

OceanTech Expo '08 Round-Up: Three Busy Days in Providence, RI

# MARINE TECHNOLOGY

R E P O R T E R

October 2008  
[www.seadiscovery.com](http://www.seadiscovery.com)

Drift Software Aids Hunt for  
**Bonhomme Richard**

Ocean Observation

## Views from NEPTUNE

Imaging Plankton

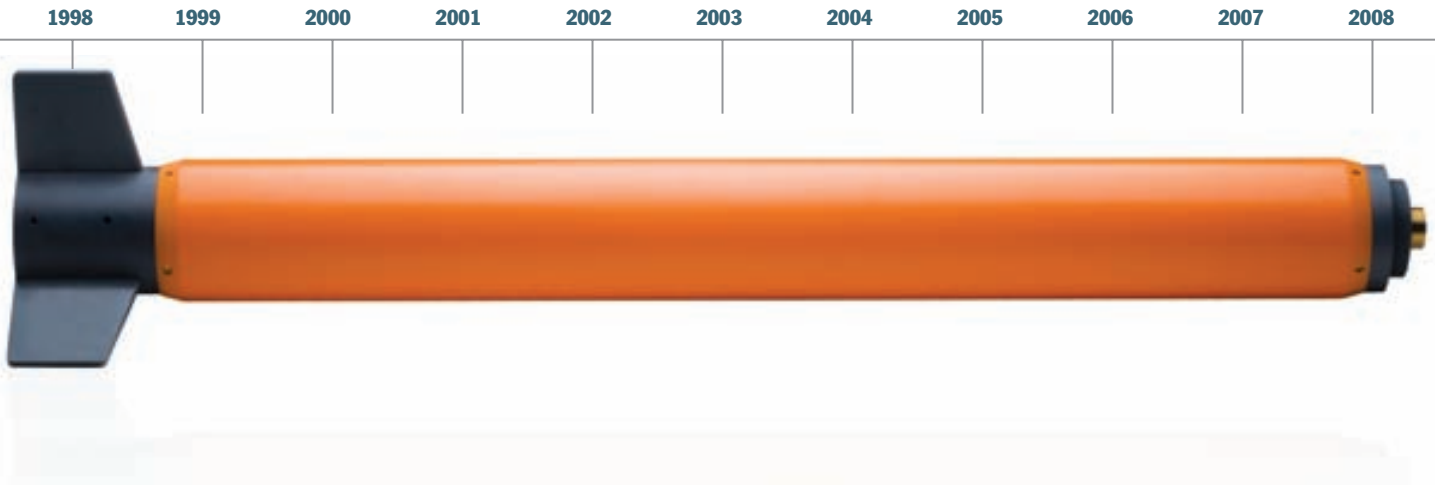
Biological Oceanography &  
Near Real-Time Processing

Filming the Deep

Camera films 5 miles down



# We got it right the first time



When we designed SeaSPY we set out to build a magnetometer that would last. A magnetometer that would not only collect data, but would be the most accurate magnetometer in the world. A magnetometer that would be free of heading errors, sensor orientation restrictions and consumable parts. A magnetometer rugged and reliable enough that our customers would use it for decades.

It seems like only yesterday when we sold our first SeaSPY, but it's already been one decade. And after 10 years and hundreds of SeaSPYs we are excited that our manifesto still holds true. We continue to look for ways to ensure that SeaSPY does the best job for our customers. And every time we do, we make the improvements backward compatible to the first SeaSPY ever sold. By the way, the first SeaSPY owner retired, but his magnetometer is working strong for a new company.

*Collecting data is not the end of the story. It's the beginning.*

# Over 80% of the world's ROVs can't be wrong.

Built to the highest levels of technology, expertise and innovation, it's little wonder our products are used in the vast majority of work-class ROV builds around the world. Capable of operating in the harshest environments, our hydraulic thruster sales are testimony to our commitment to developing effective and reliable products in direct response to the needs of the industry. As a global market leader with a reputation for setting new standards of performance whilst helping our customers reduce their operating costs and maximise profitability, our philosophy is easy - technology **that simply works**.



