to the constant technological challenges encountered in deep waters Oil & Gas operations. The company offers services from custom designs for their client all the way to operations in the field.

ATIVA is an offspring of the Genesis Institute of the Catholic University of Rio de Janeiro (PUC-Rio), which foments the creation of technologically oriented businesses ventures run by university students and graduates.

Marine Technology Reporter's correspondent in Brazil interviewed Mr. Daniel Almeida Camerini, one of the partners in ATIVA, about the origins of the company and it's role in subsea technology development in Brazil.

Daniel, along with partner Rodrigo Carvalho Ferreira command ATIVA, also known as Ativatec, in the highly competitive Brazilian subsea equipment and services market.

The subsea equipment segment of the O&G industry in Brazil, is mostly controlled by foreign companies with long track records in the area. Few 100% Brazilian companies are present in this market, which is very competitive and requires large investments in high-end technology and specialized engineering skills, making it a market which has products of high aggregated value. With the continuous growth of the deepwater equipment and services demand from super-major players present in Brazil, companies such as ATIVA are proof that local high-end subsea engineering is reaching out to face-off with established foreign competition and may also be indicative of the importance of Brazil's government sponsored local content policy.



Ativatec Partners Daniel (left) and Rodrigo

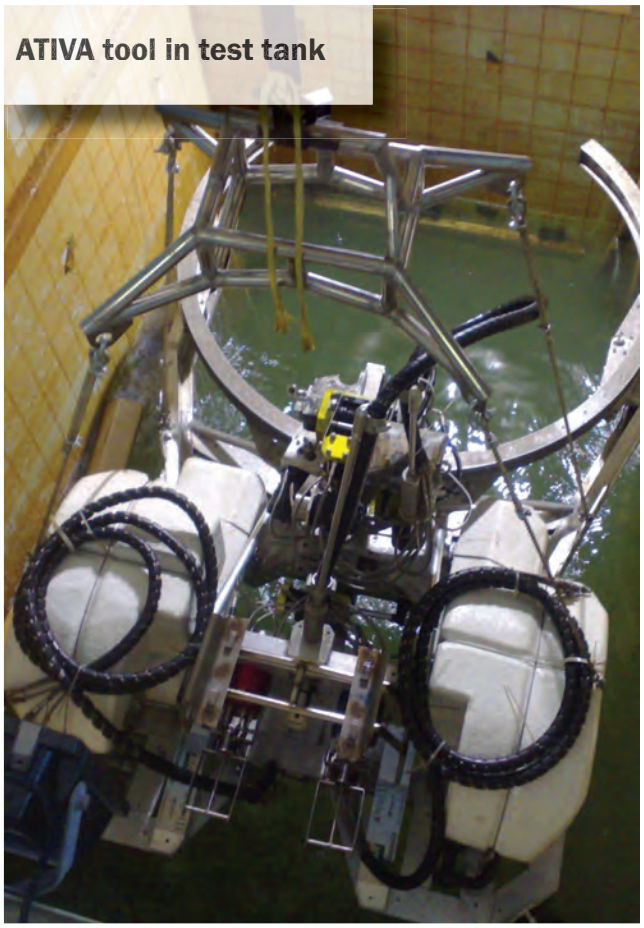
(Photo Ativatec)

Could you give us an insight into your professional profile?

I am 33 years old, and I hold a Masters Degree in Automation and Control Engineering by PUC-Rio, I have coordinated R&D projects in the O&G industry as Research Engineer for PUC-Rio for last 10 years, and I am presently partner and manager of Ativa Tecnologia e Desenvolvimento (Ativa Technology and Development).

Along with participating in the development of new equipment patents in the subsea industry I have received prizes and presented scientific papers in Pipeline Congresses, such as “Honorable Mention in the Rio Pipeline 2003 conference;” “Pipeline pigging, integrity assessment, and repair conference 2003 – EUA;” “International Pipeline Conference 2004-Canadá.” Rio Oil & Gas 2004, Inventor Prize from Petrobras in 2008 with the work on “Pig Leak Detection by Infra-Red and Inventor Prize from Petrobras in 2012 for the work on “Sistema para inspeção por ultrassom de falhas em acoplamentos submarinos e método de operação e funcionamento deste sistema” or (System for ultrasonic inspection in subsea coupling faults and method of operation of this system).

ATIVA tool in test tank



(Photo Ativatec)

Why did you decide to start a company specializing in subsea technology?

The company partners are graduates of the Catholic University of Rio de Janeiro (PUC-Rio), where they also worked in research and development projects in partnership with the Petrobras Research Center (CENPES). During this period the partners noticed that there were few local companies specialized in subsea technology and practically all equipment and services are important and have high aggregated value.

With the certainty that the technical capacity of the ATIVA team in developing products and services with high reliability and lower costs than the imports, along with the increasing demand from O&G operators to drill and produce in increasingly deeper waters, Ativatec presented itself to the market as one of the few Brazilian companies specialized in subsea technology.

What was the importance of the Genesis Institute of PUC-Rio for the company?

The Genesis Institute was important in integrating the company with professors and students at the university, to give visibility to the company through the media and in the technology and business communities specialized in subsea technology in Brazil.

When was the company founded, and how many people do you employ?

Ativatec was founded in 2006 and employs five people.

Which are your main clients?

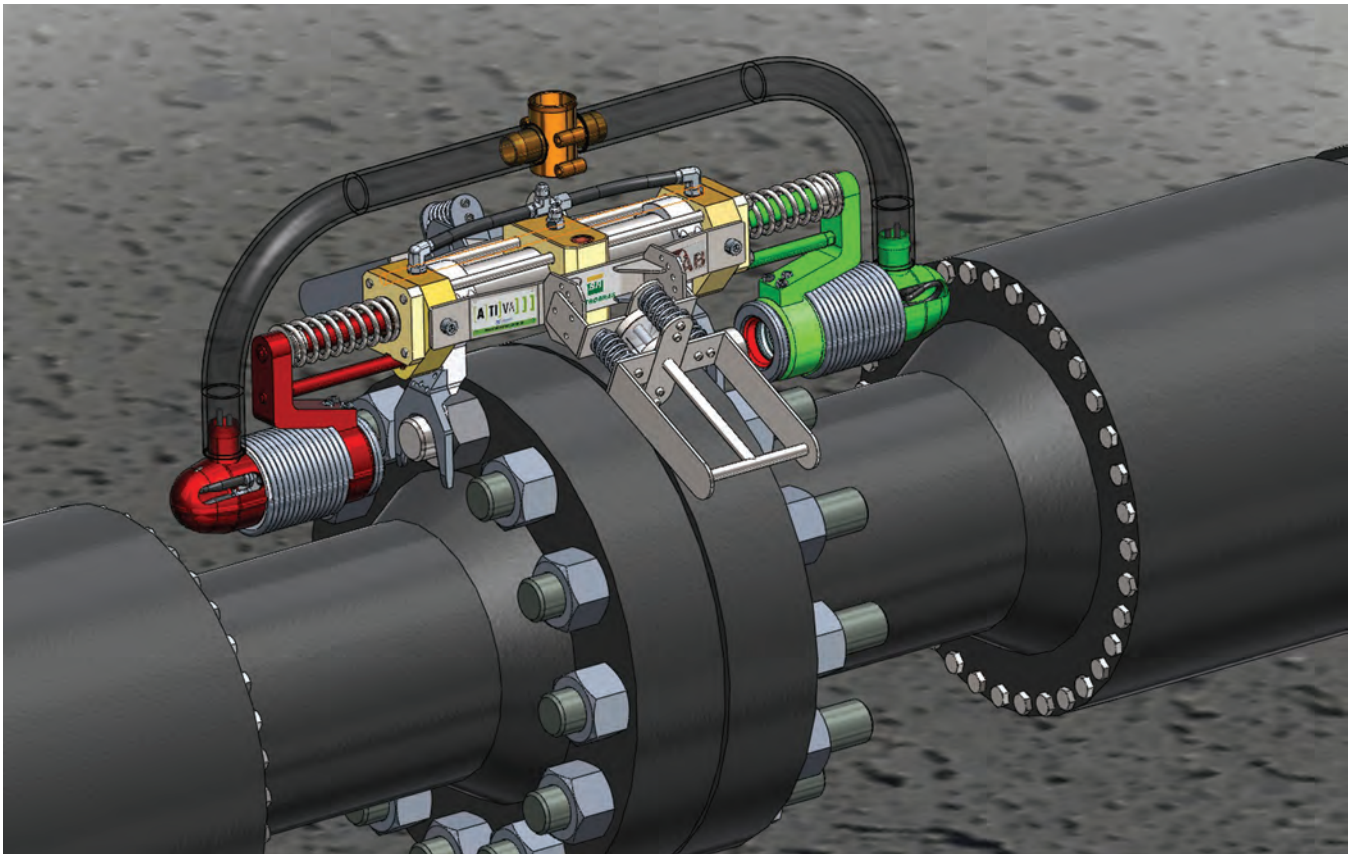
Our main client is Petrobras.

Which are the main jobs executed by the company for the O&G industry?

Ativatec has been developing new technologies for subsea Inspection, Intervention and Monitoring. In 2008 Ativatec developed a ROV operated tool for testing integrity and shielding of screws in production equipment such as Christmas Trees, MCV's and BAP's installed in 2000m depths. More than 50 successful inspections were made in offshore production fields for Petrobras in 2010.

In 2010, in partnership with Petrobras, Ativatec developed a ROV operated tool for ultrasonic inspection of subsea equipment. Baptized as Crab Tool, it is capable of detecting 3mm fissures in screws and plates installed in 3000m depths with

Crab Tool



(Photo Ativatec)

high reliability. In 2011, more than 40 successful field inspections were done and the technology was patented.
In 2012 Ativatec in partnership with Petrobras, developed another ROV operated tool for use in breaking up hydrates present in connector in equipment such as MCV's, SCM's, Tree Caps and Subsea Xmas Trees for the total or partial reestablishment of well production. The technology was approved in laboratory tests and will be available in the market in the second semester of 2013.

Which are the main products and services offered by ATIVA?

Our main products and services include:
- **Ultrasonic** inspection of subsea equipment for the detection of fissures and loss of thickness by corrosion.
- **Intervention** for hydrate break-up in subsea equipment for partial or total reestablishment of production.
- **Collection** of soil and water samples for offshore environmental monitoring.
- **Research** and development of new technologies in subsea robotics for the O&G industry.

Which are the biggest challenges in working with products used in the deepwater segment of the O&G industry?

The challenges are in offering products with simple interfaces to be operated and/or installed by ROV's and that offer at the same time high reliability, minimum maintenance needs, reduced weight and dimensions and high mechanical robustness to resist the high salinity and high pressure encountered in deepwater marine environments.

How do you see the future of the subsea segment of the O&G industry in Brazil?

The Brazilian market for subsea robotics for inspection, intervention and environmental monitoring is in increasing expansion. Various companies from around the world are investing in this area due to the aging of existing subsea equipment, which begin to deteriorate due to marine effects, generating production problems and even environmental accidents.
Other than that, the exploration of the pre-salt demands great investments in new subsea technologies for E&P in ultra-deep waters, which has been attracting international companies to Brazil.

How does your Research and Development process for automation and instrumentation

equipment for deep waters work?

Our R&D process follows this order: Identification of business opportunities, research of the demand by possible clients, literature and market research of related technologies; brainstorming of concepts by our team; estimation of costs and deadlines, laboratory prototype development for testing of new concepts, mechanical and electronic projects in subsea engineering, prototype construction for field tests, revision of projects based of field test results, and field operation to validate the technology.

What equipment do you use for deepwater acquisition, control and data transmission, and what are the challenges in real-time deepwater data transmission?

