LEGAL BEAT: Jurisdiction in Treasure Salvage Cases • NOAA Research Innovation

MARINE TECHNOLOGY REPORTER

September 2011 www.seadiscovery.com

5-minutes with
Dave Grant
Managing Director,
Saab Seaeye

Ocean Observation

Market Report
Subsea Vessel Demand Recovers

European Robotics Teams Get
SAUC-E

VideoRay

The Global Leader In MicroROV Technology

www.videoray.com

DETERMINED

VideoRay Remotely Operated Vehicles...

Rugged, reliable, and portable solutions available for underwater filming, inspection, location, and recovery. With more than 1,950 systems sold worldwide, VideoRay is the most trusted ROV on the market today. Learn how professionals just like you are using VideoRay products and services to operate safer while saving money. Visit **www.videoray.com**.

ABOVE: Shibuya Diving Industry (www.shibuya-diving.co.jp) is one of the best known and most innovative dive companies in Japan. Founded by renowned diving environmentalist Masanobu Shibuya, they are determined to repair the massive damage to ports from the recent Tsunami. Their newly-acquired VideoRay Pro 4 ROV System is a key part of their diving tools. Photo Credit: Mr. Masanobu Shibuya, President, SDI

www.videoray.com

580 Wall Street Phoenixville, PA 19460 USA

+1 610 458 3000 info@videoray.com

Piezoceramics - Transducers - Systems

CHANNEL TECHNOLOGIES GROUP

Since 1959

CHANNEL INDUSTRIES — Piezoelectric Ceramics

Since 1966

ITC — Transducers

Since 1973

SONATECH — Custom Acoustic Systems

Over 50 Years of World Class Quality

www.channeltechgroup.com

879 Ward Drive . Santa Barbara . CA . 93111 . USA . Tel. 805.683.1431

September 2011

contents

Marine Technology Reporter • Volume 54 • Number 7

Pictured on the Cover

is AXYS Technologies Inc. (AXYS) tenth 'smart buoy' into the NOAA Chesapeake Bay Interpretive Buoy System (CBIBS). The 1.7m diameter AXYS WatchKeeper buoy was deployed August 17, by the Chesapeake. Read more on page 10.

(Photo: AXYS Technologies)

Pictured in the background:
DFKI Bremen (The German Research Center for Artificial Intelligence, or The Deutsches Forschungszentrum für Künstliche Intelligenz (DFKI)) was represented by Team Avalon, and took third place in the 2011 **SAUC-E** challenge. Read the full story starting on page 12.

SBE 56 Temperature Logger

From Streams to Lakes to Oceans

- High accuracy: ± 0.002°C
- High stability: ± 0.002°C/year
- Long deployments: more than 4 million samples
- 1500 meter (4900 ft) depth
- Fast USB upload
- Easy-to-use software

Unprecedented accuracy and stability at a price you would expect to pay for recorders that are 1/10th as accurate

SBE
Sea-Bird Electronics, Inc.
13431 NE 20th Street, Bellevue, Washington 98005 USA
www.seabird.com

E-mail: seabird@seabird.com
Telephone: +1 425-643-9866
Fax: +1 425-643-9954

Authors

Katrina Phillips is a Sea Grant Knauss Fellow in the NOAA Office of Oceanic and Atmospheric Research. Prior to NOAA Katrina studied loggerhead sea turtle populations for her Master's degree at the University of Miami-RSMAS. .

See Story on page 34

Ned Lundquist is a principal science writer and naval analyst with MCR Federal in Arlington, Virginia.

See Story on page 12

***Simon Robb**, Lead Author. has been a member of DW's analyst team since 2009 and is involved in research and providing analysis to the transaction and advisory side of the business on a range of sectors within the upstream oil and gas industry.* ***Ian Jones**, Author, is an analyst for DW, contributing to the firm's commissioned research, commercial due diligence and published market studies in the oil and gas and renewable energy sectors.*

See Story on page 36

MTREnews
MTR **publishes a twice weekly newsletter via e-mail. Subscribe for FREE at www.seadiscovery.com**
For banner advertisement info, contact Rob Howard at howard@marinelink.com

SUBSCRIBE
Subscribe to the print or electronic edition of *MTR* by visiting www.seadiscovery.com, or e-mail Kathleen Hickey at mtrcirc@marinelink.com

ADVERTISE
MTR **offers a number of print and electronic advertising packages. To see our editorial calendar and advertising rates, visit www.seadiscovery.com/mt/mtMagazine.aspx?mnl2=l2advertising**

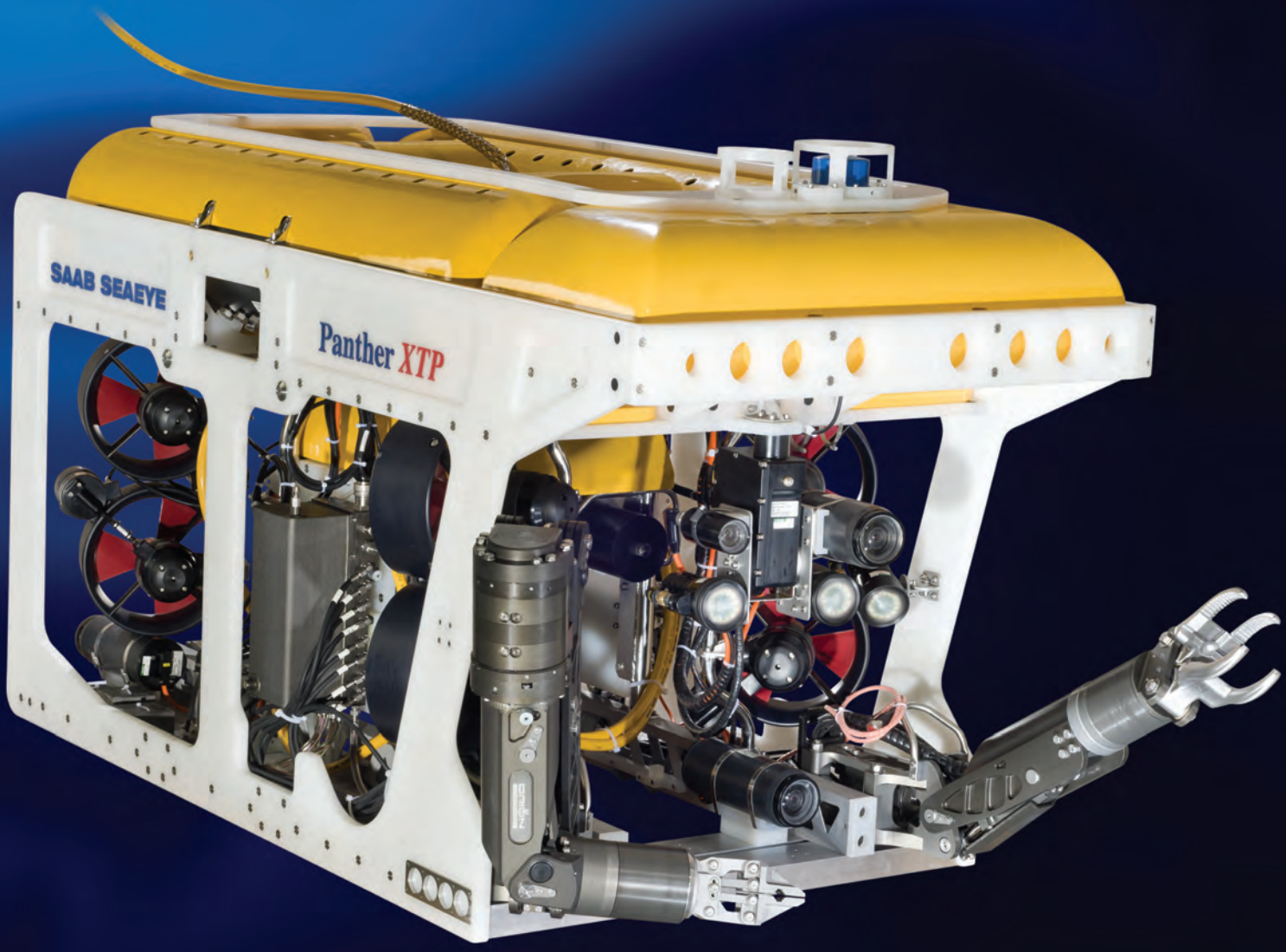
POST/SEARCH•JOBS
MTR JOBS **listings are updated weekly and help match employers with qualified employees. Post a position or keep abreast of new employment opportunities at www.seadiscovery.com/mt/mtJob.aspx**

SUBMIT•EDITORIAL
MTR **invites you to submit company news and events for publication on-line and in print. Visit www.seadiscovery.com/mt/mtStories.aspx?PostStory=new**

SUBMIT VIDEO
MTR **invites you to submit interesting Subsea videos for broadcast. Contact trauthwein@marinelink.com for details.**

EVENTS•CALENDAR
MTR **maintains a list of upcoming industry events. Search an event or post information on your event at www.seadiscovery.com/mt/MTCalendar2.aspx**

SEAEYE PANTHER-XT PLUS
1000 MSW



The World's Leading ROV Manufacturer

TRUSTED

www.seaeye.com

SAAB TECHNOLOGIES

SAAB

(Photo : AXYS Technologies)

www.seadiscovery.com

NEW YORK
118 E. 25th St., New York, NY 10010
Tel: (212) 477-6700; Fax: (212) 254-6271

FLORIDA
215 NW 3rd St., Boynton Beach, FL 33435
Tel: (561) 732-4368; Fax: (561) 732-6984

PUBLISHER
John C. O'Malley
jomalley@marinelink.com

Associate Publisher & Editor
Gregory R. Trauthwein
trauthwein@marinelink.com

Contributing Editors
Capt. Edward Lundquist, USN (Ret.) • Steve Withrow
Claudio Paschoa • Andrew Safer

Production Manager
Irina Tabakina
tabakina@marinelink.com

Sales Administration & Office Manager
Rhoda Morgan
morgan@marinelink.com

Sales & Event Coordinator
Michelle Howard
mhoward@marinelink.com

Manager, Accounting Services
Rhoda Morgan
morgan@marinelink.com

Manager, Public Relations
Mark O'Malley
momalley@marinelink.com

Manager, Marketing
Jocelyn Redfern
jredfern@marinelink.com

Manager, Information Technology Services
Vladimir Bibik
bibik@marinelink.com

CIRCULATION
Kathleen Hickey
mtrcirc@marinelink.com

ADVERTISING

Vice President, Sales and Marketing
Rob Howard
howard@marinelink.com
Tel: (561) 732-4368 • Fax: (561) 732-6984

Advertising Sales Manager
Lucia M. Annunziata
annunziata@marinelink.com
Tel: (212) 477-6700 • Fax: (212) 254-6271

Mike Kozlowski
kozlowski@marinelink.com
Tel: (561) 733-2477 • Fax: (561) 732-9670

Japan
Katsuhiro Ishii • amskatsu@dream.com
Tel: +81 3 5691 3335 • Fax: + 81 3 5691 3336

The need to attract and groom the next-generation of scientific, engineering and business talent to power the future of the global subsea industry is palpable and non-stop. In fact, it seems that literally every conversation I have had with leaders in this industry eventually turns toward this, their stated number one challenge. In addition, I have dedicated much time and many pages — in print and online at SeaDiscovery.com — toward discussing the numerous programs, organizations and individuals that are specifically geared to building and strengthening this pipeline of talent.

With that as a backdrop, I am particularly pleased this month to present an insightful report from **Edward Lundquist** on a competition that I literally did not know existed until the report landed on my desk last month: **SAUC-E**

The *Student Autonomous Underwater Vehicle Challenge–Europe* ... or SAUC-E for short ... was held at the NATO Undersea Research Center (NURC) July 4-11, 2011. Ten teams from across Europe gathered for their "mission" in NURC's marina, a salt-water basin open to La Spezia harbor on the Ligurian Sea. As you will see from Lundquist's report, which starts on page 12, the competition included some of the best and the brightest, names and faces that I am sure will become familiar in the years to come.

On the topic of familiar names and faces, **Dave Grant**, managing director of Saab Seaeye, is a ubiquitous figure in the subsea vehicle sector, and I am pleased to report that he found time to share his vision on the development and course of underwater robotic systems in our "Five Minutes with" interview, which begins on page 21. After starting his career in the design of airborne military radar, Grant has been a steady hand at the wheel of Saab Seaeye as it steadily has built and expanded its brand and reach, most recently the transfer of the Saab underwater vehicle defense manufacture to the U.K.

Gregory R. Trauthwein • trauthwein@marinelink.com • tel: 212-477-6700

MARINE TECHNOLOGY REPORTER
www.seadiscovery.com
Vol. 54 No. 7
ISSN 1559-7415
USPS# 023-276

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

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

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

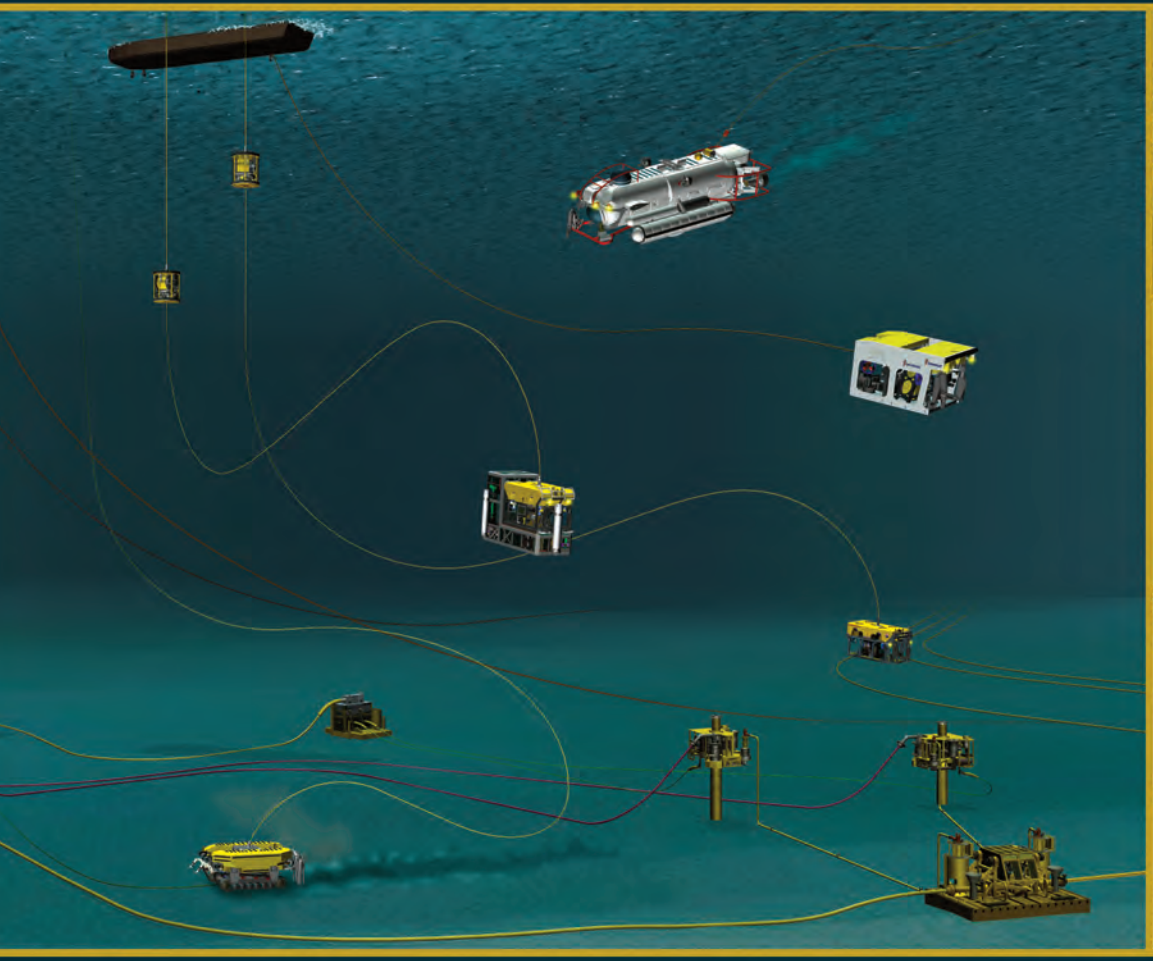
Publishers are not responsible for the safekeeping or return of editorial material.

