MARINE TECHNOLOGY REPORTER

October 2013 www.seadiscovery.com

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AUV Deployment & the U.S. Navy Fifth Fleet

Learn to Earn

Scripps helps to bring new tech to market

Lohrenz & SMAST

One-on-One with Dean of UMass Dartmouth School for Marine Science and Technology

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Development of a Research Submersible

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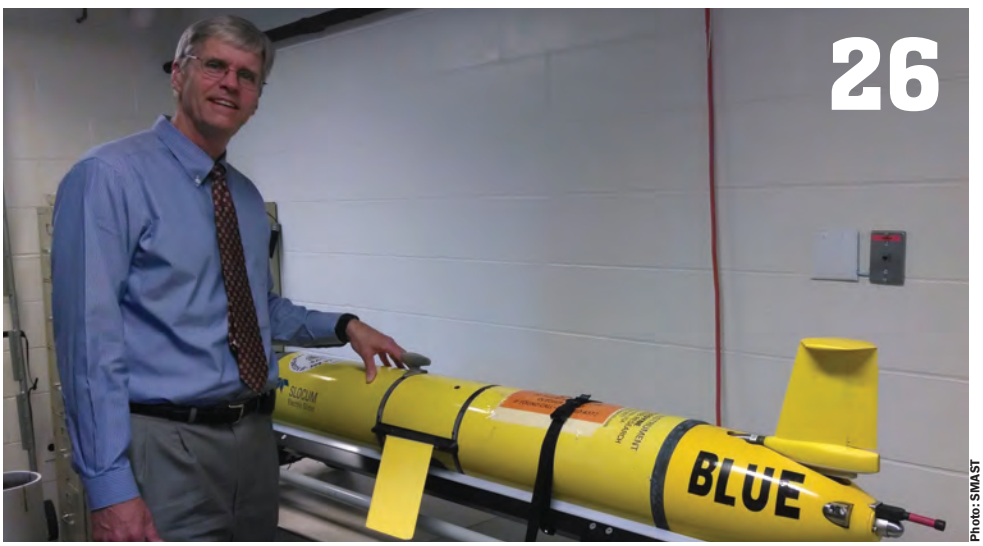

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Cover Story

Leading Off

One-on-One

Submersibles

March 15- November 8, 2013

Coming this spring!

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

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Subsea Photo Contest

MARINE TECHNOLOGY REPORTER

and

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underwater technology and ocean science news

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http://photos.seadiscovery.com

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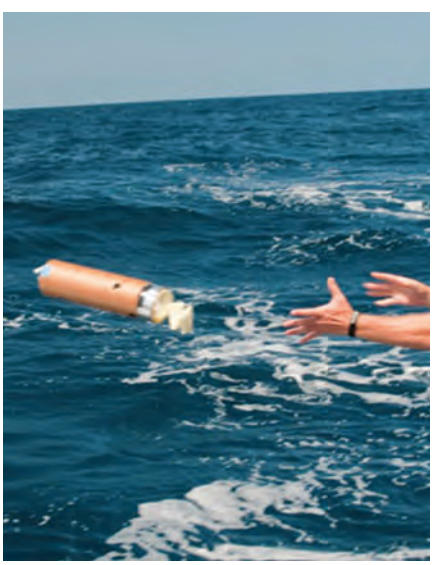

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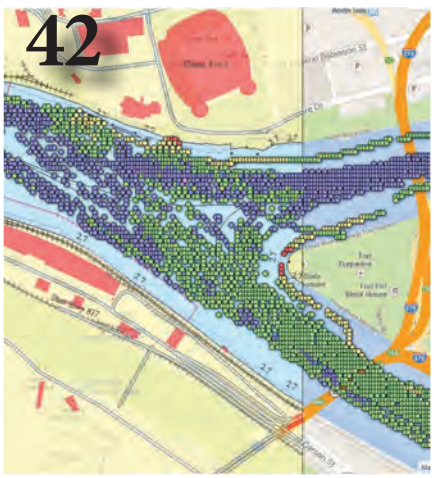

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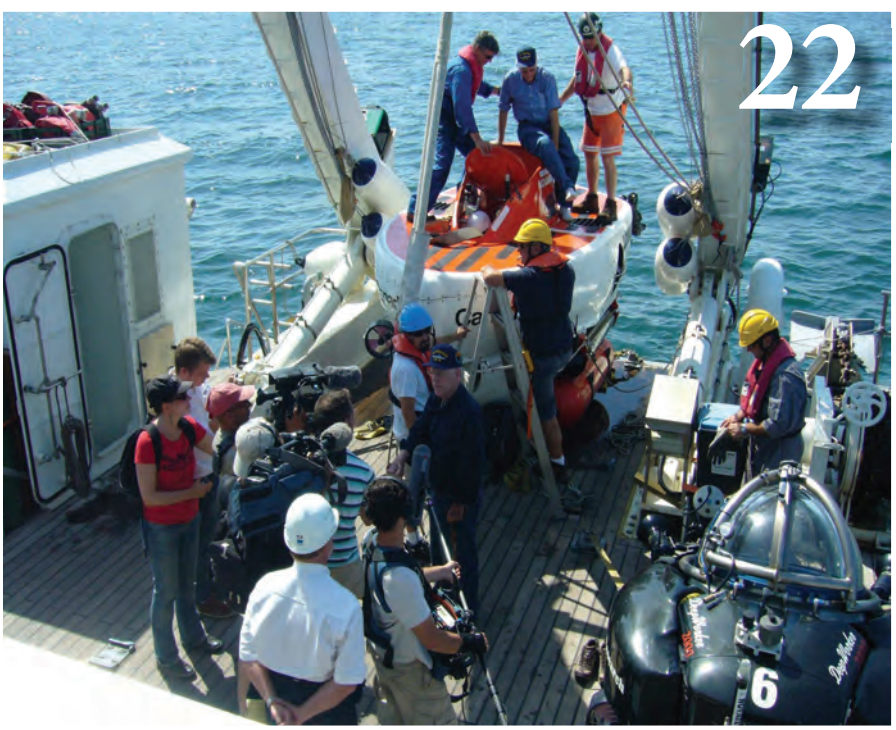

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(Photo: Hydroid)

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Last month another outstanding "Oceans" conference and exhibition came and went in sunny San Diego, California, a quintessential venue for what is arguably the strongest annual subsea gathering in North America. Next year Oceans heads to the near exact opposite corner of the continent, as St. Johns, Newfoundland & Labrador, Canada will host the event from September 14-19, 2014. St. Johns brought its traditional strong contingent of companies and executives to San Diego, and its excitement to host the 2014 event was palpable.

While in San Diego we had ample opportunity to visit with a multitude of colleagues and friends, but one that stood out in particular was with Hans de Salas-Del Valle, a business development analyst at Scripps Institution of Oceanography, a division of the University of California, San Diego. Scripps needs no introduction to the *MTR* audience, but in speaking with de Salas-Del Valle we did learn of the renewed push at Scripps to take some of the cutting edge technology from the Institution and bring it into the commercial marketplace through partnership and licensing agreement. With this we put our regional reporter, Kathleen Gleaves on the case, and she delivers, starting on page 31, an insightful look at not only Scripps and the technology it fosters, but three specific technologies and three specific companies that have made the leap from the halls of academia to the commercial market: MRV Systems and the vertical floating profile; EarthRisk Technologies and its algorithms that help make long-term weather predictions; and Quad Geometrics and its marine electromagnetic technology.

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CDR Tom Reynolds USN (ret) is a retired Explosive Ordnance Disposal Officer and U.S. Navy Deep Sea Diver who joined Hydroid, Inc. in Fall 2012 as Business Development Manager - Defense. Email: sales@hydroid.com *p.36*

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Increase in Demand for the Hot

Subsea Vessel Market

By Calvin Ling, Analyst, Douglas-Westwood, Singapore

Douglas-Westwood (DW), in its latest subsea vessels report, forecast more than $100B of expenditure on subsea vessel operations over the next five years – with global demand expected to increase by 23%. The increase in expenditure is expected to be higher than the growth in vessel days due to the move towards higher specification vessels to cater for deeper and more complicated field development programs.

Dayrates for high specification dive support vessels (DSV) and multipurpose support vessels (MSV) are expected to increase more than 40% by 2017. High spec flexlay dayrates are expected to remain similar and low spec decrease marginally. Pipelay vessel rates are expected to increase by up to 8% for high spec, whilst light well intervention vessel (LWIV) rates are anticipated to increase slightly.

The deepwater Golden Triangle (Africa, GoM and Brazilian areas) is expected to account for the majority of global expenditure on vessel operations over the forecast period. North America is forecast to be the largest market followed by Latin America and Africa.

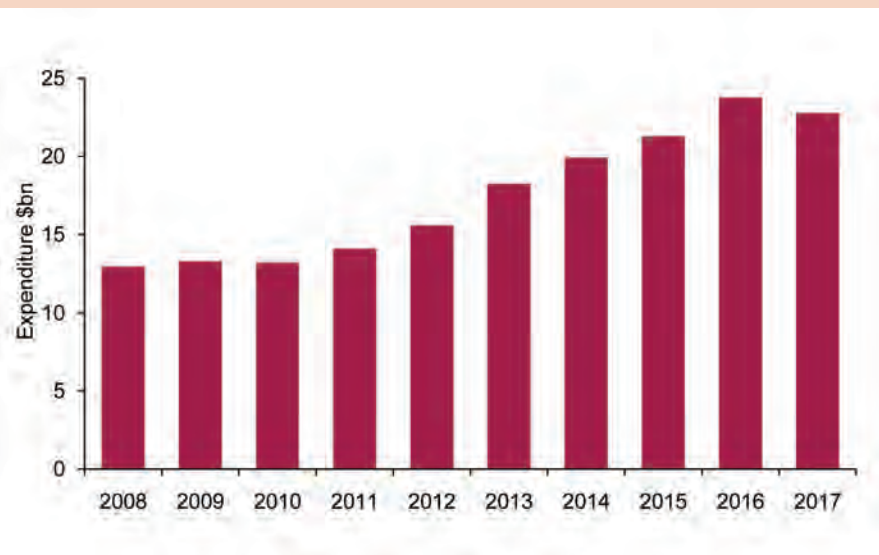
Drivers and Indicators

Global energy demand has grown significantly over the past 50 years and is forecast to continue, driven by developing economies. Oil is a fuel of huge importance mainly due to its role in transportation, where it cannot be readily substituted by alternative energy sources. Oil consumption is forecast to grow from today's 90 million barrels per day to 107mbpd by 2035. Production will increasingly have to come from unconventional sources and also deeper water. This will cause all sectors of the subsea market to increase in tandem. With the anticipated growth in offshore developments, there are more opportunities for subsea vessels to be used and due to the move towards deep and ultra-deep waters, the need for higher specification vessels is looking particularly positive.

Market Supply

The move towards deeper water activities has rendered some

2008-2017
Global Subsea Vessel Operations Expenditure



Source: Douglas-Westwood

older vessels inadequate. Saturation of sections of the market, particularly for some DSV/MSV types is now evident, with some retention of high demand for flexlay/pipelay vessels.

DW expects an upside trend of activity in vessels supply. This is largely due to the move towards building higher capability vessels to cater for deeper water activities, but also the retiring of less capable vessels and meeting increasing demand in Latin America, Africa and Asia.

Market Demand by Region

Africa

Africa will remain one of the world's most significant regions for subsea developments. A large number are currently onstream and more are planned for the forecast period. Projects such as Total's Kizomba field in Angola (2014), Shell's Bonga South in West Nigeria (2015) and Total's Egina field in Nigeria (2014), will increase the demand for subsea vessels. Total vessel operations expenditure over the 2013-2017 period is in the $16B region, a significant increase from the preceding five years, and is anticipated to be largely driven by the deepwater region requiring higher specification vessels.

Asia

Over the next five years, field development activities in the Asian region will also increasingly require vessels with deepwater capabilities. Production has, until recently, been restricted to shallow water fields, but there are now a number of deepwater projects producing or underway. Vessel demand is expected to see strong growth with developments such as Shell's Gumusut (Malaysia), Chevron's Gehem and Gendalo (Indonesia), Salamander's Bualuang (Thailand), Reliance Industries' MA-D6 (India) and CNOOC's Xijiang 32-1 (China). Expenditure is expected to increase by a CAGR of 11% over the next five years.

Australasia

Australia's offshore oil & gas reserves are found in the Bonaparte, Browse and Canarvon Basins off the west coast, as well as in the Otway, Bass and Gippsland Basins off the southern coast. Large shallow water gas developments will continue to dominate subsea activities off the west coast of Australia until 2016. There are no visible projects in 2017, but major projects are due to come onstream beyond the forecast period. Field development will account for the largest demand in the region followed by IRM.

Eastern Europe & FSU

Vessel demand is expected to be driven by ongoing pipeline projects in the region, while field development activity is expected to remain sporadic over the next five years. The subsea

sector is relatively small in the EE & FSU region with lower demand for vessels that carry out field construction, IRM and subsea intervention tasks than other regions. Vessel demand is expected to exceed 20,000 days over the next five years.

Latin America

High specification vessels are required as this region continues to develop deepwater assets and move towards ultra deepwater (>2,000m) such as Petrobras' pre-salt basins. A large amount of deepwater production has already occurred in Latin America with the vast majority off Brazil. Companies active include BG, BP, Chevron, Devon Energy, Petrogal/Galp, El Paso, Pemex (Mexico NOC), PDVSA (Venezuela NOC), Petrobras (Brazil NOC), Repsol, Shell, Statoil and Total. Expenditure in Latin America was left relatively unscathed by the economic downturn.

The region is expected to have the largest vessel spend led primarily by Brazil, and is forecast to grow strongly, accelerating from 2014 due to an increase in field development activity. Vessel day demand from 2013-2017 is expected to increase by more than 65% from the prevailing five year period.

Middle East

Subsea expenditure in the region will continue to be driven by shallow pipelines and fixed platforms, with just one subsea tree slated to be installed from 2013-2017. Beyond that time, spending is expected to be driven by the three deepwater fields all of which are located off Israel. Meanwhile the Middle East has a relatively small base of subsea infrastructure, and there are no visible field development projects over the forecast period with vessel demand mainly coming from pipeline projects.

The region is expected to have a relatively low spend, some 4% of the global total.

North America

Over the next five years subsea expenditure in the region is expected to be dominated by deepwater developments, predominately in the U.S. Gulf of Mexico (GoM). North America will also remain one of the world's most significant regions for subsea vessel demand and expenditure due to the IRM needs of the massive installed base of offshore infrastructure. Total expenditure from 2013-2017 is expected to be the largest of all the regions.

Norway

Norway is a mature region, with much shallow water production but little deepwater activity to date and expenditure will therefore arise from projects in water depths of 250-500m. In total, vessel spend is set to decrease by a CAGR of 2% over the forecast period. This is due to the lack of visibility of pipeline construction projects in 2017. Vessel demand is forecast to peak in 2016 due to an anticipated increase in pipeline activity that year. Overall activity in the next five years is expected to be driven by IRM as field developments and pipeline activity fluctuate.

U.K.

The U.K. is a mature region, with much shallow water production and field developments that utilize subsea trees are typically tied back to existing infrastructure. Shallow water developments will continue to dominate U.K. subsea expenditure. Being a mature market, vessel demand is greatly driven by IRM activities on existing infrastructure. Over the forecast

Artist rendering of a new subsea support vessel ordered last month by Oceaneering. **Full vessel details on page 12.**

five-year period, expenditure and vessel demand for both IRM and field development will account for over 45% of the total.

RoWE

The Rest of Western Europe is also a mature region, with shallow water production and little deepwater activity to date. However, there are potential deepwater gas developments in the waters of the eastern Mediterranean. Apart from those, the maturity of the infrastructure in the region means that IRM plays a significant role in vessel demand.

Conclusions

Global demand for subsea vessel operations is expected to grow rapidly over the forecast period particularly for the higher specification vessels. With the move to deeper waters, the requirements for vessels with a longer duration on site and with higher technical and operational capabilities are increasing, giving rise to higher expenditure forecasts. The outlook for the subsea vessel operations market shows good long-term growth potential, particularly in North America, Latin America, Africa and Asia-Pacific.

The Author

Calvin Ling BEng (Hons), MSc, Douglas-Westwood, Singapore is involved with the day to day execution of strategic consulting & transaction support services for a range of corporate and financial clients within the energy and oil & gas industry. Prior to joining DW, he has spent time as an executive analyst in an Asian investment banking firm focusing on the South East Asia M&A and IPO market. Calvin holds a Bachelors in Engineering (Hons) (Civil) and a Master of Science (MSc) (Geotechnical Engineering and Management) from the University of Birmingham, U.K.

The Report

The World Subsea Vessel Operations Market Forecast 2013-2017 analyzes the main factors driving demand for MSV, DSV, Flexlay, LWIV and Pipelay Vessels. Results analyze vessel demand for key subsea markets, with historic data covering the period 2008-2012 and forecast data for 2013-2017. Read more:
www.douglas-westwood.com/shop/shop-infopage.php?longref=1188

Oceaneering Taps BAE Systems to build new

Subsea Support Vessel

Oceaneering International selected BAE Systems to build a subsea support vessel for offshore drilling. The ship will be used to augment Oceaneering's ability to provide subsea intervention services in the ultra-deep waters of the Gulf of Mexico. This vessel will be U.S. flagged and documented with a coastwise endorsement by the U.S. Coast Guard. It will have an overall length of 353 ft., a Class 2 dynamic positioning system, accommodations for 110 personnel, a helideck, a 250-ton active heave compensated crane and a working moonpool. The vessel will be outfitted with two 13,000 foot-rated Oceaneering work class remotely operated vehicles. The vessel will also be equipped with a satellite communications system capable of transmitting streaming video for real-time work observation by shore personnel. It is scheduled for delivery in 2016.

The DP2 vessel will be Marin Teknikk of Norway's MT6022 design and will be equipped with a 250-ton crane capable of reaching 4,000-m water depth. It will be powered by GE tier IV-emission compliant engines, and by energy efficient and environmentally compliant power and propulsion systems.

The vessel will be used to augment Oceaneering's ability to provide subsea intervention services in the ultra-deep waters of the U.S. Gulf of Mexico (GOM). These services are required to perform inspection, maintenance and repair (IMR) projects and hardware installations. IMR projects are expected to include chemical well stimulation and hydrate remediation. Hardware installations are expected to include flowline jumpers, flying leads and subsea trees, pumps and separators.

Artist rendering of the subsea support vessel BAE Systems will build for Oceaneering.

"Deepwater drilling rig use in the GOM is currently at a historically high level of 40 rigs, and recent industry market reports have forecast that it may grow to as many as 60 rigs by the end of 2015."

M. Kevin McEvoy, President and CEO, Oceaneering International

"We are pleased to announce the construction of a vessel that will allow us to maintain our competitive position to meet what we believe will be growing demand and more rigorous technical requirements for our ultra-deepwater Subsea Projects services in the GOM," said M. Kevin McEvoy, President and CEO, Oceaneering Internatinal. "Additionally, by being Jones Act compliant this vessel will minimize the need for and risks of vessel-to-vessel hardware transfers.

Deepwater drilling rig use in the GOM is currently at a historically high level of 40 rigs, and recent industry market reports have forecast that it may grow to as many as 60 rigs by the end of 2015. "Our vessel will be equipped to perform increasingly complex deepwater field development installation work and life-of-field IMR projects resulting from the increased drilling activity. In particular, this vessel will have a crane that is capable of handling lifts 100 tons greater than any of the vessels we currently operate. This will increase our capability to meet our customers' demand to safely handle heavier subsea payloads in deeper water depths."

Van Oord Contracts Damen for

DP2 Cable Laying Vessel

Van Oord ordered a new cable laying vessel. The ship will be built at Damen Shipyards Galati in Romania and will be completed at the end of 2014. The vessel is intended for the installation of electricity cables for offshore wind farms. Van Oord is making preparations for the Gemini offshore wind farm which will be constructed 60 km to the north of Schiermonnikoog, one of the Dutch Wadden Islands. The cable-laying vessel will be deployed at that site, among many others.

