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MARINE TECHNOLOGY REPORTER

April 2012 www.seadiscovery.com

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ABOVE: The VideoRay Pro 4 Remotely Operated Vehicle (ROV) displays it's powerful thrusters. Low cost, low volume VideoRay ROVs are ideal for rapid, one man inspections of submerged assets down to 1,000 ft. (305 m) when diving is dangerous or costly. Photo: Christoffer and Henning Klepp Christensen

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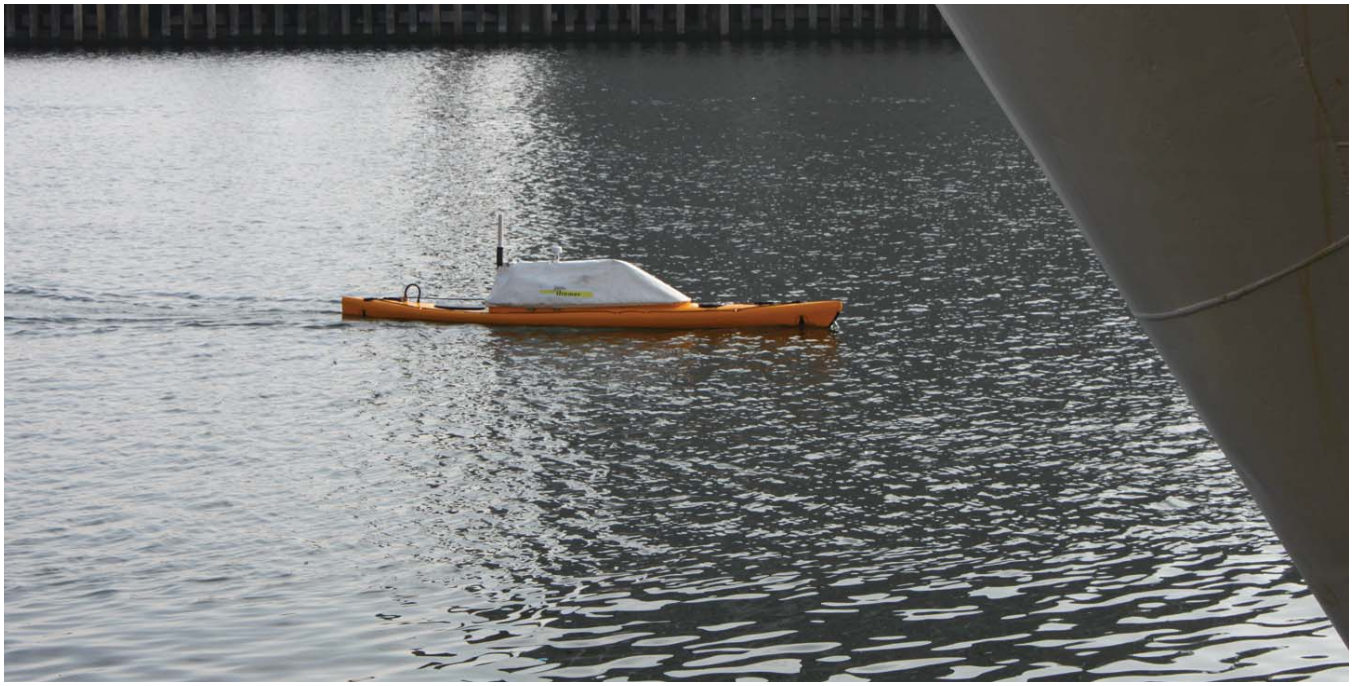

(Photo: Greg Trauthwein)

On the Cover

While the offhsore environment presents some of the most trying work conditions, it simultaneously presents some of the most lucrative rewards.

(Photo courtesy BMTArgoss)

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For those of you unable to attend Oceanology International 2012 last month in London, you missed what is arguably one of the most buoyant exhibitions in recent memory, as the show floor, conference rooms and social functions were literally abuzz with activity. (See full report on the show starting on page 18, as well as news emanating from the exhibition throughout this edition).

Despite recent government budget cutbacks in the face of a lingering global economic malaise, it appears that a ramping up of activity in the global offshore oil & gas and renewable energy sectors is set to help right the ship for the near term.

First and foremost, the Offshore Deepwater sector again appears to be the fuel to make the offshore sector go again. Now nearly two years removed from the Gulf of Mexico Macondo blow out and spill, activity in and around the Gulf of Mexico is finally starting to steam ahead. But the deepwater prospect spreads far beyond the GOM, and this month we are pleased to present the latest data, statistics and analysis from Douglas-Westwood (starting on page 26) which forecasts a global Capex of more than $232 billion for the 2012-2016 period. This report, authored by DW's Jennifer Harbour, includes insightful breakdowns for many of the world's deepwater regions.

This month I am pleased to welcome to our pages Martin Ewan, a U.K.-based lawyer with McGrigor's Energy practice, who writes (starting on page 24) eloquently on the role of offshore innovations in the revival of old and finding of new hot spots in the U.K. sector of the North Sea.

Continuing with the offshore focus in preparation for the Offshore Technology Conference in Houston later this month, MTR's Clare McIntyre again reports on the plethora of subsea and offshore technology companies in the Bergen, Norway subsea cluster. It was in late 2011 that Clare had occasion to visit personally with many of the companies in this region, and this month, starting on page 46, MTR readers receive a blow-by-blow insightful look at some of the regions — some of the world's — leading developers of technology in the sector.

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FMC: $1.5B Pre-Salt Subsea Tree Agreement with Petrobras

FMC Technologies, Inc. signed a four-year agreement with Petrobras for the supply of pre-salt subsea equipment. The total award will result in approximately $1.5 billion in revenue to FMC Technologies if all of the subsea equipment included in the agreement is ordered. The initial call-off has an approximate value of $900m in revenue to FMC and includes 78 subsea trees. FMC's total scope of supply could include the delivery of up to 130 subsea trees, subsea multiplex controls and related tools and equipment. The tree systems are for use offshore Brazil in water depths up to 8,200 ft. (2,500m). The equipment will be engineered at FMC's South American Technology Center and manufactured at FMC's subsea facility, both of which are located in Rio de Janeiro, Brazil. The subsea trees will achieve 70% Brazilian local content and deliveries are scheduled to commence in 2014.

Liquid Robotics' PacX Challenge Wave Gliders Breaks Record

Liquid Robotics reports that the PacX Challenge Wave Gliders have broken the Guinness Book World record for distance by an unmanned wave powered vehicle. Arriving in Hawaii on the first leg of its 9000 nautical mile journey across the Pacific, they have traveled more than 3200 nm breaking the previous world distance record of 2500 nm.

Launched on November 17, 2011 from San Francisco Bay, the Wave Gliders have survived 8-m (26-ft.) waves in a gale force storm, defied turbulent mid-ocean currents, all while transmitting real time ocean data and staying on course to their first destination: the Big Island of Hawaii. After a short check-up, the PacX Wave Gliders will embark on their final journeys to Australia and Japan. During this portion of the record breaking, scientific expedition, the first team of Wave Gliders will cross the Mariana Trench and battle the Kuroshio Current on their way to Japan. The second team will cross the equator on their way to Australia. It is anticipated the arrivals will occur in late 2012 or early 2013.

www.liquidr.com/pacx

Ulstein Delivers *Polarcus Amani*

3D seismic vessel Polarcus Amani was delivered from Ulstein.

Ulstein delivered the next generation seismic research vessel Polarcus Amani to marine geophysical company Polarcus on March 29, 2012. The vessel is of the SX134 design from Ulstein, and is vessel number seven in Polarcus' fleet; all with the X-BOW hull line design. "Ulstein Verft is known for its punctual and high-quality deliveries, and with the delivery of Polarcus Amani, they have once again proven their ability to handle demanding building projects," says CEO of Polarcus, Rolf Rønningen.

Polarcus Amani is the first Polarcus vessel built by Ulstein's own shipyard in Norway. It is soon to be followed by her sister vessel, yard number 293, due for delivery at the end of Q2.

Polarcus Amani is an Arctic-ready vessel designed and built for operations in Arctic waters. She carries the ICE-1A* and Winterized Basic notations from DNV, and can operate in first-year ice of up to one meter thickness without the assistance of icebreakers. The entire vessel is ice-reinforced with thicker ribs and skin plates.

She has de-icing and ice-preventing systems at critical tanks and pipelines, and propellers, gears and thrusters are dimensioned for withstanding operations in ice. Escape corridors and rescue equipment are also protected against icing during Arctic operations. Although 3D seismic acquisition will only take place in ice-free, or possibly bergy water conditions, the arctic qualities of the vessel enables it to move through ice on her way to and from the survey area, or remain in icy areas waiting for the ice to clear, increasing the operational window of the vessel. Polarcus Amani carries the Clean Design notation from DNV.

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VP of Business Development,
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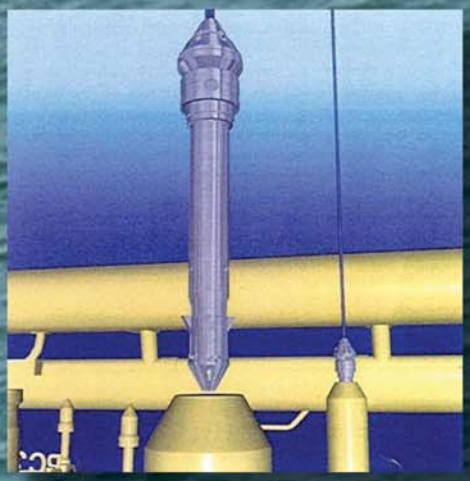

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Dakota Creek Wins Bid to Build Scripps' New RV

The U.S. Office of Naval Research (ONR) announced the shipyard responsible for constructing the next chapter in ocean exploration for Scripps Institution of Oceanography at UC San Diego. The new research vessel will be owned by ONR for the Department of the Navy and operated by Scripps under charter party agreement. Dakota Creek Industries Inc. (DCI) of Anacortes, Wash., will build AGOR 28, a new "Ocean Class" research vessel that will advance Scripps' pursuits of the planet's most vital environmental and scientific challenges. Specifically designed to operate globally, this vessel will support both U.S. Navy and national oceanographic research objectives. National security research objectives include exploring science and technology in the areas of oceanographic and meteorological observations, modeling and prediction in the battlespace environment; submarine detection and classification; and mine warfare applications for detecting and neutralizing mines in both the ocean and littoral environment.

Tritech Technology for Nautilus

Tritech supplied Soil Machine Dynamics (SMD) with Gemini Multibeam Imaging and Profiling sonars for installation on 3 SMD vehicles, built for the Nautilus Minerals Solwara 1 Project. The titanium multibeam sonar package is based on Tritech's Gemini multibeam technology and, together with supplied surface processing units, will offer profiling and imaging capabilities in the world's first deep-water mineral exploration project. In addition to the sensory equipment supplied, Tritech has configured a Subsea Visualization System for SMD; a modular-based software package for the processing and display of the real-time captured external sensor data and sonar imagery in an Augmented Reality (AR) view. The visualization system will be used in conjunction with SMD Subsea Production Tools for the recovery of Seafloor Massive Sulfides in this project. Ian Parnaby, Principal Engineer, SMD comments: "Our confidence in Tritech's subsea technology meant we were able to approach them with specific requirements for the Nautilus Minerals project."

AAM Delivers Quad Prop Cat Research Vessel

Last month All American Marine, Inc. (AAM) delivered an innovative research vessel, the Sea Scout, to C & C Technologies, Inc. of Lafayette, La. The 134 x 37-ft. aluminum vessel is unique in that the builder believes it to be the first catamaran featuring quad propeller propulsion. C & C typically operates steel monohull vessels, but according to the builder commissioning a high performance catamaran design made sense for accomplishing C & C's diverse multi-mission requirements. In particular, the catamaran design offers enhanced seakeeping ability, allowing the survey team to operate in all kinds of weather. "With this boat, we will be able to do more work in rougher seas," said Sea Scout's Captain, Jeramie Rivette of C & C Technologies. "That's really important in survey work where pitch, roll and heave will often stop you from getting good data." The vessel is certified under ABS international load line standards and contains a certificate of inspection under USCG subchapter "T" regulations. Sea Scout was built to be SOLAS compliant and may be deployed internationally in the future. The wide and open aft deck is reconfigurable and was reinforced to accommodate an equipment load of more than 80,000 lbs., inclusive of two 20-ft. van containers that are used for AUV operations.

Captain Jeramie Rivette at the helm of the Sea Scout.

The 01 deck encompasses the survey lab, server room, and data processing office. The pilot house provides 360 degree visibility, while maintaining a profile with low wind resistance. Sea Scout's decks are complemented with a 14,000 lbs. stern A-frame, a 10,000 lbs. side A-frame, 16-ft. Zodiac skiff, 5-ton hydraulic crane, and various mechanical and scientific winches. It carries a Kongsberg High Precision Acoustic Positioning system (HiPAP) for 3D tracking of underwater objects, a Kongsberg Hugin AUV, and has two transducer pods integrated into the hulls. The main deployable sonar strut is located aft of the superstructure and deploys through a large moon pool located on centerline.

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Grandweld Delivers to ADNOC

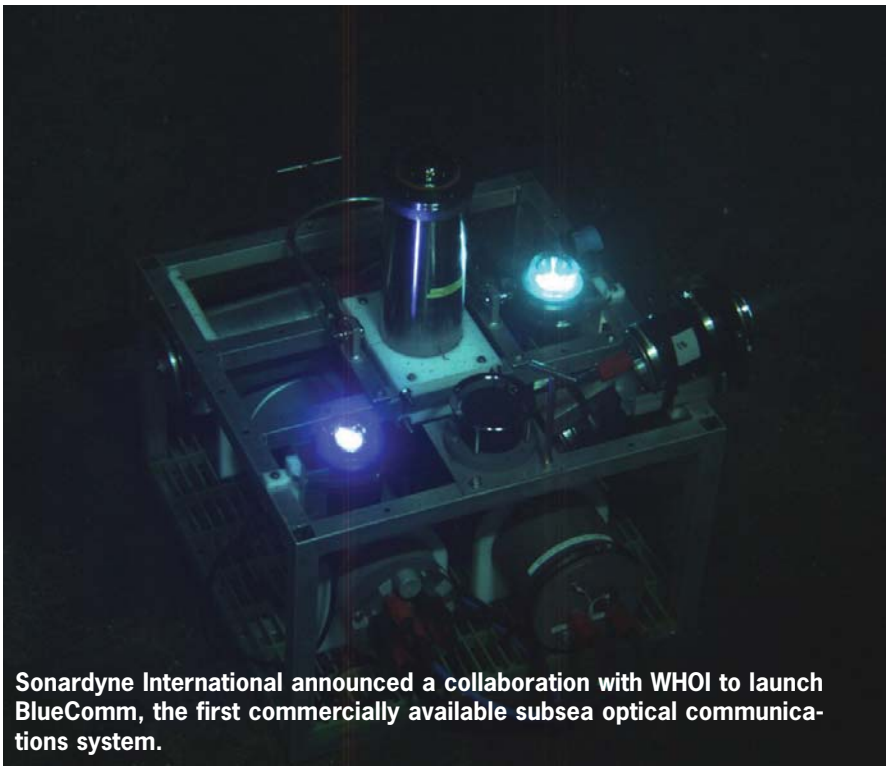
Grandweld Shipyards has completed delivery of Aradah, a 55m Dive and Maintenance Support Vessel (DMSV) built for ADNOC. The new state-of-the-art DMSV is the first from its class to be built by Grandweld Shipyards and will serve as the flagship to ADNOC offshore fleet operating in the region. The vessel, equipped with 360 degree Schottel Rotatable Propulsion System, will serve dive and maintenance operations in Abu Dhabi offshore fields. Additionally, Aradah is equipped with dynamic positioning, providing the vessel with the capability to automatically maintain position without captain intervention. The vessel is also equipped with a subsea lifting crane of 70 Ton @ 14m capacity positioned at the aft of the vessel, capable of handling Deadweight Anchors, Mooring Buoys and SBM hoses. The vessel is also equipped with two self-contained integrated diving systems complete with decompression chambers in order to facilitate under water diving operations.

AAE: Multiple USBL Orders for Japanese Navy

The Japan Maritime Self Defense Force (JMSDF) has awarded a major contract to Applied Acoustic Engineering (AAE) for the supply of a number of USBL tracking systems and associated equipment.
Following sea trials in Japan and a competitive tender process, JMSDF took the decision to invest in seven of AAE's Alpha Portable systems, after witnessing and accepting the key criteria of tracking stability, portability and ease of use.
Predominantly intended for use with their naval search and rescue dive teams, JMSDF have also specified AAE's 210 Micro/Remote transponders as the ideal beacon to attach to its divers.

WHOI, Sonardyne Collaborate

LUMASYS: Seeking to Deliver Subsea Broadband



Sonardyne International announced a collaboration with WHOI to launch BlueComm, the first commercially available subsea optical communications system.

Sonardyne created a new joint venture company with the Woods Hole Oceanographic Institution (WHOI). The spinout company, called Lumasys, is to launch the first commercially available subsea optical communication system, BlueComm. The two organizations are working in collaboration to bring BlueComm to market. This wireless communications technology is designed to enable subsea data to be transferred at speeds equivalent to broadband.

Optical communications can be used to provide ultra high data rates in typical deep water environments where there is little or no ambient light and turbidity is minimal. It is best suited to applications where significant user bandwidth is required or high levels of ambient noise preclude the use of traditional acoustic technologies.

This emerging technology uses high power light emitting diodes as the transmitter with a receiver based on photomultiplier technology that is so sensitive it can detect light energy at the level of a few photons.

BlueComm operates over short ranges of a few tens or even hundreds of meters with data transfer rates of up to 10-to-20 megabits per second to be achieved. It therefore provides an excellent complement to Sonardyne's traditional long range but lower data rate acoustic communications technologies.