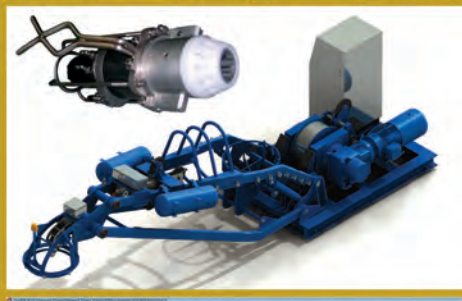
Member
BPA WORLDWIDE BUSINESS

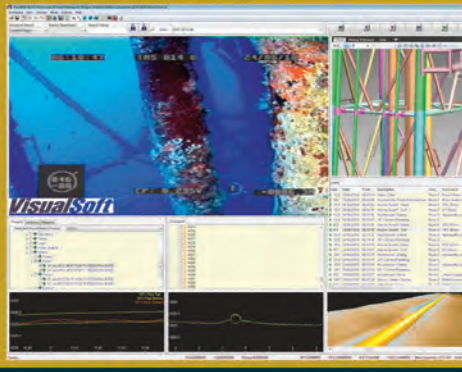
Subscription:
To subscribe please visit
www.seadiscovery.com/subscribe

FORUM™
ENERGY TECHNOLOGIES

Complete Subsea Capability







Turn to Forum's Subsea Group when you need state-of-the-art technology and experienced personnel for your next subsea project.

Forum's products include purpose built remotely operated vehicles (ROVs), ROV and custom intervention tooling, control systems and integrated system solutions. Our services include rental of ROVs, tools and positioning systems as well as personnel and training services, seabed coring, geoscience project management and subsea pipeline joint coating. Forum's pioneering Rovdrill® drilling system and VMAX™ simulation software are providing innovative ways to drill smarter and deeper. **To take your next subsea project to a new level visit: www.f-e-t.com**

Perry
sub-Atlantic
DPS OFFSHORE
UKPS OFFSHORE
OJS OFFSHORE JOINT SERVICES
GEOSCIENCE EARTH & MARINE SERVICES, INC. GEMS
VisualSoft
ROVDRILL®

Offshore Vessel Named in Norway

The offshore construction vessel, Island Intervention, of the SX121 design from Ulstein was named. Shipowner Island Offshore has great expectations for the new vessel, which will carry out advanced operations in the Norwegian Sea this autumn. Island Offshore is a leader within light well intervention and managing director of the company, Håvard Ulstein, says that its entire fleet is currently fully booked: "Island Intervention will become an important addition to our fleet. This autumn, the vessel will be installing a series of production trees on the seabed in the Norwegian Sea for a Norwegian oil company. This is a complicated operation, but we are confident, that with the right crew, this vessel is the best equipment for the job. Our experience with its sister vessels, Island Constructor, also delivered by ULSTEIN, is very good and we therefore have great expectations for the new vessel," said Håvard Ulstein. The 120 x 25-m vessel can accommodate 100 persons. It is fitted with a tower for module handling, moonpool, ROV hangar, offshore crane, helipad, and a iesel-electric propulsion system. The vessel is also equipped with ULSTEIN COM and ULSTEIN IAS.

Lady sponsor of Island Intervention, crew manager in Island Offshore, Guri Lillebø Sætre, flanked by managing director of Island Offshore, Håvard Ulstein, and Managing Director of Ulstein Verft, Karsten Sævik.

MAN Engines to Power Seismic Vessel in Norway

MAN Diesel & Turbo signed a contract to supply 4 × MAN 8L32/40 engines to power a seismic vessel ordered by Sanco Shipping of Norway. The vessel will be built by Kleven Maritime at Myklebust shipyard in southern Norway and is scheduled for delivery by May 2013. The four-stroke engines will be built in Augsburg. The company attributes the landing of the new order to its presence in Aalesund, an important European offshore center, and focused activity on this significant segment. MAN Diesel & Turbo also views the order as another step in the right direction in its targeted strategy of increasing the market share in the Norwegian offshore market.

OSD: Seismic Support Boats for Bourbon

Offshore Ship Designers will design a series of six new seismic support/chase vessels ordered by Bourbon to be built at Dubai's Grandweld Shipyards. The 53 m vessels will have a fuel efficient hybrid propulsion system delivering a flexible economic solution for the varied conditions required to support seismic survey vessels including transit speed, slow speed escort and support work and a high degree of maneuverability.

"We worked closely with Grandweld during the tender period and following their selection as one of the short-listed bidders, we assisted them technically during the successful contract negotiation process, and are pleased to have been entrusted with the design of these new vessels," said Neil Patterson, managing director, OSD-IMT.

The vessels will be chartered by Bourbon to CGGVeritas with delivery of the first vessels set for the end of 2012. They will be used to support the fleet of CGGVeritas seismic survey vessels operating all over the world, providing them with services including crew change, fuel delivery, storage, assistance and support during at-sea maintenance operations. Operational requirements of the design include:

Key feature of the hybrid propulsion system are:

- Two main marine diesel propulsion engines, two controllable pitch propellers in nozzles, two main gearboxes each with a PTI electric propulsion motor and three diesel driven generating sets, and two electrically driven bow tunnel thrusters.
- Diesel-mechanical mode using main engines only used for the transit operation.
- Diesel-electrical mode with main engines declutched using PTI propulsion motors powered by the gensets for chase and slow speed operation.
- Boost mode with main engines and PTI propulsion motors (powered by the gensets) engaged used for towing operation.
- Automatic push button selection between the different propulsion modes.

Smart Buoy Deployed in Chesapeake Bay

AXYS Technologies Inc. (AXYS) deployed its tenth 'smart buoy' into the NOAA Chesapeake Bay Interpretive Buoy System (CBIBS). The 1.7m diameter AXYS WatchKeeper buoy was deployed August 17, by the Chesapeake Bay Bridge-Tunnel near Virginia Beach. It transmits near real-time data on winds, air and water temperature, barometric pressure, waves, currents, and water quality. This data is used by weather forecasters, maritime safety personnel, coastal decision-makers, and recreational boaters and fishermen. Scientists and educators also use data from the buoys in the curriculum for innovative online activities that bring the science of the Chesapeake Bay to life. CBIBS was created by NOAA as an information system focused on the Chesapeake Bay and its surrounding estuarine environment to provide information on current marine conditions for educational and scientific purposes. Learn more about CBIBS and access live data from all ten buoys at http://buoybay.noaa.gov

ROCKLAND SCIENTIFIC

Ocean Turbulence

Instruments & Sensors

www.rocklandscientific.com

520 Dupplin Road | Victoria, B.C. V8Z 1C1 | Canada
Tel: +1-250-370-1688 | Toll free: +1-877-370-1688

SAUC-E

European University Robotics Teams Gain Deeper Understanding of Autonomous Underwater Vehicle Challenges

By Edward Lundquist

For the ten teams participating in the Student Autonomous Underwater Vehicle Challenge–Europe (SAUC-E), held at the NATO Undersea Research Centre (NURC) July 4-11, 2011, it wasn't the difficult course, or even the highly qualified competition that worried them. The biggest obstacle was the underwater environment, with its limited visibility, currents and salty water.

The team from the University of Lübeck in Germany—with their AUV named Hanse —received the top scores by successfully completing mission tasks, along with other factors such as presentation and project documentation.

The team from the DFKI Bremen (The German Research Center for Artificial Intelligence, or The Deutsches Forschungszentrum für Künstliche Intelligenz (DFKI)) was the third place winner.

The fourth place team was from ENSTA Bretagne in France (École Nationale Supérieure de Techniques Avancées Bretagne, or "National Institute of Advanced Technology, Brittany" in English).

Heriot-Watt University from Scotland and their "Nessie" AUV also qualified for the final round of the competition and received the "Cooperation Award."

This year's "mission" was conducted in NURC's marina, a salt-water basin open to La Spezia harbor—the third busiest in Italy— on the Ligurian Sea.

"This proved to be extremely challenging last year and was so again, many of the team's performances were better than the previous year, nevertheless they all found the conditions extremely challenging and careful consideration needs to be given to the tasks in 2012 to ensure they

The University of Lübeck took first prize at the Student Autonomous Underwater Vehicle Challenge–Europe (SAUC-E).

remain within the capabilities of teams whilst continuing to stretch their technical capabilities," said Vladimir Djapic of NURC, the SAUC-E technical director.

This is the sixth year for SAUC-E, and the second year the event has been held at La Spezia. The NATO research facility will also host the 2012 competition.

"Strongly supported by 10 Universities from four European countries the standard has again improved, both in terms of the student's technical prowess and the facilities that the NURC was able to provide," said Dr Dirk Tielbuerger, director of NURC. "The challenging environment, wave action, visibility, salinity, tidal and sonar conditions have raised the competition to a new level, but one which was achievable by

(NATO photo by Francesca Nacini)

A distinguished panel of judges evaluated the entries at SAUC-E 2011, held at the NATO Undersea Research Center in La Spezia, Italy.

DFKI Bremen (The German Research Center for Artificial Intelligence, or The Deutsches Forschungszentrum für Künstliche Intelligenz (DFKI)) was represented by Team Avalon, and took third place in the 2011 SAUC-E challenge.

nearly all of the teams."

Each team occupied work and storage areas with power, as well as a tented space along the basin. Two areas prepared in the tidal basin itself, one for the competition and another for testing and practice, and two pools were set up for basic testing.

Tielbuerger said it is extremely important that research establishments like the NURC support and foster the next generation of undersea scientists. "Competitions such as SAUC- E are a springboard for the next generation of scientists; they expose the students to the scientific and industrial community and us to them," he said. "Without such mentoring we run the risk of losing these talented and enthusiastic young men and women to other scientific disciplines."

In addition to technical director Djapic, NURC provided outstanding event staffing and support. Royal Navy Lt. Cmdr. Nick Gwatkin was the event coordinator, as well as the diver to support the in-water events. Stefano Biagini was the engineering coordinator, assisted by his collegue, Stefano Fioravanti, who served as a judge. NURC technicians Alberto Grati and Marco Paoli provided technical and engineering assitance, to include equipment and boat operations. The NURC Inflatable boat was used throughout the competition and provided on water safety cover and safety cover during the diving serials.

Teams could be comprised of a combination of students, faculty, industrial partners, or government partners with a maximum of 10 people per team.

Unlike some competition in fresh

REVEALING UNDERWATER DIGITAL STILLS

The all new OE14-408 Digital Stills Camera from Kongsberg Maritime provides superb image and colour quality and a range of improved features:

- **Increased 10 Megapixel Resolution**
- **Improved Colour Depth and Dynamic Range**
- **On-the-Fly USB or Ethernet Image Download**
- **Flexible Control Interfaces**
- **Compact Housing**

When used in conjunction with Kongsberg Maritime's dedicated Flashgun (OE11-442) the TTL through-lens flash metering gives accurate exposure control allowing you to capture strikingly revealing images.

Kongsberg Maritime Ltd
Telephone: +44 1224 226500
Email: km.camsales.uk@kongsberg.com

KONGSBERG

OE14-208 Images courtesy of MARE/TNC/CSUMB

OE14-408 Digital Stills Camera shown with the OE11-442 Flashgun

THE FULL PICTURE

www.km.kongsberg.com/cameras

VALEPORT

TideMaster
the new portable tide gauge from Valeport

- **512Mbyte memory**
- **Portable or fixed site use**
- **Direct replacement for the Model 740**
- **Cable, Bluetooth and telemetry communications**
- **Standard input for ultrasonic wind speed & direction sensor**
- **OLED display option for easy set up with tidal curve graphics**
- **Valeport's unique perpetual warranty scheme with service applies**

Contact us now to improve your tidal measurement.
Tel: +44 (0)1803 869292
St. Peter's Quay, Totnes, Devon TQ9 5EW United Kingdom
sales@valeport.co.uk • www.valeport.co.uk

Students from Heriot-Watt University in Edinburgh test their "Nessie" AUV in the pool before placing it into the NURC basin for qualifying trials during SAUC-E 2011.

water pools, the SAUC-E teams were operating in salt water with limited visibility. If a vehicle failed, a diver had to search for the vehicle before it could be recovered.

A new rule will be established for next year is indicative of the challenging operating environment in the basin. "To assist in the recovery of the vehicles in restricted underwater visibility each is to be fitted with a strobe light that will operate continually."

The U.S. Navy's Office of Naval Research sponsored the event. NATO nations have an interest in competitions such as this, which are designed to encourage qualified students to understand and pursue careers in underwater technology and related applications while fostering innovation and technology.

"All teams performed with important achievements that will help them to continue with their work in the future," said Tielbuerger.

The objectives of the competition were to:

- Advance the state of the art of Autonomous Underwater Vehicles by challenging multi-disciplinary teams of students and engineers to perform an autonomous mission in the underwater environment.
- To foster ties between young engineers and the organisations involved in AUV technologies.
- Create a suitable environment for interdisciplinary interactions between academic researchers.
- To promote technical excellence in the field.
- To attract research teams, schools and universities and to engage with them in order to help them to investigate and prepare for tomorrow's challenges.
- During this event, contact between the university teams and companies invited to participate will be "strongly encouraged" and reinforced by the organization of the event to help create an effective synergy between the actors in the interest of the Office of Naval Research—to include ONR Global—and NATO.

SAUC-E 2011 Results

1st	University of Lübeck (4000euro)
2nd	University of Girona (3000euro)
3rd	University of Bremen (2000euro)
4th	ENSTA – Ecole Nationale Supérieure de Techniques Avancées Bretagne (1500 euro)

Other Awards – 1000 euros

- Best use of Resources – ESIA - Ecole Supérieure D'Informatique Electronique Automatique 'Ryujin 'Team
- Experimentation – University of West of England
- Teamwork – University of Cambridge
- Engineering Award – University of Southampton and University of Birmingham (Combined team)
- Co-operation Award – Heriot – Watt University (Edinburgh)
- Perseverance and Tenacity award - ESIA - Ecole Supérieure D'Informatique Electronique Automatique

Teams participating in SAUC-E '11

- University of Girona, Spain
- Heriot-Watt University, UK
- ENSTA Bretagne, France
- DFKI Bremen, Germany
- University of Southampton and University of Birmingham (Joint Team), UK
- University of West England, UK
- University of Lübeck, Germany
- University of Cambridge, UK
- ESIEA Paris (two separate teams entered), France

About the Author

Captain Edward Lundquist, USN (Ret.) is a principal science writer for MCR Federal LLC in Arlington, Virginia.

Jurisdiction In Treasure Salvage Cases

Should U.S. courts be involved when the wreck is in international waters?

By Thomas H. Belknap, Jr., Blank Rome LLC

The term "treasure salvage" has a tendency to conjure romantic images of pirates and adventurers. Not, I might add, of modern day pirates, who are widely acknowledged to be unromantic thugs and scoundrels, but those of the old story books, of whom time and fiction writers have been more forgiving. In the stories, "x" marks the spot and the hero follows obscure and cryptic clues in a wild adventure to the long-lost chest of gold in the abandoned sunken shipwreck, keeping it all for himself and living happily ever after.