The vessel will be a multipurpose vessel measuring 120 x 28 m with a dynamic positioning system. It will be equipped with a cable carousel of more than 5,000 metric tons and a heavy crane that will enable it to lay heavy and long export cables. On board 90 people can be accommodated. The cable-laying vessel forms part of the Van Oord strategy to offer a complete package for the construction of offshore wind farms as an EPC contractor.

The new cable layer is based on the Damen Offshore Carrier, a new multipurpose vessel design with a flush working deck, Heavy Lift or RoRo transport as well as offshore installation capabilities suitable for multiple markets. To this purpose, a large number of (offshore) installation equipment can be mounted on the vessel and the design can be adapted to create a dedicated ship, such as the vessel desired by Van Oord.

MHI to Build RV for JAMSTEC

Mitsubishi Heavy Industries, Ltd. (MHI) received an order for construction of a wide-area seabed research vessel from the Japan Agency for Marine-Earth Science and Technology (JAMSTEC). The vessel will be designed to advance wide-area research into seafloor resources, its comprehensive research capabilities to include elucidation of mineral and ore deposit origins and formation conditions, and will also enable contributions to disaster prevention research. Construction will start at MHI's Shimonoseki Shipyard & Machinery Works in Yamaguchi Prefecture this year, with completion scheduled for March 2016. The ship will measure 100 x 19 m with gross tonnage near 5,500 tons. To efficiently conduct survey research of ocean floor resources, it will be capable of operating such state-of-the-art equipment as a seismic research system for investigating crustal structure, large piston corers and a seafloor-mounted excavator for collecting seabed samples, a remotely operated vehicle (ROV) and an autonomous underwater vehicle (AUV). Sea speed will be approximately 12 knots, with a crew capacity of 65. The vessel on order will also be outfitted with a marine research laboratory enabling swift analysis of collected samples without any time-lag deterioration.

OSD-IMT Wins Contracts for COSL

Seismic Support Vessel Deals

Photo: OSD-IMT

OSD-IMT, a division of Offshore Ship Designers, secured a design contract for two IMT 965 seismic support vessels with a bollard pull in excess of 50 metric tons for China Oilfield Services Ltd. (COSL), Beijing.

The vessels will be used to provide a range of support activities to larger seismic vessels which operate continuously for months when conducting seismic surveys. Designed to have a multi-role capability in support of the mother ship, they can be used for refuelling, fresh water replenishment, the provision of refrigerated stores and dry provisions, the supply of spares and general stores, emergency towing and escort support and guard duties.

The IMT 965 carries 980 cu. m. of cargo oil for refueling the mother ship, either alongside or ahead. Fuel is pumped to the mother ship from a deck-mounted fuel supply module located on the working deck of the IMT 965. Up to 500 cu. m. of fresh water can be supplied in a similar way.

Cold stores and dry provisions totaling 80 cu. m. can be accessed directly from the working deck of the IMT 965, providing easy access for transfer to the mother ship, either by the ship's crane or by a crane mounted on the mother ship.

The operating cycle for the IMT 965 requires it to be on station shadowing the mother ship for prolonged periods. During this time the IMT 965's activities include keeping passing vessels clear of the streamer arrays and ensuring that there is a traffic-free area ahead of the mother ship. The vessel is classed with a DP1 notation which will allow it to shadow the mother ship at a preset distance for long periods.

The main IMT 965 propulsion arrangement is a hybrid system, comprising twin CP propellers, each driven by a medium-speed diesel engine. A PTO/PTI alternator/motor is connected to each main gearbox, and two 360 kWe diesel generators are also provided. The system is arranged such that one main engine can drive both propellers for maximum fuel economy.

IMT 965 Main Particulars

LOA	64.9m
LBP	58.2m
Beam	16m
Draft	5.65m
Total Deadweight	1,800 metric tons
Speed	13 knots

IHC Merwede Launches Pipelaying Vessel

IHC Merwede named and launched the pipelaying vessel Sapura Diamante in a ceremony at the company's shipyard in Krimpen aan den IJssel, The Netherlands. The naming of the offshore vessel was carried out by Christina Lucia Duarte Pinho, the Executive Manager of Petrobras E&P Service.

The 550 ton pipelaying vessel – ordered by Sapura Navegação Marítima, a joint venture between SapuraKencana and Seadrill – is the first in a series of five fully integrated offshore vessels, which will be completely designed, engineered and built by IHC Merwede. After delivery, the Sapura Diamante will be used to develop deep-sea oilfields of up to 2,500m in Brazilian waters on behalf of Petrobras.

The Sapura Diamante will be equipped with a pipelaying spread that is being designed by IHC Engineering Business. It comprises of two below-deck storage carousels, with capacities for 2,500t and 1,500t of product respectively. A vertical (tiltable) lay system with a 550t top tension capacity will be permanently installed for the deployment of a range of flexible products, varying from a diameter of 100-630mm. The pipelaying spread is being built at IHC Merwede's facility in Sliedrecht, The Netherlands. In addition, IHC Drives & Automation delivered the integrated automation system, the full electrical installation and the complete electrical machinery package.

Sapura Diamante Main Particulars

Type	550t pipelaying vessel
Customer	Sapura Navegação Marítima
Builder	IHC Offshore & Marine BV
Length, o.a.	145.9m
Breadth molded	29.9m
Depth main deck	13m
Draft (operational)	7.2m
Draft (max)	8.3m
Deadweight (operational)	7,025t
Deadweight (max)	10,070t
Accommodation	120 people

Sapura Diamante

(Photo: IHC Merwede)

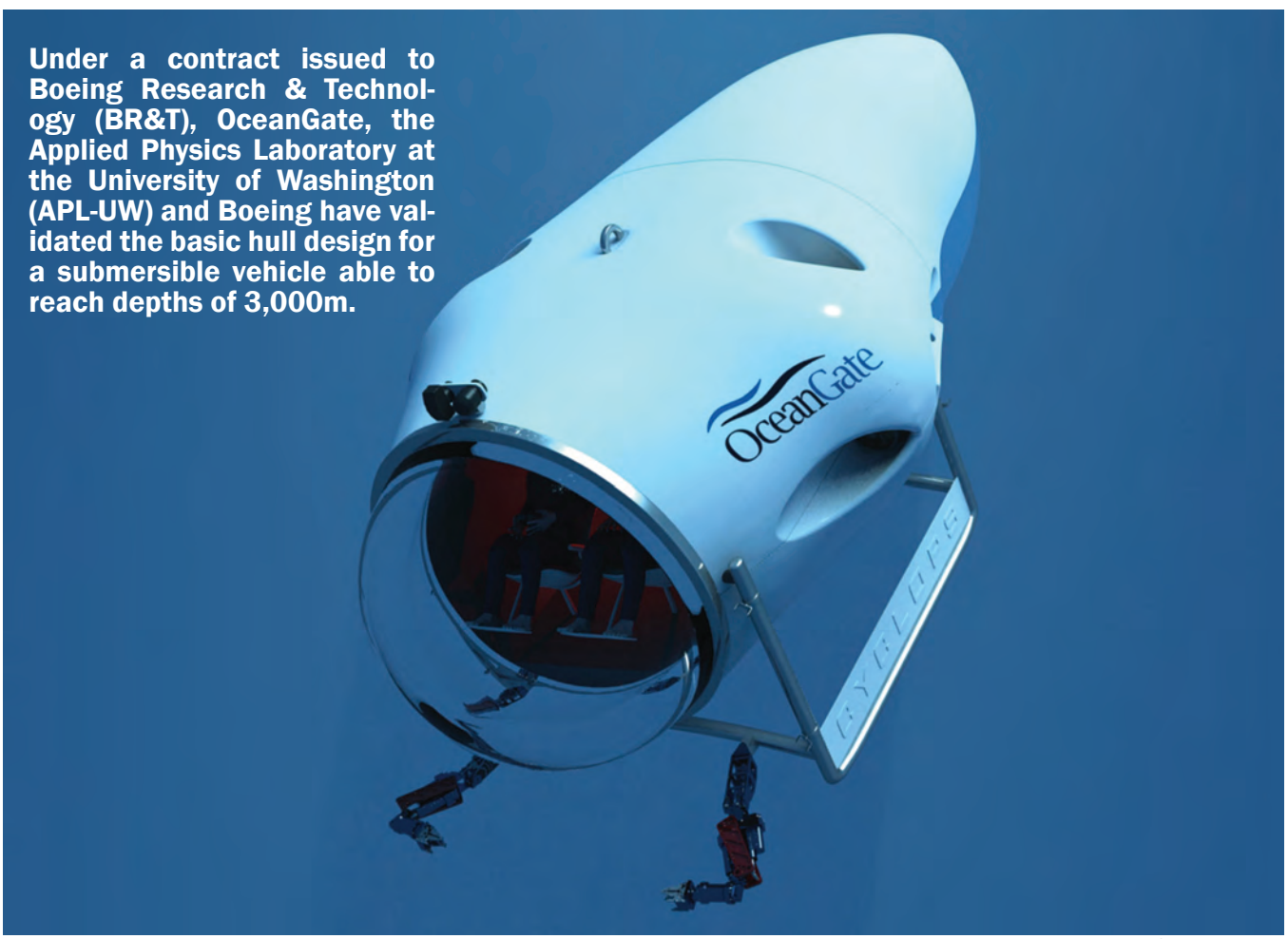
Cyclops A Revolutionary Hull Design

OceanGate Inc. announced the completion of the initial carbon fiber hull design and feasibility study for its next generation manned submersible – Cyclops. Under a contract issued to Boeing Research & Technology (BR&T), OceanGate, the Applied Physics Laboratory at the University of Washington (APL-UW) and Boeing have validated the basic hull design for a submersible vehicle able to reach depths of 3,000m.

With its large 180-degree borosilicate glass dome, the new vehicle will offer a chance to examine the environment, collect samples, and deploy technology in subsea settings in person and in real time. When commercially available in 2016, Cyclops will reportedly be the only privately owned deep-water (greater than 2,000 meters) manned submersible available for contracts. A follow on 6,000-m version is slated for completion in Q4 2016.

"Recent advances in material science, manufacturing and testing facilities that combine innovative engineering processes have allowed for a unique collaboration between OceanGate, Boeing and the APL team to complete the feasibility study and move the process to the manufacturing stage," said Stockton Rush, CEO. "The research, military and commercial markets need more vehicles for subsea exploration. OceanGate's Cyclops submersible will usher in a new class of vehicle to help fulfill this need."

The Cyclops submersible will feature a seven-inch thick, individual-fiber-placed carbon fiber hull using proprietary Boeing manufacturing technology. The ability to accurately place thousands of individual strips of pre-impregnated fiber



Under a contract issued to Boeing Research & Technology (BR&T), OceanGate, the Applied Physics Laboratory at the University of Washington (APL-UW) and Boeing have validated the basic hull design for a submersible vehicle able to reach depths of 3,000m.

will overcome many of the hard to control variables surrounding traditional filament winding processes and permit the hull to withstand the very high compressive loads at 3,000m (300 bar).

The use of carbon fiber will also help make Cyclops significantly lighter, making deployment faster, easier and more cost-efficient. While in the water, Cyclops' five crew members can comfortably observe the ocean depths through a massive glass dome, which offers unobstructed views for at-depth inspections, environmental assessments, discussion, decision making and observation.

Cyclops eliminates the tethering limitations of ROVs and allow its five crew members to observe underwater environments for up to eight continuous hours. Using a patent-pending submerging Launch, Retrieval and Transport (LRT) platform, OceanGate can operate a manned vehicle with ships of opportunity at much lower costs than most other manned vehicles and, in many cases, even less expensively than ROVs. With the ability to be quickly and affordably deployed around the world, Cyclops will usher in a new generation of oceanic exploration and study.

www.oceangate.com

First Application Accepted for Dogger Bank

The Planning Inspectorate accepted Forewind's development consent order application for the first stage of offshore wind energy development on the Dogger Bank Zone. The application for Dogger Bank Creyke Beck, comprising two offshore wind farms with a total installed capacity of up to 2.4 gigawatts.

Fugro Opens Expanded Soils Testing Lab

Fugro opened its expanded soils testing laboratory at the Group's UK headquarters. An investment of more than $1.5m was made in increasing the capacity and in equipment, as a direct result of the significant increase in the number of samples being taken from offshore wind developments, coupled with Fugro's existing work in the global offshore oil and gas industry. The floor space of the laboratory has been increased by 50%, new equipment includes 12 Computer controlled Stress Path Triaxial systems, four Cyclic Simple Shear systems, four Cyclic Triaxial systems, 10 High Pressure Incremental Oedometer systems and two Resonant Column systems.

Video Contest for Scientists to Share Ocean Research

Ocean scientists interested in sharing their latest research discoveries through video are encouraged to submit videos highlighting your research to the nationwide Ocean 180 Video Challenge, with the possibility of winning a cash prize. The challenge is funded by the National Science Foundation. The objective for each scientist is to develop a three-minute video abstract of a recent peer-reviewed ocean-science publication for submission to the 2014 Video Challenge by Dec. 1, 2013. Ocean scientists, including undergraduate and graduate students, affiliated with United States-based institutions are eligible to participate. The top three video abstracts will receive cash prizes of $3,000 for first place, $2,000 for second place and $1,000 for third place.

Email: mwatson@fit.edu
http://ocean180.org/

Final Rule for Nontank Vessel Response Plans

The U.S. Coast Guard announced publication of the final rule to increase pollution response preparedness for nontank vessels carrying oil in U.S. waters. The final rule establishes the content of oil discharge response plans so nontank vessel owners and operators understand how to comply with the preparation and submission requirements of the Coast Guard and Maritime Transportation Acts of 2004 and 2006. The CGMTAs amend the Federal Water Pollution Control Act, requiring owners and operators of nontank vessels to prepare and submit oil spill response plans.

Floating LiDAR System

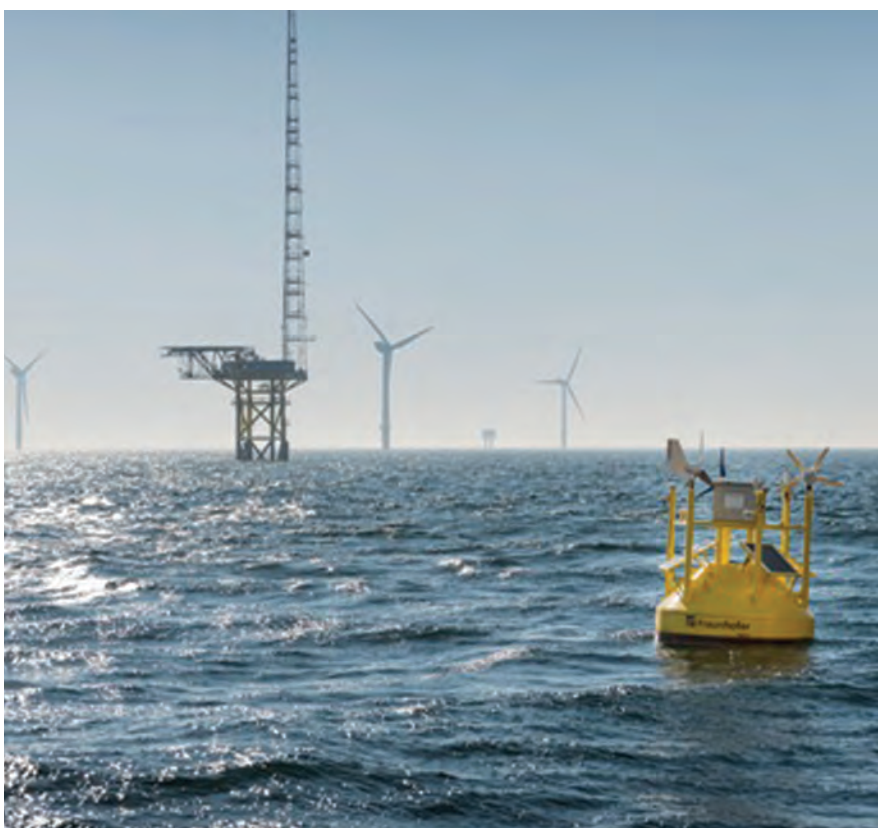
A launching of a very special kind awaited IWES scientists near the research wind farm alpha ventus, 45 km off Borkum: a LiDAR wind measuring buoy for measuring wind speeds was put to anchor in the direct vicinity of FINO1 meteorological mast. When compared with measuring masts, the buoy can be employed at any location with no extra installation costs and requires a less time-consuming authorization procedure.

This is all made possible by a correction algorithm, developed at the Fraunhofer IWES, which removes the proper motion of the floating platform from the values measured.

Using LiDAR (Light Detection And Ranging) appliances on land and on fixed platforms for measuring wind speeds at heights of 40-200m are proven. Proper motion, which falsifies measurement values taken from moving surfaces, has hitherto hindered the reliable employment of LiDAR applications offshore. Within the framework of the project "Offshore Measuring Buoy" – funded by the German Federal Ministry for the Environment– Fraunhofer scientists are excited about the first North Sea deployment of the gloating LiDAR system. A Windcube LiDAR device made by the company Leosphere has been integrated into the buoy.

The buoy will remain in the North Sea until October to prove its offshore suitability and to allow a validation of measurement accuracy using comparisons with the measurement data from the stationary mast.

www.fraunhofer.de



The Fraunhofer IWES' LiDAR wind-measuring buoy was installed near the FINO1 meteorological mast. The buoy measures wind speeds at heights of 40-200 m.

Satellite Monitoring
Captures Tanker Pollution

At a hearing at Truro Magistrates Court, the owner of a tanker paid a total of $36,000 in fines and costs after pleading guilty to a breach of U.K. maritime pollution legislation. On February 25, 2012 a satellite operated by European Maritime Safety Agency (EMSA) detected a ship trailing a slick in the waters between Lands End and the Scilly Isles. A report was made to the MCA. The alert level was given as RED, i.e. high confidence. The ship was identified as the Singapore registered tanker Maersk Kiera. The slick itself was within 12 miles of land. The vessel was contacted by Falmouth Coastguard to query whether they were carrying out tank cleaning operations as they had satellite imagery of oil traces in the track of the Maersk Kiera. The Master confirmed to Falmouth Coastguard that tank cleaning and associated discharge following a cargo of palm oil was indeed being undertaken, but that they were complying with International requirements.

Under the Dangerous or Noxious Liquid Substances in Bulk Regulations 1996 (SI 3010) discharge of palm oil slops is permissible subject to certain conditions. One of those conditions is that the discharge is over 12 miles from the nearest land.

Communications between the operators of the Maersk Kiera and the MCA took place. Initial contact on May 11, 2012 with the owners Maersk stated that the vessel had been cleaning tanks, but had stopped before the vessel was within 13.5 miles of the coast. However, the satellite imagery clearly showed a slick trailing behind the vessel when she was within 12 miles of land. Eventually a breach of the U.K. Pollution Legislation was admitted by the owners on March 12, 2012.

The owners of the Maersk Kiera, Maersk Tankers Singapore Pte Limited, were fined £15,000 with a £120 victim surcharge and prosecution costs of £7404.88 were awarded.

Captain Jeremy Smart, Head of Enforcement at the Maritime & Coastguard Agency, said:, "This is the first time satellite imagery has been successfully used as primary evidence in a maritime pollution prosecution brought by the Maritime and Coastguard Agency. The Agency will use all means available to identify and prosecute those carrying out illegal discharges within the U.K. Pollution Control Zone."

