MARINE TECHNOLOGY REPORTER

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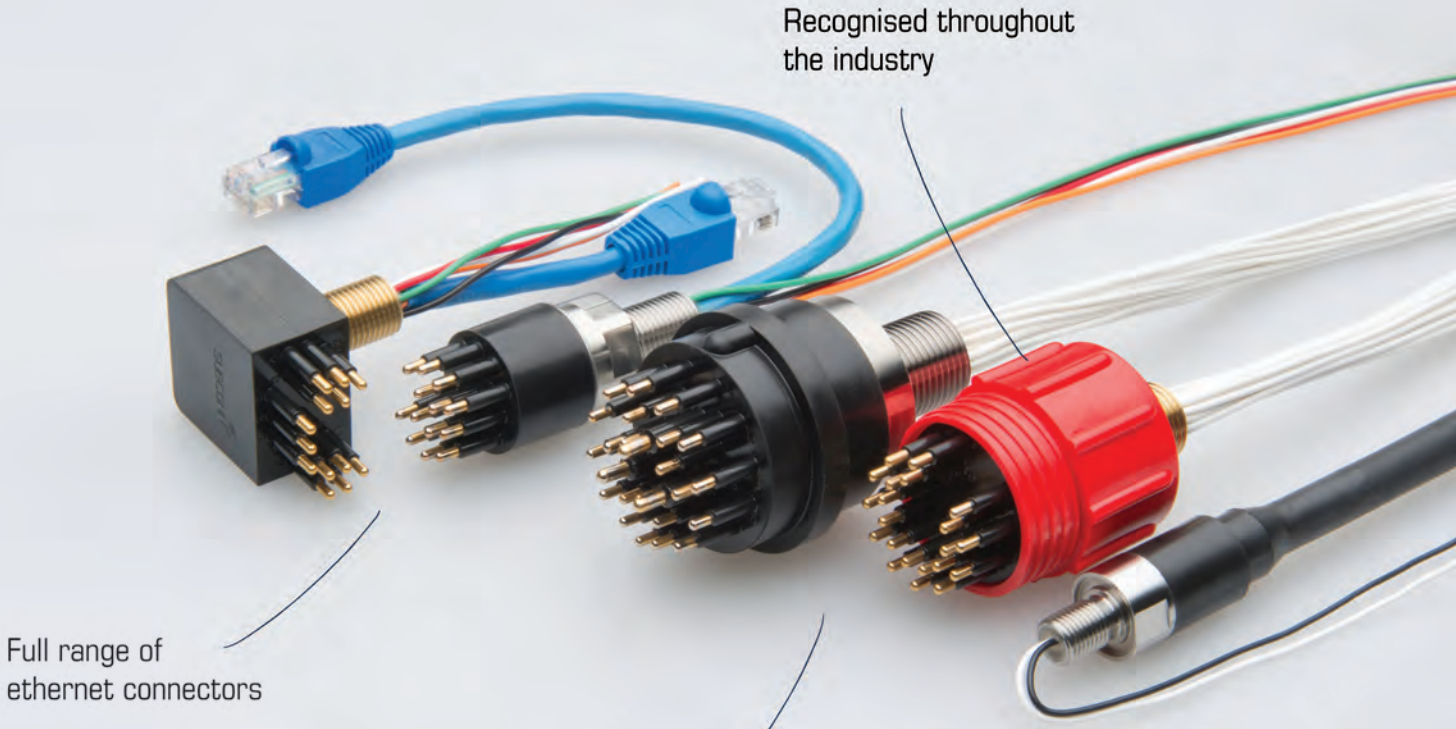

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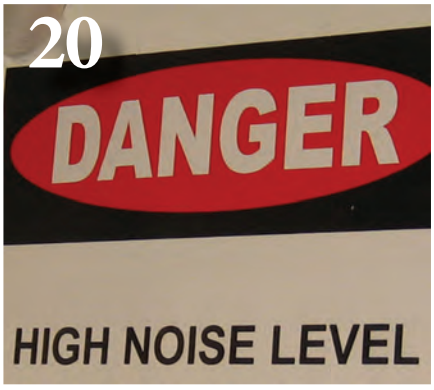

Survey

The Authors in This Edition of MTR

Claudio Paschoa

Claudio Paschoa is Maritime Reporter & Engineering News' and Marine Technology Reporter's correspondent in Brazil. *p. 36*

Michael Bahtiarian

Michael Bahtiarian is the Vice President at Noise Control Engineering, LLC and Board Certified in Noise Control Engineering. *p. 20*

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William Stoichevski began working for the Associated Press in Oslo. In 2003, he left the AP to oversee and write for a number of print and electronic energy industry publications in the Norwegian capital. He has written thousands of offshore-focused reports from his North Sea vantage point. William lives and works in Oslo. *p. 42*

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Chen Wei is a researcher in Douglas-Westwood's Singapore Office, undertaking research and analysis for publications and projects. He holds a B.S. in Economics and a second major in finance from the Singapore Management University. During his industry attachment, he was an Associate at Continento Research Private Limited. *p. 30*

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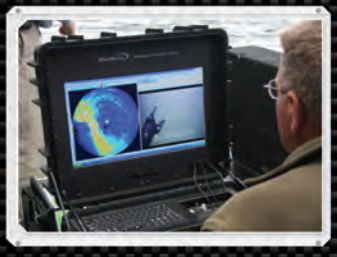

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One More Year Down

I'm not sure if it is a function of getting older, getting busier, or a combination of both, but the year 2014 to me is nothing but a blur. Despite the year-end plummet in oil prices that threatens to throw the offshore energy business into a tailspin, this has been by far the busiest and most productive year in my 20+ year publishing career, and while a drop in energy production may cause a lull in business surrounding the discovery and recovery of assets offshore, the facts regarding your business are rather simple: Energy prices will rebound with a long-term trend that is decidedly bullish; and the demand for advanced technology to discover, recover and analyze information from the world's waterways will continue to grow.

In November I was honored to join the speaker roster of The Maritime Alliance's Blue Tech & Blue Economy Summit in San Diego, an event which brought together a group of about two hundred "A List" executives from industry and government to strategize on the long-term plan to simultaneously grow the business and political influence the business and study of the ocean. I am true conference and exhibition veteran, and trust when I say this was a special event with candid conversation and liberal networking opportunities.

While I don't have a crystal ball nor do I pretend to know with complete accuracy the future direction and speed of the various niches that make up this subsea business, I can report confidently that as the world continues to evolve as an increasingly interconnected community with complex problems, high-tech industries such as this will undoubtedly grow by leaps and bounds.

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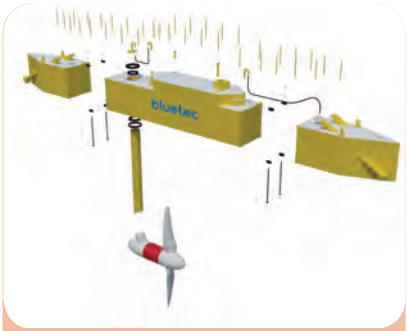

Image: Damen

Floating Tidal EnergySystem

A group of offshore companies, including Bluewater, Damen and Van Oord among others, has partnered for a floating tidal energy platform a project to generate clean electricity, marking the first time that a floating tidal platform is used for electricity production into the Dutch grid.

Set to become operational in the first half of 2015, the BlueTEC platform, which will be moored near Texel in the Waddenzee, is of modular design and uses a new type of permanent mooring lines. It will also serve as a trial for remote locations worldwide, such as islands in Indonesia, Philippines or the Pacific. The platform is designed to be shipped and installed anywhere in the world, and the BlueTEC platform is developed for cost effective installation, operations and maintenance of tidal turbines. BlueTEC floats and can be towed to location without heavy lifting at sea.

The Texel platform is the small, simple and robust version of BlueTEC. Aimed at remote locations, it consists of container size modules, can be assembled locally and installed without sophisticated equipment. It holds a 200 KW turbine that can power local villages, cooling facilities and provide lighting at schools which will change local economies. It will be the first time that electricity generated from free flowing tidal currents will be supplied to the island of Texel.

U.S. Offshore's "Huge Potential"

Two new studies by Quest Offshore Inc. for the National Ocean Industries Association (NOIA) and the American Petroleum Institute (API) show vast potential energy and economic benefits to the U.S. if the Eastern Gulf of Mexico and the Pacific outer continental shelf (OCS) were opened to offshore oil and natural gas development. Last year a similar study was conducted for the Atlantic OCS. All three areas – the Eastern Gulf of Mexico, the Pacific OCS and the Atlantic OCS – are currently almost entirely off-limits to offshore oil and gas development but could be included in the federal government's next five-year leasing program. If the federal government begins holding lease sales in these regions in 2018, the three studies show that by 2035:

- Pacific OCS development could create more than 330,000 jobs, spur nearly $140 billion in private sector spending, generate $81 billion in revenue to the government, contribute over $28 billion per year to the U.S. economy, and add more than 1.2 million barrels of oil equivalent per day in domestic energy production.
- Eastern Gulf of Mexico development could create nearly 230,000 jobs, spur $114.5 billion in private sector spending, generate $69.7 billion in revenue for the government, contribute over $18 billion per year to the U.S. economy, and add nearly 1 million barrels of oil equivalent per day to domestic energy production.
- Atlantic OCS development could create nearly 280,000 jobs, spur $195 billion in private sector spending, generate $51 billion in revenue for the government, contribute up to $24 billion per year to the U.S. economy, and add 1.3 million barrels of oil equivalent per day to domestic energy production.
- Development in all three study areas – the Eastern Gulf of Mexico, the Pacific OCS, and the Atlantic OCS – could, by 2035, create more than 838,000 jobs annually, spur nearly $449 billion in new private sector spending, generate more than $200 billion in new revenue for the government, contribute more than $70 billion per year to the U.S. economy, and add more than 3.5 million barrels of oil equivalent per day to domestic energy production.

Photo: Chevron/Statoil

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The Blue Tech Economy and the "View from the Top"

From November 12-13, 2014 the McMillin Companies Event Center in sunny San Diego, CA played host to The Maritime Alliance's 6th Annula Blue Tech & Blue Economy Summit, an event which has grown stronger year-on-year. This year's two-day event, of which *Marine Technology Reporter* served as a media sponsor, was packed with many leading executives from industry, academia and government, local, regional and national.

The conference highlight of day one was **"Panel 5: View from the Top,"** moderated by Greg Trauthwein, Editor of *Marine Technology Reporter*. The panel was unique in that it featured six industry executives participating in a free-wheeling discussion on the means and mechanisms needed to drive the Blue Economy further faster. Participants in the panel included:

- **Brett Andrews**, President, Hydranautics
- **William Kikendall**, President, Teledyne Marine Sensor & Systems
- **David Millar**, President, Fugro Pelagos
- **Casey Moore**, President, Sea-Bird Electronics
- **Drew Stephens**, Ocean Industry Manager, Esri
- **Christopher Ward**, Vice President, Xylem Analytics

The overall highlight from day one inarguably was the Gala Dinner and Awards Ceremony, complete with a keynote address by Dr. Rick Spinrad, NOAA Chief Scientist, delivering a talk entitled "Blue is the new Green – Promoting OceanSTEM, Maritime Workforce Development and a National Blue Voice." 2014 Award Winners included:

- **Alliance Building:** MiraCosta Community College
- **Educational Outreach:** Brand Architecture
- **Environmental Leadership:** Pacific Tugboats
- **International Maritime Partner:** Southampton University and the National Oceanography Center (UK)
- **Marine Science Teaching:** Rosie Beck, St. Martin of Tours Academy
- **Maritime Technology Lifetime Achievement:** Nancy Taylor, Exploring STEM Careers Initiative
- **Maritime Community Leadership:** Port of San Diego
- **Rober & Laura Kyle Chair in Mariitme History at the Maritime Museum of San Diego:** Dr. Mark Hanna, UCSD
- **Sustainable Seafood:** Tuna Harbor Dockside Market
- **TMA Cluster Supporter of the Year:** Julia Rauner Guerrero, U.S. Commercial Service

For more on the Maritime Alliance, visit **www.themaritimealliance.org**

Brett Andrews, President, Hydranautics

Casey Moore, President, Sea-Bird Electronics

Christopher Ward, Vice President, Xylem Analytics

David Millar, President, Fugro Pelagos

Drew Stephens, Ocean Industry Manager, Esri

William Kikendall, President, Teledyne Marine Sensor & Systems

Photos: Greg Trauthwein

Study:

Worldwide Ship Traffic up 300% since 1992

Maritime traffic on the world's oceans has increased four-fold over the past 20 years, according to a new study quantifying global ship traffic. The research used satellite data to estimate the number of vessels on the ocean every year between 1992 and 2012. The number of ships traversing the oceans grew by 60% between 1992 and 2002. Shipping traffic grew even faster during the second decade of the study, peaking at rate of increase of 10 percent per year in 2011.