Just to define our term, by treasure salvage we mean the subsea exploration and recovery of artifacts from sunken vessels which are believed (or, more often, hoped) to be of historical or monetary significance. Successful treasure salvage has always required mastery of the combined disciplines of historical research and subsea exploration and recovery, and in real life, of course, it has always involved long hours and a lot of disappointment.

As in many areas, technology has been the driver of change. Subsea exploration that was impossible just twenty years ago is now practically routine. Modern satellite positioning capabilities are precise to a degree that was only recently inconceivable. Data analysis and computer modeling capabilities are exponentially more sophisticated and are expanding rapidly with each passing year. Historical research and information is more widely available and accessible thanks to the internet. Successful treasure salvage, in other words, has become increasingly a product of investment and hard work rather than a game of chance.

The result of these changes is that sunken shipwrecks that were once assumed to be lost forever are increasingly being found. In addition to the "rogue" salvors who have traditionally engaged in the treasure salvage business, sophisticated publicly traded companies have entered the scene in recent years and have applied considerable funding and efforts towards seeking out newer and more dramatic discoveries. The discovery of the TITANIC in 1985 and of the side-wheel steamer CENTRAL AMERICA in 1987 are good examples of early high-profile discoveries, and more recently Odyssey Marine, a publicly traded company, discovered a shipwreck it nicknamed the "Black Swan," recovering over 500,000 silver coins weighing some 17 tons and hundreds of gold coins and worked gold. According to news reports, the estimated value of the recovered property in this case was about $500 million.

The United Nations estimates there are some 3 million shipwrecks on the ocean floor. Most, of course, are of no interest to treasure salvors; however, there are many undiscovered wrecks of substantial interest to subsea explorers. Of course, treasure salvors are only one subset of subsea explorers, and a perennial conflict exists between the interests of archaeologists and historians on the one hand, who are principally interested in collecting and preserving historical and culturally significant information, and treasure salvors on the other who, at least according to stereotype, are principally interested in recovering artifacts of value.

As often occurs, the law has been forced to adapt to these technological developments, and the adjustment has not always been entirely smooth. Early treasure salvage cases tended to rely upon the maritime law of "finds" to hold that a party that recovered artifacts from an abandoned shipwreck was entitled to keep them. More recently, however, the Courts have substantially favored applying maritime salvage law. In a nutshell, the difference is that under the law of finds the finder is considered to have title to the property once it obtains possession. Under the salvage law, by contrast, the salvor merely has a lien in the property and is deemed to be holding it in trust for the owner. It does not obtain title but instead is entitled to a salvage award to reward it for recovering the property for the benefit of the owner. The salvage law presumes, in other words, that a property's owner did not intend to abandon the property merely because it was lost at sea.

To enforce a salvage lien, the salvaged property must be arrested within the jurisdiction of a competent court or must otherwise be physically brought into the jurisdiction of the court. In the United States, the Federal District courts are vested with

exclusive jurisdiction over maritime salvage claims. Once the property is within the jurisdiction of a competent court, that court may adjudicate the ownership and salvage interests in the property as against all potential claimants. This is based on its "in rem" jurisdiction over the property.

But what about a shipwreck sitting on the ocean floor in international waters? What law applies? And what court has jurisdiction? Or, indeed, should any court have jurisdiction?

This issue was at the fore in the litigation concerning the TITANIC, which has reached the Fourth Circuit Court of Appeals on three separate occasions. In those decisions, the Fourth Circuit confirmed the view that the law of salvage should ordinarily prevail over the law of finds in this context. It also concluded that the law of salvage was so universal and well accepted that it constituted, in essence, the general maritime law of nations that should—and would—be uniformly recognized in maritime jurisdictions around the world. Thus, a U.S. District Court may exercise "constructive in rem jurisdiction" over a shipwreck in international waters, so long as the salvor has managed to bring some small artifact from the wreck in to the jurisdiction.

Constructive in rem jurisdiction means, in essence, that a U.S. court may issue orders designating a party as "exclusive" salvor of a wreck and may issue orders to protect the wreck site from interference from others. It may also issue orders to protect archaeological or historical data that might otherwise be damaged or lost in the course of salvage operations. It may not, however, adjudicate ownership of the property, nor may it issue a salvage award in the property, until

such time as the property is physically brought within the jurisdiction of the Court. The premise for exercising such extra-territorial jurisdiction is that the law of salvage is so widely recognized that a foreign court would enforce an order of the U.S. court as part of the international general maritime law.

This premise may be a bit wishful: while it is unquestionably true that the law of salvage belongs to the ancient and revered maritime law, its application to confer some degree of jurisdiction over shipwrecks located in international waters is certainly a newer—and probably less universally recognized—phenomenon. And perhaps it begs the question: should salvage law allow a U.S. court to effectively extend its jurisdictional reach into international waters?

As a practical matter, it is difficult to see an alternative that allows the salvor its reward and yet also protects both the private interests of the original owner of the property and also the public interest of preserving sites of significant cultural or archaeological importance. Under the law of finds, the finder has the incentive to reduce found property to its possession at the earliest possible opportunity, because that is how it establishes its rights in the property. Under a strict salvage regime, on the other hand, the salvor would have a similar incentive to take and deliver possession of salved property into the custody of the court at the earliest possible opportunity so that it could perfect its claim for a salvage award. In either case, the recovering party would have a strong incentive to immediately recover found artifacts even at the expense of the integrity of the wreck site.

Under the constructive in rem approach, by contrast, the salvor can take a more methodical approach to salvaging the wreck: once it has done its preliminary investigation and has determined that it has found a site of sufficient importance, it can commence an action by delivering only a token artifact into the jurisdiction of the court. This is largely a symbolic gesture but also serves to confirm that the salvor has, in fact, located a wreck and that it has the means of recovering artifacts from it. Once the court has constructive in rem jurisdiction it can enter orders to protect the salvor's salvage interest, such as naming the party the exclusive salvor in possession, which can help to avoid a "fight" over access to the salvage site or a damaging race to recover astifacts. It can also substantially incentivize the salvor to use best practices in conducting the salvage operation, because the Court can make it a condition of maintaining its exclusive status that the salvor demonstrate a continuing commitment to preserving the integrity of the site and any recovered property. The court can also enter orders aimed at protecting the site itself, such as requiring certain specific record-keeping procedures or preservation methods. It can also entertain submissions by third parties who may have a specific interest in ensuring the site is properly handled or salvaged.

It is probably impossible to construct a legal regime that fully recognizes and protects all of the competing interests in a historical shipwreck located in international waters. But devising the best possible balance within the confines of existing, well-recognized legal principles must continue to be the goal, and ultimately it will be up to the Courts to continue to wrestle with this issue in the coming years. The one thing that seems certain is that the cases will keep coming as long as there is still treasure to be discovered at the bottom of the sea.

While it is unquestionably true that the law of salvage belongs to the ancient and revered maritime law, its application to confer some degree of jurisdiction over shipwrecks located in international waters is certainly a newer—and probably less universally recognized—phenomenon.

Tom Belknap, *partner at Blank Rome, concentrates his practice in the areas of international commercial and insurance litigation and arbitration, with a particular emphasis on the maritime industry. Mr. Belknap has been involved in a wide variety of domestic and international maritime, commercial and insurance matters, and has been recognized in Chambers USA since 2009 as a leading shipping litigation attorney. Tel: 212.885.5270; Email: TBelknap@BlankRome.com*

Five Minutes With

Dave Grant *Managing Director, Saab Seaeye*

Please discuss your background.

Grant My appointment in 2007 as managing director of Saab Seaeye came when Saab acquired Seaeye Marine to strengthen their position in the offshore market. Before that I had 20 years experience in the oil and gas underwater industry, during which time I held positions in senior management and as a consultant. This June, Saab added to my responsibilities their underwater vehicles defense division, which includes transferring vehicle production from Sweden to the UK while retaining a Saab Seaeye engineering design office in Sweden.

How did you initially come to be interested in the subsea industry?

Grant After starting my career as a qualified engineer in the design of airborne military radar equipment I discovered the world of subsea engineering and became hooked! That was in the 1980's when the North Sea oil and gas industry was becoming established and ROV equipment was beginning to become an accepted method of performing underwater tasks. I figured underwater engineering would be a growth area and I wanted to be part of it. I am glad I did, because the underwater vehicle market has grown to become a vital subsea resource and the technology is very diverse and interesting for an engineer.

How would you best describe your management style?

Grant I surround myself with people I trust; I set the tone, and give them space to get on with the job – leaving me space to see the bigger picture and a clear vision for the future.

While many of our readers know your company well, can you give a brief overview, discussing your position in various markets?

Grant Having sold over 500 systems, Saab Seaeye is the world's largest manufacturer of electric underwater vehicles with about 60% of the working electric ROV's in the offshore energy market and is represented in 28 countries around the world.

We are the leading supplier of electric ROVs to the offshore energy industry, and a major ROV resource to defence forces, marine science and hydro-engineering.

Since Seaeye started in 1986, it has pioneered many innovations in the ROV industry. For instance, it overcame the widespread problem of thruster reliability that had dogged electric ROV credibility by inventing the first reliable brushless DC thruster for use on an ROV. It also overcame corrosion by introducing the polypropylene chassis; and our most recent innovation, iCON – the intelligent control of nodes – has made the ROV smarter and able to 'think' for itself, and allow remote access to an ROV from anywhere in the world over the internet.

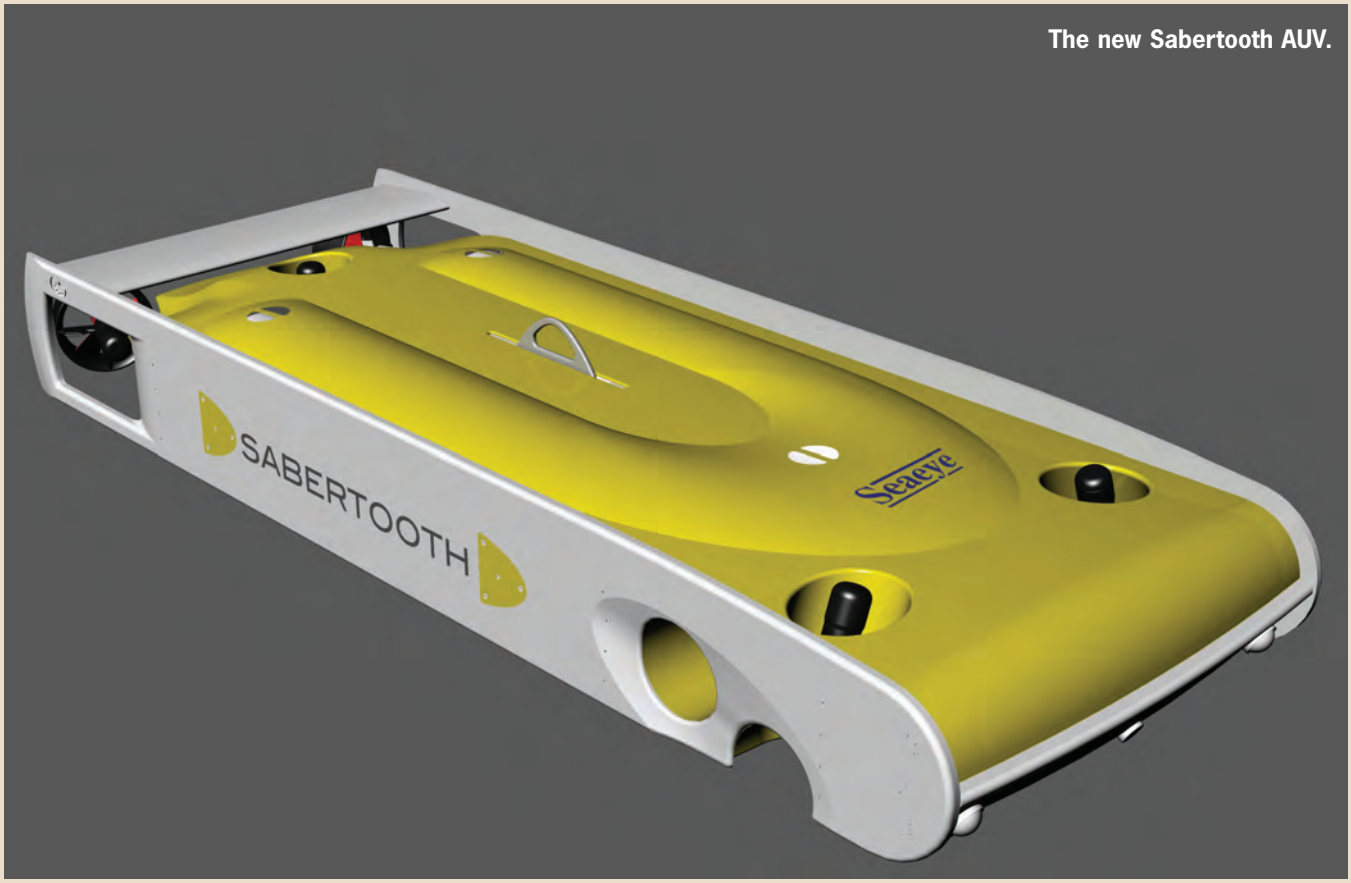
You recently added a new division?

Grant Saab's recent decision to transfer its underwater vehicle defence manufacture to the UK and integrate the engineering and marketing functions into Saab Seaeye's operations will create a powerful platform for growth and innovation that will better serve both the civilian and military market.

It's the kind of synergy that will bring cost savings to the defence industry from volume production economies and proven reliability solutions, at a time when defence budgets are under scrutiny and will allow us to be more competitive.

For the commercial market it introduces autonomous unmanned vehicle (AUV) technology adapted from the defence industry, in the shape of the new Sabertooth, with other hybrid ROV/AUV vehicles to follow.

The technology of hovering hybrid AUVs, reconfigured for the oil and gas market, will find a use in autonomous



The new Sabertooth AUV.

and semi-autonomous field maintenance and inspection. It can also be used to provide a resident hybrid AUV for maintenance of a subsea installation under the control of an operator, and be of particular value under ice, down long tunnels, or where it is not easy to use a conventional ROV deployed from a vessel.

What do you count as your greatest accomplishments at Saab Seaeye?

Grant Doubling the turnover, moving to bespoke new premises, increasing the professionalism of the organisation and guiding the company through its new ownership, has only been possible with a great team of creative, professional and dedicated people around me.

What has been the greatest challenges?

Grant Moving the company from an assortment of buildings into a single custom-designed factory, in live time, with minimal disruption to company operations and product delivery, was an interesting challenge that has paid-off.

In your estimation, what is the most important industry trend that has shaped this industry in recent years?

Grant The trend is for more powerful and smarter underwater vehicles that can perform a wider range of tasks more efficiently. But of course customers also require maximum reliability using a cost effective platform which will provide the maximum return on their investment.

Operators are doing more and more with their ROVs. They want greater power and more intelligent electronics, with precise manoeuvrability. They also want greater thrust performance in shallow water, and to go deeper when needed – and a vehicle that is

more failsafe and easier to operate.
They also want an electric ROV to take on more work tasks traditionally performed by hydraulic ROV's to cut their operating costs. This accounts for the growing sales of the Panther XT plus which can carry five-function rate grabber and seven- function position feedback manipulator arms. A very high percentage of the tasks performed by hydraulic ROV's can also be performed by the more cost effective electric ROV solution.