**Sub-Atlantic Ltd.** United Kingdom, Aberdeen  
T: +44 (0) 1224 798660 E: sales@sub-atlantic.co.uk

**Sub-Atlantic Inc.** USA, Houston, Texas  
T: +1 713 329 8730 E: sales@sub-atlantic.com

**HOUSTON FACILITY NOW OPEN**

[www.sub-atlantic.com](http://www.sub-atlantic.com)

October 2008

# contents

Marine Technology Reporter • Volume 51 • Number 8

Legal Beat

**18 The Battle Over Naval Sonar**

Legal battles surrounding naval use of sonar — and its potential impact on the marine environment — continue to rage. — By **Conor Warde, Blank Rome**

Software Solution

**22 The Search for Bonhomme Richard**

As the search for Bonhomme Richard continues, ASA's custom drift simulation software is credited for providing promising targets.

Ocean Observation

**30 The NEPTUNE Hook-Up**

With the advent of cabled ocean observatories, the ocean sciences will be transformed at a time when the world desperately needs abundant, sound ocean data for a host of scientific, commercial and public policy decisions.

— By **Chris Barnes, Mairi Best, Fern Johnson, Peter Phibbs and Benoit Pirene**

Real-Time Processing

**38 Imaging Plankton @ 5 Knots**

Biological Oceanography and near real-time processing.

— By **Charles Cousin & Cedric Guigand**

OTE '08

**41 Success in Providence**

Providence, Rhode Island again played host to OceanTech Expo, a meeting of industry, government and academia to advance the business of ocean technology.

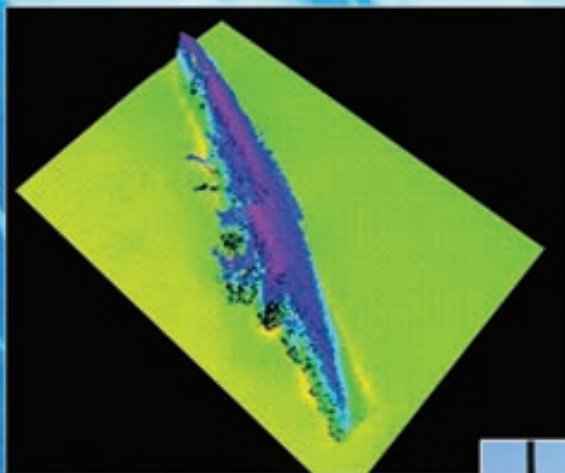
**Tyler Schilling of Schilling Robotics** visited OceanTech Expo in Providence, Rhode Island to address delegates as to the future technological needs of underwater vehicles. Full OTE '08 coverage can be found starting on page 41



# Acoustic Solutions for Marine Research

## RESON Sonar and Sensor Products

RESON leads the field with underwater acoustic equipment performing beyond the most challenging requirements of marine scientific institutions. The product range includes SeaBat multibeam sonar systems, NaviSound echosounders, and high precision hydrophones and transducers suitable for marine research.

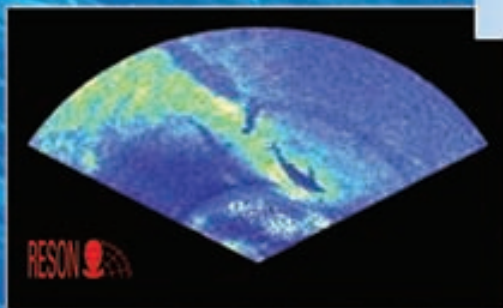


Data and Images of the HMS Yukon  
courtesy of Fugro Pelagos

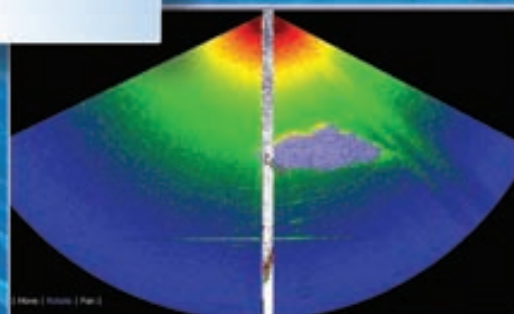
- Environmental Research and Monitoring
- Fisheries Research and Management
- Ambient Noise Measurements
- Marine Wildlife Research
- Marine Archaeology