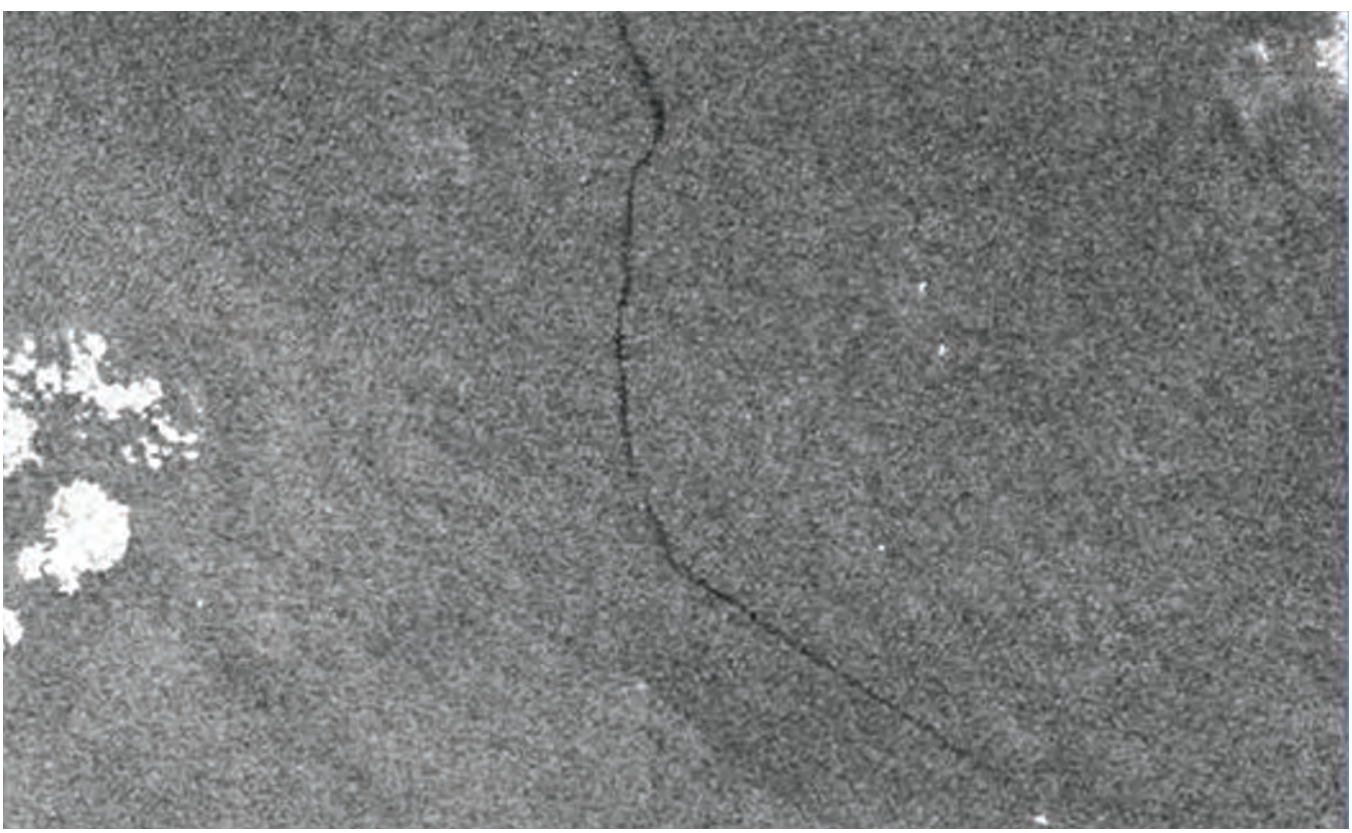


Photo: ©EMSA/MDA 2012

Furgo Performs Largest O&G AUV Survey

The largest AUV survey in the oil and gas industry is a core element of two contracts awarded to Fugro that also include metocean measurements and geohazard consultancy services for Eni East Africa. The data is being acquired for the Area 4 Rovuma basin development offshore northern Mozambique. The AUV survey is the largest ever commissioned and one of the first in this new and remote frontier area off the coast of East Africa. Fugro is providing hull-mounted reconnaissance and AUV detailed data. Covering approximately 1,440 sq. km, the survey stretches from the near shore to deepwater (2,700m). The work is being carried out using the MV Fugro Equator, equipped with hull-mounted multibeam echosounder, sub-bottom profiler, piston gravity corer and piezocone penetration system, in addition to the Echo Surveyor III AUV.

www.furgo.com

Ocean Health XPRIZE Offers $2 Million Award

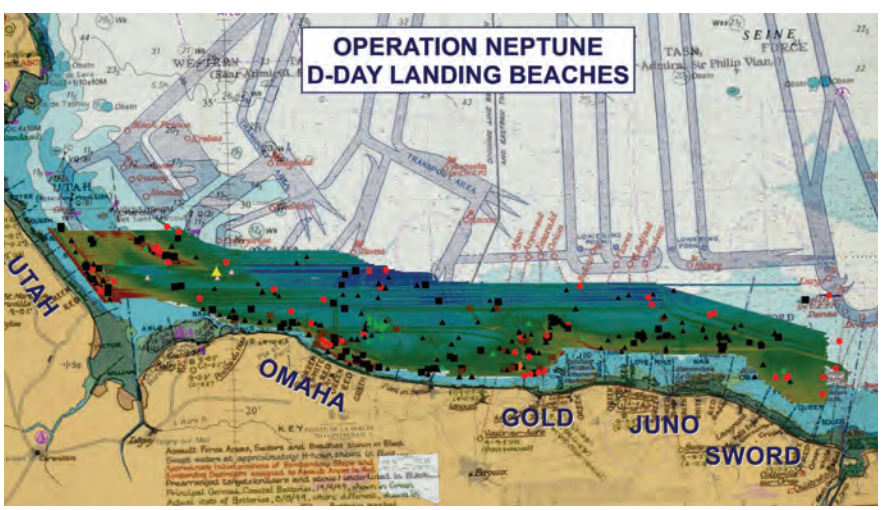
XPRIZE announced the launch of its next major competition: the $2m Wendy Schmidt Ocean Health XPRIZE. The Wendy Schmidt Ocean Health XPRIZE aims to spur global innovators to develop accurate and affordable ocean pH sensors that will ultimately transform our understanding of ocean acidification, one of the gravest problems associated with the rise in atmospheric carbon dioxide (CO_2). With inadequate or unaffordable sensors currently available on the market, ocean acidification is only well documented in a few parts of the world, making it nearly impossible to monitor our most imperiled ecosystems. To fully understand and adapt to the threat of ocean acidification, better pH sensing systems to monitor and collect ocean pH data are needed.

www.oceanhealth.xprize.org

D-Day Mapping
Expedition Completed

June 6, 2014 represents the 70th anniversary of the WWII D-Day invasion, and to commemorate this historic event an expedition took on the monumental task of creating the largest and most accurate continuous archeological map offshore of the five D-Day invasion beaches. In just 27 days 511 sq. km was initially surveyed using the Edgetech 46005 40khz combined bathymetric and Sidescan Sonar with more than 300 wrecks and obstructions identified. An R2Sonic 2024 700kHz Ultra High Resolution (UHR) Multibeam Sonar was then used to highlight over 50 sites. During the survey a SeaBotix vLBV300 ROV and the new Deep Sea Power and Light DVS300 camera system were used to investigate and identify targets. The R2Sonic, a second SeaBotix LBV300 ROV, Tritech gear, and precise positioning equipment was supplied by Measutronics that consisted of Trimble, Applanix, Marinestar, and CODA equipment. Data collection was done and post processing continues using HYPACK's HYSWEEP software. The seven week operation culminated with two Nuytco manned submersibles, Aquarius and a Deep Worker, that were used to film and bring veterans down to the shipwrecks they once sailed on, a truly moving experience for everyone involved. It must be noted as well that all of the survey and ROV equipment was donated and the survey team volunteered their time for the expedition.

Work continues with the enormous 11TB data set. Collaboration with the United Kingdom Hydrographic Office (UKHO) and the French nautical charting authority (SHOM) continues in an effort to update the international wreck database for the area. The survey will also help the Normandy region with the goal of designating the area as an UNESCO World Heritage Site. Dassault Systems are creating 3D visualizations to help reveal the wrecks on the seafloor. MC4 and LCL Production are producing a 90 minute documentary for the international market. PBS/Nova will broadcast an adaptation in North America, both to be aired commemorating the 70th anniversary. The operation was done aboard two French vessels, the Andre Malraux, operated by the Department of Underwater and Undersea Archeological Research (DRASSM) and the Etoile Marine's Magic Star.



Baltic Wind Success Paves Way for Ecosse

Ecosse Subsea Systems (ESS) has completed a $7.5m boulder clearing and pre-lay trenching project which it claims has been one of the most successful ever conducted for the wind energy sector. As subcontractor to Siem Offshore Contractors (SOC), the Banchory-based subsea specialist completed 86 boulder clearing passes followed by 172 first and multi-passes over a 90km route during a 13-week boulder clearing and trenching campaign on the EnBW Baltic 2 offshore wind farm project.

Several thousand boulders ranging up to 4m in size were cleared from the individual cable routes and ESS performed 260 individual route passes in varying and sometimes challenging soil conditions. EnBW Baltic 2 is an 80 turbine development located 32km north of Rügen island in the German exclusive economic zone of the Baltic Sea and owned by the German utility company EnBW. The 27 sq. km site spans water depths ranging from 20m to 45m LAT and has a wide array of soil conditions from fine sands to glacial tilt with areas of gravels and cobbles with numerous boulders.

www.ecosse-subsea.com

Ecosse Subsea Systems managing director, Mike Wilson, with the SCAR subsea plough

National Ocean Policy, Coastal & Marine Spatial Planning

Raising Red Flags

By Randall Luthi

This summer, the Administration released the innocuously named "Guide to Regional Marine Planning," and across town, the House of Representatives passed the latest in a string of resolutions restricting the Administration from spending money on the implementation of the National Ocean Policy. The battle continues over an issue which could well redefine the future of offshore energy development, fisheries management, renewable energy siting, coastal development, deep sea mining, and conservation policy. Because of that, National Ocean Policy (NOP) and Coastal and Marine Spatial Planning (CMSP) are the biggest issues of which you have never heard.

Here is how the National Ocean Council – part of the White House Council on Environmental Quality – describes the effort: "The National Ocean Council released a Marine Planning Handbook to support the efforts of regions that choose to engage marine industries, stakeholders, the public, and government to advance their economic development and conservation priorities. Each coastal region of the country has its own interests and ways of doing business, but all regions want to support their marine economies and coastal communities. Voluntary marine planning is a science-based tool that provides regionally tailored information that all ocean interests can use to reduce conflicts, grow ocean industries, and support the healthy natural resources that our economy and communities depend on."

A key policy tool in the Marine Planning Handbook is Coastal Marine Spatial Planning. Strong supporters of the NOP, including many environmental groups, seem completely flummoxed that the use of CMSP has much of the offshore energy industry and many current ocean users concerned. After all, as explained by the NOP, the overall goal of CMSP is to reduce conflicts and the time necessary to permit ocean uses. The stated aim is for ocean users and federal regulators to eventually spend less time contemplating the 'where' and focus instead, on just the 'when.'

In principle, it sounds good. However, the reality is more complex. Technically almost all of the outer continental shelf (OCS) has been available for energy exploration and development since 2008 when moratoria were allowed to lapse. However, while the OCS is technically open, exploration and development cannot occur without Federal approval. This Federal approval is generally granted through five year plans mandated by the Outer Continental Shelf Lands Act (OCSLA).

The last five year plan covered 2007 – 2012 and was developed before the entire OCS was technically open. In 2012, the Obama Administration had the opportunity to include much more of the OCS in the 2012-2017 five-year leasing plan, yet decided to leave approximately 87 percent of the OCS closed to exploration and development for oil and natural gas. Thus, even though technically open, the entire Atlantic, Pacific and Eastern Gulf of Mexico are locked down tight when it comes to oil and natural gas activities.

This raises red flag number one. The same Administration that closed down 87% of the OCS is now promoting the NOP and the use of CMSP. There is legitimate concern that CMSP is starting with a bias towards leaving oil and natural gas out of any future use of much of the oceans. This concern is compounded since the NOP calls for the use of CMSP without having a good idea of the potential location or extent of oil and natural gas reserves throughout much of the OCS.

Government estimates show the OCS may hold over 116 billion barrels of oil, which is enough to power 65 million cars for 60 years, and over 650 trillion cubic feet of natural gas, which could heat 60 million homes for 160 years. But these existing estimates of potential oil and gas reserves are exactly that: estimates. For most of the OCS, these estimates are based on decades-old data and are certain to be wrong. The reserves could be larger or they could be smaller. But we won't know unless exploration is allowed to take place in these areas. Proponents of CMSP often state their interest in a science-based, data-driven management of ocean resources, but they have effectively barred the oil and gas industry from collecting the data that would allow it to make its case for where to drill.

The surest way to start the exploration process and secure the necessary data to make informed decisions is to have a lease sale. Under OCSLA, lease sales are conducted by the Federal government using a sealed bidding process. In the Gulf of Mexico, where lease sales have been conducted for decades, bids range from hundreds of thousands of dollars to millions of dollars for each tract. Once a sale is announced, companies usually arrange to have the lease areas surveyed for potential oil and natural gas reserves through the use of seismic surveys, otherwise known as geological and geophysical (G&G) work. Based on these initial findings, companies then

submit bids on the tracts they judge to have the most potential. If they submit the highest bid and are awarded the lease.

But purchasing a lease does not guarantee that oil and gas reserves are present. The only sure way to see if the resources exist is to drill an exploratory well. If an exploratory well taps into sufficient reserves, then the company makes plans to actually produce the oil and/or natural gas. Each of these steps requires government oversight and permitting, as well as adherence to environmental and safety laws and regulations. In addition to the bonus bids, companies pay rent for the lease, and if production occurs, also pay royalties based upon the amount of oil and gas produced. Leases that companies do not develop are relinquished to the Federal government for possible resale.

Unfortunately, the entire process outlined above is virtually impossible to undertake in an informed or scientific manner, since there has not been any G&G work done in about 87 percent of the OCS for over 20 years. So, right now, we really have no idea if there are substantial oil and gas reserves in most of the OCS or not. Despite that lack of knowledge, regional councils under the NOP are capable of zoning off entire areas. They are not using data to make these decisions. Instead, they are guided by incomplete information and politics. This raises red flag number two.

CMSP may also lead to designations for single use of areas that are more suitable for multiple uses. For example, under the current OCSLA and Coastal Zone Management Act, any area is deemed at the outset to be open for potential oil and natural gas development, wind development and recreational and commercial fishing and diving. In many places, the end result of the process is the successful co-location of all these activities. For example, structures used in energy development and production often form vital habitat for coral and fish species. So the structures not only support energy development, but also support fisheries and fishing spots that did not even exist before. On the other hand, having CMSP pre-determine uses based on data limited solely to existing users' interests locks the oil and gas industry out of vast swaths of the OCS, and leads to multiple use areas that will not realize their full potential.

Industry and other user groups also have legitimate concerns over how and whether they will be invited to participate in the CMSP process. As currently designed, it is a management regime that focuses entirely on the agencies of the Federal and state governments as the decision makers. This is red flag number three. Where industries' concerns are solicited, there is often only one opportunity for all of industry to weigh in. Industries using the OCS are not monolithic in their interests, however. There must be real time moments in the planning process for these important voices to be heard and considered.

Finally, CMSP seems like another federal solution looking for a problem. Current law provides a robust coordination process between the Federal government, states and communities. While it may be true that competing uses in state waters make planning like this important, the OCS is vastly larger and less utilized. Trying to create a system of governance for an area that is not burdened with conflicts is unnecessary. In addition, the current public process allows ample input from the general public and industry officials.

With all these concerns, it should come as no surprise that many industry and user groups are not jumping on the CMSP bandwagon. It makes sense that the House of Representatives have repeatedly voted to halt funding for this apparently well-meaning but ill-conceived process. All of these potential pitfalls are what transform a positive-sounding process into an area of deep concern for economic users of the ocean. Until these concerns can be allayed, CMSP will remain an issue that threatens to have a negative impact on our Nation's energy and other ocean resources.

The Author

Randall Luthi is President of the National Ocean Industries Association (NOIA). An attorney and rancher from Freedom, WY, Luthi has in the past served in myriad roles, including Wyoming Speaker of the House, director of a Federal agency, legislative assistant in the U.S. Senate, to an attorney at both the Department of the Interior (DOI) and the National Oceanic and Atmospheric Administration (NOAA), where he worked on natural resource damages following the Exxon Valdez accident. Luthi most recently served as the Director of the Minerals Management Service (MMS) at DOI.

America's Offshore Energy Industry

See the federal Marine Planning Handbook by visiting:
www.whitehouse.gov/sites/default/files/final_marine_planning_handbook.pdf

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One-on-One with SMAST's Steven E. Lohrenz

MTR had the opportunity to visit with many colleagues at the recent Oceans2013 MTS/IEEE San Diego conference. Among them was Steve Lohrenz, Dean of the School for Marine Science and Technology at the University of Massachusetts Dartmouth. Steve was there to chair the session on Marine Education and Outreach and to promote the new Professional Science Master's in Coastal and Ocean Administration, Science and Technology. Steve explained the program in more detail to MTR.

Steve, please tell me a little about your background and what brought you to the University of Massachusetts Dartmouth School for Marine Science and Technology.

Before joining SMAST two years ago, I was Chair and Professor at the University of Southern Mississippi Department of Marine Science, which is located at the John C. Stennis Space Center, near Bay St. Louis. I received my Ph.D. in Biological Oceanography in 1985 from the Massachusetts Institute of Technology-Woods Hole Oceanographic Institution Joint Program. I joined the University of Southern Mississippi faculty in 1987 and became the chair of the Department of Marine Science in 2004. While my experience at Southern Miss was great, I saw the move to New Bedford as an exciting new opportunity to be part of a growing program with a stellar faculty and a great reputation. It is a fairly new graduate program (15 years old) with an excellent track record. It had a lot of really attractive qualities; specifically, the location cannot be beat. Located along Route 195, it is a hop and a skip to major cities such as Providence, New York and Boston as well as being situated in the heart of the largest cluster of world class research and education institutions and innovative marine technology manufacturers on the globe. This is a very exciting place to be and we have a lot to offer many research and private sector groups nearby and nationally.

Aerial view of SMAST. Adjacent lot is proposed site of marine science campus expansion.

Which sectors are you targeting specifically?

SMAST is well recognized for marine fisheries science and management. Proximity to the premier commercial fishing port in the U.S., New Bedford, mandates that UMASSD have strong connections with all facets of the fishing industry. SMAST graduates are working in organizations that address fisheries management, stock assessment and policy. We also have exceptional programs in coastal ecosystem processes, water quality, ocean observation and the use of novel technology for oceanographic observations. Similarly, the SMAST programs in ocean modeling and biogeochemistry are world class.

Isn't ocean biogeochemistry your research area? Please explain what the study of ocean biogeochemistry is, and what is the thrust of your research?

My field of research uses a combination of satellite technology and optical instrumentation to understand and map the biogeochemistry in the ocean on a wide range of spatial scales, literally from centimeters to kilometers. We are trying to understand how the oceans influence carbon dioxide levels in the atmosphere. A key to this is understanding the "biological pump," which is the biologically enhanced ocean uptake of carbon dioxide. We can use satellites and in water instrumentation to determine distributions of carbon and other biogeochemical materials such as chlorophyll associated with phytoplankton, and from that identify regions of high biological activity in different regions which can play an important role in ocean uptake of carbon.

How are you able pursue your

research while balancing the myriad administrative and management duties required by your job as dean?

The way I balance the duties of being a dean and a research scientist is by working at at everything 120%, and I have a top notch staff that is terrific. I am also fortunate to have two very bright post doctoral fellows working with me, one from India and the other from China. One is working on understanding changes in communities of phytoplankton (that is, the microscopic plants that dominate the oceans) and how they influence cycling of carbon. The other is exploring methods to interpret the spectral (or color) signatures of ocean waters to derive estimates of different biogeochemical constituents.

How many students are currently enrolled in SMAST programs?

We have about 65 Students and 17 full time faculty members. We also have many other faculty who are part time, adjunct from other universities and organizations, or with other departments or other campuses within the UMass system. SMAST has the largest marine science program in the Intercampus Marine Science (IMS) degree program. The SMAST as a whole, has a student, faculty and administrative population of up to 120 people. The majority of our students are in research intensive, thesis-based M.S. or Ph.D. programs.