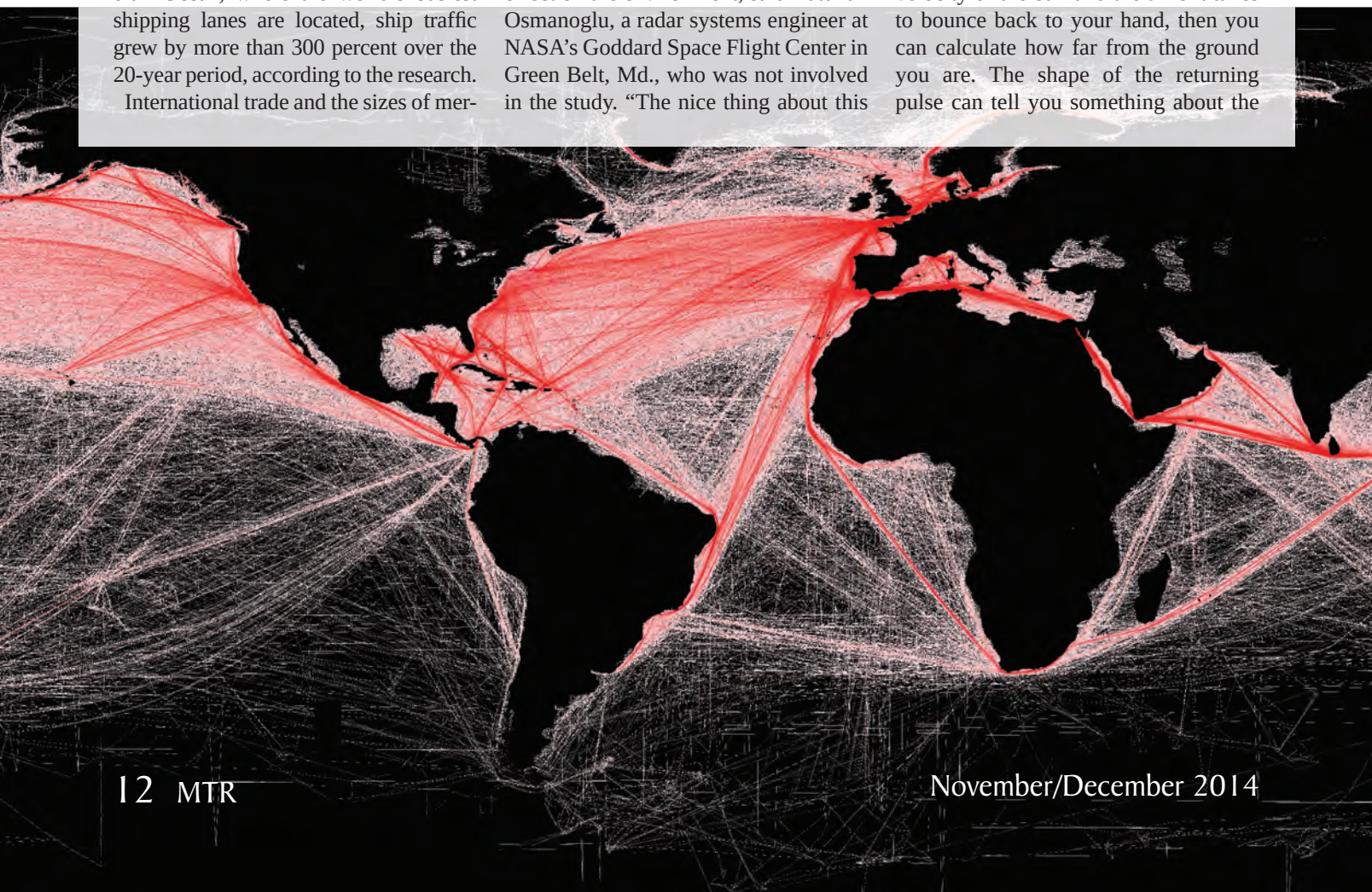
Traffic went up in every ocean during the 20 years of the study, except off the coast of Somalia, where increasing piracy has almost completely halted commercial shipping since 2006. In the Indian Ocean, where the world's busiest shipping lanes are located, ship traffic grew by more than 300 percent over the 20-year period, according to the research.

International trade and the sizes of merchant fleets have both enlarged rapidly over the past two decades, explaining the steep rise in ship traffic, the study reports. The new analysis has been accepted for publication in Geophysical Research Letters, a journal of the American Geophysical Union. Jean Tournadre is a geophysicist at Ifremer, the French Institute for the Exploitation of the Sea in Plouzane, and the study author.

The author hope the new study will increase scientists' understanding of how human activities are affecting marine ecosystems and improve models of atmospheric pollution in the open ocean.

The new dataset will provide scientists with invaluable insights into the patterns of ship traffic and the traffic's effect on the environment, said Batuhan Osmanoglu, a radar systems engineer at NASA's Goddard Space Flight Center in Green Belt, Md., who was not involved in the study. "The nice thing about this study is that they have a unique dataset, that maybe we're looking at for the first time," he said. "Whenever you have a unique dataset you can quite easily learn something new."

The new method outlined in the study uses altimeters, or instruments that measure altitude, aboard satellites to detect the location of ships at sea, similar to the way these instruments have been used to track icebergs. The altimeter sends a radar pulse down to Earth from the satellite and constructs an image of the surface based on the time it takes the pulse to bounce back to the instrument and the shape of the pulse when it arrives. The method works similar to throwing a ping pong ball at the ground: if you know the velocity of the ball and the time it takes to bounce back to your hand, then you can calculate how far from the ground you are. The shape of the returning pulse can tell you something about the



features on the ground. A smooth target like the ocean will bounce back an expected pulse shape, but if something like an iceberg, island, or ship is present, the shape of the echo will change.

In 2007, Tournadre was poring over hordes of satellite data for signs of icebergs in polar seas, when he noticed an odd shape in the data.

"We had some unconventional data in a region, and careful analysis showed us that it was a lighthouse near shipping lanes," he said. "As we processed the data over the whole globe, we also detected ships."

Tournadre found that the altimetry data accurately reproduced known shipping lanes and could be used to estimate the number of vessels on the ocean worldwide. The study used altimetry data from seven different satellites to map ship traffic from 1992 to 2012.

However, Tournadre also cautions that some of the growth he has seen in ship traffic could be overestimated because ships, especially container ships, have become larger over the past two decades and possibly easier to detect with altimetry data.

PLAT-O

New Tidal Wave Energy Device Completes Sea Trials

In the continuing quest to harvest efficient, renewable energy from the power of the world's tides, an organization called Sustainable Marine Energy's announced that its PLAT-O tidal energy platform has successfully completed its first field trials.

Despite the tremendous power and predictability of the world's waves and tides, efforts to successfully build and bring to market a device to harness, store and transmit power in an efficient manner have been largely unsuccessful in the commercial sense. In particular the tidal energy industry has struggled with high costs for installation and maintenance, but Sustainable Marine Energy (SME) claims that PLAT-O could be a game changing technology. It uses an innovative platform which is moored under the surface of the water significantly reducing costs.

PLAT-O was launched from the company's facility in Venture Quays, East Cowes, Isle of Wight and towed to the test site at Yarmouth. Once at the site PLAT-O was submerged to installation depth and a series of tests were run. PLAT-O was then successfully resurfaced and towed back to East Cowes, where it will be prepared for its next series of trials.

The marine operations were run using small vessels, demonstrating that a step change reduction in the cost of installing tidal energy devices can be achieved. The results of the sea trials provide increasing confidence in the potential for tidal streams to provide a commercially viable source of renewable energy.

"We have reached a huge milestone in the development of our solution to address the costs associated with delivering tidal energy," said Jason Hayman, Managing Director, SME.

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"Over the next few months we will be ramping up the time that PLAT-O spends at site, and running a series of tests which will culminate in the installation of PLAT-O at a more aggressive tidal site and generating power to the grid."

Orcades Marine Management Consultants manages the delivery marine operations for SME, and its , Managing Director David Thomson said "The progress that the team at SME has made culminating with this trial installation of PLAT-O should be regarded as a terrific achievement. I have been involved in many tidal installation operations and I have seen first-hand the challenges facing the tidal industry in relation to the cost of operations. It is clear to me that PLAT-O has the opportunity to succeed and provides a viable solution for the tidal energy industry."

What is PLAT-O?

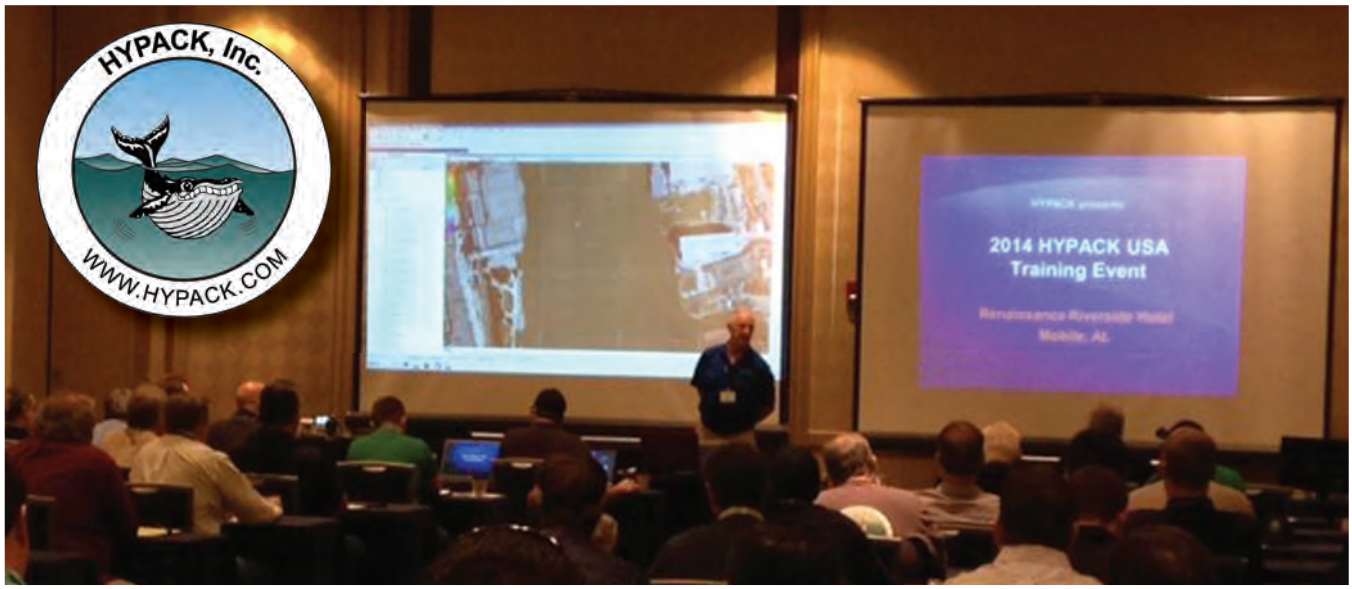
PLAT-O is a buoyant platform that is taut moored to the seabed using an anchoring solution developed by SME. It sits under the surface of the water at a depth to ensurethat surface vessels can pass safely over top. Apart from a surface marker buoy, the system is not visible on the surface.

PLAT-O is designed to be compatible with most leading tidal turbine technologies and it can be adapted to suit a wide range of configurations. SME has designed the platform with flexibility in mind, to scale up the platform and work with manufacturers of tidal generators to use new technologies as they emerge. The current PLAT-O prototype hosts two Schottel STG50 tidal generators and SME is working with Schottel to deliver a system capable of providing commercially viable tidal energy to island and coastal communities.

Key contributors to the PLAT-O development are:

- ***PLAT-O build and logistics: BSA Regal Group, PE Composites, South East Hydraulics, Kingswell Haulage, Air Power & Hydraulics.***
- ***Power take-off and control: SCHOTTEL, ASV, Goodwolfe Energy.***
- ***Design and verification: DNV GL, Ultramag Inspection Services, Future Energy Engineering, Offshore Renewable Energy Group - Cranfield University, IFREMER, Dynamic Systems Analysis, QinetiQ Marine Design Software, Adris, Autodesk.***
- ***Anchoring and mooring system: Spencer Rigging, English Braids, Harken UK, EYE Marine, PFEIFER Rope & Tackle, Autoguide Equipment, Rockbit UK, Technical Services Team, Marine South East.***
- ***Marine Operations: Orcades Marine Management Consultants, Williams Shipping, Kingston Marine Services (Cowes Harbor Commission), Andark Diving, Seastar Survey.***
- ***Key stakeholders: Yarmouth Harbour, Royal Yachting Association, Marine Management Organisation, Maritime & Coastguard Agency, Natural England, Isle of Wight Council, Royal Solent Yacht Club.***

HYPACK 2015 Hydrographic Training Event



The HYPACK 2015 USA Training Event will be held in San Antonio, Texas, January 5 to 8, 2015. The Hyatt Regency San Antonio River Walk will be providing accommodations and hosting the annual event.

Updated Software

Revealed at the event will be the newest software version, HYPACK 2015. Significant changes in HYPACK 2015 will be the new 3D real-time point cloud, water column integration, and a new anchor-handling routine.

Other new features included are:

- **enhanced topographic laser capabilities, integration of Leica and Reinshaw topographic laser system, support for multiple navigation devices,**
- **export for 3D printers,**
- **vector-scaled soundings in HYPACK SHELL and HYPLOT (WYSIWYG),**
- **multiple offsets for rig moves in HYPACK SURVEY,**
- **updated IENC presentation to latest standard,**
- **Google Glass helmsman display,**
- **real-time capture for GoPro and Nikon cameras,**
- **enhanced targeting of side scan sonar in HYSCAN,**
- **unicode implementation to support foreign language characters and update of translation texts,**
- **enhanced remote viewing, allowing for viewing and control of HYPACK SURVEY on a tablet, and**
- **updated DREDGEPACK interface for cranes.**

Attendees will get first-hand knowledge and training on all the new updates and improvements this version has to offer. There will also be a demonstration of 3D printing and Google Glass during the event.

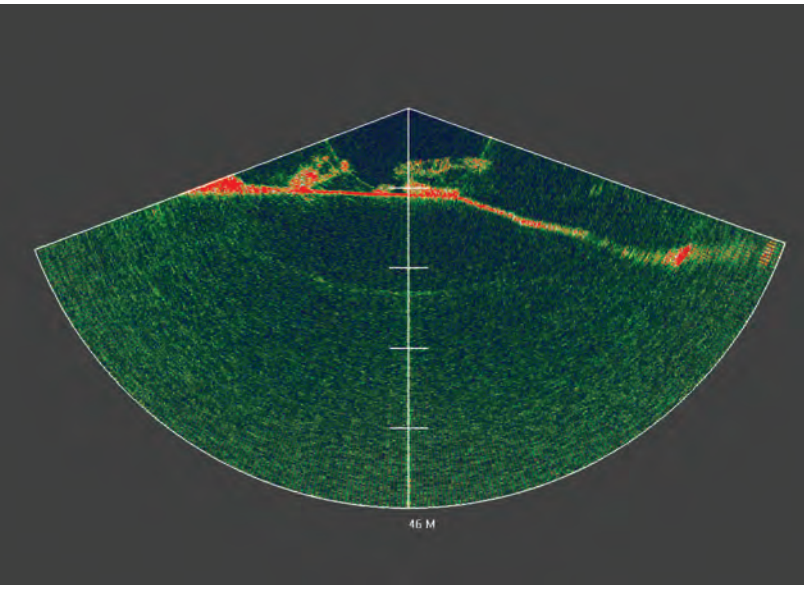
Sessions

The HYPACK USA Training Event is designed to be a low-cost method to receive comprehensive instruction in HYPACK, DREDGEPACK and HYSWEEP software. This training is targeted as a general training session for those who are just beginning to use HYPACK or those who wish to have a refresher. There are also expert sessions scheduled for in-depth training on a particular subject. If help is needed with an individual issue or question, one-on-one sessions with technicians and programmers are also available throughout the event.