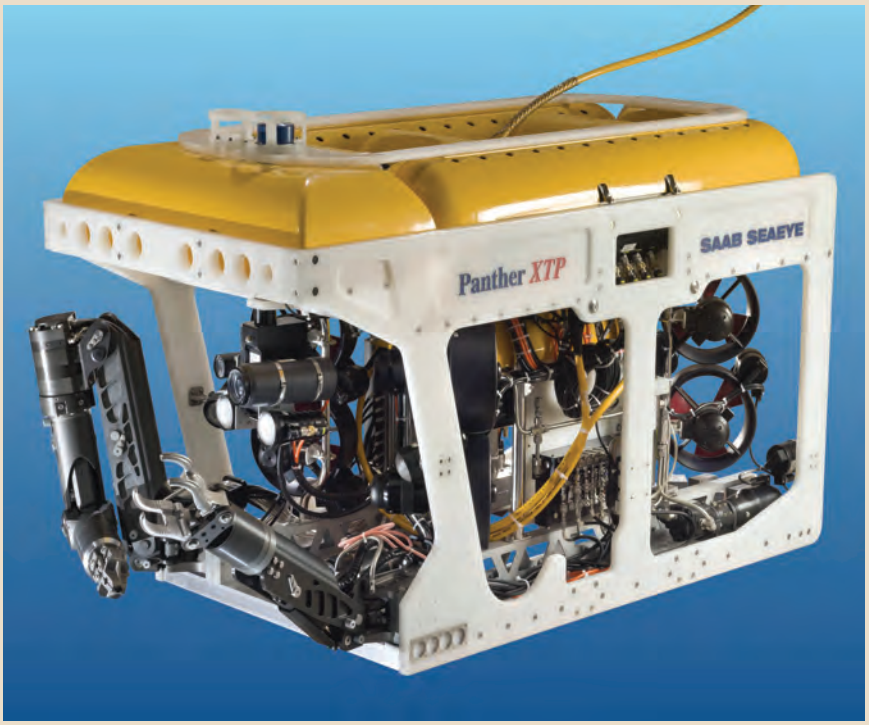
How is the company different to when you started?

Grant The factory move and the integration of the defense business into our operations, has led to a new management structure with stronger, more clearly defined roles and responsibilities and common technology utilized between commercial and defense underwater vehicle products. The new feel of the company comes from the drive by both staff and management to create a professional gold standard organization everyone can be proud of. There will, of course, always be room for continuous improvement but the feeling is we are well on our way to achieving our early goals.
On the production side it has further enabled us to improve our manufacturing systems and management organisation by placing them under a single new directorial role.

How is it the same?

Grant The fundamental building blocks of technological development that lay behind Seaeye's success – and that have been copied across the ROV industry – has created a structure and philosophy of proven performance, including valued feedback from our customers' experience, that is trusted

The powerful new Panther XT Plus.



throughout the industry and will continue to be the foundation of our business model. Customer support remains our highest priority.

How is your company investing today for tomorrow?

Grant Our investment strategy centers on both enhancing our existing range and creating new products that extend our range: iCON and Sabertooth being two recent examples.

Continued investment will expand the range of tasks possible with both ROVs and hybrid AUVs, and help bring savings in operational costs for our customers. The Saab Seaeye five year business plan contains a number of exciting initiates so watch this space for further developments

We will also continue to expand the service, support and operator training for our customers and distributors across the world. With operators relying heavily on our ROVs to work tirelessly at demanding tasks in the most hostile of conditions, the importance of excellent after sales service is a critical element of the cooperation and trust built up with our customers.

Defense underwater vehicle applications, such as submarine deployed ROV/AUV, artificial target AUV's and new scenarios of mine countermeasures solutions, will provide significant opportunities for growth in the defence market.

The world economy has been a drag on many sectors. Can you discuss the effects of current global economy on your company?

Fortunately, electric ROVs are slightly less susceptible to economic downturns than hydraulic vehicles, because inspection, repair and maintenance of existing installations must go on, but we are certainly not immune. So far, we have seen that when one area of the world such as Gulf of Mexico is very quiet, then another part of the world such as South East Asia is active, but if a world recession arrives then everyone will be tightening their belt.

Of course a stable oil price – not too low and not too high – will allow the oil and gas industry to continue offshore development, continued investment in offshore renewable energy and continued investment in underwater vehicle defence products. All are the main formulae for a healthy market for our products but of course predicted slow growth in major countries and general tightening of spending will reduce opportunities in these markets so we must insure we remain competitive in our various market areas.

What is your outlook on business?

There is still a huge demand for oil and gas as an energy source, and therefore I see sales of ROVs continuing to grow in that market over the coming years assuming financial markets and demand remain stable.

In addition, a new market for our ROVs has emerged in the fast-growing renewable energy sector with its special operational needs for installation and maintenance offshore. This is already becoming a growing percentage of our market mix, and the particular needs of this sector will influence the shape of our product portfolio into the future.

Meanwhile, continued vigilance on the defense and national security front continues to drive demand in this sector for underwater vehicles, with a

growing interest from Homeland Security. Although many countries defense budgets are reducing there are considerable opportunities for cost effective specialist ROV/AUV underwater equipment for mine countermeasures, submarine deployed systems and long range AUV's for various defence applications.

What are the most important trends affecting Saab Seaeye?

There is more than one trend shaping our future. As operators seek ROVs that are more powerful and do more things, the demand for models at the top end of the range is growing, along with a demand for more turnkey solutions, including LARS and cabins. Operators have already started to look at cost savings coming from using hybrid ROVs for maintenance, inspection and light work tasks, where a support vessel is not needed or a low cost vessel can be used.

The future challenge is to make both ROVs and hybrid AUVs more intelligent and allow for more semi-autonomous operation and also design in the flexibility to allow this technology to be applied in a staged process to build confidence and reliability.

Operators are also looking for us to provide improved tooling and sensors to reduce the time needed to perform underwater tasks.

What do you count as the biggest challenges to your business, from both the legislative and technical sides?

Grant My current priority is to integrate the UK and Swedish operations and grow both the commercial and defens areas of the business.

This successful integration will drive through the introduction of common technology across the product lines and market sectors which will provide the technical solutions and products required by both the defense and civilian markets. One of the early challenges faced is the introduction of hybrid ROVs/AUVs into the commercial market.

www.seaeye.com

Environmental Monitoring and Pollution Control by HF radar

Ocean Observation

Coastal radar is an increasingly important monitoring tool for hazard management and environmental protection of the oceans?

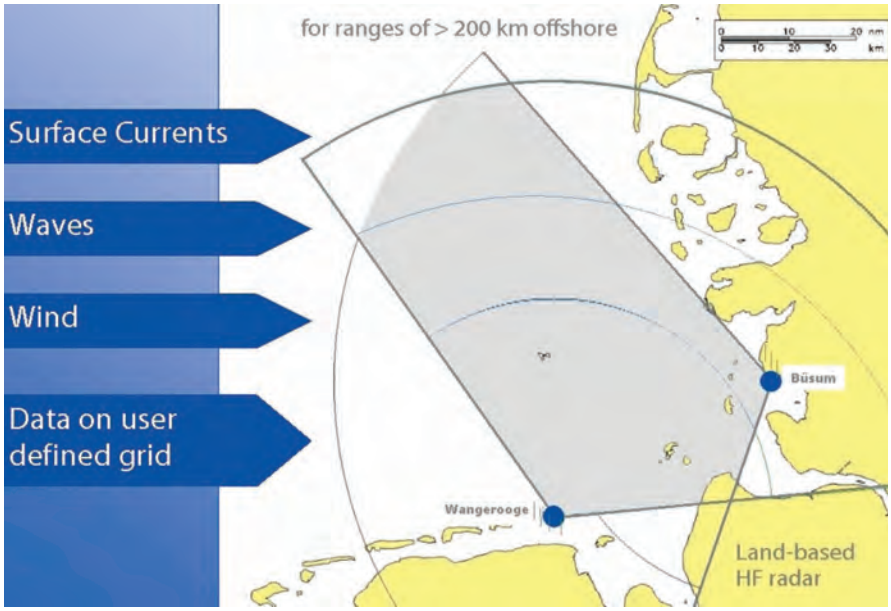
by Thomas Helzel, President of Helzel Messtechnik GmbH

During the past few years, Ocean Remote Sensing by HF radar has become more and more valuable to modern Coastal Management. It offers insights into the dynamics of the coastal seas for a variety of applications with shore based instruments.

Search and Rescue operations for example can narrow down the search radius for overboard persons, port authorities can use the data to improve vessel traffic services, environmental protection benefits from this information in case of oil spills or lost containers. Even the marine renewable energy sector has discovered the advantages of using this reliable technology. Diverse studies prove the benefits of using HF radar for hazards management (e.g. Tsunami Detection) and more and more countries rely on this method by integrating it into their marine ocean observing networks. One of the leaders in the field of HF radar is the German company Helzel Messtechnik GmbH providing the shore based Ocean Remote Sensing System WERA (WavE RAdar) which contributes to coastal management by monitoring surface currents, wind direction and wave parameters with the highest spatial and temporal resolution.

Ocean Radar

The WERA long range, high resolution monitoring system is based on short radio wave radar technology. The vertically polarized electromagnetic wave is coupled to the conductive ocean surface and follows the curvature of the earth. This over the horizon oceanographic radar can pick up back-scattered signals from the rough ocean surface (Bragg effect) from ranges of more than 200 km. The concept of the WERA system has been developed at the U. of Hamburg by Dr. Klaus-Werner Gurgel in 1995 and the hardware development was completed in 2000 at Helzel Messtechnik GmbH. Results from more than 60 installations worldwide demonstrate the features and flexibility of the system: High resolution monitoring with a range cell size of 300 m for short ranges or for long range applications with 3 km range cell size, all generated with the typical high temporal resolution of 10 minutes. As it is a very flexible system, it can be adopted to the user's needs and requirements, as well as optimized to site-specific conditions.

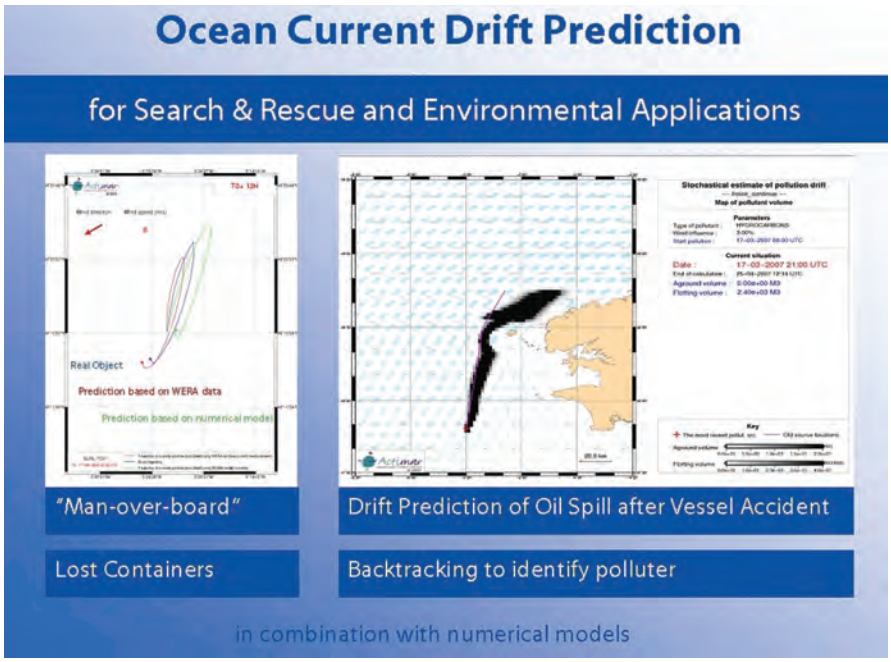


Typical coverage area of two land-based WERA HF radar systems. The over-the-horizon radar technique can reach ranges of more than 200 km offshore.

Accuracy and Reliability

A pair of WERA ocean radar stations are continuously operating since 2006 delivering data from an extremely dynamic ocean area off the French coast near Brest. The range of these systems is about 120 km with a spatial resolution of 1.5 km and a temporal resolution of 6 measurements per hour. These two shore based stations cover an ocean area of about 10,000 sq. km. The normal purpose of these systems is to provide real-time maps of ocean surface currents and significant wave height for the Vessel Traffic Services and for Oceanographic research.

Over a period of three months a study was carried out to validate the quality of the provided data by means of a comparison with buoy data. The accuracy and reliability was studied by SHOM (Service Hydrographique et Océanographique de la Marine) using an ADCP and a Wave Rider buoy for ground truthing. Both instruments were located about 30 km off the coast. The corresponding correlation between the ADCP and WERA data shows a correlation coefficient of 0.947. This excellent agreement proves the accuracy of the WERA system to measure ocean surface currents. Furthermore the reliability was quantified by comparing the users' demands for data availability with the resulting data. The result is a reported permanent data availability of 98.6% for over 3 years.



Search and Rescue

To test this technique for Search and Rescue applications, surface drifters were launched and tracked. The drift prediction for this simulated "man-over-board" situation were carried out by means of a 2D tidal model typically used for the SAR operations and in parallel by a drift prediction based on the ocean currents measured by the WERA systems. Presently, search and rescue tools are based on hydro-dynamic and atmospheric models to provide hindcast and forecast situations. Even if these oceanic numerical models are efficient in the production of instantaneous maps of currents, the accuracy of derived Lagrangian trajectories has limitations for search and rescue purposes. Results of the SAR-DRIFT project show the significant improvement of the drift simulation, when using real-time current data provided by radar systems instead of using results from numerical models. This improved quality of the drift prediction can be very useful for Search and Rescue applications.

Oil Spill Drift Prediction

In addition, this drift prediction can be used for the forecast of drifting oil spill or containers in case of an accident to make the management of the pollution more effective. Furthermore this tool can be used in case of oil pollution for backtracking any detected pollution to identify the origin and time of this pollution. In connection with the SAR-Drift project [Røang, 2009], two in-situ experiments were carried out in Norway and France with drifting objects. With the help of the Navy in both cases, models of containers and a real container were left to drift in the area of coverage of HF radars. The current-induced drifts of the objects were first predicted using forecast models, and then re-computed using currents from the radar measurements. All the results show a very good agreement between the observed trajectories and the radar-computed ones, while the predicted drifts without radar data rapidly diverge from the real trajectories. This emphasizes the importance of HF radars for search and rescue operations, especially in dynamic ocean areas. After an accident, an accurate estimation of the location of a drifting person can save life.

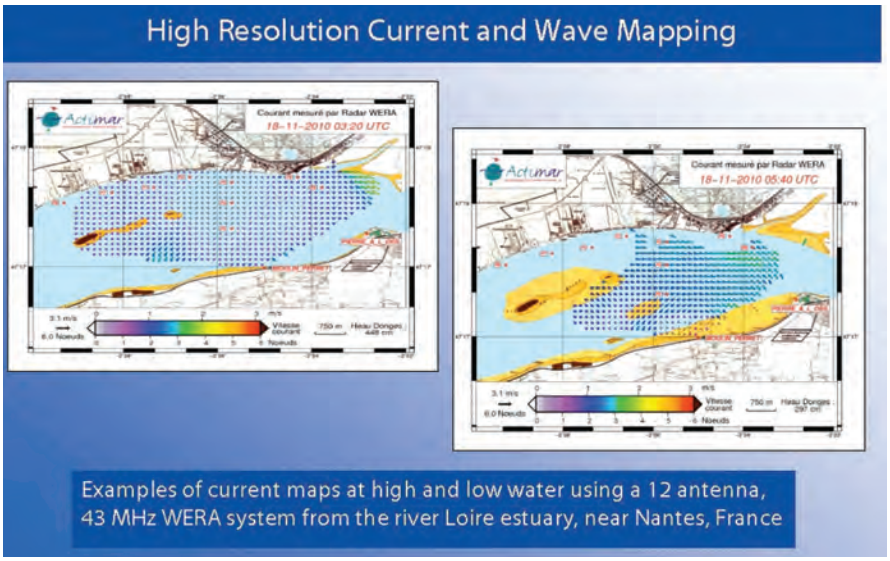
Mobile Measurement Campaigns

Budget shortage and tight project schedules do often set limitations on possible long term radar installations. Due to the superior feature of highest flexbility, the WERA system could be installed in different configuration types (compact and array type) and on a leasing basis for short-term installations, e.g. to monitor very dynamic harbour and river mouth areas with changing tides.