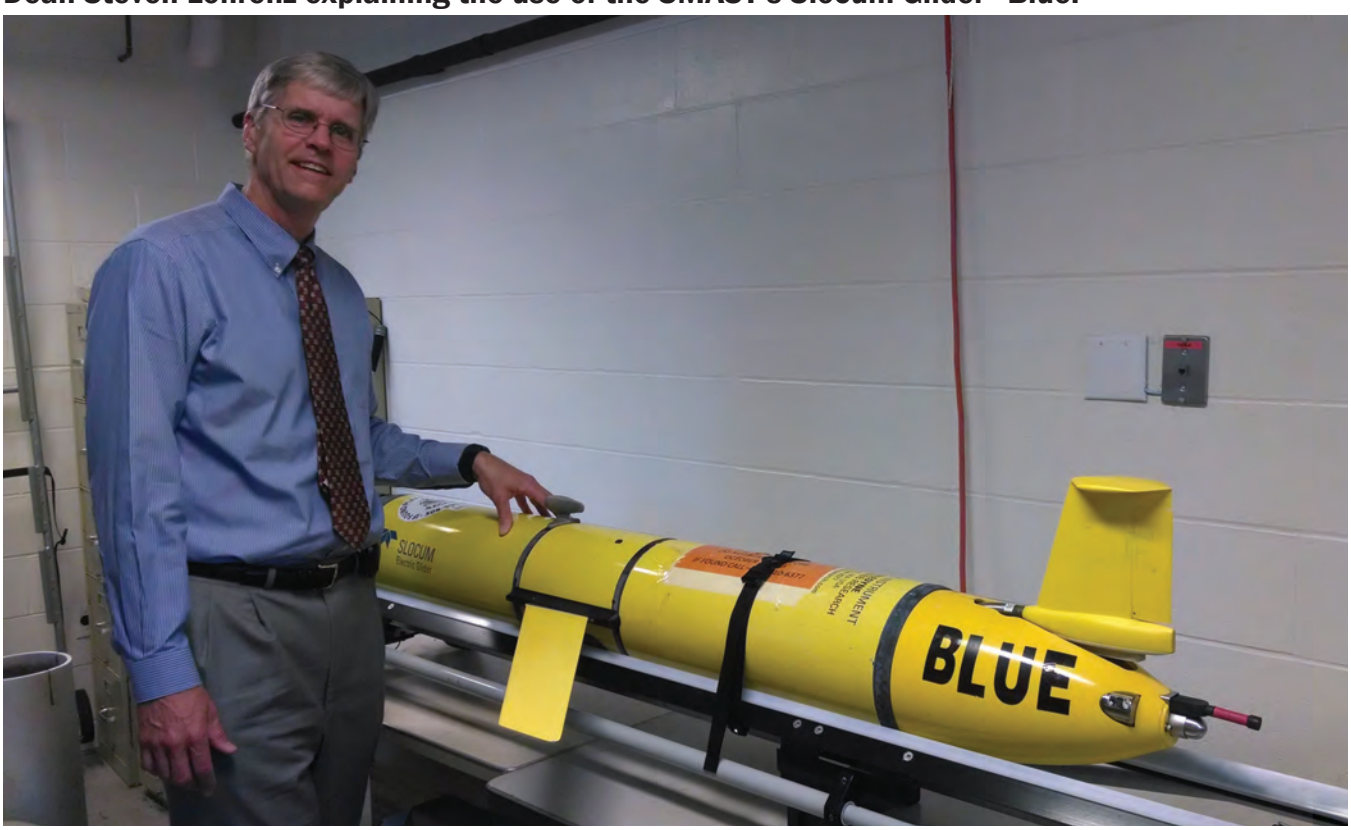
Can you talk about your new, non traditional program that is aimed at mid-career or other students seeking a non-thesis alternative?

In response to a growing demand in education to provide mid-career professionals and other students with different education goals with an opportunity to advance their skills, UMassD/SMAST created a Professional Science Master's in Coastal and Ocean Administration, Science and Technology. This two-year, non-thesis master's program blends the study of science and engineering with elective courses in management, policy, economics and law, and it provides a strong emphasis on writing and communication skills. The last semester of the program requires that the student obtain an internship in industry, government, non profit or academia.

What students are you targeting, and what sorts of jobs are available for these students?

We started the program two years ago and we have six students currently enrolled. Of course we'd like to double that number by next fall and double it every year afterward until we reach a cohort of about 36 students. These students came to us from industry, right out of college, as well as from other backgrounds. They enrolled because they saw the value

Dean Steven Lohrenz explaining the use of the SMAST's Slocum Glider "Blue."



of the coursework and its relevance to their current work or career path. Often these students are attending this program while continuing to work and they can do their internship in conjunction with their current job.
There are core courses that are required of each student and they can take a number of electives in other topics to customize their degree. No one PSM student takes all the same courses. There is a lot of flexibility in the courses one can take and one can also attend classes at the other UMass campuses. The current curriculum is a blend of face-to-face classes with a growing list of online course offerings.

How do the students go about locating a place to do an internship?

That is a great question. The idea is that a student can do their internship at work or we will help them locate a place to do an internship in a company or organization that is related to their particular course of study. This is a challenge and that is why we are reaching out to our industry partners, non profit colleagues and government agencies to see if we can pair our students with exciting and relevant internships that will give them some valuable experience and exposure to a new course for their career.

It sounds as if this is a great opportunity for industry to work with the University to provide input on the type of trained employees they need.

Yes, that is true. In addition to helping students get ahead in the workplace we also want to work closely with industry, government and non profits to understand their needs so we can offer courses that will equip existing and future employees to be effective.

Do you think there will be a need for a certain type of employee in the work place?

We have to recognize that the science and technology professional workforce is graying and there is a need for new faces. There is not an adequate pipeline with expertise for the future. There is growing pressure on ocean health, marine transportation, fisheries, coastal development and degradation, impacts of storm events, environmental disasters such as the BP oil spill, the effects of sea level rise, and so on. Providing a skilled workforce in these areas coupled with a vibrant private sector is really what we are working toward.

We understand that SMAST has an ambitious expansion plan that will likely come to fruition in the next 2-5 years.

Yes, you are correct; we have $45 million committed from a combination of a UMass Bond and from the State Department of Capital Asset Management. The plan is to expand the existing site at Clarks Cove in New Bedford onto the adjacent retired Navy Reserve Center site. We are nearing the end of a feasibility study to match space needs with what the funding will allow. We are excited about the prospect of bringing together our faculty and students who are currently split between our New Bedford site and rented space in Fairhaven. In addition, the new facility will represent a transformation of our current site into a comprehensive marine campus with greatly expanded facilities and infrastructure.

UMass | Dartmouth

University of Massachusetts Dartmouth
SMAST

COAST PSM

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School for Marine Science & Technology
Professional Science Master's Degree (PSM)
Coastal and Ocean Administration, Science and Technology (COAST)

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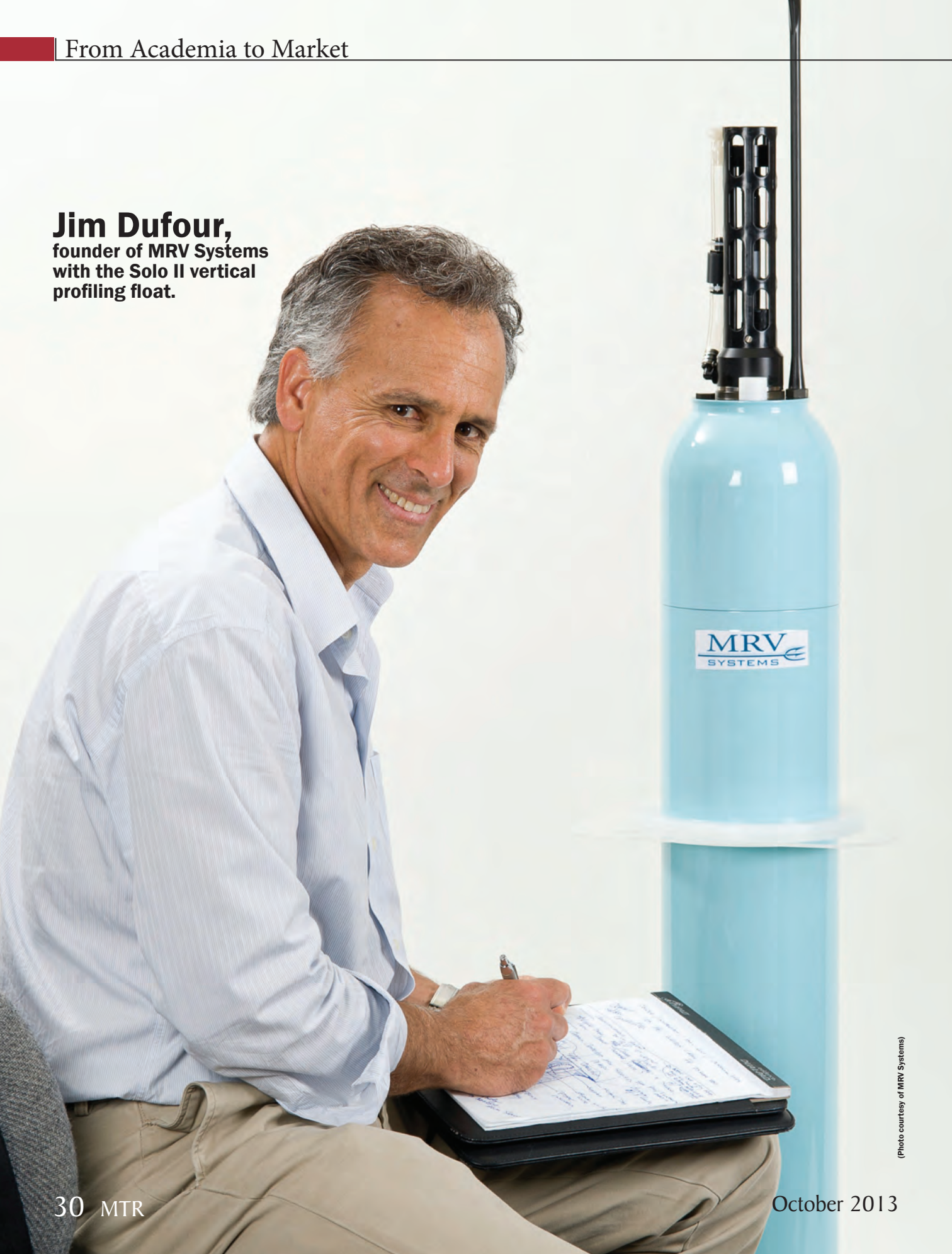
Contact: Louis Goodman, PhD, Associate Dean,
Email: lgoodman@umassd.edu
Tel: 508.999.8193



Jim Dufour,
founder of MRV Systems with the Solo II vertical profiling float.

(Photo courtesy of MRV Systems)

From Learning *to* Earning

Scripps works to bring new tech to the marketplace

By Kathleen Gleaves

Scripps Institution of Oceanography, a division of the University of California, San Diego, has been a leader in academic research for most of its 110-year history. Though for much of that time the research findings and academic knowledge were largely kept locked within the walls of the institution. Today that is beginning to change as Scripps endeavors to build collaborative relationships with private businesses to bring some of its latest discoveries to the commercial marketplace.

Spearheading that effort is Hans de Salas-Del Valle, the latest Business Development Analyst at Scripps. He and Dr. Jeffrey Gee, Deputy Director of Research are both committed to forming beneficial partnerships with either existing private companies who are interested in licensing some of the processes and equipment developed at Scripps, or by facilitating start-up businesses dedicated to commercializing their inventions.

Among the many research groups and projects ripe for future commercial markets is the Marine Natural Products Group. Scripps is isolating new compounds from marine organisms with the goal of developing new medicines for the pharmaceutical and cosmetics industry.

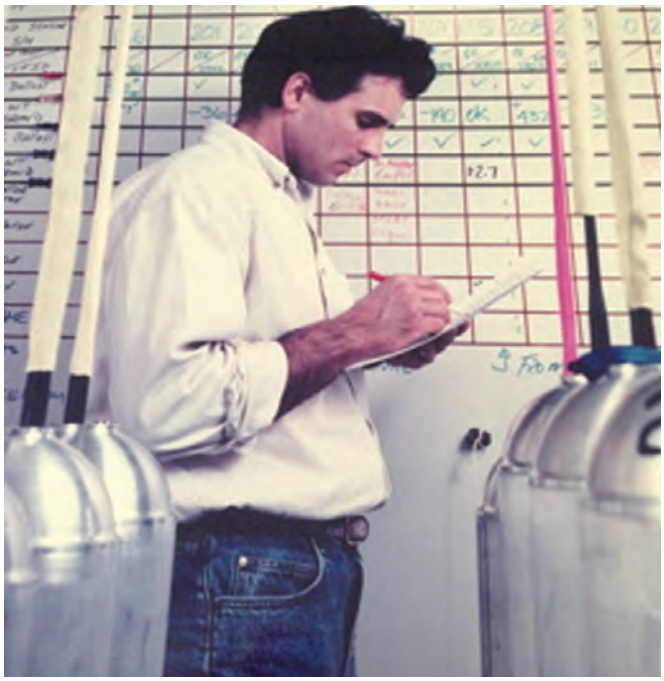
Another area of intense interest to the commercial market is Scripps' work on algae bio-fuels. According to de Salas-Del Valle, marine microalgae is an exciting area for research as scientists focus on enhancing the productivity of lipid-producing algae. These lipids have the potential for producing diesel or jet fuel. Increasing quantity and decreasing the costs are the focus of current research. Scripps has some of the leading scientists in the world working on this promising technology. Says de Salas-Del Valle, "It doesn't get much attention in the press, but it will eventually allow [bio-fuel] to be economically viable."

Making new fuel is not the only exciting prospect in algae research. "Algae can absorb CO2," says de Salas-Del Valle. "We are working with a Southern California gas company to design and deploy a system of algae-based filters that can absorb CO2 at the point of emission."

Keeping the research going and growing requires a lot of people-power. They currently have approximately 250 PhD students and 150 faculty and researchers working alongside a number of engineers and technicians who support the researchers by developing the tools they need.

While private universities have encouraged and sought out sponsored research, the majority of Scripps funding comes from federal sources; National Science Foundation, NOAA, and the Office of Naval Research primarily. Federal funding is an uncertainty these days. There are a few exceptions; the marine electromagnetics groups are funded by a consortium of oil and energy companies. This partnership allows the university to develop instrumentation and train students how to analyze the data collected. The industry then hires the students when they are ready to move into the workforce.

This is a fairly traditional model, but in a few instances, the



Defour (above, circa 1980) started MRV Systems and licensed the float technology that had been the focus of his work since the 1980s.

(Photo courtesy of MRV Systems)

technology developed is so novel and potentially valuable that a new company can be created around it. Three success stories of businesses created around Scripps technology include MRV Systems, EarthRisk Technologies and Quad Geometrics.

MRV Systems

MRV Systems makes vertical profiling floats for oceanographic research. Company CEO, Jim Defour, was a 30-year member of Scripps' Instrument Development Group (IDG). Defour's team, led by Dr. Russ Davis, collaborated with Woods Hole Oceanographic Institution to develop the floats now used in the international Argo network. (*Argo is a global array of roughly 3,600 free-drifting, vertical profiling floats that measure temperature, salinity, and the velocity of currents in the upper 2000 meters of the ocean. Data collected is relayed via satellite and made available to the public.*) When Defour retired, he started MRV Systems and licensed the float technology that had been the focus of his work since the 1980s and immediately set about improving the product. MRV's first order totaled $1.8m and gave the fledgling company just nine months to perfect the float for commercial use.

"It was a stressful time," says Defour. Improvements to the float amounted to about a 50% overhaul and there was no room for error. "There's no second chance. You can't go and pick them up if they don't work." Scientists can be skittish about trying a new product; the Argo order was vote of trust, and they had to get it right the first time.

Improvements included reducing the bulky float weight of 27kg down to a slimmer 19kg. The floats deployed today are about 52 in. tall including the antenna, and about 6.5 in. in diameter. Cost is always an issue and MRV has been able to reduce the cost of each profile to about $130, although their ultimate goal is to bring it below $100. MRV's power systems last for about eight years, but the sensors are only capable of producing about 300 profiles. MRV is working on improving the longevity of the sensors to increase the useful lifespan of the float and further improve the ROI numbers.

MRV System's Solo II float follows a programmed schedule for profiling. Once launched, the float sinks to 1,000m where it hibernates for nine days. On the 10th day it wakes up, drops to 2,000m and begins a 5.5-hour return trip to the surface at a rate of 10cm/second. Along its upward trajectory, it takes measurements of temperature, salinity and depth. When it arrives at the surface, it transmits its data via satellite then returns to the relative safety of its 1000m resting place and goes back to sleep. This pattern is repeated regularly until the float runs out of power or the sensors fail. Information sharing is not always a one-way street. During its brief moments at the surface, scientists can reprogram the float's computer and change its pattern if needed.

Sinking and rising is accomplished by transferring a bio-oil substance between a chamber inside the float and a rub-

ber bladder outside the float. This energy efficient change of density allows the float to sink and return to the surface much like a buoyancy compensator works for a SCUBA diver.

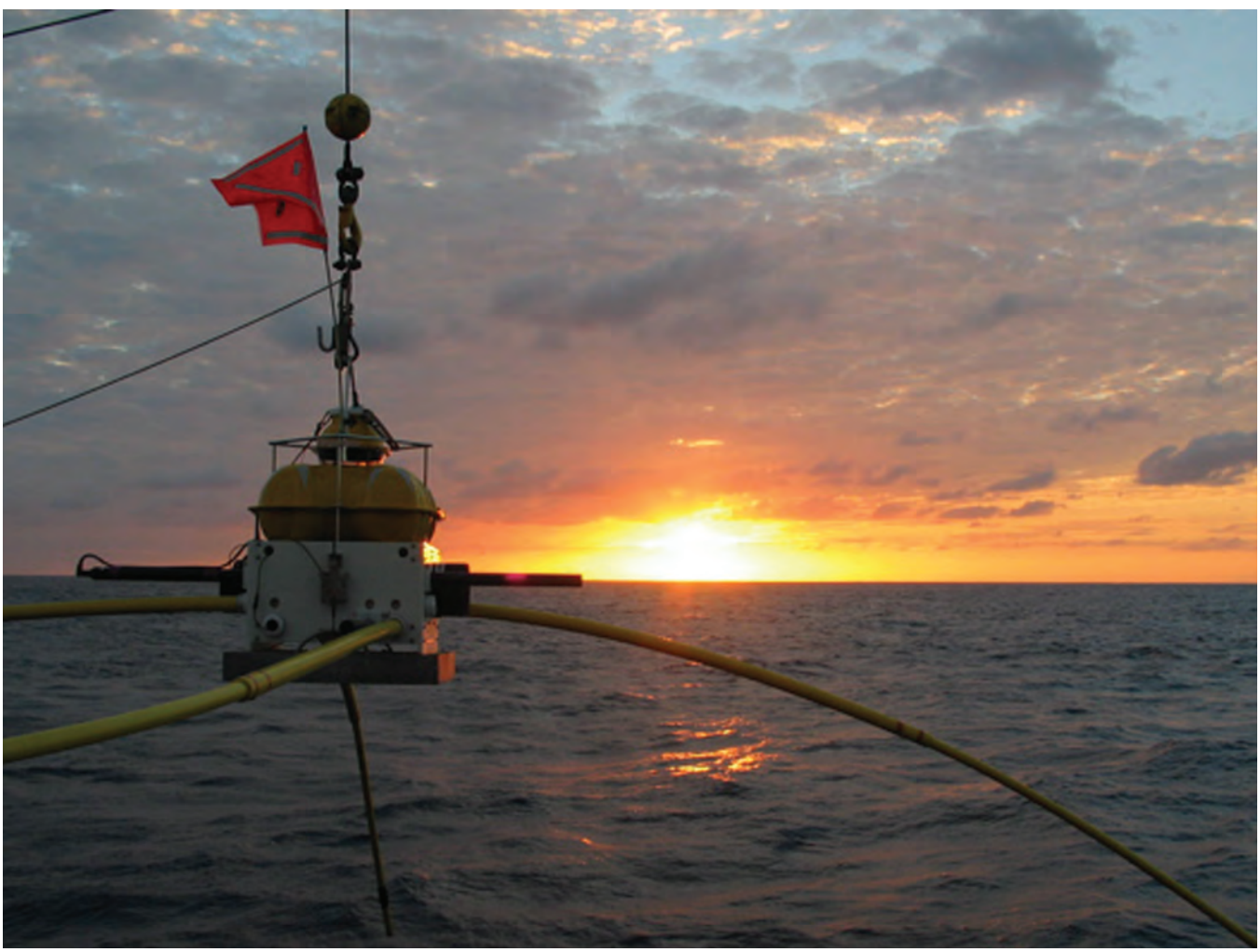
Progress in ocean profiling has moved quickly. The Argo project started in 1999 and by 2007 had well over 3,000 floats deployed each yielding new profile data every 10 days. To date, the float network has produced more than 2 million profiles. This glut of information is managed by JCommOps, a global oceanographic data management service and made available to scientists around the world through an open source interface.

