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MARINE TECHNOLOGY REPORTER

June 2011 www.seadiscovery.com

Seamaster of 2011

Admiral Gary Roughead

U.S. Navy, Chief of Naval Operations

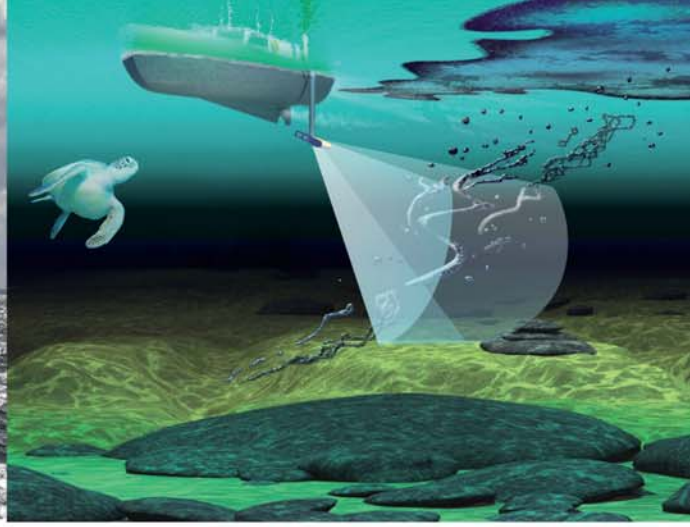
Market Report

Wave & Tide Power Report

National Championship

SeaPerch





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June 2011

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Marine Technology Reporter • Volume 54 • Number 5

Pictured on the Cover

is Chief of Naval Operations (CNO) Adm. Gary Roughead, *Marine Technology Reporter's* Seamaster of 2011.

(U.S. Navy photo by Chief Mass Communication Specialist Tiffini Jones Vanderwyst/Released)

Pictured in the background: The Easytrak Nexus has been deployed by the Geosurvey Department of Emu Ltd on several high resolution Windfarm Engineering and UXO (Unexploded ordnance) surveys. The North Sea survey work currently being undertaken by Emu represents the early stages of significant windfarm expansion plans formulated by the UK Government that is committed to raising the proportion of energy derived from renewable sources from 2.4% to 15% by 2020.

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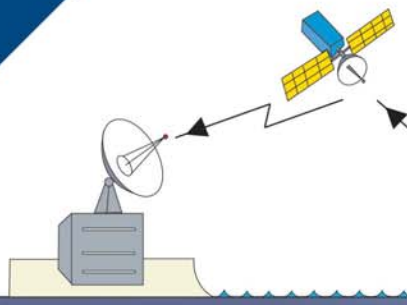

SBE 37-IMP-IDO

CT(D)-DO Recorder with Integral Pump

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CTD-DO

CT-DO

CTD

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CTD

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CT

TD

SBE 39-IM

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See Story on page 28

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See Story on page 38

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See Story on page 24

*As a senior analyst, **Frank Wright** project manages commissioned research and market studies with a focus on renewable energy. Frank led market analysis activity at Scottish Enterprise in offshore wind and was on the selection panel for the Wave and Tidal Energy: Research, Development and Demonstration Support (WATERS) fund.*
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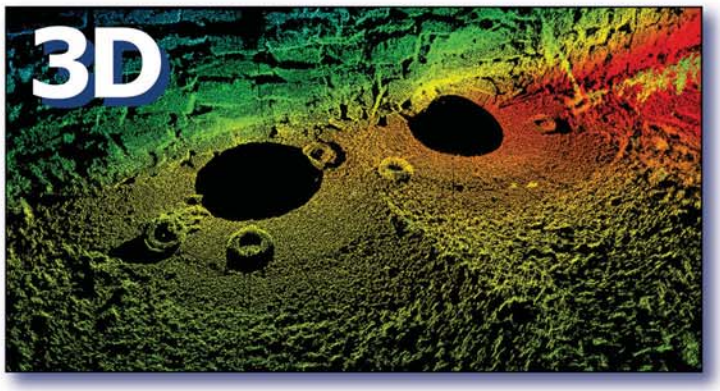

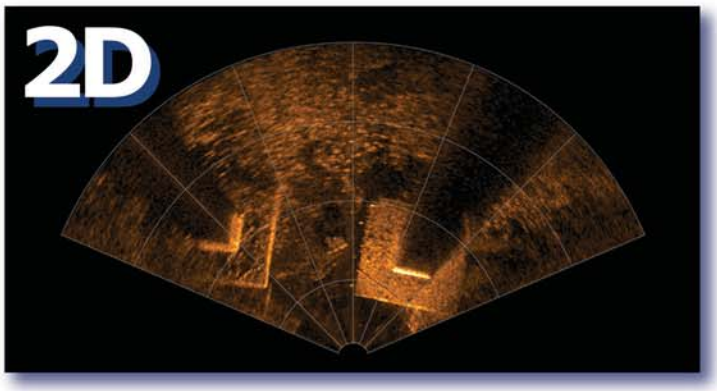

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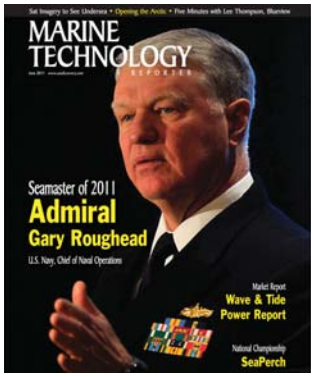

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(USN Photo Chief Mass Comms Specialist Tiffini Jones Vanderwyst/Released)

Last month *Marine Technology Reporter* (MTR) presented to United States Navy Chief of Naval Operations **Admiral Gary Roughead** (pictured right at the Award Reception) its coveted **Seamaster Award**, an award which was presented at a special Sunset Reception in his honor at the OceanTech Expo in Newport, Rhode Island.

Upon receiving the award, a commemorative crystal trophy and an Omega Seamaster watch, Admiral Roughead addressed more than 200 OceanTech Expo (OTE) delegates with his overview and vision of advancing the use of Unmanned Underwater Systems as a means to expand force capabilities while keeping U.S. sailor out of harm's way. First and foremost, on behalf of MTR and OTE, I would like to extend a sincere note of thanks to the Admiral and his entire staff for helping to bring this award, interview and presentation to fruition. It was the Spring of 2010, ironically at OTE in Newport, Rhode Island, that I received an invitation from Admiral Roughead to participate in a discussion with about a dozen industry leaders on the topic of Unmanned Underwater Systems. It was this meeting that set into motion this year's Seamaster Award: the top leader of the world's largest and most dominate naval force strongly signaling his intention to move forward quickly to help increase, integrate and extend its use of Unmanned Underwater Systems.

During his remarks at OceanTech Expo, Admiral Roughead engaged the audience in an informative *Q&A*, solidifying the notion that the U.S. Navy, from the top leadership down, is able and willing to engage industry to help it deliver on the promise of robotics underwater to help protect lives and make its diverse operations more efficient and cost-effective.

Starting on page 32, Admiral Roughead shares insights on the Navy's thinking today and going forward.

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MARINE TECHNOLOGY REPORTER
www.seadiscovery.com
Vol. 54 No. 5
ISSN 1559-7415
USPS# 023-276

118 East 25th Street,
New York, NY 10010
tel: (212) 477-6700;
fax: (212) 254-6271

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

POSTMASTER: Send address changes to MARINE TECHNOLOGY REPORTER, 118 E. 25th St., New York, NY 10010-2915. Postmaster send notification (Form 3579) regarding undeliverable magazines to Marine Technology Reporter, 118 East 25th Street, New York, NY 10010.

Publishers are not responsible for the safekeeping or return of editorial material.

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MacArtney Makes a Splash Simulating S&R @ OB'11

At the Ocean Business sonar execs from Kongsberg and MacArtney demonstrated how synchronized viewing of the same area with two sets of sonar eyes optimized sonar aided search and recovery.

Search areas can stretch over wide distances and pinpointing the exact location requires both large scale sweeping and fine detail searching.

Sonar systems are used to survey target areas and during the demonstration in Southampton, a Kongsberg rotating sonar head was placed on a tripod and lowered into the harbor basin. 360° sweeps soon identified key references, including the harbor wall, vessels moored, entering and leaving the harbor and an unidentified object – a simulated body. Product Group Manager, Bogdan Constantinescu from Kongsberg Mesotech demonstrated how readings on the screen relayed detailed information about the size and shape of the object and how the object can be geographically pinpointed for further identification.

Once a suspected target has been located, it needs to be identified. Using divers with lights and cameras to identify a target can be problematic in deep or turbid waters. Poor visibility can significantly affect the identification process by video or diver search. In some areas, divers are barely able to see further than their arm's length. Mike Sawkins from MacArtney demonstrated the advantage of using the DIDSON sonar system for close up identification in turbid waters. Once identified by the fixed, rotating sonar head, the DIDSON moved in to gain more detailed information about the subject. Detailed, near-video quality sonar imaging revealed the body in more detail – and when mounted on an ROV or in the diver held version, even closer study reveals even greater detail. Such detail is also important for identifying potential related evidence on the seafloor.

Searching and retrieving objects from underwater crime or tragedy scenes can be made more effective by combining the strengths of two different types of sonar systems. The demonstration of the two sonar systems side-by-side reflected how combining the two types facilitate the search, locate and identification process, making retrieving vital evidence from under the water precise and efficient.

110-ft. RV for Marine Surveying

Alpine Ocean Seismic Survey, a provider of marine surveying and data collection services, launched the multi-use research vessel, the R/V Shearwater. With the addition, Alpine can expand its offerings of turnkey data collection and other surveying services to offshore clients, including wind, tidal, civil engineering, shoreline protection, submarine cable, pipeline, oil, and natural gas project developers.

"The Shearwater is a state-of-the-art, multipurpose platform with fantastic maneuverability, and that means it's a great choice for both offshore and near-shore projects," said Robert Mecarini, executive vice president, Alpine Ocean Seismic Survey. "The flexibility means our customers can get a lot value for their money – we can deploy a variety of specialized equipment, collect data, and process it quickly right on board."

The shallow draft (6.5 ft.) 110 x 40 ft. aluminum twin hull Shearwater has numerous advantages for offshore work. Its superior positioning and line-keeping performance provides the essential components for both research work and transfer and supply services to development sites and working installations. The hydraulic propulsion system results in impressive fuel-efficiency and excellent maneuverability while reducing vessel noise.

The Shearwater also features two equipment moon pools, a crane, hydraulic stern A-frame, fixed starboard A-frame, dedicated equipment winches, laboratory and office space with onboard data processing capabilities, and can accommodate up to 20 people on a 24-hour basis.

Since its March commissioning, the vessel has completed several projects on the Gulf and East Coasts for clients including the U.S. Army Corps of Engineers and the NJ Department of Environmental Protection. Clients tout the vessel's unique configuration capabilities, spacious decks and workspaces, and a propulsion system that facilitates high-precision line- and station-keeping.

The R/V Shearwater is equipped with state-of-the art propulsion, lifting and lowering equipment, and hull customization that improve underwater data gathering, including:

- Hydraulic thruster propulsion with 360-degree rotation capacity
- Hydraulic crane with two-ton capacity at 38-ft. boom extension
- One-ton hydraulic stern A-frame
- Five-ton fixed starboard A-frame
- Dedicated equipment-handling winches
- Equipment moon pools in port and starboard hulls

Alpine Ocean Seismic Survey launched the multi-use research vessel, the R/V Shearwater.

Nautilus: New Partnership, New Vessel

Nautilus Minerals' plan to open a new frontier of seafloor resource production has taken a step forward, with the formation of a strategic partnership with German shipping company Harren & Partner. A joint venture company is to be formed to own and operate a production support vessel which will serve as the operational base for Nautilus to produce high grade copper and gold ore at its first development project, Solwara 1, in the Bismarck Sea of Papua New Guinea (PNG).

The vessel will be the floating platform for the mobilization and remote operation of production machinery operating on the seafloor at water depths of approximately 1600m. The seafloor production tools will cut and gather ore which will be pumped in slurry form to the Production Support Vessel, where it will be processed through a dewatering plant before transfer to barges for transport and subsequent treatment.

Under the terms of the strategic partnership, Harren will design and construct the vessel at a cost of approximately $167m, with delivery scheduled for the first half of 2013.

On delivery, the vessel will be sold to the Vessel JV in which Harren will hold a 50.01% interest. The remaining 49.99% of the Vessel JV will be controlled by Nautilus through a holding company in which the PNG government owns a 5% stake through its wholly owned company Petromin PNG Holdings Ltd.

The Vessel JV will charter the vessel to the mining joint venture, in which Nautilus holds a 70% stake and Petromin holds a 30% stake, to carry out its seafloor production operations, for a period of eight years, at an average daily rate of $70,000. Harren will provide crewing, logistics and ship management services to the Vessel JV which will be on charged at a daily rate of $10,000 to the Mining JV. The Mining JV will provide a charterer's guarantee to the Vessel JV for an initial value of $10m reducing over a five year period to $2.5m.

Funding for the Vessel JV will include approximately $99m in bank debt to be procured by Harren, which also will contribute $21m in equity and loans. Nautilus will contribute approximately $42m in equity and loans, and Petromin will contribute the remaining $5m.

"This transaction is a major step forward in the development of the seafloor resources industry," said Nautilus CEO Stephen Rogers.

"Through this joint venture with Harren, we will secure a state of the art vessel to operate on this ground-breaking project. This will ensure that we have the best available equipment and the greatest operational efficiency and flexibility in bringing Solwara 1 into production."

Harren has completed preliminary design for the vessel, a multi-purpose dry cargo ship classed by Germanischer Lloyd. It has a length of 208m, beam of 40m, a deadweight capacity of approximately 18,800 tons and a speed of 17 knots.

Taiwan Research Vessel Ready for Launch

The Taiwan Ocean Research Institute (TORI) is preparing the launch of the new 2,700 ton – ORV, Multi purpose Oceanographic Research Vessel, Research V. The vessel that is being constructed in the shipyard Jong Shyn Shipbuilding Group in Kaohsiung is scheduled to launch in June, and will be completed by 2012. Jong Shyn is responsible for the delivery of the complete research vessel to TORI and the Taiwanese science community. TORI is one of the National Applied Research Laboratories (NARL) in Taiwan.

Deck equipment and oceanographic winches are being supplied by Spanish companies. IBERCISA is leading the project for the supply of the scientific winches, working together with Industrias FERRI will supply two A-frames and Arm-Telescopic-Frame.

The Oceanographic winches designed and manufactured by IBERCISA include one Deep Sea Winch for 8,500 m fiber Technora cable that works in constant tension with a traction unit. The traction unit was designed to work with individual driven sheaves that are controlled by 8 motors.

They are controlled automatically, changing the sheaves speed according to the enlargement produced during the cable loading. This fiber cable will work with the aft A-frame supply by FERRI. Designed for a SWL of 15 tons for working conditions up to Beaufort 6, and with a working angle of 30º to aft and 60º to fore from vertical, and 9.5 m height, which is able to work with 3 blocks.

The Arm Telescopic Frame from FERRI, with 15-ton working capacity and 6.5m displacement, will work with the CTD winch, with 8,000m electromechanical cable from Rochester, which has a maximum speed of 100 m/min and 16-ton pull.

A portable electrical oceanographic winch with 3,500 m capacity was able to work even with starboard A-frame or Aft a-frame. The oceanographic winches were supplied from IBERCISA factory already with the cables spooled with tension, in order to avoid any damage and for an easy vessel installation. The total package includes windlasses, capstans, fairlead and the supply of the power packs to drive the A-frames, cranes and the winches. The Operation of the ORV shall contribute to Taiwan's ocean exploration and research capabilities.

Huisman Transports, Installs 5,000mt Crane

In March, Huisman, a Dutch-based specialist in lifting, drilling and subsea solutions, installed what it calls the world's largest Offshore Mast Crane onboard the Seven Borealis. This crane installation is considered as the heaviest and logistically most complex conducted by Huisman to date. After final load testing, Seven Borealis will depart for the Huisman production facility in Schiedam where a complete 600mt S-lay system will be finalized.

Transport and installation of the crane were performed under the responsibility of Huisman. The transport from the Huisman production facility in Zhangzhou, China to Sembawang Shipyard in Singapore was executed by BigLift's Happy Buccaneer, a heavy lift cargo vessel with first generation Huisman Mast Cranes (1984). At Sembawang Shipyard the crane was installed onboard the Seven Borealis in four days, a lift of approximately 1000t each day. The four crane pieces were installed in the following sequence: mast base, slewing section, boom and mast.

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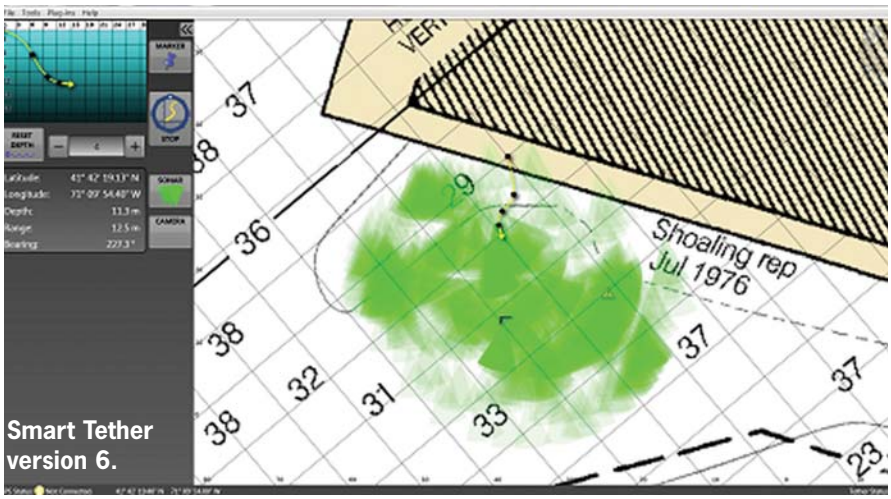
KCF Technologies: Smart Tether

From the search for discarded trash to the discovery of shipwrecked treasure to search and recovery missions for law enforcement, the demand and applications have increased for more sophisticated underwater exploration devices and underwater position software. In the last few months, KCF Technologies released software for its underwater navigation system, the Smart Tether, along with the new Tether Tender, a tether measuring device. Craig Thorngren, a retired Coast Guard Chief and the owner and principal of Submerged Recovery and Inspection Services, has been working with the Smart Tether product for about three years. "The software engineers deserve a huge round of applause from those who go out and use this gear regularly. They've not only improved the reliability of the system, they've made it much easier to use," said Thorngren.



Smart Tether version 6.