Certification

Attendees have the chance to become HYPACK certified in HYSWEEP and HYPACK after the HYPACK 2015 Training Event. This is a difficult test that given upon the completion of a three-day HYPACK Training Seminar. Users must demonstrate advanced knowledge in survey design, hardware configuration, survey, single-beam processing, sounding selection, multibeam calibration and processing, volume computations, and general hydrography in order to pass. Visit the website at **www.hypack.com**, place the cursor on the Training tab, and then click on HYPACK Certified to get more information.

Those interested in attending the HYPACK 2015 Training Event can register and find event information at **www.hypack2015.com**



Exhibitors List

There will also be an opportunity to visit exhibitors from the industry's leading hardware manufacturers, equipment resellers and service providers at HYPACK 2015. The following list of exhibitors was updated as of press time:

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Specialty Devices Inc.
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Falmouth Scientific Inc.
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OGI Inc.
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Navigation Electronics, Inc.
Imagenex
Oceanscience Group
SonTek
Subsea Technologies, Inc.
Valeport Ltd.
SBG Systems
Novatel Inc.
AML Oceanographic
Seafloor Systems, Inc.
Survey Equipment Services
L-3 Klein Associates, Inc.

What's all the Noise at IMO?

By Michael Bahtiarian, VP Noise Control Engineering, LLC

Shipping may think they hear the sound of new regulations as they are slammed onto their desks. What is all the noise concerning *noise* at IMO? This may very well be the question from ship owners, operators and builders closely following activities at the International Maritime Organization (IMO). In 2013, IMO issued mandatory regulations for shipboard airborne noise and earlier this year IMO internal committees approved new draft guidelines for minimizing underwater noise. Even though the author advised the U.S. delegation on both matters, these two codes are not related as they were shaped at IMO. Here is the author's view what the new regulations/guidelines will mean to the marine community.

Airborne Noise

Since 1981, the IMO has established a guideline for shipboard airborne noise (IMO Resolution A468XII-1981). This guideline included information on sound measurement, acoustic insulation, hearing protection and maximum recommended sound pressure levels by ship compartment type. As noted in the resolution, its purpose was to reduce mariner exposure from noise in order to provide a safe working environment (i.e. ability to hear audible alarms), reduce noise-induced hearing loss (NIHL) and provide an acceptable degree of comfort for the passengers and crew on the ship. Many vessels were designed and built to these guidelines enforced only through the contract between the ship owner and the shipbuilder.

In July 2007, all of the European Union (EU) member states and the European Commission (EC) collectively made the proposal to update the 1981 guidelines with the goal making them mandatory. This occurred under the framework of the 83rd Session of the Maritime Safety Committee (MSC) at the

IMO headquarters in London. The reason for making the current IMO guide mandatory was to address a gap in the Safety of Life at Sea (SOLAS) Regulation II-1/36 which "requires that measures be taken to reduce noise in machinery spaces to acceptable levels." As noted in the meeting minutes, "the SOLAS Regulation did not define "acceptable levels," but only provided a reference to the old IMO guideline, A.468." The MSC "work program" was approved and A.468 was given to the Subcommittee on Ship Design & Equipment (DE) Committee of IMO for the detailed review and revision. The work of revising the noise code started at the 53rd DE meeting and progressed through the 56th DE meeting concluding in February 2012. Final approval was granted at 91st meeting of the MSC in November 2012.

This new SOLAS regulation (Chapter II-1/3-12; "Protection against noise" & "Code on noise levels on board ships") requires applicable vessels to be constructed in such a manner that certain types of compartments will have noise levels no higher than specified in the Code. The new Code has mandatory and recommended sections, but the majority of the regulation is required. The Code is only mandatory for ships that are 1,600 gross tons (GT) or larger and for which the building contract was placed on or after July 1, 2014. The new code will not be applicable to numerous types of vessels such as: dynamically supported craft, high-speed craft, fishing vessels, pipe-laying barges, crane barges, mobile offshore drilling units, pleasure yachts not engaged in trade, naval ships, troopships, ships not propelled by mechanical means, pile driving vessels and dredgers.

An abbreviated list of the noise level limits is given in Table 1 along with the limits which were part of the old A468 code. For the most part, not much has changed from the old to the new noise limits. The only change from the old to the new (1,600 to 10,000 GT) is a decrease for non-specified work spaces. The limit used to be 90 dB(A) and it was reduced to 85 dB(A). The new code further divided the noise limits between less than 10,000 gross tons and greater than 10,000 gross tons. Also in the new Code a couple of room types had 5 dB lower limits for ships that were 10,000 gross tons or larger. The lower limit was put in place due to fact that it is easier to achieve lower limits on physically larger ships.

As it was mentioned above, the author was a participant in the later stages of the new code as part of the United States delegation led by the U.S. Coast Guard (USCG) and their key

TABLE 1: Abbreviated list of noise level limits from IMO 337(91).

(See IMO document for all details)

Designation of rooms and spaces	Limit from A468 (any size)	Ship Size	
		1,600 to 10,000 GT	≥10,000 GT
Machinery spaces	**110***	**110**	**110**
Machinery control rooms	75	75	75
Workshops	**85**	**85**	**85**
Non-specified work spaces	90	85	85
Navigating bridge & chartrooms	**65**	**65**	**65**
Look out posts & bridge wings	**70**	**70**	**70**
Radio Rooms	**60**	**60**	**60**
Radar Rooms	**65**	**65**	**65**
Cabins & Hospitals	**60**	**60**	55
Mess-Rooms	**65**	**65**	60
Recreation Rooms	**65**	**65**	60
Open Recreation Areas	**75**	**75**	**75**
Offices	**65**	**65**	60
Galleys (without food processing equipment operating)	**75**	**75**	**75**
Serveries and pantries	**75**	**75**	**75**
Spaces not specified	**90**	**90**	**90**

** Not continuously manned. Continuously manned machinery rooms had a 90 dB(A) noise limit*

staff Lieutenant (LT) Nick Woessner and Mr. Wayne Lundy. One need not be apprehensive of the noise limits specified in the new IMO code for ships of 1600 GT and up. These compartment noise limits can be achieved with what have become standard noise control treatments which can be designed into the ship for only a very small percent increase in the total ship acquisition cost. The key to meeting any shipboard noise requirement is to make sure the noise requirements are part of the design process when the ship is built and a good way to make sure the noise limits are achieved is to require a noise evaluation before construction starts. The author's firm has found that dealing with noise requirements after construction can increase the cost by a factor of ten to twenty.

Shipping appears to have received the new noise regulation positively, at least according to Kathy Metcalf the Director of Maritime Affairs at the Chamber of Shipping of America (CSA). She stated that, "*The industry has been aware of the process during the development of the airborne noise regulations. The industry in general saw these developments as necessary since they related to the health of the crew on board the vessel and were generally supportive of these developments as they apply to new vessels. Industry concerns related to how or if it would be possible to comply with the requirements for existing ships…is still ongoing.*"

Underwater Noise

Just a little after IMO decided to update "*Code on Noise Levels On Board Ships*," a proposal was presented by the United States to address noise below the waterline. The lead on this action was taken by U.S. National Oceanic and Atmospheric Administration (NOAA). Dr. Trisha Bergmann was the lead NOAA scientist for the issue, but early work was started by Ms. Lindy Johnson, a NOAA attorney along with others. The proposed guide was developed mostly by correspondence with most of the facilitating performed by both LT Woessner and LCDR Catherine Phillips both of the USCG. The Coast Guard is the administrative lead as they are the head of the U.S. delegation to the IMO. There was vigorous non-governmental organization (NGO) and international participation in the development of the guide especially from the EU nations.

The motivation for introducing the topic of mitigation of underwater noise was the hallmark 2008 conference held in Hamburg. It was sponsored by the Darmstadt, Germany-based Okeanos Foundation for the Sea and brought together experts in mitigation, measurement and effect of anthropogenic (man-made) noise on marine animals and fish. The final report from the Okeanos conference called for a reduction of unintentional ship noise of 3 dB over the next ten years and 10 dB over the next 30 years.

The underwater noise guidelines are not yet officially published by IMO and are assumed to be released in the near future and under the current title, "*Guidelines for the Reduction of Underwater Noise from Commercial Shipping.*" There still is an open question within IMO whether the guideline's title should be revised to include reference to adverse impact of marine life. The body of the guideline is relatively solidified with a draft approved by the IMO's Design & Equipment (DE) Committee in 2013 and the Marine Environment Protection Committee (MEPC) in March 2014.

The guideline's Preamble notes that "*Concern has been raised that a significant portion of the underwater noise generated by human activity may be related to commercial shipping.*" It goes on to note that international (scientific) community recognizes such sound may have both short-term and long-term negative effects on marine mammals and other aquatic life. The proposed guidelines were specifically developed to be applicable to any commercial ship, yet exclude any naval ship or vessel that deliberately puts sound into the ocean, such as seismic or sonar systems used in oil and gas exploration.

As noted in the guide, the purpose of the non-mandatory guidelines is to provide general design advice with respect to the mitigation of vessel generated underwater noise. The guidance is mostly aimed at ship designers, shipbuilders and ship owners. The guide's primary focus is on the main sources of underwater noise generated by propellers and onboard machinery. It also mentions that hull form and operational aspects can be factors as well. Much, if not most, of the underwater noise is caused by propeller cavitation, but onboard machinery and operational modification issues are also relevant. The optimal underwater noise mitigation strategy for any ship should at least consider all relevant issues above.

These Guidelines consider common technologies and measures that may be relevant for most sectors of the commercial shipping industry. Designers, shipbuilders, and ship operators are encouraged to also consider technologies and operational measures not included in these Guidelines, which may be more appropriate for specific applications. The draft guideline contains more detailed information regarding prediction of underwater noise, underwater noise measurement standards, ship design considerations, treatment of on board machinery, additional technologies, operational factors and maintenance considerations. Most importantly, *Shipping* should be relieved that the draft guideline does not provide any numerical noise limits at this time.

Both the new airborne noise regulation and the draft underwater noise guideline are available from the IMO website. If you have difficulty obtaining the documents, feel free to contact the author.

Michael Bahtiarian is the Vice President at Noise Control Engineering, LLC and Board Certified in Noise Control Engineering. He was an advisor to the U.S. delegation on the two noise issues discussed in the article. Email; **mikeb@noise-control.com**

Polar Research Powered by Electric

While ships have used electricity to help power vessels for a long time, new and sophisticated diesel-electric technologies are making serious gains in efficiency, noise and environmental impact, and is becoming the propulsion system of choice for some high profile names.

A recent case is the diesel-electric powered, RV Sikuliaq (pronounced "see-koo-lee-auk," an Inupiaq term meaning "young sea ice."), a vessel embarking on a lifetime of studies in the polar sea region, including examining the effects of climate change and increased human presence in the Arctic.

Sikuliaq is one of the newest addition to the U.S. academic fleet, and the 261-ft.-long vessel will be home for 24 researchers and students who will live and work aboard the ship. It is a Global Class 5 vessel that can conduct research anywhere in the world. It is also designed for research in ice-choked waters. Among its myriad of capabilities are gathering sediment samples from the seafloor, hosting remotely operated vehicles and using instrumentation to study the water column – while having the capability to break through 2.5 ft. of ice.

Its diesel-electric propulsion system ensures the lowest possible environmental impact, including a low underwater radiated noise signature for marine mammal and fisheries studies.

Owned by the National Science Foundation and operated by the University of Alaska Fairbanks (UAF), Sikuliaq was funded by the American Recovery and Reinvestment Act of 2009 (ARRA). The primary coastal facility of the UAF School of Fisheries and Ocean Sciences, the Seward Marine Center is 130 miles south of Anchorage at the head of Resurrection Bay, and is considered its primary base of operation.

Diesel-Electric Vision Comes Together

There is a long-term and never-ending need for research vessels to study the world's oceans, particularly those able to traverse the treacherous Arctic waters. Through the years, various vessel design options were considered, and in 2004 Glosten Associates came up with the initial design of the Sikuliaq. Even then, the UAF and the architects knew the ship would be powered by a diesel-electric propulsion system because of its mandatory, minimal environmental impact and quiet operation.

At the earliest stages of planning, a state-of-the-art research vessel was envisioned, including the design of the diesel-electric propulsion system, said Siemens Marine Segment Director David Grucza. "We started working on the diesel-electric design in 2004, including one line diagrams, how to handle harmonics, designing the smallest component footprint and applying the equipment," Grucza said. "Our team in Alpharetta, Ga., helped design the Sikuliaq and execute the project and support startup and commissioning."

In December 2009, UAF awarded the shipyard contract to

Marinette Marine and construction concluded in 2014. Marinette Marine is part of the Fincantieri Marine Group, a subsidiary of Fincantieri, one of Europe's largest shipbuilders with a history dating back 200 years and a track record of producing more than 7,000 ships. In 2014, the Sikuliaq began its maiden journey from the Wisconsin shipyard, through the Great Lakes-St. Lawrence Seaway transit system, through the Panama Canal and then to Alaska.