RESON  
Hydrophone products



Whales seen with a SeaBat  
8128 imaging sonar



SeaBat 7125 Data Image Courtesy of Tom Weber,  
University of New Hampshire



shallow survey 2008

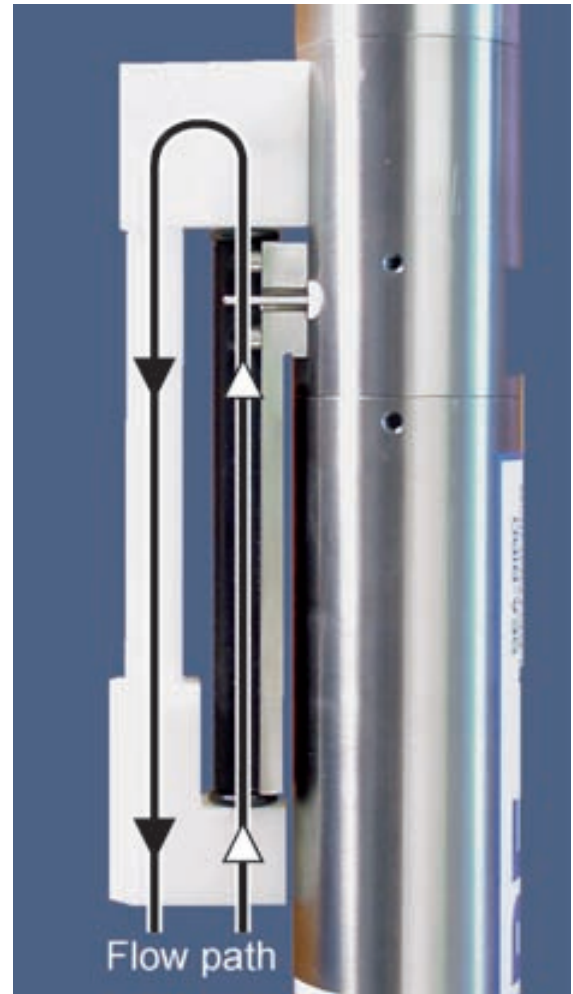


# Moored Salinity?

## STOP the Flow to Prevent Drift

*Revolutionary long-term Salinity accuracy delivered in more than 2500 Sea-Bird-equipped ARGO floats was achieved with our “Controlled Flow” technique, which prevents flow between samples and creates known flow speed during measurement. More effective anti-fouling and more accurate measurements combine to increase long-term accuracy; here’s how:*

- Water is trapped, allowing minute amounts of anti-foulant to remain concentrated *inside* the cell between samples.
- U-shaped flow path nulls flushing between samples due to mooring motion, currents, and internal waves.
- Integral pump draws a completely new sample for each measurement and expels the previous sample.
- Vigorous flushing prevents accumulation of debris within the conductivity cell.



*Conductivity cell guard removed*

*Now available in a moored instrument, the Controlled Flow technique brings ARGO-like stability to your moorings.*



**Sea-Bird Electronics, Inc.**

1808 136th Place NE, Bellevue, Washington 98005 USA  
Website: <http://www.seabird.com>

E-mail: [seabird@seabird.com](mailto:seabird@seabird.com)

Telephone: (425) 643-9866

Fax: (425) 643-9954

## on the **Cover**

On this month's cover is the deployment of a specially made camera, designed to withstand the rigors of filming more than five miles below the ocean's surface. The set-up allowed the world's deepest living fishes to be filmed for the first time. The work is part of Oceanlab's HADEEP project — a collaborative research program with the University of Tokyo — devised by Priede to investigate life in the hadal region of the ocean, which is anything below 6000 m down. The expedition, funded by the Natural Environment Research Council and the Nippon Foundation in Japan, started on September 24 and ended October 6, 2008.

For more information, turn to page 55.