Our equipment have optical interfaces for data transmission, through the ROV video camera and an electric interface via the ROV umbilical.
The difficulty in real-time deepwater data transmission lies in signal attenuation due to the long length of the umbilical cable, which in ultra-deep waters and reach 3km, which many times requires the use of fiber optics.

What are your plans for the future?

The company plans are focused in firming partnerships with high-end companies in our segment in order to participate in large contracts and increase our team and industrial area.

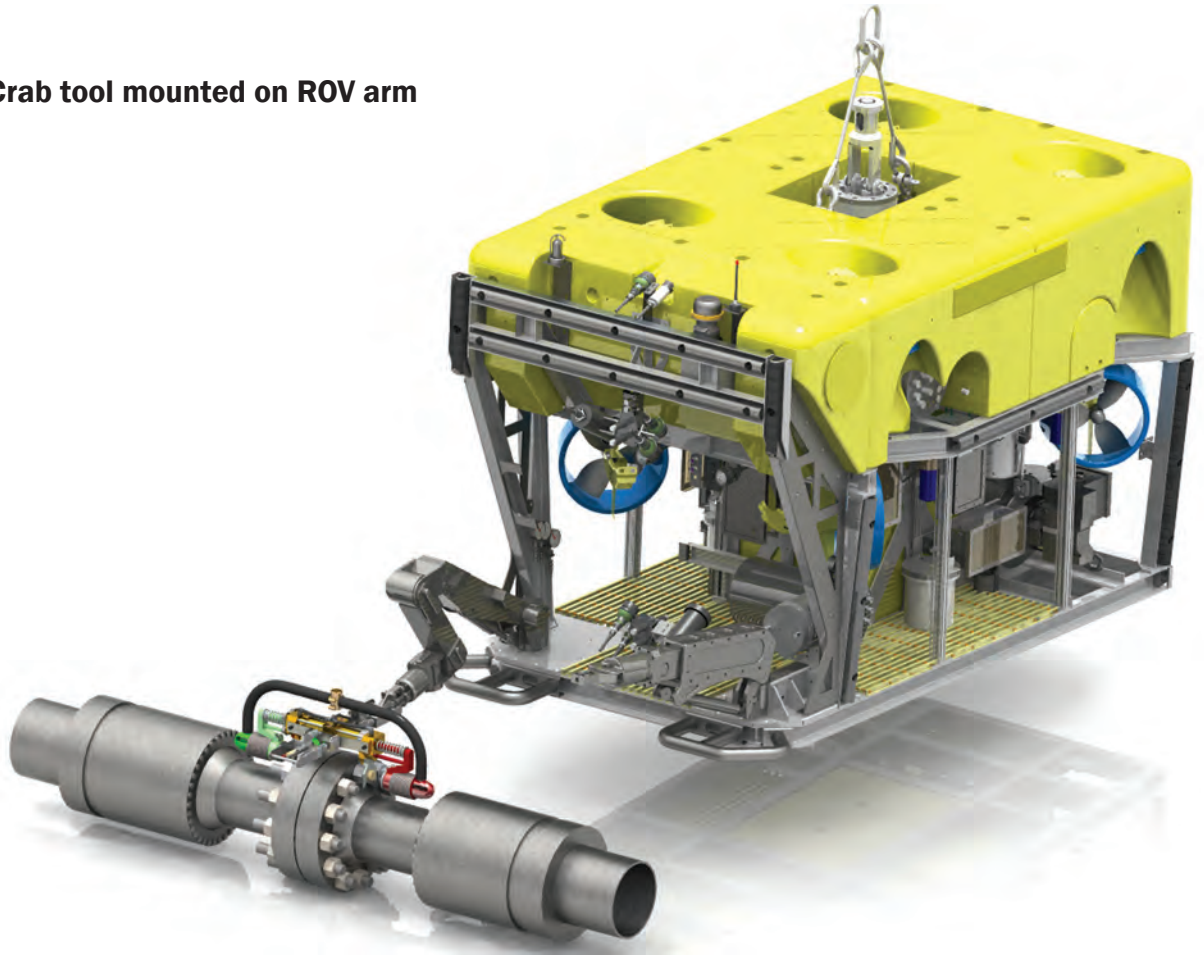
How does the "Hot Stab Ativa" work and what are the advantages of your system over similar imported systems?

The Hot Stab Ativa has compact dimensions and three hydraulic functions of 5000psi, magnetic coupling and a flexible gauntlet that increase the connection operation reliability via ROV.

How does your partnership with AC-ROV work?

Ativatec is the distributor of AC-CESS (www.ac-

Crab tool mounted on ROV arm



cess.com) in South America. We also make product demonstrations, technical support and product training in Brazil.

Is there any other information you would like to pass on to MTR readers/potential investors?

Ativatec is looking for a partner in the subsea area in order to undertake offshore inspection, intervention and environmental monitoring services, specifically in ultrasonic inspection, hydrate dissociation and subsea integrity monitoring. Ideally, an interested company would have expertise in ROV operations and offshore equipment, such as hydraulic crane and subsea equipment operation.

ATIVA techy mounting Crab Tool on on ROV arm for Petrobras

Cenpes *Leading Petrobras' R&D Effort*

By Claudio Paschoa

Petrobras expects to raise a net $4.3 billion in global capital markets each year to fund its investment plan over the next five years, according to Chief Financial Officer Almir Barbassa. During a presentation to analysts on March 19th, Barbassa explained that the expected increase in crude oil production during the 2013-2017 period, which covers the investment plan, had allowed Petrobras to reduce its net financing needs by 50% compared with the 2012-2016 investment plan. Petrobras also expects to raise about $9.9b from divestments as part of the plan.

Petrobras has plans to invest $236.7b to develop massive offshore oil fields recently discovered off Brazil's coast, virtually the same level as their last investment plan. Of the total sum planned, $207.1b of the investments are classified by the national operator as under implementation. Crude oil production is expected to reach 2.75 million barrels boe per day by 2017 and 5.7 million barrels boe per day by 2020.

Barbassa added that the national operators gross debt needs are expected to be about $12.3b annually over the next five years. **Petrobras is banking heavily in new technologies and increasing its investments in R&D in order to meet the challenges posed by deepwater pre-salt exploration.**

Futuristic hallway at Cenpes illuminated by natural light.

(Photo Claudio Paschoa)

As a continuation of the 2012-16 business plan, the 2013-17 business plan was based on the following principles:

- Maintaining the same production targets for oil & gas production;
- No additional projects, except those related to oil & natural gas exploration and production in Brazil;
- Incorporating the results of the structural support programs: PROCOP, PROEF, PRCPoço and INFRALOG;
- Expanding the scope of the divestment program (PRODESIN).

The second principal is a strategic decision which may allow Petrobras to keep up its exploration rate and also maintain, if not increase its investments in R&D, which is considered crucial in order to develop the complex deepwater pre-salt plays efficiently. E&P will see investments of $147.5b, with 62% of the funds earmarked for the 2013-2017 business plan. It is still unclear how much of this will be set aside for R&D, but there is no doubt that it will be a considerable sum, and that the biggest piece of the R&D pie will be forwarded to **Cenpes, Petrobras's in house research center.**

Cenpes stands for "Centro de Pesquisas e Desenvolvimento Leopoldo Américo Miguez de Mello," and it is reportedly the largest research complex in the Southern hemisphere, located about 10km from downtown Rio de Janeiro at Fundão Island, which is part of a technological complex administered by the Federal University of Rio de Janeiro (UFRJ). **Both the old Cenpes center and the new building are located within what is known as the UFRJ Technology Park (or Rio Technology Park), which also houses Baker Hughes, Schlumberger, FMC Technologies, Halliburton, BG, and will also see R&D centers from General Electric, Tenaris, and Siemens.**

After a short drive, which may take less than 15 minutes in normal traffic from downtown, you reach the sprawling Technology Center, where the new

Cenpes building is located, just across the street from the old Cenpes complex. The $700 million structure, is a low structure, and proposes to be an environmentally friendly building. It has a mostly transparent roof in form of a wave which lets in sunlight to reduce energy consumption. The top floors are adorned with a host of small gardens that receive sunlight from the roof and also collect and drain rainwater. In between these gardens are rest areas for staff. The lower floors house administrative offices, conference rooms and auditoriums, with the high technology labs located on the ground floor. One would expect large laboratories in such a sprawling futuristic building, yet that is not the case, and upon examining the labs and speaking to researchers, it becomes clear that what is really important here is the high aggregate value of the minds that work in these labs, along with the state-of-the-art equipment and the experience accumulated along many years of research.

Two of the most important labs are the Geophysics lab, known as Rock Physics Laboratory, which deals with measurements of seismic velocity in rock samples using a method of propagation of ultrasonic pulses. In this lab it is possible to measure the reservoir under real conditions: pressure, temperature and saturation. By analyzing seismic velocity data measured in the Laboratory of Rock Physics and other data from other Cenpes laboratories is possible to calibrate the seismic images used to evaluate reservoir potential and change these properties for rocks that are useful for developing oil fields and also to help to monitor production.

The database of accumulated information in these labs is invaluable to pinpoint new reservoirs and to plan water or CO2 injection parameters to increase reservoir pressures in order to facilitate and increase production: important in both new deepwater acreage as well as in older shallow water fields.

Another important lab is the Fluids Laboratory, coordinated by Rosana Lomba. This lab carries out research to develop innovations in drilling and completion fluid technology, such as developing drilling fluids, the suitability of fluid formulations

(Photo: Petrobras)

Marcos Assayag, General Manager, Cenpes.

Cenpes in Numbers

- Built area: 118 thousand sq. m. (both buildings)
- Total area: 308 thousand sq. m.
- 227 Laboratories
- 8,000 pieces of research equipment
- 15 external researchers for each Petrobras researcher
- 101 Brazilian universities developing projects with Cenpes through 50 thematic networks.
- 1,897 employees (2012)
- 496 MSc researchers (2012)
- 238 PhD researchers (2012)

Aerial view of Cenpes (Photo: Petrobras)

(Photo: Petrobras)

(Photo: Petrobras)

Above: Fluids Laboratory, which carries out research to develop innovations in drilling and completion fluid technology, such as developing drilling fluids. **Below: The Rock Physics Laboratory,** which deals with measurements of seismic velocity in rock samples using a method of propagation of ultrasonic pulses.

(Photo: Petrobras)

in drilling and completion of wells in the Brazilian basins and the physical simulation of formation damage.

They do work on completion mud composition for the different reservoir characteristics and temperatures, which are vital to guarantee drilling efficiency and safety.

Reservoir characterization in the deepwater pre-salt also requires advances in multiple fronts. Better 3D imaging through the salt is a start, and Cenpes also boasts of a state of the art 3D reservoir visualization capability, but the unpredictable carbonate formations always add to the difficulties. The complex biological origins of these formations make them somewhat unpredictable, according to Lomba. A better understanding is needed in how fluids interact with the rocks when estimating potential reserves, maximizing production and increasing drilling and production safety.

The level of research spending by Petrobras is not likely to be a limiting factor. Between 2013 and 2020, the 1% rule is expected to generate around $5b in R&D spending in Brazil.

These are undoubtedly significant numbers for research investments, yet they are hardly a guarantee of positive results and only a continuous effort to research and understand the challenges of deepwater pre-salt reservoir characteristics will give any hope of assuring a successful E&P effort by Petrobras. To this end Cenpes Executive Manager, Marcos Assayag explained that its long term strategy, is anchored on technology development being in line with the business plans, encouragement of high-risk, high-reward project for radical innovations, such as moving towards more production equipment being placed on the seafloor, yet maintaining a gradual and safe implementation of new technologies.

Petrobras and Cenpes are counting on intense cooperation with key research partners such as universities and high technological service providers, many of which are already present or soon will be, at the Rio Technology Center.