Integrated Propulsion System

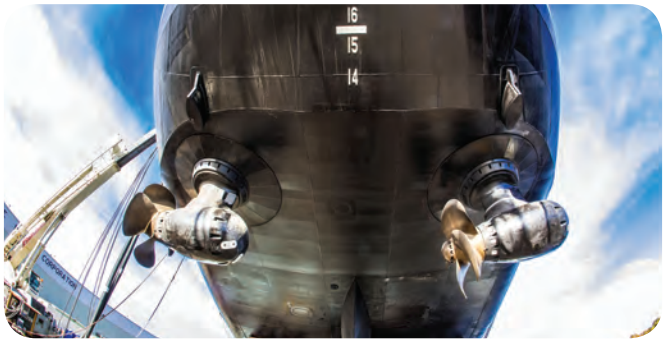
Allan Pomeroy, Marinette Marine's senior buyer, has been an integral part of the construction of the ship – beginning with preliminary design, through construction and delivery. He is also responsible for the warranty of the ship. A shipbuilding veteran with 47 years of industry experience, Pomeroy's responsibility for the Sikuliaq goes from bow to stern, including the Siemens Blue Drive Plus C diesel-electric propulsion system, which was selected to meet the UAF's tough environmental and performance prerequisites. "Whenever you need a quiet and energy-efficient vessel you go to electric propulsion," Pomeroy said.

According to Siemens, the Blue Drive system stacks up favorably to alternative drive systems, significantly reducing NOx and greenhouse gases by up to 27%, reducing gas consumption between to 15-23%.

The components of the Blue Drive system include the Simatic PCS 7 monitoring and control system that keeps a watch on power management, as well as more than 4,000 operational points on the ship. Electrical power for the vessel is provided by four diesel generator sets – two MTU 16-cylinder 4000 engines driving 1,850 kW Kato generators, and two MTU 12 cylinder 4000 engines driving 1,380 kW generators. Any can be operated individually or in parallel.

The stern thrusters are ice pod type Z drives supplied by Wärtsilä and the bow thruster is an Elliott Gill water type jet. The Z drive propulsion allows the propeller to swivel 360 degrees horizontally, eliminating the need for a rudder. The port and starboard stern thrusters are each powered by a Siemens 2,875 kW AC motor and a Sinamics S120 variable speed drive (VFD). The bow thruster is powered by a 1,150 kW horsepower Siemens AC motor and another S120 VFD. A 24 pulse configuration on the two main propulsion VFDs elimi-

(UAF photo by Val Ihde)



nates virtually all harmonic distortion by adding a phase shift to the drives' transformers. This ensures that no dangerous harmonics will affect either the vessel or its sensitive research experiments.

Siemens S7 400 controllers, HMI and four, 690V switchboards take the power from the generators and communicate via hardwire and serial I/O.

Simatic touch panel HMI screens are located on the bridge, galley, captain's stateroom, chief engineer stateroom, powerhouse, and engineering control room. Step 7 software includes a historian function to accommodate the redundant controller configuration and deliver clear, intuitive information to the crew.

Power Management

The ship's power management capabilities, an integral part of the Blue Dive / PCS 7 control system, are designed to help keep the Sikuliaq and crew safe while operating in the Arctic environment. "If you lose one of the four generators when you are out to sea, it is not really a big problem," Pomeroy said. "The power management system ensures the load on each generator is less than 90 percent, but can go up to 110 percent for short periods of time. You cut back your loads to fall within the power that is generated from the other generators. If you lose another one or two, you have to cut your power back in order to stay within the power being generated by the plant because you don't want your entire plant to go dead," Pomeroy said.

The Sikuliaq's power management system monitors the online generator capacity as well as load consumption and automatically cuts back, or cascades, non-essential loads as needed.

"We go through the electrical loads on a ship and we rank them, priority one through 10. The lights in the storeroom are considered a priority 10," Pomeroy says. "The propulsion system and its auxiliaries are priority ones. Every load on the

entire ship is prioritized. If the load is increasing and gets close to the capacity of the generator we knock the circuit breakers off in all the switchboards starting with non-essential priority 10 loads, followed by nine and eight and so on." Until we reach a safe generating capacity for the machines on-line at that time.

While the breakers are taken offline in a cascading priority, the power management system automatically shuts down the failing generator and starts the standby.

"The Siemens monitoring and control system monitors 250 points on the engines," Pomeroy says. "In a diesel engine you monitor every piston for temperature, pressure, overheating temperature, temperature of the exhaust and horsepower to make sure that each diesel is putting out the right amount of horsepower. If one piston stops putting out horsepower, we shut the engine down and find out why. That protects the engine. In the middle of the ocean, you don't want to damage it. You want to fix it."

As the engine is shut down to prevent damage, the standby is automatically brought online. When it is up and online, and it sees it has a lot of power available, the engineer brings the circuit breakers online beginning with the top priorities and ending with priority 10 loads.

The captain and chief engineer are given enunciations every step of the way through the network of HMIs in the event of a cascading power reduction or any other event monitored by the system.

"Let's say we shut down the number three engine for low oil pressure, overheating, or loss of fluid. The captain and engineer are informed that the number four, or standby, engine is coming online. Then he is given another announcement that we have tripped off the number 10, nine and eight breakers. He is then informed when the number four engine has come up to speed and is generating the necessary voltage to achieve the proper 60 cycles."

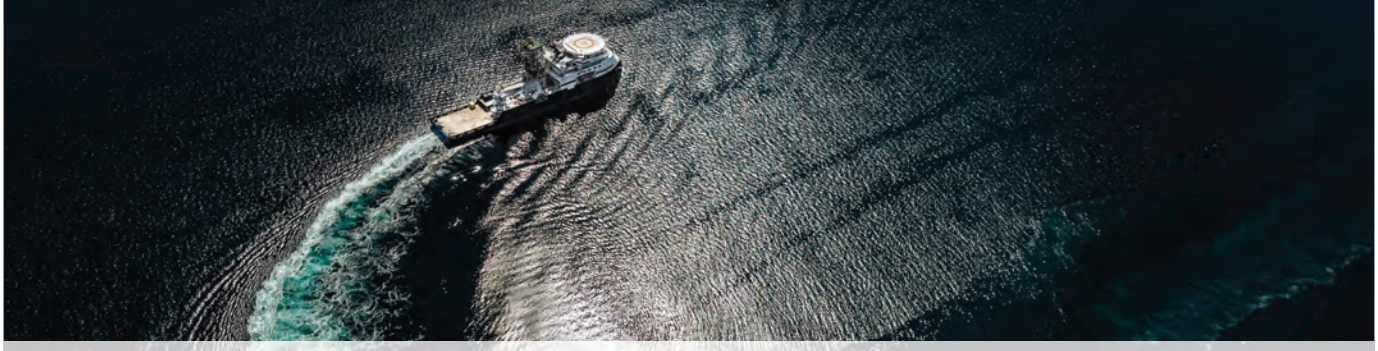
When the power management system's load sharing function adjusts the load equally among all three generators, the cascaded circuit breakers that dropped off the switchboards are brought online. At this point, the captain and engineer are notified the condition has returned to normal.

"He is also reminded what started the event in the first place," Pomeroy says. "If it was low oil pressure in the number three generator he would be notified to check it out."

Sikuliaq has been approved to Unmanned Engine Room standards because of the automated power monitoring, control and alarming functions supplied by the Blue Drive system.

Growing Subsea Vessel Operations Over the Next Decade

By Chen Wei, Analyst, Douglas-Westwood, Singapore



Courtesy of Ulstein Group/Marius Beck Dahle

Over the next five years Douglas-Westwood (DW) expect $122 billion (bn) to be spent on global subsea vessel operations – an increase of 64% compared to the previous five year period. This growth will be driven not only by volumes of work but also by the growing usage of higher-end vessels able to cope with increasingly harsh operating conditions and evolving customer requirements with regards to safety and operational efficiency.

Field development activities, including SURF installation and light/medium construction, will account for 40% of forecast expenditure. Given the prevalence of high value assets such as Reel-lay, Flex-lay and larger MSVs this segment is the most cost-intensive in the subsea vessel industry; accounting for just 35% of anticipated vessel days over the next five years. The field development market will enjoy the fastest growth profile driven primarily by continued pre-salt developments in Brazil, revitalized activity in the Gulf of Guinea and the emergence of East Africa, with these regions accounting for 48% of projected global spend. Longer term, pre-salt potential in the Gulf of Mexico, signaled by PEMEX's recent Vasto prospect, could see the region become a major buyer of subsea vessel services.

The installation, repair & maintenance (IRM) of existing infrastructure will account for 42% of total vessel operational day requirements, the largest of all market segments. However, a tendency to use smaller vessels and long-term contracting leads to only 39% of projected spend. Unlike field development the IRM market is less associated with deepwater/subsea and is driven by conventional, shallow water infrastructure. Asia and North America will dominate global IRM requirements accounting for 46% of projected expenditure. The former in particular is becoming an increasingly attractive market to international contractors as local operators turn to more modern DSV/MSV assets to improve operational efficiency.

Construction of export pipelines and international trunklines, including supporting DSV and MSV activity, will account for 19% of projected spend over the period. Total volumes of activity are expected to be sustained at around current levels with the Middle East and Asia retaining a combined 66% share of the market. Geopolitical uncertainty in Europe is currently threatening the viability of high profile trunklines such as Gazprom's South Stream project which could impact anticipated demand for both dedicated pipe layers and support vessels.

Subsea well intervention is the smallest market segment covered in DW's definition of subsea vessel services, accounting for

just 5% of forecast spend. Aimed at providing a cost competitive means of improving productivity from ageing subsea wells, this had previously been seen as a game changer for the subsea market but a hesitance to adopt new technology by operators has seen subsea well intervention fall out of focus in recent years, a fact compounded by Total's recent cancellation of a contract with Aker Oilfield Services in June 2014. Therefore DW expect limited growth in this segment with activity continuing to be focused in the North Sea where a combination of ageing well stocks and falling well productivity and relatively shallow waters provide the biggest incentive to the local E&P community.

Africa

Africa will remain a strong contributor towards subsea vessel demand, accounting for 16% of the global vessel operations expenditure at $19.8bn over the 2015-2019 period. The significant increase in expenditure from the preceding five years is due to higher vessel specification requirements as deeper water activities increase. Vessel demand is also anticipated to increase by 57% from the 2010-2014 period. Projects in countries such as Mozambique and Tanzania will contribute to regional spending.

Asia

The majority of subsea developments in Asia are located in shallow waters but this is expected to move continuously towards water depths beyond 1,000m over the next five years. Deepwater developments are driven by projects such as Cheveron's Gandang, Gehem and Gendalo fields, Reliance Industries M-1 and Shell's Kamunsu East. Both Malaysia and India are expected to account for the largest field development-related vessel demand in Asia over 2015-2019.

Australasia

Subsea vessel demand in the region will be largely driven by shallow water LNG developments in Western Australia from fields in the Bonaporte, Browse and Canarvon basins. Vessel requirement is also anticipated to increase by 54% as compared to the 2010-2014 period. Field development will account for the largest requirement in the region follow by IRM. Subsea trees in deeper waters are expected to be installed towards the end of the forecast period on the Great Gorgon and Scarborough projects.

Eastern Europe & FSU

The majority of EE&FSU regional developments are shallow water-focused with increasing deepwater projects coming online through the forecast period in the Caspian Sea. The majority of regional expenditure is associated with pipe laying

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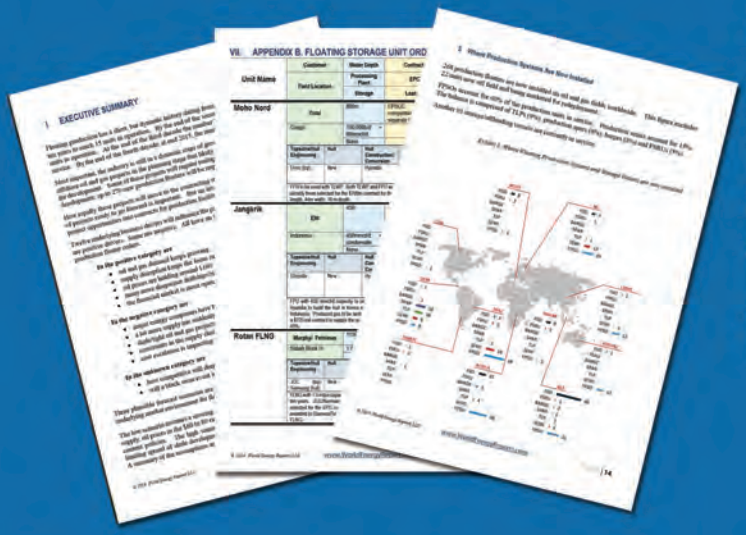

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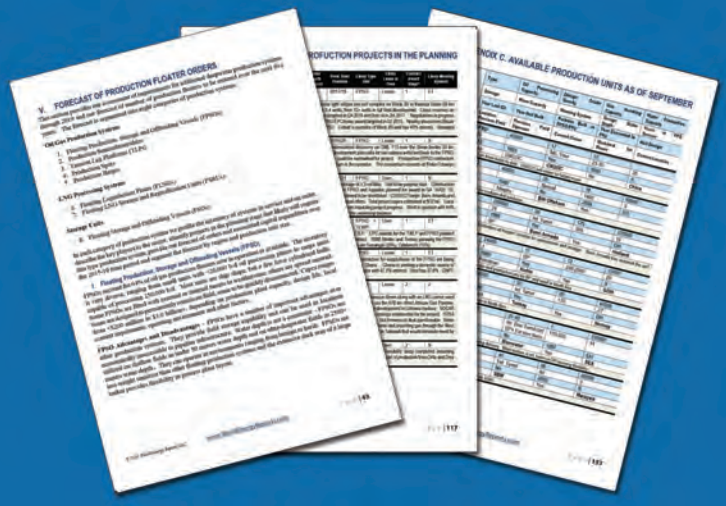

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and pipeline support vessel activities due to large pipeline installation projects in Azerbaijan and Russia. Vessel demand is anticipated to be approximately 22,000 days over the forecast period.

Latin America

Latin America is one of the largest regional markets with total expenditure amounting to $18.2bn between 2015 and 2019, an 86% increase from the 2010-2014 period. Vessel demand is also anticipated to increase by 50%. The growth in the region will be led by the field development sector (59%) which will peak in 2018 led by projects from Petrobras. A large majority of developments will be ultradeep water projects in fields such as Lula and Lara field.