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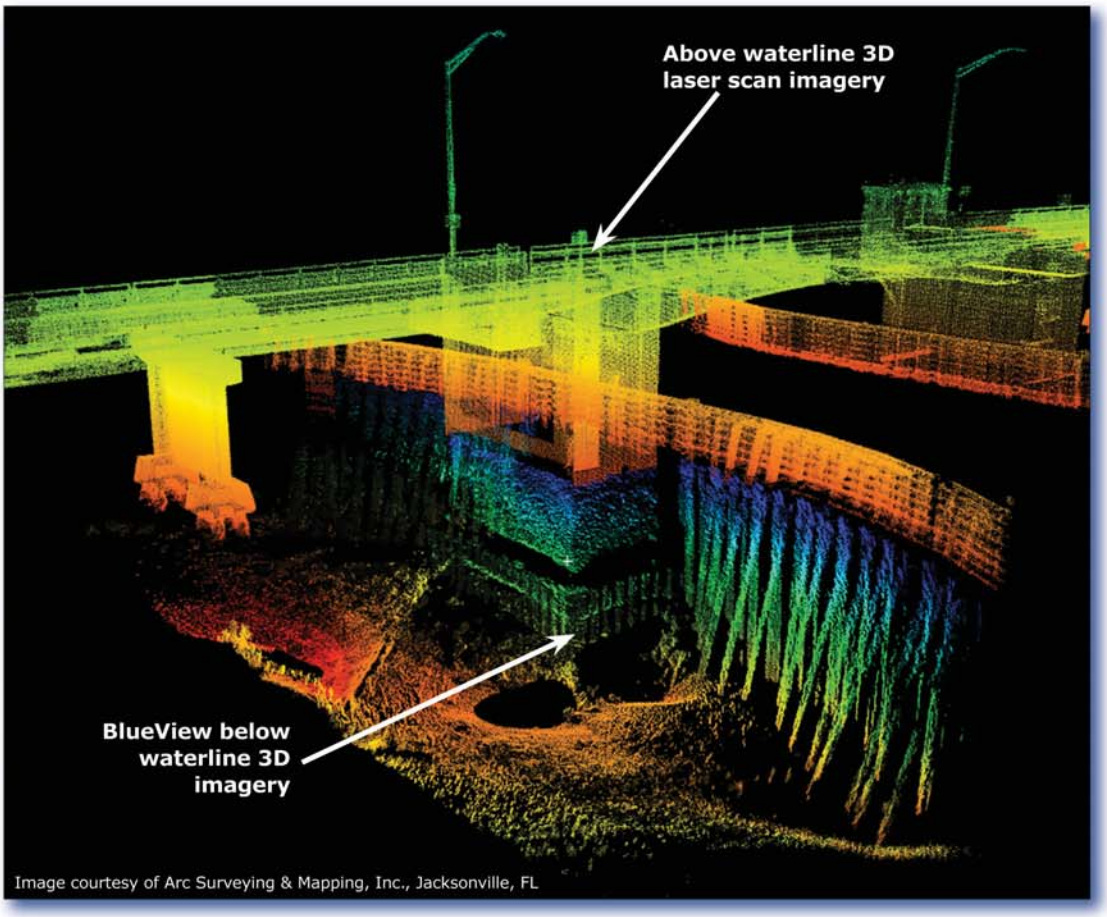

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Bluefin Receives Subcontract Award

Bluefin Robotics won a Phase II subcontract from Applied Physical Sciences Corp. (APS) for the Deep Sea Operations (DSOP) Technology and System Development Program sponsored by the Defense Advanced Research Projects Agency (DARPA).

EIVA: New Rep of Teledyne Gavia

EIVA has been appointed by Teledyne Gavia as their exclusive representative in Denmark, Norway, Sweden and Finland. The Gavia AUV is a self contained survey solution with a low logistics footprint and capable of operations at depths of up to 1000m while carrying out a wide range of missions for military, commercial and scientific applications. EIVA has experience in supplying AUVs to several customers in the past years, and we are very excited about how the Gavia differentiates itself compared to other products.

www.eiva.dk

AML Oceanographic Launches Bathymetric System with Field-Swappable Sensor Heads

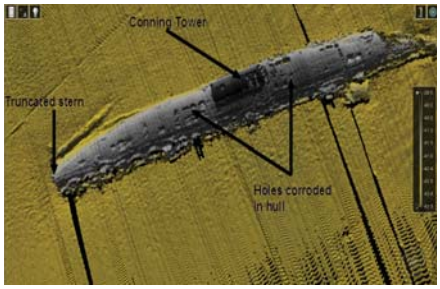
AML Oceanographic announced bathyMETRECX, the first bathymetric system with field-swappable sensor-heads. "We are very excited to launch bathyMETREC-X," said Robert Haydock, President of AML Oceanographic. "It is the only instrument to combine the two key features of a bathymetric system: a low drift, high accuracy 0.01% Paroscientific Digiquartz pressure sensor and a high accuracy time-of-flight sound velocity sensor. Combining this with its field-swappable sensor-heads is a real breakthrough in the industry."

bathyMETREC-X can be field-configured to suit the application at hand. In addition to the instrument's internal Digiquartz pressure sensor, the user can connect up to five field-swappable sensor-heads.

Available sensor-heads include conductivity, time-of-flight sound velocity, temperature, dissolved oxygen, and turbidity. Piezo-resistive pressure sensor-heads can also be connected. Sensor-heads can be swapped, in-the-field and on-demand.

www.AMLoceanographic.com

UL Smart Robot Explores Irish Wrecks



An advanced marine robot designed and built by University of Limerick researchers was deployed to explore wrecks of The Aud and WW1 U-Boat, UC42 outside Cork Harbor. The Aud was scuttled by its crew while under Royal Navy escort to Cork Harbor after it was prevented from landing guns in 1916 and the UC42 sank in 1917 while laying mines. With the help of the Irish Naval Service, the UL Marine Robotics team deployed the advanced Smart Remotely Operated Vehicle called ROV Latis which has patented technology features, from the LÉ Eithne to undertake submarine archaeological investigations of wrecks off the Cork Coast.

The investigations entailed high resolution multi-beam sonar survey combined with video survey with instruments aboard the ROV Latis platform. The precision flight control of ROV Latis and advanced auto pilot control capabilities developed by team member Dr. Edin Omerdic, allowed the robot to follow precise transects for multibeam sonar and video imaging of the wrecks. This fidelity in flight control offered by ROV Latis enabled acquisition of high quality imagery which was used to build the three dimensional model of the UBoat on the seabed. The expedition also involved Irish Naval Service (ROV) team and dive unit for training and trials of the INS Cherokee ROV alongside the advanced ROV Latis systems.

www.ROVLatis.ie

New Subsea Fiber Optic Connector

SEA CON's new commercial subsea fiber optic connector is based on SEA CON's standard rubber molded connector series and provides a cost effective solution for single channel fiber optic requirements in subsea environments. Cable assemblies (single-mode or multi-mode) are terminated at each end with a Cable Connector Plug (CCP) and the Bulkhead Connector Receptacle (BCR) has pigtails terminated with standard ST connectors.

This connector has a mated pressure rating of 1,000 psi (700m) with an insertion loss of 0.5dB typical (1.0dB max) and a mate/de-mate cycle of >20. Easy to connect, plug and lock, this new connector is suitable for many harsh environments.

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Imenco Powers Ahead Offshore

The story of Haugesund, Norway-based Imenco is not far afield from that of other Norwegian maritime and subsea sector companies: Innovative & fast-growing with a keen engineering sense.

The Norwegian maritime and subsea clusters are well-regarded globally for innovative, well-engineered solutions. Imenco is no exception. On the occasion of OI '12 last month in London, *Marine Technology Reporter* has the opportunity to sit down with Imenco CEO **Geir Egil Østebøvik** and its VP of Business Development in the U.S., **Al Cohen**, to discuss the quick rise and promising future of a company with innovation at its heart and engineering in its soul. **— by Greg Trauthwin, Editor**

When Østebøvik joined Imenco in 1999 as its managing director, he could not have imagined the rapid rise and successful trajectory of Imenco. When he joined, there were six people total in the company. Two years later the fate of the man and company became forever intertwined, as Østebøvik bought the company and immediately set a course toward growth.

When he joined, Imenco was mainly an engineering consulting company with but a single product, the guide wire anchor. "Fairly early on I saw that in order to grow the company, in order to make money, we needed to have more products in the range, so we started developing our own products, buying product lines from other companies, and in fact buying other companies," said Østebøvik. The strategy reaped dividends, setting the foundation for Imenco to grow from a six-person engineering shop to a 100-person engineering system solutions company, able to deliver from design to installation a wide spectrum of products and systems to the global maritime and offshore markets.

"All of our products are engineered for safety and security built in," Østebøvik said. "We have Statoil as one of our big and demanding customers, and they think safety, safety, safety … to keep them as a customer safety is the center of our company culture."

Geir Egil Østebøvik, managing director and CEO of Imenco, has grown the company from 6 employees in 1999 to more than 100 today.

Breadth of Product, System and Service

Imenco is an EPC-contractor to the maritime industry that designs, develops, and manufactures a wide range of products such as Diving Systems, Helicopter Fuel Systems, Industrial CCTV Systems, Cameras, Lifting & Handling products, Subsea cameras and tools, including subsea Lights and Lasers. Its engineering team is specialized in the area of mechanics, hydraulics and electronics engineering.

We typically get business from the oil companies, particularly Statoil which is very close to us, said Al Cohen, Imenco's Vice President of Business Development for the U.S. based in Houston, and a driver for the company's business outside of its home base in Haugesund. Samsung and Hyundai in Korea are major clients as well, as we are helping in the outfitting of offshore rigs and FPSO, mainly with our helicopter refueling system and some of our guiding systems.

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Al Cohen is Imenco's VP of Business Development - USA. Sitting in Imenco's Houston office, Cohen has been instrumental in helping to expand Imenco's brand, reputation and sales outside of its native Norway.

In the previous few years, the company has been busy building saturation diving systems, and this was in fact its biggest volume of business. But today, with activity in that sector relatively weak, Østebøvik said that there is a big push for its subsea camera systems, and also for its subsea lifting and handling solutions. He also said that the company is looking to expand, but focused rather on opening new world regions unfamiliar with Imenco solutions. "There is big potential for us worldwide, particularly when you measure the efficiency and redundant safety of our systems against others," Østebøvik said.

The more things change …

While there have been innumerable changes in the offshore oil and gas market during his career, Østebøvik maintains that a constant is the industry's continued push for safer systems. "It has become much more stringent, he said. " If you go back 10 or 15 years, products and systems that we thought were safe would not be acceptable today because they had only one security level. A key to Imenco's continued success, according to Østebøvik, is the continuity and strength of his company's engineering department. While boasting on one's own engineering prowess may seem a given, the point is particularly acute at Imenco, where 40% of its employees are dedicated to engineering, many of whom have been with the company since its inception 33 years ago. The latter point is particularly noteworthy, as in Norway today there are an estimated 16,000 vacant engineering positions, and company's of Imenco's size must consistently compete with much larger corporate entities for top engineering talent. "We are a company that does not simply take equipment from the shelf and push it to our clients," Østebøvik said. "We ask the client what they need, and try to deliver to

What Does Imenco Offer?

• **Diving Systems (NUT)** Norwegian Universal Technology (NUT) — a leading suppliers of pressure equipment for civilian and military use as well as for medical and scientific research work — became a part of Imenco August 2008.

• **Guide Wire Systems** Subsea guide wire systems, including a complete range of equipment including surface tensioners.

• **Helicopter Fueling Systems** Setec Contracting — specialized in design and manufacturing of Helicopter Refuelling Systems was merged with Imenco in 2005.

• **Industrial CCTV Systems** Industrial CCTV systems for land based industry, marine and offshore industry, including hazardous areas.

• **Subsea Lifting & Handling** Imenco has been engaged in lifting and handling products and services over the last decade. Our engineers have long experience and Imenco is certified to design, manufacture and issue certification for lifting and handling equipment to the marine industry both top side and subsea.

• **Special Subsea Tools** 3 finger jaws; Bolts, brushes, Grinders and Torque tool; Cutting and drilling tools; ROV Shackle; Anodes & Torque Tool; Compensators; Latches

• **Subsea Cameras, Lights & Lasers** Subsea cameras & Lasers - Shark Range; LED Lights; Fish farming equipment; Inspection ROV; Diving equipment

• **Engineering**
Imenco was established in 1979 as an engineering company, serving offshore and maritime industry.

them based on their needs. Being able to offer the engineering resources to deliver to our offshore oil and gas clients a product and system based on their need is the strength of our company." Typical of this approach was a recent project to designer and deliver a diverless hot tap solution for an oil major. Imenco worked with the client for more than five years to design, develop and deliver a diverless hot tap clamps, allowing it the ability to tap a pipe without putting a diver in the water.

Challenges Ahead

Imenco faces many of the same challenges faced by companies large and small globally: a dearth of engineering talent. Also, the strength of Norway and its currency, the NOK, makes it particularly challenging to export its brand of expertise globally. "The currency exchange rate is a big negative," admitted Østebøvik. Whereas it used to be about 10 NOK to a dollar, today it is about is 5.5 NOK to a dollar, meaning that if we sell the same product in the same dollar price, we get half the money. And we can't just say to our customers that, "we're sorry, we have to double your price."

But Imenco continues to grow and prosper, buoyed by a resurgent offshore oil and gas business in its homeland and a plethora of untapped opportunities globally. The offshore market is now increasing, with investment levels in and around the North Sea never higher and projected to grow in the coming two or three years.

According to Geir Egil Østebøvik, Managing Director and CEO, Imenco, a key to his company's continued success is the continuity and strength of its engineering department. In fact, the engineering staff makes up 40% of his 100-person company.

The London Tradeshow "Buzz"

OI '12 Breaks Records

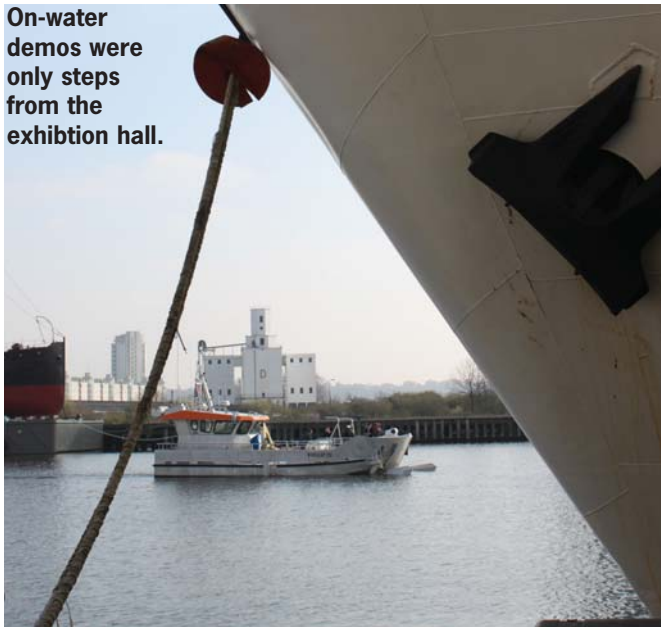
OI '12
Attendees 7,728
Countries 70
Increase v. '10....10.8%
Exhibitors.....525
Countries 33
(Source: Reed Exhibitions)

Last month Oceanology International 2012 set up shop in London's ExCeL center, again confirming its position as the largest, most vibrant and busy subsea technology show in the world. OI '12, held in London mid-March, proved to be the bi-annual event's largest, most successful show, according to the show director. *Marine Technology Reporter*, on hand from start to finish, noted a palpable "buzz" in London's ExCeL hallways among both exhibitors and visitors alike. In terms of attendance and the number of exhibiting companies, with a reported 7,728 attendees from more than 70 countries (a 10.8% increase on 2010) and more than 525 exhibitors from 33 countries, the biennial show broke all previous records. This year Interspill London 2012, with 110 exhibitors, was held alongside Oceanology International, attracting a total attendance figure of 1,346, meaning that the two conjoined shows attracted a grand total of 9,074.

"This year we attracted higher attendance from countries such as China and Russia – and this was also remarked upon," said Exhibition Manager, James Coleman of Reed Exhibitions. "We are looking forward now to Oceanology International 2014, which will be held once again at ExCeL, from March 11-13, 2014."

The exhibition saw a host of product and service launches (which can be found throughout this edition of MTR), as well as contract announcements, including:

- Ashtead Technology purchased $1.4m of Sonardyne 6G subsea acoustic positioning equipment.
- Saderet reported a record first day of sales (to Tower Hydrographics, Coastline Surveys, Svarog).
- Energypro in the Interspill exhibition reported highly encouraging levels of requests for sampling of its Absorbent+00 which recovers spills back to commercial usage.
- GSE Rentals invested in RESON's SeaBat technology, procuring its first SeaBat 7125SV2.
- ASV and Marine Electronics announced a new working partnership.
- Systea's WIZbuoy collected data from the Thames which could be seen in real time on their stand.
- Knudsen drew crowds to its stand as visitors checked out its new innovative 'plug & ping' solution to shallow water



On-water demos were only steps from the exhibtion hall.

(All images: Greg Trauthwein)

sub-bottom profiling.

• GeoSim Global Sim Card reported very high levels of interest in its machine to machine (M2M) global data and telematics service.

• BMT ARGOSS announced its latest research project in partnership with Reading University and OceanExpert Ltd.

• EIVA and AML Oceanographic (formerly Applied Microsystems) signed a distributor agreement with the aim of EIVA reselling the AML Oceanographic product line; additionally EIVA was appointed representative of Teledyne Gavia.