Smart Tether V6.0 – a complete redesign from its previous system – offers the ability to export data to Google Earth for enhanced mapping and GPS to navigate the ROV from a moving point. KCF Technologies has also added advanced zoom, pan, and rotate abilities, along with a quicker updating rate of 10 Hz to allow real time navigation. "It's a very intuitive onscreen display," said Thorngren. "The way you can overlay charts maps shows you where you've got coverage, where you're painting, where you're going, and whether you're using sonar or video searching. It just gives you a very high degree of confidence that you've searched an area and that there's nothing in that area," said Thorngren. Tom Wrasse, the Conservation Warden Supervisor for the Wisconsin Department of Natural Resources and new Smart Tether user, also believes that the Smart Tether will help tremendously in his Department's search missions.

"What I like about it the best is that I can now know where I've been and where I am, and I can mark targets on a map and I can go back to them if I need to. We're doing a lot of searching — a lot of our work has been searching for victims — and if we can eliminate going back over areas because we've already been there, we can do a full coverage quicker," said Wrasse.

www.smarttether.com

Subsea 7 Completes first AIV

Subsea 7 completed the design and build of the first commercial AIV, a technology which has the potential to revolutionize Life-of-Field projects. Subsea 7 has a plan to develop a series of Autonomous Inspection Vehicles (AIV), initially capable of general visual inspection, through to fully capable work-class sized intervention vehicles. A combined project team comprising hardware developers and operational personnel from Subsea 7 and Seebyte has been working together to deliver the first vehicle. The design and build of the vehicle is complete and successful progress through in-water trial and commissioning phase is underway. Following completion of extensive in-water testing and capability development, the first commercial AIV is expected to be available in late 2011. The vehicle is fully autonomous and will be designed to operate for a 24-hour period on a single charge of its lithium-ion batteries.

OPT Commences Trials of Wave Power Device

Ocean Power Technologies, Inc. (Nasdaq: OPTT) commenced ocean trials of the first of its new generation utility-scale PowerBuoy device, the PB150. With a peak-rated power output of 150 kW the PB150 is the largest and most powerful wave power device designed by OPT to date. This device was successfully deployed at sea on April 15, 2011 by a team including Scotland-based Global Maritime Scotland Ltd, Port Services (Invergordon) Ltd and OPT, with the support of the Cromarty Firth Port Authority.

CIDCO Purchases Iver2 AUV for Mapping & Research

OceanServer won a contract from CIDCO (Interdisciplinary Center for the Development of Ocean Mapping) for an Iver2 Autonomous Underwater Vehicle (AUV). CIDCO has a long history of facilitating new mapping technologies to further develop the maritime industry in Quebec, Canada. The new autonomous vehicle, equipped with Marine Sonic's HDS Sonar, will be used in near coastal waters including ports, harbors, lakes, and rivers for bathymetric surveys and modeling. The Center will also take advantage of the Iver vehicle's unique open system platform as a test bench to develop new applications and technologies. The multi-purposed vehicle will help CIDCO explore these new methods and tools to facilitate the logistics of data acquisition in shallow water. All Iver2 AUV models come standard with OceanServer's VectorMap Mission Planning and Data Presentation tool, which provides geo-registered data files that can be easily exported to other software analysis tools.

BlueView Receives Large Order From Seatronics

BlueView Technologies received an order for another 20 high-resolution P900-130 Imaging Sonar systems, and another BV5000-1350 3D Mechanical Scanning System from Seatronics, Ltd. In the coming months BlueView will deliver the systems to Seatronics offices around the globe in part to increase their international lease pool. These systems include some of BlueView's latest system options including built-in Ethernet extenders, and oil compensated electronics for a 4,000 meter depth rating.

AUV Pipeline Inspection

Kongsberg Maritime HUGIN 1000 Completes World's Longest Multi-Sensor AUV Pipeline Inspection

Kongsberg Maritime has completed the world's longest multi-sensor AUV pipeline survey using one of its HUGIN 1000 Autonomous Underwater Vehicles (AUV). The pipeline inspection took place February 9-11, 2011, in the Hjelte fjord near Bergen, Norway and the HUGIN 1000 was operated from the Royal Norwegian Navy vessel HNoMS Malty. The subject of the inspection was two subsea pipelines going to the Mongstad oil refinery. The HUGIN 1000 AUV was equipped with an advanced suite of Kongsberg imaging equipment including the HISAS 1030 synthetic aperture sonar, EM3002 multibeam echo sounder and an optical camera with LED lighting. The instruments were used to inspect around 30 km of subsea pipeline in an 8-hour, two-pass mission.

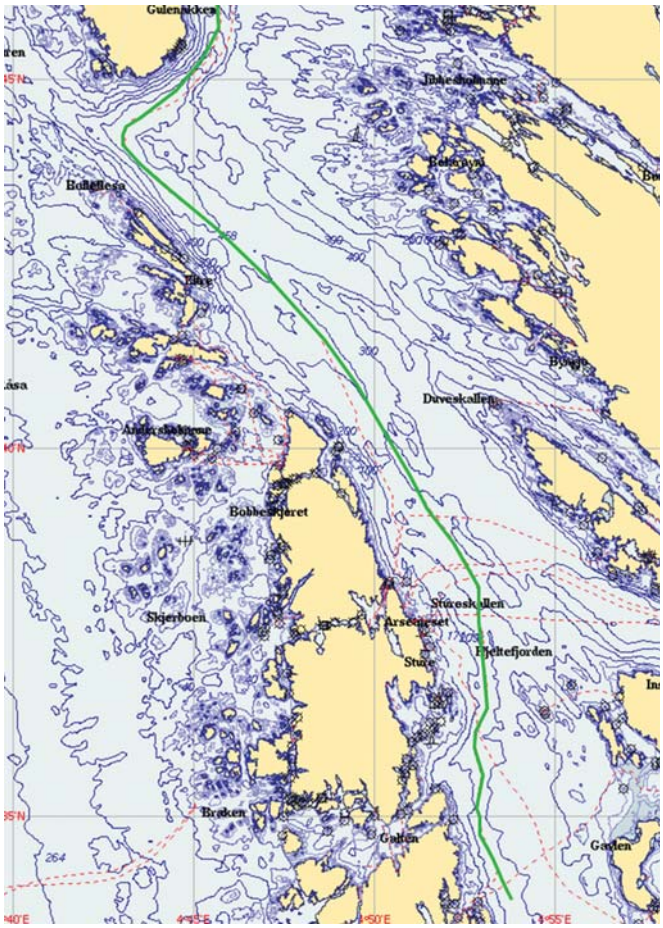


Figure 1: The first 8-hour mission (green line).

In the first pass, side-scan data from the HISAS 1030 sonar was used to detect and track the pipelines in real-time, using PipeTracker software for pipeline detection and tracking extracted pipe-like features in the sonar images, with a high degree of robustness towards false detections.

The PipeTracker software, which was developed in a collaborative effort with the Norwegian Defence Research Establishment (FFI) in a project funded by the Norwegian Research Council, runs as a plug-in module in the standard HUGIN payload system. The HUGIN 1000 control system in turn uses the identified pipeline tracks to position the vehicle at an optimal range for HISAS imaging. The whole process is fully automated inside the AUV and requires no operator intervention.

In the second pass, HUGIN followed the pipeline tracks identified in the first pass at low altitude and inspected the

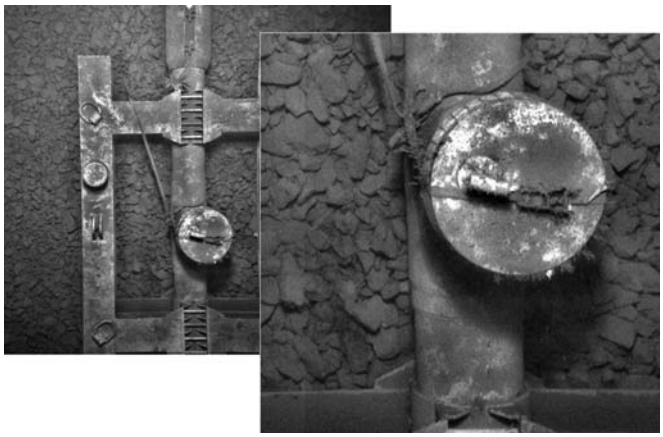


Figure 2: A single 3 Megapixel camera image. Altitude 4.6 m. Resolution 2x2 mm.

pipelines using the EM 3002 multibeam and the optical camera. After the mission, the recorded HISAS 1030 data was post-processed into high-resolution (4x4 cm) sonar images and bathymetry maps of the pipeline. Together with the optical images and the multi-beam data recorded in the second pass, this gave a detailed view of the pipeline surroundings and the pipeline itself. The complete procedure was repeated the next day over the second pipeline in a new eight-hour, two-pass mission.

Both pipelines were surveyed at a constant speed of 4 knots and at 4-25m altitude, depending on the sensor in use. Water depth was 180-560m. The greater speed of the HUGIN 1000 compared to that of a ROV meant that 60km of pipeline could be inspected in a little over 16 hours during the two passes. Furthermore, the stability of the HUGIN platform and the ability to simultaneously operate both at high speed and at low altitude resulted in an efficient survey with crystal clear images from the onboard optical camera.

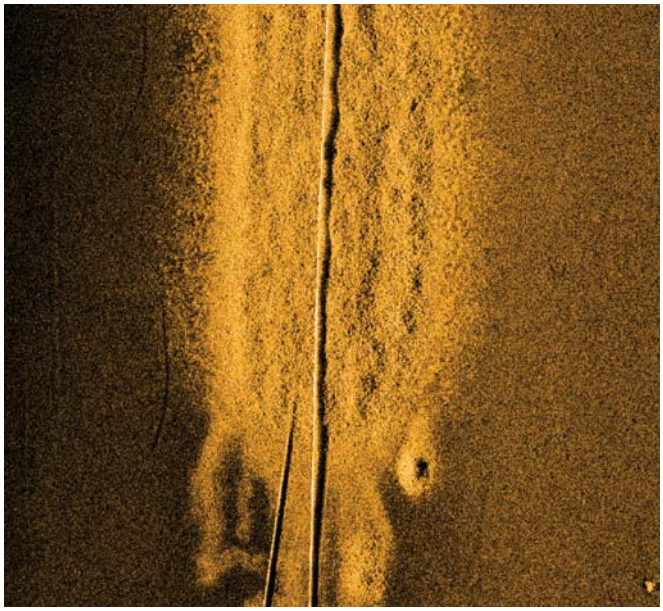


Figure 3: HISAS image. Area 120 x 90 m. Range 32-152m. Resolution 35 x 35 mm.

Easytrak Nexus Top Marks for Accuracy

The Easytrak Nexus has been deployed on various subsea tracking surveys across the globe since its introduction in 2009 and is currently being used nearer to home during the geophysical survey of sections of North Sea, close to shore. The Geosurvey Department of Emu Ltd, a marine development, research and planning company based in Southampton, UK, is using the Applied Acoustics' system on several high resolution Windfarm Engineering and UXO (Unexploded ordnance) surveys off the East coast. It is currently on the 12m vessel Emu Surveyor, being used to track towed sensors in less than 5m of water. Two further Nexus systems are on hire for similar jobs, one on the 24m Survey vessel RV Discovery and one on a charted vessel Nabcat II.

Emu has found the Nexus system particularly reliable and accurate in shallow water environments compared to other USBL systems they have used, and have been impressed with the consistency of results.

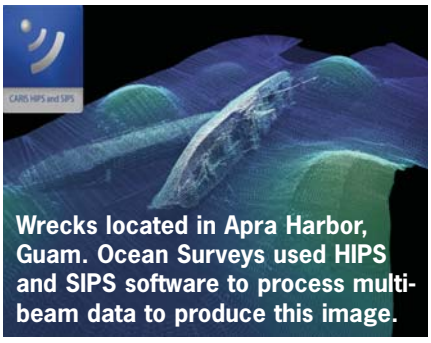
"We undertake a wide range of geophysical and hydrographic surveys for a variety of customers including scour monitoring, pipeline surveys and ports and harbour surveys in addition to the Coastal Windfarm Engineering and UXO survey we are currently engaged in," said Richard Hamilton, Marine Geophysicist with Emu, "and of course in each case we always employ the latest technology from our survey vessels to provide cost effective world class results. The selection of the Easytrak Nexus system for positioning and tracking towed sensors is yet another example of us sourcing the best kit available."

Easytrak Nexus is a rack-mounted USBL positioning system incorporating Digital Spread Spectrum Technology in its design. This reduces the transmitted acoustic signals' susceptibility to interference enabling the calculation of accurate positioning information. The technology also rejects unwanted reflected signals that have made operating in challenging locations such as ports and harbours difficult in the past.

The North Sea survey work currently being undertaken by Emu represents the early stages of significant windfarm expansion plans formulated by the UK Government that is committed to raising the proportion of energy derived from renewable sources from 2.4% to 15% by 2020.

Processing Efficiencies Realized with Latest HIPS and SIPS

CARIS released a 64-bit version of its comprehensive hydrographic processing software HIPS and SIPS. HIPS and SIPS 7.1 with 64-bit support will provide users who have access to a 64-bit computer the ability to handle large multibeam sonar



Wrecks located in Apra Harbor, Guam. Ocean Surveys used HIPS and SIPS software to process multibeam data to produce this image.

datasets even faster. This will provide organizations with significant savings in time, which is crucial for marine surveying organizations that wish to make efficiencies.

In-house tests revealed that the CUBE surface creation and Merge processes are now 15-30% faster respectively. The 64-bit technology also allows access to larger banks of RAM, increasing the ability to multi-task while processing.

HIPS and SIPS supports over 40 sonar and LiDAR formats, allowing it to process data from virtually any system configuration. The software also includes the latest seafloor classification tools and workflows, enabling the optimum amount of information to be extracted from organizations' seafloor measurements.

"With this release of HIPS and SIPS we have listened carefully to what our clients have requested," said Corey Collins, HIPS and SIPS Product Manager. "They are telling the team here that support for 64-bit processing power is becoming a priority due to the increasing size of their sonar data. They are telling us that they want the most stable hydrographic processing application available on the market. We are happy that we are able to deliver on these priorities with the release of HIPS and SIPS 7.1."

A new license string will be required to make use of the new 7.1 features. Each of the individual licenses are unique and will only work with the corresponding HIPS and SIPS 7.1 software, as well as earlier versions.

Email: support@caris.com
www.caris.com/products/hips-sips

Cmdr. Krepp Takes Command of NOAA Ship

NOAA Corps Cmdr. Lawrence Krepp has assumed command of NOAA Ship Thomas Jefferson, one of the world's most technologically advanced hydrographic survey vessels. At a May 6 change-of-command ceremony in Norfolk, Krepp relieved Cmdr. Shepard Smith, who will serve as senior advisor to Kathryn D. Sullivan, the newly appointed assistant secretary of commerce for environmental observation and prediction for "Cmdr. Krepp is a proven leader who is committed to providing the highest level of science, service and stewardship to the nation," said Rear Adm. Jonathan W. Bailey, director of the NOAA Office of Marine and Aviation Operations and the NOAA Corps.

Nuts & Bolts

Orphan Industries' L&R System

by Andrew Safer

In a 20,000 sq. ft. fabrication shop in St. John's, Newfoundland, Canada, Orphan Industries Limited's 50 welders, pipefitters, millwrights, and electricians work 12-hour shifts around the clock, building ROV launch and recovery systems (LARS) and other subsea equipment, primarily for the offshore oil and gas industry. In Orphan Industries' test facility outside, the LARS that has just been built is picking up a 40,000-lb. load weight to simulate an ROV and manipulating it back into position. Once the tests are complete, this unit will be loaded onto a tractor trailer and shipped to Dynacon Inc. in Bryon, Texas where the winch will be added and the complete system tested before it is transported to a location offshore Africa where it was designed to operate. The LARS are deployed on offshore supply vessels and rigs around the world. Dynacon builds its own LARS but contracts Orphan Industries to handle the overflow. In addition, Orphan Industries is a major supplier of LARS for Houston-based Oceaneering International, Inc. which pairs the LARS with its own ROVs. Dynacon and Oceaneering are major suppliers of LARS for the offshore oil and gas industry.

Orphan Industries' A-frame LARS are fabricated from low-temperature, high-impact steel. The units range in weight from 42,000 to 58,000 lbs., are nearly 11 ft. wide, 24 ft. deep, and extend to a maximum height of 29 ft. Its lifting capacity is 30,000 lbs. and in the overboard position it is capable of putting the ROV into the water 13 ft. from the edge of the vessel. The company's test facility incorporates a concrete pad that weighs 260,000 lbs. which enables them to do static A-frame load tests up to 56,000 kg.

In addition to LARS, Orphan Industries also builds subsea well temporary guide bases (TGBs) and permanent guide bases (PGBs) for Cameron International Corporation (Houston), spooling for Transocean (Houston) and Atlantic Towing (St. John's), winches for Dynacon, and shipping containers for Harvey's (St. John's). Jobs on the fabrication shop floor on this day include: the base and part of the crown of a DT 4400 LARS for Oceaneeering, a gas uplift pipe for the dehydration structure at Hibernia, a flexpipe for a winch platform at Hibernia, drill collars requiring maintenance work for Schlumberger, and tubular steel, which will be fabricated into a container.

DFB Group, a St. John's company that manufactures, fabricates, services and repairs offshore, marine and industrial equipment, established Orphan Industries, a wholly owned subsidiary, in 2005 to manufacture LARS. "We're not steel-bashing machinists," explains DFB Group's Chief Engineer Torfi Thorarinson. "What we build has gears, belts and hydraulics, as opposed to just welding steel together." He recalls that Orphan Industries competed with 25 bidders worldwide for the first contract to build five DT4400 LARS for Oceaneering. Orphan Industries and one other bidder in Singapore were awarded contracts to build three, with the promise of another two if they maintained the schedule and quality. "We won the contest, got the next order for 10, and have continued to build for them ever since," Thorarinson said. To date, the company has built 57 LARS which are being used by all of the major oil companies on offshore supply boats and rigs in various locations around the world including Newfoundland and Labrador, Singapore, Norway, and Africa. The number of LARS shipped has increased sharply from 10 in the first three years to 47 in the last three years. Sean Power, DFB Group Vice President Business Development, attributes much of that growth to Orphan Industries' inroads in improving plant efficiencies. The company initially enjoyed a 20 per cent competitive advantage internationally due to a favorable exchange rate between the US dollar and Canadian dollar. When they lost that advantage, they started looking for ways to streamline production. "We hired one of the best lean

(Credit: Andrew Safer)

Orphan Industries Chief Engineer Torfi Thorarinson beside a structural component of LARS. The white spray paint indicates where a weld has been inspected.

manufacturing experts in the country three years ago," Power says. Since then, the time it takes to build, paint, and test one LARS has dropped from 4,000 hours to under 2,000 hours, reducing delivery time from two months to one. One example of eliminating wasted man hours is not having to spend 10 minutes a day looking for a tool, which saves 2 hours and 15 minutes a week per person in lost time. Profit sharing provides an incentive for employees to participate in the process. Thorarinson and Power emphasize that safety is priority number one. Before starting work, the employees rate the risk of each job using field level risk assessment cards and then figure out how to mitigate the risk. That could mean using a full harness with double lanyards to weld eight feet in the air, erecting scaffolding, or calling on someone with lifting experience before moving a heavy piece of equipment. "What we're most proud of is our safety record," said Thorarinson. "Safety isn't something you shove down someone's throat. It's a culture we've built here," pointing to a sign on the wall in the front office that reads: "1,115 days without a lost-time accident."