Middle East

Total spending on vessel operations in the region amounts to $14.2bn. Subsea expenditure in the region will largely be driven by pipe laying and supporting vessels, as well as IRM-related vessel spending. The majority of pipeline related projects are expected to occur in Iran and Kuwait. Field development-related vessel expenditure contributes marginally to the region's spending over 2015-2019 with the exception of deepwater offshore gas field developments in Noble Energy's Leviathan field.

North America

North America is a large, mature subsea market with deepwater developments predominantly in the US Gulf of Mexico. Over the next five years, there will be an increased portion of subsea developments in water depths beyond 1,500m. IRM-related vessel expenditure represents 63% of regional spending and the biggest of all the regions due to the large installed base of offshore infrastructure.

Norway

Norway is a mature region where majority of production is located in shallow waters. However, field development is expected to total 55% of spending due to increasing activity in the 250-499m water depth bracket as well as in deepwater areas with such projects as Aasta Hansteen and Ormen Lange.

UK

Similar to Norway, the UK is considered a mature region with harsh subsea operating conditions in the North Sea. The vast majority of the subsea production will take place in shallow waters with subsea trees tied back to existing infrastructure. Field development spending represents a significant portion of regional vessel operating expenditure (54%). The majority of these developments are led by IOCs and independent oil companies. Key projects driving the UK subsea developments over the medium term include Fair Field Energy's Darwin and Premier Oil's Greater Catcher.

RoWE

The Rest of Western Europe is a mature region with the vast majority of subsea production attributed to shallow waters. The IRM-related vessel expenditure will remain high, driven by a large number of mature subsea infrastructure. The region will experience a moderate growth of 0.3% CAGR over the forecast period with a lack of project visibility in 2019. Deepwater developments (beyond 500m water depth) should occur off the southeastern coast of Cyprus and the Atlantic side of Ireland.

Market Supply

Cyclicality is an inherent characteristic of the subsea vessel industry. To date there have been two major build cycles, where the size of the global subsea fleet increased by 112%, driven by interworking factors such as the changing E&P environment and oil & gas prices.

Among the various vessel types, MSVs have the highest order book to existing fleet ratio. Across the global subsea vessel fleet, average vessel days are expected to become more expensive due to increasing demand for higher specification vessels and stringent customer requirements.

There will likely to be a decoupling of supply from demand due to market fragmentation, as more vessel owners enter the market. There is also a growing number of vessels being constructed in the Chinese shipyards as attractive financing terms lower building costs for vessel owners. Despite the potential growth in subsea vessel supply, we still see a shortage of vessels in regions with harsh operating conditions, requiring units with higher specifications.

Conclusion

Global expenditure for subsea vessel operations will undoubtedly grow over the next five years. This increase in expenditure will be driven by growing requirements for vessels to operate in harsh conditions in isolated regions, for longer duration on site and the large increase in deepwater activities. The outlook for subsea vessel activities will be robust over the forecast period in regions such as Asia, Africa, Latin America and North America. Despite unprecedented levels of recent vessel deliveries, increasingly complex operating conditions and stringent customer requirements will drive demand for further deliveries.

About the Author

Chen Wei is a researcher in the Singapore Office, undertaking research and analysis for publications and projects. He holds a Bachelor of Science (Economics) and a second major in finance from the Singapore Management University. During his industry attachment, he was an Associate at Continento Research Private Limited where he conducted research and data analysis on the maritime sector. He also spent some time at IHS Private Limited as an Intern for Economics and Country Risk Consulting Asia Pacific.

Order the Report

The World Subsea Vessel Operations Market Forecast 2015-2019 analyses the main factors driving demand for MSV, DSV, Flexlay, LWIV and Pipelay Vessels. Results analyse vessel demand for key subsea markets, with historic data covering the period 2010-2014 and forecast data for 2015-2019.

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Courtesy of ESG

Bravante/RRC Robotica

Local IMR and Offshore Support Specialists

By Claudio Paschoa, Brazil

Courtesy of RRC

Bravante Offshore

The increase in partnerships, mergers and acquisitions, between offshore service providers in Brazil is a noticeable and constant trend in the last decade. This has been true for deals between foreign and local companies, and also between local companies. The competition for offshore contracts for PSVs and IMR vessels only gets stronger as the demand increases and the major contractor continues to be national operator Petrobras. This opens a window of opportunity for local companies to enter the highly specialized ROV service market and the growing IMR market, both in shallow and in deep water. Traditionally, these markets have largely been dominated by foreign groups with big fleets and global footprints. However, with the Brazilian government's demand for high local content levels, local companies that can offer high services standards can expect to have some advantages when competing in Petrobras tenders.

Marcelino Jose L. Nascimento, chairman of the Bravante Group, explained that the Bravante Group started back to the 1960s, as a company operating gas stations in strategic locations in Rio de Janeiro. Good relations with Petrobras, led to new opportunities. The Group entered the bunker transportation business by acquiring Navegação São Miguel and forming a partnership with Petrobras that has remained in place to this day. In the late 1970s, the Group opened the São Miguel Shipyard, which now occupies a 20,000 square meter site in Rio de Janeiro. In 2000, Navegação São Miguel's environmental unit was spun off as a separate subsidiary called Hidroclean. In 2010, given the Group's enormous growth potential, BTG Pactual, Latin America's biggest investment bank, acquired a minority stake in it. This deal brought together the bank's financial solidity and Bravante's expertise and knowledge in the oil and gas industry. Various investments have since been made in the Group's companies, strengthening their expansion and growth plans. The company was formerly known as Brasbunker Participações S.A. and changed its name to The Bravante Group on September 10, 2012. The Bravante Group was incorporated in 2011 and is based in Rio de Janeiro, Brazil.

The Bravante Group is present in maritime transport, offshore logistics, environmental protection, and subsea engineering activities in the Brazilian states of Rio de Janeiro, Alagoas, Amazonas, Bahia, Ceará, Espírito Santo, Maranhão, Paraná, Pará, Rio Grande do Norte, Rondônia, São Paulo, and Sergipe. It offers offshore support services, including maritime transportation through a fleet of PSVs and other support vessels such

as anchor handlers, oil spill response vessels, tankers, barges, tugboats, and auxiliary motorboats. The company also provides other offshore support services, including bunker fuel transportation, transport of offshore provisions and the use of preventive containment booms in cases of suspected leaks, along with dedicated onboard environmental coordinators, and shipbuilding and ship repair facilities. Furthermore, the company, through its subsidiary RRC Robótica, provides subsea engineering services, including submarine engineering, ROV systems operation, management, and maintenance, consulting in subsea operations, and subsea operation simulations and modeling. "The Bravante Group now also engages in the IMR operations and has extensive experience in subsea operations simulation for Petrobras, planning many of the largest pre-salt operation being undertaken by Petrobras," said Nascimento.

Rolls Royce, won a $37.5 million order to design and equip four PSVs for the Bravante Group in 2013. The UT 775 SE PSVs were designed to carry deck cargo, pipes and diesel oil to and from offshore oil and gas platforms, chartered by Petrobras. The Bravante Group build the vessels at its ship yard in Niteroi, across the bay from the city of Rio de Janeiro. Anders Almestad, Rolls Royce, President-Offshore said at the time, "This is an important contract to Rolls-Royce that consolidates our strong support of the growth in Brazil's offshore oil and gas industry. Our bespoke integrated power and propulsion systems are optimized for each individual ship's intended operational environment." In addition to the design, Rolls-Royce supplied a wide range of onboard equipment including Azipull and bow thrusters, deck machinery, a bulk handling system, Active Front End (AFE) frequency converters, automation and control systems and a dynamic positioning system.

Bravante has more recently placed multiple orders for PSVs with Eastern Shipbuilding Group, through Brazil-based Boldini SA, which will own the vessels. Marcelino Nascimento, explained why Bravante sourced a number of its PSVs in the United States. "Bravante decided to source part of its fleet in the USA because the shipbuilding industry there is reputable and respected, and vitally to our business also has some very attractive financing packages," he said. "We received one of the lowest interest rates on our fiscal package, with a 23 year bond at 3.6 percent interest per year. This was a very good opportunity," said Nascimento. Bravante VIII is the latest delivery, the DP2, PSV 4500 Bravante VIII arrived in Brazil in October to join sister ships Bravante V, VI, VII and IX. Westshore Shipbroker said these last four PSVs will be employed on contracts supporting Petrobras beginning in the third and fourth quarters of 2014. STX Canada

RRC state-of-the-art ROV simulator

Courtesy of RRC

Marine provided the STX SV290 design which is the basis for the very successful and proven Eastern Shipbuilding "Tiger Shark Class" series. The Department of Transportation's Maritime Administration (MARAD) loan guarantee was key in guaranteeing the viability of the projects. By choosing Eastern, Boldini and Bravante helped create 350 jobs in Panama City, FL, which in turn added more than 2,600 overall new jobs to the U.S. economy through suppliers and other jobs in the local economy. The $250 million loan guarantee will enable Eastern Shipbuilding to build five 282 ft. long PSVs that will be used in Brazil's offshore industry. "This is the kind of return we hoped for when we awarded Eastern two small shipyard grants totaling $3.4 million to buy new panel lines, and modern welding equipment," said MARAD. "That equipment enabled them to construct ship panels more quickly than they had previously, when each was built by hand. The end result was lower costs and much higher, more cost-efficient productivity at Eastern Shipyard."

RRC Robótica

RRC Robótica Submarina is a local company that was established nine years ago, following the increase in the Brazilian market's demand for subsea support services using ROVs. With the growth of the ROV market, RRC reviewed its growth strategy and started to focus on ROV operations. RRC is one of the only Brazilian companies in the Work Class ROV support, operations and training market. The company started operations focusing on the training and consulting segments, later expanding its businesses to leasing and selling of imported subsea tools, simulation and modeling of subsea operations, practical training with subsea equipment and professional ROV operations simulators.

In 2004, the company was established to form and provide qualification for ROV pilots. In 2007 the company saw the need to increase its infrastructure. RRC moved from the building where it had first been established to an area of 2000 square meters at Granja dos Cavaleiros. By 2008 RRC had established an international partnership with Perry Slingsby Systems, of the Triton Group, now F-E-T (Forum Energy Technologies), and brought to Brazil the quality of Perry Slingsby Systems' technology with the sales and leasing of subsea tools, as well as technology to manufacture custom-made tools. In a cooperation agreement, RRC validated its simulation laboratory with CENPES (Petrobras Research Venter), creating the Simulations Technical School, thus ensuring compliance with the requirements for analysis of operations of ROV and subsea equipment. A partnership with Vmax, another Triton Group company, allowed the installation in Brazil of a third ROV simulator, which consolidated it as the only ROV operations simulation laboratory with

such infrastructure in Latin America. In 2010 RRC finally entered the ROV operation market. RRC was awarded with two 10-year contracts for ROV operations from client Lupatech, worth $61 million, to provide support to light work over operations, subsea construction; survey operations; drilling and completion of wells. RRC also become the only Brazilian company to provide offshore training certified by the IMCA (International Marine Contractors Association).

The company really took off in 2011, when the Bravante Group acquired 70% of the company shares, which allowed Bravante to enter the huge and challenging ROV operation market in Brazil and abroad, with income estimated at $50 million per year from 2013. Keeping innovation in mind and seeking to reach new markets, in 2012 RRC started to developing computer-based tools and

Bravante V in Brazil

technologies for the training and monitoring of offshore pollution response operations. RRC invested $1.2 million in P&D for the development of an advanced maintenance system, to allow for equipment maintenance training in a virtual environment, using state-of-the-art technology for man-machine integration. Finally, in the same year RRC was awarded a Global Bid contract for the operation of 24 ROV systems, becoming the third largest ROV operator in Brazil. With an operations base in Macaé-RJ, and a robust infrastructure, with mechanical, electric and hydraulic workshops, as well as state-of-the-art equipment, and modern training facilities, RRC, as a Bravante Group company is planning to increase its position in the Brazilian IMR marker, through its ROV operations experience.

Courtesy of Marcelo Lopes

Courtesy Petroleum Geo-Services ASA

Flagship
A PGS Titan-class survey vessel at work in the Barents Sea.

Kongsberg EVOTEC's "A"

By William Stoichevski, Norway

Making ships gear can require deep pockets. Ask Kongsberg Evotec AS management. A savage turn of fortunes for offshore surveyors has cooled orders for handling machinery from seismic vessel owners. As much as 80 percent of the survey business has, in places, evaporated and left widespread disbelief. To counter the trend, this company whose largest shareholder is super supplier Kongsberg Maritime is ready to turn to offshore shipping despite the presence locally of well-connected rival outfitters with competing designs.

Not long ago, the owners of an offshore construction vessel awaiting sea trials told this writer that the two ROVs aboard ship would bring in all the earnings they would need in the first year of waiting for an expected contract with a major oil company.

The ship's two ROV decks took on an importance out of all proportion to the vessel's future earnings picture. So, too, did the critical handling equipment, as the ship made ready to survive solely on subsea inspections of mooring cables.

Fast-forward eight years, and Kongsberg Evotec management say they, too, will look to ROVs, especially, to earn while the market for handling equipment for seismic survey arrays takes a major dip. Seismic has been 80 percent of the fledgling Kongsberg business's revenue.

"The (financials) are red and Kongsberg as shareholder would like to change that," says Kongsberg Evotec president,

Courtesy Kongsberg Evotec

Sales slump: Gun winch and fairlead seismic array handling gear

Jan Emblemsvåg. He adds, somewhat dramatically, "We are in a turnaround situation."

Sales to survey companies dried up after agreeing in 2013 to outfit the giant, 104-meter-long Ramform type seismic vessels owned by customer PGS. The Ramforms can haul 20 kilometers of streamer, or sensor-dense listening cables drawn behind the vessel during surveys. The towed array is "the largest moving object in the world," and Evotec provided the back-deck handling solution. In 2012, two Sanco vessels, the Swift and Sword, were outfitted by Evotec, and equipment for another Ramform-class vessel will be delivered in April 2015 before the vessel heads straight to the Barents Sea, a vast area but one made potentially less endless by sanctions on Russian offshore oil and gas. The economic measures appear to have left their mark on a global business.