(Photo: Claudio Paschoa)

SailBuoy

Unmanned Surface Vehicle for Ocean Monitoring

By C. Barrera(1), D. Peddie(2) , J. Viera(1) and M.J. Rueda(3)

(1) Oceanic Platform of the Canary Islands (PLOCAN). PO Box 413, Telde. Spain; (2) Christian Michelsen Research (CMR). PO Box 6031, Bergen, Norway; (3) Instituto Canario de Ciencias Marinas (ICCM). PO Box 56, Telde. Spain

Ocean observatories play a crucial role in relevant aspects of the climate system on longer time-scales, including among others, global heat budget, sea level rise, potential variations in the meridional overturning circulation, and long-term storage of climatically relevant compounds such as CO2. Expanding the ocean observing system towards being truly global will require an increased commitment to the design and implementation of technologies for collecting offshore and deep ocean data and transmitting them to shore in a useful and cost effective manner. By definition, ocean observatories usually include a broad and multidisciplinary range of fix and mobile autonomous platforms, from underwater vehicles to sea-bottom seismic networks, including moored surface and subsurface buoys, floats or drifters. Most of them are designed to provide continuous, or at least periodic, field data over a long-time period in near-real time.

The European Station for Time-Series in the OCean -ESTOC- is currently joining the global ocean monitoring strategy as site-partner of baseline initiatives such as EuroSites, ICOS, ESONET or EMSO. Placed 60 nautical miles off Northwards Gran Canaria island at 29º 10' N, 15º 30' W with a depth of 3685 m., is still operational since 1994 through a permanent observing program addressed to monitor biochemical seawater parameters variability over time using a wide in-situ sampling methodologies and instruments i.e. research vessels, VOOP, moorings, turtles, drifters, underwater gliders, among others.

ESTOC is located in the North Atlantic Sub-tropical Gyre and exhibits oligotrophic characteristics. The circulation is driven by the southward-flowing Canary Current and the NE Trade Winds. A clear seasonality is recognizable when upper

SailBuoy's Main Technical Features

Length (LOA)	**2m**
Displacement	**60 kg**
Payload	**10 kg / 60 l.**
Speed	**1-2 knots**
Navigable wind speed	**3-20 Knots**
Operational time	**1 year**
Communication	**Iridium SBD**

layer temperature reveals warming during the Summer season and cooling during Winter. Nowadays the site is managed by the Oceanic Platform of the Canary Islands -PLOCAN- through a multidisciplinary set of in-situ monitoring autonomous platforms, where unmanned surface and underwater vehicles develop a special role.

PLOCAN is a multi-purpose public consortium infrastructure engaged for research, technology development and innovation in the marine and maritime sectors. Its main goal is to promote long-term and sustainable ocean observations, providing a cost-effective bend of services as test site, observatory, underwater vehicles base, as well as training and innovation hub.

In this regards, PLOCAN focuses on international and interdisciplinary networking and partnership activities with key-baseline research institutions and companies in the field of marine and maritime technology. The norwegian company Christian Michelsen Research -CMR- Instrumentation, represents a suitable example in this sense. CMR is a highly specialized company for the design and development of groundbreaking ocean instrumentation specially addressed for harsh environments, being one of its products the autonomous unmanned ocean vessel, SailBuoy.

The SailBuoy Technology

The SailBuoy is a small unmanned wind-driven ocean vessel able to travelling across the oceans for extended periods of time. It navigates autonomously, controlled by Iridium satellite link communications, transmitting data in real time underway. Since Iridium is a 2-way communication system, commands such as new waypoints, tracks and sensor param-

eters can be easily sent to the vessel underway. The SailBuoy can be fitted in a highly modular way with a wide variety of instrumentation payloads able to be used for a broad number of ocean applications. It can easily keep station or travel from point to point.

The high modularity level offered by this technology allows to integrate a broad number of sensors engaged to monitor parameters like i.e. water temperature, conductivity, dissolved oxygen, heave (wave height), fluorometer, chlorophyll in vivo, blue green algae, crude oil, current, wind, air pressure. hydrophone, echo sounder, among others. Therefore, a wide range of scientific and industrial direct applications are able to SailBuoy's users, i.e. climate science, oceanography, meteorology, seismic monitoring, marine mammal monitoring, algae tracking, wave measurement, emission monitoring, fisheries management, aquaculture, visual inspection, subsea communication, transportation,... among others.

The Mission: Goal and Description

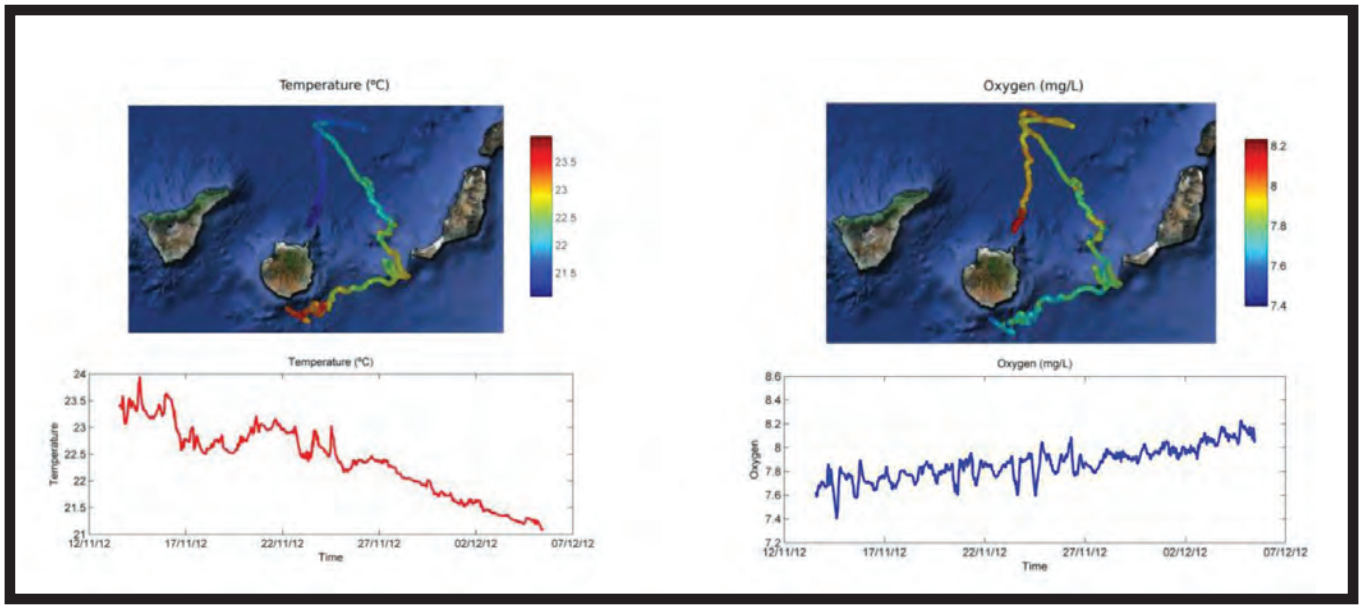
The mission's goal focused on testing and evaluating technical aspects of the navigation and sampling site from the SailBuoy technology for a first time in subtropical areas as it is the Canary Islands archipelago, while to improve the ESTOC's monitoring program strategy. The mission was performed through the surrounding waters of ESTOC site and the channel between Gran Canaria and Fuerteventura Islands with the SailBuoy unit SB02.

For this specific purpose, SB02 was fitted with a payload sensor configuration that include a Neil Brown's G-CTD for water conductivity and temperature, and an AADI Optode 4835 -shallow water version- for dissolved oxygen measurements. Sampling rate was ½ hour for most of the time and increased to hour during starting and ending mission periods.

Piloting tasks were time-sharing carried out between skilled technical staff from CMR and PLOCAN through a dedicated user interface directly linked to the Iridium satellite system. Despite the high marine traffic density usually existing in central areas of the Canary Islands archipelago (specially Las Palmas harbour surroundings), SB02's piloting was performed without any noteworthy issue, even crossing several times some of the main cargo and oil-tanker shipping lines in the area. The gathered sea-state conditions were under a wide Beaufort and Douglas range variability (from 0 to 7 and 0 to 5, respectively), where wind speed varied from 0-29 Knots and wave height from 0-3.2 meters. The overall distance sailed was 460 Nm along 22 days mission, from 13th November to 5th December 2012. During this period of time, SB02 sailed windward 75% and 25% leeward, being required for that purpose several tack maneuvers. The maximum speed value reached was 3 Knots being the average 0.85 Knots for the whole performed mission. A total of nine waypoints were required to pilot SB02 properly according to the navigation needs and existing wind and sea-state conditions. SB2 was deployed off Southwards Gran

Canaria and recovered three weeks later few nautical miles off La Isleta, at the Northeast coast of the previously mentioned island.

SailBuoy's piloting requirements are very few. Only a web browser over internet is required. In terms of tasks, first one is to define the target waypoint and setup the desired and safer path to follow. The path should avoid as best as possible shipping lanes, staying away from the coast and trying to sail as



inside the strongest wind zones as possible. A standard piloting procedure is to decide a destiny waypoint and a corridor width that depends on the sea and wind conditions. The corridor width is the SailBuoy's horizontal deviation along the ideal straight line track.

A standard value of 10 km radius is used allowing SB02 to sail diagonally from the ideal track, having space to manoeuvre and not forcing her to tackle so often, saving power. This value should be reduced when crossing a dangerous zone, to keep tight the path.

On daily basis, checking the SailBuoys status (GPS location and sensors output values), wind forecast maps and marine traffic are the must-do tasks. The wind maps will give an approximation of how SailBuoy will behave, and if the Waypoint should change according to wind forecast. Sometimes is not possible to avoid shipping lanes, but one should try to predict traffic densities and cross the lane in the hours when there is the least amount of traffic. If it is necessary to change the waypoint or the radius, the commands are also sent via this web interface. Finally, data is displayed on a table for NRT analysis, but it can be easily downloaded and imported to any data processing software tool.

Conclusions

A SailBuoy unit has been tested for first time in subtropical latitudes with successful results in operational and scientific terms. Sea-state conditions along the mission were highly variable, from calm to Beaufort 7 and Douglas 5, enabling to test the vehicle in different work-sailing scenarios. Biofouling effect was an issue to consider only in few and specific hull places. Piloting tasks were easy and successfully performed despite marine traffic density at certain times and opposite sea-state conditions when calm. Gathered scientific data allowed to clearly identify the startup of the decline in the annual temperature pattern, while identify monitoring synergies between autonomous platforms in ocean observatories as is ESTOC, with special relevance in terms of surface and underwater unmanned vehicles. SailBuoy can be considered an efficient, rugged and affordable device for autonomous in-situ and real-time surface ocean monitoring. Baseline partnership collaboration between CMR and PLOCAN through SB02 mission has been mutually helpful and successful for both sides.

Acknowledgments

The authors want to truly acknowledge all institutions, companies and people involved in this challenging mission, with special mention to the EU-FP7 Program for funding the GROOM project within this mission has been partially carried out. Also to thank technological partners like Grafinta SA for their support and collaboration. A special mention also to Las Palmas and Tenerife Harbourmasters authorizing the mission performance across to the described Canarian waters.

Mooring Ropes

Economics of Dyneema-based ropes offshore

Traditionally thought an expensive alternative to traditional steel wire and conventional polyester-based synthetic ropes, offshore ropes and mooring systems made with Dyneema have been making inroads. End users such as ConocoPhillips, Shell and Petrobras are working with systems based on the high-strength, low-weight fiber of DSM Dyneema. Coupled with their durability and longevity, these rope systems are increasingly recognized for a variety of performance and user benefits that ultimately save on the bottom line.

DSM Dyneema's entry into the offshore industry over 10 years ago met with more troubled waters initially. Manufacturers and users were slow to latch on to the long term value and investment payback that Dyneema offered, as the higher upfront capital investment proved a disincentive. In addition, Dyneema fiber supply was occasionally restricted due to capacity restrictions in the early days of market commercialization.