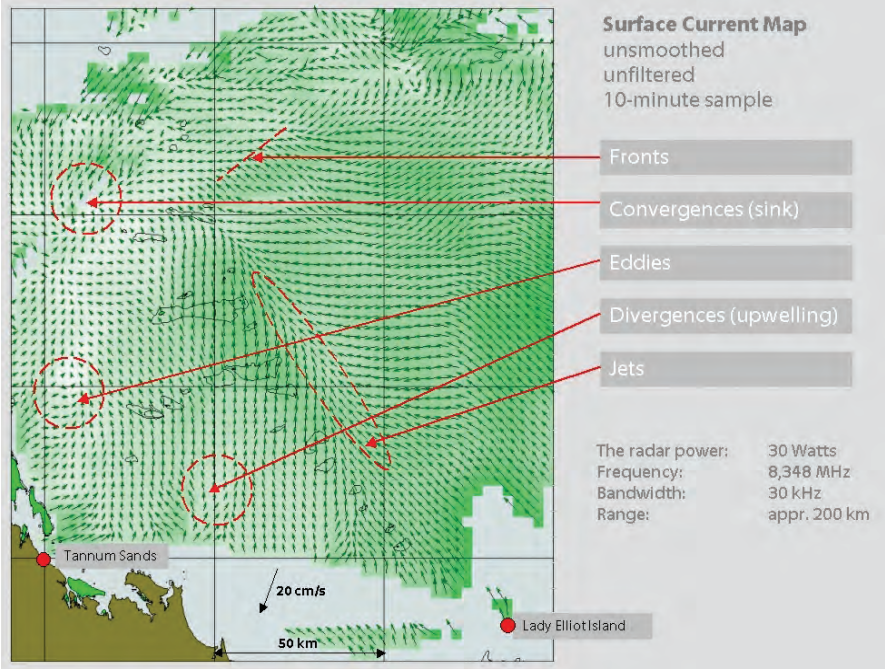
Part of Ocean Observation

Another trend can be seen in the integration of HF radar into national ocean observing systems as has been done within the COSYNA project at the German North Sea coast or on a larger scale within the Australian Coastal Ocean Radar Network ACORN.

The German North Sea systems are operated by Helmholtz Zentrum Geesthacht, Centre for Materials and Coastal Research. Data from three WERA stations on the island of Sylt, Büsum and the island of Wangerooge are delivered to the COSYNA database in real time providing valuable information on the German Bight for



WERA current maps from a 2 months measurement campaign in France showing clearly the changing tides.



Data courtesy of the Australian Coastal Ocean Radar Network (ACORN) which is part of the Australian Integrated Marine Observing System (IMOS). For a more detailed overview, please visit the IMOS website: www.imos.org.au

research and offshore construction work.

As part of the Integrated Marine Observing System (IMOS) Australia is establishing the Australian Coastal Ocean Radar Network (ACORN).

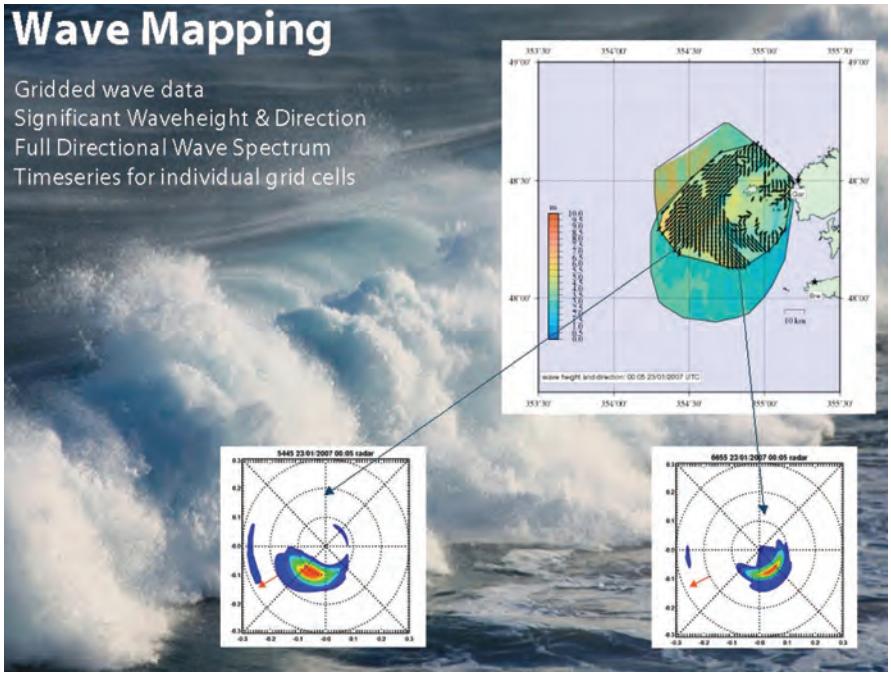
It is a system with exciting implications and widespread potential to help many aspects of coastal ocean research and management, from coral reef restoration and tsunami warning to pollution control and search-and-rescue efforts.

In 2007, the first WERA radars were installed on the beach of Tannum Sands and on Lady Elliot Island. After the Great Barrier Reef installations, the next radars were installed in Western Australia followed by set-ups in South Australia.

There is potential for application of the data to management of coastal marine resources, and in marine safety areas. Real-time maps of surface currents and the prospect of short-term forecasting have the potential to reduce search areas in coastal waters and to make pollution/spill mitigation more effective.

In April 2010 the data provided by the WERA system was used to support the management of the incident and eventual salvage of the coal carrier Shen Neng I which ran aground on Davies Shoal, within the Great Barrier Reef Marine Park.

The near real-time provision of surface currents and wave height data in graphic format on a freely accessed web site has the potential to improve the level of awareness of the maritime conditions within the community, e.g. for recreation applications. With the establishment of HF radar monitoring stations like those in ACORN, there is growing opportunity for researchers around the world to access data from well curated archives to carry out basic research on physical oceanography, or applications research without having direct access to the measuring facility.



Directional Wave Spectra, data courtesy Seaview Sensing Ltd. www.seaviewsensing.com

Benefits of HF Radar for Marine Renewable Energies

Finally, the renewable energy sector has discovered the usefulness of HF radar for their purpose to measure wave energy resource potential and to judge the influence of the marine renewables on the ocean environ-

ment.

The Wave Hub project, for example, is a groundbreaking renewable energy wave power research project to create the UK's first offshore facility to demonstrate the operation of arrays of wave energy generation devices. Many different devices are being developed in the UK and elsewhere to generate electricity from the power of the waves. After the devices have been tested as prototypes elsewhere, the Wave Hub provides an area of sea with grid connection and planning consent where arrays of devices can be operated over several years.

The project will be developed approximately 10 miles off Hayle, on the north coast of Cornwall, UK. The hub is a 'socket' sitting on the seabed for wave energy converters (WEC) to be plugged into. From Hayle, a cable will be taken through a duct beneath the sand dunes and then across the sea bed to an eight square kilometre area within which the devices will be moored. This area will be indicated with navigational markers. A cable from the hub to main land will take electrical power from the devices to the electric grid. Further details on the Wave Hub are available at www.wavehub.co.uk

To monitor the influence of these devices on the ocean environment, the Peninsula Research Institute for Marine Renewable Energy (PRIMaRE / www.primare.org), a joint venture of the University of Plymouth and the University of Exeter installed two WERA systems at the north Cornwall coast to receive current and wave data on the sea area leased to the device developers. The landbased radar systems will be able to deliver valuable real-time data on ocean currents for 110 km and wave data up to 50 km.

The extraction of energy by the devices will by definition change the physical environment at the Wave Hub site. The radar systems are sought in order to determine the magnitude of this change and to assess the nature and magnitude of far field changes present in the shadow area in the lee of Wave Hub. In addition, they will provide the offshore wave boundary conditions for numerical simulations of nearshore and shoreline change in the Wave Hub shadow, particularly high-resolution directional wave spectra. It is also expected that Wave Hub, with its large collection of in-situ sensors will provide an optimal site for proving the reliability of high-frequency radar systems for wave measurements.

Tsunami Detection

After the strong earthquake occurred in Japan on March 11, 2011, the generated tsunami travelled across the Pacific Ocean and reached the coast of Chile within 22 hours. Following the earthquake and tsunami news, the Chilean WERA system of the University of Concepcion was switched into fastest operation mode, which allows the collection of real-time data every 30 seconds.

The research group lead by Prof. Dante Figueroa has reported that their WERA radar system was able to capture the signal of the tsunami that struck northeast Japan. This is the first time ever that an ocean radar detected an approaching tsunami.

Following the Sumatra tsunami in 2004, Drs A. Dzvonkovskaya and K.-W. Gurgel (University of Hamburg, Germany) used a numerical model that was able to prove that ocean radar systems could be used as Tsunami Early Warning Systems. The results clearly showed that ocean radar systems can be used as a tsuna-

SeaDiscovery.com

underwater tech and ocean science news

July 6 - Nov. 10, 2011

MARINE TECHNOLOGY REPORTER

Subsea Photo Contest

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. All contest winners will be published in a special section of the Nov/Dec issue, with one winner featured on the cover. Go to:

http://photos.seadiscovery.com

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

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

Contest Sponsored By:

GLOBAL Diving & Salvage, Inc.

KONGSBERG

SEACON®

mi warning system, assuming the distance between the coastline and shelf edge is long enough (> 50 km) to allow sufficient time for warning. This can be achieved only with array type antenna systems like WERA which are the only systems able to provide the spatial and temporal resolution required for reliably detecting the fast approaching tsunami wave.

Tsunami waves generate a characteristic periodic ocean surface current pattern which can be used as tsunami "signature". This tsunami signature was detected in the signal recorded by the WERA system in Chile. A comparison of the measured radar signatures with nearby sea level measurements showed a high correlation between the two signals confirming that the WERA system was successful in capturing the tsunami signal.

This unique radar measurement of a real tsunami is the proof of concept the ocean radar community has been waiting for.

The significance of this finding required a rigorous review of the acquired data and confirmation of the results by three independent scientific groups (University of Concepcion, Chile, University of Hamburg, and Hamburg University of Technology, Germany). The final and detailed results of the analysis will be presented by these groups in upcoming conferences and in the peer reviewed literature.

Thus, HF radar technology proved to have widespread potential to help many aspects of coastal ocean research and management.

Additional information could be found on the following websites:

aHelzel Messtechnik is the German manufacturer of the shore-based ocean radar "WERA". The system provides reliable data of ocean surface currents and significant wave height and direction pixel by pixel with an outstanding spatial and temporal resolution for VTS, SAR and environmental protection applications. WERA systems are modular, broadband and can provide either very long ranges of more than 200 km or shorter ranges with higher resolution. WERA can be configured in a compact site geometry using direction finding methods or with array type antennas in beam forming mode providing highest reliability and accuracy.

www.helzel.com • www.wavehub.co.uk
www.primare.org • www.imos.org.au
www.seaviewsensing.com
www.actimar.fr

NOAA Research Innovation

Improving Accuracy of Ocean Temp Probes for Climate Research

by Katrina Phillips,
NOAA Sea Grant Knauss Fellow

NOAA scientists are improving the accuracy of ocean temperature measurements, an essential step to inform the next generation of global climate studies. There are currently two methods used to collect the majority of long-term temperature data in the open ocean. The first is ARGO, a global network of drifting buoys that measure temperature and salinity at various depths as they are carried by ocean currents. While ARGO provides information throughout ocean basins, once deployed their location is entirely dependent on where the currents take them.

The second method uses smaller expendable bathythermographs – XBTs for short – launched from ships along consistent shipping routes. XBTs allow for comparison of the same locations across seasons and years, which is of particular importance for climate scientists to monitor variability over time. "When XBT probes were originally designed, they were for Navy uses," explains Gustavo Goni, Ph.D., Director of the Physical Oceanography Division at the Atlantic Oceanographic and Meteorological Laboratory (AOML). "With time scientists realized these could also benefit the oceanographic community by providing key upper ocean thermal observations, while being cheap and easy to deploy."

How XBTs Work

An XBT probe is designed for one-time use, and can be deployed from any ship at sea. The probe is deployed over the side of the ship. As it travels through the water it sends temperature measurements back through a wire connected to a receiver on board the ship. This wire allows the expendable probe to drop to about 800 meters depth before it stops spooling, the wire snaps, and the probe drops away. All XBTs are designed to drop at a known rate, so the depth of each temperature measurement received can be calculated using the amount of time the probe has been falling.

An XBT Probe

(Credit: Robert Simmon, NASA Earth Observatory

One Problem…

The fall rate equation used to convert time of descent into depth is not perfect, says Goni. The error in using the equation to calculate depth can be 2 to 3 percent of the depth. A temperature measurement calculated as 100 meters may actually be from 97 to 103 meters, while 800 meters may really be anywhere between 776 and 824 meters. The Navy used XBT probes for rough estimates of the ocean's temperature layers to locate oceanic sound channels, but measurements for climate science need to be more accurate.

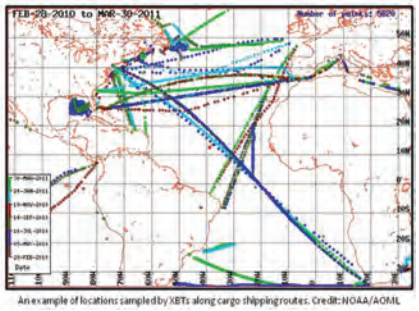
The Solution

The international science community has been working on improving the accuracy of the fall rate equation, and has reduced the error from 3 percent to approximately 1 percent. But this error is still too high for climate research. So NOAA scientists at AOML are taking the lead in developing a new way to determine the depth of XBT probes. They have been testing pressure sensors, similar to those used in the newer ARGO

floats, to send a signal when specific depths are reached.

AOML experiments have identified small changes that will greatly improve XBT measurements. Goni is leading this NOAA Research effort. "If we add two pressure switches - these are very little, the size of the head of a pin - to tell us when the probe is 100 meters deep and 400 meters deep, then we can correct the errors due to the fall rate coefficients and end up with a probe that will be adequate to do climate studies", he says. AOML is now investigating ways to create and test a prototype with their recommended changes.

Goni stresses that the key to success is simplicity, "We don't want to start from scratch. We would like to see a new probe based on the good qualities of current probes with just a few improvements we believe need to be introduced. The advantage of this platform is that it's simple and inexpensive, so it can be widely used." An improved XBT probe would be useful to climate researchers throughout the scientific community. Ann Gronell Thresher, Ph.D., from Australia's Commonwealth Scientific and Industrial Research Organisation comments, "I personally would love to see depth signals on the temperature traces from XBTs." She adds that "an optimal solution would be two pressure signals on the profile." With the hard work and innovation of NOAA researchers, more accurate XBT probes will soon be available to scientists for use within and beyond the agency.



An example of locations sampled by XBTs along cargo shipping routes. Credit: NOAA/AOML

Katrina Phillips *is a Sea Grant Knauss Fellow in the NOAA Office of Oceanic and Atmospheric Research. Prior to NOAA Katrina studied loggerhead sea turtle populations for her Master's degree at the University of Miami-RSMAS.*

Subsea Vessel Demand

Strong recovery projected in subsea vessel demand

by Simon Robb & Ian Jones

Expenditure on Subsea technology is climbing, with expanding infrastructure outstripping capability. Maturing markets are imposing greater IRM (inspection, repair & maintenance) requirements, while the move to deepwater has exposed a shortage of vessels capable of undertaking work. Vessel day rates are escalating.

Between 2011 and 2015 over $72 billion (bn) will be spent on subsea vessel operations in field development; inspection, repair and maintenance; subsea intervention, and plug and abandonment. This represents an impressive rise of 52% over the previous five years.