Drilling and exploration activity in the Gulf of Mexico is still slow following the Macondo Blowout and as the economy recovers from the recession, says Power. "But business has been picking up," he adds. "Permits are being issued. I'm pretty optimistic about LARS over the next 12 months."

Five Minutes With

Lee Thompson, Ph.D.

CEO/CTO, and Founder of BlueView Technologies, Inc.

What is your background?

Thompson I have been involved in high resolution acoustic imaging since I started my career. My first job was developing advanced mine countermeasures sonar with the US Navy lab in Panama City, FL (NSWC-PC). As a civilian employee of a US Navy Lab, I became aware of the many challenges confronted by the military personnel when accomplishing their missions in the marine environment, particularly in the area of underwater sensing. These are similar challenges to what many maritime professionals deal with every day, from the oil and gas industry to port security. That experience instilled in me a deep interest in delivering new, better, and reliable solutions to maritime professionals in the field. That interest is what drives us at BlueView. Delivering a new solution that makes a real difference to our customers, whether their job can now be conducted safer, faster, or better, is what is really exciting and satisfying.

How did you come to be involved in the industry?

Thompson I think an interest in the maritime industry was really in my blood. I grew up fishing, diving, and boating in and around the often-murky waters near Tamp Bay, Fla. I always wanted to be able to see better underwater, whether I was diving on a wreck or avoiding a rock or sandbar in a boat. There was never enough visibility for me. When I first learned about acoustics, I was hooked because I knew it could be a great tool for solving many underwater vision and measurement challenges.

Please give a brief description of BlueView

Thompson BlueView is a company that uses focused R&D efforts to deliver easy-to-use technology breakthroughs. It is a US based manufacturer and a spin out from the Applied Physics Lab at the University of Washington. BlueView was founded in 2003 with my partners Jason Seawall and Scott Bachelor. Today, it is a rapidly growing organization that delivers underwater

vision and measurement solutions with more than 500 systems installed worldwide.

What do you consider your core business?

Thompson Our 2D imaging sonar or 'acoustic cameras' are fast-becoming standard tools for both offshore and inshore operations. As a pioneer in multibeam sonar, we consider our 2D multibeam imaging sonar systems to be our 'core business.' However, we continue to develop new solutions, like our 3D scanning and MicroBathymetry solutions.

What are the core strengths of your company?

Thompson BlueView's core strengths are our innovation and technology, an exceptional team, and strong

industry partnerships. We also have a broad suite of compact, low power, high resolution 2D and 3D product solutions that work extremely well for a wide range of energy, defense, and industrial applications. In addition, I think one of the greatest strengths of our company is the ability of our products to uniquely make many underwater operations more efficient, and consequently to significantly reduce operational costs for the customers.

How has the subsea industry changed most significantly in your career?

Thompson I have seen a significant shift toward more aggressive technology investment and rapid adoption during my career. Maritime professionals still want to know that a new solution will work before they commit, but the subsea industry has been growing more progressive over the years. There is a palpable sense that new solutions are critical to solving the maritime energy and defense challenges we face today.

What, in your opinion, have been the most important technical advancements in the past few years?

Thompson I think the increased use of remote semi-automated and fully-automated robotics for real-time, sensor-based operations is one of the most important technical advances. This is still in the early phases, but it will be transformative in the next decade. I am also very excited about the opportunities for high precision 3D acoustic measurement tools to fundamentally change both inshore and offshore operations. The ability to measure and visualize details and subtle features in 3D and in any water clarity conditions means that a lot of jobs can now get done that were not previously possible.

How is BlueView investing today?

Thompson We are investing heavily in R&D, especially on enhancing our 3D technology to deliver flexible, accurate, and reliable systems that meet our customer's needs. We are also working on new interface solutions that make our systems even easier and faster to integrate.

What is the biggest challenge to keeping ahead in your sector?

Thompson I think one of the most important things a high tech company can do is to deliver breakthrough products that are also easy to use. It actually takes quite a bit of work to make such products, but it is critical to the user's success in the field. We work really hard to make our systems easy to use, but also include open architecture options for the power users.

What is on the horizon – in terms of competition, legislation, or technology – that you believe will change the way you do business most in the coming decade?

Thompson I think there are a number of key drivers. The marine industries will continue to rely more and more on sensor-based automated systems. We are positioning our development efforts to help this industry transition to be as efficient and smooth as possible. Also, I think the maritime industries will continue to be motivated by an increasing amount of required monitoring and inspections in challenging environments both inshore and offshore. It will be critical to have accurate, sensitive, and reliable underwater sensor solutions to meet these requirements.

World Wave & Tidal Market

With $1.2 billion of capital expenditure forecast between 2011 and 2015, wave & tidal current stream is entering a commercial period. Small commercial projects are starting to be realized with a dramatic increase towards the end of the forecast period.

With $1.2 billion of capital expenditure forecast between 2011 and 2015, wave & tidal current stream is entering a commercial period. Small commercial projects are starting to be realized with a dramatic increase towards the end of the forecast period. This increase is led in large part by the UK's first licensing round, which has encouraged large projects to come forward from utility companies. A growing number of wave and tidal current stream technologies have progressed to a near-commercial status. The next two years will be vital in creating an investment environment that allows the financial community to fund these projects and to invest in the necessary supply chain.

Market forecasts

A total of 150MW of wave and tidal current stream capacity is forecast to be installed between 2011 and 2015. Installations in 2011 are more than double those in 2010 and further rapid growth will take place as more devices are installed at full-scale and the first commercial projects start coming online. Commercial projects take-off noticeably in 2014 when installations more than double. Installations are set to increase further in 2015. There is some upside potential given that developers have not in all cases planned projects beyond their pre-commercial devices.

The largest market is the UK, which is set to install 110MW of wave and tidal current stream projects over the next five years. An excellent wave and tidal resource, together with encouraging levels of government funding, market mechanisms and site licensing make the country the strongest market for both wave and tidal. Driven by a strong tidal resource, strong R&D and support, Canada is the second largest market. The USA is also making progress, again with much R&D funding attracting developers. Split by sector, it is evident that tidal current stream installations are expected to be greater than wave (91MW against 59MW) over the next five years.

Over $1.2 billion of capital expenditure (capex) is expected in the 2011-2015 period. This is six times greater than the $188 million spent over the previous five years. The big increases in 2014 and 2015 are due to the first significant commercial projects coming online. The UK is by far the biggest market; capex here will reach almost $900m across the next five years, with annual expenditure topping $500m in 2015.

Split by sector, tidal current stream projects will see almost 54% more expenditure than wave. The tidal sector is expected to see capex of close to $750m over the next five years, with annual expenditure of over $260m by the end of the period. Wave energy projects will see expenditure of almost $500m over the 2011-2015 period with annual spend reaching $250m in 2015.

Market Issues

- **Costs** – With few devices yet installed in their commercial guise and fewer still in multiple-unit installations, the full future cost of wave and tidal farms is uncertain. As expected, costs are high at present but have significant potential for reduction as the supply chain develops and manufacturing begins. Wave and tidal will also require higher levels of support from appropriate market mechanisms (such as feed-in tariffs or green certificate schemes) than more established technologies such as wind.
- **Financing** – The development of offshore wind in the last decade has shown the importance of creating confidence amongst investors in the sector. Long-term market mechanisms and commitment to the sector must be driven by individual governments. The leading wave and tidal technologies have already seen considerable investment from a wide variety of sources – taking a device from conception to full-scale prototype costs between $40-70 million. The increasing involvement of utility companies is expected. With utilities heavily involved in offshore wind in Europe, many are now investing in wave and tidal technologies. Large-scale project financing has not previously taken place, given the lack of large projects to-date, but is now underway as initial commercial projects draw closer. The large diversity of devices within each sector creates uncertainty, so it is essential that government funding be in place to help devices get to a pre-commercial stage.
- **Supply chain development** – One of the most challenging aspects of wave and tidal sector growth is supply chain development. Whereas the offshore wind industry grew coupled with a strong onshore wind supply chain, the marine renewables sectors are more isolated. The diversity of different wave & tidal devices in comparison to the similarities between wind turbine devices indicates that supply chain development will be more challenging. For manufacturing companies, tooling-up for supplying a small number of (or a single) wave & tidal devices could be difficult and impede cost reduction.
- **Grid connection** – Grid connection represents a major constraint for marine renewables deployment in several countries. The variability of the output together with the remoteness of many sites makes grid connection a challenge to commercial development. With projects often located away from areas of demand, grid upgrades are required. In some countries, such as Portugal, this is not a significant issue, but countries such as the UK, particularly Scotland, have much to overcome. While grid upgrades are planned, these have not been done with marine renewables in mind. The expansion of other renewable sources, such as wind, presents competition for grid and transmission capacity.
- **Installation** – It should be recognized that final installation techniques have not yet been developed for devices. Prototype installations have often been completed using any available vessels. In these installations, speed of installation is not the critical factor. On large commercial projects, the installation methodology will change and evolve.

Competition with other sectors such as offshore wind is possible for some devices in some locations. However, we would expect greater diversity of vessel types given the range of devices, water depths and foundation/mooring types. Once large numbers of individual devices begin to be installed, vessel operators may emerge with specific offerings, if there is sufficient market

demand. Piling and installing tidal turbines is a specific sub-sector where there could be sufficient commonality between devices, from different markets, for a specific installation service to be offered. Further device manufacturers will likely develop their own vessels, where cost effective, especially if O&M activity involves removal of the device. Devices themselves will need to be refined to find the most cost-effective installation methodology. Project developers will not want to be beholden to heavy-lift vessels for installation given the competition for these vessels, day-rates and weather window risks.

- **Survivability** – Wave & tidal devices operate in difficult environments and survivability is critical. This relates to internal components and the entire device also. There have already been cases of devices being washed ashore from storm damage to moorings. Devices must be able to survive predicted and extreme weather conditions (wind, wave, current, temperature, etc.).

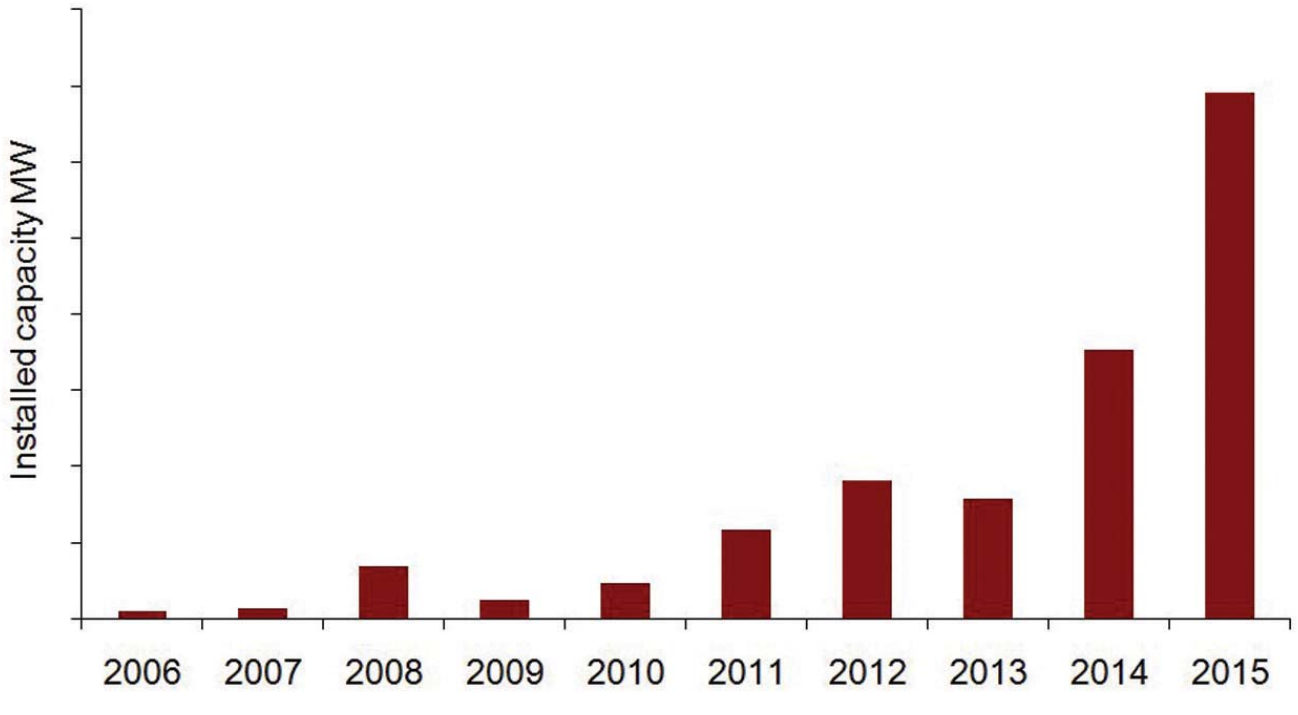
Overall reliability is critical and, in this respect, consideration must be paid to the effects of structures in the water for very long periods – and what remedial works need to be built into plans for regular maintenance (acceptance or removal of fouling, for example). The ability to map and predict the resource and the device's ability to perform accordingly is key to the predictable power output and behavior. This is achieved through thorough resource analysis, accurate weather forecasting and detailed modelling on the device and of waves/currents.

There have been a number of publicly-documented instances of wave and tidal current stream devices breaking free of moorings or sinking over the last decade, but these are to be expected, as all the devices concerned were prototypes or developmental units whose purpose was to identify potential areas of improvement before commercial operations. Some of these incidents have contributed to issues with financing or permitting of future developments, with one case of a developer leaving the sector altogether. It is apparent that manufacturers have not invested in on-site replacements for critical parts, although it is acknowledged that these instances are pre-commercial demonstration and development systems. Lead times for blades and rotors using aerospace materials and manufacturing techniques are substantial and delays often mean that suitable weather windows for replacement can be missed.

About The Authors

Ian Jones is an analyst for DW, contributing to the firm's

Figure 1: Wave & Tidal Current Stream – Installed Capacity 2006-2015.



commissioned research, commercial due diligence and published market studies in the oil and gas and renewable energy sectors. Recent work includes a major study on building an industry for RenewableUK (Formerly BWEA), a major strategic study on Norway's offshore wind options and 2020 targets for the UK's Department of Business, Economics & Regulatory Reform. He is a contributing author of DW's renewable energy publications including The World Wave & Tidal Energy Market Report and The World Offshore Wind Market Report.

As a senior analyst, **Frank Wright** project manages commissioned research and market studies with a focus on renewable energy. He studied mechanical engineering at the University of Edinburgh and then worked for Aberdeen Drilling Consultants as a project engineer. He then completed a postgraduate degree in Industrial Design Engineering including a design project with Unilever. At ITI Energy he worked as a technology analyst carrying out detailed market assessments and developing R&D programme proposals. Prior to joining Douglas-Westwood, Frank led market analysis activity at Scottish Enterprise in offshore wind and was on the selection panel for the Wave and Tidal Energy: Research, Development and Demonstration Support (WATERS) fund.

Buy This Report

The World Wave and Tidal Market Report 2011-2015 is now in its second edition. The report focuses on the current and future prospects, technologies and markets for the wave and tidal current stream sectors. The report provides a comprehensive and fully illustrated review of different technological concepts and devices employed in both existing and future projects.
Further information is available at www.dw-1.com. The authors can be contacted via research@douglaswestwood.com or +44 1227 780999.

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From satellite imagery above to oceans below

How We See

To observe the earth, man has operated from observational data for hundreds of years. But now with the rise of satellites and remotely sensed data, will this change how humanity views the oceans?

by Tyson Bottenus

Evan Howell has it tough. He's a research oceanographer at NOAA studying how endangered species such as the loggerhead sea turtle (Caretta caretta) migrate across thousands of miles. In one sense, he's an environmental steward: a scientist and a manager monitoring a domain that encompasses millions of square miles. It's a daunting job but it's one made significantly easier with the rise of remote sensing. It's also become more complex with the rise of remote sensing. As Howell and other oceanographers have learned, the ocean is not just one massive expanse of water – it's an amalgam of different marine habitats all shifting and changing on seasonal, interannual and interdecadal timescales.

Today, ocean scientists like Howell can study the ocean using remote sensing in a variety of ways. The first reliable sea surface temperature maps of the ocean came about in the early 1970s. Ocean color, a proxy for biological productivity, came twenty years later. Add ocean topography, significant wave height, continental and sea ice extent (and thickness), surface vector winds, time-varying gravity and soon sea surface salinity to the list, and one gets the idea that there's almost nothing we can't monitor from space these days. Factor in the costs of current in situ data collected by oceanographic vessels and one begins to wonder why we even leave our chairs to collect data in the open ocean at all.

What's significant is that this data is available to fishermen, policy analysts, and industry experts. But how exactly is this data being used and what does the future hold? If it remains true that science acts as a bellwether to how other stakeholders will respond, the next coming years should produce some interesting tools designed using remote sensing technologies.

Reducing Bycatch

Depending on the time of year, if you travel somewhere between 500 and 1,000 nautical miles north of the Hawaiian Islands, you will enter a region of the ocean known as the Transition Zone Chlorophyll Front. It's a thin band, only 300 nautical miles stretching north to south, but from east to west, it extends over 4,500 nautical miles across the entire North Pacific Ocean. Oceanographers call this area the transition zone because it marks the transition between the oligotrophic (low in chlorophyll) sub-tropical gyre to the south and the highly productive sub-arctic gyre to the north. In the summer, the transition zone can be found farther north, but in the winter the transition zone can move over 500 nautical miles closer to Hawaii. Swordfish migrate along this area, making it a hot spot frequented by longline fishermen. But loggerhead turtles share this aquatic highway as well and frequently become caught as incidental bycatch.

Shallow sets were banned in 2002 due to increasing numbers of loggerhead bycatch by the Hawaii longline fishery. They became legal again in 2004, but only to a limited fishery and with significant gear restrictions (i.e. circle hooks, designed to limit the bycatch). A take limit was also enacted, which entailed that if seventeen loggerhead turtles were accidentally caught, the season would be terminated prematurely.