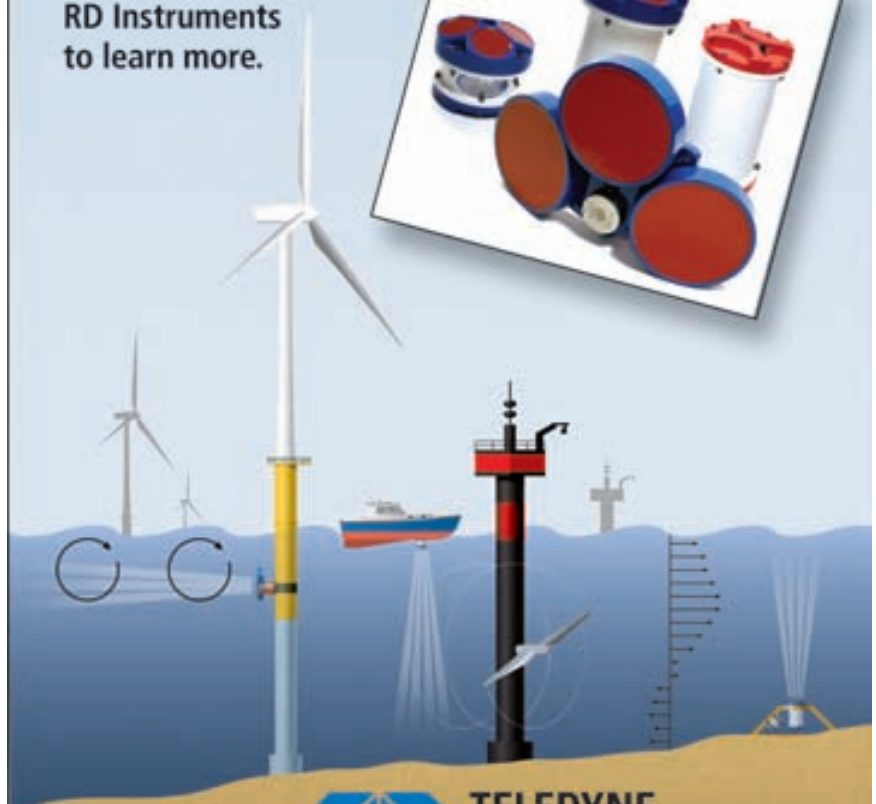
## also in this **Edition**

- 2 Contents
- 8 Editorial
- 10 EB Sea Stallion Rides Again
- 12 New AUV Surveys the Deep
- 14 Offshore News
- 18 Legal Beat
- 22 Searching for Bohnomme Richard
- 41 OTE '08 Round-up
- 48 Directory: Marine Renewable Resources
- 50 People & Company News
- 55 New Products
- 60 Calendar
- 61 MTR Marketplace
- 63 Advertiser's Index

# One great technology, so many applications.

Take the guesswork out of your next offshore renewable project. A single Teledyne RD Instruments ADCP provides you with a clear, concise understanding of the currents and waves affecting your environment.

Contact Teledyne RD Instruments to learn more.



**TELEDYNE  
RD INSTRUMENTS**

*A Teledyne Technologies, Inc. Company*

Poway, CA USA

Tel. +1.858.842.2600

[www.rdinstruments.com](http://www.rdinstruments.com)



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

**Production Manager**

Irina Tabakina  
tabakina@marinelink.com

**Sales Administration Manager**

Tina Veselov  
veselov@marinelink.com

**Marketing Administration**

Kami Accursio  
accursio@marinelink.com

**Manager, Accounting Services**

Esther Rothenberger  
rothenberger@marinelink.com

**Manager, Public Relations**

Mark O'Malley  
momalley@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

**Scandinavia**

Roland Persson • roland@orn.nu  
Tel: +46 411-184 00 • Fax: +46 411 105 31

**Japan**

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

## the Authors



**Chris Barnes**, Project Director, NEPTUNE Canada, University of Victoria, was previously at the University of Waterloo, Memorial University of Newfoundland, and Geological Survey of Canada and was Director, Centre of Earth and Ocean Research and School of Earth and Ocean Sciences at UVic. [crbarnes@uvic.ca](mailto:crbarnes@uvic.ca)



**Mairi Best**, Associate Director Science, NEPTUNE Canada was formerly an Assistant Professor at McGill University, with research interests in the preservation of calcium carbonate skeletons, cycling of biogenic carbonate and ocean acidification.



**Fern Johnson**, Associate Director, Finance and Administration with NEPTUNE Canada, is a Certified General Accountant who manages the finances and also provides oversight management of facilities, central office operation, and human resources.



**Peter Phibbs**, Associate Director, Engineering and Operations for NEPTUNE Canada, had prior experience with 360Networks managing complex deepwater construction projects, including submarine telecommunications systems in the Atlantic Ocean; he is particularly responsible for the Alcatel and OceanWorks contracts.