MRV is working on a smaller device for air-deployment to monitor what is happening below the ocean surface before, during and after a hurricane. Working with the 53rd Weather Reconnaissance Squadron, AKA "The Hurricane Hunters," MRV System floats will be dropped from planes ahead of the hurricane season. The tiny probes will hide out safely below the surface sending back their valuable data in rapid succession – no sleeping on the job for this robot crew. Their data is expected to increase hurricane knowledge exponentially, helping scientists understand how the ocean influences the swirling air mass above, and how the air affects the ocean.

When asked how commercial entities can partner with Scripps to utilize the brain trust at the university, Dufour chooses his words carefully. "Universities are all about discovery and asking questions, but the commercial world, my world, is all about solutions and finding answers. Making the connection between the science and the public is a huge challenge and a necessity in this world." Dufour believes that a fast-track way must be found to integrate the good science coming out of our higher learning institutions with the solutions-based mindset of commercial business. One of the best ways to build the connection between the universities and commercial organizations, in his opinion, is for commercial business to develop the data gathering products then turn the data over to the Scripps scientists for analysis. "Nobody is better at analyzing it in a creative way."

"Traditional means of funding are drying up for the universities. They need to start building partnerships with commercial entities." The MRV, Scripps and Woods Hole relationship is a great example of a success story. "If it wasn't for Scripps, I wouldn't be doing what I'm doing," said Dufour.

Data receiver at sea.



(Courtesy Earth Risk Technologies)

(Photo credit Scripps Oceanographic Institute)

Instruments used by Quad Geometrics.

(Photo credit Scripps Oceanographic Institute)

Scripps is a scenic launch point for technology.

EarthRisk Technologies

Atmospheric research is a specialty of Scripps. Several years ago, researchers patented analytical algorithms capable of making long-term weather predictions. The process has subsequently been licensed and is seeing a successful commercialization at a company called EarthRisk Technologies.

EarthRisk is all about weather forecasting, but not the kind of weather seen on the nightly news. Their predictions are the probabilistic distribution of weather risk for a 30-40 day period. The probability that it will be extremely cold or extremely hot within the next five weeks is critical to many who have a financial exposure to the price of natural gas. Prices rise and fall with the temperature and clients use EarthRisk's data and analytics to get a sense of likely gas prices over the five- week period that lies ahead.

EarthRisk, leveraging the existing data from public sources such as NOAA and others, then applies their proprietary analysis known as TempRisk to massive amounts of data cross-referenced to years of research findings and produces a scientifically validated long-range forecast. The TempRisk program processes more than 250 million calculations, using over 380 known weather patterns, and cross-references that to over 20,000 days of actual observed weather conditions across multiple global regions. After all of the calculations, the program produces a forecast that takes into account historical weather patterns, long-range seasonal temperature variations and current observations to produce what they call a scientifically validated probability.

The first stage of the algorithm development process occurred at Scripps, the analysis technique was then licensed to EarthRisk. The company built on it adding new data and new levels of analysis. It has taken five years for the technique to reach its current level of refinement.

Steve Bennett, President of EarthRisk, worked at Scripps for three years as the first Business Development Analyst. He helped develop the original analysis product. While there, he helped put the team together that started MRV and also built the EarthRisk team. Today EarthRisk's 20 plus clients subscribe to varying levels of information - from a simple report once or twice a week, to 24/7 access to all data, models, and data sources. Clients include the insurance and financial industries, plus agriculture and energy futures traders.

Bennett explains, "Other weather forecasts don't do what we do. None produce a credible lead longer than 15 days. We have scientifically validated [forecasts] for up to five weeks." As for the possibility of going beyond five weeks, Bennett says his clients would be interested, but it's not feasible with the existing methodology. "Chaos effect takes control," beyond that.

Quad Geometrics

With a profound understanding of the oceans and the atmosphere, Scripps has a lot to offer companies looking for ways to find and understand oil and gas deposits deep within the earth. With that same interest in mind, Quad Geometrics, LLC, another recent Scripps startup, was cofounded by Mark Zumberge, Ph.D., Research Geophysicist and head of the Gravity Lab at the Institute for Geophysics and Planetary Physics, to provide products and services that precisely measure key earth parameters such gravity, sound, pressure and vibration. Quad Geometrics takes technology developed through decades of research in the North Sea and other areas

"Universities are all about discovery and asking questions, but the commercial world, my world, is all about solutions and finding answers. Making the connection between the science and the public is a huge challenge and a necessity in this world."

Jim Dufour, Founder of MRV Systems

of intense oil and gas exploration, and brings it to the commercial marketplace. The instruments, licensed to Quad Geometrics by the University of California, San Diego, show changes in density under the seafloor so drilling companies can see what's happening underground as the oil and gas are pumped out. Changes in gravity measurements help extraction companies understand and maintain the balance between remaining oil and gas, empty space and the water used to backfill the voids created by the pumping activity.

Information on how much product remains in a reservoir is potentially worth hundreds of millions of dollars to these companies. Quad Geometrics' instruments can give a clear picture of the underground/underwater topography showing how much or how little viable product is sitting below the sea. As companies attempt to squeeze out the maximum from each well, such technologies can measure the reservoir to see if it's cost effective to continue pumping or time to stop.

Prof. Steven Constable directs the Marine Electromagnetism (EM) Laboratory at Scripps and established the Seafloor Electromagnetic Methods Consortium (http://marineemlab.ucsd.edu/semc.html), which has attracted the support of leading oil and gas companies and specialized geophysical services providers that benefit from the laboratory's world-class expertise and access to cutting-edge instruments developed over decades by the EM Lab.

Future Partnerships

Continuing the support for aspiring entrepreneurs hoping to start new companies using Scripps technology lies with Hans de Salas-Del Valle. He describes his role as one of support for innovation internally and for the industries that would benefit from Scripps technology.

"I want to make it as easy as possible [for them] to work with us." With three successful spin-off companies to its credit, de Salas-Del Valle claims it is "…a testament to the robust and valuable technologies at Scripps." He plans to replicate those success stories.

"At the end of day, our mandate is to bring our technologies into the market for the public benefit. Whether a medical treatment from the sea, or a tool to make it safer and more efficient to bring resources out of the marine environment," de Salas-Del Valle will work to continue the shift in culture toward partnerships between Scripps and industry entrepreneurs.

Scripps buoy.

(Photo credit Scripps Oceanographic Institute)

U.S. Navy MK 18 Mod 2 (Hydroid REMUS 600)
Vehicle Recovery During Mine Countermeasure Mission.

AUV Deployment by the
U.S. Navy 5th Fleet

By Tom Reynolds

The U.S. Navy has made significant changes to its mine countermeasures (MCM) operations over the past decade as its Avenger-class MCM ships and Sea Stallion helicopters approach the end of their service life. One of the most significant developments has been the introduction of autonomous underwater vehicles (AUVs) into regular deployment by the Navy. The MK 18 Mod 2, a specialized version of the REMUS 600 AUV built by Hydroid, Inc. in Pocasset, Mass., is currently used for MCM operations by the U.S. Navy 5th Fleet in their area of responsibility, the Arabian Gulf. Using this technology to its full effect has had significant benefits.

The deployment of AUVs for mine countermeasures has allowed the U.S. Navy 5th Fleet to more safely and effectively ensure the security of our seal lanes of communication. The MK 18 Mod 2, like all REMUS 600s, has a maximum mission duration capability of 20 hours and top speed of five knots, allowing a single vehicle to survey significant portions of narrow and shallow straits in a single deployment. After the MK 18 Mod 2 has surfaced, its depleted battery can be quickly recharged and the vehicle redeployed.

The ability of the MK 18 Mod 2 to operate without being tethered to a ship makes it difficult for enemy forces to detect. In current 5th Fleet MCM operations, the AUV is launched from an 11 meter rigid-hulled inflatable boat (RHIB) deployed from an amphibious transport dock, such as the former USS Ponce. Deploying the vehicle from a small RHIB makes its launch more difficult to detect and its area of operation harder to determine.

The MK 18 Mod 2 can remain submerged for its entire mission duration, making it nearly impossible for the enemy to counter without advanced technology. This is especially important for combating non-state actors – similar to IEDs, naval mines are inexpensive and easy to deploy, making them an attractive option for terrorist groups.

For shallow water mine countermeasures and hydrographic reconnaissance, the MK 18 Mod 2 uses two primary instruments: side scan sonar and a downward looking camera. On its first deployment to a new area, the vehicle collects high-resolution bathymetric data and images that allow it to establish a baseline map of the seafloor. During subsequent deployments, the AUV looks for any changes in the terrain of the seafloor which may represent a mine. Once a mine has been positively identified and its location fixed, a Remotely Operated Vehicle or diver can be sent in to destroy it. Data collected by vehicle can then be integrated with other intelligence to identify to help determine the mine's origin.

In addition to the MK 18 Mod 2, the U.S. Navy also uses another modified Hydroid vehicle for MCM operations. The MK 18 Mod 1, an AUV based on the Hydroid REMUS 100 vehicle, is a smaller, man-portable vehicle designed for rapid deployment to very shallow water (VSW) regions. Ideal for fast moving expeditionary forces, the Swordfish can be launched from nearly anywhere and can be flown by helicopter directly to the point of need. Though it lacks the deeper water capabilities of larger AUVs, the MK 18 Mod 1 is very effective at quickly clearing harbors and ports where mines are suspected.

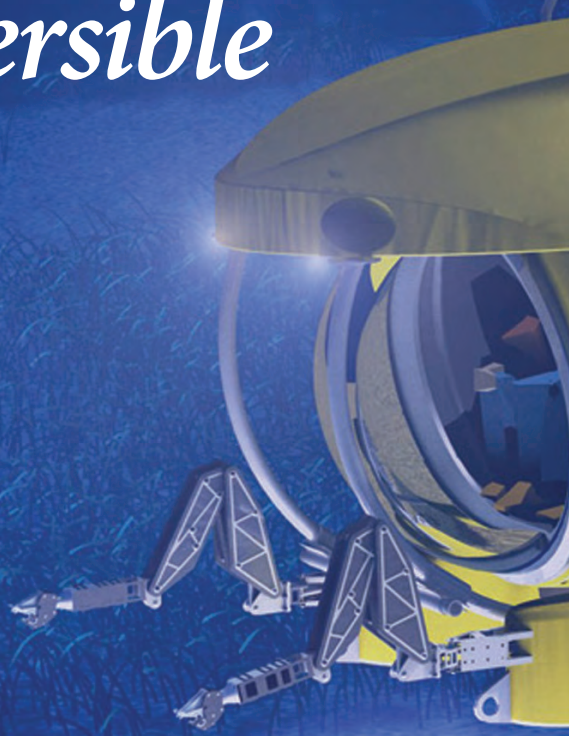
Currently operated by civilian contractors, the Hydroid AUVs in use by the U.S. Navy 5th Fleet are expected to come under full Navy control in 2015. As the newer littoral combat ship (LCS) enters broad deployment over the coming decade, the MK 18 Mod 2 can continue to serve a role in MCM operations. The LCS will have the capability to deploy several types of AUVs depending on the needs of the mission – the mid-depth MK 18 Mod 2 and the ultra-portable MK 18 Mod 1 can complement the capabilities of other AUVs on-board the LCS, allowing the ship to conduct effective mine countermeasures in any marine environment.

The Author

CDR Tom Reynolds USN (ret.) is a retired Explosive Ordnance Disposal Officer and U.S. Navy Deep Sea Diver who joined Hydroid, Inc. in Fall 2012 as Business Development Manager - Defense. Email: sales@hydroid.com

ICTINEU 3

Development of a Research Submersible



By Carme Parareda
Cofounder and COO,
ICTINEU Submarins SL

This article provides a short overview to the development of the manned submersible ICTINEU 3, a work class vehicle with high capabilities for research, ocean observation and underwater intervention, but also suitable for filming and leisure. It has been designed for 1,200m depth and a crew of three: one pilot and two observers (passengers, and will be certified and classified by Germanischer Lloyd).

The challenge has been to achieve a very small and lightweight but at the same time versatile and highly operational vehicle, with the aim to improve the capabilities of existing submersibles in this depth rate. The result is a new generation of manned submersible, a compact vehicle of only 5,300 kg, that is designed to be easy to operate from most research vessels and incorporates outstanding innovations such as a lithium-ion-polymer battery system that will provide the vehicle with a high power capacity.

Ictineu Submarins SL was founded in 2007 to develop and built the ICTINEU 3 manned submersible. The vehicle was named ICTINEU 3 as a tribute to Narcís Monturiol that built the first modern submersible in history, the first Ictineu or Ictíneo in 1859, and the second in 1864.

The aim was to build a new generation of manned submersibles that would improve the observation and operation capabilities, as well as be versatile, easy to operate and maintain. As part of the team that has worked in the development and engineering had no background in underwater vehicles, a completely new approach has been brought to the table in terms of design, construction materials, systems integration and in particular its energy system and automation. In this sense new solutions have been provided that appear to be practical and efficient.

Development and Innovations

In order to achieve a small, lightweight and versatile vehicle with a big field of view and three passengers, many challenges had to be solved during the design phase of the Ictineu 3, and a lot of technology review was needed. In particular, there are several issues where most effort has been put on:

- **Weight reduction.** A big effort on design and research on new materials was needed in order to drastically reduce weight in several systems. Extensive calculation was done by FEM as well as design optimization and research in new materials, mainly in the pressure hull. Innovation in stainless-steel materials and design have lead to an unparalleled volume to weight ratio of the pressure hull, that weights only 2,714kg (including the two acrylic domes, 540kg) for 3,089 cu. m. of internal volume. Composites (CFRP) have been largely used as structural and constructive material, both outside of the pressure hull (exostructure, tanks, pressure-tolerant containers) and inside. The exostructure and the fairings have been built completely in composite, as a sole body, yet withstand-

ing the requirements of the certification authority. Many years of experience have allowed us to work with different materials and properties, achieving lightweight, high-resistance, fire-proof and electrically isolated parts/elements, suitable both for inside the pressure hull and exterior of the vehicle (in water). Finally, the development of a pressure-tolerant li-ion-polymer battery system has been definitive in the final weight reduction. As a result, the vehicle does not need the addition of syntactic foam.

- **Maintenance reduction.** Last generation stainless steel has been used for pressure hull so the need for painting and corrosion maintenance has been cancelled. Aluminium materials have been reduced to a minimum, and are never in contact with steel or carbon fiber parts. The use of composite in shells, the conception of exostructure and farings in one sole body, and a practical anchoring and fixing system, allows for a very fast assembly and disassembly of all the systems with very few personnel needed.
- **Improvement of performance in navigation.** The aim was to built an easy to pilot, safety improved vehicle, with fine control on navigation systems. Apart from diving tanks with 600l capacity, also interior buoyancy tanks have been provided with a capacity of 220 liters. They will allow a fine control of the ascent-descent as well as trimming of the vehicle. If we add eight powerful thrusters, 2.5kW each, to the system, we have a vectorial propulsion system on full six degrees of freedom. Custom-made, pressure-tolerant motor controllers have been designed. They allow for a proportional control on the thrusters and for a pilot-configurable navigation board. The whole must be an efficient and easy to pilot system.
- **Improvement of performance in operation.** A high power and high energy system has been developed based on lithium-ion-polymer technology. The result is a compact, lightweight and safe battery system that will provide endless capacity to work at a normal load for longer missions (up to 10 hours) and enough power to respond to an emergency with high power requirements. An optimal selection and configuration of thrusters, the proportional motor drives and the architecture of the whole electric system will add efficiency to the vehicle. Power and communications system has been dimensioned so they can adapt to any task and mission requirements, with capability to upload any instrument from the client in an easy and quick way.
- **Improvement in safety.** Three different active safety systems (manually actuated) have been implemented in the vehicle: diving tanks with 258 liters capacity at 1,200m depth, drop-weigh system (200-500kg), emergency buoy with 1,800m high-resistance rope. As passive safety, design has been used also to improve hydrodynamics and to avoid as much as possible entanglement areas. If we add an electrical system distributed architecture and powerful and efficient energy system, the vehicle gains in autonomy, performance and finally: safety.

The Vehicle

The pressure hull is 1.7m in diameter and it has two acrylic domes, one on top (entry hatch) and one in front: 1.5m external diameter, 150º. The front dome is in a very advanced position with respect to the skids/supports, and it has an inclination of 10 degrees forward in respect of the vertical, so the vision on the sea floor is greatly improved. This allows the three passengers a large field of view and excellent capabilities for ocean observation, as well as the possibility to take high quality photography and video recording from inside the pressure hull. An important effort has been done in design for optimization of space and ergonomics have also been taken in account in order to make submersibles a comfortable place to travel and work.

The weigh of the vehicle will be about 5,300kg, so it can be operated from most research vessels, but it can be also towed from harbour if working area is near the coast. Due to shape and diving tanks capacity, passengers can go in/out from water surface in good sea state. As it has a very reduced size it can fit in a 20-ft. container, so it's easy to transport to the work place by road, ship or air worldwide.

The power system is based on last generation lithium-ion-polymer batteries, which give the vehicle a high power capacity: 42 kWh.

This means it can work 10 hours full autonomy at normal load capacity and will be able to travel up to 20 nautical miles underwater. Battery system is robust and safe and it can be controlled either automatically or manually, as it can be also double checked and monitored for safety.

The Ictineu 3 will have scientific instrumentation on board, and the data obtained will be published so that they can be used by the scientific and oceanographic community.

Summary

Sea trials and classification are expected during fall 2013, though the pressure hull pressure test was successfully completed in summer 2011.

Once the vehicle is finished, the company itself will operate the submersible and offer diving services. Operation of ICTINEU 3 submersible can be adapted to any need of the client, either for long campaigns on a mother ship or on a daily basis with the need of only a small surface support vessel. A daily mission of 8-10 hours can be run, and a regular time lapse of five hours will be needed to recharge the batteries, though they can support a fast charge. The company also offers engineering services and the possibility to build new submersibles according to client needs. The design and construction of the Ictineu 3 is the result of nearly 10 years of work. Through this period, the project has counted with the selfless collaboration of many people motivated by the sea, science and technology. Up to 2.000 individuals and organizations have collaborated in a crowd-funding campaign, and a sponsoring opportunity is still open for companies.

ARGUS

Enviable Technology, Unlimited Potential

System is designed to universally interface with a vessel's existing navigation equipment and autonomously deliver water depths seen by the vessel to a central server. Almost four years and 100 million soundings later, the concept is a reality.

By Joseph Keefe

Almost two years after we first reported on an innovative, depth sounding recorder device that made wide swaths of data available to perhaps anyone who wants it, the concept envisioned by ARGUS has developed into a viable tool that could change the way government agencies schedule surveys and dredging. Beyond that, the resource represents a valuable asset for commercial and pleasure mariners alike who, if they so choose, can "take advantage of the depth sounder on the boat in front of them."

How it Works

Today, about 40 boats have voluntarily placed on board their vessels the ARGUS (Autonomous Remote Global Underwater Surveillance) system transmitters. ARGUS is designed to universally interface with a vessel's existing navigation equipment and autonomously deliver water depths seen by the vessel to a central server. In April, SURVICE and the ARGUS inventors, John and William Hersey, received from the U.S. Patent and Trademark Office a patent for the ARGUS system. SURVICE, the parent company of the ARGUS effort, provides service to the Department of Defense, among others, performing survivability testing, simulation and modeling. According to John Hersey, the ARGUS service is a natural outgrowth of that business.