The longline industry was closed two years later. "In March 2006, the seventeen loggerhead turtle-take limit

was reached, forcing the closure of the shallow set fishery," says Howell. In response to this closure, NOAA began working on a dynamic product that would show spatially where the highest number of loggerhead sea turtles was more apt to be found. Based off work by Jeffrey Polovina, Donald Kobayashi and with other colleagues at the Pacific Islands Fisheries Science Center (PIFSC), Howell looked at all the data he had from logbooks taken from the long-line fishing industry, what loggerhead turtles and sword-fish were more prone to eat, sea surface temperature, and chlorophyll-a data that had been gathered remotely, along with migration routes from several turtles that had been outfitted with satellite transmitters. Most of the work, admits Howell, had already been done by others.

"PIFSC has been going up to the transition zone for a long time," Howell explains. "There's a 1980 technical report with a bunch of nice work from up there". Before Howell, much of the research on this ecosystem had been teased out. PIFSC knew that ecological domain after having observed remotely sensed data and linking this with in situ observations made from oceanographic vessels. They had already tracked turtles using satellites. But none of this research had been assimilated into an operational product that stakeholders could use. Enter TurtleWatch.

Evan Howell

For an operational product that the fishing industry could use easily, Howell used work from his colleagues at PIFSC who found that there was a strong relationship between sea surface temperature and where loggerhead sea

turtles were being caught . Ocean color was not relied on heavily in this product. "Chlorophyll-a data is problematic when there are clouds , which are pretty much a given in a frontal zone," explains Howell. Since fishermen use sea surface temperature to look for "hotspots" anyway the choice was made simple.

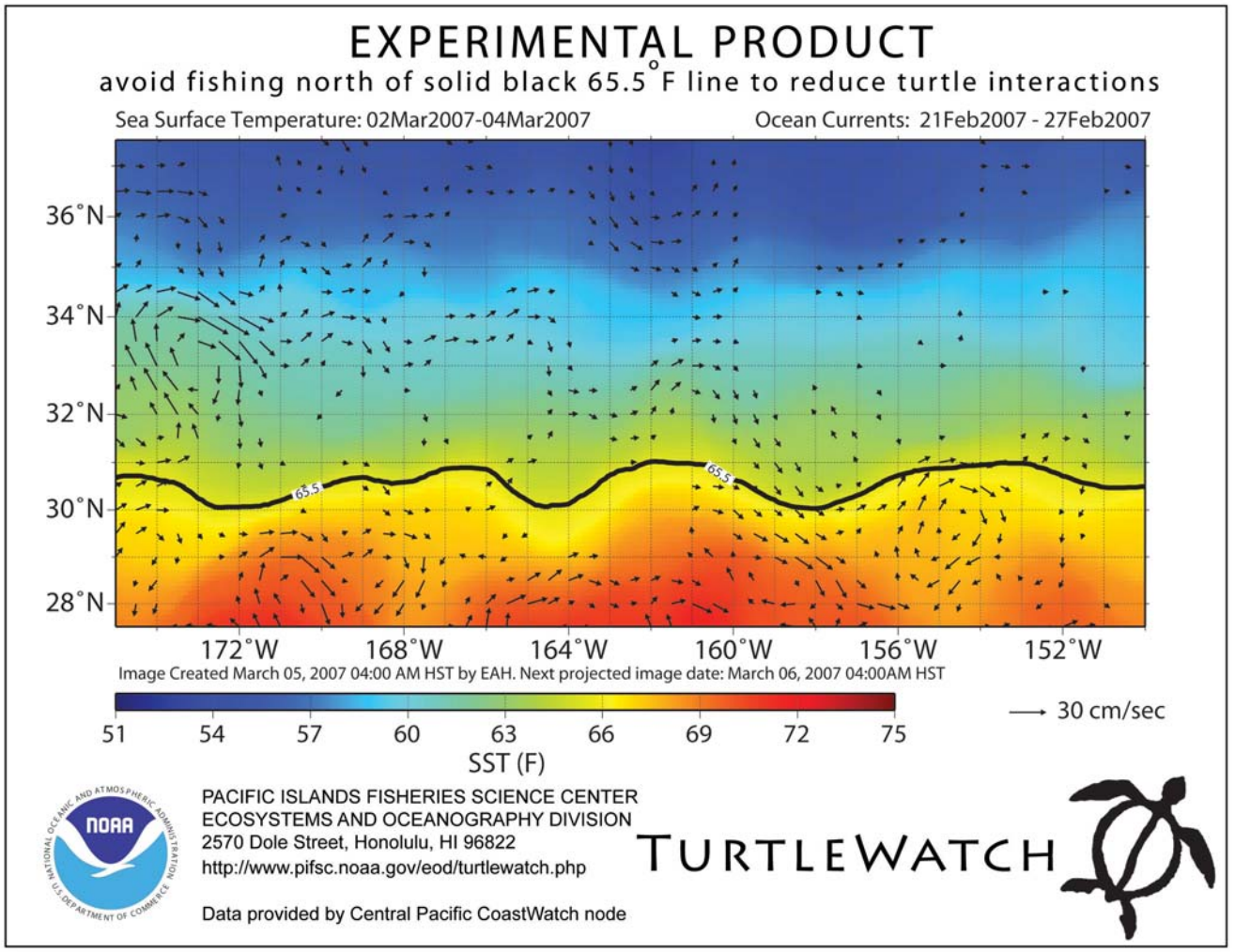
In December of 2006, nine months after the premature ending of the Hawaiian longline fishery, an experimental version of TurtleWatch was released in hopes of helping to curb the problem of loggerhead bycatch. Fishermen were told that this was an experimental product and that it should be taken under recommendation. Twelve loggerheads were caught in 2007, with eight of those incidents occurring in the surface temperature range; right where TurtleWatch recommended fishermen to avoid setting shallow longlines.

After 2007, fishermen who were willing to try anything to stop the bycatch epidemic got the picture . Between 2008 and 2010, almost no loggerheads were reported as incidental bycatch.

Initially, NOAA personnel gave out copies of the TurtleWatch product to departing vessel captains. But as TurtleWatch became seen as reliable within the industry, a company called GeoEye, which provides fish finding maps to fishermen, took up the product.

"GeoEye collects satellite data from several different sources, registers that data to a map projection and sends this to subscribers," says Chris Wilson, Senior Director of Sales and Marketing for GeoEye. "On board, the captains use a software application to pull in the data automatically for viewing and interpretation. The software has powerful tools to filter data sets based on what conditions the

Original printout from TurtleWatch when it was released to the public in 2007. The initial product drew a line where fishermen should not cross north. Anything colder than 65.5 degrees Fahrenheit was considered populated by loggerhead turtles.



captains are looking for."

"With tuna and swordfish being so highly migratory, our aim is to provide the fishing industry and management officials the best possible data on where fish might be located," explains Wilson. With regard to TurtleWatch, Wilson only has praise for the product: "it's a fantastic program."

The Future of Remote Sensing

Howell's decision to use sea surface temperature was based partly on the lack of quality that ocean color can currently provide and also on the basis that many fishermen only use sea surface temperature to gauge where to fish. But as GeoEye is starting to show, there is a new generation of fishermen out there who are equally aware of the value satellite data can have.

One of the more significant data sets GeoEye offers commercial fishermen is ocean color, a proxy for biological productivity. "From 1997 to late 2010, [ocean color] data was collected by SeaWiFS (Sea-viewing Wide Field-of-view Sensor) on the OrbView-2 satellite." In 2010, SeaWiFS – long past its design life – became inoperative, forcing GeoEye to just use data from the MODIS (MODerate Resolution Imaging Spectrometer) satellite for ocean color data.

But MODIS is also past its design life, leaving some concerned about the future of ocean color. The next ocean color satellite due to launch is the Visible/Infrared Imager Radiometer Suite (VIIRS) in 2012. If MODIS goes down before this satellite is launched, there will be a gap in the global ocean color data. Europe launched its own ocean color satellite in 2002 – MERIS (Medium Resolution Imaging Spectro-meter) – but it has been criticized for having less frequent coverage than MODIS. Two more ocean color satellites, JPSS-1 and JPSS-2 (Joint Polar Satellite System) are also slated to launch in 2016 and 2019, both well off in the future.

Technologically speaking, future satellites are expected to include the ability to monitor ocean color in coastal areas as well as in the open ocean. It is difficult to gather data from coastal areas because of suspended sediments and organic matter in the water. MERIS has the ability to monitor coastal environments, but data from this satellite are largely inaccessible. Data accessibility from ocean color satellites is crucial if other satellite projects expect to get funding.

Geostationary satellites are also making their debut for scientists and managers who need multiple observations of one region in the ocean during a single day. South Korea recently launched GOCI (Geostationary Ocean Color Imager) over the East China Sea in 2010. An expected follow-up mission has been tentatively set for 2019.

As it stands, operational products founded on remotely sensed data is still in its infancy. Many fishermen rely on sea surface temperature, but companies such as GeoEye and scientists like Evan Howell are changing this model. Other parameters such as ocean color are slowly being looked at more and more extensively by scientists, managers and fishermen. With ocean color data, we have the ability to look at the ocean in an entirely new light: one that will hopefully suply fishermen with enough fish to catch and endangered species with a stronger chance for survival.

Tyson Bottenus is a maritime writer currently based in Massachusetts. In the fall, he will be attending graduate school at the University of Washington.

MTR's Seamaster of 2011, U.S. Navy Chief of Naval Operations (CNO)

Admiral Gary Roughead

Admiral Gary Roughead shares with Marine Technology Reporter his views on the U.S. Navy's ongoing commitment to enhancing the capabilities and use of Unmanned Underwater Systems in its effort to extend its dominance at sea for another generation.

By Greg Trauthwein, Editor

Unmanned Systems (robotics) have had a dramatic effect on the way in which the U.S. military conducts its business. Can you put in perspective for me where the U.S. Navy is in its use of Unmanned Underwater Systems, compared to unmanned system usage in the other military services?

Adm. Roughead The Navy has been working hard to incorporate unmanned underwater vehicle (UUV) systems in the fleet and we have been very successful in several areas. We currently have UUVs that perform ocean sensing, shallow water mine search, battlespace preparation, hull inspection, and pier and piling inspections. These systems perform important functions, typically in limited duration missions. We are working aggressively on developing UUVs for longer endurance missions and are centering our efforts in finding power solutions – specifically, safe, shipboard energy storage capacity. We are a globally-deployed force that may be employed far from any support. For that reason, our UUV system development is focused on developing vehicles that are not energy constrained.

Last Year (July 2010) you called several industry leaders to Washington for a frank discussion on advancing Unmanned Underwater Systems in the U.S. Navy. What was the impetus for this meeting, at this time?

Adm. Roughead I wanted to relay to industry leadership our vision for a future Navy that includes a potent unmanned underwater vehicle force, and to seek their assistance in achieving that goal. Although there are some differences between systems currently being used in industry and those that we need for naval missions, I believe that industry can inform the Navy on unmanned systems. The biggest gap that I saw was energy. My discussion with industry was really to spark a dialog about what technologies exist now to allow us to move forward and look for broader opportunities to integrate with industry.

Given the types of systems the U.S. Navy is using today, what do you view as the current systems' strengths?

Adm. Roughead The real strength of these systems is their ability to conduct operations in areas where you might not want to place a manned platform - such as minefield

Admiral Gary Roughead addresses delegates and guests at the Sunset Reception in his honor, May 17, 2011 at the OceanTech Expo in Newport, RI. Admiral Roughead was presented Marine Technology Reporter's **Seamaster of 2011 Award.**

(U.S. Navy photos by Chief Mass Communication Specialist Tiffini Jones Vanderwyst/Released)

search and clearance. We often refer to our unmanned systems as doing the "dull, dirty, and dangerous" tasks, and that is critical to increasing the effectiveness of our Sailors and the major platforms that they operate.

What do you view as the leading technological limitations of Unmanned Underwater Systems today?

Adm. Roughead Energy storage and endurance are the biggest challenges right now, so that is where we are focusing our efforts. Our UUV mission effectiveness revolves around energy. Our UUVs need to augment our manned platforms, not limit them. If I have to retrieve, recharge and redeploy UUVs on a continuous basis because of limited on-board energy, I'm not getting the most out of the manned-unmanned mix.

What, specifically, does the U.S. Navy need for Unmanned Underwater Systems to do that they cannot do today?

Adm. Roughead UUVs can extend the reach of our manned platforms, extend their field of awareness, and operate in areas where we may not want to place a manned platform, such as potentially mined waters. We don't need UUVs to do anything fundamentally new. We

The Admiral on Unmanned Underwater System challenges

Energy storage and endurance are the biggest challenges right now ... Our UUV mission effectiveness revolves around energy. Our UUVs need to augment our manned platforms, not limit them.

MTR Welcomes Seamaster of 2011 Admiral Gary Roughead to OceanTech Expo in Newport, Rhode Island. From Left: John O'Malley, Rob Howard, Admiral Gary Roughead and Greg Trauthwein.

(U.S. Navy photos by Chief Mass Communication Specialist Tiffini Jones Vanderwyst/Released)

do need them, however, to do those tasks for longer durations. In this sense, UUVs augment our manned platforms, not replace them. As we look to the challenges of maintaining our ability to respond globally to a range of situations, UUVs will bring additional capability to bear across the operational spectrum. For instance, a UUV that provides in-water and bottom information for mine warfare may also be able to help assess channel safety following a natural disaster where we need to know the event's impact on navigational safety. In order to do all of this, we need systems that demonstrate true operational utility - that begins with tactically relevant endurance.

MTR How is the U.S. Navy investing today to advance the capabilities and use of Unmanned Underwater Systems?

Adm. Roughead Today we are investing in and operating oceanographic sensing systems to increase our awareness of the environment. As a maritime force, we need this knowledge to optimize the effectiveness of our manned platforms. Our Littoral Battlespace Sensing (LBS) is an unmanned undersea vehicle program that is fielding small, long-duration, buoyancy-driven sensor systems called gliders. These vehicles will be operated by the Naval Oceanographic Office to gather ocean column data to support anti-submarine and mine warfare. The LBS glider program leverages commercially available technology to support Navy missions such as sensing the water column to improve sonar performance, and identifying mine-like objects to enhance mine warfare capabilities.

On the longer-term issue of developing a large, powered UUV, this year we have demonstrated in-water testing to include underwater navigation and multi-day missions. These are being developed in a coordinated, phased approach to meet my goals of a fleet operational capability with several weeks and even months of endurance by the end of this decade. The capabilities will augment fleet capacity in several mission areas. We will take incremental steps in the interim to build to this capability.

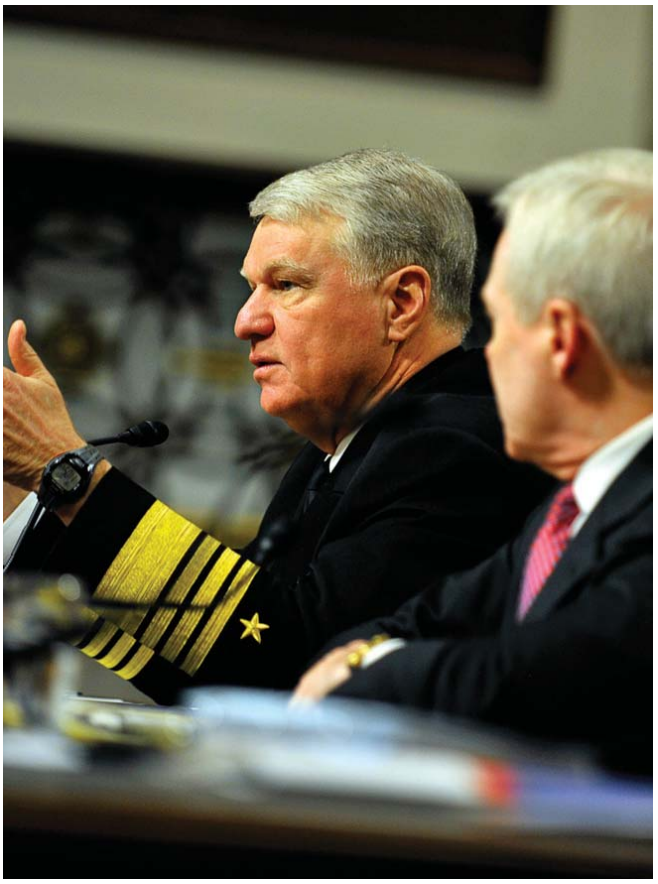
How will investment in Unmanned Underwater Systems impact budgeting and spending on traditional Navy ships, boats and submarines?

Adm. Roughead We will assess the capability provided by individual unmanned systems and weigh their utility relative to our traditional platforms. We will then balance our mix of individual vehicle capability and total vehicle numbers (capacity) to best augment our manned platforms to provide the most effective force. We are still in the formative stage of looking at those sorts of capability

The Admiral on UUV utilization

A UUV that provides in-water and bottom information for mine warfare may also be able to help assess channel safety following a natural disaster where we need to know the event's impact on navigational safety.

Chief of Naval Operations (CNO) Adm. Gary Roughead answers questions from members of the Senate Armed Services Committee during the Defense Authorization Request for Fiscal Year 2012 and the Future Years Defense Program for the Department of the Navy.



(U.S. Navy photos by Chief Mass Communication Specialist Tiffini Jones Vanderwyst/Released)

mixes, so it is too early to speculate on any specific budget issues.

What is your timeframe for enacting the improvements to Unmanned Underwater Systems to meet the Navy's needs? (ie. 2 years or 20 years).

Adm. Roughead We are engaging on all fronts to achieve these capabilities as soon as possible. We are working on critical capabilities such as energy, submerged precision navigation, autonomy, and command & control. Our plan is to incorporate these advances into operational prototypes. We will then put those prototypes in the hands of our operators to develop the tactics, techniques, and procedures necessary to support warfighting needs.

Can you put in perspective your vision of the Navy 20 years from now, specifically commenting on the desired evolution of Unmanned Underwater Systems in context of all U.S. Navy assets (both hardware and human).

Adm. Roughead I don't think anyone 20 years ago would have predicted some of the capability that we have today - so predicting twenty years into the future is not easy. I envision, however, a mixed force composed of manned and unmanned naval capabilities over, on, and under the sea delivering combat capability from the sea for the nation. I foresee a force in which unmanned systems are not tied to a single host platform, but can operate seamlessly to provide networked information across the battlespace. Those unmanned platforms will be sufficiently robust, integrated, penetrating, and persistent to ensure that the most valuable information is available, accessible and employable by decision-makers and commanders. Most importantly, the individual unmanned systems will be sufficiently autonomous so that they assist our Sailors through highly advanced processes that takes in the flood of data and turns it into actionable information. This last piece is critical - we cannot merely pull in vast amounts data that overwhelm our operators and analysts. Our systems will provide processed, correlated, synthesized information that streamlines the decision processes of our sea-based leaders.