• Surrey based Planet Ocean Ltd. and its Canadian principal, the newly launched Ocean Sonics Ltd, made delivery of the very first ic-Listen-HF, High Frequency Smart Hydrophone to Dr Merin Broudic of Swansea University at a small ceremony on its stand.

• AXYS Technologies Inc. signed Fabricom (part of the GDF Suez operation) as its exclusive agent for marine product sales in Belgium; and also announced that RWE Innogy GmbH (Hamburg, Germany) has invested in a TRIAXYS Directional wave and currents buoy.

• Sonardyne International Ltd. announced the creation of a new joint venture company with the Woods Hole Oceanographic Institution. The spinout company, called Lumasys, is to launch the first commercially available subsea optical communication system, BlueComm.

• Coda Octopus Products and the world's largest marine electronic equipment rental company, Seatronics, signed an agreement with an initial investment worth over $1.5 million to increase the number of Echoscope systems available for rental worldwide through a joint Technology Access Program, (TAP).

• iXBlue, France signed an agreement with CDL Ltd, the UK's Aberdeen-based subsea engineering specialist, for the supply of 50 FoG-based IMUs.

Before Oceanology International got underway, a new conference – *Catch the Next Wave* – was held at The Royal Institution taking a long term view of the capabilities and disruptive technologies that will shape future ability to explore, understand, predict and exploit the oceans. The day-long conference, on the eve of the exhibition and conference at ExCeL, featured presentations by global experts on key disruptive technologies and presentations from senior members of the marine community focussing on where these technologies are emerging in the marine sector. Fittingly, as the man who has designed and built more than 60 manned vehicles used for ocean science and industry, and most recently, a microsubmersible destined to travel to the bottom of the Mariana Trench, Graham Hawkes, who delivered the opening keynote address at Catch the Next Wave , joining such luminaries as Don Walsh (once again in the news with the Mariana Trench successful dive by James Cameron); Sylvia Earle, Explorer in Residence, National Geographic; Vince Cardone of Oceanweather; Jim Baker who was Administrator of NOAA and is now working for the Clinton Foundation; Klaus Hasselmann of the Max Planck Institute and last year's winner Ian Gallett of the SUT. Two other presentations were made that day. Garry Mardell, who recently

Perennial powers drew crowds

Graham Hawkes was awarded The Oceanology International Lifetime Achievement Award

Contracts were signed, products were launched.

retired as Operations Director of Fugro GEOS, received the Society for Underwater Technology Alan Greig Memorial Award; and Brendan Hyland of WFS Technologies was presented with the AMSI Business Person of the Year Award.

One of the great advantages of holding Oceanology International at ExCeL is that vessels can be moored alongside the exhibition hall, and demonstrations held in the water and on the quayside. Ten vessels and a remote controlled boat visited the show; and during the course of the event 380 people visited FS Borda the French Navy survey vessel of the Laperouse Class.

SMD Sells Two ATOMs

SMD have secured the first and second sales of the new Atom WROV system. The Atom is an ultra-compact Work Class ROV, comparable in size to top end electric ROVs but providing the customer with true Work Class capability. The system is suitable for drill support, IRM, survey and light construction duties and can be mobilised on vessels and rigs with limited deck space. Designed with ease of operation and maintenance in mind, Atom boasts the latest DVECS II distributed control system with graphical displays and pilot aids coupled to Curvetech hydraulic components. The first Atom system to be sold was ordered by Allied Marine and Equipment (AME) of Malaysia. Albert Michael, AME's Technical and Operations Director stated: "The purchase of AME's first Atom system represents a major milestone in the evolution of AME as a fully integrated offshore services provider, raising the profile of ROV services within the suite of services offered to our clients. It is planned to use the Atom straight from delivery to support projects for major clients in the South East Asia region." Only two weeks after the first Atom order a second was placed by a Mediterranean based subsea contractor, who will use the Atom to support underwater laying and protection operations.

Cyril McKelvie

President & CEO, Marport

Marine Technology Reporter recently spent time with Cyril McKelvie, Marport's new President & CEO, to discuss this innovative company's promising future.

By Greg Trauthwein

Describe your management style?
Focused. I believe in creating a 3-5 year strategy that supports market, customer and technology focus and drives the behavior of the organization to develop and achieve key objectives that support that strategy. The management team has accountability to shareholders, customers, suppliers and employees as the key stakeholders, and I believe in accountability at all levels. Also, I consider myself a collaborative leader, but in the end it is not a democracy so I take responsibility for decision making if consensus cannot be found.

What do you count as your greatest career achievement to date?
Being a key part of a team that help build NewBridge Networks into a $3b per year company.

I've known Karl Kenny for several years, and he is indeed a "unique" C-Suite executive: In taking the reigns of a company driven for so long by such a powerful personality, what is your strategy in ensuring a seamless transition and laying your own "stamp" on the company?
Karl truly is an "Evangelist in the industry" and has been a key driver behind Marport's success. Our personalities complement each other. At this time in Marport's history we need to start to focus on creating scalable infrastructure that will allow us to execute operationally (Sales, Design, Operations). This is my area of expertise; this will be my legacy with Marport.

In accepting the post at Marport as its President & CEO, what attracted you to the company, and to the position?
Karl's energy; The management team; The technology; The niche fast growing market; The opportunity to influence the direction at the highest level; A Canadian company; and the Atlantic Canada connection.

What are its greatest challenges?
As a market leader, chosing which opportunities to pursue and then focusing on only those opportunities

In terms of TECHNOLOGY, what are your near-term goals to help improve and expand Marport as a whole?
Continue to expand the sensor business built around the SDS platform Deliver the new hull mounted sonar based on the SDS platform. Deliver the first MCM platform sonar to GDC Finish development and deliver Marport's first SAS solution.

In terms of Markets served, where do you see the greatest opportunity in the coming 12 to 36 months?
In the next 12 months commercial fishing; in the next 12 to 36 months defense focused on the MCM market.

Offshore Innovation

Martin Ewan is a UK lawyer, part of legal firm McGrigors' Energy practice. He holds a Masters of Laws (LLM) in Technology Law and advises oil companies on mergers, acquisitions, disposals and restructures.

It is widely accepted the UK Continental Shelf has passed peak production and is in decline. The core areas of the UKCS — the southern, central and northern North Sea — are maturing, large field discoveries are now rare and those remaining prospects are smaller and more difficult economically to exploit. At the same time, in the less explored area of the UKCS, water depth, metocean and geological conditions provide considerable challenges to both exploration and development.

Throw in other factors such as the UK Government's fiscal and regulatory policy (which saw an unexpected £2bn windfall tax introduced in March 2011), the harsh natural environment and complex facilities and skilled personnel needed to operate offshore, and the UKCS becomes a relatively expensive place in which to operate.

For all those reasons, the next generation of North Sea activity will depend greatly on innovation focussed on the twin pressures of technical challenge and cost containment. Innovation has been at the heart of the development of the North Sea for more than 40 years and despite the mutterings of the doom-mongers, I am confident innovation, in both processes and technology, will slow the decline and extend the life of the UKCS for many years to come. Some fine examples of recent and current innovative work taking place include developments in subsea technology and automated platforms to reduce costs, the use of 4D seismic to identify precision-drilling opportunities to access small pockets of by-passed oil, and developing techniques for exploiting previously unrecoverable oil.

For that band of innovators working behind the scenes, the commercial challenge of getting a product or service to market should not be underestimated. It's an extremely competitive world and where competing interests are seeking to solve the same technical problems, only one – or at best a few – will ultimately succeed in the commercial marketplace.

To gain 'first mover' advantage is crucial for technical innovators. The first viable product which achieves broad field acceptance tends to benefit from the network effect of suppliers and clients building experience of the product, making them reluctant to change to an alternative. Secondly, the innovator's staff can become leaders in the field and its solutions benefit from lessons learned in earlier operations. If an innovative company misses the window of opportunity to become the dominant or significant supplier, regardless of how superior the solution may be, it will be extremely difficult to dislodge the incumbent to achieve commercial success.

To prove the viability of a product, the innovator must carry out field testing to an appropriate standard. Over the last 20 years the upstream oil industry in the UK has developed a tiered nature, with operators directly involved in relatively few operations. The work is generally contracted out to what can best be described as an oligopoly of "tier one" contractors which emerged from a major consolidation of the service sector in the 1990s.

These tier one contractors each offer an entire range of services needed for particular functions. For example, tier one contractors in the drilling and well operations sector are each capable of providing all the necessary services and products required to drill a well, mostly from their own internal resources. Only those products and services which are infrequently required, or are so highly specialised as to be uneconomic to develop internally, are purchased from second tier suppliers.

This one-stop-shop approach has many benefits for operators, however the downside is the contractors can act as a gateway to the operators, filtering customer requirements that might otherwise drive innovation, and passing down the chain only those products or services they are unwilling or unable to deliver.

For small innovative companies, the difficulties in gaining the field trial experience which is crucial to proving a concept can be significant and sometimes even fatal. I am aware of several technological innovations which have left the UK not because they were not of value to UKCS operations, but because the developers were unable to gain the

Innovation has been at the heart of the development of the North Sea for more than 40 years and despite the mutterings of the doom-mongers, I am confident innovation, in both processes and technology, will slow the decline and extend the life of the UKCS

early field experience necessary to commercialise the product.

It is also notable that many innovative start-ups choose to exit by way of a trade sale to a first-tier contractor, rather than pursue development of a global presence themselves. Of course, many of the tier one contractors are hotbeds of innovation, possessing both the financial resources to tackle big problems and the necessary access to both field testing and markets.

While most of these challenges are commercial, from a legal standpoint it is important to not only establish and preserve the value of innovation though effective protection of intellectual property, but also to obtain appropriate contractual protection against the backdrop of these fundamental industry dynamics. The legal protection of technology is largely the province of intellectual property (IP) law. It is the areas of patents, copyright and confidential information (including trade secrets and know-how) which form the bedrock of law in this area. The legal framework is then overlaid with a range of relatively standard contractual indemnities.

In many cases, it has been the ongoing and largely reciprocal relationships between the contractor and operator community in the UKCS which have historically prevented much litigation amongst the industry based on IP infringement. However, as economic conditions harden and as further new entrants enter the basin, the accepted conventions may change. With that in mind, it is advisable to consider how the risk of alleged infringement should be handled within each contract.

The UK's national interest in maximizing hydrocarbon recovery, which in turn provides energy security and global competitive advantage, is clear. Government and industry need to work together to find efficient solutions which combat rising lifting costs and aging infrastructure. These solutions are dependent on the technical expertise of our engineers and ensuring that their efforts are appropriately protected and efficiently exploited.

With oil and gas contributing a greater amount of tax revenues to the UK Treasury than any other industry, it is no exaggeration to say that the individuals working on the technical and commercial aspects of the next generation of technologies in the North Sea will be serving their country in a vital way. And it is up to lawyers to play their part as well. It is not acceptable for lawyers to act (or be seen to act) as a "brake" on the commercial activities of the companies they serve - we also need to be as innovative as our engineering colleagues.

Offshore Deepwater

DW forecast a global Capex of over $232 billion for the 2012-2016 period – 90% more than the amount spent in the preceding five year period.

Jennifer Harbour is an author of ***The World Deepwater Report***. Jenny joined Douglas-Westwood in 2011, having previously worked within the field of industrial energy generation, distribution and efficiency measures. She is a graduate from the University of East Anglia's School of Environmental Sciences where she focused her studies on energy management, low carbon energy technologies and scenarios of peak oil. Since joining Douglas-Westwood, Jenny has been responsible for the collation and verification of data from a wide range of sources, her input having being pivotal in the derivation of metrics used to determine future expectations of oilfield service demand.

Since Douglas-Westwood's first coverage of the deepwater sector in the 1990s, it has developed into a vast multi-billion dollar business. The spectacular growth of this industry has been supported by some astonishing technological advances. However, the industry has seldom been free from political interference, environmental debate and commercial challenges. The intention of this article is to examine the present state of play, drivers of activity and future outlook for the deepwater sector, drawing upon Douglas-Westwood's research.

Industry Drivers

Deepwater exploration and production (E&P) activity is driven by a variety of supply-side and demand-side factors:

- The potential for world-class (multi-billion barrel) discoveries
- The lack of new opportunities onshore or in shallow waters and the need to offset decline from existing reservoirs
- New technological advances that improve technical and economic feasibility of deepwater developments

In recent years, the world has witnessed oil price shocks driven by situations where supplies have become very tight as spare capacity is absorbed by growing demand for energy across the world. Future projections of oil supply and demand suggest that this situation is likely to be repeated again within the next few years.

Fossil fuels are becoming more expensive as the resources we extract become more technically demanding and indeed energy intensive to access. Ultimately, a future peak in world oil supply is inevitable; the only question remaining is the date that this will happen. The implication of this supply scenario for the global energy markets is that we will expect to see a sustained increase in oil prices as supplies tighten in the run-up to the peak year. This will impact on deepwater developments to the extent that they will become even more economically viable as the oil price rises. Developments that were marginal at $60/bbl will undoubtedly be more vigorously pursued in an environment where the long-term expectations of oil price are $80/bbl and upwards.

For oil companies the overall outlook for 2012 is positive, with Barclays Capital estimating that worldwide E&P budgets will increase by 11%. The longer-term outlook indicates that subsea, predominately deepwater, developments will continue to play a major part in the portfolios of the majors independent oil companies (such as Total, Shell, BP and Exxon) and some national oil companies (such as Petrobras and Statoil).

Regional updates

Africa

Africa is one of the key regions of the deepwater 'Golden Triangle' and is currently the largest region of deepwater capital expenditure. However, it is likely to be eclipsed by Latin America over the forecast period. Most of the major deepwater developments in Africa are located off Angola, Ghana and Nigeria. Notable exceptions include West Nile Project (Egypt) and Windjammer (Mozambique).

• **Angola** – The country has had a reputation in recent years as a "deepwater tiger", with its output at 1.7 million bpd in 2011. Major projects that have recently come onstream in Angola include Pazflor and Platina, whilst those planned or underway include developments of the Canela and Kaomba fields.

• **Ghana** – The Jubilee field is one of the biggest discov-

eries offshore West Africa in recent years. Operated by Tullow Oil, the field commenced production in November 2010. Production was reported to be 70,000 barrel of oil per day in May 2011 and further development is planned to include integration with other discoveries. Other planned projects in Ghana include Tweneboa and Enyera.

• **Nigeria** – As Africa's largest oil producer, Nigeria already has an established deepwater oil and gas industry with major players including BP, Chevron, ConocoPhillips, ENI, ExxonMobil, Shell and Total. Production is underway from the Agbami, Akpo and Erha projects and development is underway at Usan. Planned projects include Bosi and Chota.

Latin America

Latin America is currently the second biggest deepwater region by total Capex after Africa. Continuing development of the pre-salt basins off Brazil by Petrobras should see this region overtake Africa in 2013. Notable developments in Brazil include Lula (Tupi), Lula Northeast, Guara (Sapinhoa) and Jupiter.

Petrobras, the Brazilian NOC, is the largest energy company in Latin America and the third largest in the world. It has reserves estimated at 16 billion barrel of oil equivalent and production of 2 million boe/d. More than 40 deepwater prospects have been identified off Brazil since 2003 and Petrobras plan to deploy 50 FPSOs and semi-submersibiles by 2020. In November 2011, Subsea 7 confirmed a $500 million, five-year deal from Petrobras to supply a deepwater flexible pipelay vessel for developments off Brazil. The new $350 million vessel is equipped to trans-

port and install flexible flowlines and umbilicals in water depths of 3,000 m.

North America

The global economic recession led to a significant downturn in activity in the 2009/2010 period in this region. In addition to this, the Macondo incident in 2010 and the subsequent deepwater drilling moratorium caused oil production from the US Gulf of Mexico to fall significantly. The Macondo spill is likely to impact installations in 2012 due to the 18 to 24 month lead time for such projects. However, the outlook for 2013-2016 looks promising as many prospective deepwater developments exist and activity is expected to recover by 2013. However, there is a risk that new safety and environmental regulations will make permitting in the Gulf sufficiently cumbersome to prevent or delay its full recovery.

Asia

Despite a significant decline in activity during the global recession, deepwater basins remain an important focus area for development in this region. The market began to recover in 2011 and is poised for significant growth over the next five years. Though some areas of Asia are considered relatively benign in metocean terms, India's Bay of Bengal suffers from harsh wind and wave conditions apart from during a four month weather window and many Asian countries are routinely visited by typhoons. These factors support the use of FPSOs that can disconnect and head for safe ports. Future deepwater projects include the continuing development of the Krishna Godavari Basin (India) especially the ultra-deep D6 Satellites fields, the Gehem and Gendalo fields (Indonesia) and Gumusut-Kakap (Malaysia).

Australasia

Although largely thought of as a shallow water region, Australasia is seeing an increased focus on deepwater basins, particularly off the coast of Western Australia. Significant future projects include Gorgon, one of the world's largest natural gas projects. The development will include subsea completions on the Gorgon and Jansz fields and the construction of a LNG plant on Barrow Island. First gas is scheduled for 2014.

Eastern Europe and FSU

Eastern Europe and the FSU is predominately a shallow water region and historic deepwater Capex has largely been related to the deepwater Gunashli field in Azerbaijan as well as a few pipeline projects.

However, global trunkline expenditure over the 2012-2016 period is dominated by Eastern Europe and the FSU. The number of deepwater pipeline projects underway or planned for this region will require 5,300km of pipe to be installed over the next five years. Most of these trunklines, such as the 3,600km South Stream gas pipeline will traverse the Black Sea to bring gas to markets in Europe. Compared to the upstream market, the pipeline market is much more politicised and the viability of projects is heavily influenced by geopolitics, potential consumer markets and the viability of alternative supply routes (such as LNG or onshore pipelines).