"Exploration is under more scrutiny right now," said Lukas Daul, an offshore analyst for the financiers ABG Sundal Collier in Oslo.

"Oil companies are in cost-cutting mode, and exploration is the low-hanging fruit," he adds.

Daul specializes in a rig market that depends on seismic success. Survey vessels, like rigs, are a key bellwether for offshore drilling fortunes. Daul said exploration, as opposed to production drilling, still offers oil companies "immediate flexibility" when looking at costs.

"CAPEX cuts in exploration have been much bigger than the overall decline (in offshore energy) at the moment," he confirms.

All About A-Frames

Emblemsvåg hardly needs confirmation of a drought in available survey vessels to equip, and he has Evotec nudging itself toward still-growing offshore fleets, especially construction vessels. Apart from a couple of recent "2D" seismic contracts with COSL, it is a handful of ROV launch-and-recovery contracts that now offer cheer and direction. While seismic is mostly about winches, tension blocks and cable management, contracts for ROV handling seem to lean heavily on A-Frame sales which also bring business in winches and control systems.

Emblemsvåg, a former shipyard man from Vard, says A-frames save deck space more than a crane might at "three stories tall instead of four". Cranes, it is understood, require better weather "in general," so a better operating window would seem possible with the A-Frame.

Promising Orders

In the Evotec warehouse, company vice-president for offshore supply and subsea, Jon Olav Kopperstad, says A-Frame's for the ROV handling aboard six Brazilian CMO Offshore vessels have just gone out, and Shell as charterer is understood to have generated a large order for an offshore construction vessel being built at Remontowa shipyard in Poland. This OSV will be fitted with a 12-ton A-Frame, winch and drive control system.

"Costs are improving, and now there's extra value for customers in active heave-compensating for deepwater," Kopperstad asserts, adding that a 650 kW drive offers more power at key intervals for better lift. He confirms the offshore focus is for ROV handling systems for the likes of Technip, Oceaneering Swire Seabed, Olympic Shipping or Deep Ocean. Some "10 to 20" installations a year seem to be needed to keep things viable

"If you ask me, next month I think that (customer) list will be double," said Kopperstad.

In the wings, Ewotec is understood to be readying the release of a new inspection, maintenance and repair handling system with a tower, cabin and K-Master workstation. The rest is "hush-hush".

Surveying Hope

"Thirty vessels (outfitted per year) should be the goal for us," Emblemsvåg said. Right now, he'll try creating a little seismic opportunity in the Evotec labs.

"Now there's time for R&D and for

The Ramforms can haul 20 kilometers of streamer, or sensor-dense listening cables drawn behind the vessel during surveys. The towed array is "the largest moving object in the world."

Courtesy Petroleum Geo-Services ASA

systems derived from R&D which we hope will generate future growth," he says. After all, Evotec started out in 2006 as a purely engineering outfit.

"Seismic came up as an opportunity. It's a very volatile market, but that's why we're working on offshore now, too," he said.

Seismic is still hot in Brazil, he confirms, but an oil company focus on costs worldwide has clipped orders short, starting with the multi-client hires by oil companies pooling their money. About a third of offshore seismic earnings worldwide come from companies paying this way for detailed geological knowledge of their offshore licenses. It's the crimping of this "good will" seismic that appears to be hurting orders. A further draining of order books has been flagged by a barrage of market messages. PGS Geo-Services, a relative giant, has announced it will sell or scrap two vessels to save $150 million in CAPEX over two years.

Orders for offshore construction vessels, meanwhile, have kept apace, promising more work for Evotek's ROV offering. "Offshore service and subsea are increasing (in importance) rapidly," said Emblemsvåg. It'll be A-Frame versus crane going forward.

Sales Slump
Gun winch and fairlead seismic array handling gear.

Courtesy Kongsberg Evotec

Shallow Water Monitoring

Sensors Track GOM Nitrate Pulse

A new U.S. Geological Survey (USGS) report describes how advanced optical sensor technology is being used in the Mississippi River basin to accurately track the nitrate pulse to the Gulf of Mexico.

Excessive springtime nitrate runoff from agricultural land and other sources in the Mississippi drainage flows into the Mississippi River and downstream to the Gulf of Mexico. This excess nitrate contributes to the Gulf of Mexico hypoxic zone, an area with low oxygen known commonly as the "dead zone." NOAA-supported researchers reported that the summer 2014 dead zone covered about 5,052 square miles, an area the size of Connecticut.

USGS in (Fresh Water) Action

The following pages illustrate the work of the USGS in studying, measuring and analyzing the nation's shallow, fresh waterways.

What: Hydrologist Measuring Streamflow
When: 4/11/2014
Where: Smelterville, ID, USA

Details: USGS hydrologist Greg Clark measures streamflow on Government Gulch Creek, a tributarty to the Coeur d'Alene River in northern Idaho. Streamflow data collected are included in the Coeur d'Alene Basin Environmental Monitoring Program the USGS conducts in cooperation with the Environmental Protection Agency.

Credit: U.S. Geological Survey
Department of the Interior/USGS
U.S. Geological Survey/photo: Deena Green

The USGS is using the new sensor technology to collect nitrate concentration data every hour to improve the accuracy of nitrate load estimates to the Gulf of Mexico. The data can also be used to make it easier to detect changes in nitrate levels related to basin management and to track progress toward the goal of reducing the size of the dead zone.

"High frequency data from these sensors has revealed considerable variability in nitrate concentrations in small rivers and streams," said Brian Pellerin, USGS researcher. "However, we were surprised to see nitrate concentrations vary by as much as 20 percent in a week in a river as large as the Mississippi River without similar changes in streamflows."

What: USGS Hydrologic Technician Measuring Streamflow
When: 3/26/2014
Where: ID, USA

Details: A U.S. Geological Survey hydroloic technician measures streamflow in the Blackfoot River at the site of USGS streamgaging station 13063000, Blackfoot River above Blackfoot Reservoir near Henry, ID. Streamfow data collected at the streamgage and by manual measurements such as this were included in a selenium study.

Credit: U.S. Geological Survey
Department of the Interior/USGS

These rapid changes are very easy to miss with traditional water-quality monitoring approaches.

However, hourly information on nitrate levels improves the accuracy and reduces the uncertainty in estimating nitrate loads to the Gulf of Mexico, especially during drought and flood years.

This high frequency data also provides new insights into timing and magnitude of nitrate flushing from soils during wet and dry conditions.

For instance, the high frequency data revealed high nitrate concentrations during the spring and early summer of both 2013 and 2014 following the drought of 2012. Nitrate sensors on small streams and large rivers throughout the Mississippi River basin are improving our ability track where the pulses are coming from and forecast when they will arrive at the Gulf.

The USGS, in cooperation with numerous local, state, and other federal agencies, currently operates over 100 real-time nitrate sensors across the Nation.

Real-time nitrate monitoring is supported by the USGS National Stream Quality Accounting Network, Cooperative Water Program, and the National Water-Quality Assessment Program.

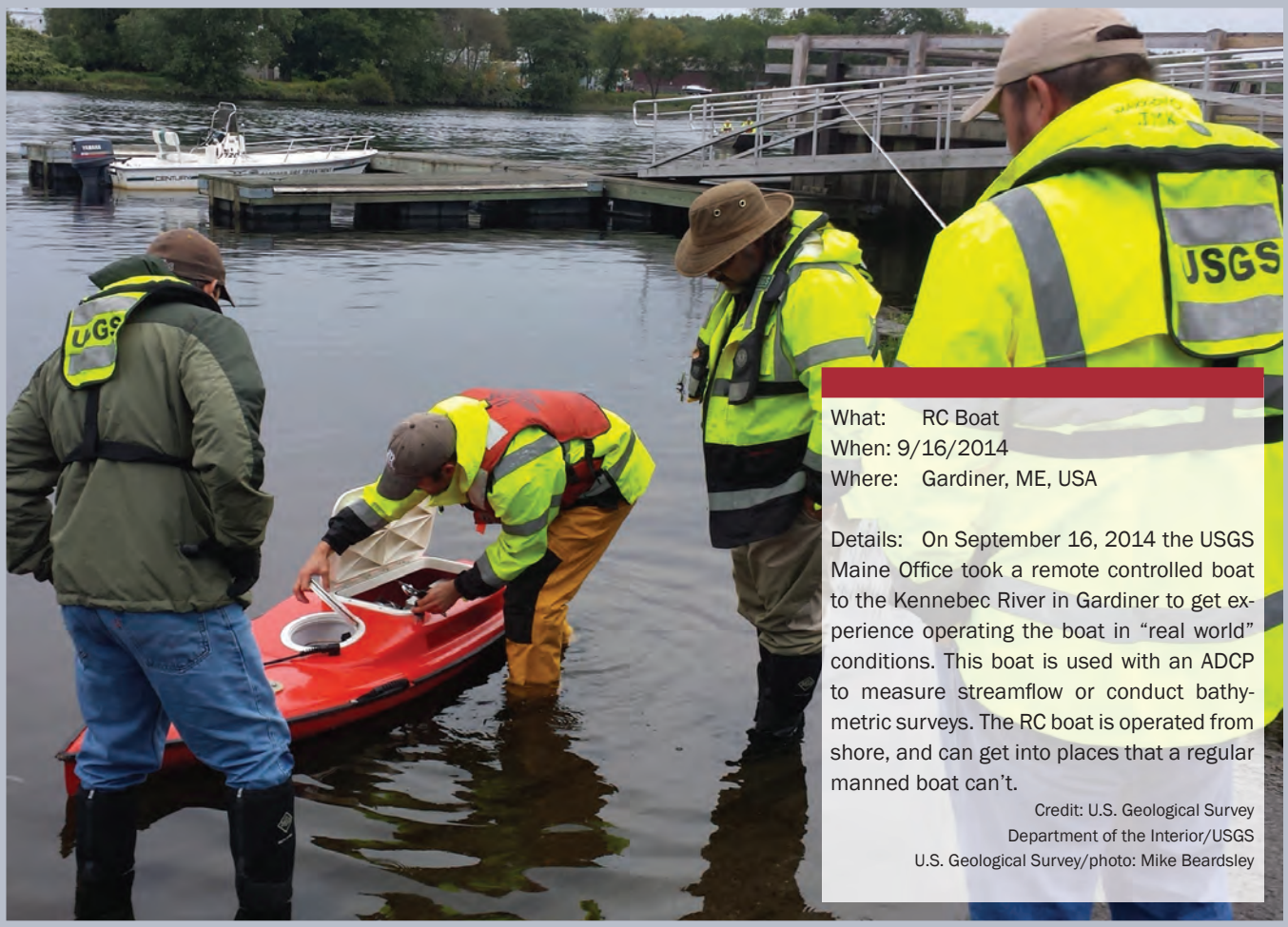
The following information was extracted directly from the U.S. Geological Survey (USGS) report. For full details and references, please visit:

http://ca.water.usgs.gov/pubs/2014/PellerinEtAl2014.pdf

Abstract

Accurately quantifying nitrate (NO_3^-) loading from the Mississippi River is important for predicting summer hypoxia in the Gulf of Mexico and targeting nutrient reduction within the basin. Loads have historically been modeled with regression-based techniques, but recent advances with high frequency

USGS in (Fresh Water) Action

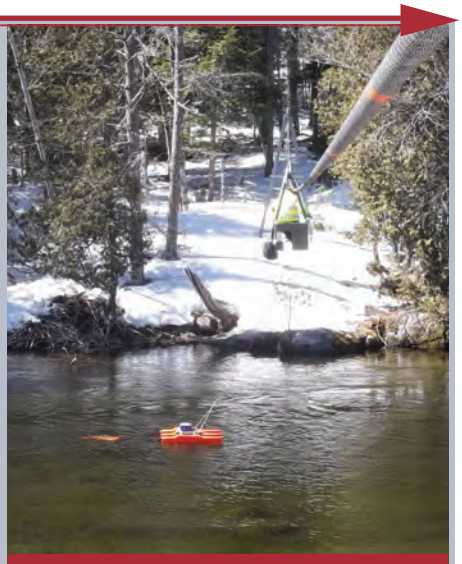


What: RC Boat
When: 9/16/2014
Where: Gardiner, ME, USA

Details: On September 16, 2014 the USGS Maine Office took a remote controlled boat to the Kennebec River in Gardiner to get experience operating the boat in "real world" conditions. This boat is used with an ADCP to measure streamflow or conduct bathymetric surveys. The RC boat is operated from shore, and can get into places that a regular manned boat can't.

Credit: U.S. Geological Survey
Department of the Interior/USGS
U.S. Geological Survey/photo: Mike Beardsley

NO_3^- sensors allowed us to evaluate model performance relative to measured loads in the lower Mississippi River. Patterns in NO3– concentrations and loads were observed at daily to annual time steps, with considerable variability in concentration-discharge relationships over the two year study. Differences were particularly accentuated during the 2012 drought and 2013 flood, which resulted in anomalously high NO_3^- concentrations consistent with a large flush of stored NO_3^- from soil. The comparison between measured loads and modeled loads (LOADEST, Composite Method, WRTDS) showed underestimates of only 3.5% across the entire study period, but much larger differences at shorter time steps. Absolute differences in loads were typically greatest in the spring and early summer critical to Gulf hypoxia formation, with the largest differences (underestimates) for all models during the flood period of 2013. In additional to improving the accuracy and precision of monthly loads,



What: Cableway Measurement
When: 4/10/14
Where: Grand Lake Stream, ME, USA

Details: On April 10, 2014 hydrologic technicians Nick Stasulis and Anthony Underwood visited the USGS gaging station on Grand Lake Stream at Grand Lake Stream, Maine. The cableway was used to make a discharge measurement with an acoustic Doppler current profiler (ADCP). ADCPs measure river depth and velocity and compute discharge.

Credit: U.S. Geological Survey
Department of the Interior/USGS
U.S. Geological Survey/photo: Anthony Underwood

high frequency NO_3^- measurements offer additional benefits not available with regression-based or other load estimation techniques.