ARGUS, in operation and field testing since 2010, automates the acquisition and processing of depth, environmental and meteorological data from coastal and inland waterways and provide the data to Government, commercial, academic and other interested organizations.

The autonomous onboard system (without the need for any crew intervention) continuously processes and transmits GPS position and single-beam sonar data from a growing network of commercial and recreational mobile marine platforms to supplement nautical charts, many of which have become outdated and inaccurate.

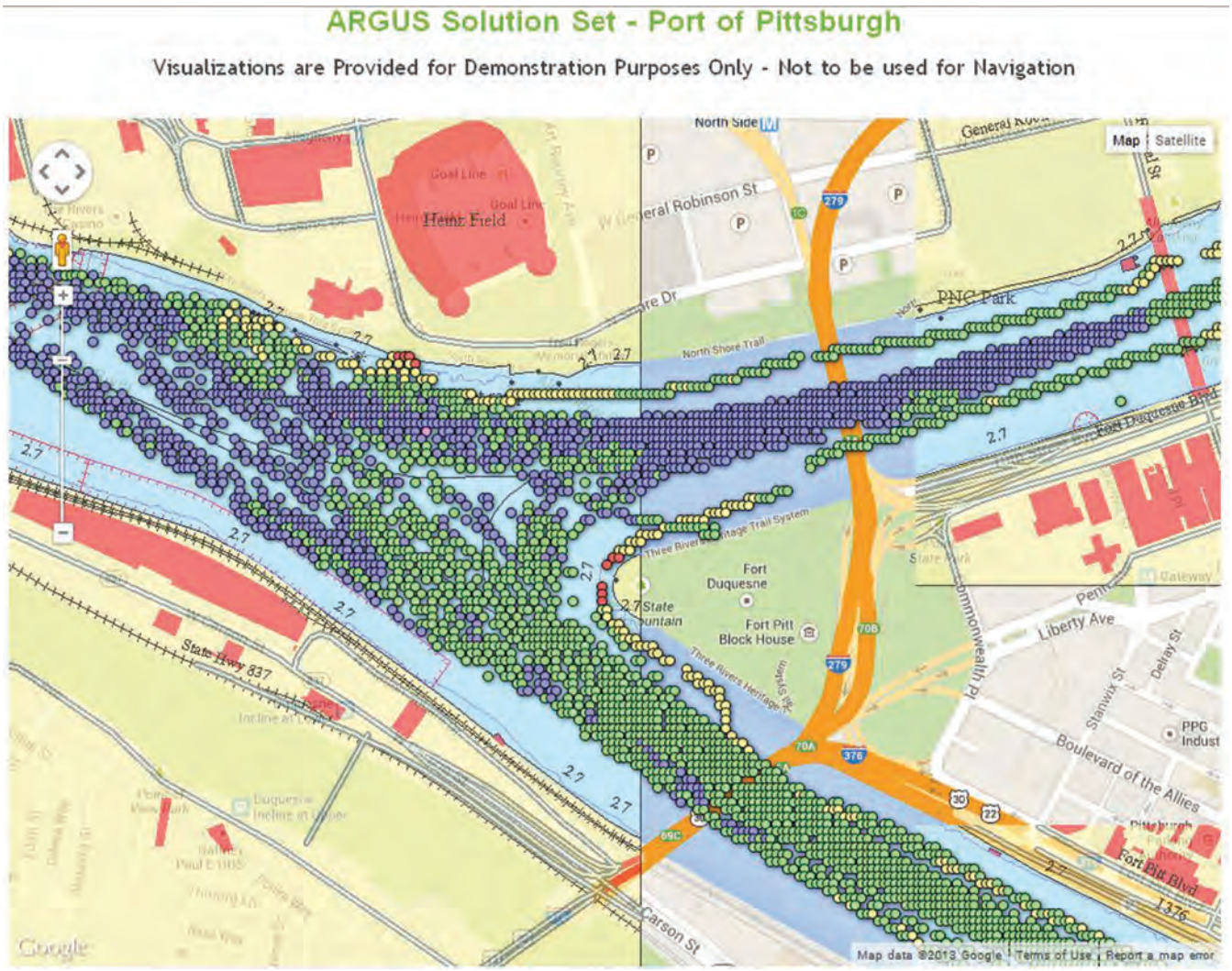
SURVICE characterizes the patented system as "crowd-sourced" bathymetry (CSB), perhaps akin to the efforts being put forward by disaster first responders who hope to better harness the power of social media outlets. This innovative approach to data collection, however, leverages existing infrastructure and a potentially unlimited workforce. The cost-sharing of data products results in low-cost bathymetry and other data and utilities that are valuable to many different interests. Since 2010, ARGUS has acquired more than 100 million soundings from a distributed fleet of vessels navigating U.S. and international waters.

Signals can be transmitted via WiFi or SATCOM and can be viewed in "real time," if desired. Each dot on a typical ARGUS solution depiction represents at least 140 soundings. Those soundings, initially reported without input for the state of the tide or other variables, are corrected automatically after transmission and before posting.

Unlimited Potential

Backend processing of the data from all participating vessels is used to provide the latest condition reports back to the vessels to optimize route planning and navigation safety, and in the case of the inland waterways, could be used to optimize barge loading based on the current depth conditions. The system can contribute to the Corps' mission at a minimum as a reconnaissance tool, highlighting for them areas that require expenditure of their resources vs. those that do not. ARGUS is a self-enabling technology for the inland waterways industry, providing condition reports at a fraction of the cost and at a speed many times faster than what it takes the Corps to provide updates to the waterway charts.

In early June of 2013, a demonstration was conducted in coordination with the Port of Pittsburgh Commission's (PPC)



Wireless Waterways program. As reported in the October 2012 edition of MarineNews, the $1.3 million wireless project was funded by a $975,000 federal port security grant and $325,000 from the nonprofit port commission, an organization that supports the region's river transportation system. The event provided an opportunity for companies with technologies that could fit into the Wireless Waterways framework, and also contribute to needs of the Port to demonstrate those technologies. SURVICE participated with its patented ARGUS platform, deployed on the RiverQuest Explorer, on Campbell Transportation and Consol Energy vessels and on the Platypus unmanned surface vessel. ARGUS solutions were displayed on the Maritime Situational Awareness Portal (MSAP) and refreshed every two minutes based on incoming data, providing real-time display of bathymetry updates through the wireless Portal. The solution sets, received from active vessels, truly represented a first in the application of crowd source bathymetry and went right to the heart of its purpose, providing users with current information.

Participants & Partners

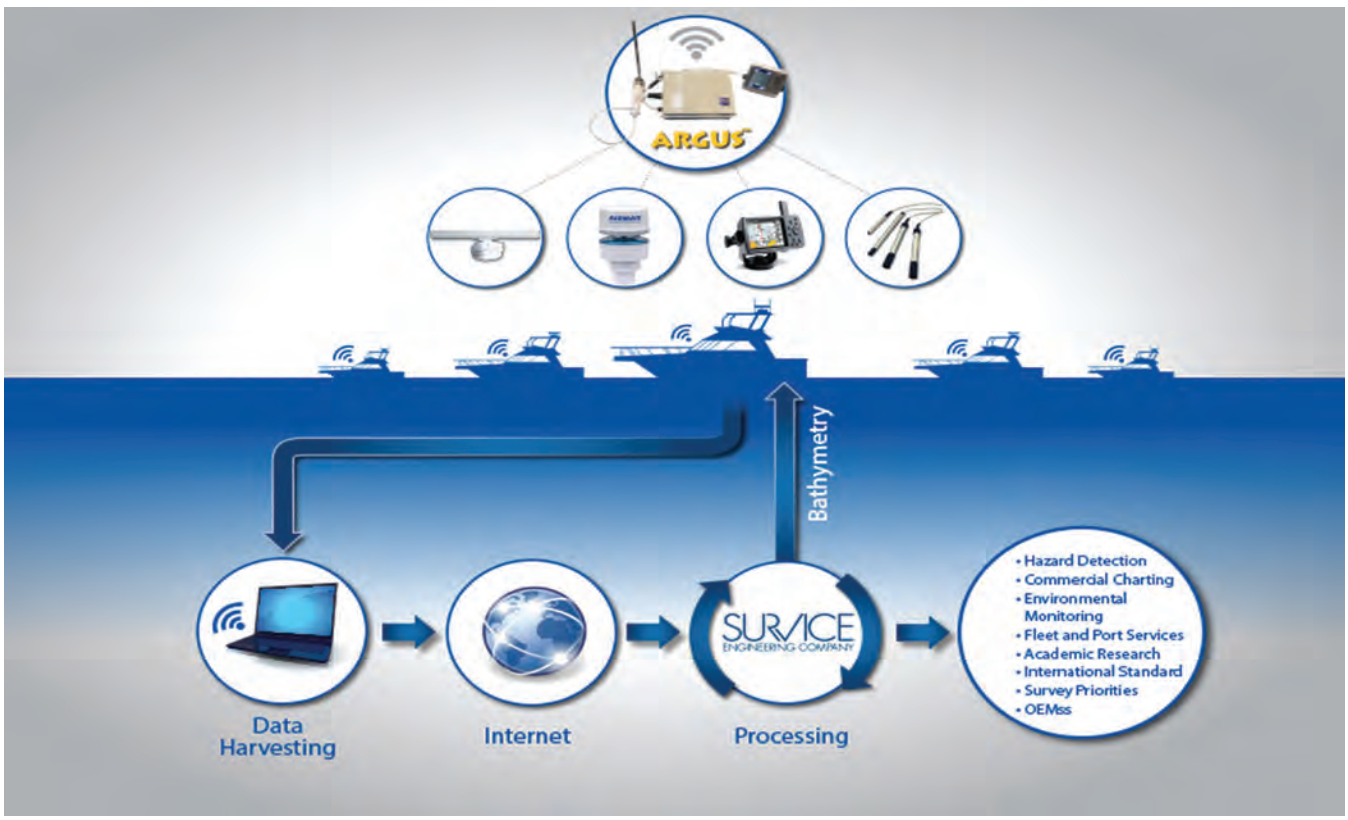
Over time, many commercial, private and pleasure operators have participated in the ARGUS effort. Commercial firms such as McAllister towing, at least one cruise line operator (who did not want to be identified), Rivercrest (classroom), Campbell Transportation, Consol Energy, and the Platypus unmanned surface vessel have all at one time or another had ARGUS equipment deployed on board. Beyond this, ARGUS has collaborated on one level or another with the port of Pittsburgh, NOAA, the University of New Hampshire and many others.

Downstream Applications

It is hoped that ARGUS eventually will be a primary tool in helping to prioritize dredging areas, surveys and could also substitute for a dredging schedule that may not reflect real needs. In a world where cruise lines increasingly go to places not considered mainstream ports that lack reliable soundings, the participation of local boaters in the ARGUS scheme could

provide real commercial value in that regard. Yachts and others cruising on intercoastal waterways could benefit immediately by using improved, community generated chart products at a fraction of the cost of current methods, and in places that haven't been surveyed in decades. And the Wave WiFi, integrated into the ARGUS onboard units for data offload, provides multipurpose Internet connectivity.

Most recently, ARGUS participated in a NOAA-led discussion at the University of New Hampshire Center for Coastal and Ocean Mapping (UNH-CCOM) on crowd-sourcing of hydrographic data. Eventually, says Hersey, ARGUS hopes to address the 100-year Federal surveying backlog. And, Hersey



ICW Study Area — % of Soundings

Start Location	Mile Marker	End Location	Mile Marker	Distance (mi.)	Total No. Soundings	Depths < 12'	Depths < 6'
Atlantic ICW (Norfolk, Va.)	0	Fort Pierce, Fla.	965	965	277,078	9.1	0.1
VA/NC Border	35	Winn Bay	105	70	12,207	31.7	0.0
Bogue Sound	215	Carolina Beach	295	80	15,197	5.9	0.0
North Myrtle Beach	345	International Drive	360	15	7,390	13.3	0.0
Georgetown	400	Charleston	460	60	23,520	29.9	0.2
Edisto Island	500	Beaufort	535	35	11,517	14.7	0.2
Hilton Head Island	560	Savannah	585	25	12,163	6.1	0.0
Saint Catherine's Sound	625	Jekyll Sound	685	60	23,755	9.6	0.1
Fernandina Beach	720	Jacksonville Beach	745	25	10,748	10.6	0.4
Flagler Beach	810	Fort Pierce	965	155	34,528	14.9	0.3
Gulf ICW (Sand Ridge)	185	New Orleans	0	185	16,489	6.7	0.1
Sand Ridge	185	Gum Island	155	30	1,996	29.0	0.1
Cypremort	135	Mud Lake	120	15	587	19.6	0.0
Larose	35	New Orleans	0	35	3967	5.2	0.0

Source: ARGUS. This data not to be used for navigational purposes.

is looking at an ongoing research effort with Towson University to develop analysis tools specific to the temporal and spatial characteristics of the continuous stream of ARGUS data.

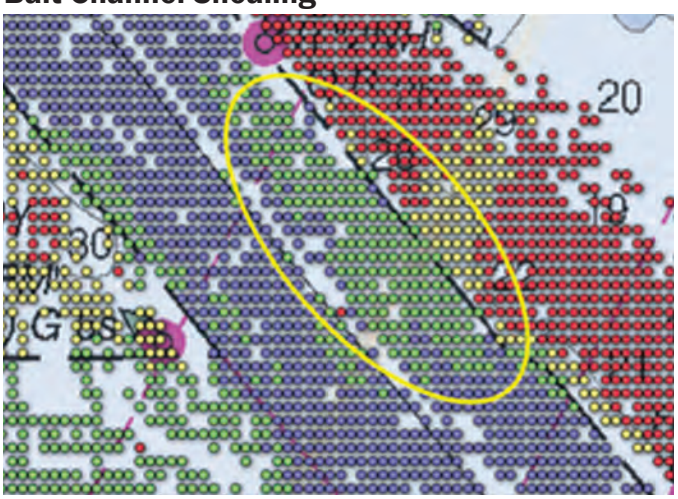
In Use Today

In a partnership with Cruisers' Net and EarthNC, a beta release of ARGUS solution sets for the ICW compatible with OpenCPN is now happening. According to Hersey, OpenCPN is a capable open source PC Navigation software application in use by a large following of recreational and commercial boaters. Eventually, ARGUS intends to further develop the integration of ARGUS solution sets, making them available through Cruisers' Net as a complement to other valuable information they provide. There may be no more important issue to vessel operators today than the depth of the water under the keels of 40,000 commercial hulls crisscrossing the nation's waterways. Great Lakes operators put the exclamation point on that by illustrating how many tons of cargo is lost annually due to each inch of draft that is unavailable. Beyond the gray noise of complaining about the lack of maintenance dredging is the concern that depths on charts may be inaccurate, at least until now. If you plan to transit the ICW in the near future and depths less than 12 feet get your attention, then you might want to take a look at the chart shown on the bottom of this page.

Note that these are simple vessel observations that reflect tidal conditions, have not yet been corrected or added to the database for collective processing and should not be used for navigation. Today, federal law provides for the waterway to be maintained at a minimum depth of 12 feet (4 m) for most of its length. But, as shown below – this isn't always the case. Moreover, depths on charts are typically referenced to a mean low water datum, and since the state of the tide isn't taken into consideration below, actual depths may even be less.

ARGUS represents the way forward for many applications, but its initial value may be found in merely taking advantage of the boat's depthsounder that's just ahead of you. And, that can be done today.

Balt Channel Shoaling



Etherson

Cameron & Gray

Roell

Bibby Offshore Appoints Etherson

Bibby Offshore appointed Nicky Etherson as its new commercial director to help facilitate the company's ambitious growth plans. Etherson joins the business with almost 20 years' experience in the oil and gas industry, having previously held the position of head of contracts for Total E&P UK Limited. Here she was responsible for managing all aspects of the contracts function, supported by a team of 15 personnel, covering a range of services including drilling, well control, subsea support, logistics and topside operations. Prior to this, Etherson worked for oil and gas majors Acergy Limited, AMEC Oil and Gas and Technip Offshore. As Commercial Director, Etherson will be responsible for all commercial and contractual governance within the Bibby Offshore group of companies.

Ceona Awards Contract to ROVOP

Oil and gas subsea construction specialist Ceona awarded a five-year contract worth more than $71.8m to independent ROV provider ROVOP. The contract will see ROVOP provide hydraulic, work-class ROV services on board Ceona's fleet of new, purpose-built deepwater pipelay and construction vessels including the Ceona Amazon and the Polar Onyx. As a result of this contract, ROVOP is creating 50 new jobs. ROVOP will deploy hydraulic work-class ROV systems, manufactured by FMC Technologies Schilling Robotics, from its growing fleet of ROVs. Ceona's Polar Onyx and Amazon vessels are due to come into service in March 2014 and January 2015 respectively.

Based on a drillship design, the Ceona Amazon boasts exceptional sea-keeping characteristics making it ideal for operations in remote and challenging locations. The multi-layer vessel, which is SPS compliant and equipped with a DP2 system, is a large, state-of-the-art, multi-functional, dynamically-positioned, pipelay and construction vessel.

The vessel is capable of laying rigid pipelines, flexible pipelines and umbilicals as well as installing large, subsea structures using one or both of its two compensated masthead cranes in tandem-lift mode to 3,000m depth. The vessel does not require a spool base to support its operations and can be remotely operated, making it extremely well suited to overall field development.

Ceona's high-capacity Polar Onyx is designed for operations in harsh conditions and deep waters, with a length of 130m and a 25m beam. The vessel, which is being built to the highest standard for dynamic positioning, DP3 is designed to operate in the SURF, construction, and inspection repair and maintenance markets.

RSC Bio Solutions Hires Technology VP

RSC Bio Solutions, developer of readily biodegradable lubricants and cleaners, has added Bernie Roell as vice president of technology. RSC Bio Solutions said it is aggressively addressing the needs of the biobased chemical industry for new innovative solutions for a wide range of applications. Roell will work to gain even more application approvals for company products and lead other quality, technology and application development initiatives in conjunction with the research and development department. He brings more than 25 years of research and development, business development and general management experience. Over his career, he has led process improvement teams, managed technology groups and run business units for Lubrizol, Ciba Specialty Chemicals and Houghton and has deep experience with a wide range of industrial lubricant applications. Roell holds both a Bachelor of Arts and a Bachelor of Science degree from Lock Haven University, as well as a doctorate in organic chemistry from Ohio University.

Riedel Joins Global Diving & Salvage

Global Diving & Salvage, Inc. hired Jim Riedel, who will join the Pacific Northwest Environmental Division. Based out

Riedel

of the Seattle corporate office, Riedel will assist in the management of existing preventative booming operations as well as the pursuit of additional opportunities in the Puget Sound and surrounding areas. Riedel brings with him more than 17 years in the Environmental Services industry at National Response Corporation (NRC). From 1995-2003, he was the General Manager of the West Coast Region where he was responsible for the regulatory interface and the establishment and maintenance of a subcontractor network that extended throughout the West Coast. In 2003, with the addition of Foss Environmental to NRC, Mr. Riedel became the PNW Region General Manager charged with business development and client maintenance and responsible for more of the day-to-day operations of preventative booming operations.

MacArtney Named Pioneer Company of the Year

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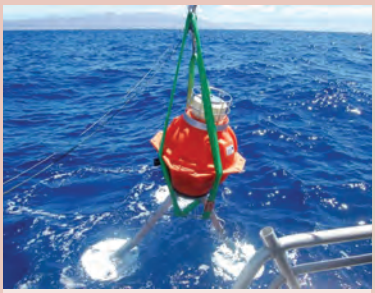
MacArtney won the big prize when the 'Pioneer of the Year Award 2013' was recently presented at the annual Borsen Top1000 conference in Copenhagen, Denmark. At the Top1000 event, more than 150 chief executives were

MacArtney Honored

gathered to discuss what it requires of companies to gain and maintain a position as the innovators and growth drivers of tomorrow. According to Marco MacArtney, who was present at Hotel d'Angleterre to accept the award, the award marks a substantial pat on the back for MacArtney, its employees and their ability to successfully navigate in a world characterizsed by ongoing change. "I am very pleased to learn that central elements in our strategy can be converted to measurable results - and then of course it is wonderful that you can still be a pioneer after 35 years in the business," said MacArtney.