Forecast

The deepwater market can be broken down into the following sectors:

- Drilling and Completion – including wet 'subsea completed' and dry 'surface completed' development wells
- Floating Production Systems – FPSOs, FPSSs, Spars and TLPs
- Subsea Hardware including:
  - — Production hardware (Units) – subsea trees, control systems, templates & manifolds, flying leads and jumpers
  - — SURF (km) – infield flowlines, production umbilicals and risers
  - — Processing hardware (Units) – boosting/pumping, separation, compression and multiphase metering
- Pipelines (km) – trunklines

DW forecast a global Capex of over $232 billion for the 2012-2016 period – 90% more than the amount spent in the preceding five year period.

The 'Golden Triangle' of deepwater will dominate deepwater expenditure of the next five years with activity in West Africa, the Gulf of Mexico and Brazil. African and Latin American developments are expected to drive the forecast spend, with African developments largely concen-

trated in Angola, Ghana and Nigeria. Latin America is likely to experience substantial growth, exceeding Africa's deepwater expenditure towards the end of the forecast period. Activity in the region will be driven by Petrobras investing in development of its pre-salt Campos and Santos fields off Brazil. Asia and Australasia are relatively small markets, but will become increasingly important areas for deepwater activity. Asian Capex is expected to total $19bn over the next five years, with important deepwater projects being developed off India, Malaysia and Indonesia. Australasia deepwater activity is focused in basins off the Western Coast, with notable projects feeding LNG export plants.

Drilling and completion of subsea wells dominates deepwater spend during the 2012-2016 period. Forecast expenditure will build each year over with expenditure on the drilling and completion of subsea wells to total $82bn, more than double the previous five year period.

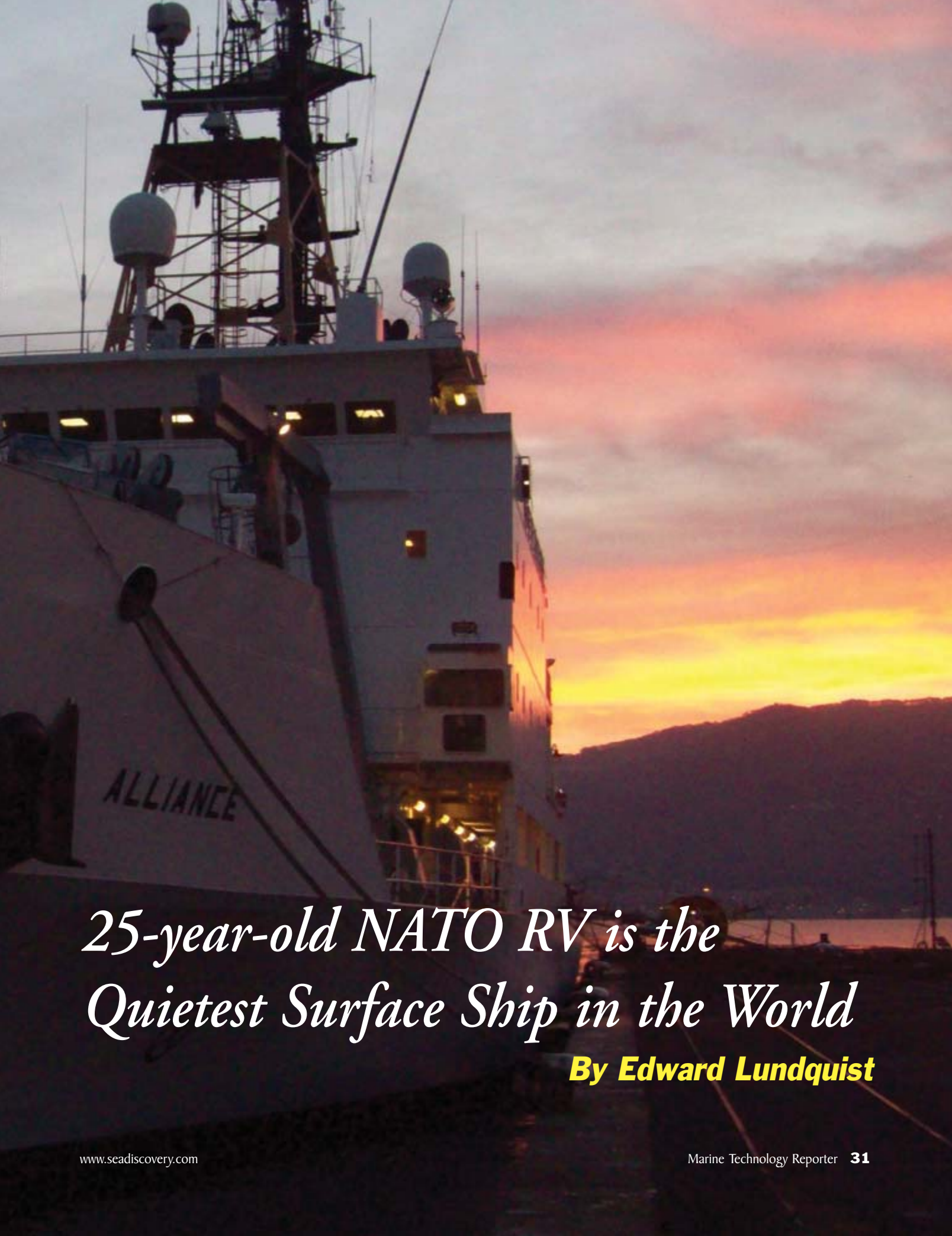
Conclusions

In the global context, the overall outlook for the global deepwater business is clearly one of significant long-term opportunity with substantial growth in activity in West Africa, Brazil and Asia. Political intervention and uncertainty is not a new challenge for the oil industry but it does threaten to over-shadow the great technical progress in recent years that has resulted in remarkable feats of engineering and the ability to explore for oil in water depths to 3,000m. As deepwater projects become increasingly capital-intensive there is an economic challenge for E&P companies and a significant potential prize for international oilfield service and equipment vendors.

The World Deepwater Market Report 2012-2016 *is an acclaimed series of business studies used by organizations in more than 60 countries, including oil majors, investment banks, OEMs, offshore contractors, agencies and government departments. Established in 1990, Douglas-Westwood is an independent company and the leading provider of business research & analysis, strategy and commercial due diligence on the global energy services sectors. The company has offices in Canterbury, Aberdeen, London and New York and, to date, has completed more than 750 projects in 70 countries across the globe.*

Shhhh...

(Photo credit: NATO Photo by Captain Dave Waterman, USN)



25-year-old NATO RV is the Quietest Surface Ship in the World

By Edward Lundquist

The NATO Research Vessel (NRV) Alliance is unique in more than 28 ways. It is owned by the 28 member nations of the NATO alliance. The 305-ft. Alliance is essentially a "Global class" research vessel, capable of operating wherever NATO needs it, but is specially designed for underwater acoustic research for the benefit of the member nations. NATO researchers say she is the quietest ocean-going research ship in the world.

Alliance is an asset of the NATO Undersea Research Centre at the Italian port city of La Spezia. The ship flies the merchant marine flag of Germany and is listed as a naval auxiliary with the German Government.

Alliance is managed under a contract with Anglo-Eastern Ship Management (UK) in Glasgow, according to Capt. Helge Wrage, an ASM employee who has served aboard as master for seven years. And he's the "new guy," because there are several crewmembers on board who have served since the beginning, 25 years ago.

Wrage says Alliance has two crews which rotate on board to maximize the time the ship can spend underway.

Alliance has an overall length of 305 ft. (93m), with a beam of 50 ft. (15.2m) and draft of 17 ft. (5.2m). With a clean hull, she can sustain up to 16.3 knots, and can cruise economically at 11.5 knots for 7,200 nm. She consumes about 8 tons of fuel per day cruising and about 5 tons at lower speeds for conducting scientific operations. Alliance has an endurance of 26 days, enabling it to perform extended research on site. Even when nations have their own capabilities, there is tremendous value in sharing a research ship which performs scientific research for the benefit of all NATO nations.

Decision Making Support

"We publish our schedule," says Ed Gough, NURC's chief scientist. "Others can come and work with us. We plan cruises that are mutually beneficial." Gough says the science conducted on Alliance, as with all the work done at NURC, delivers knowledge to enable better strategy and tactics. "We're in the decision-making business. There's no harder place to make decisions than the ocean environment."

NURC scientists help speed the delivery of new capabil-

(Photo credit: NATO Photo by Captain Dave Waterman, USN)

The stern shows the unique capability to tow sophisticated arrays and systems for underwater research.

ities to the fleet, while reducing risk as much as possible. The research conducted by NURC helps deliver value to the military forces of the member nations, Gough says. "We want to deliver a greater level of capability for the same cost, or the same level of capability for less cost."

NURC has more than 40 researchers drawn from among the NATO member countries. They are supported by a still larger experienced technical staff of electronic and mechanical engineers, and computer programmers. When Alliance gets underway for science missions, large science parties from NATO nations and other researchers add to NURC's impressive capabilities.

Research ships are usually available to scientists on a "bare ship" basis. That means they have to bring along everything they may need for the expedition. According to Ian Sage, who heads ship management for NURC, Alliance has most of the gear the science party would want, from 400 square meters of laboratory space to deck handling 'A' frames, powerful winches and cranes to wet labs and data cables. The sophisticated deck machinery can deploy, tow and recover of a variety of sensor arrays and oceanographic instrumentation in all sea conditions. According to Sage, Alliance has towed four separate arrays astern at the same time.

Alliance looks 25 years young. Although most ships her age would show her years of hard work, Alliance has the appearance of a modern, well preserved, brightly lit, spacious, clean and neat ship.

Forward of the main industrial work deck is a covered passage way, with workshops on either side, known as the garage. Heading forward, one enters the main science lab, which Sage says is the largest in the world on a research ship. He points to the preinstalled wire ways which helps the science teams install their gear. "We have a full Ethernet available," Sage says." All workstations on the ship can access data.

There is a hull mounted multi-beam echo sounder which provides a detailed survey of the bottom. Across from the combined wardroom and conference room there is a small "internet café" where off duty personnel can check their email.

Near the oceanographic wet lab, where water samples are processed and examined, a hatch on the starboard side can open to the outside so the oceanographic winch can lower gear down to a depth of 3,000 meters. The large enclosed focsle protects the personnel working on the main deck forward.

Wrage says Alliance stays out of the shipping lanes to perform its scientific work, and usually calls at various Navy bases so it is not often seen in civilian ports. Alliance carries two offshore RHIB boats, capable of speeds of 35 knots, which can be launched and recovered from the boat deck by crane. There is a large after bridge to permit observing boat deck and industrial deck evolutions.

The ships has both X-band and S-band radar, and the bridge is fully integrated with Kongsberg integrated bridge and ECDIS electronic charts. "With full integrated electronic navigation, engine automation and station keeping capability, we only need one officer on the bridge and one able bodied seaman for lookout when underway." Wrage says. "I'm on the bridge during operations, as well."

"We have very accurate GPS," Wrage says. "This is not your standard Garmin unit."

Alliance also has dynamic positioning for working alongside buoys or when maintaining precise location is required. The Wave and Surface Current Monitoring System (WaMoS) is installed to analyze wave field parameters such as significant wave height, peak wave period and direction, and surface current speed and direction.

Wide array of sensors

The ship is capable of global deployments, but normally operates in the ocean areas of strategic importance to NATO nations, from the Mediterranean to the polar margins of the North Atlantic. It is equipped with extensive and sophisticated navigation, communications and computer equipment, winches, cranes, loading frames and other deck machinery for the deployment, towing and recovery of a variety of sensor arrays and oceanographic instrumentation in all sea conditions. Alliance can deploy acoustic and oceanographic sensors such as vertical and horizontal towed arrays, self-recording oceanographic devices, and towed oscillating systems and experimental mine counter measures systems and research tools. According to Sage, Alliance carries a 75 kHz acoustic Doppler current profiler for underway surface current profiling, as well as an 80-beam ATLAS MD (49 KhZ) multi-beam swath mapping system. "Because the system is so integrated with time tagged precise positioning, it provides a means for determining seabed site morphology in specific areas of acoustic and scientific interest, down to depths of about 1000 meters." The main science lab is one of the largest on any research ship, Sage says.

What makes Alliance truly extraordinary is the design and construction that permits the ship to operate with the lowest possible underwater radiated noise (URN) levels at all speeds and in all operating conditions. Every aspect of the construction, operation and continuing maintenance of the vessel is completed with the aim of running as quietly as possible for acoustic research. As an electric dive ship, mechanical noises are reduced and the motors can draw power form any of the ships power sources. The double hull helps to reduce radiated noise. The two propellers are variable pitch, and also designed for quiet operation. The two main diesel engines and accompanying electric generators are mounted on vibration isolating rafts inside soundproofed enclosures on special shock mountings to absorb vibrations. With one of the engines run-

Where many naval ships use gas turbines to achieve high speeds, Alliance is the opposite. The gas turbine operation is used for silent towing speeds up to 6 kts. "You can hear a pin drop down here when we go to gas turbine," says Neil Macdonald, the chief engineer and a member of the Alliance crew since the beginning.

Leonardo is World-Class Coastal Research Ship

In addition to Alliance, NURC also operates the smaller 94-ft. coastal research vessel Leonardo. Like Alliance, CRV Leonardo is a diesel electric ship which permits quiet operation for acoustic research. The ship has a pair of azimuth pod thrusters and a water pump jet bow thruster, and is capable of 10.5 knots. At 10 years old, Sage says Leonardo is the smallest research vessel in the world that is fitted with dynamic positioning and substantial deck handling equipment. Wet and dry laboratories; diving facilities; deck handling cranes, winches and one A-frame permit extensive shallow water ocean scientific research operations. Accommodations are provided for 10 , which can be expanded to 15 including crew for short trips. Leonardo is a "world ship," fitting of the NATO alliance. She was designed by the UL firm of Burness, Corlett and partners. The hull was built at Remontowa in Poland with the superstructure and assembly completed at McTay Marine in the UK. The main diesel generators were manufactured by Cummins in the U.S.; Schottel built the azimuthing thrusters in Germany; the electrical distribution and power management system was provided by Ansaldo Hill Graham in Italy; and the dynamic positioning is from Norway's Kongsberg. To facilitate deployment and tracking of experimental AUV/ROV systems and port protection work., Leonardo has with a moon pool, a HiPap 500 acoustics tracking and location device linked to the vessel's DP system, and Kinematic GPS., LEONARDO provides a near perfect surface tracking platform. An integrated 20-ft. container can augment the scientific laboratory on board. Leonardo, while an asset owned by the NATO Nations, is managed, crewed and operated by the Italian Navy, and flies the ITN flag.

ning, you can carry on a quiet conversation next to the engine until you open the access door when it becomes too loud to communicate. The secondary gas turbine propulsion system generates mounted in a sound-proofed housing above the waterline makes even less noise. Where many naval ships use gas turbines to achieve high speeds, Alliance is the opposite. The gas turbine operation is used for silent towing speeds up to 6 kts.

"You can hear a pin drop down here when we go to gas turbine," says Neil Macdonald, the chief engineer and a member of the Alliance crew since the beginning.

"Even the air conditioning operates at a whisper," says Sage. "This is why it's so important to keep up with the maintenance."

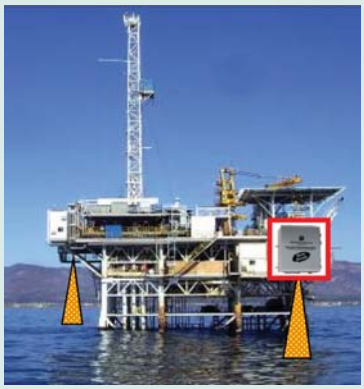
"When stationary, we can use batteries instead of any other propulsion source to induce a state of absolute quiet," Wrage says. The ship has comfortable accommodations for the 24 ship crew members and up to 24 members of a science party. Most of the cabins are single suites, with the exception of four double cabins. Each cabin has individual bathroom facilities. The galley and mess hall serves three meals a day. There is an officer's and a crew lounge, and the ship has video, television, and stereo entertainment, games, a library, and a gymnasium. Even the workout and entertainment room is sound-proofed.There is no doctor on board, but there is medically trained staff and a fully equipped sick bay.

High speed digital data exchange, including extensive telemetry facilities, is available. Alliance features separate communications for the ship and scientific trials, albeit with some overlap. Communications include HF, VHF and UHF, Inmarsat A, B and C systems, data transfer, including voice, teletype, telemetry, E-mail, fax, and HSD link via Inmarsat B, Globalstar and Celnet phones.

"We are capable of classified work," says Wrage. "We have military radios. But everything else is what you would find in a modern merchant ship radio room."

Captain Edward Lundquist, a retired U.S. naval officer, visited the NATO Undersea Research Centre for MTR and filed this report on the ultra-quiet research ship Alliance when it was in port at La Spezia, Italy.

Parties interested in chartering the vessels should contact SMO by Email smo@nurc.nato.int



Slick Sleuth Rig Guard Oil Spill Detection System

Slick Sleuth Rig Guard is the latest addition to the Slick Sleuth product line. Rig Guard offers technology for real-time monitoring and alert of oil leaks and spills in offshore environments. The system is designed to provide operators with reliable oil-on-water detection around drill rigs, production platforms, and other offshore sites where the risk of accidental spills exists. Whereas major offshore spills get the most attention, accidental discharges in the form of smaller-scale spills and leaks are more common and are also of concern, as environmental rules and penalties for offshore and maritime operators continue to soar. Rig Guard is designed to detect any size surface oil sheen or slick. The benefits of early detection include oil spill risk reduction, as well as minimizing (or altogether avoiding) the myriad costs associated with regulatory fines, clean-up efforts, legal fees, shut-downs, and environmental mitigation/restoration expenditures associated with oil spills. This may also be leveraged to help protect corporate image and project a proactive environmental stewardship posture. The Slick Sleuth Rig Guard is a robust system, ruggedized for permanent installation and continuous operation on platforms, in any sea-state, and all marine weather conditions. The system is non-contact, thus it requires minimal maintenance and no operational expense.

www.SlickSleuth.com

Environmental Monitoring

Global Focus on Arctic Response Capabilities

Founded by seven original partners in 1979, Global Diving & Salvage remains today as a privately held, diverse group of marine professionals. Based in Seattle, WA, the firm also boasts a Gulf Coast presence (Houston), a local office in San Francisco and a robust presence in Anchorage, AK.