These issues no longer persist today. Today fiber is gaining acceptance as a smart choice for the long term, an investment that can pay back on the CAPEX in a few short years. In addition, over the past 10 years DSM has invested significantly to boost capacity in its global plants in order to meet the growing year on year demand as well as anticipated market growth.

Most recently, Brazilian oil giant Petrobras specified Dyneema fibers for a complete set of mooring ropes for a semi-submersible mobile offshore drilling unit (MODU).

Petrobras specifically asked for the ropes to be made with SK78 grade of UHMWPE (ultra high molecular weight polyethylene) fibers from DSM Dyneema for its high strength at low weight properties. SK78 grade fiber was developed specifically for this type of mooring application and although it has a proven track record of success in Asia, U.S. and European waters, the Petrobras order marks the first time they will be used for MODU mooring in Brazil. SK78 is the only HMPE fiber approved by Bureau Veritas and ABS for MODU moorings.

Petrobras is expected to use eight mooring ropes made with Dyneema SK78 fiber on a MODU in its new Pre-Salt deepwater fields off the South-eastern coast of Brazil, site of one of the largest recent oil discoveries in the Western Hemisphere.

"Petrobras has chosen to use ropes made with Dyneema over polyester because of the lower weight and greater ease of handling. Polyester ropes with the same mechanical properties weigh around three times as much and are almost twice as thick as ropes made with Dyneema," said Jorn Boesten, Offshore Segment Manager at DSM Dyneema "Steel ropes would weigh around seven times more than ropes made with Dyneema. Ropes made with Dyneema will allow Petrobras to moor the MODU more quickly, saving on equipment costs, as well as on support vessels, delivering lower operating costs and a positive return on the investment."

Case: Unocal SEDCO 601

Full mooring lines with Dyneema - 1676, 1981m water

Issue	Resolution
Rig rated at 1500m	Upgrade mooring capabilities with Dyneema
Mooring and unmooring over 1 week/move	75% faster using preset system with Dyneema
AHV too small for polyester moorings	50% less volume required for reels and on winches. Vessel of opportunity could be used
Offsets must stay within certain limits	Rope with Dyneema much stiffer than Polyester.

Allowed Unocal to use existing rig and avoid the need to lease a more expensive one.

Ropes made with Dyneema are proving a success in drill rig mooring systems which are typically relocated every 3-6 months during the span of a campaign, incurring time and heavy cost. With Dyneema based systems every rig relocation delivers OPEX savings through a multitude of operational and performance benefits. In the course of relocating a drill rig the lighter ropes can translate into up to 40% faster mooring and installation compared to polyester. Rig down time is reduced considerably as hookup speed is expedited. It also means smaller Anchor Handling Vessels can be used, and less trips to shore are required.

Belgian Dredging International switched its barge mooring lines from steel wire ropes to ropes made with Dyneema. While initially more expensive, the improved productivity, ease and speed of handling and safety all reportedly made these ropes well worth the investment.

The saving can come from unexpected sources too.

Ropes made with Dyneema need no oil or grease, eliminating the need for grease, as well as the cost of manpower needed to apply and clean it up. In many cases, the period needed to payback the initial investment for these advanced ropes is short, particularly if you factor in the absence of injury-related costs, as well as those costs for maintenance, repair and replacement. “During the use of the ropes only minor abrasion could be observed. This contributes to their long life,” said Jorne Beyen of Dredging International.

Quiet Efficiency

Working Together to Reduce Subsea Noise

With increased focus on the negative impact of subsea noise on the marine environment, regulators are considering action. Until then, different stakeholders are working together to develop a range of technical solutions to manage the issue. Over the past decade, regulators have sought to manage the impact the shipping industry has on the environment by introducing legislation covering ballast water treatment, restrictions on substances used in marine coatings and carbon emissions, among other issues. However, while subsea noise has long been recognised as a threat to marine life, there has been little action to manage the issue.

That may be changing. Last year, the IMO's Sub-Committee on Ship Design and Equipment established a correspondence group on reducing commercial shipping noise through non-mandatory technical guidelines. The Committee identified four focus areas for noise reduction: propulsion, hull design, onboard machinery, and operational modifications. In Europe, the EU Marine Strategy Framework Directive is working with University researchers to assess noise pollution and define baseline levels of underwater noise. Once complete, the EU plans to introduce legislation setting standards to reduce noise levels by 2020. At the same time, the US-based National Oceanic and Atmospheric Administration (NOAA) is working on a global project to document human-generated subsea noise to create the world's first sound maps.

In the meantime, most of the work to develop quieter ships so far has been driven by owners with commercial or scientific incentives to reduce subsea noise. According to DNV's Kai Abrahamsen, Principle Engineer (Noise and Vibration), interest in this specialist field is growing. "Our work in this area has been confined to vessels active in seismic surveys, scientific research, commercial fishing and government-related naval projects. But we have also been engaged by energy companies, who seek to shield sensitive acoustic instrumentation related to sub-sea construction and communications from underwater noise," he says. "We are encouraged by NOAA's focus on subsea noise and statements made by the IMO and the EU suggesting that action may be taken to apply new standards for merchant vessels, which produce the most noise."

Abrahamsen explains that low frequency sound waves can travel for hundreds of kilometres underwater before they dissipate, upsetting the highly evolved hearing abilities that fish and sea mammals (especially dolphins, whales and seals) rely on to hunt and communicate. "Reducing noise and vibration can be a complex engineering challenge, but we are seeing specialists in different areas working together to develop some highly innovative technical solutions," he says. "A lot of subsea noise generated by ships can be traced to propellers, but some industry players are turning their attention to another significant contributor – engine vibration."

Water is an efficient conductor of sound and engine and propulsion noise is amplified by a vessel's hull. Underwater noise results from airborne noise, which is generated from the machinery to the structure of the vessel, and structure borne noise, which is generated from the vibrations of the machinery to the hull of the ship. To minimise this noise, engineers must consider a broad range of issues, including engine and generator mounting systems, base frames, materials and the position of isolators. One company working with noise and vibration is Pon Power Scandinavia, a leading distributor of Cat and MaK marine propulsion systems. In 2008, Pon Power began work on a mounting system designed to isolate engine vibration of high-speed gensets. According to Pon Power's Area Service Manager, Øystein Skår, the development of the Genflex system was driven by the increasing power density of generator sets. "Over the last decade, engine output has been increasing. As a result, generators can no longer survive the mechanical noise and vibration produced by many of the new, more powerful diesel engines," he says. "We identified a market for a mounting system that could reduce noise and vibration and be flexible enough to work with generators manufactured by different suppliers."

Pon Power developed a system where the generator is rigidly mounted on easily adjustable chocks, and flexible mounts are fixed between the engine and base frame. Introduced in 2009, the Genflex concept has attracted significant industry interest. "The development process brought us into contact with a number of noise and vibration specialists around the world and has enabled us to carve out a strong reputation in a growing market," he says. "This has lead to our participation in some interesting projects within noise and vibration."

In 2008, Pon Power was asked by Siemens to provide generators for a diesel-electric powered research vessel under construction at the Jong Shyn Shipyard in Taiwan. The vessel, ORV Aerial, was ordered by Taiwan Ocean Research Institute

to monitor sea life and perform acoustic surveys and high-resolution imaging of the seabed, among other tasks. To meet standards set by International Council for the Exploration of the Sea (ICES), the yard contacted DNV and the US-based company, Noise Control Engineering, to work with Siemens to ensure the vessel fulfilled the underwater noise requirements by reducing the vibrations and mobility levels of the gensets. Jeanette Jonasson, Project Manager for Pon Power Scandinavia, says the company assembled an international team to get the job done. "Our first challenge was to perform a lot of calculations to determine the optimal position and calibration of the mounts, isolators and base frame," she says. "To get it right, we relied on other specialists to arrive at a good solution."

Oriantek, a US-based company specializing in power train vibration and acoustic engineering, provided critical high-end dynamic analysis and layout schematics, including connections between engine and alternator and related pipe work. Jerry Vietinghoff, a 20-year veteran in the world of noise and vibration, says that the two companies have a long working relationship. "Oriantek supported Pon Power's development of Genflex and has worked with Caterpillar on a number of noise and vibration projects over the years," he says. "It is a real advantage to work with familiar faces who know what they are doing."

Jonasson says Oriantek's work led to a unique solution. "We selected highly flexible and resilient engine mounts and seismic masses in a three-stage isolation scheme and added a flexible coupling between the engine and the generator," she says. "By placing isolators between the base frame and the blocks, and the blocks and the foundation, our calculations indicated that we could reduce vibration levels significantly, especially between the rotor and stator." The design also included the addition of an extra mass of 15 tons below the flexible skid to further reduce vibration to the hull.

Pon Power turned to Christie & Grey, a leading manufacturer of precision anti-vibration and isolation mounts. Patrick Bergin, lead engineer on the project, says the company applied its proprietary design software to calculate the natural frequencies and response to seaway motion of five different masses (the diesel engine, the alternator/base frame and three cast iron blocks) to properly design the resilient mounting system. "We had worked on three stage systems in the past, but never one that accounted for so many masses and frequencies," he says. "I've worked in this field for many years and believe this system is not only unique, but represents a big

step forward in structural noise control." The calculations were then completed and verified by the shipyard.

After more than a year, the team assembled at Pon Power Scandinavia's facility in Esbjerg, Denmark for the Factory Acceptance Test (FAT). Other participants included a large delegation from Taiwan, including government officials and shipyard personnel, and representatives from Siemens, Oriantek, Christie & Grey and Noise Control Engineering. DNV was also present to verify that the solution complied with ICES. "The test won approval and, save for a few minor adjustments, the project was a complete success," says Jonasson. "Members of our team were on hand during installation and were very impressed by the care the yard had taken on the foundation," she says. "This was one critical part of the project we did not control, but they did a fantastic job."

Launched in 2012, the Ocean Research Vessel (ORV) Aerial completed sea trails and is now in active service. DNV's Abrahamsen, who followed the development process from beginning to end, says that demand for innovative technical solutions to manage noise and vibration will continue to rise. "Increasingly, noise and vibration have been included in environmental impact studies for coastal projects. Also energy companies with operations at sea have started to apply stricter requirements on underwater sound for offshore support vessels," he says.

"This project is a good example of how different industry stakeholders can work together to develop innovative solutions that, pending more action from regulators, will have a positive, long-term impact on fragile marine eco-systems all over the world."

Sustainable Ocean Summit 2013

Washington D.C. - April 22-24, 2013

The Sustainable Ocean Summit 2013 (SOS 2013), organized by the World Ocean Council (WOC), is an international ocean business community gathering dedicated to industry leadership and collaboration in developing solutions to ocean sustainability challenges.

The theme of SOS 2013 is "Oceans 2050–The Ocean Business Community and Sustainable Seas." The SOS is designed for the diverse range of ocean industries: shipping, oil and gas, fisheries, aquaculture, tourism, offshore renewable energy, ports, dredging, mining, cables and pipelines, marine science, engineering and technology, the maritime legal, financial and insurance communities and others. If space permits, SOS is also open to ocean stakeholders from the government, intergovernmental, academic and environment communities.

SOS 2013 will address priorities for cross-sectoral industry leadership and collaboration in ocean sustainability over the coming years, including ocean policy, regulations and governance; marine spatial planning; the role of industries in ocean and climate observations; biofouling, biosecurity and invasive species; responsible use of the Arctic; sound and marine life; marine debris; marine mammal interactions; the role of finance, insurance and legal sectors in ocean sustainability.