The Admiral on investing in the future

On the longer-term issue of developing a large, powered UUV, this year we have demonstrated in-water testing to include underwater navigation and multi-day missions. These are being developed in a coordinated, phased approach to meet my goals of a fleet operational capability with several weeks and even months of endurance by the end of this decade.

(U.S. Navy photos by Chief Mass Communication Specialist Tiffini Jones Vanderwyst/Released)

Admiral Roughead accepts Marine Technology Reporter's Seamaster of 2011 Award.

Admiral Gary Roughead
Marine Technology Reporter's Seamaster of 2011.

National SeaPerch Challenge Teaches Students how to

Cap the Well ... Save the Sea

by Edward Lundquist

The first-ever National SeaPerch Challenge was held on May 24 at Drexel University in Philadelphia, Pennsylvania for top robotics teams from middle and high school districts and student interest groups with established SeaPerch programs.

SeaPerch is an innovative underwater robotics program, sponsored by the Office of Naval Research and managed by the Society of Naval Architects and Marine Engineers (SNAME) that trains teachers and provides a curriculum to instruct students on how to build an underwater Remotely Operated Vehicle (ROV) in an in-school or out-of-school setting. Students build their own ROV from a kit comprised of low-cost, easily accessible parts, following a curriculum that teaches basic engineering and science terminology and principles with an ocean and marine engineering theme.

At the National Challenge, students participated in a two-day series of events, which included team presentations, a vehicle underwater obstacle course and a simulated seafloor oil spill that required teams to cut the flow, cap the well, and conduct recovery operations.

Because the event was held concurrently with the Navy's Intelligent Ships Symposium IX, the students also had an opportunity to participate in this major technical symposium of scientists and engineers and to meet and talk with them. The winning teams were recognized at the symposium and the top teams delivered formal presentations to some conference attendees as well as their fellow competitors about their technical solution to meet their mission requirements. Phil Kimball, the for-

mer Executive Director of the Society of Naval Architects and Marine Engineers (SNAME) and now SeaPerch's Program Director, helped organize the competition. "The program has come a long way, and because of the program's expansion to 38 states, it was time to have this national championship." Kimball says the teams won regional events to get to the championships, so they have experience. "They are all winners," Kimball says.

The challenge required teams to come up with a solution to use their SeaPerches to navigate an obstacle course, cap a well and recover the spilled oil, or plastic wiffle golf balls, from that well, and prepare a poster presentation about their ROV design and solution. "The middle school students are judged by their posters alone, but the high school students must make an oral presentation before a panel of judges who also may ask questions," Kimball says.

Different Approaches

The Tiger Sharks from Gar-Field High School in Woodbridge, Va., used different robots optimized for the two different competitions. According to senior Abdulla Ahmed and sophomore Tomas Lopez , one was equipped with a net and a camera for the well-capping operations, which the other was built for speed and agility. "We wanted to keep it simple," says Lopez.

Teammate Romian Shields, a senior, says putting the motors farther apart can help with maneuvering. "It can turn a lot faster," adds Joseph Bevers.

The Owens valley High School team of Kevin lee and Sagira Perkins named their robot Gir, after a cartoon character. Lee was the driver, while Perkins offered advice. "Turn left. Up. Up. Now down. Stop. Go back. Now, right."

Camryn Yoshioka and Jennifer Loui from Highland Intermediate School came all the way from Pearl City, Hawaii, to compete. Their robot, named Nagisa, which is Japanese for water's edge, featured a unique tether, which included the control and power lines as well as their camera cables, all inside a bright yellow polypropylene braided line. "The polypropylene is buoyant, so the line doesn't get tangled as easily," says Loui.

Some teams made last minute modifications to improve their results. Tremel Cain and Bae Minh Nui from Eastern High School in Silver Spring, Md., trimmed their floats and added ballast to ensure the vertical access motor could submerge. But they found that they had over compensated, and their tether was getting fouled on the obstacles, so they made additional modifications.

2011 SeaPerch National Challenge
Top Teams

High Schools (top three)

First
Bloomington High School South Kvalinator, Bloomington, Ind.

Second
Southern Indiana Career & Tech Thunder Chickens, Evansville, Ind.

Third
Upper Darby High School Robotics & Engineering, Upper Darby, Pa.

Middle Schools

First
Piccowaxen Middle School CPUs, Silver Spring, Md.

"One of the most important things the students learn through this process is that failure is an option, said Susan Giver Nelson, Executive Director of the SeaPerch Program. "They learn that part of engineering is problem solving, and they had to do so on the deck of the pool. In fact, some of the SeaPerches were damaged in transit, and repairs had to be made just prior to the event. What a great opportunity for the students to learn a valuable lesson in engineering."

Many of the robots had a unique, customized look. Junior Keys McDonald and sophomore Patrick Gauntt from the Starkville, Miss., Christian Home Educators (SCHE) support group Finding Nemo Robotics team painted their robot, named Dory, bright orange. McDonald looks forward to a career in engineering, while Gauntt is interested in wildlife management.

Teams that spent more time operating their vehicles in practice were often able to post faster times. Jordan Benner and Annamarie Sciarra from Ridley MS in Ridley Park, Pa., named their robot Kraken. "We practice in our school pool," Benner says.

Adapting for the Mission

Ali Tomasevich and Connor Gephart of Indian Valley HS in Harleysville, PA hooked up their camera on their robot, Leviathan, for the obstacle course, "Just in case it's needed," says Gephart. "Our wires are already together."

"This is our second year, says Tomasevich. Our robotics


STEM
6

club has five teams. We had our own competition. The team that won got to go to Drexel."

She says the "cap the well" challenge this year is much harder than the 2010 Philadelphia SeaPerch challenge, which involved picking up rings and putting them in a bucket. Gephart says the camera proved to be very useful for capping the well. Tomasevich and the other girls on her team decorated their team T-shirts with sparkly hearts and other designs. The boys didn't follow suit. "I only keep him because he can drive," says Tomasevich of her partner.

To cap the well, the teams had to secure the well by activating a magnetic switch; they had to cover the pipe that was emitting air bubbles; and they had to collect plastic wiffle balls.

Capt. Bob Palisin of ONR, who was a judge for the "cap the well" event, notes that teams took different approaches to the "cap the well" challenge. "One team brought their SeaPerch back after meeting the first two objectives and installed a basket for the final task to collect the items. Another team positioned their camera from a stationary location to provide in-place monitoring."

Team Effort

The team from Upper Darby HS in Pennsylvania took a different approach, building their Os-Perch with inspiration for the V-22 Osprey Tilt-Rotor aircraft.

Kyle Tressi, who aspires to be an engineer, says his crew works well as a team. "We share ideas."

Junior Omar Farooq wants to be a software engineer. "Kyle's the electrical engineer. I'm the CAD guy. I used Autodesk Inventor to design our SeaPerch."

Each SeaPerch has three motors which are mounted so the robot can move forward, up and down, and turn. The Upper Darby team made molded fairings for streamlined pods and mounted their motors together on a horizontal shaft that could rotate 90 degrees so that all three motors can move forward or up or down. The outboard motors can be maneuvered individually for turning.

"We used gears from our VEX Robotics project to build a worm gear system to control the motors between the perpendicular and horizontal orientation," Tressi says. "Our design goal was to be small and compact."

There were six sub-groups working on the frame, machinery, research, contacts, electrical, and the presentation. Raji Kurbaj, a sophomore who wants to be an electrical engineer, says the team started out working with the FIRST Robotics program, but evolved into SeaPerch "because we thought it was very cool."

"We wanted something that wasn't a 'kit bot,'" he says. "We wanted something to be special."

Kurbaj says the team spent a lot of time experimenting with different gear ratios and testing the gears.

Kurbaj says the club meets three times a week, but its members have been working overtime on their SeaPerch as the challenge day approached. "We were up until 11 o'clocklast night making the final preparations."

The team plans to hold seminars this summer for younger students to introduce them to SeaPerch and robotics.

Justin Johnson says the Upper Darby team completed the project in just a few weeks. "The best part was learning from and working with the mentors."

Eli Canavati says their advisors were helpful, but the students had to do the work. "If we didn't know how to do it, or how it worked, we weren't allowed to use it."

"The judges told us they were impressed," says Johnson, who wants to be wants to be an architectural engineering technician or a mechanical engineering technician. "We were pretty impressed with it, too."

The posters were very professional. The Baltimore Maritime Academy Charter School poster competition entry included a detailed diagram and legend, which included such items as the propeller obstruction deflector (POD); adaptable reconfigurable manipulator (ARM); current limiting utility bar (CLUB) and netted extension storage tray (NEST).

Program's Progress

"This is just the beginning," Kimball adds. "This is a chance for students to meet other students from across the country. They learn from each other. They talk to the other teams, and observe how others have solved similar problems or how they've modified their robots.

"This event was the realization of a dream - four years of building programs one by one until we had a critical mass of enough programs to host a national challenge, and it exceeded our expectations," said Nelson.

"I can see that the students, teachers and parents are already gearing up for next year," Kimball says. "They've learned from their experience, and want to come back and do better next time."

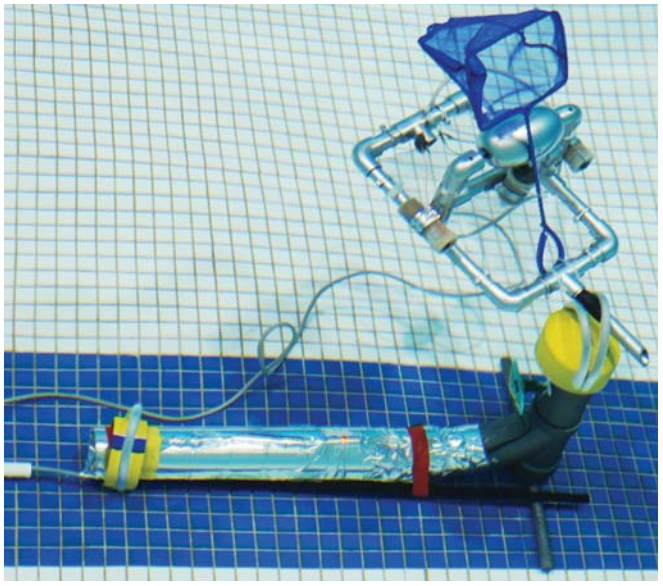
The 2012 SeaPerch National Challenge will be hosted by the Prince William Public Schools at George Mason University in Northern Virginia.

The Pearl City girls were passing out macadamia nuts. They really liked meeting students from across the country, especially the kids from Philadelphia. "They were so cool," says Megan Mikami. "They had shirts with platypuses on them."

"One of the most important things the students learn through this process is that failure is an option," said Susan Giver Nelson, Executive Director of the SeaPerch Program. (pictured above, left, addressing the students.) "They learn that part of engineering is problem solving, and they had to do so on the deck of the pool."

"Building the SeaPerch is awesome, powerful and empowering, but it's just the beginning," said Toby Ratcliffe, an engineer at the Naval Surface Warfare Center at Carderock, Md. "The kids see it as a final product, but they soon realize it can do other things. "The cool thing is they learn troubleshooting. But more than that, it's the connection between students and engineers as role models."

"For those engineers or scientists interested in starting a community SeaPerch program, I would say there couldn't be a more satisfying activity that not only teaches basic mechanical and electrical skills through hands-on learning, but allows the student builders to test, balance, operate and compete against other teams in a clean, fun and wholesome interactive environment, Kimball says. "To know that you might have sparked a lifelong love of learning, and opened the eyes of just one student to a future career as a scientist or engineer, is its own reward."



Project Focused on Arctic Subsea Development

INTECSEA

Eager to address the delivery of strategically important subsea developments in remote and hostile environments—particularly in offshore arctic and cold-climate regions—INTECSEA is leading a joint industry project (JIP) that will yield a wide spectrum of safe, reliable production opportunities with the application of existing and emerging technologies, said Uri Nooteboom, president of INTECSEA. "The prize is enhanced confidence in deeper waters and ice-prone regions worldwide while improving the availability of valuable hydrocarbons," said Nooteboom.

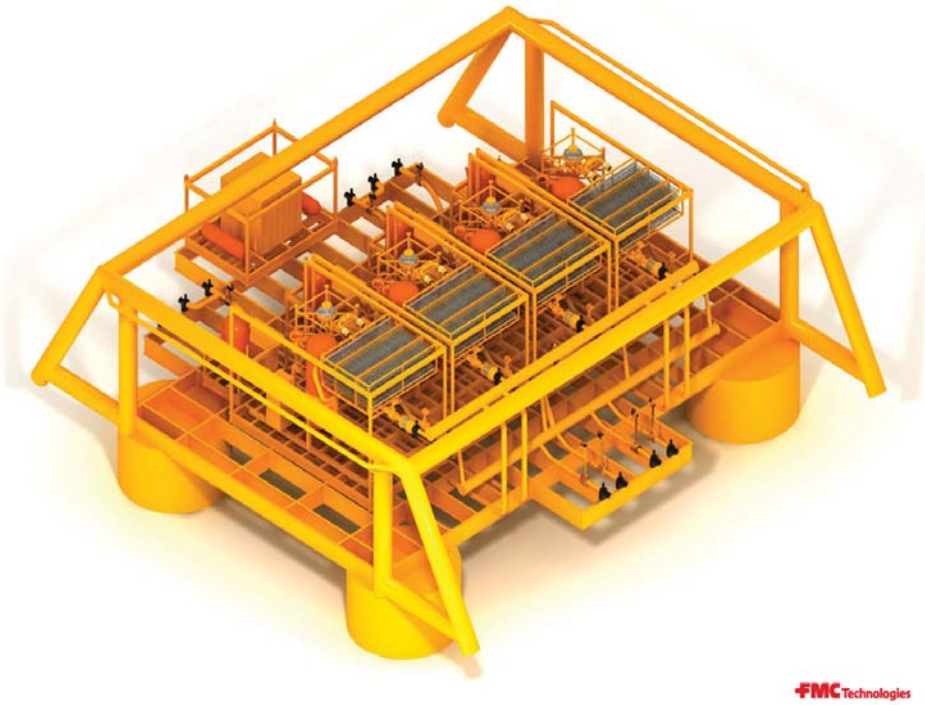
Frontier developments in cold climates—where ice floes and icebergs are prominent much of the year—and in remote offshore arctic areas require subsea systems that manage the extraction of produced fluids and transportation to the end user, he added.

INTECSEA kicked off the JIP in December 2010 in St. John's, Newfoundland, Canada, and completion is scheduled for year-end 2011. JIP participants include three oil companies participating in arctic developments offshore Eastern Canada; Petroleum Research Atlantic Canada (PRAC) administers the contractual entity.

The JIP partners foresee subsea processing requirements for both brownfield expansions and greenfield developments within the next decade.

Garry Mahoney, INTECSEA senior vice president of Business Development and Chief Technology Officer, advises the JIP aims to encourage the use of proven and evolving technologies from deepwater Gulf of Mexico, offshore Brazil and northern North Sea to enhance production in arctic and subarctic waters, including offshore Eastern Canada.

"Our joint efforts will facilitate next-generation subsea solutions and improve confidence in the economic appraisal of offshore cold-climate developments while creating an open platform for industry collaboration," said



Subsea compression stations, such as this one, compress gas to move it from a subsea well to a host facility. This technology is one of several components used to enhance the viability of reliable production in hostile offshore environments, including cold-water regions and remote offshore arctic areas.

Mahoney. Subsea processing encompasses a broad range of significant emerging technologies, which INTECSEA collectively refers to as subsea active production technologies. All of these technologies contribute to the reliable flow of production fluids and are focused on either the conditioning or addition of energy to the wellstream at the seafloor.

Conditioning of fluids in a flow system includes application of pipe-in-pipe and thermal insulation technologies and chemical injection at the subsea wellhead, each of which can facilitate stability. Examples of adding energy to the wellstream include direct electric flowline heating, produced liquids pumping and gas compression.

In deepwater, supplementation of energy into the wellstream on the seafloor can improve production flow from a subsea wellhead to surface facilities. High-voltage electrical cables and connectors integrated into the subsea architecture design deliver power to the system.

Targeted benefits include improved feasibility in terms of initial cost and life-of-field investment, said Ian Ball, INTECSEA project manager for the JIP. In some cases, industry can anticipate an overall reduction in capital expenditures by reducing weight or space requirements on an associated surface structure, or even eliminating a surface structure altogether. "Importantly, in arctic regions where icebergs are evident, industry can expect to gain an increased range of technical solutions for addressing these unique challenges," said Ball.

This approach, adds Ball, mitigates higher back pressures on seafloor wellheads in deepwater and allows well fluids to flow more readily to surface facilities. The applied technology, therefore, can increase flow rates from individual wells and increase cost-effective total recovery volumes from each well.

For the transport of produced hydrocarbons, operators may potentially increase the tie-back distance from wellhead to surface facilities — perhaps double current achievable distances. Using these technologies, operators also may be able to reduce the number of wells drilled using costly deepwater drilling rigs.

"INTECSEA's leadership role in a 2007 subsea processing JIP was a worthy predecessor to the new offshore arctic subsea JIP," said Mahoney.

A Framo hybrid pump. This boosting pump adds pressure to a subsea system to improve production efficiency from a subsea well to a host facility. Frontier developments in cold climates require subsea systems, such as hybrid pumps, to manage the extraction of produced fluids and transportation to an end user.

The 2007 JIP focused on identifying active production solutions for deepwater and/or long offset tie-backs to host facilities or to shore. The state-of-the-industry report highlighted available equipment and technology, current operational status and future strategic direction within this industry subset.

One deliverable of the new JIP is a user-friendly, system-design database that consolidates objective and up-to-date component information, allowing operators to match their asset needs with the most appropriate conventional, enhanced and active subsea production technologies.

"In short, the JIP will offer industry a mechanism for optimizing design schemes and field development architecture for the efficient delivery of hydrocarbons in arctic and subarctic waters," said Ball.

The current study will incorporate information from the 2007 study with additional updated information on conventional and emerging subsea technologies and relate them specifically to the participants' interests in offshore Newfoundland, Labrador and arctic environments worldwide.

Existing developments in offshore Newfoundland include Hibernia, Terra Nova and White Rose, with Hebron expected to begin development in the near term. Step outs from existing facilities are contemplated, with one already completed on the White Rose Field.

Frontier and deepwater prospects offshore Eastern Canada which would benefit from the JIP research include Orphan Basin, Laurenian Basin, Central Ridge/Flemish Pass and the Labrador Shelf, says Mike Paulin, INTECSEA Operations director for Canada.

"The Labrador Shelf is a very harsh environment and will require innovative solutions to overcome the challenges," said Paulin.