High Frequency NO_3^- Sensor Measurements:

A submersible ultraviolet nitrate analyzer (SUNA) with a 10 mm optical path length (Version 1; Satlantic, Nova Scotia, Canada) was mounted on an instrument cage along with a custom submersible CR1000 datalogger (Campbell Scientific, Logan, Utah) and ancillary electronics.

The instrument cage was deployed vertically on a fixed I-beam from a pier on the eastern bank of the Mississippi River and was maintained at a fixed depth that ensured at least 1 m of water above the sensor at all times. The SUNA collected data every 15 minutes initially, but was later adjusted to measure every 3 hours to conserve power while still capturing the temporal variability in NO_3^- concentrations. The SUNA was operated in freshwater mode (i.e., without bromide temperature compensation) and included an external nylon brush wiper (Zebra-Tech, New Zealand) that cleaned the optical windows prior to every sampling interval. Sensors were checked for blanks and linearity prior to and during deployment as described in Pellerin et al.

In situ NO_3^- concentrations were measured by the SUNA at a sampling rate of ~1 Hz over a 30 s burst window at each sampling interval, which typically resulted in ~20 measurements of NO_3^- concentrations per burst. Outliers within the burst were eliminated based on the median absolute deviation and burst statistics (mean, median and standard deviations) were calculated from the remaining data (typically >90% of the initial burst data). Additional information that describes the burst variability and spectral data such as the root-mean-square error (RMSE) of the algorithm fit were used to flag erroneous data from the time series, resulting in the elimination of approximately 2% of the data from this record. A regression of depth- and width-integrated discrete NO_3^- plus nitrite (NO_2^-) concentrations with sensor NO_3^- concentrations on 25 dates covering a range of flow conditions shows the two were strongly correlated, indicating that the sensor measurements were rep-

USGS in (Fresh Water) Action ... A Long History

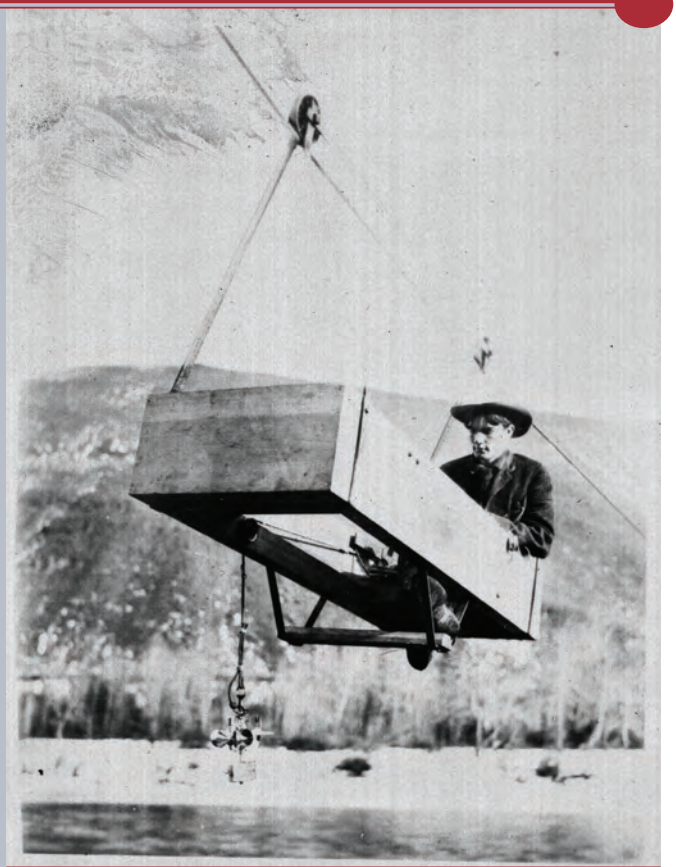
What: USGS Embudo Personnel
When: 1888
Where: Embudo, NM, USA
Details: Personnel of the USGS in the field of Embudo, New Mexico, the "birthplace of systematic streamgaging", circa 1888. Personnel in photo:
Back row: L.S. Kendall; W.P. Trowbridge, Jr.; Prof. E. Curtis; T.M. Bannon; F.H. Newell; G.T. Quinby; R. Robertson
Middle Row: R.S. Tarr; R.P. Irving
Front Row: R. Shumway (Packer); J.W. Mitchell; W.A. Farish

Photographer Credit: USGS

resentative of the cross sectional averaged concentrations. However, the data showed a consistent instrument bias (overestimate) of +0.10 mg N/L that was corrected for during post processing as described in Pellerin et al.17 While the SUNA does not explicitly account for absorbance by NO_2^- in the range of 210−220 nm, the concentration of NO_2^- is almost always negligible in surface waters and has little effect on reported N concentrations in the Mississippi River.

For the Full Report with References

Brian A. Pellerin, Brian A. Bergamaschi, Robert J. Gilliom, Charles G. Crawford, JohnFranco Saraceno, C. Paul Frederick, Bryan D. Downing, and Jennifer C. Murphy, 2014, **Mississippi River Nitrate Loads from High Frequency Sensor Measurements and Regression-Based Load Estimation**, Environmental Science & Technology 2014 48 (21), 12612-12619,
http://ca.water.usgs.gov/pubs/2014/PellerinEtAl2014.pdf



What: Embudo Streamgaging
When: 1888
Where: Embudo, NM, USA
Details: Streamgaging at Embudo, New Mexico, circa 1888.

Photographer Credit: USGS

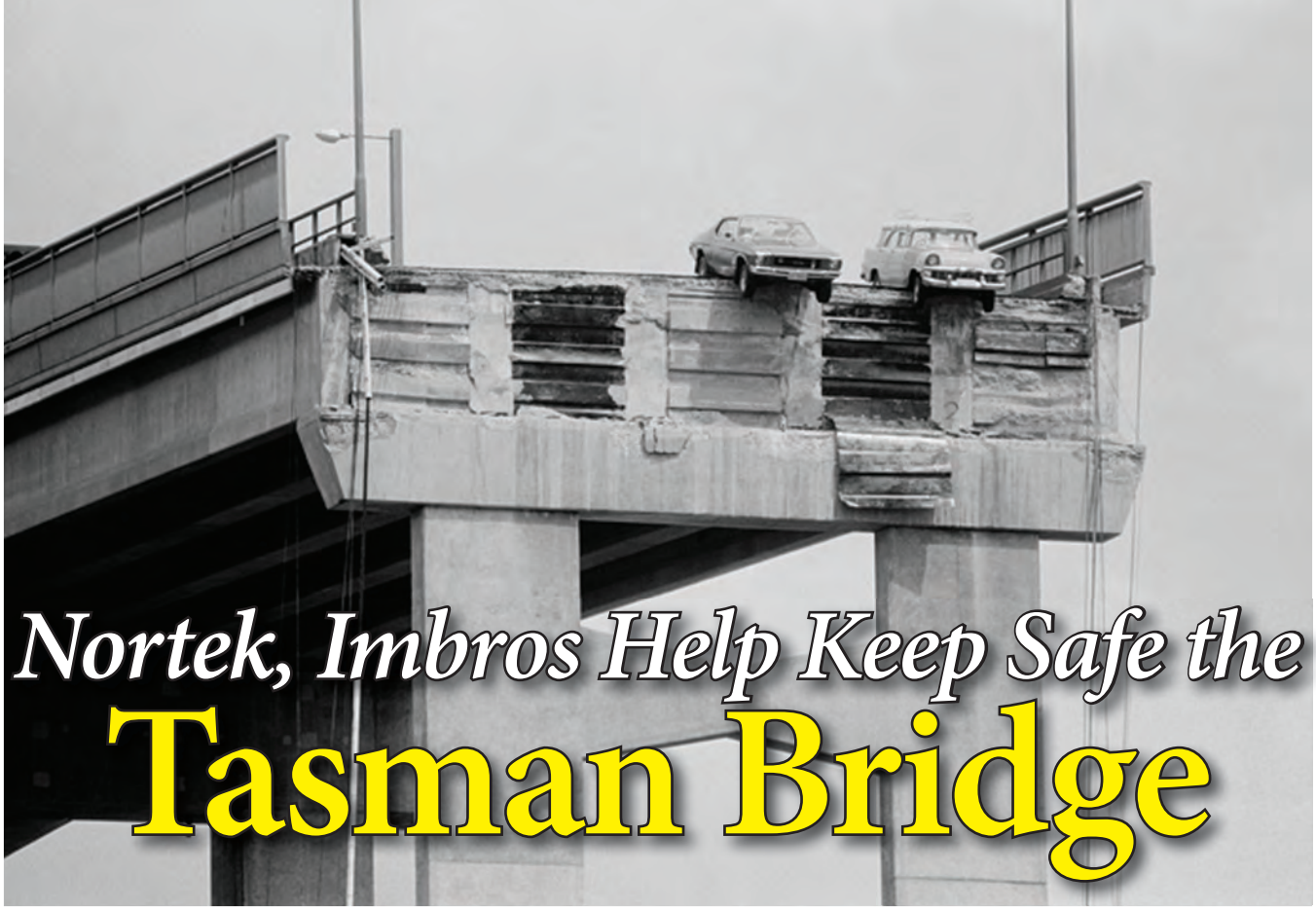


Photo: National Archives of Australia

Nortek, Imbros Help Keep Safe the Tasman Bridge

Today, a driver over the 1.4 km long Tasman Bridge, in Hobart, Tasmania, inspires marvel at how the Derwent River gently flows past the bridge. Few today recall how this peaceful scenery was once a disaster scene, when on the evening of January 5, 1975, a bulk ore carrier vessel collided with the bridge causing two pylons to fall and a 127m section of the road to collapse onto the ship and into the water.

A total of twelve lives were lost in the disaster and the Hobart region was severed in half for over two years. Although human error played a key role in the accident, the strong tidal currents at the site were to have its share of the blame To help improve vessel traffic safety around the Tasman Bridge, the Tasmanian Ports Corporation (Tasports) teamed up with Nortek and Imbros (Nortek Representative for Australia), and since 2007 the three have been working closely to provide the most accurate current data possible for safe navigation through the bridge. Tasports have two Nortek 600KHz Aquadopp Profilers deployed, one to the south of the bridge and one to the North.

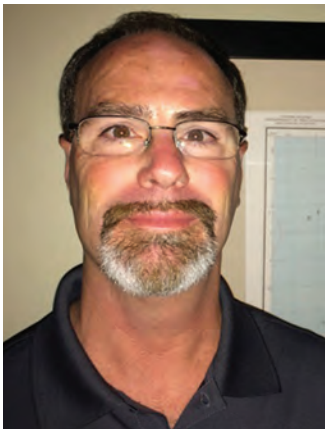
They are housed in a seafloor mounted frame designed by Imbros that allows for easy deployment and hassle-free compass calibration, with the ability to make small adjustments to ensure a correctly oriented instrument.

Both are powered via cable, utilizing the Nortek 48/15V DC-DC converter, regulating voltage input over long distances. Communications are via the same cable, using an RS-422 wiring harness feeding into a radio transmitter. Data is then transmitted back to the Tasports port tower for analyzes through their server and software solution, allowing the ship pilots to view a summary page of live current speeds and direction. The Nortek 600KHz Aquadopp measure the water column to give an accurate reading of current speed and direction at one meter cells, every minute. This allows the pilot to consider up-to-date and accurate current data at the depths that may affect their particular vessel.

www.nortek-as.com

Parent

Dentzman



MacMillan

Farthing

EdgeTech Hires Parent

Marc Parent has joined EdgeTech as Director, Engineered Systems, brining more than 20 years of hands-on engineering and managerial experience associated with the design, development and production of underwater acoustic systems for commercial and government applications. Parent has experience in underwater acoustics, sonar systems design, new product development, engineering management and staff development.

Working out of the West Wareham, Mass. office, Parent will work with the company as the Director of Engineered Systems.

Wynne to Lead AUVSI

Brian Wynne has been named president and CEO of the Association for Unmanned Vehicle Systems International (AUVSI), succeeding the retiring Michael Toscano on January 12, 2015.

Wynne is currently president of the Electric Drive Transportation Association (EDTA), a post he has held since April 2004. The organization promotes battery, hybrid, plug-in hybrid and fuel cell electric vehicles and infrastructure. Previously, Wynne held a senior leadership role at the Intelligent Transportation Society of America (ITSA) and was CEO of the Association for Automatic Identification and Mobility (AIM).

Dentzman Joins Teledyne Odom

Dentzman has worked in numerous offshore research diving and mapping programs and has over 18 years of seafloor surveying and mapping experience. He was received a B.S. in Geology from the University of Illinois, and an M.S. degree from North Carolina State in Geological Oceanography. He previously held positions as owner and CEO of AquaMap, at Triton Elics as Manager of its East Coast Office, iXSea Inc. as its U.S. Sales Manager, Teledyne Benthos as its Business Development Manager for Acoustics & Communications and with Sonardyne, Inc. as its Business Development Manager for Defense and Maritime Security. Dentzman also served nine years in the U.S. Navy, serving four of those years onboard a nuclear fast attack submarine.

MacMillan Joins Unique

Unique Maritime Group (UMG) said that Steve MacMillan has joined the company as the Global Project Director for its Diving Division and the Global QHSE Director, to be based at UMG's head office in Sharjah, UAE. MacMillan's main responsibilities will focus on managing and coordinating large and complex diving related projects through all phases of design, permitting and construction. He will also provide leadership for the regional site project management teams by managing, coordinating and developing UMG staff. Steve will also be responsible for developing and driving the companies QHSE culture in his role as Director of QHSE.

Ennsub Appoints Farthing

Peter Farthing joins subsea products and equipment manufacturer Ennsub as the company's new sales and marketing manager. Farthing comes from Cortland, where he was international ROV/defense business development manager for three years in addition to having extensive sales, marketing and commercial experience gained over a 15 year career in the international offshore oil and gas markets.

Sims Joins Torqeedo

Torqeedo added Captain Todd Sims as its new global sales and product manager, hybrid systems. In this position, Sims will lead sales and create opportunities for the company's newest offering, the Deep Blue Hybrid system. Sims spent 23 years in the IT industry in both technical and sales positions. For the last eight years, he has owned and operated EPowerMarine LLC, an independent boat dealership located in South Florida specializing in electric propulsion options for boaters.