Sustainable Ocean Summit 2013 Session Topics

- Smart Ocean/Smart Industries: Scaling Up Industry Observations of Ocean, Weather and Climate
- Ocean Policy and Ocean Industries in International Waters
- Marine Spatial Planning
- Sound and the Marine Environment
- BioFouling and Invasive Species
- Responsible Cargo Management and Port Waste Reception
- The Arctic: Challenges and Opportunities for Responsible Industries
- Marine Ecosystem Services and Blue Carbon
- Climate Change and Sea Level Rise: Port and Coastal Infrastructure Adaptation
- Financing Innovation and Technology for Ocean Sustainability
- PRE-SOS WORKSHOP: Oceans 2050: Drivers, Trends and Scenarios for Ocean Industries and Sustainable Seas

A panel of senior executives from oil and gas, shipping, fisheries, aquaculture, offshore renewable energy, and science and technology will start the SOS 2013 with the Ocean Executive Forum on industry leadership and collaboration. The multi-industry panel will consider private sector challenges and opportunities for Corporate Ocean Responsibility while at the same time responding to the growing need for ocean energy, food, transport and information.

Sustainable Ocean Summit 2013 Panelists

- **Steve Carmel**, Senior Vice President, Maersk Line Ltd (shipping)
- **Jeffrey Grybowski**, CEO, Deepwater Wind (offshore renewable energy)
- **Gary Isaksen**, Manager, Global Ocean Science and Policy, ExxonMobil (oil and gas)
- **Robert Orr**, CEO, Cuna del Mar (aquaculture)
- **Mikael Thinghuus**, CEO, Royal Greenland (fisheries)
- D**awn Wright**, Chief Scientist, ESRI (science/technology)

Preceding the SOS 2013, the unique workshop on "Oceans 2050–Drivers, Trends and Scenarios," held on April 22, will provide input to the Ocean Executive Forum. Leadership companies are invited to this half-day workshop which will identify the constraints and opportunities affecting future ocean operations and the scenarios for responsible use and sustainable seas in coming decades.

For more information on the Sustainable Ocean Summit 2013 and the World Ocean Council visit www.oceancouncil.org.

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Offshore Achievement Awards

(L-R) Graham Skinner, Trainee Rig Manager at KCA DEUTAG Drilling was presented with the Young Professional Award and Malcolm Webb, Chief Executive of Oil & Gas UK with the Significant Achievement Award.

Offshore industry's high achievers were recognized at the 2013 Offshore Achievement Awards, with Malcolm Webb, chief executive of Oil & Gas UK, picking up the Significant Achievement accolade. The 27th awards ceremony, which saw a record attendance of 530 guests, took place at the Aberdeen Exhibition & Conference Center and was hosted by Scottish comedian Kevin Bridges. The industry's top talent was celebrated in categories which included Great Large and Great Small Company, Safety Innovations and Emerging Technology. The awards, which were supported by main sponsor TAQA Bratani for a second consecutive year, were successfully re-launched in 2011 by the Society of Petroleum Engineers (SPE) Aberdeen section.

The 2013 Offshore Achievement Award winners (at a glance):

Significant Achievement	***Malcolm Webb, Chief Executive, Oil & Gas UK***
Great Large Company Award	***Axis Well Technology***
Great Small Company Award	***ROVOP***
Young Professional Award	***Graham Skinner – KCA DEUTAG Drilling Ltd***
Working Together Award	***Maersk Oil/ Technip***
Export Achievement Award	***Online Electronics Limited***
Safety Innovations Award	***Houlder***
Innovator Award	***Red Spider Technology – JOINT WINNER***
	Stork Technical Services – JOINT WINNER
	Tendeka – HIGHLY COMMENDED
Emerging Technology Award	***Web Rigging Services***

• Great Large Company Axis Well Technology

Axis Well Technology is an independent provider of well technology and reservoir development consultancy services. The company has built up a global portfolio of more than 100 clients with over 28% of sales in overseas markets. Axis continues to expand its services having recently established two new divisions, sub surface and well integrity. Sales have almost tripled in recent years and operating profits increased around 50% in the past year to date.

• Great Small Company ROVOP

Since formation in 2011, ROVOP has set new standards for reliability and service in ROV operations. ROVOP is currently providing support to jack ups, specialized lay vessels and IRM activities. Recognizing the critical nature of ROV operations to subsea projects, as well as major advances in technology, ROVOP invests in the most advanced and reliable ROVs. The company has committed to $23m of new vehicles, as well as a $378,000 simulator to enable onshore project preparation, scenario planning and training. Having achieved repeat business from all customers, ROVOP has expanded rapidly, recruiting more than 40 personnel in one year. From sales of $4.5m in its first year, the company is on target to achieve $15m this year.

• Young Professional Graham Skinner, KCA DEUTAG Drilling Ltd.

Graham Skinner graduated with a 1st Class Honors in Scot's Law before joining KCA DEUTAG. He is a trainee rig manager on KCA DEUTAG Drilling's graduate development program. His time with KCA DEUTAG has not only seen him work through drilling positions from roustabout to tool pusher, but he has also qualified as a risk manager and a project manager. His role has seen him manage risks on new build land rig projects, supervise rig move activities and deliver safety on two jack-up refurbishment projects.

Graham is currently working in South Africa as Safety Supervisor on a project to refurbish two of KCA DEUTAG's jack-up fleet. He has had to work closely with the main contractor to develop documents which meet KCA DEUTAG's safety standards as well as coordinate emergency response plans, site layout, confined space and working at height plans and rescue arrangements.

• Safety Innovations Houlder

Risks in transferring personnel between workboats and turbine towers on offshore wind farms are a major concern for operators. Houlder's innovative and entrepreneurial solution, developed with BMT Nigel Gee, is the Turbine Access System. The Turbine Access System is a hydraulically motion-compensated, lightweight gangway providing a stable point on the workboat foredeck. Designed to be retrofitted and used in up to two-meter waves, it increases typical operability by half a meter. With improved safety and meeting operators' stringent cost requirements, it means more work days are possible than with traditional access. The first system was successfully deployed on the Rhyl Flats wind farm where sea trials were also a success.

• The Innovator

» Red Spider Technology – JOINT WINNER

Red Spider's innovative and unique full-bore ball valve is changing the way wells are completed. During subsea completions the e-Red-FB is permanently deployed as part of the tubing string. The e-Red-FB is a computer-controlled valve that can be repeatedly opened and closed by remote command. The field-proven, intervention-less technology uses a closed-loop hydraulic circuit, powered and controlled by integrated electronics, with no connections to the surface. Operators can install well completions faster in increased safety, eliminating the need for repetitive and costly interventions. The result is a saving of around 36 hours per completion, the equivalent of about $1.5 million per job.

» Stork Technical Services – JOINT WINNER

Corroded stud bolts seriously impact on an asset's integrity and unscheduled pressure releases can have a devastating impact offshore. This led to Stork Technical Services developing a more sophisticated method of removing and replacing corroded bolts. The requirement was to mitigate risk, improve safety, reduce operating costs and optimize production. Stork introduced the industry's first Hot Bolt Clamp technology in 2012, with thousands of connections reworked in the North Sea, without shutdown and with 100% success.

» Tendeka – HIGHLY COMMENDED

Wireless technology has proven to be a much more flexible alternative to traditional cabled systems in addressing downhole monitoring requirements. Tendeka's wireless gauge allows real time flow and shut-in data to be efficiently transmitted to surface. The gauge has been successfully trialed in the North Sea and is now appealing to a wider global market. Through a unique tool design, a series of short pressure pulses are created using the energy of the well. These pulses are then decoded on surface to provide pressure, temperature and well status.

• Emerging Technology (sponsored by Nexen) - Web Rigging Services

Web Rigging Services' have developed a system for temporary underdeck access for fabric maintenance on offshore structures. The patented Web Deck combines modern, strong, lightweight materials and innovative design to provide significant advantages over suspended scaffolding.

In comparison to traditional scaffolding, the system has 87% less contact points and 75% less volume. The Web Deck is significantly lighter and is proven to reduce installation time by up to 80%.


Klusza

UTEC Announces Houston Appointment

UTEC appointed Mark Klusza as its new Vice President of Measurement Technology at its Houston HQ. Klusza – who holds a Bachelor in Design in Architecture from the University of Florida – brings to the role more than 20 years of experience in the industrial measurement arena.

Senergy Makes Senior Appointments

Senergy strengthened its senior management team with a number of key appointments. Allan Mathieson is the new global technical head of project management and carbon capture and storage (CCS team leader), and Andrew Jones takes up the role of Asia Pacific energy services manager in power engineering. Senergy has also appointed two subsurface managers: Don DiBenedetto for the Middle East and India region with Ronald Hoogenboom responsible for the Asia Pacific region.

"Our continued success across all our areas of specialist services and technical expertise is providing Senergy with a solid platform to ensure future growth," said Alasdair Buchanan, COO, Senergy. "The appointments of Allan, Don, Ronald and Andrew to our senior management not only brings additional, valuable experience but reinforces Senergy's ambitious vision to become the industry-leading energy services expert."

Mathieson will be based in Edinburgh and will be responsible for instilling a sense of professional project management in the delivery of projects to clients – the focus will be on the application of scope, cost and time management principles to projects to enhance their value to Senergy.

Jones will be based in Melbourne and will oversee the region's alternative energy business. He has more than 15 years' industry experience including transmission operation with Hydro Tasmania, electric market operation at NEMMCO, energy trading and regulatory affairs with Origin Energy, and energy policy for the Tasmanian Government. DiBenedetto will lead and manage the day-to-day delivery and growth of the subsurface business in the Middle East and will work from Senergy's Abu Dhabi and Dubai offices. He has extensive experience in the subsurface industry, particularly in extracting value from existing fields and in developing new assets.

From Kuala Lumpur, Hoogenboom will be responsible for leading and managing the day-to-day delivery and growth of the subsurface business in Asia Pacific.


Alisdair


Hoogenboom


Mathieson

Over the past nine months, Senergy has appointed 121 members of staff into new roles across the business – with 80 of those based in its northeast offices (Aberdeen, Banchory & Alford) and nine in Edinburgh – and enjoyed a 50% increase in international business. The company is looking to recruit an additional 80 employees before the end of this financial year.

Obituary: Captain Curtis Johnson

Captain Curtis Johnson passed away on February 28, 2013 at the age of 84. Captain Johnson began his career at SIO in 1964 as an Able Bodied seaman and worked his way up through the ranks sailing on the ARGO, ALEXANDER AGASSIZ, OCONOSTOTA, HORIZON, THOMAS WASHINGTON, MELVILLE among others. In the early 1980's Curt was appointed Master of R/V THOMAS WASHINGTON and finished his career in 1989 as Master of MELVILLE. Curt was a Captain who quietly led by example and was well respected and liked by the crews who sailed with him. Never flustered, he coolly and calmly rescued many young mates who had gotten themselves into difficult ship handling situations with miles of wire over the side. Curt's passionate pastime at sea was wood carving and some may remember the Winchester lever-action 30-30 he carved that was so realistic-looking it nearly got him into trouble with more than one port authority for not declaring his firearms! Curt retired to Campo in San Diego's east county where he built his dream home (a log cabin) from scratch and where he continued to live until the end. He is survived by his wife Nancy.

Obituary: Michael Jean Markey

Michael Jean Markey died at Swedish Hospital on March 2, 2013. Mike was born in Seattle, Wash., in 1932. He graduated from West Seattle High School in June 1950, and he received a Bachelor's Degree in Engineering from Stanford University in June 1954. In 1958, Mike joined his father, William C. Markey, at the family firm, Markey Machinery Company, Inc. in Seattle. MMCo was founded in 1907 by Mike's grandfather, Charles H. Markey. Mike was with the company until his retirement in 1996. For many years, Mike was an enthusiastic member of the Jaguar Drivers & Restorers Club of Northwest America. He loved hiking and backpacking in the Cascade and Olympic Mountains. Mike is survived by his wife, Norma Markey; his daughter, Jocelyn Markey; his first wife, Mel McConnell; his stepdaughter, Debra Dana; his stepson, Mark Dana; and Mark's daughters, Rachel and Jennifer.