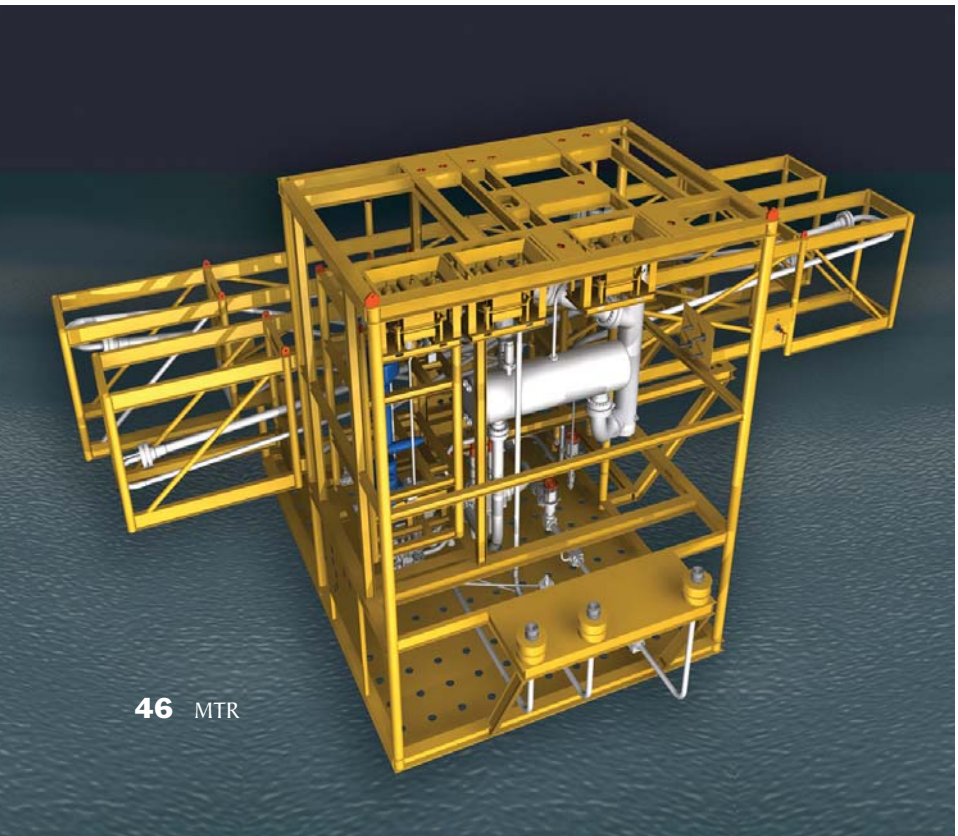
The Labrador Shelf includes water depths up to 9,900 ft. and experiences waves up to 43 ft. high. Ice conditions on the Labrador Shelf are significant, with pack ice reaching a thickness up to 23 feet and icebergs a serious threat from July through October. To address these and other frontier issues, the JIP will generate a database with an interface tool that allows operators and developers to screen and select from a broad array of active production technologies, including separation, boosting, compression and direct electric heating systems, suitable for stranded and existing field developments.

Inherent evaluations include system installability, operability, reliability and maintainability issues specific to the environment, as well as technology maturity and any additional fit-for-purpose qualification programs. Efforts of the JIP will redefine current industry limits for field development architecture in cold-climate regions while improving expectations for systems that are flexible and responsive.

The JIP also is tackling prominent offshore arctic issues, including the impact of iceberg scouring on subsea facilities, said Paulin. "A floater can be relocated but subsea facilities cannot," he said.

Arctic operators, particularly offshore Eastern Canada, dig huge holes—60 ft. deep and up to 1,080 ft. to avoid ice scouring, said Paulin. "This approach is costly, time-intensive and will not sustain the level of subsea development the industry anticipates," he said.

The JIP is led out of INTECSEA's St. John's office. INTECSEA personnel supporting the project include Ian Ball; Dr. Kalyana Janardhanan, group lead Subsea Active Production Technology; Richard Voight, executive engineer; Cody Moffitt, Subsea Discipline manager; and Julie Burke, Subsea engineer.



Two-phase separation facilities separate produced fluids, such as oil and water, and boost oil for transport to a host facility. The water can then be transported or re-injected into a subsea development system to support and improve reservoir pressure, thus producing more hydrocarbons.

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OceanTech Expo'11

Last month OceanTech Expo (OTE) was held in Newport, Rhode Island, attracting a cross section of the industry from defense, commercial and scientific entities; all with the common goal of discussing and trialing the latest subsea technology.

Highlights from the exhibition were plentiful, and the ensuring page provide a visual reflection of the people and events of OTE 2011.

(Photo Courtesy Office of the Governor

Rhode Island Governor Lincoln D. Chafee (third from left) officially opens OceanTech Expo 2011 in Newport, RI. Rhode Island lives up to its nickname — The Ocean State — with a strong comittment to conserving and utilizing the Atlantic Ocean for its renewable energy resources.

(USN Photo Chief Mass Comms Specialist Tiffini Jones Vanderwyst/Released)

CNO Admiral Gary Roughead took the opportunity to discuss emerging subsea technologies with Dr. Barbara Fogarty, National Coordinator Advanced Marine Technology Program – SeaChange Management Unit.

The low-key nature of the on-water local in Newport, Rhode Island affords exhibitors and visitors more time for in-depth conversation.

Live in-water demonstrations, from the dock-side exhibition area or onboard a number of research vessels, is a key plank to three days of technology at OceanTech Expo in Newport, RI.

Below: OceanTech Expo offers a full slate of Social Functions, from refreshments and entertainment by the "Dead Blues Society" in the exhibition hall after the show on Wednesday, to the Sunset Reception which honored MTR's 2011 Seamaster.

Liquid Robotics: Former Sun Microsystems Exec Named CEO

Liquid Robotics, developer of the Wave Glider self-powered hybrid sea-surface/underwater robotic vehicle, and cloud-based data service provider, closed a Series D $22m financing round led by VantagePoint Capital Partners, the company's first institutional investor together with participation by oilfield services provider Schlumberger.

In addition, the company announced the appointment of Bill Vass, former President and COO, Sun Microsystems Federal, as CEO.

Liquid Robotics has created a new category of wave-powered marine robotic vehicles with a platform for ocean observation, data collection, intelligence, surveillance and reconnaissance. The company's flagship product, the Wave Glider, is designed as a reliable, persistent and economical autonomous marine drone that has the capability of efficiently completing demanding long-duration missions with minimal environmental impact. In addition to providing Wave Gliders as a product, Liquid Robotics has also set up a Data-as-a-Service cloud which provides direct, real-time access to ocean information.

Vass brings more than 30 years of U.S. government and private sector IT leadership experience to Liquid Robotics. Prior to joining Sun and serving in a number of senior-level positions including Chief Information Officer, Vass had a lengthy public service career. He worked in the Office of the Secretary of Defense at the Pentagon, and was Chief Technology Officer and technical lead for U.S. Army worldwide personnel systems. Earlier, Vass developed large-scale IT engineering and business systems solutions for the oil and gas industry, defense systems integrators and ocean engineering.

"We are fortunate to add an experienced executive like Bill Vass and a leading global energy investor such as VantagePoint to our team," said Roger Hine, Liquid Robotics' Founder and Chief Technology Officer. "This important hire and significant round of financing allows us to further develop and market our unconventional technology for exploring and monitoring the world's marine environment."

Keith Named GM at OceanWorks

OceanWorks International welcomes Robert Keith to its team in the position of General Manager. Acting as General Manager, Robert's primary function will be to promote the company's deepwater engineering, fabrication, and operational capabilities. He has worked in the offshore underwater services industry for more than 30 years, and has actively participated in manned, atmospheric, and remotely controlled diving operations in more than 20 different countries. His expertise lies primarily in the use and management of ROVs, and he has held positions with several companies ranging from ROV offshore technician and supervision, through project and operations management, to regional responsibility and senior executive management.

Two Join Hydroid

Rick Morton has joined Hydroid as Hydrographic Sales Manager, responsible for expanding Hydroid's AUV sales into commercial and non-military markets. Morton brings a diverse scientific background spanning 20 years in the industry. Prior to joining Hydroid, Morton was the North American Sales Manager-Geosciences for Cambridge-based Ixsea, Inc. Tim Russell has also joined Hydroid, as Proposal Coordinator, responsible for all proposals and quotations in support of sales and marketing activities. Prior to joining Hydroid, Russell was a Senior Contracts Negotiator at Lockheed Martin Mission Systems and Sensors, supporting U.S. government, commercial and international naval programs.

Marport CEO One of Atlantic Canada's "Top 50"

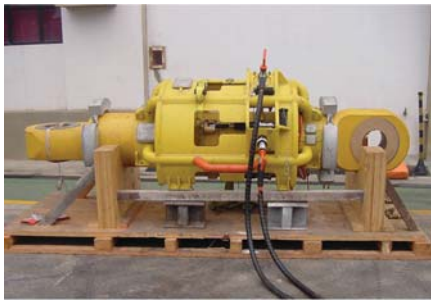
Marport Deep Sea Technologies said that for the second year in a row, Karl Kenny, Marport's President and CEO, was named one of Atlantic Canada's Top 50 CEOs by Atlantic Business magazine. Marport was also recognized for having the fastest revenue growth among the winning companies.

Tritech Wins Naval Contract

Tritech has been contracted to supply Ultra Electronics, the defense, security, transport and energy company, with a suite of sonar equipment over a 12-month supply program. With delivery of the first consignment completed, Tritech is the sole supplier of the integrated homing sonar mounted on the German-designed Atlas Elektronik Seafox, the oneshot mine disposal vehicle sup-

plied to the Royal Navy by Ultra Electronics in support of its strategic mine hunting operations.

Subsea 7 Picks BMT For Riser Monitoring



Subsea 7 contracted BMT Scientific Marine Services (BMT) to provide riser monitoring systems for two Hybrid Riser Towers (HRT) and one Single Hybrid Riser (SHR) for the CLOV Development Project offshore Angola operated by Total E&P Angola. These systems will monitor the integrity of the risers by measuring the buoyancy uplift and bending fatigue, as well as each riser's motions and set-down due to lateral excursions. Each system will include the BMT Subsea Strain Sensor Assembly; subsea data acquisition, motion and depth modules; and a rack-mounted display with BMT's WinMon software for riser monitoring systems. Data transmission will be via a hard-wired link to the FPSO. The system will be designed for 21 years subsea service.

GD Canada Creates New Underwater Intel Center

General Dynamics Canada created a new Underwater Intelligence, Surveillance and Reconnaissance (UW ISR) Center of Excellence, the latest in a series of initiatives made to reinforce General Dynamics Canada's underwater ISR technical and product leadership. The Center is designed to accelerate the company's research and product development efforts as naval fleets around the world look to reestablish this critical capability in the face of new threats. Located in Halifax, Nova Scotia, close to key Canadian military naval and air bases, the General Dynamics UW ISR Centre of Excellence will leverage the company's collaborative relationship with Defense Research and Development Canada - Atlantic (DRDC Atlantic), a globally-renowned defense research center with expertise in anti-submarine warfare and mine and torpedo defense systems. Today's announcement also builds on the company's 2009 partnership agreement with Marport C-Tech Ltd., to jointly develop and market a suite of next-generation underwater acoustic products to support underwater military ISR missions. It will be integrated into the company's 46,000 sq. ft. facility in Halifax, which opened in 2008. The center will be staffed by an integrated team of hardware and software engineers and experts in underwater acoustics and naval sonar operations. The team's initial focus will be further development of the company's flagship acoustic products. Those include the MATADOR Torpedo Detection System and the TrailBlazer Mine and Obstacle Avoidance Sonar, a joint development effort between General Dynamics Canada and Marport.

www.gdcanada.com

Mini Work Class ROV for Scripps

Ocean Innovations supplied a mini work class ROV to Scripps Institution of Oceanography. The H2000 ROV, manufactured by DOER Marine, features hydraulic thrusters and high bandwidth fiber optic cable. The vehicle was equipped with a five function DOER SeaMantis manipulator, powerful LED lights, three video cameras, and a multi-beam sonar.

Scripps intends to use the vehicle on its fleet of ocean going vessels for retrieving lost instruments, collecting samples, and other scientific tasks. With its 2000 meter depth rating, 160 lb payload capacity and 327 lbs of forward thrust, the H2000 will be up to the job. A key feature for Scripps' is the vehicle's instrument manifold that is pre-wired for RS-232, RS-485, and ethernet thus making it easy to integrate additional sensors.

www.doermarine.com

C-Innovation Expands ROV Fleet

Schilling Robotics announced that C-Innovation has placed a contract for multiple ROV systems in support of their expanding international operations. This contract includes the supply of both HD and UHD work class ROV systems that will be deployed globally, including Brazil and Singapore. This continued expansion of C-Innovation's ROV fleet with a mix of the HD and UHD systems will broaden their regional capabilities and target markets, especially with the addition of the mid-size HD system that complements C-Innovation's existing fleet of over 25 UHDs.

Acteon Group Acquires NCS Survey

Subsea services group Acteon acquired Aberdeen-based NCS Survey Limited. The acquisition adds to Acteon's capability in the rig-positioning market and provides an additional suite of survey services to clients that operate rigs and vessels. NCS Survey provides high-precision rig-positioning, construction-support and subsea-visualization services to the global offshore market. NCS Survey has performed over 600 projects in 35 countries since it was founded in 2005. The company will retain its existing personnel and management team, headed up by current managing director, Andy Gray. The transaction, the terms of which are not being disclosed, was completed on May 25, 2011. Acteon enjoys the financial backing of First Reserve Corporation, a leading private equity company in the energy sector. Corporate finance advice to Acteon was provided by KPMG Corporate Finance, Aberdeen, UK. Legal advice was provided by Birketts LLP, Norwich, UK. NCS Survey's vendors were advised by Simmons & Company International and Paull & Williamsons LLP, Aberdeen, UK.

FairfieldNodal Helps Apache Tame Alaskan Challenge

FairfieldNodal successfully employed of ZLand and Z700 cable-free equipment on an Apache Corporation seismic test survey in the challenging onshore and shallow-water region of Cook Inlet, Alaska. Due to restrictive state and federal permits, the test took place on a condensed timeline from mid March to early April of this year. Unpredictable ice and ground conditions in the area put additional demands on the operations.

Apache contracted NES, LLC to organize and test a variety of seismic recording and source systems to determine optimum equipment and acquisition parameters for potential future exploration over their lease holdings in the area. FairfieldNodal contributed to the test by organizing and assembling its own true cable-free ZLand and Z700 recording systems, and installing a Z700 deployment/retrieval system on a local vessel. For the limited test, FairfieldNodal supplied 725 ZLand nodes and 200 Z700 nodes, plus support and operations personnel.

Operationally, FairfieldNodal components and support performed nearly flawlessly, a tribute to the team's efficient organization as well as the suitability of both ZLand and Z700 equipment for work in harsh environments; in this case, one of the world's most challenging regions for seismic operations.

OceanTools Expands

OceanTools, which designs and manufactures products for the subsea ROV and robotics industry, has made a $1.5m investment in new build headquarters in Aberdeen. The custom built offices, situated within the Aberdeen Science and Technology Park, are almost four times as large as the company's previous office space, giving 500 sq. m. of offices, development laboratory and electronics workshop space. OceanTools plans significant expansion in the coming two years and the increased space and enhanced facilities will allow the company to double its staff by 2013.

"Building our new headquarters is a key step in the OceanTools expansion strategy," said managing director Kevin Parker. "We now have the space for an additional twelve development and production engineers as well as increased administration positions. These new posts will enable our further expansion into key market areas including extension of our FPSO anchor chain/bend stiffener video monitoring systems."

"We have recently built and delivered out first subsea digital video recorder for a Canadian client and plans are well underway for the launch of a new suite of cutting edge products by the end of the second quarter of 2011.

We are also in the process of completing the design of two highly engineered electric pan and tilt units, along with standard and high definition subsea video cameras and LED lighting systems. These innovative products complement our existing range of OceanTools gyrocompasses, video overlays, digital CP probes and underwater displays."

Marport Awarded Sonar Contract By General Dynamics Canada

Marport Deep Sea Technologies won a contract to manufacture the TrailBlazer Sonar for defense contractor General Dynamics Canada. The work will be carried out by Marport facilities in Ottawa and Cornwall, Ontario. Financial details were not disclosed.

TrailBlazer is designed to be a cost-effective, high-resolution sonar specifically designed for mine and obstacle avoidance on naval vessels operating in littoral or deep waters.

The system uses a high frequency phased array transducer interfaced to Marport's Software Defined Sonar transceiver electronics, together with an open architecture, digital signal processing waveform suite with graphical user interfaces specifically tailored to mine and obstacle avoidance missions. The product is a result of ongoing co-development efforts between Marport and General Dynamics Canada.

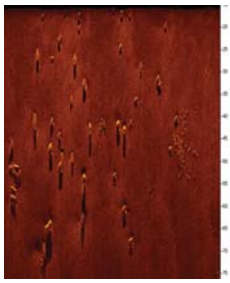
Retired from USF, "RDSEA" Expands

After 21 years with the University of South Florida (USF), Rick Cole, President of RDSEA International, Inc. (RDSEA) shifts his attention to this fast-growing company within the ocean community. Cole, recently retired from the College of Marine Science, USF, St Petersburg, FL, has broad knowledge in the development and implementation of "ocean technologies and observing systems". With RDSEA, a Florida-based oceanographic consulting company founded in 2002; Cole will provide the experience and expertise necessary in project development from design conception to data dissemination of offshore technologies worldwide. The timing of this change coincides with the expansion of coastal monitoring around the U.S. and international coastlines as well as in blue water science, offshore alternative energy solutions and oil and gas environmental assessments. Beginning his career with NOAA in the early 1980's in Seattle, WA, Cole performed hydrographic surveys in Hawaii and Alaska and at the Pacific Marine Environmental Laboratory (PMEL) on federal oceanographic programs in the tropical regions of the Pacific. He then moved onto academia for the next two-plus decades. He is a co-founding member of USF's Ocean Circulation Group (OCG, R. Weisberg) beginning in 1989 engaged on NOAA, NSF, ONR, USGS and other State and local projects and programs. In 1993, the OCG set the footprint for one of the first coastal monitoring programs in the U.S. in the eastern Gulf of Mexico along the west Florida shelf with what eventually became the "offshore component" of the State of Florida's "Coastal Ocean Monitoring and Prediction System" (COMPS) a sub-component of the Southeastern Coastal Ocean Observing Regional Association (SECOORA), governed by the U.S. Integrated Ocean Observing System (US-IOOS). Cole managed and choreographed the offshore side of COMPS and other deep ocean programs from the OCG laboratory at USF and at sea as Chief Scientist and Dive Master on over seventy research cruises. Cole now takes the reins of RDSEA to bridge gaps within the ocean community between federal agencies, universities and the private sector on scientific, engineering and environmental monitoring endeavors. RDSEA offers over 30 years of experience on, in and under our oceans on a wide range of projects from the beach on out to over 5000 meters depth (including bays and estuaries) with a focus on "air-sea interaction" and "ocean circulation". RDSEA's most recent project involved the design, development, manufacture and deployment of several moored buoy systems for the First Institute of Oceanography, Qingdao, China and the Administration of Marine Fisheries Research, Jakarta, Indonesia on the "Research Moored Array for African-Asian-Australian Monsoon Prediction Program (RAMA, a subcomponent of the Indian Ocean Observing System, "IndOOS").