**Benoît Pirenne**, Associate Director, Information Technology, NEPTUNE Canada, previously had 18 years experience at the European Southern Observatory (ESO) in charge of science data archive of Hubble Space Telescope and ESO's telescopes.



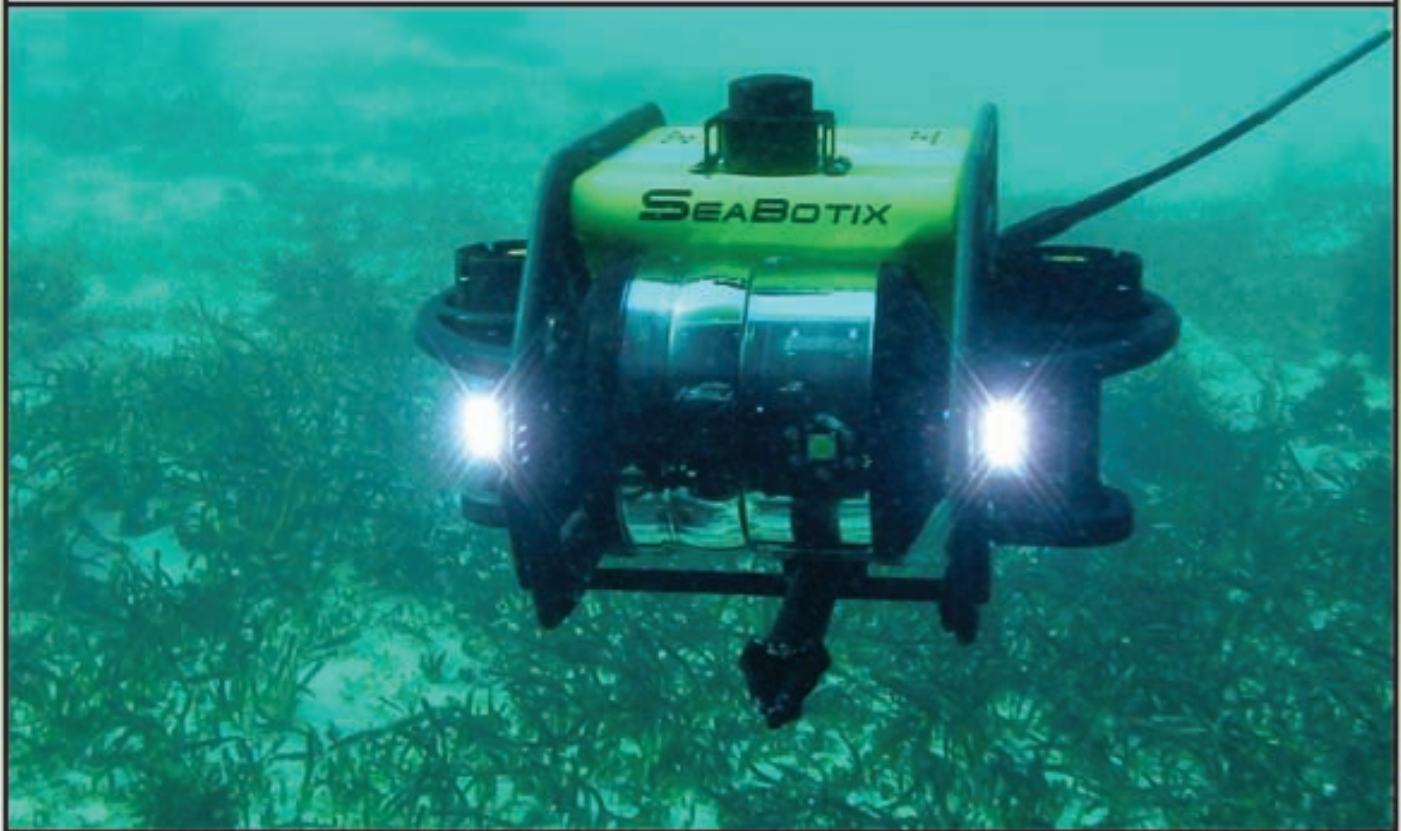
**Tom Skwara** is Director of Technology at Electrochem. He joined Electrochem in 2007 as a result of the company's acquisition of IntelliSensing, a wireless sensor manufacturer founded by Tom in 2004. Contact Tom at Email: [tskwara@electrochemsolutions.com](mailto:tskwara@electrochemsolutions.com), tel: 716-759-5812.