Also providing service internationally when the right opportunity presents itself, it is the firm's Alaska and Arctic capabilities that may someday be its most important asset. Overseen by David DeVilbiss, Global's Vice President of Marine Casualties and Emergency Response, the Global Alaska presence includes about 35 full time personnel and a large quantity of prepositioned gear, supported by platforms like their 85 foot dive support boat and state-of-the-art ROV's. As it turns out, that's no accident.

DeVilbiss said that in the harsh Arctic regions, being able to move people and equipment quickly is one

of the keys to a strong and effective response.

Global, he adds, also prepositions its equipment in places like Prudhoe Bay and Nome. And, while he feels that the salvage community has done a good job in getting more prepared for the burgeoning commerce and eco-tourism in the region, he cautions, "The lack of deep water ports north of Dutch Harbor is of real concern. Finding refuge for the occasional large vessel that gets itself into trouble is problematic." So, too, is the lack of a permanent, large towing vessel in the area.

Global Diving & Salvage brings much more than its Alaska-based assets to the table, however. DeVilbiss says that having the corporate headquarters just around the corner in Seattle allows the firm to quickly reposition personnel and equipment to Alaska, if necessary.

With six core services lines – diving services and diving support for marine construction operations, casualty response project management, marine construction operations, marine environmental support operations including small vessel operation, offshore diving support operations for the energy sector, and unmanned underwater operations with ROVs – Global is capable of supporting all service lines in all of the regions that they operate.

Global's recent response work in Alaska includes the salvage of several barge groundings, including a 150' self-propelled unit. But, beyond the obvious challenges of operating in inhospitable, icy Arctic waters, the task of keeping personnel and equipment busy and earning revenues in the periods between casualties is vital, too. DeVilbiss says that diversification is the key. Being aware that all service lines have distinct market cycles, Global regularly utilizes and moves personnel and equipment across various regions and service lines. This has the added benefit of developing and increasing skill sets and exposure to different types of work.

This also involves an opportunistic approach – like building a robust presence in places like Alaska – in advance of the business that will certainly come as the ice recedes and risks taken by those visitors increase. Global Diving & Salvage is firmly anchored in Alaskan and Arctic waters.

And, that's no accident.

New Hydrocarbon Leak Detection System

Teledyne TSS is bringing advanced hydrocarbon detection technology to the offshore sector with the introduction of the new TSS MELDS system. The instrument is capable of detecting leakages of dissolved methane and combustible gases from pipelines and subsea structures at depths to 3000m. The Mobile Early Leak Detection System has been developed to provide a versatile and sensitive tool that can be ROV-mounted and used in conjunction with Teledyne TSS subsea pipe trackers.

The MELDS unit includes a methane sniffer and a flowhead, a PAH (Hydrocarbon) fluorometer, CTD (Conductivity, Temperature and Density) sensor and a pump and T-handle with suction tube rated to 3000m. It has been designed for easy integration and operation and includes an intelligent sensor suite that can quickly provide precise results cost effectively.

The new leak sniffer weighs 12.3 kg in air and 9.3 kg in water and has a measuring range for CH4 at 0,1 – 50 ± 0.3 µmol/ L and PAH 0 – 500 µg/L . With a reaction time of less than 10 seconds, it uses specialist software that provides a graphical ROV operator display and interface for the easy location of leaks. The export option offers integration into user navigation software and supports standard oceanographic sensors for full coverage of any kind of anomaly. With automated detection of any oil or gas leaks presented through a graphical display with simplified status flags.

Long-term Deployment of Submersible Imaging Device

Researchers off a dock in Florida recently celebrated the successful long-term deployment of an imaging technology device that has potential uses for characterizing and combating microscopic plankton that muck-up water and marine equipment. Scientists at Battelle in Columbus and Fluid Imaging Technologies (FIT), in Yarmouth, Maine, consider the recent field demonstration of a novel biofouling control technology as passing a major milestone.

Taking as many as 22 digital photos per second, the Submersible FlowCAM can identify and measure the abundance of many types of microscopic plankton and other water organisms and particles in oceans, lakes, reservoirs and streams, and then transmit that data to scientists.

The team has a patent pending for the capillary flow cell and the biofouling control technology installed in the Submersible FlowCAM that was first unveiled at the 2010 Ocean Sciences meeting. The biofouling control technology enabled the device to collect high quality planktonic species images and abundance data without operator intervention for more than five weeks while deployed from a dock at Battelle's Florida Materials Research Facility in Ponce Inlet, Fla.

Why is this important?

The device has potential applications for combating problems such as toxic red tide, algae blooms or odorous public water supplies. But before these blooms can be imaged, biofouling of the cell for long-term deployments must be controlled.

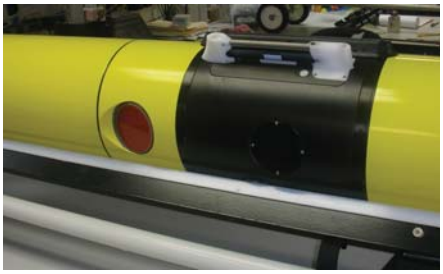
"This test demonstrates the ability to collect plankton (and other particle) data for extended periods without the use of chemical agents to clean the capillary walls or other intervention of operators," said Carlton Hunt, Research Leader at Battelle's Duxbury, Massachusetts lab. "Moreover, the test demonstrated the ability to observe and download the data from remote locations. FIT and Battelle operators were able to periodically check in on the system from offices in Maine, Massachusetts, Ohio and Florida."

The Battelle developed biofouling control technology is part of the device and is crucial to keeping the optical components clean, so that it can continue to capture images and data, without frequent cleaning. It's an important way to save on manpower for a device that might be mounted on a buoy 500 miles offshore. Equally important is to not interrupt the continuous flow of data by having to clean components.

Battelle scientists teamed with Fluid Imaging Technologies (FIT) to design and build the Submersible FlowCAM. The device is based on laboratory and portable monitoring devices FIT has built for environmental monitoring and for quality control in the pharmaceutical, chemical, plastics and other industries. The Submersible FlowCAM is currently designed for use at depths up to 656 feet or 200 meters.

"We have been aware of the requirement of marine researchers and water quality monitors for an in situ device providing real-time information on microorganisms in water systems ever since we first developed the FlowCAM in 1999," said Harry Nelson, Director of Aquatic Sales for FIT. "Teaming up with the engineering expertise of Battelle, we are very pleased to be able to now offer our imaging technology filling this important need."

Slocum Glider Tech fo OOI



Teledyne RD Instruments (RDI) said that engineering and field work is underway to test the full integration of Teledyne RDI's Acoustic Doppler Current Profiler (ADCP) into the Teledyne Webb Research Slocum Glider. Last year, Teledyne Webb Research was chosen by The Consortium for Ocean Leadership and the Woods Hole Oceanographic Institution (WHOI) to provide its coastal G2 Slocum gliders for the Ocean Observatories Initiative (OOI). The gliders will support the Pioneer and the Endurance Arrays of the Coastal and Global Scale Nodes (CGSN) of the OOI. The Ocean Observatories Initiative is a multi-scale observatory that will use a network of sensor systems to collect physical, chemical, geological and biological data from the ocean and the seafloor on coastal, regional and global scales. Teledyne Webb Research's Slocum G2 gliders are designed for long deployment endurance with the ability to maneuver and operate where the total water depth is less than 30m and up to 1000m along deeper coastlines. The vehicle construction facilitates swappable payload bays for a multitude of integrated sensor suites. Included in the sensor package is Teledyne RDI's ADCP, which was specified to provide the program with current profiling data. This contract, and the resulting engineering effort, will provide for a fully integrated ADCP with bottom tracking capability that will be used to collect high resolution current profiling data from a glider platform. Removing the platform motion is of critical importance to the success of the application and early testing in shallow water has shown that an initial implementation of the techniques developed by the Lowered ADCP community is yielding good results. Testing of the prototype Slocum G2 glider is currently underway, with the delivery of up to 24 units in support of this program.

Aquadopp for WHOI

WHOI, in partnership with the Consortium for Ocean Leadership, awarded NortekUSA a contract to supply all single point velocity sensors to the Ocean Observatories Initiative, funded by NSF. The Ocean Observatories Initiative (OOI), a project funded by the NSF is planned as a networked infrastructure of science-driven sensor systems to measure the physical, chemical, geological and biological variables in the ocean and seafloor. Under a three-year contract with an additional one-year option, NortekUSA will provide the acoustic Doppler current meters necessary to support the measurement objectives of the OOI.

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EXO Breaks the Sonde Barrier

YSI has used its long experience in water quality monitoring to develop the ultimate multiparameter sondes for challenging marine conditions.

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The new EXO1 offers ports for four sensors, and the new EXO2 has six ports and a central anti-fouling wiper. Each sonde is rated to a depth of 250m. Parameters include: Temperature, Conductivity, Depth, Dissolved Oxygen, pH, ORP, Total Algae (Blue-green Algae and Chlorophyll in one sensor), Turbidity, and fDOM, plus six calculated parameters.

Unique Solutions in Monitoring, Early Warning Systems

Unique Maritime Group (UMG) recently completed the upgrade of Dubai Municipality's forecasting and early warning system. The original system was established by UMG in January 2010, and has been providing Dubai Municipality and Dubai Police with visibility forecasting, including a mix of terrestrial, coastal and offshore monitoring nodes with centralized data collection, post processing and model implemented. The upgrade of DM's visibility forecasting and early warning system was commissioned to UMG to improve the existing shore tide, and met monitoring network consisting of five Aanderaa AWS-2700 weather stations. Umm Suqeim, Jebel Ali, Jadaf, Hamriah (Mamzar) and Dhow Wharfage Stations were all upgraded with equipment consisting of IP-camera, housing with electronics and solar panel assembled on a new stainless steel mast which is permanently fixed on concrete foundation. Meteorological data and camera images are successfully integrated into the new Visibility Forecasting Network and updated on the associated website accordingly. The coastal tide-met stations were upgraded with the latest GPRS communication, additional web servers were installed allowing public web access to the system, and the visibility system were extended to incorporate satellite data.

"Our main goal is the safety of our community, and with the new upgraded visibility forecasting and early warning system, motorists in Dubai can now be alerted of foggy conditions six hours in advance to prevent road accidents due to poor visibility," said Eman Ahmed Al khatibi Al falasi, Head of Section, Geodesy & Hydrographic Survey Section, Survey Department, Dubai Municipality. " These stations give live updates of air temperature, relative humidity, rainfall, sea water level, wind direction and wind speed in different areas, thus helping surface traffic safety on the roads and marine navigation."

Training was also conducted at Dubai Municipality premises by UMG staff, in order to help DM personnel enhance their knowledge and capabilities to better operate the recently upgraded system.

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European Delegation Visits St. John's to Explore Potential for

Ocean Tech Collaboration

By Andrew Safer

A delegation of eight ocean technology researchers, industry representatives, and agents/distributors from the United Kingdom, Spain, and Italy visited Halifax and St. John's from September 25th to 30th, 2011 to explore opportunities for collaboration, technology transfer, and product distribution in the European market. The Government of Canada's Department of Foreign Affairs and International Trade (DFAIT) initiated the Inbound European Ocean Observing Mission which was supported by DFAIT and the Atlantic Canada Opportunities Agency.

This visit followed the Italian Embassy in Rome's trade mission to the NEPTUNE Canada and VENUS observatories in British Columbia in January 2011, when Italian delegates involved in the sector met with SMEs and research laboratories, and in 2009, a Spanish trade and R&D mission to Halifax, St. John's, and British Columbia that focused on ocean observatories. "Last year, we added ocean technologies as a new priority sector," said John Picard, Director of Science and Technology for the Trade Commissioner Service in Rome, Italy who led the European delegation to Atlantic Canada, in discussing the

European Mission delegates and trade commissioners:
L to R (front) Keith Birch, Alessia Baldini, Noelia Ortega, Andrea Faccioli, Adolfo Uriarte, Giorgio Budillon, Isidro Garcia, Daniel Tibbetts; L to R (back) Lorenzo Motos, Stephen de Mora, Alejandro Palmeiro, John Picard.

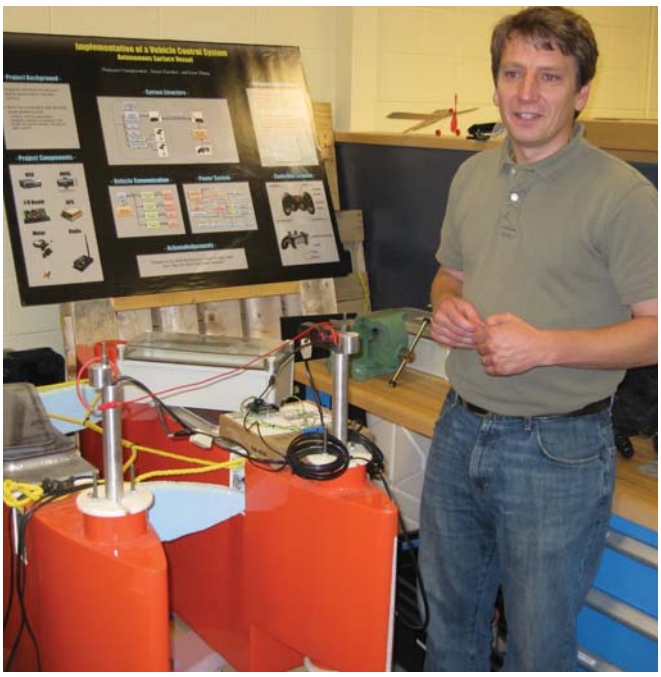
mission afterwards. “As Science Officer in Italy, I discovered there is a lot of interest in Canada as a marine technology center of excellence. There are many potential synergies.”

The missions flow from DFAIT’s global ocean technology strategy, developed by Jane Rutherford, DFAIT’s Global Practice Lead in Ocean Technology. She works out of an office next to OceansAdvance, the organization that represents the Newfoundland and Labrador ocean technology cluster, at the NRC-Institute for Ocean Technology (NRC-IOT) in St. John’s. "Judging by the feedback we received from mission participants,” Jane Rutherford said afterwards. “I think they got a sense of ‘The Canadian Way’ of pursuing research and development and our interest in partnerships, networks and excellence. Canada has state-of-the-art marine research facilities, significant and growing public sector investment in R&D and a global reputation for ocean science and technology excellence. The recent mission to Atlantic Canada was a great opportunity to profile the region and explore new potential international partnerships. We're keen to do more!"

The delegation included:

- **Dr. Adolfo Uriarte and Dr. Lorenzo Motos (AZTI Tecnalia)**
- **Noelia Ortega (Centro Tecnologico Naval y Mar), & Alejandro Palmeiro (Nautilus Oceanica) from Spain;**
- **Keith Birch (National Oceanography Centre, Southampton), and Professor Stephen de Mora (Plymouth Marine Laboratory) from the UK; and**
- **Professor Giorgio Budillon (CoNISMa) and Alessia Baldini (DLTM) from Italy.**

Following presentations by the Newfoundland and Labrador ocean technology cluster, the delegates and cluster members discussed their areas of research interest, opportunities for ocean technology development, and potential collaboration.During the two-day visit, they walked from meetings at the NRC-IOT to the Faculty of Engineering and Applied Science at Memorial University and visited the Autonomous Ocean Systems Laboratory. They toured the facilities at the Fisheries and Marine Institute of Memorial University of Newfoundland (Marine Institute) where they were given an overview of the Centre of Applied Ocean Technology and the School of Ocean Technology. They visited the facilities at the NRC-IOT; Provincial Aerospace; and the Marine Institute’s Holyrood Marine Base. DFAIT arranged one-on-one meetings between the delegates and representatives of Newfoundland and Labrador ocean technology companies. Reflecting on the mission, Ms. Noelia Ortega, Managing Director of Centro Tecnologico Naval y Mar (CTN), the center for maritime technology development in the Murcia Region in southeastern Spain, noted the innovation of SMEs, and the extent of collaboration among community partners. During the two-day meeting, she said that CTN, a technology transfer entity, could serve as the intermediary in the process of collaborating to develop new products. “We would be getting knowledge from Canadian companies and we would be providing our knowledge and expertise,” she said, “and a new product could be sold in the future.” Whereas Spain has strong research capacity in fisheries and significant technological capacity in shipbuilding, defense and security, Ortega said there is a lack of ocean technology developers and manufacturers, which has resulted in researchers having to buy technologies from abroad. “A lot of projects for ocean observation are going to be stopped,” she said, “because there is no private funding for this.” She suggested that medium- and long-term partnerships with Canadian SMEs could help Spain develop capacities to be able to continue with ocean observation research.



Dr. Ralf Bachmayer, Canada Research Chair in Ocean Technology, explains his work with gliders at Memorial University's Autonomous Ocean Systems Laboratory.

Regarding innovation, Ortega said, “I have seen how medium-sized and small companies can create new innovative products and can benefit from this innovation. It’s something that’s very inspiring for me.” She added that the “high technological level of capability at Memorial

Jane Rutherford, Department of Foreign Affairs and International Trade's Global Practice Lead in Ocean Technology.