Email: rickcole@rdsea.com
www.rdsea.com

Edgetech Demos

EdgeTech will conduct on-water demonstrations of the new Littoral Mine Countermeasure Sonar (LMCS) in Boca Raton, Fla., July 18 – 22. This event is focused on the military community and will highlight the latest EdgeTech LMCS solution. The system includes a unique suite of integrated vehicle, sonar and software technology which provides high speed, high resolution and long range underwater imaging. For more information, contact Rick Babicz at Tel: +1 508-356-9741 or



email: babicz@edgetech.com

L-3 Klein Delivers HarborGuard for Security Upgrade Program

L-3 Klein announced the first deliveries of its HarborGuard Integrated Waterside Security and Surveillance System for a major U.S. security upgrade program. With its ability to provide immediate alerts and updated threat positions, L-3's HarborGuard System is a key component of new security measures throughout the U.S. that provide continuous coverage and monitoring of all surface activity around dams, with special attention on security zones to protect critical infrastructure.

Balmoral's Subsea Test Center

Balmoral Offshore Engineering opened its new test facility, The Balmoral Subsea Test Center, located at company HQ in Aberdeen. The center offers a comprehensive range of procedures including hydrostatic, mechanical and laboratory testing and represents a multi-million pound investment for the company. A custom-built pressure test vessel, 'PV6', thought to be the largest commercially available unit in Europe, forms the centrepiece of the new center. Installed vertically with an internal diameter of 1.83m (72-in.) an internal length of 9m (29.5-ft.) and a maximum operating pressure of 410bar (6000psi), the vessel is fitted with penetration flanges to allow the connection of hydraulic and electrical lines.

India Orders Deepwater System for "Black Box" Recovery

National Institute of Ocean Technology (NIOT), in Chennai India, has awarded a contract to RJE International to supply a multifunctional acoustic directional receiver for their 6000m Remote Operated Vehicle (ROV). The AHS765 Acoustic Receiver will assist the ROV in locating and recovery of aircraft flight recorders or "black boxes" by homing in on the acoustic signal emitted by flight recorder's acoustic beacon. With recent air disasters happening over deepwater, Directorate General for Civil Aviation and the Airports Authority of India has tasked NIOT to expand the capability of their ROV to assist aircraft disasters investigation.

To meet this challenge, RJE International and Falmouth Scientific Incorporated, of Catumet, MA has teamed up to deliver the subsea acoustic receiver designed not only to detected underwater acoustic beacons but transponders as well. The AHS765 is a versatile eight channel receiver/interrogator that is operated from the surface using a RS232 interface with the vehicles control system. Custom software allows the ROV operator to determine range and bearing to the target beacon or transponder with provide full control of the receivers functions. The AHS765 small footprint makes it ideal for large and small submersible vehicles.

Sensor Tech Expands

Sensor Technology Ltd. opened a new manufacturing facility, in a building that was purchased in January of 2011 and located immediately adjacent to SensorTech's previous two building campus. It adds a third building to the company's operations and increases total workspace by 25 percent. The majority of the square footage in the new building has been allocated to Sensor Technology's piezoelectric powder production, increasing the space for this cornerstone operation by forty percent. The new building also consolidates all machining operations to a single facility and provides dedicated areas for R&D, electronics testing and sales & marketing. By freeing space in the previous two buildings, the change has also allowed for a larger potting/encapsulation facility and a smoother production workflow across all three buildings.

RAdm Firebaugh Joins Marport Board

Marport Deep Sea Technologies Inc. announced the appointment of Rear Admiral Millard S. Firebaugh, USN (ret) to the Marport Board of Directors. Admiral Firebaugh has held distinguished leadership positions in research and development,

naval ship and system design, submarine technology and advanced electronics.

BMT Scientific Marine Services Opens in Rio

BMT Scientific Marine Services (BMT) opened a new office in Rio de Janeiro, Brazil. Trading as BMT Scientific Marine Services Ltda, BMT will operate in Rio de Janeiro as an extension of its existing offices in California and Houston. The local presence provided by this new base in South America is integral to BMT's ongoing effort to enhance product sales, delivery and service support to Petrobras and other oil and gas firms in Brazil. BMT's enhanced presence in the region is supported by a Portuguese language website at www.scimar.com/Brazil.

OceanTools New Intelligent Subsea Digital Video Recorder

OceanTools completed the development of a new intelligent subsea digital video recorder, the VideoLOGGER. The first unit was recently shipped to a Canadian customer. The VideoLOGGER uses a PC104 format Intel Atom CPU to record video to a solid-state disk drive. The recording process is controlled by a microcontroller on a PC104 card. This card provides an accurate real time clock and a built-in or remote pressure sensor interface. Recordings can be scheduled to be triggered on either Time or Pressure values being reached. An Ethernet interface to the PC allows the unit to be configured prior to deployment, and recordings to be retrieved. The VideoLOGGER provides for two types of recording – Continuous or Snapshot. In Continuous video recording mode, a video recording runs from the Start event to the Stop Event and records all video presented to the VideoLOGGER between these events. The Start and Stop events can be based on either Time or Pressure.

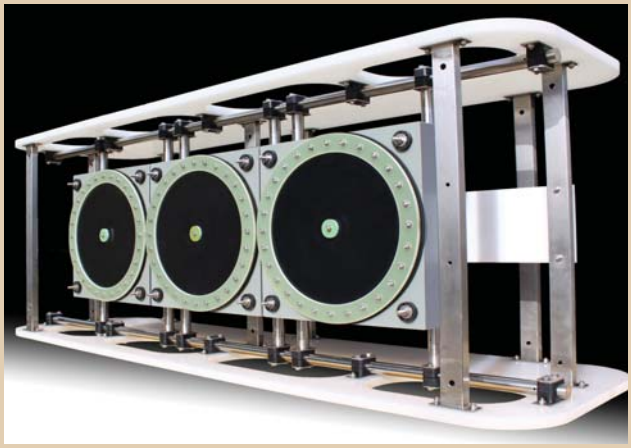
www.oceantools.eu

Noordhoek Group: Born Again

After a turbulent period the Noordhoek Group is in the concluding stage of a relaunch. By attracting external capital the company is to proceed to operate at the same location in Zierikzee, while the vast majority of the quality staff will be able to join the company. The investment company Value Enhancement Partners from Amsterdam will obtain a majority share and will be supported by the Noordhoek family and Hanzevast, the owner of the Noordhoek Pathfinder. Because of the new financial structure and the planned reinforcement of the management, future development will be looked upon with great confidence and the company will be able to extend their specialist knowledge in the area of Diving, Subsea IRM, Survey and Subsea Equipment. Currently, the Noordhoek Group is involved in a variety of projects, among which the construction of the second Coen Tunnel and Survey projects at the North Sea and the Mediterranean. Noordhoek is a leading provider of Subsea Construction, Diving, ROV and Survey Services to the offshore oil and gas industry, serving operators and contractors internationally and domestically in the North Sea. Construction services include installation, upgrading and decommissioning of pipelines and production infrastructure. Diving, ROV and survey services include inspection, repair and maintenance services and support services for subsea infrastructure and underwater structures. Supply of high-tech subsea equipment is, within the Noordhoek group, the domain of Seatec.

S-Boom System

By harnessing the combined power of three of their AA202 Boomer Plates to provide a single pulse, the Applied Acoustics' S-Boom System is helping to redefine the boundaries of shallow seismic surveying. Already recognized for producing high resolution seabed profiles, the fusion of these three transducers delivers a source level high enough to significantly increase sub-bottom penetration without loss of data



quality. Capable of operating at a maximum energy setting of 1000 Joules per pulse, and firing at three pulses per second, the S-Boom has achieved penetration results of over 200mS through sand and limestone while delivering the high quality resolution records expected from boomer systems. The high repetition rates and pulse stability allow for faster surveying, adding to the system's overall versatility. As with all Applied Acoustics' sub bottom systems, the S-Boom forms part of a modular package able to operate from a number of energy sources from the renowned CSP range. For optimum results, the fast charging CSP-S1200 power supply has been designed as the energy source of choice for this system, although the system can operate just as well with a source from the larger CSP-S range. Furthermore, some existing variants of the CSP-D range can also be used at lower settings and longer pulse intervals.

www.applied-acoustics.com

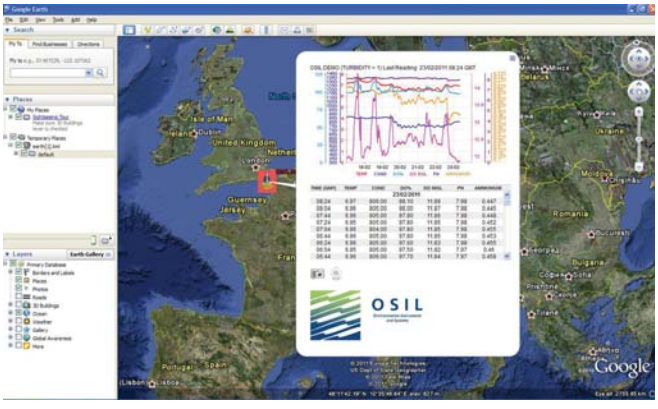
OceanSENSE Leak Detector

A leak detector engineered by OceanTools has reportedly delivered a 100 percent detection record across a recent series of major North Sea projects. The OceanSENSE-DH diver held leak detector was launched by OceanTools in late 2010. OceanSENSE is compact and lightweight and can be operated by an ROV team. The design allows the units to be mounted on a wide range of ROVs. As the system uses high intensity light emitting diodes (LEDs) for excitation of the fluorescence, there are no safety issues. The OceanSENSE units can be configured to detect any combination of fluorescing materials, including fluorescein, rhodamine, hydrocarbons, hydraulic fluids (with certain added tracers) and chlorophyll. The OceanTools development team has also been producing variants on OceanSENSE including OceanSENSE-Micro, an ultra compact version; OceanSENSE-Pelagic, a Pelagic 100 detecting version; and OceanSENSE-AUV, an AUV mounted version. OceanSENSE units are available for sale or rental.

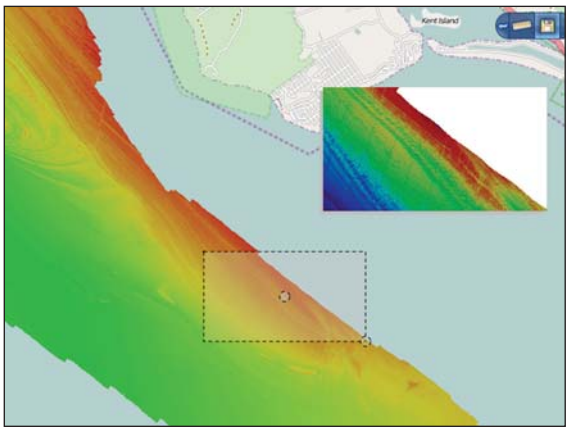
www.oceantools.eu

New Data-to-Web System

The Falcon (standalone), and Falconet (integrated) Data to Web system is designed to provide a low-cost, flexible solution to transmit, store, host and present data from all common sensors to a dedicated website in real time. The new system can communicate using GPRS, GSM, radio or satellite, can be coupled to almost any sen-



CARIS: Spatial Fusion Enterprise



Spatial Fusion Enterprise enables users to distribute and interrogate bathymetry on the web.

The latest release of Spatial Fusion Enterprise is building on its support of Open Geospatial Consortium (OGC) standards by implementing the Web Coverage Service (WCS) standard for bathymetric data. This is a continuation of CARIS' commitment to provide organizations with the latest technology for delivering their geospatial information on the Web. WCS is an OGC standard for downloading coverages of gridded and point cloud data. This will allow CARIS' marine clients to share their bathymetric data through data downloads in 32-bit GeoTIFF, BAG and XYZ formats. The inclusion of WCS is seen as the next logical step in the development of Spatial Fusion Enterprise, and follows the successful implementation of other OGC standards for viewing, querying and downloading, including Web Map Services (WMS), Web Map Tile Services (WMTS) and Web Feature Services (WFS). Spatial Fusion Enterprise is the final component of CARIS' unique Ping-to-Chart solution. This solution allows for increases in efficiencies and seamless interoperability through the entire hydrographic workflow from hydrographic data processing to the capability, using Spatial Fusion Enterprise, to distribute and interrogate bathymetry on the web.

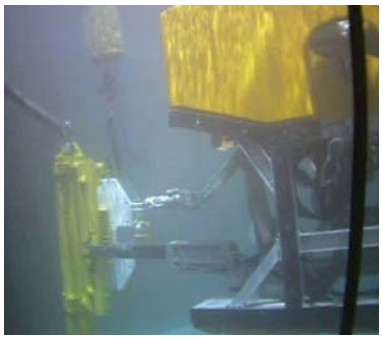
www.caris.com/products/sfe

sor, and can be retrofitted to existing platforms. Data is presented on a dedicated website with a password access, using secure servers, and can interface with existing data gatherer and SCADA systems. Multiple sites can be displayed on one screen, with inputs from multiple sensors. Applications can be developed in short timescales and at low cost to enable tailored software solutions. Data can also be integrated easily into the Google Earth program. Any web enabled device can be used to view the data, which can also be transmitted via text, including alarms, or a stand alone receiving terminal can be set up. The on site equipment can be reconfigured or controlled through the 2 way communication link, or a voice menu system.

Email: sales@osil.co.uk
www.osil.co.uk

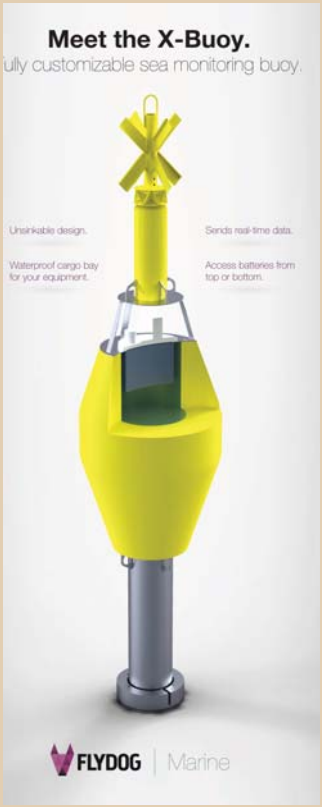
ROV Servicable Subsea Strain Sensor Assembly

BMT Scientific Marine Services launched a fully-qualified ROV-Serviceable Subsea Strain Sensor Assembly (SSSA) for monitoring the structural integrity of subsea structures (tendons, production risers, steel catenary risers, platform legs and braces, etc). With the ROV-serviceable SSSA, Floating production storage and offloading (FPSO) and platform operators have the opportunity to benefit from an increased degree of system reliability and quicker, simpler replacement operations. BMT Scientific Marine Services (BMT) has developed its existing diver serviceable strain sensor into one that is serviceable by ROV. This has been achieved by designing a special ROV



tool and alignment cage for sensor removal or installation. The tool for handling the sensor mates with this cage, which is bolted to the riser or subsea structure and provides the precise alignment needed to attach the sensor repeatedly and accurately. The design is purely mechanical and is compatible with an ROV equipped with one 5-function and one 7-function manipulator. As long as the failed sensor is replaced in the presence of at least three functioning sensors, the absolute tension or bending moment measurement is preserved during and after the change-out operation.

www.scimar.com



X-Buoy 450

The X-Buoy 450 is an innovative open-platform profiling surface buoy. Designed to fit profilers, probes & sensors of your choice for measuring parameters in a water column in depths up to 300 meters. Floats in any type of coastal waters at wave heights up to 6 meters. The X-Buoy is equipped with a watertight 100 litre Cargo Bay carrying up to 40kg equipment. Gain low maintenance costs by on-water accessibility to batteries and instrumentation. It's unsinkable compact design makes it robust and easy to deploy.

www.flydogmarine.com

DCL Engineered Solutions

DCL Engineered Solutions has unveiled its new Workhorse Synthetic Rope Connector (SRC). Designed to improve upon the roulette thimble/wide-body shackle configuration and H-Link, in connecting segments of polyester mooring ropes for MODUs and permanent moorings

www.dcl-usa.com

New Monitor & Recorder for Underwater Cameras

Not long ago boat-deployed underwater video systems were expensive pieces of equipment used primarily by the military, oil and gas industry, and oceanographic institutions. Today these underwater cameras are being employed by a wide range of users that includes commercial diving companies, law enforcement agencies, public safety dive teams, professional fishermen, and even recreational scuba divers. They are affordable, easy to operate, and available in a variety of configurations such as helmet-mount, diver-held, drop, and towed. One problem encountered in using these systems around a marine environment is viewing the picture from the underwater camera. Standard TV sets and video monitors have a metal or plastic shell lined with openings for air circulation to cool the electronics; not a good setup for use in an open boat on the ocean. It's also hard to see the picture on the screen on a sunny day. To overcome these difficulties, JW Fishers designed the VRM-1 video recorder and monitor. The VRM-1 is a rugged console in a waterproof case with built-in 10.4 inch flat screen monitor and digital video recorder (DVR). The monitor's ultra bright display is easy to see, even in sun light. The DVR records up to 12 hours of high resolution video on a 16GB SD card. The console's control panel has all the switches necessary to operate the lights, camera and the complete system, along with input jacks for a microphone and external monitor. Attach the microphone, which is included, and record audio with the video. Connect a cable to the console's video output jack, and the picture can be viewed on an external monitor. A GPS interface option allows a GPS receiver to be connected to the VRM-1 to capture position coordinates. Time and date can also be displayed on the screen and recorded with other inputs. Remove the SD card from the DVR, insert it into the USB port of a computer, and play the video on the PC, or burn it onto a DVD.

www.jwfishers.com

New Airborne Lidar Bathymetry System

Fugro announced a new cycle of Airborne Lidar Bathymetry (ALB) system development and have commenced flights trials of the Fugro LADS Mk 3 ALB system. The new system has successfully acquired accurate depth and hyperspectral data over test areas in St Vincent and Spencer Gulfs near Adelaide, South Australia. The new generation Fugro LADS Mk 3 system has been developed from the Fugro LADS Mk II and RAN LADS 2 technologies, and is now smaller, lighter and more efficient to operate. The Fugro LADS Mk 3 is designed for operation in a wide range of aircraft and is suitable for small turbo props or rotary wing aircraft alike. The new system continues to offer a high laser power, large aperture receiver and automatic gain controls, enabling superior system performance to collect bathymetry to IHO Order 1a and 1b survey requirements. The laser rate of the Fugro LADS Mk 3 system has been increased to 1.5 kHz and its maximum depth performance extended to 80m, subject to environmental conditions. The faster laser rate provides wider and more efficient swath widths up to 430m. The Fugro LADS Mk 3 system can be used for a wide range of projects, including nautical charting, pre-seismic surveys, coastal engineering projects such as port development, and environmental surveys for habitat mapping and coastal zone management (CZM). The Fugro LADS Mk 3 system can also be fitted with a hyperspectral sensor (HSI) for simultaneous ALB/HSI data acquisition that enables further habitat mapping and CZM applications to be undertaken.