**Conor T. Warde**, an Associate at Blank Rome, concentrates his practice in maritime law, commercial transactions, and international trade law. Before joining Blank Rome, Mr. Warde served as associate general counsel to International Registries, Inc., which administers the Marshall Islands Maritime Registry. Email: [Warde-C@Blankrome.com](mailto:Warde-C@Blankrome.com)



Size doesn't have to sacrifice stability!



**The most Versatile and Stable MiniROV on the Market.**

The latest addition to the SeaBotix line of MiniROVs is the LBV150SE-5<sup>2</sup>. Uniquely featured with dual vertical thrusters for added vertical thrust, stability and control. The LBV150SE-5<sup>2</sup> offers incredible performance both horizontally and vertically using the latest Brushless DC thrusters. In addition to the added power/control the LBV layout further increases stability by distributing the weight outboard. The system is easily configured with a wide variety of options to meet each operator's requirements.

**LBV150SE-5<sup>2</sup>**

**Depth rating** 150 meters **Umbilical** 175 meters on reel  
**Thrusters** 5 high output Brush-Less DC including lateral  
**Cameras** hi-res color and low light B/W **Optional equipment**  
scanning sonar, USBL tracking system, grabber, video enhancement, multi-beam sonar and additional lighting

**ROV**



As a stand alone ROV or simply ROV mode the LBV150SE-5<sup>2</sup> is a highly capable free swimming ROV. Equipped with all the standard features of the proven LBV line of MiniROVs.

**CRAWLER**



Add the crawler skid enabling the LBV150SE-5<sup>2</sup> to adhere to hard surfaces such as a ship hull for unmatched precision and stability. Increased working capability to 5 knots current.



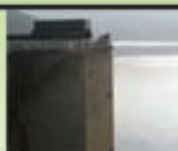
**LBV150<sup>2</sup>**  
The benchmark MiniROV system  
Depth: 150m  
Umb: 100-175m



**LBV200<sup>2</sup>**  
Powerful and portable  
Depth: 200m  
Umb: 250m



**LBV300<sup>2</sup>**  
Long line or extreme power  
Depth: 300m  
Umb: 350-750m



**LBV600<sup>2</sup>**  
Deep water rapid response  
Depth: 600m  
Umb: 750m

When OceanTech Expo (OTE) closed its 2008 edition October 3, 2008, the one word that resonated throughout the halls was "success." Providence, Rhode Island, once again played a gracious host and astute partner to OTE, proving the importance of the Northeast corner of North America when it comes to the subsea technology industry. OTE '08 opened strong, graced with the presence of **Rhode Island Governor Donald Carcieri**, who made time from his busy schedule to officially open the OceanTech Expo on October 1, 2008, and to address OTE delegates as to the importance Rhode Island places on the subsea industry as a whole. His presence, coupled with the Rhode Island Economic Development Corporation's (RIEDC) tireless effort in working with New Wave Media — producers of OTE and publishers of Marine Technology Reporter — conspired to help make the three day event a success. A key logistical change to this year's event was the strategic placement of the Industry Outlook Panel discussion program in meeting rooms situated inside the exhibition hall, giving exhibitors and delegates greater opportunity to meet and discuss the business of ocean technology. The conference program was highlighted with a number of presentations geared toward the users of subsea technology — users from the ranks of industry, government and academia — coming together to discuss the real-world use, and the real-world needs from the industry. Two sessions of particular note included the "Growing Markets and Application for Underwater Vehicles" session, a session organized by **David Kelly** of Bluefin Robotics and featuring a top line of speakers, including **Andy Bowen** of WHOI and **Tyler Schilling** of Schilling Robotics. **Marianne Molchan** of Molchan Marine Sciences Inc. once again pulled together a provocative and productive panel addressing the "Growing Challenges of Keeping International Ports and Harbors Secure."



Personally, I would like to extend a personal "thanks" to **Thomas Chance**, CEO of C & C Technologies, who added OTE to his agenda to formally accept Marine Technology Reporter's first ever "SeaMaster of the Year" award, presented during the Exhibitor's Reception. His presence — and in fact the presence of everyone who exhibited, attended or helped to coordinate the OceanTech Expo — is greatly appreciated, and has set the stage for an even bigger and better event in 2009.