(Source: Published in The Seattle Times on March 10, 2013)

DeepSea Power & Light Hires Fischer

DeepSea Power & Light said that Eric Fischer has joined the team as its new Technical Sales Representative. Eric will be assisting with customer support, visitation and problem solving and will attend trade shows. Eric completes his BS in Mechanical Engineering with an emphasis in Machine Design at San Diego State University come this May 2013. Eric has also volunteered his time and raised funds for Engineers without Borders and the Associated Society of Mechanical Engineers at SDSU.

New HQ for Bibby Offshore

The new purpose-built headquarters for subsea installation contractor, Bibby Offshore is entering its final phase of construction. The new 53,427 sq. ft. office facility at Prospect Park, Westhill, which represents a multi-million pound investment, is on track to be completed by April 2013. Bibby Offshore staff are due to relocate from its existing offices at Waterloo Quay by the end of May 2013.

A planning application has also been submitted for a new warehouse workshop and yard on Peregrine Road, Westhill. It comprises 3,800 sq ft of office space, 18,500 sq ft workshop/warehouse space with a 5,000 sq ft mezzanine deck and 33,000 sq ft yard. Construction of this new facility will be carried out by developer, Dandara and is anticipated to begin around April/May 2013, with a projected completion date of the end of 2013.

Bibby Offshore currently has more than 1,000 people working onshore and offshore worldwide, with offices in Aberdeen, Liverpool, Singapore and Trinidad. It recently added two new vessels to the fleet and continues to expand its subsea construction, engineering and project delivery services.

Tesla Offshore Orders Bluefin-21 AUV

Randall P. Bergeron, President and CEO of Tesla Offshore LLC, has announced the purchase of a Bluefin-21 AUV from Bluefin Robotics, leader in the development, production, and operation of AUVs and related technologies for defense, commercial, and scientific customers.

"In the highly competitive and evolving field of AUV development, Bluefin Robotics certainly belongs at the top of a very short list of suppliers that could meet our subsea data acquisition and sensor integration criteria," said Bergeron.

The purchase coincides with Tesla's intent to expand its presence in deepwater oil and gas field development, as well as positioning itself to pursue governmental, environmental and academic applications support. Tesla Offshore will operate their AUV on a global basis and, specifically, in the Gulf of Mexico where US government regulatory agents are considering proposals that mandate archeological and shallow hazard survey data be acquired by AUV technologies.

Assigned to spearhead the implementation of the technology are Tesla's Nathaniel Usher, Director of Geoscience and George Loy, Innovative Solutions Manager.

The Tesla Bluefin-21 AUV is a modular system capable of carrying multiple

sensors in a single payload section. It boasts a highly efficient power solution that enables extended operations at depths up to 4,500m. The design includes swappable payload sections and battery modules for fast surface turnaround, as well as portability and flexibility to operate from various ships of opportunity worldwide.

The AUV's unique sensor suite includes a broadband multibeam echosounder, a chirp sub-bottom profiler, and a very high definition digital camera. According to Tesla it will be the first AUV in the industry with the fully-integrated synthetic aperture sonar (SAS) produced by Raytheon Applied Signal Technology.

Kongsberg Offshore Vessel Simulator for Bibby

Bibby Ship Management India Pvt. Ltd contracted Kongsberg Maritime to deliver a Kongsberg Offshore Vessel Simulator (KOVS) including an upgrade of the customer's existing Kongsberg Dynamic Positioning (DP) simulator in Mumbai. This extension to the established Bibby Training Institute Mumbai represents the first KOVS in India and was commissioned to strengthen Bibby's ability to conduct advanced training courses for Indian seafarers.

The Bibby Training Institute Mumbai has already helped to grow the number of certified Indian DP operators, from 60 when it opened in 2006 to more than 1000 today. The new simulator delivery will meet a similar growing demand for trained and certified crew, especially for anchor handling and other specialist operations.

"This addition to the training center will open up new avenues for Indian seafarers who will have the opportunity to learn on high-end simulation technology," said Mr. Prakash Agarwal, Managing Director, Bibby Ship Management India Pvt. Ltd. "Our new simulator will add a lot of value to what we have been doing so far and will help to meet the need for Indian crew certified in specialist operations."

The scope of supply for the delivery includes a Kongsberg Offshore Vessel Simulator with visual scene, featuring Anchor Handling vessel, Shuttle Tanker and Drilling Rig models, enabling advanced offshore operations exercises and courses covering: Manual Handling OSV, Anchor Handling, Offshore Loading, Position Reference, Drilling Rig Operation, Power Management, Ship Manoeuvring, Advanced ECDIS, Bridge Team Management, Bridge Resource Management and Pilotage.

The existing Kongsberg DP simulator will also be upgraded to a DP 2 simulator fulfilling DNV/NI class A requirement as part of the project. The DP simulator will be integrated with the KOVS, providing the possibility to run DP2 courses with sea time reduction in addition to complete offshore vessel training.

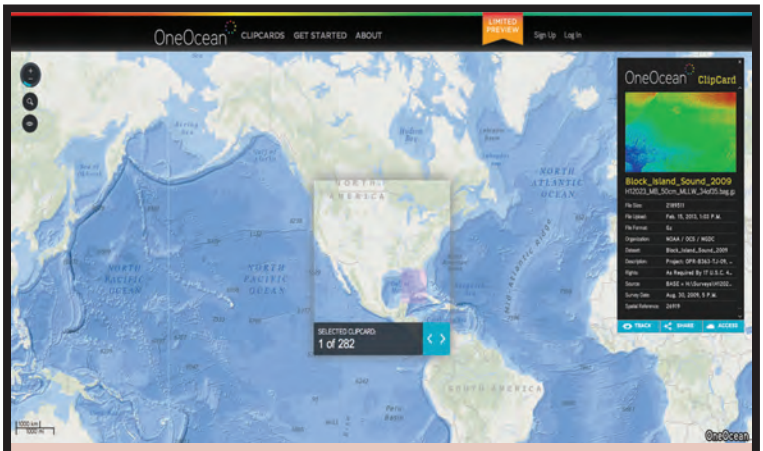
ABB Wins $26m Order

ABB won a $26m order to supply electrical power and propulsion systems for two next generation Ramform vessels, capable of 3D seismic data acquisition for deep sea resource exploration. The ships will be built by Mitsubishi Heavy Industries, and delivered in 2015 to Norway's Petroleum Geo-Services ASA (PGS). The Ramform Titan-class vessels are the newest generation in the Ramform series, featuring advanced 3D seismic data acquisition/analysis capability. At 104m long, the ships will have an exceptionally wide breadth of 70m and will feature diesel electric main propulsion for quiet operation. ABB will supply an advanced complete power and diesel electric system package, consisting of medium voltage switchboards

Kim Lehmann, President and CEO, RESON and Aldo (Al) Pichelli, President & Chief Operating Officer, Teledyne.

Teledyne Buys Reson

Teledyne Technologies Incorporated completed the acquisition of Reson. Reson, headquartered in Slangerup, Denmark, provides high-resolution marine acoustic imaging and measurement solutions. The acquired company will operate under the name Teledyne Reson. Terms of the transaction were not disclosed. With more than 30 years of experience and approximately 1,400 Reson echosounders sold worldwide, Reson is a provider of multibeam sonar systems and specialty acoustic sensors for hydrography, global marine infrastructure and offshore energy operations. Reson's multibeam sonar systems range from portable high-resolution shallow water systems used on autonomous underwater vehicles (AUVs) to full ocean depth vessel mounted oceanographic systems. "Reson is our 13th acquisition in our marine instrumentation group, which provides sonar systems, acoustic sensors and communication devices, harsh environment interconnects, and complete autonomous underwater vehicles," said Robert Mehrabian, chairman, president and CEO of Teledyne. "With the addition of Reson, as well as BlueView and Optech last year, Teledyne now offers 3D marine imaging systems for use from aircraft, fixed platforms, surface vessels and AUVs over a wide range of distances and water depths."



OneOcean Signs TerraSond

OneOcean Corporation (**www.OneOceanCorp.com**), which recently introduced its ClipCard platform and cloud-based service for managing marine geospatial data, announced its first enterprise customer, precision surveyor TerraSond, a leader in precision land and marine geospatial, geophysical, and geoscience survey solutions dedicated to imaging the earth globally. Headquartered in Palmer, Alaska, with multiple offices in the United States as well as South America and Central Africa, TerraSond's services and solutions are sought by clients in the oil and gas, pipeline, power, telecom, renewable energy, mining, shipping, dredging, construction and engineering sectors.

As a OneOcean customer, TerraSond is taking an approach to managing over 50 terabytes (TB) of bathymetric and other hydrographic survey data – digital assets accumulated in more than 15 countries since its founding in 1994.

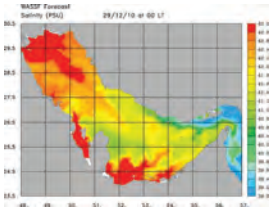
"We've been collecting data for nearly two decades," said Tom Newman, CEO and cofounder of TerraSond. "But we have been hard pressed to visually organize all of that work in a single place, and we have been seeking an efficient way to manage the data itself across our growing global footprint. With OneOcean, we believe we have found a solution to both of these challenges."

OneOcean's ClipCard platform gives TerraSond a summary of its worldwide data holdings that is searchable and spatially organized. Each ClipCard is a rich abstract of a unique file or dataset that TerraSond has collected, linked to its source but only a fraction of the size. With OneOcean's global cloud infrastructure backed by Amazon Web Services, TerraSond can use the ClipCard platform to grant secure access to source data on any continent when it's needed.

"ClipCard was designed to help companies like TerraSond realize the greatest possible value from their data," said Don Pickering, CEO of OneOcean. "TerraSond uses some of the world's most advanced technology to collect data, and we're proud to be offering them an equally advanced platform managing and leveraging those valuable data assets."

including power management systems, generators, transformers, frequency converters and motors. The systems will provide reliable and fuel efficient propulsion for the ships. The Ramform Titan-class vessels will employ multiple streamer cables, each several km in length, towed from the vessel's stern.

NKUA Appoints Unique System FZE



Unique System FZE, a Unique Maritime Group Company, was appointed as an authorized partner of NKUA for the Middle East region for Atmospheric Modeling and Weather Forecasting Group activities. The National and Kapodistrian University of Athens (NKUA) is the oldest (Established 1836) and biggest University of Greece. The Atmospheric Modeling and Weather Forecasting Group (AM&WFG) is part of Faculty of Physics and the Institute of Accelerating Systems and Applications (IASA) of NKUA. The research activities of the group are related to atmospheric physics and chemistry, renewable energy, sea state and wave modeling and regional climate. The main focus is in atmospheric, energy and wave model development and applications. Other activities include various applications related to energy production and management (wind energy, load forecasting) services related to weather and wave forecasting, optimal ship routing and safety. The AM&WFG is active in the Arabian Peninsula and Gulf Region by providing software and operational services (weather, wave, sea-current, tidal and air pollution) to various clients for more than a decade now.

Unique System FZE will be responsible for the sale of Atmospheric Modeling and Weather Forecasting Group activities and systems and will also offer Weather Forecasting services.

Lamor Appoints Unique

Unique System FZE also announced its appointment as an authorized distributor of Lamor for the Middle East region for their entire range of Oil Spill Response Kits.

Lamor (Larsen Marine Oil Recovery) Corporation offers solutions for optimal oil spill response and recovery. Lamor provides expertise coupled with solutions that protect the environment and our ecosystems. The company develops, manufactures, and supplies best available technology (BAT) oil spill recovery equipment and services. Included in

its portfolio of solutions, Lamor offers contingency planning, risk assessments, equipment maintenance and service coupled with training.
Unique System FZE will be responsible for the sale, service and rental of these Oil Spil Response Kits.