Boskalis Gets Stake in Fugro

Royal Boskalis Westminster N.V. has acquired a 14.8% stake in Fugro N.V. Boskalis said it views Fugro as an interesting company with activities that fit very well with its own activities, adding that it wants to enter dialogue with Fugro to explore options for possible cooperation. The company stressed, however, that it has no intention to make an offer for Fugro. "Fugro is an attractive company with activities that fit together well with those of Boskalis," said Peter Berdowski, CEO Boskalis.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The combined annual conference of the
Association of Diving Contractors International
and the Marine Technology Society's ROV Committee
www.underwaterintervention.com

Fugro High Res Subsea Laser Scanning

Fugro expanded its services for the offshore oil and gas sector with the addition of high resolution subsea laser scanning specialist technology that can be applied to a wide range of subsea services including metrology, field mapping, structure mapping, change detection and integrity management. Fugro's Marine Construction Survey group recently used subsea laser scanning in a number of projects in the Gulf of Mexico, including metrology and asset mapping. With subsea laser scanning, companies have an opportunity to gather high resolution 3D point clouds of subsea assets which are used to obtain accurate point-to-point measurements.

AML Delivers Cabled UV

UV AML Oceanographic released the sister product to UV Xchange, Cabled UV, which aims to bring UV biofouling control to an even wider array of applications and devices. As promised in the September 2014 in *Marine Technology Reporter* article *Biofouling Foiled*, the new product launch comes six months after the debut of UV Xchange, a product which uses UV light as a method to control biofouling on instrumentation. Cabled UV provides the technology of UV Xchange in a format compatible with almost any device and capable of accommodating the individual requirements of each deployment, the manufacturer said. AML marked the release with a delivery to the U.S. Geological Survey Woods Hole Coastal and Marine Sciences Center, Mass.

(Photo: AML Oceanographic)

www.amloceanographic.com

Bowtech Debuts New Underwater Camera

The Bowtech product Pioneer is a high resolution underwater color CCD camera with six integral high intensity LEDs. It provides a cost effective solution to general underwater viewing observation, down to 4,000 meters ocean depth.

Measuring 53mm diameter and 78.8mm in length (excl. connector), the camera is suited to observation of tooling and manipulator tasks. The fully controllable integral LEDs remove the requirement for separate lights where space is restricted. Lighting control is factory set as Analogue 0-5V, Analogue 0-10V, Tristate, RS-485, or Power cycle.

The camera is enclosed within high quality titanium housing, rated to 4,000 meters operating depth. The camera is fitted with a fixed focus wide angle lens, giving a 57 degree diagonal angle of view in water through a sapphire window which is highly scratch resistant and 99.8% optically pure. The camera features in-built reverse polarity protection.

(Photo: Bowtech Products)

The miniature, high specification 1/3"-in. sensor offers 720TVL high resolution and excellent low light level sensitivity.

The Pioneer is also available as a monochrome version with improved low light level sensitivity.

bowtech.co.uk

Realtime Tsunami Monitoring in Japan

In 2014, tsunami waves originating off the coast of Chile were detected near Japan, where EvoLogics modems enabled acoustic communication between JAMSTEC's Vector Tsunameter on the seafloor and the autonomous Wave Glider vehicle on the ocean surface, transmitting real-time data to the shore over satellite.

Japan Agency for Marine-Earth Science Technology (JAMSTEC) has developed and tested the new ocean bottom Tsunameter (The Vector TsunaMeter - VTM), which estimates the tsunami propagation vector based on the ocean dynamo effects.

As a step towards building a VTM network for real-time observation, a trial monitoring station was deployed about 200 km East of the Oshika peninsula, Japan (38°14.0 N, 143°35.13 E) in 2013 - 2014. The Vector Tsunameter was deployed on the seafloor 3420 m deep. Data, collected by the VTM, were transmitted acoustically to surface-cruising Wave Glider and then over satellite transferred to the shore.

The application required fast and reliable data transfers between the VTM and the Wave Glider to transmit critical information in real time. The long-term deployment of the instruments demanded low power-consuming solutions.

Moreover, reducing drag was important for the Wave Glider vehicle on the ocean surface.

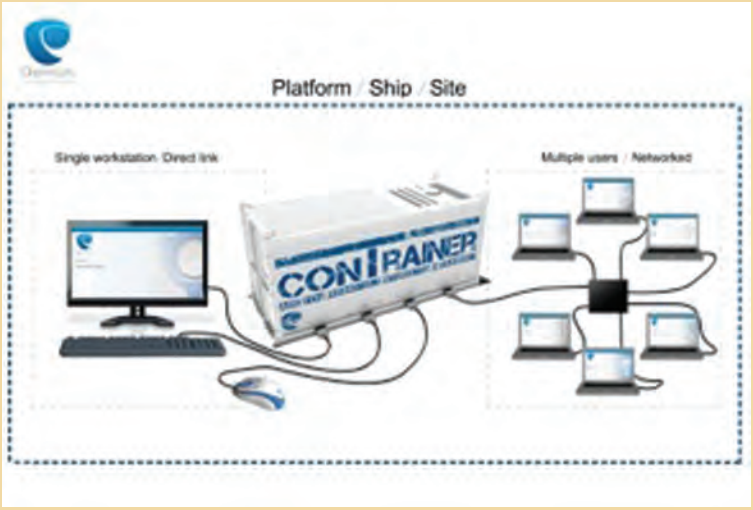
EvoLogics S2C R12/24 underwater acoustic modems were integrated on both the VTM and the Wave Glider. During the long-term deployment of the system in 2013-2014, the modems provided bidirectional communication between the VTM and the Wave Glider/shore control station. In normal operation mode 1457 bytes were transmitted to the Wave Glider every hour, containing 60 sets of minute-long measurement data samples from the VTM. In Tsunami-mode, the downside modem was transmitting 161 bytes every 1 minute with six sets of 10-second-long measurement data samples.

As the system was deployed from 2014/3/13 till 2014/5/10, it operated in Tsunami-mode for four hours.

On the early morning of April 3, the system caught the tsunami waves propagating towards the Japanese coasts after an 8.0 magnitude earthquake hit 83 km North-West of Iquique, Chile on April 2, 2014 (JST).

www.evologics.de

Offshore eLearning Sans Internet Access



Oilennium Ltd., a Petrofac Training Services (PTS) company that provides eLearning training services to the oil and gas industry, announced that since Dolphin Geophysical deployed the ConTrainer on its global fleet of seismic vessels, the company has experienced an improvement in its ability to deliver health, safety and technical training to its crews offshore.

The ConTrainer, a standalone Learning Management System (LMS) that features training content for the oil and gas industry on a small computer system, offers eLearning modules offshore and in remote locations.

Developed by Oilennium, the ConTrainer was created in response to demand from oil and gas companies seeking to provide interactive learning for employees working in remote locations where access to the Internet is intermittent.

Norway's Dolphin Geophysical, which supplies marine geophysical services with its fleet of seven seismic vessels, recognized a need to train its crews consistently, whether offshore or docked in harbor.

"Before we began using the ConTrainer, our efforts to train crews on vessels via eLearning systems were compromised by constrained VSAT access to the internet, which most eLearning systems require," said Mike Hodge, Vice President of QHSE for Dolphin Geophysical. "To test the effectiveness of the ConTrainer, we conducted a three-month trial on two of our new 3D vessels Polar Duke and Polar Duchess, in international waters. We were able to monitor learners' progress from our global headquarters in Bergen, Norway. We were impressed by the rapid uptake by our crews. The compelling, media-rich quality of the programs really engaged them, and fuelled their desire to progress, which in turn enhanced retention."

Because the ConTrainer is not dependent on unbroken connectivity to the Internet, it has meant that during downtime caused by bad weather, for example, crews can take advantage of that time to progress through some of the 50 courses available on topics ranging from leadership and management to those with a technical or HSE focus. With the ConTrainer, downtime is never "lost time."

During the past two years, Dolphin Geophysical installed ConTrainers at its Bergen base and throughout its entire fleet. Approximately 424 registered users have access to 50 courses that can be viewed any time. The training program has been so successful that Oilennium has been commissioned to provide another 20 modules, including two bespoke courses dedicated to a company safety induction, that are scheduled for installation on every Dolphin Geophysical ConTrainer in 2015.

In addition to delivering consistent health, safety and technical knowledge, Dolphin Geophysical's training department is kept up-to-date on the progress of every user. This is achieved through a custom, graphic online dashboard, which provides a snapshot and long-term results in an easy-to-view format. Every day at the same time, each of the eight ConTrainers sends a report on user progress, allowing training managers to assess the level of eLearning on a vessel-by-vessel basis.

Every ConTrainer is populated with an on-site version of the Oilennium Learning Management System, the interactive learning modules and learners' user details. The unit, which can be connected to the client's network or standalone, is then placed in the remote location where employees are working, and internet access is limited or unreliable. As a part of their competence development, employees can access the LMS, and progress through the learning modules. The modules fall into four broad categories: 1) Introduction to Oil and Gas, 2) QHSE, 3) Technical Courses and 4) Leadership and Management. Tailor-made or existing modules can also be installed remotely from the UK office onto the ConTrainer, making them readily available.

www.oilennium.com

O&G Workforces & Online Distance Learning

MTCS (UK) Ltd, has devised a portable, virtual learning environment, where the online system has been built to aid companies whose individuals spend a lot of time offshore on vessels or rigs. Indeed, many subsea Industry executives now realize that knowledge and the application of knowledge, is key to business success.

"While we do send trainers when possible to company employees; their being all over the world or on changing shift patterns, means extra issues with the training and getting trainees together," said Gail Bartolf, Global Sales Coordinator for MTCS (UK) Ltd. "A major issue is cost to the company, which can include flights, accommodation and perhaps day rates. MTCS Online is a distance-learning program designed for instant accessibility and optimum portability.

It makes our products available anywhere, anytime, allowing companies to use one system to track and monitor learners' progress throughout their offshore career."

Dingena Theunisse, Competence and Training Manager, Atlas Services Group, who currently uses the MTCS online distance learning tool, said: "Atlas agrees that Online Learning is and has proven to be a huge step forward in providing a set of courses independent of location and time limitations. MTCS offers a recognized Competence Management Framework, tailored to meet our preferences and allowing our workers to gain certification in the workplace, no matter where in the world they are working."

All competence certificates are IMCA graded and the program is compatible with Apple Mac, Windows 7/8, Android and iOS tablets and mobiles.

"This is a faster and more efficient way for MTCS to deliver solutions to our global client base and obviously has huge potential for companies," said Bartolf.

Courses available via MTCS Online include: High Voltage, ROV Hydraulics and Skills Assessor - with Fiber Optics coming shortly. Additionally, the system is host to competence programs for all IMCA grades, including marine back-deck, diving, survey, and in fact all offshore IMCA competence grades. www.mtcs.info/online MTCS also deliver ROV Induction courses, which are available worldwide.

www.rovtraining.org

"Atlas agrees that Online Learning is and has proven to be a huge step forward in providing a set of courses independent of location and time limitations."

Dingena Theunisse,
Competence and Training Manager,
Atlas Services Group

Editorial Calendar

MARINE TECHNOLOGY REPORTER

ISSUE	EDITORIAL	BONUS DISTRIBUTION	AD CLOSE
January/ February	**Underwater Vehicle Annual: ROV, AUV, and UUVs** **Market:** Subsea Engineering: Oil & Gas **Tech:** Harsh Environment Systems for Arctic Ops **Product:** Scientific Deck Machinery	**Arctic Technology Conference** March 23-25, Copenhagen, Denmark **Subsea Tieback** March 3-5, New Orleans, LA	January 21
March	**Oceanographic Instrumentation: Measurement, Process & Analysis** **Market:** U.S. Navy Strategic Initiatives **Tech:** Ocean Business 2015 Technology Spotlight **Product:** Sonar Systems & Seafloor Mapping	**Ocean Business** April 14-16, Southampton, UK **Sea-Air-Space** April 13 - 15 National Harbor, MD	February 18
April	**Offshore Energy Annual** **Market:** Seismic Vessels & Systems **Tech:** Deepwater Positioning, Mooring & Anchoring **Product:** Subsea Vehicles and Systems for Pipeline Survey & Inspection	**Offshore Technology Conference** May 4-7, Houston, TX **AUVSI 2015** May 5-7, Atlanta, GA	March 27
May	**Underwater Defense** **Market:** Offshore Renewable Energy: Wind, Wave & Tide **Tech:** International Naval Technologies **Product:** Remote Sensing & Environmental Monitoring	**MAST Asia** May 13-15, Yokohama, Japan **UDT** June 3-5, Rotterdam, NL	April 24
June	**Hydrographic Survey** **Market:** Comms, Telemetry & Data Processing **Tech:** GPS, Gyro Compasses & MEMS Motion Tracking **Product:** Interconnect: Underwater Cables and Connectors		May 27
July/ August	**MTR100** **The 10th Annual Listing of 100 Leading Subsea Companies** **Market:** Offshore Europe Tech & Trends	**Offshore Europe** September 8-11, Aberdeen, UK	July 21
September	**Ocean Observation: Gliders, Buoys & Sub-Surface Networks** **Market:** Oil Spill Monitoring & Tracking Systems **Tech:** Seafloor Engineering & Remote Operations **Product:** Geospatial Software Systems for Hydrography	**OTC Brazil** October 26-29, Rio de Janeiro, Brazil **SeaTech Week** October, Brest, France	August 21
October	**AUV Operations** **Market:** Research Vessels **Tech:** ROV Technology: Workclass to Micro Systems **Product:** Underwater Tools and Manipulators	**Oceans 2015** October 19-22, Washington DC **SNAME** November 4-6 Providence, RI	September 25
November/ December	**Subsea Engineering & Construction** **Market:** Fresh Water Monitoring & Sensors **Tech:** Offshore Inspection, Maintenance & Repair (IMR) **Product:** Underwater Imaging: Lights, Cameras & Sonars	**Underwater Intervention 2016** New Orleans	November 26

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