Background

The move to deepwater production has dominated discussion within the oil industry over the past five years. The development of deepwater reserves is growing rapidly, with exploration driven by appetite. As other opportunities are played out and the rate of discovery onshore and in shallow waters declines, the potential for world-class discoveries has led operators to a new focus on deepwater. Douglas-Westwood has monitored the deepwater sector from the 1990s. Over twenty years we have watched as the deepwater sector has developed into a multi-billion dollar business, supported by the emergence of new subsea technologies which have made cultivation of deepwater fields economically feasible.

Technological advances and subsea demand provide the context for a new Douglas-Westwood report, The World Subsea Vessels Operations Market 2011- 2015. The subsea study is the work of three of Douglas-Weswood's senior analysts, led by Simon Robb.

A comprehensive review of the subsea vessel operations, the report builds on Douglas-Westwood's World Subsea Hardware Market Report and includes supply and demand and expenditure forecasting. Key report findings will be presented at conferences over the next few months, and are summarised below.

Drivers and Trends

The Subsea Vessels Operations Markets are driven by:

- The move to deepwater production: Offshore production is increasing as more deep water fields come on-stream. While shallow water oil production is stabilising, deepwater production will grow from 8% of total global production in 2010 to 12% by 2025.
- Use of subsea technology: Deepwater fields are increasingly being developed using subsea technology due to its cost effectiveness in deep water, strong resistance to prevailing climatic conditions and the ability to link marginal fields through tie-backs to a hub facility.
- The adoption of subsea separation and boosting technology allows an increase in production from difficult reservoirs, longer distance tiebacks (due to improved flow assurance) and marginal fields (due to greater overall recovery and product rates).

Market Confidence

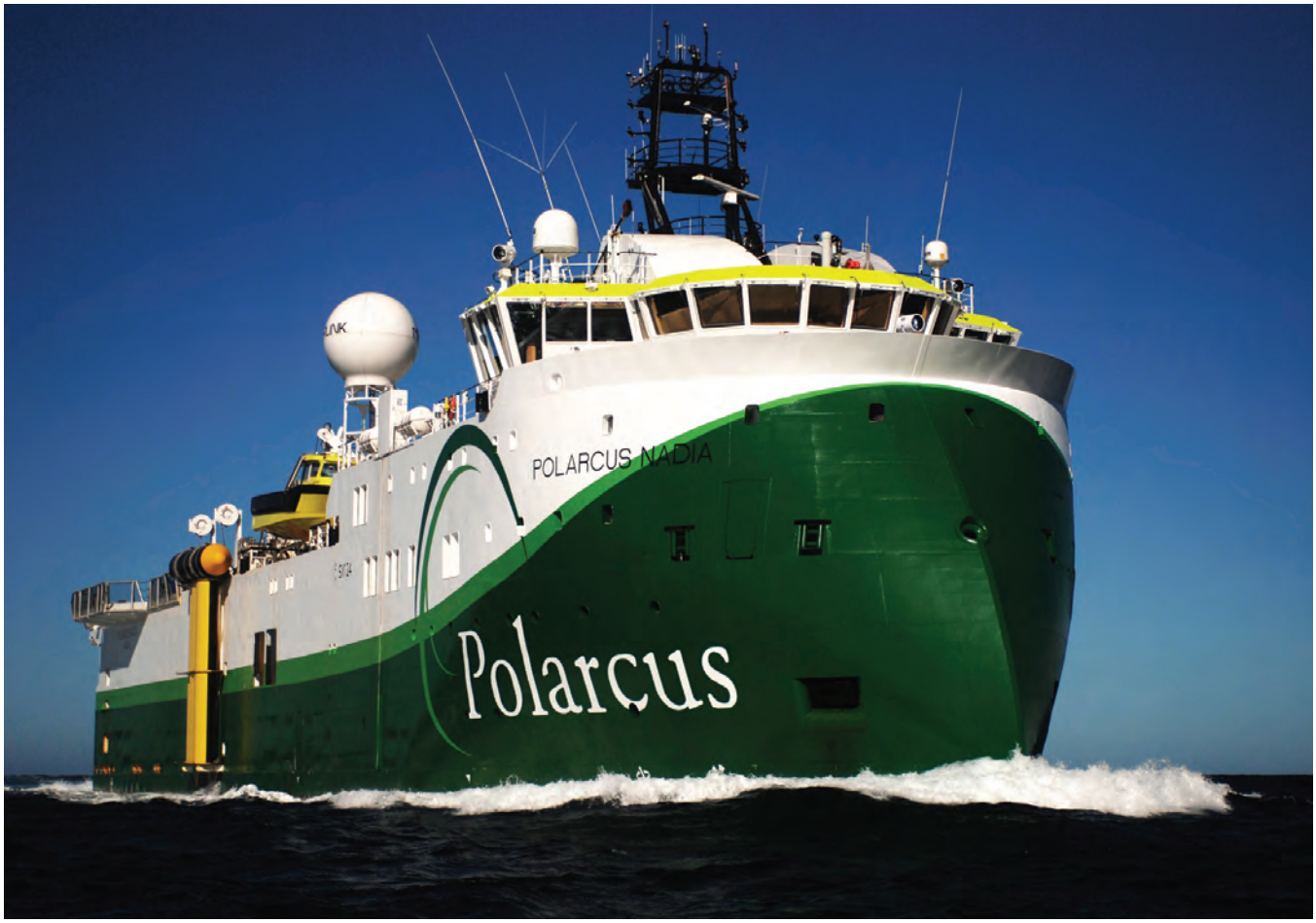
Based on these fundamentals, the subsea vessel operations market has returned to growth after a brief spell of retrenchment. In the Douglas-Westwood World Subsea Vessels Operations Market 2011 – 2015 we see market expansion being reflected both in climbing expenditure and in the number of vessel days needed to fulfil requirements.

Douglas-Westwood forecast that global vessel demand will climb to over 313,000 days during 2011-2015, a 28% increase over the number of days recorded for the previous five year period. Within this growth forecast, we anticipate that deep water demand will be the sub-sector which continues to register the notable rates of expansion.

The number of vessel days in deepwaters will increase by 54%, or just over 120,000 days over the next five years, compared to the 80,000 days logged during 2006-2010.

This sub-sectoral growth is highlighted when looked at against a shallow water comparison such as the delivery of surface trees. While absolute numbers of trees will continue to climb over the same period, to 2015 a compound annual growth rate of just 1% is anticipated.

The difference is a product of the typically more mature state of shallow



(Photo: Polarcus)

water fields and of the economic uncertainty that has ruled investment markets over the past four years. The economic downturn was preceded by a period of unusual confidence, in which construction dwarfed all historic newbuild booms. The last five years have seen an unprecedented increase in the number of newbuilds entering the subsea vessel market. Between 2006 and 2011, 140 vessels entered increasing capacity by 85% from 177 in 2006 to 305 in 2011.

A slackening of demand has led to oversupply of vessels suitable for shallow waters and an associated slippage of day rates.

Despite this continuing difficulty in one part of the market, analysis suggests that even during the worst of the economic uncertainty, confidence was never very far from the broader subsea vessels market.

Double-digit growth in expenditure was recorded for all but one of the past six years. A backlog of orders kept the industry busy in 2008 and 2009, and in only one year has expenditure actually declined. That was in 2010, when a total spend of $9.8 bn was recorded, against $10.5 bn in 2009.

The delayed impact of the economic challenges on Subsea Vessels Operations points to the inherently cyclical nature of the market, with contractors shielded by pre-orders.

In 2011 general expenditure has rebounded strongly, with the dip in spending for 2010 now wholly compensated for. Douglas-Westwood forecasts suggest that the $9.8 bn spend recorded in 2010 will grow to $11.2 bn in 2011. This rate of increase returns growth to double digits, where it should sustain to 2015 and beyond. The market for subsea vessels operations will be worth $1.3 bn more in 2011 than in 2009. This is market expansion at close to 10% over two years –not just recovery, but outright growth.

Regional Expenditure

As one would expect, there are clear differences in expenditure across regions, with the deepwater 'Golden Triangle' of West African, GoM and Brazilian waters continuing to account for the majority of spending. These waters will absorb a 54% share of expenditure to 2015.

The latter part of the forecast period should accord with the introduction of more complex deepwater projects. This will benefit for deepwater contractors with the capability to accept complex contracts. New deepwater awards will suit contractors with

modern fleets, strong project execution skills and a track record in deepwater delivery.

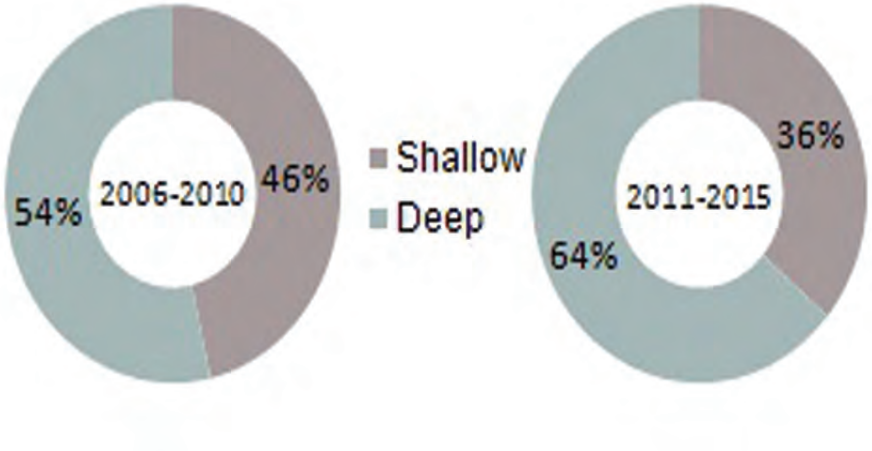
We forecast that Africa is the single largest market by expenditure with close to $14 bn in investment required – a 60% increase on spending over the last five years. The Latin American market is marginally smaller in scale; with an expected spend of $13 bn over the next five years in comparison to the $13.7 bn anticipated in Africa: however, rates of growth are higher, at 62% to 2015.

North American waters present a more complex picture, and not just because of the continuing fall-out of the Deepwater Horizon oil spill. The subsea vessels operations market in the Gulf of Mexico is maturing, and while it remains one of the most significant subsea regions for vessel demand and expenditure, this is strongly associated with the IRM requirement of the region's massive installed base of offshore infrastructure.

North American waters account for 33% of IRM activity monitored by Douglas-Westwood: vessel expenditure here will be some 20% higher over the forecast period than for the past five years. The global market for IRM is also growing strongly. In 2011 Douglas-Westwood value the total demand for IRM vessel activity at $3.6 bn. As the installed infrastructure base expands, we expect this to climb to $5.8 bn by 2015.

Growth in Latin American and African waters is strongly correlated with field development. The imperative to renew reserves continues to push operators to waters which, in the past, may have been regarded as too considerable a challenge. Based on this, Douglas-Westwood calculates that the number of vessel days needed to support deepwater development will double over the next five years.

The push to deeper water requires vessels with better capabilities – rendering much of the current fleet inadequate and the general vessel contracting market oversupplied.



Fleet Characteristics

From 2000-2011 74% of the vessels deliverd to the market possessed a crane capacity of less than 150t. Whilst these vessels will be more than capable of operating in the IRM sector they will not be suitable for operations in future subsea field developments.

With the move to larger and more complex deepwater projects the industry will require vessels that have lifting capacities above 250t. Whilst there has been a slight trend towards this from 2005 onwards only 26% of the new fleet possessed a lifting capacity above 250t by 2011. However, appetite doesn't necessarily imply delivery. There are constraints on the normalisation of supply, including access to funding.

The access of cheap debt to finance newbuild vessels was a major driver of fleet growth to 2008. Borrowing was at an historic high, with banks eager to provide cheap debt to finance new vessels. In recent years the impact of the global recession has seen banks retrench this position reducing access to capital and constraining future fleet expansion.

The vessel contracting market remains highly fragmented, with Douglas-Westwood identifying over 300 vessels from close to 80 different contractors. Cal Dive (13%), Subsea7 (10%), Technip (9%), Maridive (7%) and Mermaid Offshore (6%) are the leading vessel contractors by market share.

The completion of Acergy / Subsea7 merger in January 2011 has led to limited consolidation in the vessel contractors' market. However, the market remains comprised of a significant number of international vessel contractors together with a limited number of smaller regional players.

A trend towards further consolidation is now likely, as operators continue to favour companies with a proven track-record and experience of completing high cost projects.

Dayrates

Based on supply and demand data, the The World Subsea Vessels Operations Market 2011- 2015 contains forecasts for day rates across different classes of vessel.

For DSVs, the industry has just undergone an aggressive newbuild cycle with many new DSV Type 1 vessels entering the market after 2007. These were required to meet demand from developing regions and ageing infrastructure in mature regions that require a significant amount of IRM work. Rates will continue to grow robustly during the forecast period, potentially reaching $220,000 in Europe and $240,000 in Latin America.

The market for Type 1 ROVSVs is now saturated, as shallow water activities are becoming less common. The industry now requires Type 2 ROVSVs able to operate in deeper waters, especially in West Africa, Latin America and the GoM. The regions where dayrates are most likely to remain strong are in West Africa and Western Europe at around $15,000 to $20,000 lower than in Latin America.

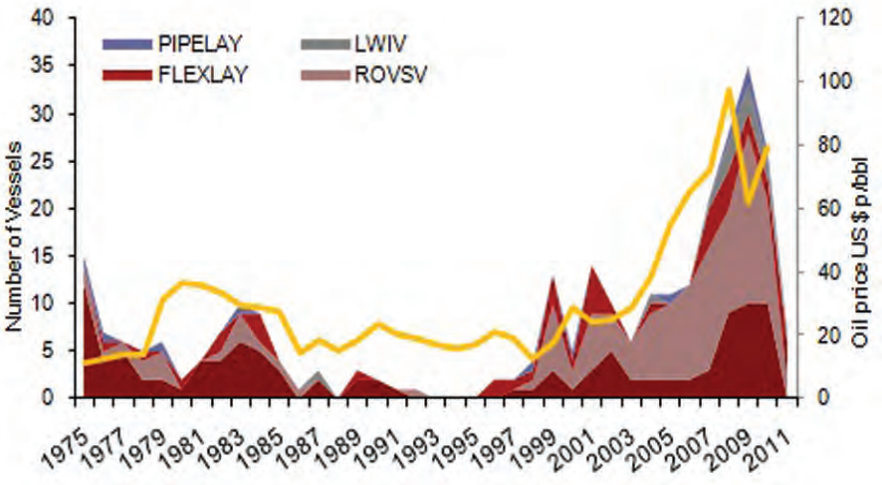
The lowest rates will be for vessels with small crane capacities as these are most likely to be used to carry out inspection work. These are much smaller vessels with less versatility and are limited by the number of tasks that they are capable of performing.

Regionally, the lowest rates will be in Asia where vessel quality has historically been poor. Douglas-Westwood believes dayrates for a low-end ROVSV to be in the region of $60,000 per day, forecast to grow slightly by 2015. Dayrates in other regions have fluctuated heavily during the economic crisis and are not likely to recover until 2011 and 2012. Even then information shows that dayrates will be just short or equal to where they were in 2008 at around $120,000. After this they should grow slowly but steadily.

With the market tightening, it is likely that day rates for any type of vessel with deepwater capability will escalate. Currently, for a top of the range ROVSV vessel, rates are highest in deepwater areas of Latin America (Brazil) at around $175,000 per day. This is forecast to rise steadily as the global economy comes out of recession - rates could exceed $200,000 per day by 2015.

Rates for a top end flexlay vessel are estimated to be in the region of $300,000 per day. By 2015 dayrates could reach over $400,000 due to a tightening in the supply/demand balance for vessels that possess deepwater capabilities.