Fugro Chance, Coda Octopus Collaborate

Fugro Chance Inc. and Coda Octopus Group Inc. (CODA) entered into a Co-operation Agreement for two years to take advantage of Coda Octopus Echoscope, a patented 3D sonar technology. This relationship will give CODA early access to real-world requirements associated with Fugro Chance projects. Having access to the myriad of data acquired by Fugro will enable CODA to utilize the Echoscope in a variety of applications and challenges, thus maintaining a cutting edge in sonar technology. In return, Fugro will have the advantage of working with CODA to develop tailored solutions for their clients' subsea imagery deliverables.
Coda Echoscope Dual Frequency 3D Sonar is a unique sonar device using phased array technology. It generates more than 16,000 beams simultaneously, producing instantaneous, 3D sonar images of both moving and stationary objects and enabling extremely rapid reconnaissance and inspection.
Fugro Chance has proven field success in project time and cost savings as well as operational benefits from using this technology. The companies will work together on joint developments of new applications for meeting Fugro Chance requirements in data visualization and processing. In addition, Fugro Chance will gain market advantage from training opportunities provided by CODA as well as project support.

OSS Targets Brazilian Market

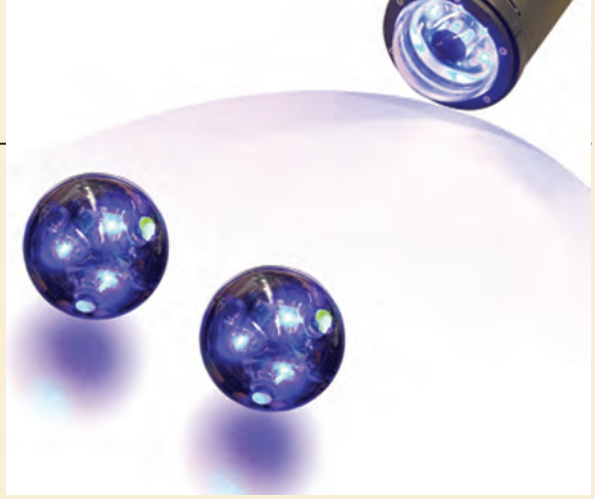
Offshore handling systems company Caley Ocean Systems and Brazilian company LIG Global Services announced the formation of a new company to supply locally produced marine equipment to the Brazilian power, telecommunications and oil and gas industries. Called OSS Sistemas Offshore Ltda (OSS), it will supply a wide range handling systems for cable laying, and subsea umbilicals, risers and flowlines (SURF) projects. The company's first project will be to build a $1m expandable 1,000Te carousel system that will be delivered in 4Q13.
OSS is intent to bring the combined strengths of both companies in handling systems and deployment to the growing market for offshore cable installation, as well as the rapidly expanding oil and gas sector. The company will undertake the design and construction of project-specific equipment in Brazil. Caley will assist in engineering the handling systems.
"We see this as a great opportunity to expand our business in Brazil working with LIG Global Services, an established supplier of cable installation services," said Gregor McPherson, sales director, Caley Ocean Systems. "Efficient handling systems whether for power cable or flowlines are critical to efficient and effective installation and safe handling offshore. OSS allows us to establish a supply chain that will have access to design and technical know-how gained over many years on some of the most demanding cabling and oil and gas projects."

Statoil Contract a Milestone for Ocean Installer

Ocean Installer won an Engineering, Procurement, Construction, Installation (EPCI) contract for subsea installations and tie-in operations at the Statoil operated fields Gina Krog (former Dagny) and Eirin. The contract value is approximately $85 million, including options.
The scope of work is part of the field development of the Gina Krog and Eirin fields and includes design, fabrication and subsea installation of Gas Export Pipeline End Manifold (PLEM), the oil export riser base, the tie-in spools and covers, as well as all associated remote tie-in operations. The work scope related to the Eirin field is included as an option due to the later project sanctioning schedule for this development.
The engineering and project management onshore will start up with immediate effect and be executed from Ocean Installer's Headquarters in Stavanger, Norway. The offshore campaigns will be executed in 2015 and 2016 and Ocean Installer will use the construction support vessels CSVs) Normand Mermaid, Normand Clipper and Normand Vision to undertake the offshore work.
Gina Krog is an oil and gas field located approximately 30 km north of the Sleipner A installation in the Norwegian sector of the North Sea. The gas/condensate field Eirin is located nine km northwest of Gina Krog. The water depth in the area is approximately 120m. The two fields are developed in parallel and start-up of production is foreseen for Q1 2017.

Coastline Surveys Launches Offshore Division

As part of its continued growth Coastline Surveys launched Coastline Offshore Ltd, a new division of the company developed to meet the growing demands for specialist offshore geotechnical and geophysical services beyond their established coastal markets.
The new division will enable the company to employ its experience in emerging offshore renewables at home and abroad, while also establishing them as a significant survey support subcontractor within the Oil & Gas industry.
Coastline has recently focused sizeable investment within its geotechnical division, with the addition of a Datem 5000 CPT, which in conjunction with the expanding pool of vibrocorers, grabs and in house labs enables it to offer a complete package of geotechnical services.



MacArtney Shows Sensorbots at Ocean Business

MacArtney Underwater Technology Group is scheduled to display and demo the Sensorbot technology at Ocean Business 2013, held early April in Southampton, U.K.

As human understanding and appreciation of the oceans rapidly increases, so does the demand for equipment capable of remotely monitoring this inhospitable and underexplored ecosystem. For this purpose, scientists at the Arizona State University have developed Sensorbots - a potentially transformative technology that promise to mark the beginning of a new era in ocean sensing.

Sensorbots are small, transparent spherical devices equipped with variety of surface mounted sensors for measuring various analytes such as pH, trace metals and temperatures related to underwater environmental micro and macro events and conditions. Once the surface mounted sensors pick up a reading, this is reported to the inner electronics which, in turn, transmit these into what is basically a visual Morse code of bright blue flashes of LED light. These optical signals are picked up and passed on by neighboring Sensorbots until they are eventually received and transmitted to the surface by a central masternode which is designed and manufactured by MacArtney.

Underwater Optical Networks (UON)

This kind of optical underwater light propagation - where Sensorbots relay information about the surroundings to neighbouring bots and ultimately to a masternode, is based on the theory of underwater optical networks (UON). By means of UONs, the optical signals transmitted by the Sensorbots are intelligently linked, using so called 'multi-hop' networking technologies, not unlike that used for cell phone and other land based wireless networks. This entails that information and data is 'hopped' between the nodes to overcome optical range limitations of underwater signal propagation.

In essence, this means that one will be able to apply Sensorbots like strings of pearls over great distances - with full utilization of all the benefits of optical communications speed and energy efficiency, but without the detriment of optical loss attenuation in seawater. Furthermore, the Sensorbots feature an 'omni-directional' communicative capability. This entails that each Sensorbot can both emit and detect optical signals from any direction.

A sea of potential

Networks of Sensorbots hold several useful applications:

- Ocean science
- Environmental monitoring
- Aquaculture
- Fisheries
- Geology
- Marine biology
- Oil and gas industries
- Other marine industries
- Accident remediation
- Defence and security

In Ocean Science, Sensorbots will help answer questions relating to topics as diverse and complex as detecting and monitoring oil spills, tracking and observing animal population migrations, hydrogeological flows, the evolution of emission plumes, ocean acidification, hazardous waste flows and other chemical distributions, all of which require extensive and accurate data to be gathered and analysed over vast areas simultaneously from remote ocean locations. When deployed, the Sensorbots will enable continuous spatiotemporal monitoring of key elements in the ocean and the ability to respond to events such as underwater earthquakes and hydrothermal vents.

Moreover, Sensorbots are a platform technology that easily supports new sensor materials as they become available. For example, the sensors can be used for hydrocarbons and methane (for oil and gas Sensorbot types) and dissolved oxygen, conductivity, temperatures, nitrates and chlorophyll (for ocean science, fisheries and aquaculture Sensorbot types) - as well as several other parameters.

Sensors for pH, dissolved oxygen, trace metals, and temperatures are now in operation, and several others are undergoing development. Currently under development are fluorescent polymers that respond to methane, sulphate, CO2 and other critical analytes in areas of diffuse flow in hydrothermal regions of the deep ocean.

The future, swarms of autonomous Sensorbots

As sensorbot technology develops, they may blanket large areas of the ocean and transmit information regularly to a central data hub. Ultimately, Sensorbots will be capable of operating in semi-autonomous self-propulsed robotic swarms, moving under remote control in a 3D geometric formation through precisely controlled volumes of seawater.

MARINE TECHNOLOGY REPORTER

2013 Editorial Calendar

January/ February — Ad Closing: Feb 1

Subsea Vehicle Report: Unmanned Underwater Systems

Market: Renewable Energy –Wind, Wave & Tidal Power Report
Product: Scientific Deck Machinery
Regional Report: Northeast USA

Bonus Distribution
Subsea Tieback
March 5-7
San Antonio, TX

March — Ad Closing: Mar 1

Instrumentation: Measurement, Processing & Analysis

Market: Sonar Systems & Seafloor Mapping
Product: Umbilicals, Cables, Connectors & Power Supply
Preview: Ocean Business 2013

Bonus Distribution
Ocean Business
April 9-11
Southampton, UK

April — Ad Closing: Apr 1

Offshore Energy Report

Market: Seismic Vessels & Systems
Product: Deepwater Positioning, Mooring & Anchoring
Report: Environmental Monitoring, Remote Sensing & Pollution Control

Bonus Distribution
OTC
May 6-9 Houston, TX

May — Ad Closing: May 7

Hydrographic Survey

Market: Salvage & Recovery
Technical: Seaflooor Mining
Product: Subsea Inspection

Bonus Distribution
Energy Ocean International
June 10-12 Warwick, RI
UDT 2013
June 18-20 Hamburg, DE

June — Ad Closing: Jun 3

AUV Operations

Market: Communications, Telemetry & Data Processing
Product : Deck Machinery, Winches, Cranes and Ropes
Report: Seafloor Engineering & Remote Operations

Submission Deadline:
Entries for the MTR 100 must be submitted to the editor by June 28

July/ August — Ad Closing: Jul 26

MTR 100

The MTR 100 is an invaluable guide for companies, government agencies, municipalities, research institutions and universities

Special Edition:
MTR 2013 Global Subsea Products & Services Directory

Bonus Distribution
AUVSI Aug 12-15
Washington DC

September — Ad Closing: Aug 28

Ocean Observation: Gliders, Buoys & Sub-Surface Monitoring Networks

Market: ROV Technology: Workclass to Micro Vehicles
Products: Underwater Imaging: Lights, Cameras, Sonar
Regional Report: Southern California
Preview: Oceans 2013

Bonus Distribution
Oceans '13
Sept 23 to 27
San Diego, CA

October — Ad Closing: Oct 4

Subsea Defense

Market: Naval Underwater Warfare Technology
Product: GPS, Gyro Compasses and MEMS Motion Tracking
Special Report: Training & Education Institutions & Facilities

Bonus Distribution
SNAME
Nov 6-8 Seattle, WA

November/ December — Ad Closing: Nov 22

Fresh Water Monitoring & Sensors

Market: Marine & Subsea Engineering & Construction
Product: Offshore Inspection, Repair & Maintenance
Preview: Underwater Intervention 2014

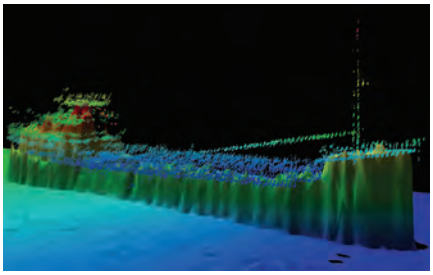
Special Edition:
2nd Annual Underwater Imaging Contest

Bonus Distribution
Underwater Intervention

Please note that the publisher reserves the right to alter this calendar. All features are subject to change in light of industry trends and developments.