Luther Joins Liquid Robotics as CFO

Liquid Robotics, an ocean data services provider and developer of the first wave-powered Wave Glider ocean robot, said that Pablo Luther, former CFO of Gridiron Systems Inc. has joined the company as Chief Financial Officer (CFO). Reporting directly to Bill Vass, CEO and President of Liquid Robotics, Luther will be responsible for the finance, human resources and information technology organizations. His position is effective immediately. Luther holds a dual MBA in Marketing and Finance from Wright State University and a BS from University of Mumbai (India).



Sonardyne, Liquid Robotics, NOAA Team

In early August off the east coast of the U.S., a team from Sonardyne, Liquid Robotics and NOAA concluded the second leg of an extensive ocean observation technology demonstration project. Using Sonardyne's Fetch and Tsunami sensor nodes and a Liquid Robotics Wave Glider, the project was performed in collaboration with MARACOOS (Mid-Atlantic Regional Association Coastal Ocean Observing System), NOAA National Data Buoy Center (NDBC) and managed by NOAA US Integrated Ocean Observing System (IOOS) Program Office with the objective to test new long endurance ocean observation instruments that have been designed to work in tandem.

The Fetch node was deployed in 550 ft. of water to measure ocean temperature and pressure, and the Tsunami sensor in 8,000 ft., while the Wave Glider recorded data on the wind, waves, water temperature and salinity as it transited between the two sensors. Once the Wave Glider was stationed above the location of each instrument, it acoustically uploaded both real-time and logged data which was then transmitted onwards via satellite to shore-based operators for analysis.


Photo: JMS Naval Architects

JMS to Design RV

JMS Naval Architects of Mystic, Ct. won a contract from the Virginia Institute of Marine Science to provide concept through contract-level design, shipyard bid support, and owner's rep services for VIMS' next research vessel.

The VIMS research vessel will be used for scientific research in the main stem and tributaries of the Chesapeake Bay, capable of conducting extended science missions in coastal and offshore areas within the Mid-Atlantic region. The JMS Coastal Research Vessel Series concept-model provides a multi-purpose, efficient and cost-effective platform from which scientists and educators can study coastal oceanic phenomena. The design offers flexibility in science outfitting allowing for high utilization and affordable operating day rates. The vessel will be able to easily adapt to evolving scientific research areas such as environmental impact studies, offshore oil & gas exploration surveys, wind energy development surveys, and maintenance of ocean observing systems. The 80-ft. VIMS vessel will be designed for multi-disciplinary coastal-science studies including fish and invertebrate sampling; bottom geological and benthic coring; deployment and retrieval of data buoys; heavy mooring, seismic and bathymetry surveys; mid-water and trawls; CTD and other vertical water-sampling deployments.

Harkand Appoints Reed as New CEO

Harkand announced the appointment of John Reed as its new CEO as it embarks on the next stage of its growth strategy. Reed, an industry veteran with more than 30 years' experience in the offshore engineering and construction sector, will lead the development of the company as it drives forward with its target of growing turnover to $1 billion in the next five years. Due to take over the reins in October, he replaces Nicolas Mouté who steered the group's formation since inception and through the merger of Iremis, Integrated Subsea Services (ISS) and Andrews Survey following investment by Oaktree Capital Management and the acquisition of Veolia Marine Services. Mouté will move to another senior role within the group, to be announced later.Reed most recently served on the Cal Dive International Inc. Board of Directors from May 2012 to August 2013. Prior to that he was CEO of Global Industries Ltd. from March 2010 until its acquisition by Technip S.A. and is a former CEO of Heerema Marine Contractors.

ASA Elects Officers

The American Salvage Association (ASA) elected a new slate of officers at its fall meeting in Arlington, Virginia. Paul Hankins, Vice President for Salvage Operations at Donjon Marine Co., Inc., was elected President, succeeding Tim Beaver, Global Diving & Salvage, Inc., who served as President from 2011-2013. Todd Schauer, Resolve Marine Group, was elected Vice President, and Jim Elliott, Teichman Group, was named Secretary/Treasurer.

Hankins has more than 30 years' experience in the marine industry after graduating from the U.S. Naval Academy in 1981 with a Bachelors of Science in Naval Architecture and from George Washington University in 1991 with a Master's degree in Environmental Management. He has participated in countless national salvage and oil spill response operations and exercises and has held positions with the Navy SUPSALV; with SERVS Alyeska in Valdez, Alaska; as Deputy Director of Maritime and Land Security at the U.S. Transportation Security Administration, and as president of Donjon-SMIT.

In addition, David DeVilbiss (Global Diving & Salvage, Inc.), Robert Tyson (Svitzer), George Wittich (American Marine Corporation), were elected to ASA's Executive Committee. John Cameron (Charleston Pilots) was elected chairman of the Associate Membership Committee, and will serve on the Executive Committee in that capacity.

Bluefin Acquires SeeByte

Bluefin Robotics, a provider of Autonomous Underwater Vehicles (AUVs), acquired SeeByte, Ltd., a provider of autonomous platform software that enhances the user experience and the capabilities of underwater sensors, vehicles and systems. SeeByte, headquartered in Edinburgh, Scotland, will operate as a wholly-owned subsidiary of Bluefin. Terms of the transaction were not disclosed.

BLUEFIN ROBOTICS
A Battelle Company

seebyte

SeeByte Wins VIPS Innovation Award

SeeByte was awarded the Marcus Kolb prize for Innovation at the recent VideoRay VIPS event in San Diego. The accolade, which was presented at a VideoRay Awards Dinner, celebrated the work of SeeByte's SeeChart; a new tool for ROV operators, designed for chart plotting and asset monitoring.

CTG Acquires H.C. Materials

An affiliate of Channel Technologies Group, LLC, a manufacturer of piezoelectric ceramics, transducers and complex sonar and navigation systems used in the defense, medical and energy industries, acquired the assets of H.C. Materials Inc. and its affiliates from Dr. Pengdi Han. As part of the acquisition, Dr. Han will become an equity owner of CTG, as well as an active board member. Other terms of the transaction were not disclosed. CTG is a portfolio company of Blue Wolf Capital Fund II, L.P. The acquisition enables CTG to capitalize on HCM's leadership in the piezoelectric single-crystal arena, especially within the medical ultrasound market, and it helps to consolidate CTG's position as a leader in the ceramic-based piezoelectric industry.

NRC, Resolve Expand FiFi, Spill Response

National Response Corporation (NRC) and Resolve Marine Group announce the expansion of their 1Call response coverage for all vessels trading in U.S. waters. The service offers tanker and nontank vessel owners and operators full, single-source coverage in compliance with latest U.S. Coast Guard regulations for Salvage and Marine Firefighting (SMFF), and Oil Spill Removal Organization (OSRO). This reflects the U.S. Coast Guard's final rule in the Nontank Vessel Response Plans and Other Response Plan Requirements published in the Federal Register. The rule requires owners or operators of vessels trading in U.S. waters to submit response plans naming OSRO and SMFF providers by January 30, 2014. NRC and Resolve formed its 1Call partnership in 2003.

EdgeTech Expands Manufacturing Space

EdgeTech added more than 7,500 sq. ft. to its main office in Massachusetts. The expansion is the second in less than two years for the company. EdgeTech continues to see a growing demand for the company's side scan sonars, sub-bottom profilers, bathymetry systems, AUV-based sonars and deep sea acoustic releases.

Ellicott Dredges Adds Parts Distributor

Ellicott Dredges, LLC appointed MAKISUR S.A. de C.V. as its distributor for dredge parts in Mexico. Makisur will distribute parts and provide technical and onsite support for all of Mexico's existing and new Ellicott dredge owners.

Airmar Acquires Marport Division

AIRMAR Technology acquired substantially all of the assets of Marport Deep Sea Technologies' Commercial Fishing division, a developer of advanced sonar technology. Airmar will also acquire the name "Marport" and the web domain (www.marport.com) as a part of the transaction.

The Economic Impact of Ocean Observation

The U.S. Integrated Ocean Observing System awarded ERISS Corporation the funds to work with The Maritime Alliance on a study that will articulate the economic impact of the ocean observation sector in the U.S.

Korean Hydrographic Society Joins IFHS

The Hydrographic Society of Korea (HySK) has been elected a member of the International Federation of Hydrographic Societies (IFHS), joining other national organizations representing Australasia, Benelux, Denmark, Germany, Italy, South Africa and the U.K. Based in Seoul, the HySK is headed by its President, Dr. Dae Choul Kim of Pukyong National University's Department of Energy Resources Engineering, whose fellow directors are drawn from key sectors of the Korean maritime industry.

2H to Assist Riser Engineering for Tullow

2H Offshore, an Acteon company, has been appointed by Tullow Oil as lead riser engineering consultancy for the delivery of the flexible riser system for its Tweneboa, Enyenra and Ntomme (TEN) field development, offshore Ghana. The TEN development is located in the Deepwater Tano block, approximately 30km to the west of the Jubilee field and lies in water depths ranging between 1,000-1,800m. The development will consist of oil and gas production wells, water injection wells and gas injection wells.

Prysmian Signs with Petrobras

Prysmian Group, a company in the energy and telecom cable systems industry, has been awarded new contract worth a total of up to approximately $260m, related to a frame agreement for Umbilical products for offshore oil and gas extraction, by Brazilian oil company Petrobras.

Ballard Changes Name

Ballard Diving & Salvage changed company name to Ballard Marine Construction, Inc. to better reflect its customer base and service capabilities. In addition, the company is expanding with fully staffed and equipped locations in Chicago, Florida and Wisconsin.

New Simulator

Kongsberg Oil & Gas Technologies AS (KOGT) released LedaFlow 1.4, the new transient multiphase simulator for wells and pipelines. The latest release of LedaFlow contains significant additions and improvements that are designed to enable flow assurance engineers to operate faster and more efficiently. With LedaFlow 1.4, speed increases of up to four times can be seen in network cases using multi-CPU capabilities, shaping the LedaFlow solution into a more productive tool for all engineering challenges.

Multi-Sensor ROV Survey Package

Sonar Equipment Services delivered its first multi-sensor ROV survey package to Calecore's marine survey division, Calesurvey. The supplier of marine survey equipment to the offshore energy industry has integrated, tested and mobilized a complex array of survey and subsea equipment complete with offshore support personnel for the survey in Norwegian waters.

Huisman Brazil Receives First Order

Huisman received a first order for its new production facility in Brazil. The new order includes three sets of five cranes, which will be manufactured as soon as construction of the Brazilian production facility is completed in 2014. The sets of cranes are scheduled for delivery between Q3 2015 and Q1 2017.

The order includes three identical sets of cranes for the new build vessels Cassino, Curumim and Salinas. Each set consists of two 60mt Pedestal Mounted Offshore Cranes (PMOC), two 60mt Knuckle Boom Cranes (KBC) and one 12mt Pipe Handling Knuckle Boom Crane (PH-KBC). The cranes can be used for various applications, including unloading of supply vessels, pipe handling, offshore construction work, and subsea installation. Besides the three sets of cranes, Huisman will also deliver three 550mt Tiltable Lay Systems for Subsea 7 and the two 650 and two 340mt Tiltable Lay Systems for Technip-DOF. All these pipelay equipment orders are part of a big Petrobas order and should be ready to serve the Brazilian market in 2017.

Falmouth Scientific Adds Products

Falmouth Scientific announced two new additions to the PLUS FAMILY of measurement instruments: the ACM-WAVE-PLUS and WAVE-TIDE-PLUS. They join the ACM-PLUS acoustic current meter. The ACM-PLUS, which was announced in July 2012, is designed to provide high-resolution 3D current readings in very clear as well as turbid water, and operates right at the water surface (e.g. for oil spill tracking), or at deep depths where slow moving currents are difficult to measure accurately. The new ACM-WAVE-PLUS provides current speed and direction, wave direction, wave height, and other wave statistics by combining FSI's enhanced ACM-PLUS technology with a high-accuracy, micro-machined silicon pressure sensor.

Senergy Expands

Senergy has reinforced its survey and geo-engineering team by almost 30% after building on its fast-growing global footprint through the expanding geographical reach of its operations. New contract wins across the U.K., Norway and Australia have resulted in the growth of the company's survey and geo-engineering division which has also seen its team increase from 36 to 46 with plans to further grow to 55 people by the end of 2014.

IEEE Awards Student Poster Efforts

The 33rd IEEE OES Student Poster Competition was held at the OCEANS'13 conference and exhibition. Students were able to display their research, and in total 16 posters were shown, selected from 100 received Abstracts. The students came from schools spread across Europe, Asia, the U.S. and Canada. The founder of the Student Poster Competition, Norman Miller, could not attend the Oceans meeting. To commemorate his founding of the competition and the 600th participating student, MTS and IEEE OES have this year decided to name the first prize after him. The winning students are:

- **First prize** of $3,000, now named the Norman Miller award, went to Natalia Hurtos for her research in sonar image processing.
- **Second prize** of $2,000 was awarded to Luke Rumbaugh for his work on laser remote sensing underwater.
- **Third prize** of $1,000 was given to Sean Walstead.
- **Honorable mention** prize was given to Donia Frank.

OceanEye

When Elastec/American Marine managed the controlled burn operation in the Gulf of Mexico in 2010, the response operation was more efficient with aerial surveillance. Fixed-wing aircraft and helicopters were frequently employed in the search for oil, but those alternatives proved costly and were also unavailable at night. In other scenarios, limitations such as fog, heavy rains or snow may make flying impractical and unsafe for the flight crew. Elastec/American Marine is always on the hunt for new technologies to improve oil spill response operations. In the search for an alternative to traditional aerial surveillance, Donnie Wilson, CEO, discovered OceanEye in Norway. Compact and light, effective by day and by night, resistant to the elements and more cost-effective than traditional air surveillance systems, OceanEye delivers high-definition imagery and reconnaissance data to the heart of response operations. Technologically intelligent, yet simple to deploy and operate, the OceanEye oil spill aerial surveillance system, developed by Maritime Robotics of Norway, is designed to reduce emergency response operation costs, as well as health, safety and environmental (HSE) risks. OceanEye provides the technologies to locate the spill, assess its dimensions, monitor its movement and communicate information instantly to other responders for water or land-based spills.

"You can have the best oil spill equipment in the world," said Donnie Wilson, CEO of Elastec/American Marine, "but if you can't see the oil, you can't recover it."

Improved eBird

Kongsberg Seatex, a fully owned subsidiary of Kongsberg Maritime, has now given users of the eBird Seismic Streamer Control System the ability to equip SmartWing instrumentation with two additional features: a compass and a GNSS receiver. eBird is a novel bird concept for lateral, vertical and roll streamer control in marine seismic acquisition that enables fault tolerant and efficient multi streamer steering by employing a wide range of innovative and patented technological solutions. The innovative approach of placing a GNSS receiver in the wings opens new opportunities for improving the efficiency of an operation, in particular during launch and recovery, but also when running lines.

www.km.kongsberg.com

AMEC Buys AXYS Sensor

AXYS Technologies said that AMEC will be the first to receive the TRIAXYS Next Wave II sensor integrated into its WatchMate met-ocean monitoring buoy. The TRIAXYS Next Wave II has been released as the new wave sensor for measuring directional waves and motion. Improvements include reduced power consumption, reduction in the sensor size and weight and an increase in wave data accuracy and resolution. AMEC will use the WatchMate 1.8 DM buoy to receive comprehensive environmental data, which will support marine construction operations. The data will be sent to AMEC in real-time via cell phone and satellite telemetries.

www.axystechnologies.com

The Cavidome

Underwater cleaning just got easier with the introduction of the CaviDome, the first hand-held attachment for the CaviBlaster series of underwater cleaning equipment. Available now from CaviDyne, the CaviDome uses dual-rotating nozzles with a unique cavitating action to quickly and efficiently remove all types of marine growth in just one pass. CaviDome is lightweight and easy to handle. It measures 13-in. in diameter and weighs less than nine pounds. CaviDome is the first attachment manufactured for the CaviBlaster system, which includes a drive train (engine and pressure pump) and a cleaning gun. The cavitation takes place in the nozzle of the gun and on the two nozzles of the CaviDome.

www.caviblaster.com

New Additions to Imagenex Line

Imagenex has released new additions to its line of products. The new Model 878 Sidescan Sonar is the next generation in high resolution sidescan sonar. The unit runs two simultaneous sonars on each side at different sound wavelengths for enhanced image clarity. The Model 878 “RGB” Sidescan (triple simultaneous frequencies) has undergone a facelift and become more affordable. Both models are equipped with an optional echo sounder and a built-in orientation module as well as depth and temperature sensors.

The new DT100 Sensor Interface Relay (SIR) provides a central connection point for all your bathymetric sensors, including sonar (one or two units), GPS, MRU, Gyro/Heading and Sound Velocity. Powered by AC or DC, the SIR box provides DC operating voltages for each of your sensors. Sensor messages are time stamped and stored at their native update rates with a timestamp accuracy of 100 microseconds. The DT100 Multibeam Echo Sounder reaches a new performance level in the new DT101 – a single instrument integrating the sonar, motion reference unit (MRU) and sound velocity sensor into one compact unit. The DT101 requires one cable for operating all three sensors.

www.imagenex.com

GE Dynamic Positioning

For Hornbeck's New Subsea Construction Vessels

While astounding technology advances in the maritime and subsea sectors are becoming more common place, the capabilities of modern vessels in the offshore O&G sector are still something to behold. For example, holding a 100-m subsea construction vessel in position as it lowers with its 250-ton crane, heavy subsea modules to the seabed. GE's Power Conversion helps to take the guess work out of complex dynamic positioning (DP) operations with its advanced human-machine interface (HMI) and returns ship control to the mariner, so skilled DP operators can once again focus on the task of ship handling. When the system is operating in its new "Energy Efficiency" mode, it offers the owner/operator reduced fuel consumption with the associated reduction in engine emissions continuing with GE's global mission for a greener environment.

Hornbeck Offshore will employ Power Conversion's latest generation DP technology for its four new multi-purpose supply vessels (MPSVs). In their role as MPSVs, they can operate as either a subsea construction vessel capable of performing complex subsea construction operations or as a resupply and support vessel to ultra deepwater drilling in the Gulf of Mexico, or anywhere else in the world as required by their charterers.

"The DP solution and its user interface is the heart of a ship's positioning system. When we can continue to work with a company that knows us, has supplied us with systems in the past and, with our input, can supply us with a next generation system we can rely on, it remarkably enhances our mission to provide value-added business solutions for our own customers," said Carl G. Annessa, EVP and COO at Hornbeck Offshore. "By using GE's next generation solution, we gain efficiency and flexibility thanks to a commonality of systems, as well as access to a global team of experts."

GE will power, propel and position the new ships by delivering the integrated diesel-electric system including generators, propulsion and thruster drives, motors, switchboards, LV distribution, transformers, Class 2 DP, power management, alarm and monitoring, vessel control and an integrated bridge system comprising a comprehensive navigation and communications suite including radars, ECDIS, GMDSS and a full suite of internal and external communications systems.

GE is also equipping Hornbeck's series of 10 platform supply vessels (PSVs), the first, HOS Red Dawn was delivered June 21 of this year and has been operating successfully ever since.

Launched in May this year at the Offshore Technology Conference in Houston, Texas, Power Conversion's latest generation of dynamic positioning redefines DP with unprecedented flexibility for effective maritime operations. Its advanced HMI returns ship control to the mariner, so skilled DP operators can once again focus on the task of ship handling and be freed from the constraints of complex computer interface.