University is mainly focused on industry needs. It's very important to me to see that reality." While in St. John's, she had discussions with several companies and Memorial University to identify opportunities to collaborate on knowledge transfer, and for Spanish companies to assist in commercializing new Canadian ocean technology products. "Canada has invested in technology and innovation. It's more than 30 years after they started to think about ocean technology. They have a very profitable business sector and they also have a good link between the universities, research centers and industry. Projects are easily done here. Their system for transferring knowledge is running very well."

Her colleague, Dr. Lorenzo Motos, is Director of the Marine Research Division at AZTI Tecnalia in Pasaia, northern Spain. Eighty researchers work in this Division which provides advisory services in fisheries management and environmental management of the coastal zone. Dr. Motos is also a representative of the Basque Marine Cluster. Asked about his objective in visiting St. John's, he said, "I want to learn about the capacities of Canadian marine science, new technologies and advanced techniques, and identify where we can collaborate." After visiting the Marine Institute, he said, "I was very interested in the flume tank which has very good equipment for developing seabed-friendly gear for trawlers. I could see researchers coming over here using the flume tank to do experiments." He added the facilities are well equipped and are affordable for testing certain aspects of the geometry and behaviour of fishing gear. Dr. Motos also expressed an interest in arranging a Master's level course at the Marine Institute's School of Ocean Technology for researchers at AZTI Tecnalia's Marine Research Division. Concerned that too many young fish are being caught in the fishing attraction devices (FADs) that are being used in the international high-seas tuna fishery, Dr. Motos said that researchers are working to develop an acoustic system to differentiate the young and old tuna in the FADs, adding, "We could partner on this kind of research."

Professor Stephen de Mora, Chief Executive of Plymouth Marine Laboratory (PML) in Plymouth, UK, said he sees a lot of scope to conduct enhanced research and development activities in ocean acidification and ecosystem modeling with the Ocean Sciences Centre, a cold ocean research facility operated in conjunction with Memorial University. The impetus for his visit was to explore potential collaborations in studies of the marine ecological effects of ocean acidification and explore the opportunity to establish a centre for ocean acidification research. Referring to the Ocean Sciences Centre, Professor de Mora said, "Because their hatchery facilities are different from ours, it opens up opportunities for us to do research we can't do back home." Referring to the centrifuge at C-CORE, the facilities at the Centre for Marine Simulation, and the flume tank at the Marine Institute, he said, "There's a huge infrastructure base here that not only supports research and development but must attract outside interests. It must be a magnet for bringing people in."

Mr. Keith Birch, Business Development Manager, National Oceanography Centre, Southampton (NOCS), said, "I see opportunities for universities to work really strongly with the commercial sector." He expressed an interest in partnering on glider projects. Referencing NOCS' group of 30 researchers and PhD students who are developing micro-sensors, he said that some sensors could be put on gliders for testing and evaluation. He added that a lot of sensors have underlying generic technology, and with more people interested in different sensors, they could be brought forward into other areas. He added that NOCS has several devices involving microfluidics. "We only have enough resources to take two or three options forward," he said. "More people can take the same technology forward."

When Ms. Alessia Baldini met with St. John's ocean technology companies, she was looking for potential matches with members of DLTM, the marine technology

cluster in the Liguria region of northwestern Italy, which is home to a diversified group of SMEs, all directly and indirectly active in the marine sector. The DLTM business developer saw the potential for cooperative R&D projects and other joint initiatives with DLTM members, including research centers, and 112 SMEs associated with Tecnomar Consortium, an important member of the cluster. In addition to looking for opportunities for collaborative research and education initiatives, Baldini also suggested that an Italian company could do contract manufacturing for a Newfoundland and Labrador-based company, providing access to the European market while eliminating shipping and transportation costs. "Your company could get to know a new market," she said, "and after a while, they could start their own business in Italy." She added that the same arrangement could apply to Canadian companies doing contract research for Italian companies. Baldini said DLTM is interested in creating links in Newfoundland, not only for doing business but also to develop R&D and education projects—in line with the statutory aims of DLTM. Regarding collaboration in Newfoundland and Labrador, she said, "There is a really strong connection between industry, research institutes, and university."

Mr. Andrea Faccioli, Head of Business Development at Codevintec Srl in Milan, Italy, is a supplier of technology, including sensors to be used both on land and subsea to monitor earthquakes. He was looking for marine and environmental sciences instrumentation products to add to his product line. "Ocean business is keeping the company running," he said. "I'm here to see if there are new ideas, new opportunities I can bring to Italy." Faccioli noted that in the last 10 years the percentage of Canadian companies he represents has increased significantly. Prior to the visit, he had received a number of client requests for AUVs, and so was pleased to learn about AUV development initiatives in St. John's, both at the Autonomous Ocean Systems Laboratory at Memorial University and in the private sector.

The mission highlighted many areas of common interest and opened the door to potential collaborations between Newfoundland and Labrador ocean technology companies, educational and research centres, and the organizations represented by the European delegates.

Bergen Bound ... Part II

By Clare McIntyre

Earlier this year Marine Technology Reporter sent Clare McIntyre on a mission to explore the subsea industry cluster of Bergen, Norway, a report which appears in the January/February 2012 edition. Following on that report, in conjunction with the Offshore Technology Conference in Houston, MTR provides more in-depth technology reports from the region.

Norway is a clear leader in innovation and development of subsea technologies. The Bergen region, on the country's west coast, has more than its fair share of subsea innovation and expertise. As operators like Statoil, Shell, and BP focus efforts on getting more oil out of mature North Sea fields, a number of innovative companies with a presence in Bergen are developing subsea technology to support these goals. Their products help increase oil recovery from existing fields, and to make it safer and easier to refurbish and upgrade existing subsea installations.

The electronic pod of Aker Solutions' PodEx system undergoing temperature testing.

Companies including Aker Solutions, DOF Subsea, Framo Engineering, Advantec, Roxar and ClampOn are bringing to market new products such as sensors, boosting systems, regulators and intervention and installation equipment, aimed at supporting operators' ambitions of increased recovery from maturing fields.

Aker Solutions

Aker Solutions is seeing growing interest in its recently introduced PodEx instrument gateway solution, designed to improve oil recovery from mature oilfields. PodEx can be used to provide extra power and communications ability to existing subsea installations, without a wholesale upgrade. A wide range of new, innovative sensors and detection equipment is now being deployed in mature oil and gas fields, to better monitor well activity and regulate production. These add-ons require significantly more electrical power than older equipment, plus increased communications bandwidth to transmit subsea data to topside data acquisition systems – all made more complex by the fact that the equipment is operating in a subsea environment.

Full-scale upgrades or replacements of subsea systems are both expensive and time-consuming. PodEx provides a solution when a full- scale upgrade is either impossible or too expensive. The module integrates directly with existing electrical and communications systems, and is compatible with controls systems from all manufacturers.

It allows operators to integrate new instrumentation

Framo Engineering´s Wet Gas Compressor unit hanging from a crane prior to installation in the test loop tank.

with much less downtime and at much lower cost than either changing or re-designing the original control system. Gordon Birnie, engineering manager with Aker Solutions' Subsea Lifecycle Services group in Bergen, believes that production downtime could be eliminated completely for very simple installations. More complex jobs could required anywhere from a few hours of downtime, to one or two days, depending on complexity and the need for testing after installation. This makes it attractive to operators who want to enhance their sensor systems with minimal disruption to production.

Birnie said that the PodEx is beginning to attract attention from several North Sea operators. Three PodEx modules have been ordered and completed installation testing for Statoil´s Njord field on January 15 2012. The topside part of the PodEx system is planned to be installed offshore in March 2012 and the first subsea unit is planned to be installed and commissioned in April 2012

Framo Engineering

Bergen-based Framo Engineering has developed a cutting-edge subsea wet gas boosting system, which Statoil is considering for the Gullfaks field.

The Framo Multiphase Compressor is a counter-rotating subsea compressor capable of boosting gas containing both water and condensate – a significant improvement on conventional wet gas compression systems which rely on upstream processing and a liquid pump, in combination with a dry gas compressor. By contrast, Framo's Wet Gas Compressor is designed specifically for the pressure boosting of an unprocessed well stream. By eliminating the need for upstream compression, the compressor has the potential to save operators money and overcome the challenges of declining production or difficult-to-access gas resources.

The Wet Gas Compressor builds on Framo's well-established expertise in developing subsea pump systems. Its

Advantec

Advantec, a privately-owned technology company based on Norway´s west coast, grew out of Aker Kværner Elektro's reorganisation in 2005. Established with 20 engineers from Aker Kværner, the company has grown to more than 160 employees and has benefitted from Aker's support to innovative technology companies in western Norway.

Advantec's main focus is its multi-purpose Installation and Workover Control System (WOCS), for installation of subsea christmas trees and tubing hangers, downhole completion, and maintenance of subsea wells. Advantec's WOCS allows for control of the well during service and is used in upgrading and refurbishing equipment on older subsea wells, for example, during the installation and retrieval of christmas trees. The company also provides global operational support to users of the system via a team of operators experienced in offshore installation and workover operations.

Very confident in future growth and demand for its products in the growing subsea technology market, Advantec is investing in nearly 3000 square meters of new workshop and office facilities at Stord, Norway in 2012.

process, electrical power, auxiliary and instrumentation connections are the same as those used in previous Framo products. The design has no surge or minimum flow restrictions, and can tolerate up to 100% liquid content without any disruption to flow. It is also highly efficient: in testing, the Wet Gas Compressor has achieved up to 85% polytropic efficiency at 98 – 100% gas. It has three main components: an upper electric motor, the compressor, and a lower electric motor.

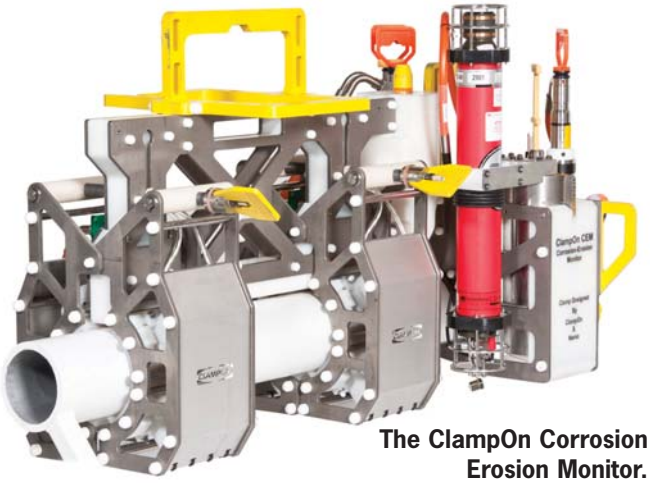
Framo has been working on this technology for 10 years and have invested upwards of 100 million NOK. The company partnered with Statoil on the technology in 2009, and is waiting for Statoil's decision on whether to implement the technology for Gullfaks beginning in 2013. Statoil has invested an equal amount in the qualification phase for the subsea compressor, and is simultaneously looking at a competing, more traditional topside compressor solution. A decision on which solution will be adopted for Gullfaks is expected in the first quarter of 2012.

Kongsberg Oil & Gas Technologies

Subsea production also requires conduits to shore and surface. Kongsberg Oil & Gas Technologies, a wholly-owned subsidiary of Norway´s Kongsberg Gruppen ASA, has developed an innovative approach to the problem of installing subsea flowlines, risers and umbilicals. The Capstan Reel Installation System (CRIS) is ship-based, and uses a reel which uses the capstan principle to ensure controlled installation, thereby reducing the risk of damage to the riser and speeding up product installation. The use of a reel eliminates the need to work at great height, as is the case with traditional installation towers.

Compared to traditional installation techniques, the CRIS system simplifies installation, saving time for operators looking to begin or re-start production as quickly as possible. Because the system has a lower center of gravity, the CRIS system can also be used on a simpler, cheaper vessel with multiple applications, rather than requiring a purpose-built ship.

In October 2011, Kongsberg signed its first agreement to supply a CRIS system to the Offshore Installation Group (OIG). The system will be developed and built by Kongsberg and delivered to OIG for installation on a dedicated, OIG-built vessel, the Giant III.



The ClampOn Corrosion Erosion Monitor.

ClampOn

The latest sensor technology is in constant demand by operators looking to maximise efficiency and output from existing wells. ClampOn AS is a Bergen-based company specializing in non-invasive ultrasonic intelligent subsea sensors, and is the largest supplier of ultrasonic sensors for the oil and gas industry. 85% of the company´s products are exported out of Norway, to markets including the UK, the US, Brazil and Australia. ClampOn´s sensors provide additional information to help manage the flow of oil and gas – for example, sand/particle monitoring, pig detection, and leak monitoring. As the company´s name suggests, ClampOn´s sensor products are non intrusive – they "clamp on" to existing subsea systems. They can also be moved around without the risk of leakage. They are particularly effective subsea where they can be used to monitor for leaks or problems in the flow line on an ongoing basis. Most recently, the company has introduced a non-invasive solution to the problem of corrosion and erosion in subsea pipelines – a key challenge to prolonging the life of mature fields. ClampOn´s Corrosion-Erosion Monitoring System uses acoustic transducers to monitor wall thickness and send information to the surface about the condition of a section of pipe. Between two and eight transducers are mounted on the pipe surface, and connected to a ClampOn control unit. Ultrasonic signals are sent continuously through the pipe material, received by a sensor and analyzed to give a picture of the condition and thickness of the pipe.

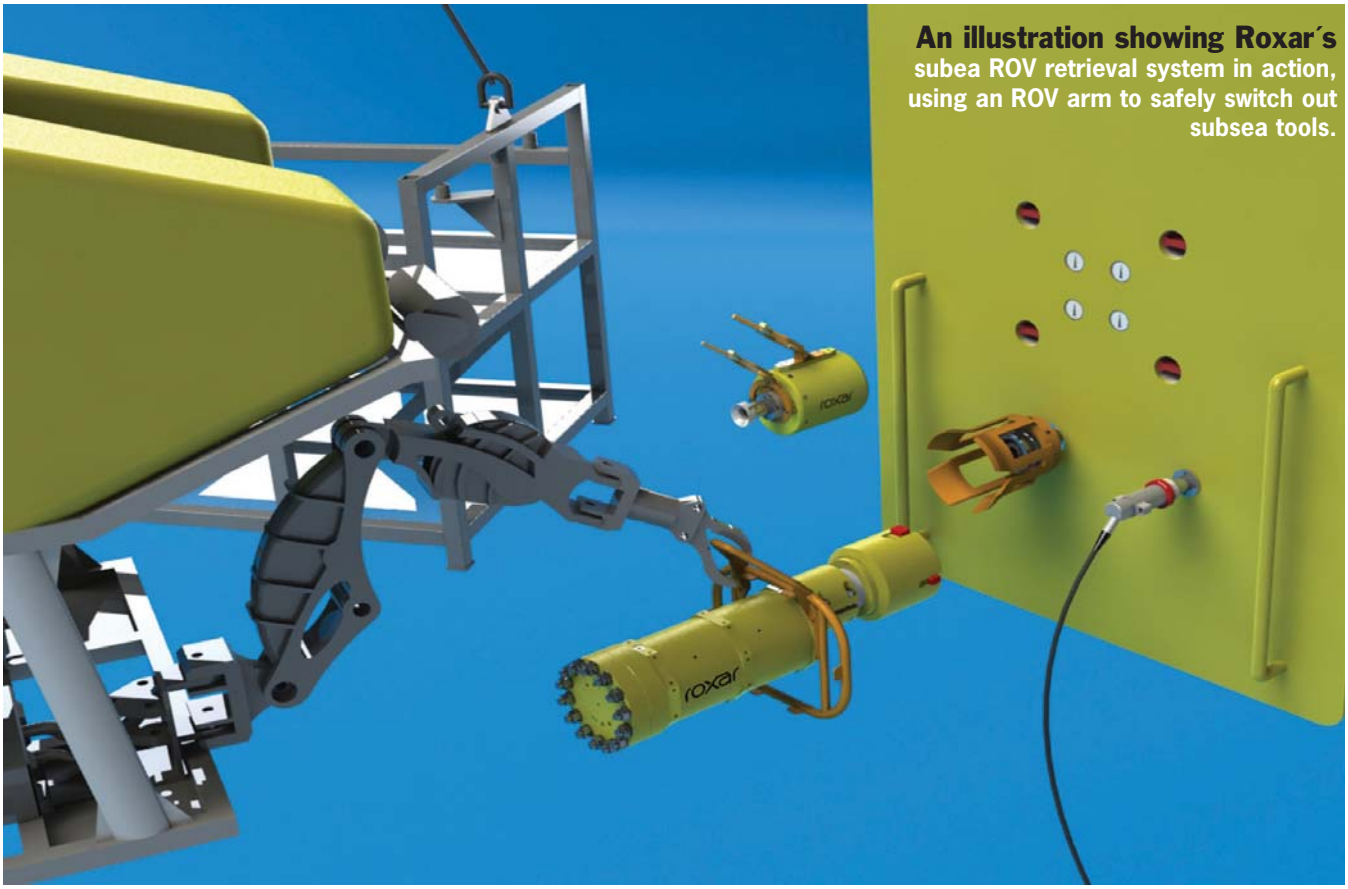
ClampOn has two major orders for this product, one for a BP field life extension project in the Gulf of Mexico and one for Total in the North Sea.

Roxar

Roxar, a Norwegian company acquired by Missouri-based Emerson Process Management in 2010, has its own innovative take on optimization and regulation of subsea production. Its Flow Measurement division has developed a collection of intelligent sensors addressing the various challenges of subsea operations, Roxar focusses on reservoir management and instrumentation to facilitate increased recovery and accelerated production at lower costs. With a view to facilitating tool renewal and retrieval, and avoiding the major costs associated with shutting down production to retrieve a subsea installation from the seabed, Roxar has developed a subsea ROV retrieval system for tools and sensors. It has worked in collaboration with major operators including BP, Chevron, Shell, Total and Statoil. Tools for monitoring temperature, pressure, erosion and corrosion can be switched out from subsea christmas trees, manifolds and process systems in as little as two hours, without impacting operations.