The system is designed to enable shallow water and coastal zones to be surveyed faster and more cost effectively by enabling high quality data to be economically collected across a wide range of environmental conditions. The system architecture has also been designed to facilitate continuous technology development and there are plans in place to further increase laser rates and swath widths. The Fugro LADS Mk 3 system build was completed in Adelaide at the end of March with ground and airborne trials occurring during April. It is planned that the Fugro LADS Mk 3 system would then be available from May 2011 for shallow water hydrographic surveys that Fugro conduct worldwide.

www.fugro.com

DMS-500RP Range from Teledyne TSS

A new addition to the Teledyne TSS range of DMS motion sensors was launched at the US Hydro 2011. The DMS-500 range is being developed specifically to meet the needs of users who require a top-quality motion sensor with Ethernet connectivity, but do not require the subsea-rated housings that typify Teledyne TSS products. The result will be a complete range of conservatively-priced sensors that incorporate a number of advanced and innovative features for applications such as Dynamic Positioning (DP), wave height monitoring and structural stress monitoring. The versatile design means that the range will be available in various accuracies to make it suitable for a wide range of bespoke applications.

The first phase of the product's launch introduces the Roll Pitch range of sensors - DMS-525RP, DMS-535RP and DMS-550RP. The solid state circuitry of the DMS-500 is contained within a surface-use housing that is water resistant to International Standard IEC 60945 Class B for marine applications (IP65).

www.teledyne-tss.com

Renewables Mammal Detection System

Tritech expands its sonar range with a key renewables device, launching its Gemini SeaTec Mammal Detection System. Gemini SeaTec is a mammal detection system which provides a tool in the detection of marine life around subsea turbines. Tritech's subsea sonars have been deployed on marine current structures since 2008 when the company made its first step into the offshore renewables sector. Tritech has now developed its real-time multibeam imaging sonar technology for this market.

The Gemini SeaTec system uses Tritech's Gemini 720id multibeam sonar and its bespoke image detection software. This software is designed to provide an early warning of the presence of sea mammals in the vicinity of marine current turbine structures. The Gemini SeaTec provides real-time monitoring of marine wildlife, allowing the operator to take corrective action as required. The logged data can be stored for analysis and used for environmental assessment as part of the current turbine development process.

The Gemini SeaTech is currently installed on SeaGen.

Synthetic Aperture Sonar

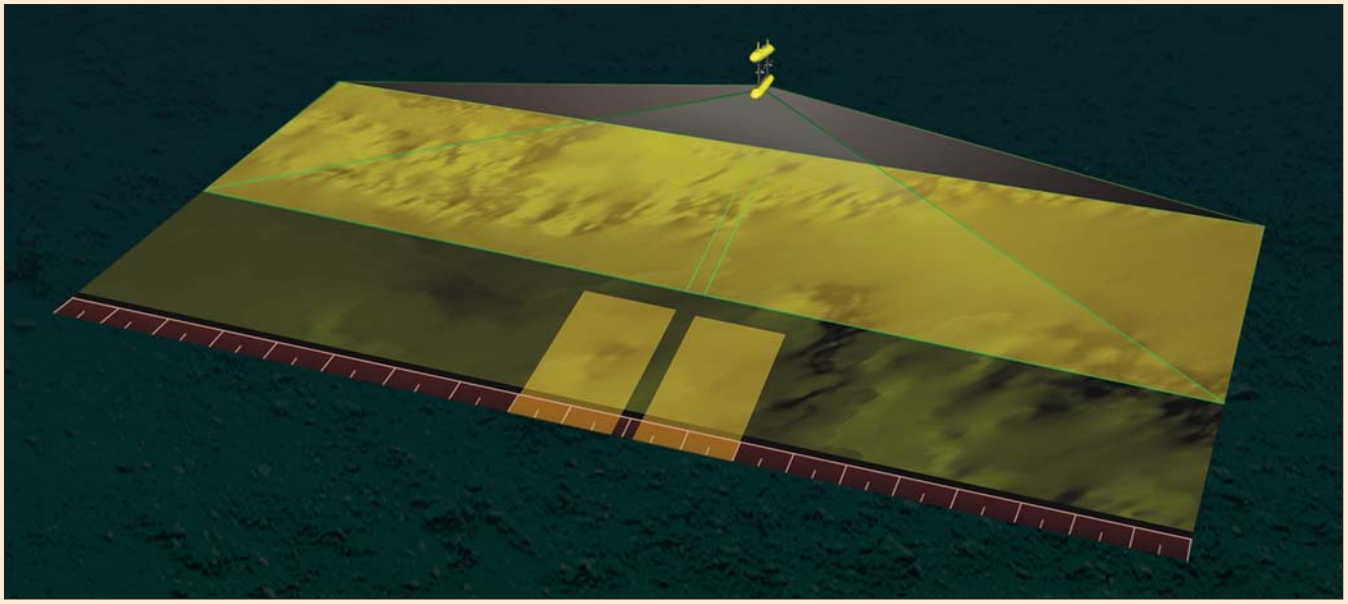
Marport Deep Sea Technologies Inc. introduces AquaPix, a new interferometric Synthetic Aperture Sonar targeted to mine countermeasures, hydrography, seabed survey and other underwater imaging markets. AquaPix is the latest product to be based on Marport's Software Defined Sonar, an underwater acoustics technology platform that enables advanced underwater sensing, communications and imaging products. The sonar is frequency agile from 200 – 400 kHz and offers range independent resolution of 2.5cm by 2.5cm with co-registered 3D bathymetry. Effective swath widths are up to 12 times water depth in shallow water, to a maximum width of 600m. With the integration of AquaPixonboard AUVs the system can reconstruct images taking advantage of sonar sensor data with multi-aspect diversity. It's expected that a future application of AquaPix will be Circular Synthetic Aperture Sonar (CSAS) using techniques similar to medical imaging to reconstruct scenes of interest from data obtained over a full circular aperture. Such advanced imaging capabilities will provide the critical level of image detail required in missions such as underwater ISR, mine countermeasures, hydrographic survey and search and recovery.

The AquaPix sonar design exploits a dual row frequency multiplexed transducer array which allows selection of the vertical beam width of both the transmitter and the receiver on the fly in order to optimally suppress multipath. Two beams with different beam-widths are transmitted at the same time, at different frequencies, and the best beam is dynamically selected by frequency filtering, a technique which is directly inspired from Orthogonal Frequency Division Multiplexing (OFDM) used in radio communications for the same purpose. At the same time the multiplex provides the high level of spatial overlap required to robustly implement the adaptive focusing techniques referred to above.

The AquaPix sonar solution is modular in design, using broadband piezocomposite ceramic arrays which are fully encapsulated for robustness against harsh environments. The use of piezocomposite ceramics not only provides unsurpassed bandwidth and flexibility, but also delivers repeatability in manufacture of sonar arrays with precisely defined beam patterns to provide the spatial filtering crucial to achieving high performance. Transmit and receive electronics are fully encapsulated within the sonar array modules, with small, flexible cables for connectivity to a host pressure vessel.

The pre-amplifiers and sampling rates exploit many years of SAS science and engineering development and achieve true 24 bit sampling with a power consumption of 150mW per channel. The transmit electronics achieve 97% efficiency, with fine phase and amplitude control. The modular arrays are designed to be integrated into a range of platforms such as autonomous underwater vehicles, towed vehicles and hull mounts.

www.marport.com



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GLOBAL DEFENSE SALES AND BUSINESS DEVELOPMENT MGR.

Job Location: USA, WA Seattle
Summary:
BlueView Technologies seeks a highly motivated, experienced sales and business development manager to support our growing global defense segment. The ideal candidate meets educational and experience requirements with a solid understanding of underwater defense operations and government procurement procedures in a global environment. Candidates must have excellent communication, business development, and closing skills with demonstrated abilities working with engineering teams to deliver customized high-tech instruments that meet customer specifications .This position requires extensive domestic and international travel.

Responsibilities:
•Achieve sales goals and objectives for the defense segment
•Seek out and identify sales opportunities within the global defense segment
•Development, follow-up, and closure of project business
•Develop and establish sustainable business partnerships with defense groups worldwide
•Differentiate BlueView solutions and services from competitors by applying creativity, ingenuity, and innovation to a value-added sales approach

Qualifications:
•Bachelors Degree or equivalent experience, engineering degree a plus
•5+ years technical and/or industrial sales experience
•5+ years experience working in or with defense groups and government procurement departments
•Defense industry knowledge, underwater operations a plus
•Existing senior level relationships in the defense industry
•Ability to identify and quickly build relationships with key decision makers within the defense segment
•Ability to develop and execute sales plans and account development plans, candidate will effectively utilize applicable sales tools to plan and document progress to increase business volume within the segment
•Ability to manage multiple, on-going sales opportunities focusing on solution selling and providing value-added service
•Effective communication skills with demonstrated ability to articulate and deliver the value proposition with all levels of an organization
•Effective internal communication skills with demonstrated ability to convey project requirements and customer needs to engineering and sales support teams

Steve Chapman
BlueView Technologies, Inc.
2151 N. Northlake Way, Suite 214
Seattle, WA 98103
USA

Phone: 2065457260
Fax: 2065457261
Email: hr@blueview.com
WEB: http://www.blueview.com

CHIEF ENGINEER, PART TIME

Job Location: USA, NC Wilmington
Chief Engineer needed for the R/V DAN MOORE (Cape Fear Community College's 85', 600HP student training vessel)
Time periods: June 6-10, June 13-17, June 20-24.
Minimum certification needed is a USCG license as Chief Engineer or Designated Duty Engineer for vessels of 1000 horsepower.
Pay will be approximately $1,300 per week.
Duties include engineroom watchstanding during student training voyages. The voyages leave Wilmington, NC on Monday mornings, arrive in Beaufort, NC for an overnight on Wednesday, then return to Wilmington on Friday. The full time assistant engineer is well acclimated to the plant and its management and will provide guidance on the particulars of the operation.
The regular chief engineer is out on medical leave.
Interested respondents can contact Captain Steve Beuth at 910-362-7414 or e-mail sbeuth@cfcc.edu .

Steve Beuth
Cape Fear Community College
411 North Front St.
Wilmington, NC 28411
USA

Phone: 910-362-7414
Fax: 910-362-7495
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Standing Tall in NYC

Alpine Ocean Seismic Survey, a provider of marine surveying and data collection services, launched the multi-use research vessel, the R/V Shearwater. With the addition, Alpine can expand its offerings of turnkey data collection and other surveying services to offshore clients, including wind, tidal, civil engineering, shoreline protection, submarine cable, pipeline, oil, and natural gas project developers.

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Software Defined - Synthetic Aperture Sonar

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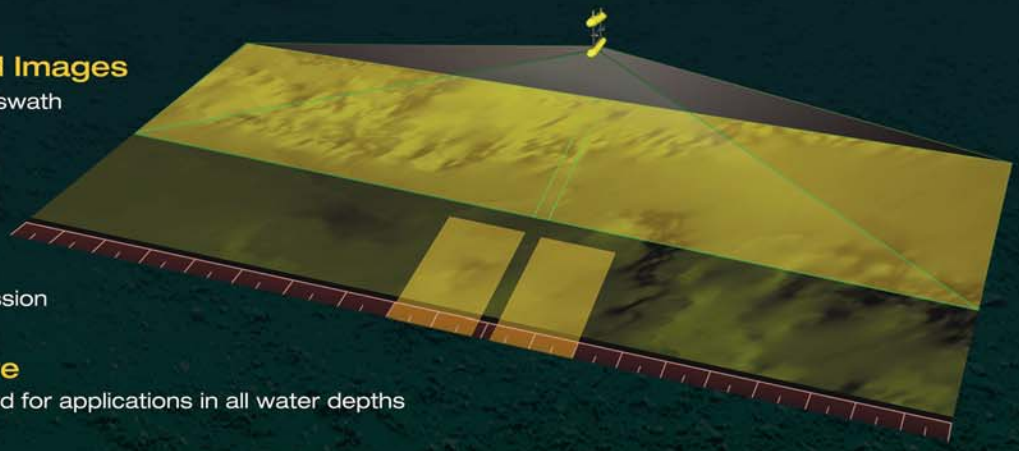
- IHO standards up to 12x water depth

Ultra High Resolution 3D Seabed Images
- 2.5 cm x 2.5 cm resolution cell across full swath

Co-registered Imagery & Bathy
- Real-time geo-referenced data

Unsurpassed Shadow Depth
- Advanced shallow water multipath suppression

Modular and Flexible Architecture
- Broadband arrays and transceiver designed for applications in all water depths



AquaPix® is the world's first software-centric Synthetic Aperture Sonar and sets a new benchmark for underwater imaging applications. Priced to compete with premium sidescan sonars, AquaPix® provides ultra-high resolution images and detailed 3D bathymetry of the seabed.

The broadband system utilizes Marport's award-winning Software Defined Sonar® architecture and can be dynamically tuned over a frequency range of 200 to 400 kHz. It uses the latest digital signal processing techniques to provide range-independent resolution of 2.5 cm x 2.5 cm over swath distances of up to 600 metres, delivering operational coverage rates 12 times greater than conventional sidescan sonar. This allows rapid and cost effective collection of large swaths of seabed imagery and 3D bathymetric data that meet IHO special order requirements.

AquaPix® imaging and mapping capabilities provide the critical level of detail required in demanding missions such as underwater ISR, mine countermeasures, hydrographic survey and seabed imaging. The modular and flexible system is designed for hull mount, AUV, ROTV or towfish configurations in all water depths.

A leader in acoustic imaging science, Marport develops and supplies Software Defined Sonar® solutions for a wide variety of commercial and military applications. For more information, visit www.marport.com or email us at aquapix@marport.com.

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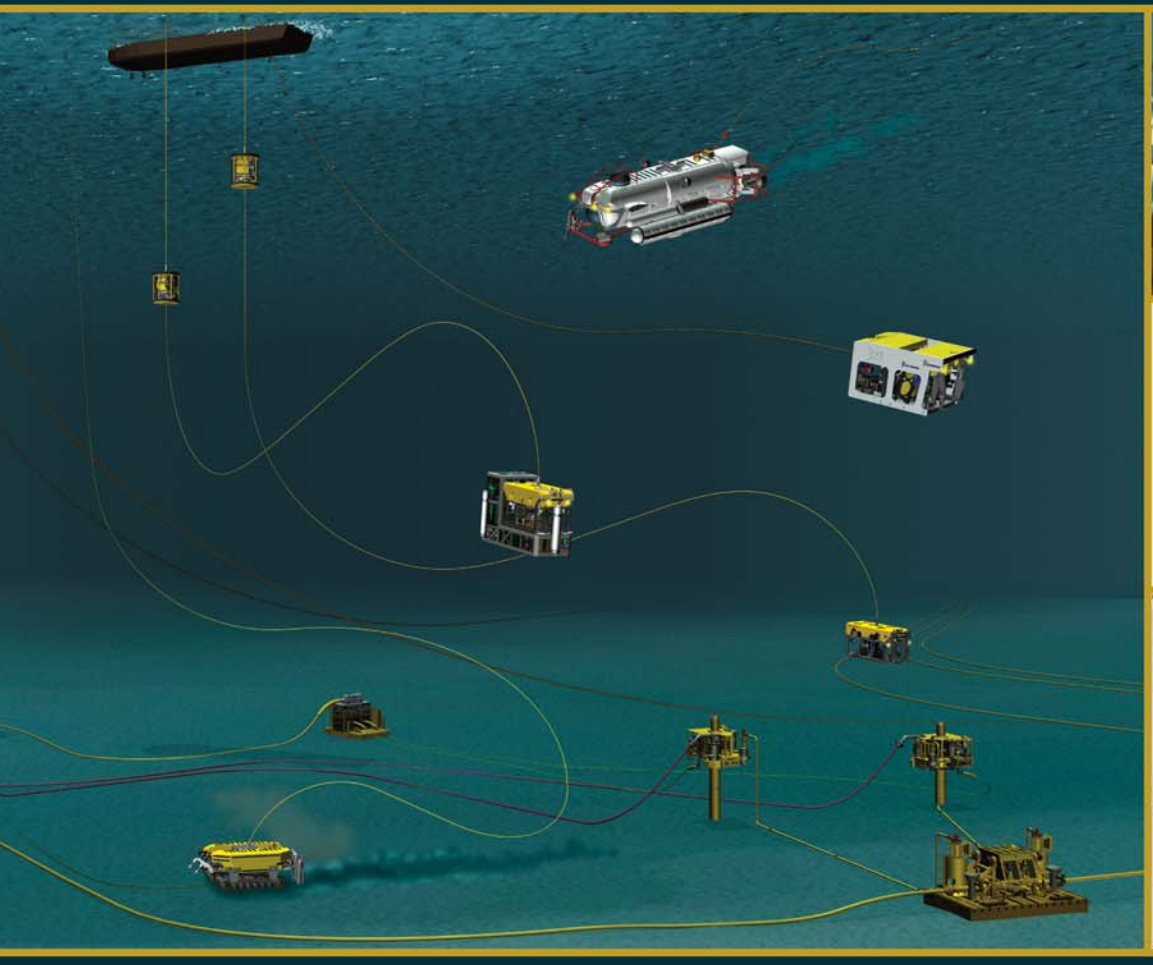

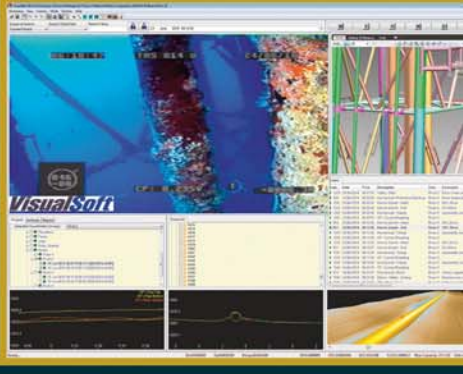

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