Photos: Mara Tuchman

CARIS releases HIPS and SIPS 8.0



Water column data can be selected and imported as additional bathymetry in HIPS and SIPS 8.0.

CARIS released CARIS HIPS and SIPS 8.0, a hydrographic data processing system. HIPS and SIPS offers a single solution for bathymetry, seafloor imagery and water column data processing.

The release of HIPS and SIPS 8.0 includes significant enhancements, such as the continued implementation of water column data processing allowing the data to be supplemented into the bathymetry, the redesigned calibration tools in Subset Editor and the new HIPS project database allowing for faster open times and multi-user access.

"The major release of HIPS and SIPS 8.0 has many new features that our clients have been eagerly waiting for," said Burns Foster, product manager for HIPS and SIPS. "The ability to be able to select and import water column data as bathymetric data into existing projects is very exciting as there are plenty of useful applications for this, from scientific endeavors to verifying the least depth on a wreck. Also, the new HIPS database file is the first step in bringing data storage and management in HIPS and SIPS to the next level and we have some big plans for this going forward."

Following the introduction of water column data processing in HIPS and SIPS 7.1.1, the continued development in HIPS and SIPS 8.0 now allows users to supplement the bathymetry in existing projects with water column data. The data can be selected and imported as additional bathymetry and is stored in a CSAR point cloud. Water column data can now be imported as fully corrected bathymetric data and utilized in the same tools and workflows as standard bathymetry.

New HIPS project database with multi-user access

The new .hips file for HIPS and SIPS projects is a database that will provide several advantages, including management of multi-user access to the data. The project database also significantly improves the performance of opening a project. Testing on a project containing hundreds of track lines shows open times are dropping from several minutes to only a few seconds.

CARIS clients who have a valid CARIS subscription can now download HIPS and SIPS 8.0 from the CARIS Online Customer Services website. Individuals new to HIPS and SIPS can contact info@caris.com for more information and a quote.Water column data can be selected and imported as additional bathymetry in HIPS and SIPS 8.0.

www.caris.com

Massive Light Output, Minimal Energy

The robust new BIRNS General-Area Chamber Light-LED is an fixture that is designed to safely provides brilliant lighting inside HeO2-atmosphere PVHO chambers. It is a customizable solution for submersibles, diving bells, personnel transfer capsules and a wide range of decompression, recompression and hyperbaric chambers.

The system provides brilliant white light 3,500K illumination with a 50,000 hour lamp life and a low <1W power consumption. It has an electrochemically polished aluminum reflector, and is vibration and shock proof—tailored to withstand the rigors of varying pressure work environments. The BIRNS General-Area Chamber Light-LED can mount on nearly any ceiling or structure wall and has a superior heat sink design and case ground (earth) connection for safe and seamless operation. It features a stainless steel helium release valve to prevent the risk of post-decompression explosion. This comprehensive low voltage (15-40V DC; 12-28V AC) system comes complete with a factory-installed penetrator and cable assembly for savings and convenience and meets or exceeds applicable Det Norske Veritas (DNV), Lloyd's and UL requirements.

Crafted from rugged hard black anodized aluminum with a tempered borosilicate glass lens, it integrates a stainless steel cage for additional lamp protection and can be specified with an added connector and/or on/off switch.

www.birns.com

SEA CON's Configurable PBOF Manifold

SEA CON has answered the growing customer demands for a modular system which allows the user to easily replace sensors and other equipment without field terminations. SEA CON's PBOF manifold has been developed to allow users the ability to mate the interface connections at the manifold with either rubber molded cable or oil filled hoses. It is designed to be a reliable junction box which allows serviceability and reconfiguration by the user. To protect the system, each connector is independently water-blocked, thus creating redundant seals preventing collateral damage should any one component be compromised.

www.seaconworldwide.com

Falmouth Scientific Enhances the Bubble Gun Family

Falmouth Scientific, Inc. (FSI), a leader in precision oceanographic instrumentation and marine systems integration, is further developing its product line of HMS-620 Bubble Gun seismic systems and has announced two important enhancements.

According to the manufacturer, FSI's Bubble Gun Systems are designed for small boat shallow water surveys. Data collected with the HMS-620 rivals that of much larger, heavier and more expensive air-gun, boomer and sparker systems, and its small size makes it easily deployable without the need for heavy machinery, winches or cranes.

Bubble Gun systems uses a 15 cu. in. air volume to generate narrow band, low frequency acoustic signals, a technology designed to provide superior signal penetration through coarse sand, gravel tills and other difficult to penetrate sediments. By adding a second transmit channel to the existing transceiver enclosure and by synchronizing the two signal generators, FSI has realized significantly higher energy output, which results in much deeper signal penetration. The two Bubble Gun source transducers can be mounted together on one tow vehicle or can be configured as two separate single-source vehicles.

All of FSI's Bubble Gun systems can be fitted with a 24 VDC power option which allows them to be powered by lead-acid marine batteries.

www.falmouth.com

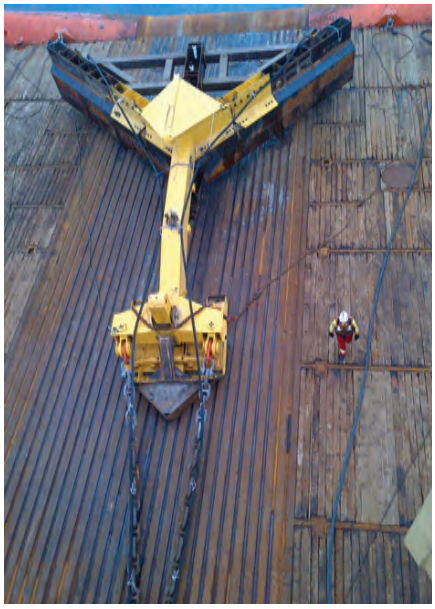
Shark Debuts New Product

Shark Marine Technologies Inc. of St.Catharines, Ontario, Canada, announced a new topside video controller with a built-in digital recorder and 15" daylight viewable monitor. The SV-DCC controller, records real-time video to SD memory cards and is backwards compatible with Shark Marine's entire line of Standard Video, underwater cameras and lights. Selectable recording modes allow for 16 to 49 hours of recording time on the included 16G SD card and double that amount on an optionally available 32G. The 15", 1500 nit display mounted in the lid of the controllers rugged case provides a crisp, clear image of the underwater operations for the topside operator. Other readily available options include GPS Overlay, Keyboard/text overlay and built-in video enhancement features such as LYNN or Helios.

www.sharkmarine.com

Ecossee Trenching Plough

Ecosse Subsea System's SCAR subsea trenching plough can be operated from a range of vessels, including anchor handlers and multicats and launched/recovered over the stern roller, negating the need for expensive vessel hire and lifting equipment. It can be operated by four to six man crews and when used for Burial Assessment Surveys it aids project planning by providing data on soil strengths, tow force requirements, speed, route mapping and identifies variations and potential problems. SCAR can deliver a first pass of a multi-pass cable trenching solution, will clear and prepare a route for the trenching phase and cut the initial trench.



www.ecosse-subsea.com

Siemens Subsea
All-Electric Tube Bending for Production of Subsea Hydraulic Flying Leads

Siemens Subsea Products has chosen an all-electric tube bender from Unison to improve the quality and speed the production of the small-bore hydraulic tubes it uses on subsea hydraulic flying leads with Multiple Quick Connections (MQC), Cobra Heads and associated offshore oil and gas recovery equipment. The tubes feature complex bends of extremely high accuracy, and until now the company has either fabricated them manually or bought them in as preformed sub-assemblies.

Siemens Subsea Products produces a wide range of subsea electric, fiber optic and hydraulic power and control systems for offshore oil and gas subsea applications. Its hydraulic workshop at Kongsberg in Norway operates world-class fabrication and assembly processes, producing systems for direct sales and third-party suppliers. As part of its strategy to expand manufacturing capabilities in this specialist field, the company recently reviewed tube bending automation, starting by comparing the performance of a number of leading hydraulic and all-electric tube bending machines.

The tube bender supplied to Siemens Subsea is a 25 mm model based on Unison's popular Breeze platform of all-electric machines and incorporates a 'rise and fall' pressure die which enables it to perform right- and left-

handed bending; this increases manufacturing flexibility and throughput by allowing long and complex parts to be produced from a single length of tubing in one continuous cycle. Installed at Siemens' Kongsberg facility at the end of last year, the machine is currently undergoing commissioning and due to commence operation during January 2013.

All critical movement axes on the Unison tube bender are controlled by precision servomotors, enabling fast and repeatable fabrication of parts with accuracies to within fractions of a millimeter. The machine is also capable of generating the high torque needed for bending tubes fabricated from exotic alloys such as Inconel, Duplex and Super Duplex, which are used extensively for subsea applications to improve corrosion resistance.

Siemens Subsea's first project involving the Unison machine will be the South Belut Project production of 800 tubes, all made from 316 and requiring complex bends and orbital welding in both ends, for use on umbilical termination units known as MQCs. These are used on various subsea structures, including Christmas trees, and Siemens' versions can accommodate up to 13 hydraulic lines, demanding extremely tight manufacturing tolerances. Each tube is designed on a Inventor 3D CAD system, and the company generally then produces a prototype to verify its accuracy and feed any necessary corrections back into the production process to ensure the quality of subsequent parts. Automating the tube bending process is set to accelerate this procedure – the CAD system and bending machine are linked by a production computer network – and will help Siemens Subsea Products maintain the fully traceable manufacturing records needed for this industry.

www.siemens.com/oilgas

New LedaFlow Release

Kongsberg Oil & Gas Technologies AS (KOGT), a wholly owned subsidiary of Kongsberg Gruppen ASA, announced the release of LedaFlow (1.3), the new transient multiphase simulator for wells and pipelines. Continuing with KOGT's ambition to provide greater detail and accuracy to multiphase simulation in the Oil & Gas industry, this release of LedaFlow contains significant additions and improvements, including:

- ***a new separator model,***
- ***the bypass pigging capabilities,***
- ***black oil PVT definitions,***
- ***dead oil circulation using custom fluids,***
- ***standard volume flowrates, and***
- ***emulsion models.***

KOGT has reports an average 70% speed increase using multi-CPU capabilities.

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11	SouthWest Electronic Energy Corp	www.swe.com	(281) 240-4000
43	Specialty Devices, Inc.	www.specialtydevices.com	(972) 429-7240
64	Subsea Photo Contest	http://photos.seadiscovery.com	Please visit us online
47	Sustainable Ocean Summit 2013	www.oceancouncil.org	Please visit us online
37	Teledyne Benthos	www.benthos.com	Please visit us online
1	Teledyne Blueview	www.blueview.com	(206) 545-7260
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3	Trimble	www.trimble.com/gnss-inertial	Please visit us online
60	Undersea Defense Technology	www.udt-global.com/mtr	Please visit us online
17	Valeport Limited	www.valeport.co.uk	44(0) 1803869292
C2	VideoRay LLC	www.videoray.com	(610) 458-3000

March 15- November 8, 2013

Coming this spring!

For the third year in a row Marine Technology Reporter sponsors the Subsea Photo Contest, showcasing the best underwater images- from vessels and equipment to people and ocean life. Winning photos will be published in a special section of the Nov / Dec issue of MTR, featuring the Grand Prize Winner *on the front cover of the magazine.*

3rd Annual

Subsea Photo Contest

MARINE TECHNOLOGY REPORTER and SeaDiscovery.com

underwater technology and ocean science news

To see submissions from last year, go to:
http://photos.seadiscovery.com

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