Roxar´s system uses a pre-installed permanent mechanical interface on the subsea structure, designed to accommodate different types of tools. Tools are switched out of the mechanical interface using an ROV retrieval tool, which uses a collet connector to create a leakproof connection to the hub. The system also includes a sensor/transmitter with a probe carrier, electronics canister and power/communications cables, which transfers data from sensor to the control module, and a skidded ROV equipped to transfer and install new tools on the subsea structure.The company is also working to bring to market a 3rd generation subsea multiphase flow meter, the Roxar subsea MPFM 2600FX, based on the existing platform of a topside meter. Roxar´s goal is to bring this platform to the subsea environment, and to address specific market demands for high pressure and high temperature monitoring, as well as salinity and GVF (gas volume fraction).

Roxar sees integration with both multinational and national operators as critical to future success, and is working on the flow meter in a Joint Industry Project partnership with Statoil, Total, BP, Shell and ConocoPhillips. A complementary second-generation subsea wetgas meter is also in the works, although without the explicit backing of a JIP. Roxar intends to qualify both products by the end of 2012.



An illustration showing Roxar´s subea ROV retrieval system in action, using an ROV arm to safely switch out subsea tools.

MARINE TECHNOLOGY REPORTER

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Subsea Photo Contest

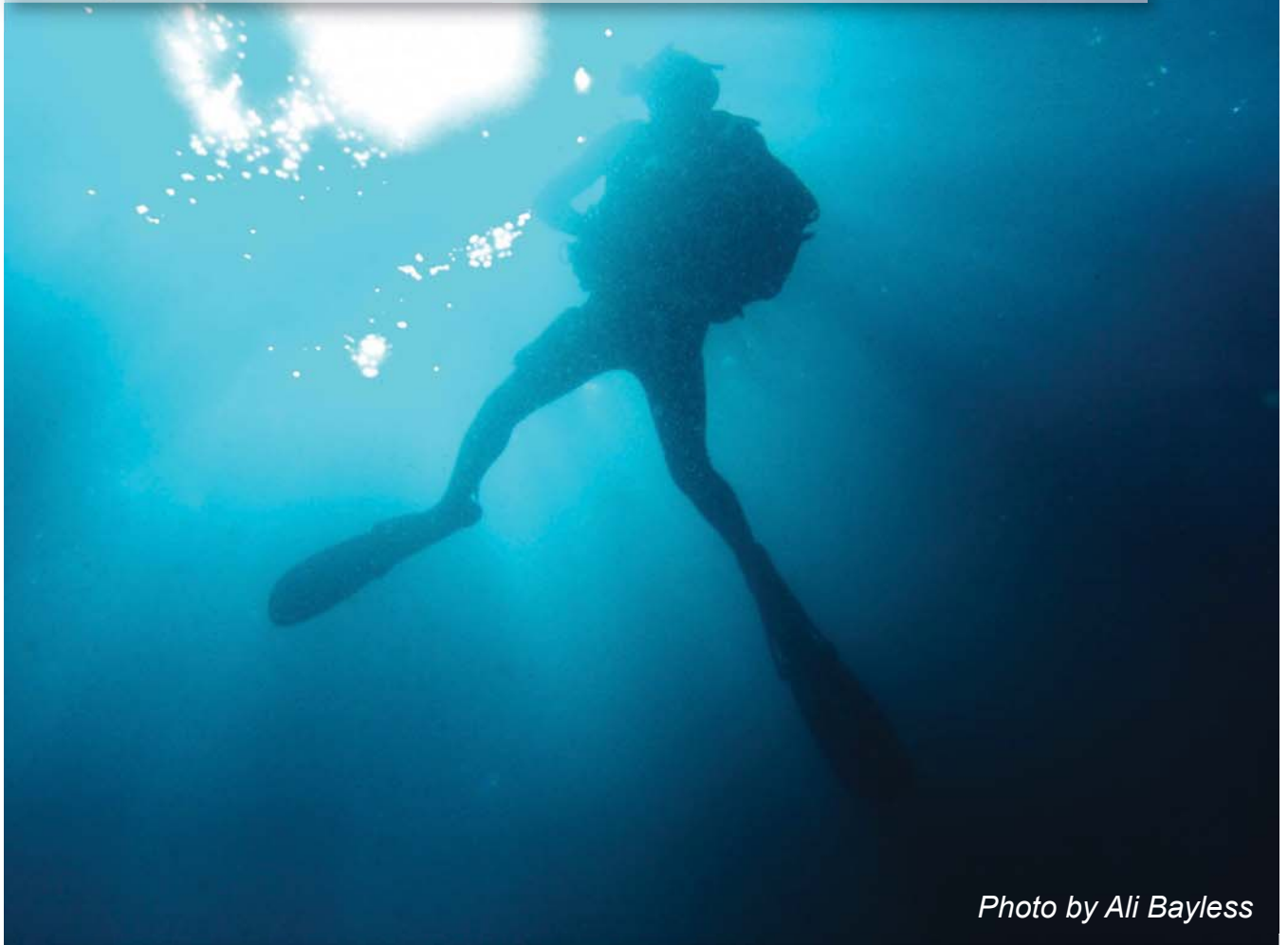

Photo by Ali Bayless

Your photo could be on the front cover of MTR

Share your experiences in the underwater world - your entry will be seen by thousands of your colleagues. Contest winnering photos will be published in a special section of the Nov/Dec issue, with the Grand Prize Winner featured on the cover. Go to:

http://photos.seadiscovery.com

to submit your best subsea images. Complete rules and terms can be found on the website, or go to:

http://photos.seadiscovery.com/rules-and-terms.asp

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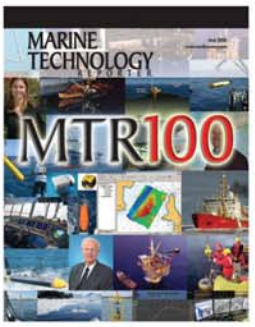
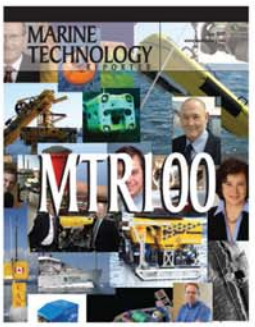
Each year, there are more applications for a limited number of slots. We consider hundreds of candidates in an effort to highlight the best.

This year will be the 7th annual edition...





WILL YOUR COMPANY BE FEATURED THIS YEAR?

The subsea technology market is a dynamic marketplace with strong regional alliances and growing global influence. Our industry is equally populated with giant global corporations and with smaller, privately held companies.

Every summer, Marine Technology Reporter selects 100 companies that have made significant and lasting contributions to the industry. Along with financial health, we consider emerging technologies, research and development, and resource and facilites management.

Our hope is not only to spotlight the industry's giants, but to discover and illuminate the up-and-comers; to examine the current industry leaders and illuminate the future of marine technology.

ONLY IF YOU APPLY.

To nominate your company, go to **http://mtr100.seadiscovery.com**
For additional information, contact us at - MTR100@marinelink.com

Bluefin Hires Two

Bluefin Robotics hired several new key employees: Omer Poroy as VP of Business Development and Ian Estaphan Owen as Director of Programs. Poroy is an Ocean Engineer by training and spent the past decade with Teledyne RD Instruments, leading the industry in Doppler Aided Navigation Solutions for AUVs. Owen spent more than four years working for Raytheon where he served as Lifecycle Support Program Manager for the US Navy's Airborne Low Frequency Sonar (ALFS) and a lead for several elements of the Ocean Observatories Initiative.

Thome Offshore Bolsters Management

Thome Offshore Management (TOM) and Thome Oil & Gas (TOG) appointed John A. Sydness, as Managing Director for Thome Offshore and Thome Oil & Gas. He was previously Managing Director of TOG. He takes over from Claes Eek Thorstensen, who is moving into a group role in TSMI – the holding company of the Thome Group of companies. In addition Thome Offshore promoted:

- Paul Schaab to General Manager, Offshore Fleet.
- Manfred Mueller as GM, Commercial, Thome Offshore.
- Cynthia Surin Harris as the Finance Manager of Thome Offshore and Thome Oil & Gas.
- Gaurav Gupta, a new hire, joins as the new Head of Marine HR, Thome Offshore and Thome O&G.

Pharos Offshore Names Gartshore CTO

Pharos Offshore Group announced the addition of Scott Gartshore as Chief Technical Officer (CTO) to the executive team. A marine industry veteran, Scott's previous roles include Project Manager and Senior Engineer, as well as Trenching Systems Sales Manager at IHC Engineering Business Ltd.

Unique System Orders Sonardyne 6G Equipment

Unique System (UK) purchased 6G acoustic positioning equipment from Sonardyne. Unique System (UK) Ltd, which is part of the Unique Maritime Group based in Sharjah, UAE, is a distributor and rental company for marine and diving equipment. The Fusion LBL 6G equipment will be added to the equipment inventory pool held at its new regional headquarters in Aberdeen and will be made available for use on survey construction projects across Europe. 6G products use Sonardyne's ultra-wideband width, digital ranging and telemetry protocols.

John Ramsden, Managing Director of Sonardyne International (on left) and Ray Hughes, Managing Director of Unique System UK.

CodaOctopus, Seatronics Sign Agreement

CodaOctopus and Seatronics signed an agreement with an initial investment worth over $1.5m to increase the number of Echoscope systems available for rent worldwide through a joint Technology Access Program (TAP). TAP allows clients can contact any CodaOctopus or Seatronics base office directly to hire the real-time 3D sonar technology that is transforming applications from marine construction through to port security, dredging and decommissioning. Over and above access to revolutionary sonar technology, TAP also makes available a pool of trained operators who can deliver a host of service provision to suit every client's requirements.

Email: sales@codaoctopus.com
Email: aberdeen@seatronics-group.com

MacArtney Inc. North America

MacArtney Underwater Technology Group expanded its North American operations. MacArtney Offshore and M.J. Stewart Associates have joined forces as MacArtney Inc. MacArtney Inc. has assumed responsibility for SubConn sales in North America and augmented the sales organization

with additional products and expanded stocks.

"The fusion allows us to connect the leading brand of underwater connectors to our broad range of trusted engineering services, terminations, slip rings, moulding, multiplexers and subsea systems and products providing our customers with full project solutions," said Lars Hansen, MacArtney Inc. President. M.J. Stewart Associates has been the sales organization for SubConn wet mateable connectors in the U.S. for more than 15 years and MacArtney Group responsible for SubConn sales for the rest of the world. The MacArtney Offshore office and workshop in Houston has been offering a wide range of underwater technology systems and services since 1995.

CTG Receives ISO 9001:2008 Certification

Channel Technology Group (CTG) received ISO 9001:2008 Certification Standard issued through Bureau Veritas North Americas, Inc. CTG, a leading manufacturer of piezo-ceramics, transducers and systems, attained certification with the International Organization for Standardization (ISO) 9001:2008 for its quality management systems. CTG is backed by private equity firm Blue Wolf Capital Partners, LLC.

www.channeltechgroup.com

Consortium for Enhanced Metocean Services

BMT Argoss announced its latest research project in partnership with Reading University and OceanExpert Ltd. The 18-month project which is co-funded by the Technology Strategy Board will look at developing, trialing and implementing commercial decision support systems for offshore operations; designed to increase the reliability of present, operational metocean information services for the O&G and renewables industries. Existing services tend to provide either standalone forecasting, real-time measurements or historical

statistics. With the objective to make practical and innovative use of very large and disparate data sources, BMT ARGOSS hopes to improve the understanding and forecasting of the offshore environment. Through this research project, BMT ARGOSS and its partners are developing techniques which will allow a more 'end-to-end' service provision, with large scale environmental datasets being combined and assessed against local in-situ, real-time and historical measurements.

This will allow decision support services to reflect both environmental and engineering constraints within offshore operations.

Specialist Subsea and Renewables Unit

International shipbroker, The Stewart Group, added depth with the appointment of Michael Braid to launch its specialist subsea and renewables business. As part of the RS Platou ASA Group, The Stewart Group uses a network of 390 professionals with a track record of global commercial delivery and time-critical market analysis in the shipbroking industry. The Stewart Group, which has offices in Aberdeen, London, Houston, Cape Town and Ghana, is a leader in shipbroking for the procurement of offshore support vessels, deep sea towage, salvage and ship sale/purchase services. The company has now added subsea and renewables capability.

EIVA, AML Sign Agreement

EIVA and AML Oceanographic (formerly Applied Microsystems) signed a distributor agreement with the aim of EIVA reselling the AML Oceanographic product line. EIVA will provide the AML Oceanographic products comprising CTD, sound velocity, and environmental instrumentation in its integrated survey and monitoring system solutions provided to the offshore energy sector, hydrographic survey industry and oceanographic science and research institutes. In addition the AML Oceanographic products will be available for integration in the EIVA ScanFish remotely operated towed vehicle, along with a wide range of other sensors.

featured products

Forum Subsea's New
Tomahawk ROV

Forum SVP Mick Jones with Tomahawk

Forum Subsea Technologies launched Tomahawk, the latest addition to its range of multi-role ROVs. Tomahawk has been built to be fast and agile and it shares the same 35kW power system and thrusters as Forum's largest electric, the Comanche. It is manufactured by Sub-Atlantic, a product line of Forum Subsea Technologies, at its facility in Aberdeenshire, Scotland. Tomahawk's open deck space and payload are supported by a large buoyancy area, which is designed to provide a stable platform. It is rated to a depth of 3,000m, which makes it suited for deep-water operations such as the Gulf of Mexico, West Africa, and Brazil. Tomahawk is equipped with Coarse Wave Division Multiplexing (CWDM) and dual gigabit Ethernet options and communication junction box to easily integrate the operators' own equipment, which can be monitored, controlled and diagnosed by Forum Subsea's Sub-Atlantic subCAN system. Combined with Sub-Atlantic's 3,000v, 400Hz small diameter tether technology makes the Tomahawks speed and agility ideal for live-boating operations. It can also be equipped with a 10kW hydraulic power unit for running heavy-duty manipulators, tools and work skids. The Type 4 Tether Management System (TMS) allows the tether to be connected to either rear or top of the Tomahawk.

www.f-e-t.com/our_products_technologies/subsea-solutions

The LUXUS series includes:

Lights
- LUXUS Compact LED
- LUXUS Power LED
- LUXUS High Power LED

Cameras
- LUXUS Compact Camera
- LUXUS Low Light Camera
- LUXUS Colour Zoom Camera
- LUXUS High Definition Camera

Video units
- LUXUS Compact Media Controller
- LUXUS Multi Media Controller

Other
- LUXUS Pistol Grip
- Compact Diver Bundle

Compact Media Controller, Compact Camera, Compact LED, SubConn connectors and 100m cables

LUXUS Range

Launched by MacArtney

The MacArtney Group is launching a new video unit, camera and light range, the LUXUS series with three types of lights, four cameras, two video units and accessories. Their compact size and robust design make them ideal for ROV and diving applications – from shallow dives to deep water ROV operations. MacArtney's LUXUS range is based on standard housings, which makes swapping lights and cameras in the field fast and convenient. A camera or light type can be removed from the bracket and exchanged with another for a change in application – from low light to color zoom or HD or high power LED. Standard sizing makes camera or light changes more convenient and all the cameras and lights in the LUXUS range use the same brackets. Lights can also be dimmed from 0 to 100%, making it easy to perfect the light level while working. The diver or operator needn't worry about choosing the right depth rating for cameras or LED lights. The complete range is tested to 4000 metres as standard.

The compact design is based on three standard sized titanium housings that give the entire range a working depth of 4000m. Housings are light, strong and non-oxidizing for long lifetime and minimal servicing. Their cylindrical shape combines strength and compact design, making them ideal for divers or on ROVs.

Hydroid Launches New AUV: *The REMUS 100-S*

Hydroid, Inc., a subsidiary of Kongsberg Maritime announced its new AUV, the REMUS 100-S, an evolution of the man portable REMUS 100 system configured specifically for hydrographic and offshore surveys. The REMUS 100-S features the Kongsberg Inertial Navigation System, which includes a Honeywell Inertial Measurement Unit (IMU), the NavP navigation processing suite, and a payload processor, which is used to initialize and control all sensors. The 100-S also features a new Vx Works Operating System, updated version 7.0 of VIP software, a field-replaceable antenna, a precision GPS sensor and 1 GBit Ethernet, allowing users to download data at high speeds. The REMUS 100-S is compatible with industry standard post-processing software packages including Kongsberg's Reflection and NavLab. Reflection is available to process data from the vehicle's core module, side scan sonar and GeoSwath interferometric sonar. NavLab is used with NavP to post-process navigation data to deliver higher accuracy position data. To differentiate the 100-S from the standard REMUS 100, the entire body of the AUV is painted yellow.

www.km.kongsberg.com/hydroid

ROVINS: Enhanced Heave Compensation

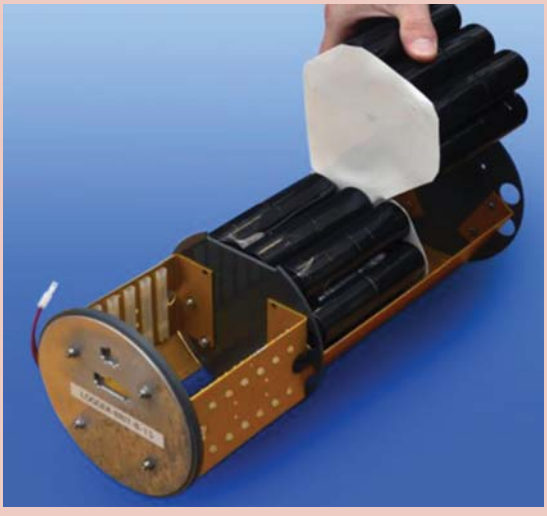
Calesurvey was in the market for a superior motion sensor to use in conjunction with a variety of instruments, most notably an R2Sonic multibeam echosounder (MBES), onboard the Kommandor Stuart, the company's dedicated DP-2 geophysical survey vessel. Based on upcoming survey work in the seas around Greenland, where challenging, long-period swells are common, Calesurvey was particularly interested in the heave compensation performance of the motion sensor. iXBlue proposed Calesurvey use one of its ROVINS units to provide the necessary input required by the MBES. ROVINS is based on iXBlue's innovative fiber-optic gyroscope technology and is an underwater product intended for use by the offshore industry in water depths of up to 3000 metres. The unit provides accurate position, heading and attitude data and combines a survey-grade, fully-featured, inertial navigation system (INS). ROVINS heave accuracy is, stated by the manufacturer, 2.5 cm or 2.5% of amplitude, whichever is lower, courtesy of the Smart Heave algorithm, which filters the vertical acceleration data prior to integration and applies a 100-second delay on the datastream, during which short-term motion history is taken into account. iXBlue engineers were on hand to install the ROVINS unit on the Kommandor Stuart and to help iron out integration issues in preparation for a trial in the North Sea. Most importantly, the survey results from the MBES contained half of the heave artefacts that Calesurvey was accustomed to, with twice the overall heave accuracy.

www.ixblue.com

Custom Made Battery Packs

Cell Pack Solutions design and build battery packs for underwater applications using Tadiran lithium cells built into different configurations, with specific design considerations to enable them to be installed into the equipment - lithium cells are particularly good for use in harsh marine environments where temperatures and conditions can sometimes become extreme. The battery pack is designed to power a particular piece of oceanographic equipment, and is popular with universities and research institutes. The particular characteristics of lithium batteries – especially lithium thionyl chloride manufactured by Tadiran means the battery pack will be more suitable than other lower powered battery chemistries such as alkaline.