Further information is available at **www.douglaswestwood.com**



The Authors

Simon Robb, Lead Author, *has been a member of DW's analyst team since 2009 and is involved in research and providing analysis to the transaction and advisory side of the business on a range of sectors within the upstream oil and gas industry. He has worked on a number of subsea vessel related projects covering well intervention, drilling and IRM markets together with equipment manufacture as well as contributing on a number of other DW publications. Prior to joining DW Simon worked as an Analyst in 3i's Oil, Gas & Power team based in Aberdeen and has held research posts working for Barclays Capital and KPMG in London. Simon is a History graduate from the University of Stirling, and an MSc graduate from The Robert Gordon University, Aberdeen.*

Ian Jones, Author, *is an analyst for DW, contributing to the firm's commissioned research, commercial due diligence and published market studies in the oil and gas and renewable energy sectors. He has worked on a number of subsea vessel related projects covering IRM, well intervention and field development markets. He is a contributing author of DW's publications including The World Subsea Hardware Market Report, The World FLNG Market Report, The World Offshore Wind Market Report and The World Wave & Tidal Market Report. Ian is a social sciences graduate from Loughborough University.*

The authors can be contacted via
E: research@douglaswestwood.com
or
T: +44 1227 780999

New ROV from Pharos Offshore is

Designed for Offshore Wind Cable Market

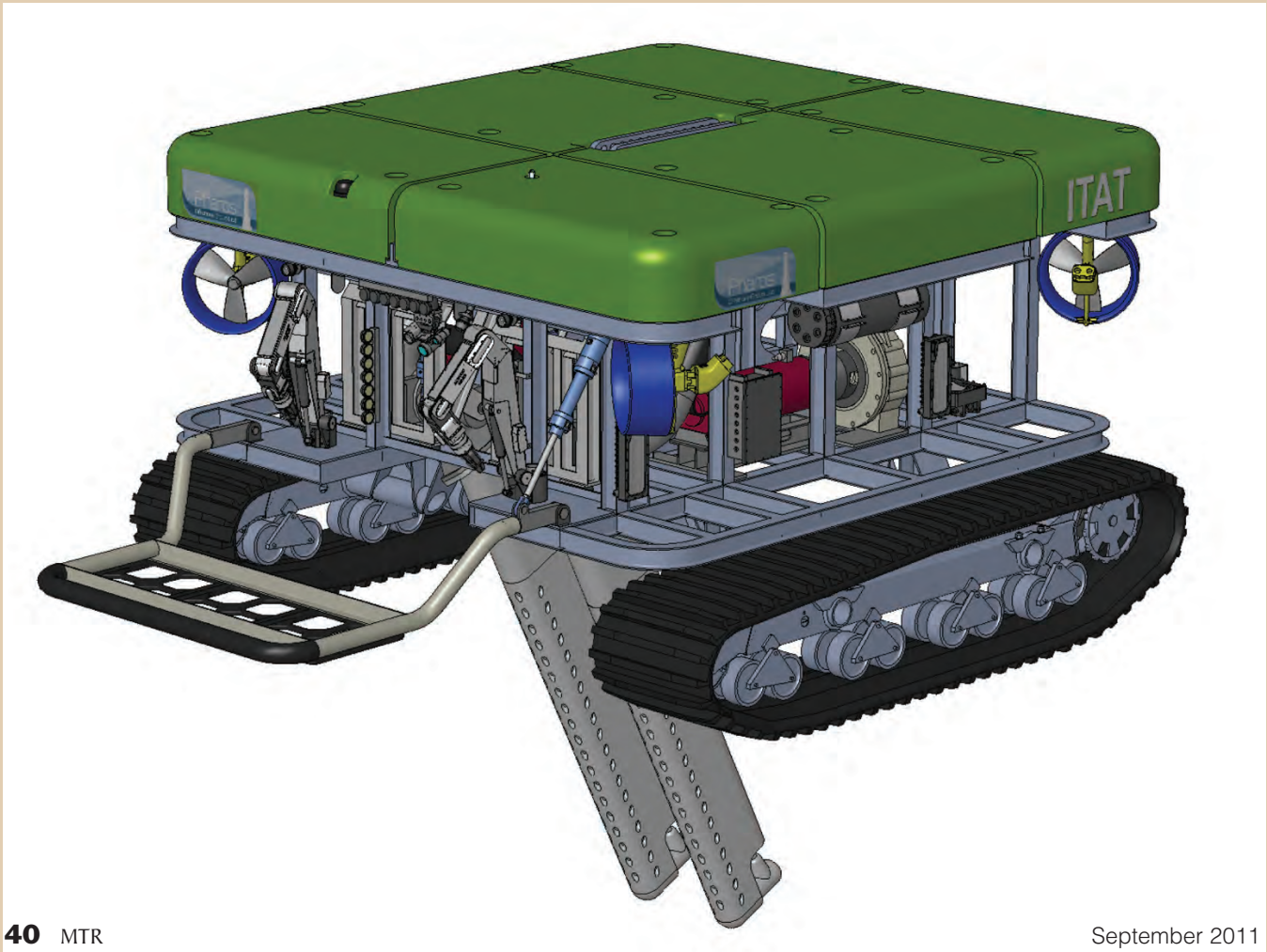
Pharos Offshore Group has started construction of a newly designed remotely operated vehicle (ROV) specifically for the offshore wind farm cable market.

The new Inter Turbine Array Trencher, the ITAT 800, is an 800 HP (600 kW) self-propelled trenching ROV that can be more easily maneuvered by the operators onboard its support ship than a towed plough. It uses a unique water jetting technology to cut the seabed. The technology is safer than a metal plough share or mechanical cutter around the valuable power cable. The water jets "fluidize" the sea floor material and allow the interconnecting power cables of a wind farm to sink in up to three meters deep.

Wind farm developers and cable installers can also gain scheduling flexibility when using a trenching ROV like the ITAT 800 when compared to a conventional cable ploughs. The inter-array cable can be laid on the sea floor to connect the wind turbines more quickly and then a process called Post Lay Inspection and Burial – PLIB is used to complete the burial process using a trenching ROV.

This industry practice of subsea cable burial ensures cable protection in distribution systems worldwide and is widespread best practice in the telecoms industry. Left unprotected, power cable, fiber optic telephone cable and oil and gas pipe is vulnerable to damage from ship anchors, fishing activity and other threats.

The design of the ITAT 800 has been a priority for Pharos Offshore Group due to demand from customers for safer trenching methods, particularly for the offshore wind market. The need to operate around the inter turbine array cable, also called infield cable, with extreme care is due to the multiple short runs of cable within a



confined, precisely planned area of the turbine foundation array. Over the last eight years, many insurance claims have been needed by offshore developers to cover the costs of damage to cables during the installation and burial processes currently used.

"We are excited to bring together the expertise of our operational personnel and designers, with the construction of the ITAT trenching ROV. We think this will fulfill a critical need of the growing offshore wind farm market," says Phil Walker, CEO of Pharos Offshore Group.

The ITAT 800 is about the size of large car. The concept and the design have been developed from the experience gained from many tens of thousands of kilometers of cable burial in the telecoms and oil and gas sectors. It is built using many proven and readily available Commercial-Off-The-Shelf (COTS) parts -this reduces the system's initial price tag, and helps keep ongoing operating costs low. The ITAT's maneuverability, survey equipment, low profile and jetting power provides the flexibility required for infield cable work.

The cable maintenance version of the ROV named the MENTOR 800 provides the ITAT's powerful jetting capability to depths up to 3000 meters for deeper cable and O&G pipeline work. Interchangeable tooling systems provide the flexibility to accommodate the most demanding undersea cable installation and maintenance operations.

Pharos Offshore Group. plans to sell and lease multiple vehicles to serve Round 3 wind farm projects in the United Kingdom and upcoming projects in North America.

Email: info@pharos-offshore.com
www.pharos-offshore.com

8 Channel Hybrid Hydralight Available

SEACON Advanced Products, LLC's optical 8 channel wet-mate Hydralight connector is now also available in a hybrid configuration. Fully underwater mateable, oil filled and pressure balanced, this connector incorporates four modular optical and four electrical contacts with a voltage rating of 1,000 VAC and a current rating of 5 amps. This connector is qualified to 7,000m (23,000ft), with an average single-mode insertion loss of less than 0.2dB and an average single mode back reflection of -50dB. With a design life of 25 years and a life cycle of a minimum of 100 mate/de-mates, this connector meets 'Optical Wet-Mate Connector Specifications' for Norsk Hydro, Statoil, Elf Exploration, Total, Hess and BP.

Email sales@seacon-ap.com
www.seaconworldwide.com

48 Channel Optical Wet-Mate Hydralight Under Development

A high count optical wet-mate Hydralight is currently under development with a maximum of 48 Angled Physical Contacts (APC) optical channels using a modular approach. The external size is identical to the current standard field proven 8-channel Hydralight family of connectors with an increased fiber interface utilizing high density optic ferrules. The design is being driven initially through the need to optimize optical data transfer between the surface platform and a vast array of optical sensors that are deployed subsea.

Email sales@seacon-ap.com
www.seaconworldwide.com

Pro-Oceanus Debuts Mini-Pro CO2

Pro-Oceanus introduced its new Mini-Pro CO2. This new sensor is lightweight and compact, and carries the tradition of the CO2-Pro.

While most Pro-Oceanus dissolved gas sensors (sold now in 27 countries) are used to study and monitor CO2 dynamics, biological production and mixing, more exotic uses include monitoring gas buildup in African "killer lakes", regulating pCO2 in tanks to study larval corals and studying denitrification in anoxic regions of the oceans.

Email: sales@pro-oceanus.com
Web: www.pro-oceanus.com

New Data to Web Broadcast Solution

OSIL offers a unique modem to the marine market, designed to take data from any Campbell Scientific Datalogger and broadcast it directly to a secure website using GPRS/GSM technology. The Osprey modem simply connects directly to any Campbell Datalogger, is compatible with any new system, and can be retrofitted (in a suitable weather proof housing). Data is presented on a dedicated website with a password access, using secure servers, and can interface with existing data gatherer and SCADA systems. Multiple sites can be displayed on one screen, with inputs from multiple sensors.

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

ROS Debuts Anchor Bolster Video Monitoring System

Remote Ocean Systems (ROS) introduced an advanced Anchor Bolster Video Monitoring System that is designed to provide high performance video of mooring chains, wires and anchors and is easily controlled by one person from the winch cabin. This ROS advanced system incorporates high resolution video inspection equipment mounted on a compact carbon-steel deployment frame that is raised and lowered by a pneumatic winch on stainless steel wires to the four anchor bolster mounts. The system includes a sophisticated image-stabilized camera, pan and tilt, dual high intensity dimmable LED lights, an integrated controller and console and stainless steel deployment wires.

Email: Beto@rosys.com
www.rosys.com

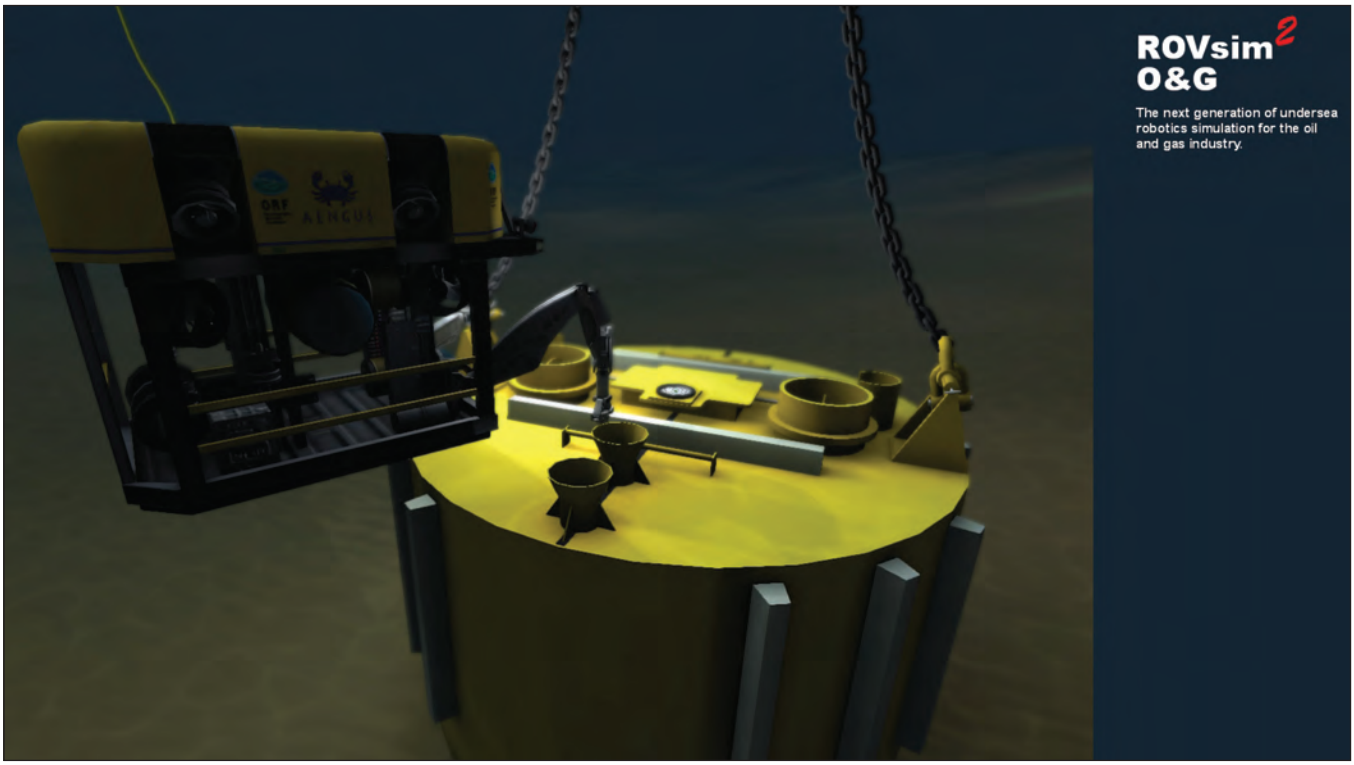
SeaShield SplashZone UW Epoxy

SeaShield SplashZone UW Epoxy is a solvent-free patching compound used for repairing pits, cracks and voids in steel, concrete, wood and other surfaces with very minimal experience or tools required.

By simply mixing two equal parts together, the product, can be applied by gloved hand, trowel or broad knife, to wet or underwater surfaces.

The product can be applied up to 2 inches thick as a patch or grout repair in various splashzone applications. With a fast cure time, you can quickly repair corrosion damage without any new corrosion damaging agents setting in.

E-mail: info@densona.com
www.densona.com



Next Generation ROV simulator

Marine Simulation released the ROVsim2 O&G and ROVsim2 Pro - its new family of next generation undersea robotics training simulator systems. ROVsim2 reflects an important step in the development of 3D simulation and integrates a number of important new features and enhancements, including:

- Five new Oil and Gas missions, including two new anchor and suction piling support missions that can be used independently of or fully integrated with Marine Simulation's vSHIP ship simulator.
- Four new Search and Recovery missions, including an airliner "black box" recorder recovery mission modeled after the recent Air France recovery effort.
- A variety of new ROV tools, including 7, 5, and 3 function manipulators, cathodic potential (Cp) probe, ultrasonic thickness probe and laser measuring devices.
- Full serial communications (RS 232, RS422, etc) support so the simulator software can be integrated into custom control consoles and send data to external devices such as chart plotters and instrument displays.
- Extended support for Windows 7 64 bit operating systems enabling even larger and more complex mission areas than before.