Seatronics, CodaOctopus Agree

Seatronics do Brazil, an Acteon company, was appointed the exclusive distributor for CodaOctopus Ltd. in Brazil, a decision that will widen the portfolio of specialist subsea marine equipment that it can now offer to the Brazilian market. The new partnership will enable Seatronics, as a global supplier of electronic subsea equipment, to provide its offshore construction and survey customers with leading 3D echoscope real-time sonar, F180 inertial positioning and motion sensing and digital data acquisition and geophysical data processing technologies. A major benefit for Seatronics' Brazilian ROV and survey customers will be the access to unique 3D imaging capabilities, especially where real-time visualization is required at depth.

www.seatronics-group.com
www.codaoctopus.com

Sea Catch Spring Safety Pin

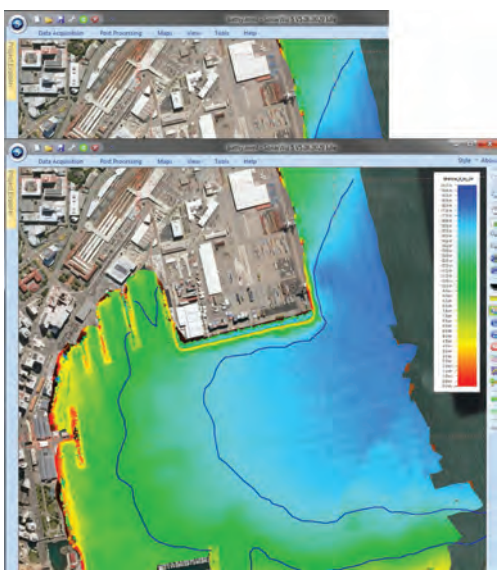
Sea Catch quick releases can now be fitted with a Spring Safety Pin (SSP) that allows users to eject the pin from a distance and do so using the release lanyard. The first pull on the lanyard removes the R-clip from the pin and a compression spring ejects the pin which is firmly tethered to the body. The second pull activates the release lever to release the object or item under load. This option is most useful on models TR3 to TR10. McMillan Design, Inc.

www.seacatch.com

Shark Eye

The Shark Eye was developed by Shark Marine to solve a common problem faced by many EOD / SAR teams, poor visibility. The Shark Eye allows divers to see objects and conduct detailed visual inspections at arm's reach even in turbid/dark water, eliminating the need for the diver to press their mask against what could be explosive or hazardous material. The Shark Eye consists of a head mounted display, battery pack and a camera with hand held mount. It allows divers to perform visual inspections in areas that are hard to access without having to place their entire bodies inside.

www.sharkmarine.com

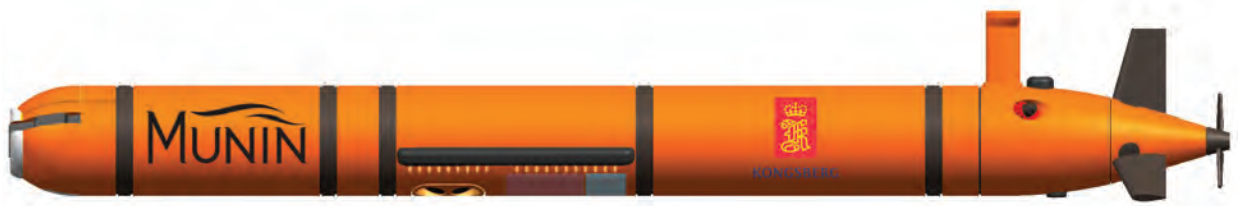


CTI SonarWiz Update

ChesapeakeTechnology announced an advancement to its SonarWiz software with the addition of post-processing for multi-beam echo sounder and interferometric bathymetry systems. SonarWiz now offers data processing for both multi-beam and interferometric bathymetric systems with present support for processing bathymetry file types of ALL, HSX, JSF, R2S, RDF, S7K, SXI, and XTF. SonarWiz is the software that streamlined the processing of sidescan sonar, sub-bottom profiler and magnetometer data and now with the new bathymetric processing capability, brings together the data from these different geophysical sensors in one unified workspace. SonarWiz Bathy reads the native data formats directly and gives the user all the tools required to view and edit the bathymetric data to produce high resolution maps and reports. By integrating the processed bathymetry data with sidescan sonar data, stunning 3D sidescan sonar mosaics can be generated giving a whole new visual dimension to seafloor data.

www.chesapeaketech.com

Compact Survey AUV



MUNIN Debuted by Kongsberg Maritime

Kongsberg Maritime recently launched MUNIN, a nextgeneration Autonomous Underwater Vehicle (AUV) for offshore survey. Kongsberg Maritime's Subsea Division has combined its experience in developing and manufacturing the HUGIN and REMUS AUVs to bring the compact MUNIN AUV to the market, setting new standards for performance and flexibility in low logistics AUV survey operations.

The MUNIN AUV is designed to collect high-resolution sonar data geo-referenced by a survey grade positioning system. Capable of providing the same high-level performance and survey accuracy of the established KONGSBERG AUV family, MUNIN is an efficient, compact vehicle design, providing for easier launch and recovery and the possibility of using smaller launch vessels.

MUNIN features a modular structure that provides the ability to install extra batteries to extend operational scope for missions lasting up to 24 hours at depths as deep as 1,500m. Weighing in at less than 300 kg in air, its 34cm diameter and length between 3-4m depending on configuration, places MUNIN as a light, compact and (virtue of its pedigree) capable AUVs..

Despite its small size, MUNIN is capable of carrying a complete subsea survey payload, consisting of sensor technology. It features an advanced new rigid design which integrates the navigation systems and acoustic payload sensors in a single mechanical housing, which is factory calibrated and requires no realignment after transport or remobilization. The IHO special order (S-44) compliant sensor payload includes a custom version of the EM2040 multibeam echo sounder, 200-400 kHz, 1 degree x1degree beam width, swath 120 degrees in addition to an EdgeTech side scan sonar 230/540 kHz and forward looking sonar with advanced terrain following and collision avoidance. Also included is an NBOS conductivity and temperature (CT) sensor whilst a sub-bottom profiler and still image cameras can be specified.

User configurable, MUNIN's flexible communications and navigation systems feature an array of sophisticated technology. Communication is via Kongsberg Maritime's cNODE acoustic command and data link, Wi-Fi and Iridium. The Kongsberg Maritime NavP aided inertial navigation system (AINS) with Honeywell HG9900 inertial measurement unit (IMU) feature within the navigation system alongside cNODE and HiPAP (option), which offer precise, reliable acoustic positioning.

In Norse mythology, MUNIN (Muninn) and HUGIN (Huginn) are a pair of ravens that fly around the world of Midgard, collecting information for Norse God Odin. Kongsberg Maritime AUVs are designed to provide survey operators with highly accurate data, so alongside the existing HUGIN, MUNIN was the perfect name for this next generation survey vehicle.

www.km.kongsberg.com

New NEXUS HD Multiplexer from MacArtney

MacArtney Group introduced the NEXUS MK VI, a new and promising addition to the range of NEXUS multiplexers and telemetry solutions. The MacArtney NEXUS MK VI is a HD video and multibeam sonar multiplexer that carries all signals over one single mode optical fibre via CWDM (Coarse Wavelength Division Multiplexing). As a frequently selected option, the multiplexer comes with integrated (P)ECL and 10/100 Ethernet cards.

The NEXUS MK VI multiplexer is designed and built to be a rugged, efficient and versatile HD solution for interfacing a wealth of different sensors, equipment and subsea systems.

www.macartney.com

Tritech's RAMS Integrity Monitoring Technology

Tritech won a contract for its real-time riser and mooring line monitoring system RAMS. Tritech was selected by Single Buoy Moorings Inc. (SBM), designer and supplier of Turret Mooring Systems (TMS), to supply the primary safety tool for real-time mooring line failure detection and riser monitoring for the new build Floating Production Storage and Offloading Unit (FPSO), for the BP Quad 204 development. The RAMS technology will provide 24/7 real-time simultaneous monitoring of the presence and precise position of all subsea targets beneath the FPSO. Tritech is to supply a full hardware and software solution to comply with detailed project specification, including DNV high availability and redundancy requirements.

www.tritech.co.uk

Mustang Launches Ocean Commander Immersion Suit

Mustang Survival launched an improved Ocean Commander immersion suit to the Canadian marketplace; reportedly the first immersion suit to receive Transport Canada, MED, and SOLAS approvals. After research and tests, this launch also marks the return of the long-trusted Ocean Commander immersion suit for sailors, offshore boaters, fisherman and other commercial marine workers alike. The new Ocean Commander (Model #OC8003 HR) is constructed of a high visibility fluorescent yellow-green shell material, building off the findings of a recent study led by Mustang Survival's research department.

mustangsurvival.com

Reservoir Modeling Platform

Shell and Baker Hughes announced a software license and joint development agreement to produce a high-end platform for geological and reservoir modeling. The new platform will be designed to bring enhanced evaluation and visualization capabilities to Shell allowing geoscience and petroleum engineering experts to better plan and manage the extraction of oil and gas resources, realizing their full potential. The system will be optimized for resource modeling and production in tight/shale gas and liquids rich shale reservoirs and is based on the Baker Hughes JewelEarth software platform, which has a strong track record of delivering integrated, data-driven workflows for optimizing these types of plays.The new platform will complement Shell's existing applications, including GeoSigns, Shell's proprietary software used to visualize and interpret seismic data, and will form part of an integrated working environment for Shell's exploration and modelling experts.

"The JewelEarthTM platform can handle multiple solutions, from basin to wellbore scale, using one generic data source," said Mario Ruscev, Chief Technology Officer at Baker Hughes.

www.shell.com
www.bakerhughes.com

MacArtney Inline Termination for Andritz Hydro Hammerfest

MacArtney announced that tidal power array developer and supplier Andritz Hydro Hammerfest has recently taken delivery of a MacArtney Medium Voltage Inline Termination. Due to the link with the lunar cycle, tidal currents can be predicted in advance, and with stable energy flow and fixed maintenance windows, there are hopes that tidal power will become a significant part of the future renewable energy mix.

One of the frontrunners in the race to effectively harness the power generated by tidal currents is Andritz Hydro Hammerfest. In 2011, Andritz Hydro Hammerfest installed a 1MW tidal power turbine, named HS1000, at the European Marine Energy Center (EMEC) located near the Orkney Islands, U.K. After overseeing a positive initial testing period, the tidal turbine is now producing electrical power.

All power generated by the HS1000 turbine is taken to shore by means of a 11 kV subsea electrical and fiber optical export cable. Fully installed and tested by MacArtney offshore technicians, a MacArtney Inline Termination is deployed to enable connectivity between the subsea export cable and the turbine, hereby facilitating the flow of electricity to the onshore grid.

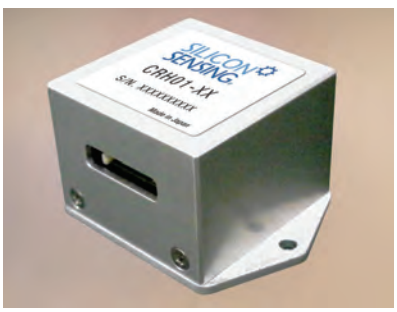
MacArtney Medium Voltage Inline Terminations are engineered to make offshore inline connections faster, easier and more effective. Cables can be terminated on site or ahead of cable laying and the actual mechanical connection of the two halves takes less than two hours, making it an option for applications with limited time windows, such as tidal energy units. The short connection time also means that valuable ship and downtime is reduced.

www.macartney.com

EIVA: New Winch Range

The OceanEnviro range of winches for survey and deployment operations are now available to EIVA's customers. EIVA has delivered winches for more than 30 years. As of October 2013, the winches will carry EIVA's logo and the name OceanEnviro, as the company launches its own range of winches for survey and deployment in connection with oceanographic and hydrographic operations. OceanEnviro is designed in collaboration with Sepro Technology AS, and the range is a further development of existing Sepro Technology AS products. The OceanEnviro product range offers maximum cable lengths ranging from 600-2,700m, drum diameters from 250-480mm, and motor power from 1.5-10.4kW – just to mention a few of the options available through the five models comprising OceanEnviro.The frame and plate components are made of AISI 316 marine stainless steel, which reduces the risk of corrosion.

www.eiva.com



Silicon Sensing: CRH01

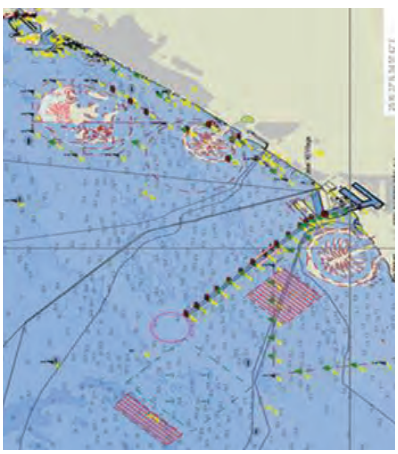
Silicon Sensing launched CRH01, a new high performance single-axis MEMS gyroscope which delivers very low bias instability, claimed to be below 0.2°/hr, and suitable for all marine attitude and positioning control system applications requiring high accuracy and reliability, in a compact and affordable module. Following the success of the CRS09 gyro, CRH01 is the latest of a new range of precision MEMS inertial sensors to emerge from Silicon Sensing offering lower cost, robust and compact alternatives to expensive FOG and RLG technologies. Four variants are available to accommodate dynamic ranges from 25°/sec to 400°/sec.

www.siliconsensing.com

MetOcean Snow Beacon

MetOcean released the innovative Snow Beacon. Designed and tested in conjunction with the world renowned Alfred Wegener Institute (AWI), the Snow Beacon is an Iridium reporting data collection and processing beacon ideal for remote polar applications. Developed to measure snow height and guaranteed to deliver high reliability, low power consumption, and dependable operation, the Snow Beacon is the perfect turn-key solution to measure snow height for any size project. The Snow Beacon is also equipped with various sensors: GPS positioning, barometric pressure, air temperature, sea surface temperature sensors, and four snow height sonar sensors.

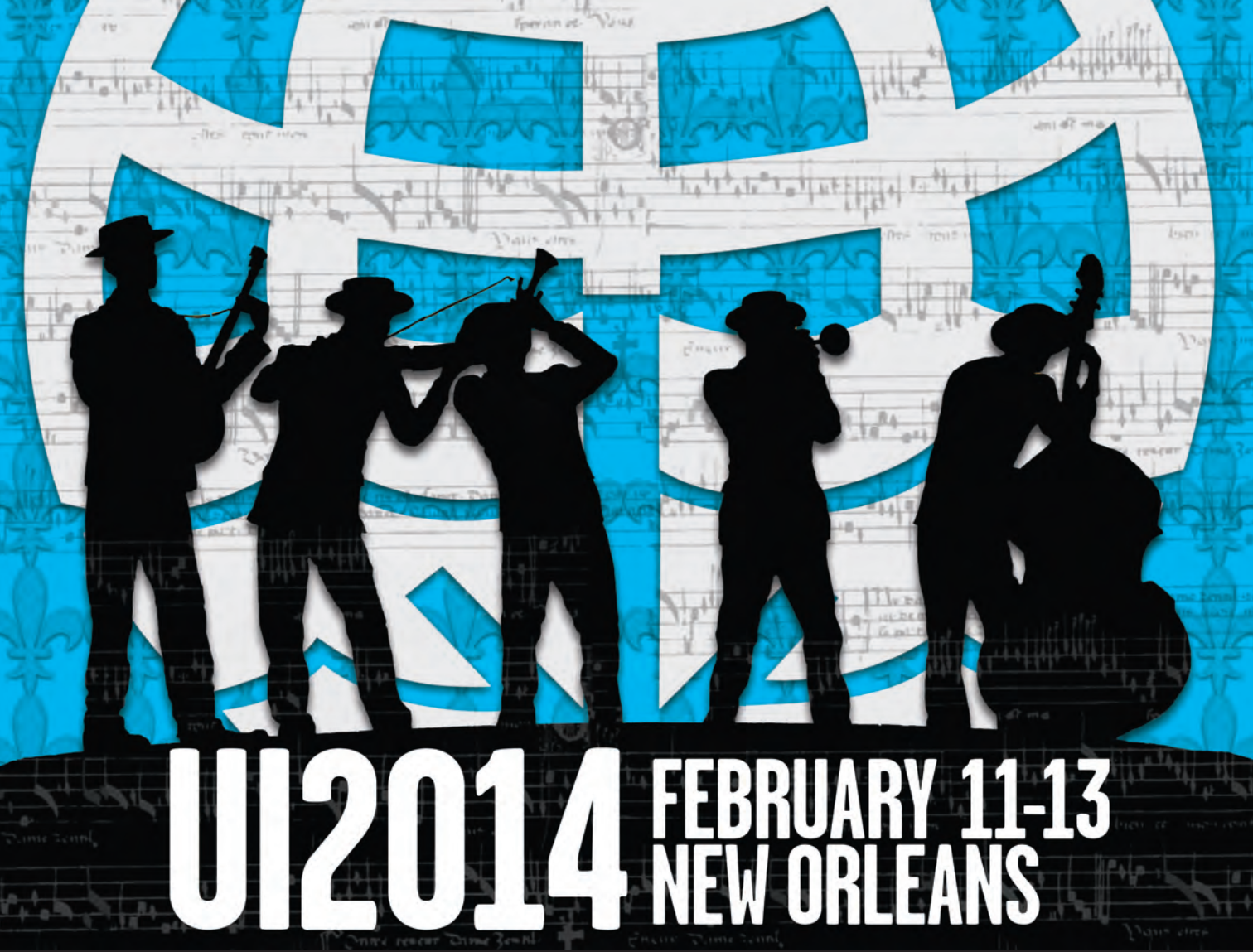
www.metocean.com



Free Web-Embeddable Map Widgets

Marine geospatial data provider SeaZone created a series of free map widgets to embed into web pages. By embedding the map widgets into a web page, the user has instant access to SeaZone's worldwide marine mapping. Data is available to purchase through one-click online purchasing, and is made available to download almost immediately. Widgets are available for SeaZone's online vector mapping products; SeaZone HydroSpatial Global, SeaZone HydroSpatial Base and SeaZone HydroSpatial One.

www.seazonedirect.com



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MARINE TECHNOLOGY REPORTER

2014 Editorial Calendar

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

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Fischer Connectors

Push-pull connectors and cable assembly solutions

Fischer Connectors has been designing, manufacturing and distributing high performance connectors and cable assembly solutions for almost 60 years. Known for its reliability, precision and resistance to demanding and harsh environments, Fischer Connectors' products are commonly used in fields requiring faultless quality. High quality and customization have always guided Fischer Connectors in the conduct of its business. With high flexibility of configurations, including low/high voltage, coax/triax, fiber optic, liquid/gas and hybrid, the product range comprises more than 10,000 items. Fischer Connectors works with its customers to select and adapt connectors and cable systems that are dedicated to providing solutions to their interconnecting applications.

Fischer Connectors continually invests in connector product design and functionality, helping to ensure that the device manufacturers and their users can take advantage of the latest technologies. Fischer Connectors' primary design and manufacturing facilities are located in Saint-Prex, Switzerland, with subsidiaries and distributors located worldwide.

The Complexity of Sealed Connectors

Sealed connectors are used in many applications where leakage into or out of equipment must be avoided. Sealing is a very complex science itself, as it involves many physical aspects including mechanical design, materials science, surface science and fluid behavior. There are three major application groups exist that require different sealing levels and different solutions: environmental sealing, hermetic sealing and high pressure sealing. Environmental sealing is applicable for typical outdoor applications, while hermetic sealing is required for gas tightness for vacuum applications or pressurized vessels. For marine technology applications, high pressure sealing is required because the connectors are exposed to liquids under high pressure for extended periods of time. When the connectors will be used in these types of harsh operating environments, it is important to check the manufacturer's IP (Ingres Protection) rating for sealing to water at various depths and operating time frames. Most of the IP designations have specific conditions, but the IP68 rating may be defined by each manufacturer differently. A system being submerged at two meters for 24 hours has a different impact on the connector than at 120 meters for 24 hours, but both situations can be defined as an IP68 rating. Fischer Connectors has a wide range of connectors perfectly suitable for marine technology applications. The company offers a broad line of sealed connectors designed to suit the needs of many applications. Some of them present unique challenges with distinctive requirements and demands. Fischer Connectors' engineers design custom solutions using the latest development tools and technology.

www.fischerconnectors.com

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- accuracy: up to 0.04 degrees

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