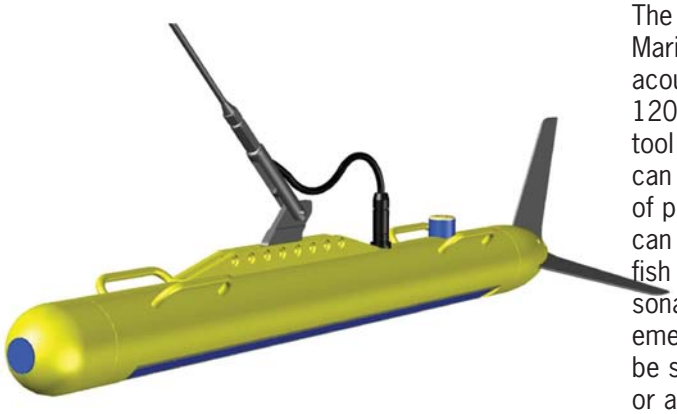
www.cellpacksolutions.com



DMS-500 Sensor Range

A new addition to the Teledyne TSS range of DMS-500 motion sensors was launched. The DMS-500 range was developed 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 is 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.

www.tss-international.com



WideView 3D Side-Scan Sonar

The new WideView 3D side-scan sonar was launched by Marine Electronics Ltd. It employs the latest interferometric acoustic technology to provide high resolution images over a 120° field of view. The new sonar is a particularly valuable tool for shallow water surveys where its wide field of view can save time and operating costs by reducing the number of passes needed to scan a specific area. The new sonar can be supplied as a complete system integrated into a tow fish that can include additional options of a forward-looking sonar, downward-looking altimeter, pressure sensor and emergency relocation beacon. The WideView sonar can also be supplied mounted on a V-plate for side pole deployment or aboard a client's own vehicle or towed body.

www.marine-electronics.co.uk

Birns Snooper III

The new version of the Birns Snooper provides up to 33,000 lumens and 3250K illumination, with a choice of 400 to 1,200W lamps and four different lens options. The new BIRNS Snooper III is available with a new backwards compatible conversion kit, with an innovative new lamp, reflector, base and lamp base mount, providing seamless adaption for any legacy system. And there are tens of thousands of existing BIRNS Snooper systems in the field—many of them on vehicles and used by divers, and still working perfectly since the 1960s.

www.birns.com

Bowtech Upgrades Dive Camera Range

The monochrome LCC-700 camera replaces the LCC-600 and the color camera L3C-650 replaces the LCC-550. Bowtech's LCC and L3C cameras have been on the market for over 15 years. As camera technology has progressed over the years, the cameras have been upgraded as significant increases in performance were proven to ensure that we continue to deliver the most up to date and reliable camera technology to our customers. These sensitive, higher resolution cameras are manufactured in a Titanium housing with Sapphire glass ports and are rated for use to 4000 metres ocean depth (with a 6000m option). They have proven extremely popular with customers with over 5000 from this range of cameras delivered for use in many underwater industries and applications. The Bowtech Divecam range (rated to 100 or 300m) has also been upgraded by 100 TV Lines each.

www.bowtech.co.uk

LCC-700 & L3C-650

SubConn 25-pin Connector Series

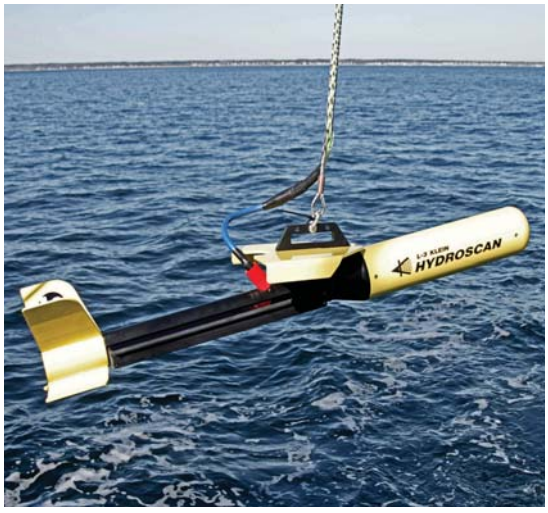
Demands placed on underwater connectors have increased as underwater projects combine increasing numbers of sensors and each sensor requires multiple connections. Often connectors need to combine power and signal – power to supply the sensors and signals for information. SubConn Inc. has developed a new series of SubConn connectors designed to carry more power and signal connections than previously available. This new SubConn range has 25 pins – 3 for power and 22 for signal. The new SubConn series is based on the existing C size series, offering the assured quality and reliability already proven in decades of use offshore. Using the same dimensions as the standard C size connector also makes it compatible with the same locking sleeves, nuts and other accessories.

www.subconn.com

L-3 Klein: HydroScan Rapidly Deployable S&R SSS

L-3 Klein Associates introduced a new lightweight, rapidly deployable side scan sonar (SSS) for search and recovery (SAR) applications. HydroScan implements advanced technologies, resulting in a highly compact profile that is designed to deliver higher quality imaging and range performance. From nose to tail, L-3 Klein's HydroScan was designed to anticipate the needs of SAR and related applications. The system uses proprietary dual-frequency (455 and 900 kHz) wideband FM Chirp sonar to provide high-resolution imaging, outstanding contrast ratios, and under certain conditions, as much as double the range of competitive lightweight systems in disaster, emergency and first responder surveys. The HydroScan is rated to a full 100-m depth and is designed with rugged components that are built to last.

www.L-3com.com/Klein



Applanix Debuts POS MV

Applanix introduced its POS MV system capable of receiving Fugro's Marinestar positioning service. By using the Marinestar positioning service, POS MV can deliver significant benefits:

- Large area of operations: No geographical limitations
- Easy to use: No additional hardware to purchase, integrate and maintain
- High accuracy: Position data is accurate to less than 1 decimeter
- Efficiency: Data is produced in real-time

www.applanix.com

Subsea Li-Ion PowerPack

For the supply of autonomous stations and underwater applications SubCtech offers PowerPacks, which contain industrial-grade Li-Ion rechargeable batteries inside robust, non-corrosive titanium housing. The whole pack can be customized in terms of housing dimensions regarding space and operating depth (down to 6000m), capacity (typ. 1.7kWh), voltage output (typ. 14,8V) or current (typ. 7A).

www.subctech.eu

RBR Debuts New Single Channel Logger

The RBRvirtuoso is RBR's totally redesigned new single channel logger. The RBRvirtuoso maintains the RBR 24-bit sample resolution for high accuracy data acquisition along with more flexibility with the deployment schedule and measurement parameters.

- More than 30 million measurements
- More than 5 year deployment @ 1min sample intervals
- True USB download
- Compatible with the MLM-1000 inductive mooring line modem

The RBRvirtuoso is available in the following configurations: RBRvirtuoso T - measures temperature; RBRvirtuoso D - measures depth (pressure); RBRvirtuoso DO - measures dissolved Oxygen RBRvirtuoso tide - measures and averages changes in pressure (depth) to determine tide parameters; RBRvirtuoso wave - measures changes in pressure (depth) to determine surface wave spectra and tides, and; RBRvirtuoso BPR - measures very small changes in pressure (depth) to determine depth level to a high precision.

www.rbr-global.com

Log onto SeaDiscovery.com to explore these new job openings.

PRODUCTION MANAGER

Job Location: USA, MA East Falmouth, MA
McLane Research Laboratories, Inc. (www.mclanelabs.com) designs, manufactures, and sells reliable, autonomous, time-series sampling instruments for physical and biogeochemical ocean research and environmental monitoring. Our systems consist of Tattletale based control and data acquisition modules, analog and digital subsystems, oceanographic sensors, and custom software/hardware.
This position is for a creative, self-motivated, experienced Production Manager who will manage day-to-day production of oceanographic research instrumentation. This is a hands-on production position working closely with production personnel, engineering, and customers to ensure timely and efficient production of oceanographic research instrumentation from start to finish. This position overlaps with sales, production engineering and engineering R&D. Applicants must be able to work cooperatively with others and have excellent communication, organizational, and interpersonal skills.

Level of hire dependent on candidate's qualifications and experience.

Responsibilities:
-Plans overall production schedule from initial customer order to final delivery.
-Works closely with manufacturing partners (machine shops, distributors, manufacturers and sub-contractors) to ensure timely delivery of component parts.
-Supervises inventory management, purchasing, receiving, incoming Quality Control.
-Schedules daily and weekly priorities with production personnel.
-Works with engineering to develop and implement manufacturing specifications, process procedures and quality plans.
-Coordinates component and repairs, prepares recommended services and costs for customer approval.
-Examine equipment, processes, operations, and assembly to determine time or quality revisions and suggests improvements.
-Introduce efficient methods of production.
-Develop, evaluate, and improve manufacturing methods, utilizing knowledge of product design, materials and parts, fabrication processes, tooling and production equipment capabilities, assembly methods, and quality control standards.
-Edit and create documentation for standard and custom instruments.
-Identify risks in the production chain and take appropriate actions.

Requirements:
A Bachelor's degree in Engineering, Manufacturing, Operations Management or equivalent field of study desired. Candidates with significant work experience will be considered.

-Experience with inventory management software, bill of materials, purchasing management.
-Experience with Microsoft Office products.
-Must be able to communicate effectively both verbally and in writing and interface effectively with all levels of technical personnel including engineers and scientists, explain technical information, respond to routine issues or situations and maintain the confidentiality of sensitive information.
-Experience in production and testing of oceanographic electro-mechanical instruments highly desired.
-Experience with high pressure housings, o-rings and seals a plus.
-High degree of mechanical aptitude. Must be able to use standard shop and assembly tools and measuring equipment.
-Ability to read and understand assembly procedures, drawings and schematics.
-Must have valid MA drivers license and lift 50lbs.

This position will be based in our East Falmouth, MA facility, which is a smoke-free work environment. This is a full-time position with a competitive benefits package. Equal Opportunity Employer (EOE). Travel may be required.

McLane Research Laboratories
McLane Research Laboratories
121 Bernard E. St. Jean Drive
East Falmouth, MA 02536
USA
Email: McLane@mclanelabs.com
WEB: http://www.mclanelabs.com

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15	SMD Ltd	www.smd.co.uk	Please visit us online
29	Specialty Devices, Inc.	www.specialtydevices.com	(972) 429-7240
51	Subsea Photo Contest	http://photos.seadiscovery.com/rules-and-terms.asp	Please visit us online
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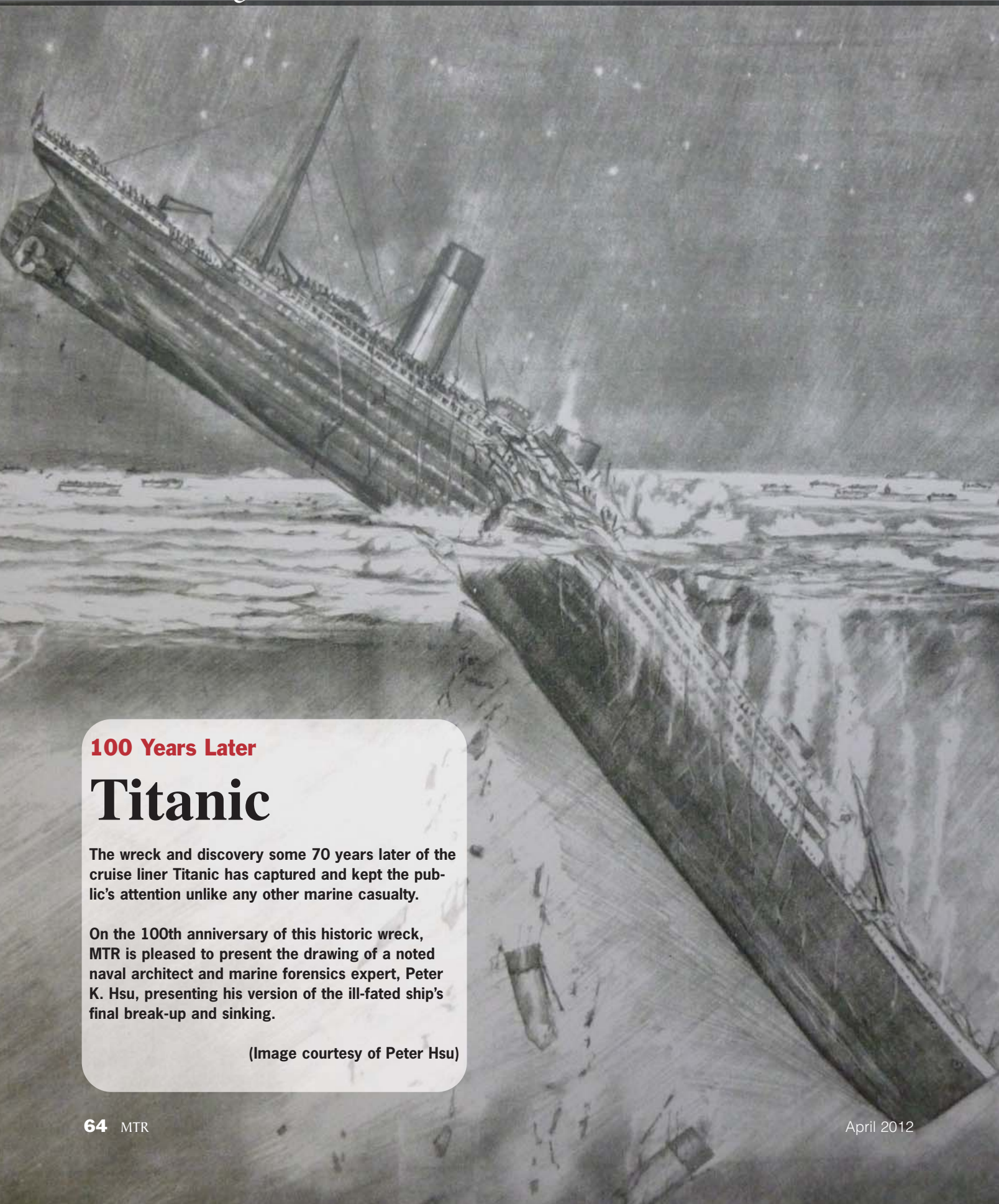

100 Years Later

Titanic

The wreck and discovery some 70 years later of the cruise liner Titanic has captured and kept the public's attention unlike any other marine casualty.

On the 100th anniversary of this historic wreck, MTR is pleased to present the drawing of a noted naval architect and marine forensics expert, Peter K. Hsu, presenting his version of the ill-fated ship's final break-up and sinking.

(Image courtesy of Peter Hsu)

UNDERWATER COMMUNICATION AND POSITIONING SOLUTIONS

Evo Logics®

S2C technology: communication and tracking combined for a wide range of subsea applications

- time, space and cost-saving solutions
- low power consumption for autonomous operations
- advanced data delivery algorithms, addressing and networking, remotely configurable settings
- extendable platform with multiple configuration options: power-saving Wake Up module, acoustic releaser, additional sensors, custom solutions, OEM versions available

USBL POSITIONING SYSTEMS

simultaneous positioning and communication - no need to switch between positioning mode and modem mode

- multiple target tracking
- reliable data transmissions
- range: up to 8000 m
- accuracy: up to 0.04 degrees

LBL POSITIONING SYSTEMS

highly accurate, precise and stable performance

- multiple target tracking
- range: up to 8000 m
- accuracy: better than 0.01 m

UNDERWATER ACOUSTIC MODEMS

reliable data transmissions even in adverse conditions

- range: up to 8000 m
- depth: up to 6000 m
- data rate: up to 31.2 kbps
- bit error rate: better than 10^{-10}

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Forum Subsea Technologies is everything remote.
We have gathered a diverse group of global experts to provide the energy industry with a full-service organization supporting remote products, people and services.

To learn about Forum Subsea Technologies
email: **everythingremotelypossible@f-e-t.com**
or visit: **http://f-e-t.com/subsea**

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