Email: info@marinesimulation.com
www.marinesimulation.com/

EIVA's NaviModel 3.2

EIVA released NaviModel 3.2, its DTM modeling package that now comes in a full 64 bit version. This release takes full advantage of all hardware, including parallel processing and additional memory. Below is a list of additions

- 64 Bit: NaviModel now automatically takes advantage of all CPU's installed in your system, working in parallel where possible to improve overall performance. In 32 bit, the memory addressing is limited. Now with a 64 bit system, you will make use of additional RAM available.
- Real-time Terrain Model: A connection to NaviScan can be established to build infinite DTM models online. In the 3D view you will see a point cloud containing a customized amount of incoming scans. The online DTM will update automatically, providing an updated look at your coverage. The online DTM's can be used for online QC, under keel clearance, immediate hand-out or processing to the end.
- Stronger NaviEdit Connection: The NaviEdit graph displays inside NaviModel now comes with built-in editing and filtering tools. The ability to import runlines and pipetracker directly from the NaviEdit database was added.

E-mail: eiva@eiva.dk
www.eiva.dk

Oceans of Opportunity: International Cooperation & Partnerships across the Pacific

Important Dates

Final Submission of Papers: 15 July
Early Bird Rooms & Registration: 01 Aug
NELHA Tours sign-up: 15 Aug
Education Symposium sign-up: 26 Aug
Conference dates: 19-22 Sept 2011
www.oceans11mtsieeekona.org

Will you be there?

Keynote Speakers

Dr. Marcia McNutt, Director, U.S. Geological Survey
Mr. Mike Utsler, COO, Gulf Coast Restoration Organization (GCRO), BP
Dr. Eddie Bernard, Former Director, NOAA PMEL

Technical Program - OCEANS '11 MTS/IEEE Kona will have a very strong technical program. A record 750+ abstracts were received with substantial international representation and a broad range of topics, including Ocean Vehicles, Ocean Observations, and Sonar Signal/Image Processing & Communication. In addition to the Kona Special Topics, there will be a track to accommodate the canceled UT'11 Tokyo Symposium.

Exhibits - Over 100 national and international exhibitors from government, academia, and industry have already committed. Please contact our Exhibits team at exhibit@oceans11mtsieeekona.org for further details and to reserve your space. A few limited booths remain in the HI, WA and the BC (Canada) groupings.

Tutorials - Nine offerings for full- and half-day sessions on a wide variety of technical topics ranging from imaging technologies, autonomous vehicles, ocean energy and modeling, as well as a business-oriented topic for companies seeking to improve on strategies for engagement with government customers in DoD and other federal agencies. Tutorial participants may earn formal credits through IACET.

Education Symposium - Sat Sept 17, 2011, Hilton Waikoloa Village - Free full- & half-day professional development offerings for elementary to high school educators focusing on Pacific Coral Reefs and Climate Change, Discovery of Sound in the Sea, and Exploration in the Mariana Trench Marine National Monument.

Exclusive Tours - A tour of the Natural Energy Laboratory of Hawai'i Authority (NELHA) will be offered. Don't miss this chance to visit and learn about the state's most unique and innovative ocean science and technology development park, where NELHA is growing sustainable industries for the 21st century.

Patron Opportunities - There are a number of remaining opportunities for exhibitors who want to enhance their market presence at OCEANS and companies/organizations that are looking for an alternative strategy to raise their visibility with this highly qualified target audience!

MTS www.oceans11mtsieeekona.org info@oceans11mtsieeekona.org IEEE OES

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

SENIOR OCEAN APPLICATION ENGINEER

Job Location: USA, MA N. Falmouth
Senior Ocean Application Engineer

Teledyne Benthos is seeking a Senior Ocean Application Engineer who will provide both internal & external customer support. The Application Engineer will provide customer support both in the field and the office, provide sales support, as well as on site technical support which may include time at sea.
Requirements:
- BS or MS in Engineering or Physics
- Excellent communicator, both verbal and written, with strong interpersonal skills
- Ability to learn and understand complex technical requirements, understand and write technical documents
- Computer skills and knowledge of Microsoft office products is essential Excel, Word and Power Point
- Must be able to travel 30%-35% of the time, international and domestic

Preferred:
- Knowledge of the Oceanographic industry
- 8 or more years Technical sales and customer service experience

Send Resume outlining education, experience and salary history to:
Human Resources
Teledyne Benthos, Inc.
49 Edgerton Drive
N. Falmouth, MA 02556
e-mail: benthosrecruiting@teledyne.com
AA/EOE/V/D/F/M
Human Resources
Teledyne Benthos, Inc
N. Falmouth, MA 02556
USA
Email: benthosrecruiting@teledyne.com

FIELD TECHNICIAN

Job Location: USA, MA Pocasset
Field Technician

Located on Cape Cod just 2 miles past the Bourne Bridge, Hydroid is the #1 leader in the design and manufacture of Autonomous Underwater Vehicles for military and commercial applications. A Kongsberg company, we are World Class through People, Technology and Dedication.

Field Technician
Hydroid currently has an opening for a field technician working outdoors year round on small and large sea vessels. The successful candidate will have mechanical and electronics troubleshooting experience in the manufacturing and repair of AUV's. Experience with complex, software intensive systems. Understanding of sonar systems including side scan, Acoustic Doppler Current Profilers (ADCP's), DVL's, Multibeam Sonar and others and positioning and navigation systems beneficial. Domestic and international travel is required up to 50%. Going to sea and small boat operational experience a plus. Good communication skills are required as the position will require customer training and interface. Will also require the ability to work within a cross functional team within production, engineering, and our UK office.
Completed technical school degree or certificate required and four – six years of related experience in a technical, electronic, or manufacturing environment preferred. Previous training experience a plus.
Applicants selected will be subject to a government security investigation and the ability to obtain a security clearance is required.
We offer an attractive starting salary and an excellent benefits package including medical, dental, life, STD, LTD, tuition reimbursement and 401K with match and more.
Qualified candidates should send their resumes, including salary requirements to hr@hydroid.com. Hydroid is an Equal Opportunity Employer.

Hydroid, Inc,
6 Benjamin Nye Circle, Pocasset, MA 02559

Resumes also to mlregan@hydroid.com

Mary Lou Regan
Hydroid, Inc.
6 Benjamin Nye Circle
Pocasset, MA, MA 02559
USA
Phone: 508-563-6565
Email: mlregan@hydroid.com

Advertiser's Index

For Fast, Free Information from Advertisers visit www.maritimeequipment.com/mt

Page	Company	Website	Phone#
17	Airmar Technology Corporation	www.airmar.com	(603) 673-9570
9	Applied Accoustics	www.appliedacoustics.com	44 (0) 1493440355
C3	AXYS Technologies, Inc.	www.axystechnologies.com	(250) 655 5850
27	Balmoral Offshore Engineering	www.balmoraloffshore.com	44 (0) 1224 859000
9	Birns, Inc.	www.birns.com	1.888.Birns.88
1	Channel Technologies Group	www.channeltechgroup.com	(805) 683-1431
31	Compusult	www.compusult.net	(888) 307-7707
7	Forum Energy Technologies	www.f-e-t.com	Please visit us online
17	iRobot	www.irobot.com/mtr	(888) 776-2687
35	JW Fishers Mfg Inc.	www.jwfishers.com	(508) 822-7330
23	Kongsberg Defence Systems	www.kongsberg.com	011 47 74 83 34 00
15	Kongsberg Maritime LTD	www.km.kongsberg.com/cameras	011 44 1224 226500
21	Lighthouse R&D Enterprises, Inc.	www.lighthousehouston.com	Please visit us online
4	LYYN AB	www.lyyn.com/craig	Please visit us online
26	Mar Inc/Ohmsett	www.ohmsett.com	(732) 866-7183
C4	MSI	www.msitransducers.com	(978) 486-0404
44	Oceans11	www.oceans11mtsieeekona.org	Please visit us online
24	OceanServer Technology, Inc.	www.ocean-server.com	(508) 678-0550
33	Oceanworks International	www.oceanworks.com	(604) 415-0088
23	PMI Industries	www.pmiind.com	(216) 881-4914
25	Pro-Oceanus Systems Inc.	www.pro-oceanus.com	(902) 530-3550
11	Rockland Scientific International, Inc.	www.rocklandscientific.com	(250) 370-1688
5	Saab Seaeye	www.seaeye.com	Please visit us online
3	Sea-Bird Electronics	www.seabird.com	(425) 643-9866
4	Sensor Technology Ltd	www.sensortech.ca	(705) 444-1440
12	Shark Marine Technologies Inc.	www.sharkmarine.com	(905) 687-6672
29	Silicon Sensing Systems Ltd	www.siliconsensing.com	44 (0) 1752 723330
26	Specialty Devices, Inc.	www.specialtydevices.com	(972) 429-7240
32	Subsea Photo Contest	http://photos.seadiscovery.com/rules-and-terms.asp	Please visit us online
19	Teledyne Benthos	www.benthos.com	(508) 563-1000
13	Teledyne RD Instruments	www.rdinstruments.com	(858) 842-2600
33	Titanium Engineers Inc.	www.titaniumengineers.com	(281) 265-2910
15	Valeport Limited	www.valeport.co.uk	44 (0) 1803 869292
C2	VideoRay LLC	www.videoray.com	(610) 458-3000

Seeking Sockeye

Fisheries managers at the Quinault Indian Nation (QIN) have a long history working with BioSonics on management of the salmon resources of the Quinault River, and have recently incorporated a first-of-its-kind salmon counter.
Read about how BioSonics is helping to takes small steps for Sockeye, and giant leaps for hydroacoustics, in the October 2011 edition of Marine Technology Reporter.
(Photo Courtesy of BioSonics)

Helping Students Understand the Sea

The Chesapeake Bay Interpretive Buoy System (CBIBS) was created as an information system focused on the Chesapeake Bay and its surrounding estuarine environment to provide information on current marine conditions for educational and scientific purposes.

NOAA's Chesapeake Exploration is a new and innovative collection of online activities for middle and high school students that bring the science of the Chesapeake Bay to life. Chesapeake Exploration gives teachers and their students unprecedented access to lessons designed around real-time observational data from CBIBS.

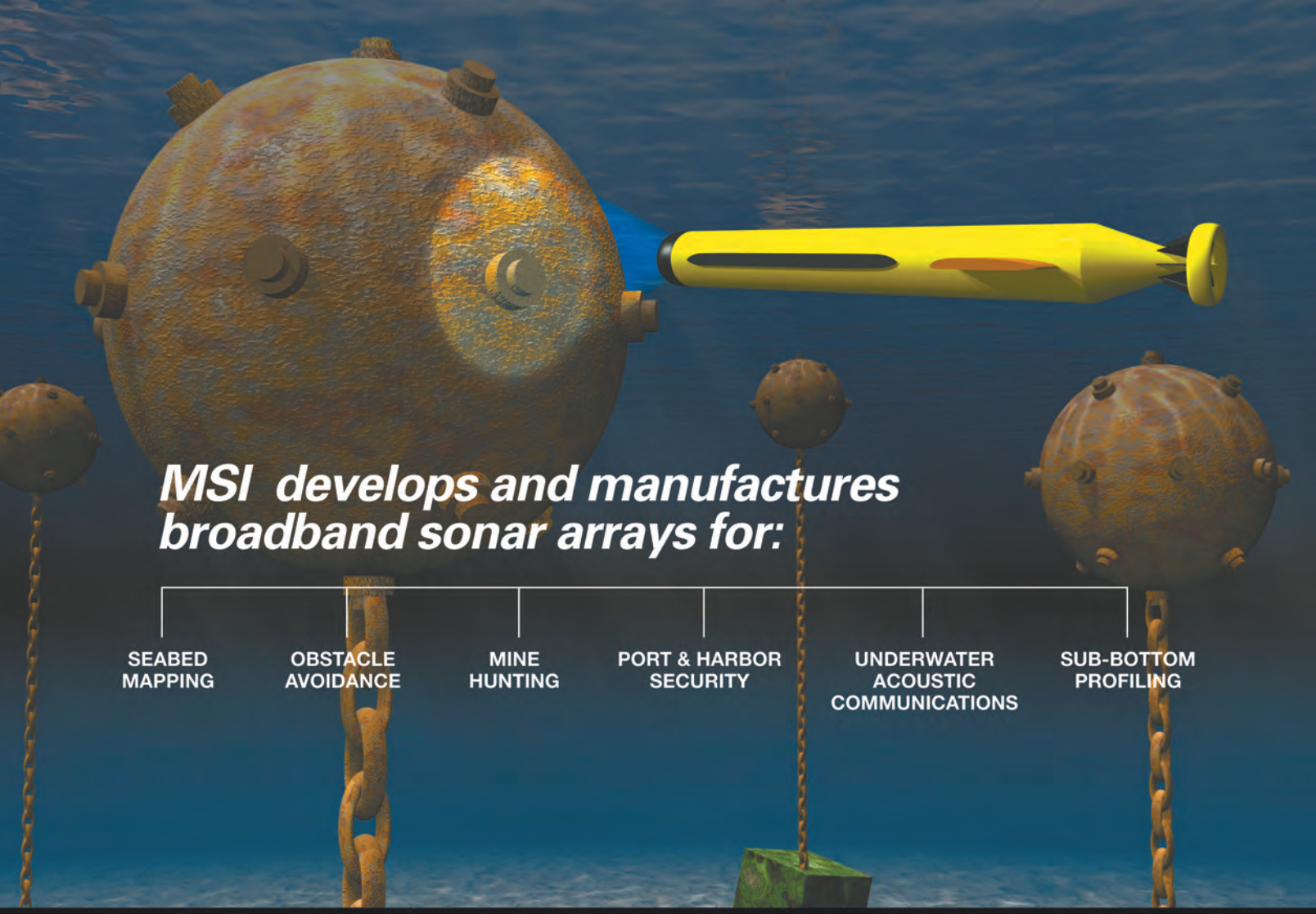
AXYS
Technologies Inc

www.axystechnologies.com
+1 (250) 655-5850
info@axys.com

Live data across Chesapeake Bay

Check out AXYS WatchKeeper buoys in action on the CBIBS website and connect with your environment.

www.buoybay.noaa.gov



MSI develops and manufactures broadband sonar arrays for:

- SEABED MAPPING
- OBSTACLE AVOIDANCE
- MINE HUNTING
- PORT & HARBOR SECURITY
- UNDERWATER ACOUSTIC COMMUNICATIONS
- SUB-BOTTOM PROFILING

for high resolution acoustic imagery … think MSI

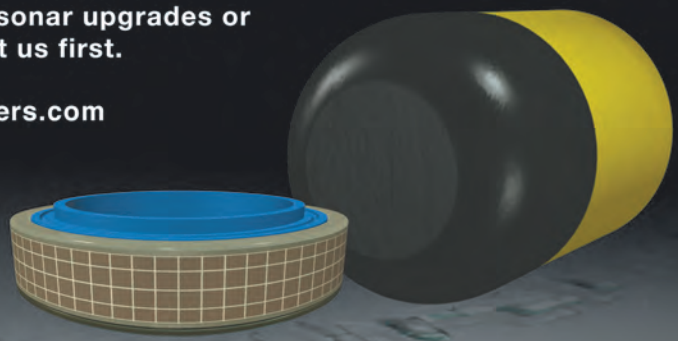
MSI's broadband injection molded piezocomposite arrays enable increased range and resolution in some of the world's most advanced sonar systems.

Our unsurpassed ability to design, manufacture and deliver broadband acoustic arrays in large or small quantities can be your competitive edge in today's crowded sonar marketplace.

Whether your transducer needs are for sonar upgrades or next generation sonar products, contact us first.

Learn more about us at **www.msitransducers.com**

Littleton, MA 01460, USA T: +1.978.486.0404
info@msitransducers.com



ISO 9001 Certified

MSI®

When acoustic performance matters

Sonar Transducers and Arrays