Gregory R. Trauthwein • [trauthwein@marinelink.com](mailto:trauthwein@marinelink.com) • tel: 212-477-6700

**Your Marine Technology One-Stop-Shop**



[www.seadiscovery.com](http://www.seadiscovery.com)

Log on everyday and receive:

- Daily News
- Exclusive Product & Technology Reports
- New Job Listings

Or, join thousands of your colleagues and sign up for our weekly NEWS & JOB Updates via E-mail.

**It's Fast ... and FREE!**

**MARINE TECHNOLOGY**  
REPORTER

Vol. 51 No. 8  
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 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. ©2008 New Wave Media.



Business Publications Audit of Circulation, Inc.

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means mechanical, photocopying, recording or otherwise without the prior written permission of the publishers.

**Subscription:** To subscribe please visit [www.seadiscovery.com/subscribe](http://www.seadiscovery.com/subscribe)



**C-Nav**<sup>®</sup>  
WORLD DGPS

- S**upport - 24/7 Support and global integrity monitoring
- A**ccurate - One decimeter accuracy
- F**lexible - Hardware and service options to fit your needs
- E**ase - Simple to install & operate
- R**eliable - Two Signal Networks / No single point of failure



**C-Nav**<sup>®</sup> GPS gives you the **WORLD**,  
one decimeter at a time

WEB: [www.CnavGPS.com](http://www.CnavGPS.com)

LAFAYETTE - CORPORATE +1 (337) 210-0000	HOUSTON +1 (713) 468-1536		
MEXICO +52 (938) 381-8973	BRASIL +55 (21) 22102555	EUROPE +44 (1284) 388-631	SINGAPORE +65 (62) 95-9738
SOUTH AFRICA +27 (21) 702-1870	ANGOLA +244 (222) 330202		

Generate  
**high-resolution maps**  
of water quality and bathymetry



*without getting your feet wet.*



**800 363 3269**  
[systems@ysi.com](mailto:systems@ysi.com)  
[www.yisi.com/ecomapper](http://www.yisi.com/ecomapper)

**Introducing...**

**YSI EcoMapper<sup>®</sup> Autonomous Underwater Vehicle.**

The first AUV designed specifically for water quality and bathymetry mapping. Easy mission planning and one-person deployment save time in the field. Stay dry, learn more.

**MTRNews**

*MTR* publishes a weekly newsletter via e-mail. Subscribe for FREE at [www.seadiscovery.com](http://www.seadiscovery.com). For banner advertisement info, contact Rob Howard at [howard@marinelink.com](mailto:howard@marinelink.com)

**SUBSCRIBE**

Subscribe to the print or electronic edition of *MTR* by visiting [www.seadiscovery.com](http://www.seadiscovery.com), or e-mail Kathleen Hickey at [mtrcirc@marinelink.com](mailto: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=l2](http://www.seadiscovery.com/mt/mtMagazine.aspx?mnl2=l2) advertising

**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](http://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](http://www.seadiscovery.com/mt/mtStories.aspx?PostStory=new)

**SUBMIT VIDEO**

*MTR* invites you to submit interesting Subsea videos for broadcast. Contact [trauthwein@marinelink.com](mailto: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](http://www.seadiscovery.com/mt/MTCalendar2.aspx)

## EB Sea Stallions Ride Again



Increased activity in the submarine telecom and offshore renewables sectors has seen a dramatic rise in the usage of Sea Stallion cable ploughs designed and built by IHC Engineering Business (EB). Sea Stallion ploughs that have been 'resting' since the collapse of the submarine telecoms industry in 2001 have been brought back into service as this industry expands once more. EB has also recently received an order from Tyco Telecommunications for an all new Sea Stallion 3 plough system for delivery Christmas 2008.

"We are delighted to see this superb workhorse back in demand," said Dr. Tony Trapp, Managing Director of EB. "A Sea Stallion 3 has been mobilized on the 'CS Durable' by Tyco and has been working hard in the South China Sea; a second is being bought back into service by Tyco to support cable operations in the Atlantic, and now they have ordered a third Sea Stallion 3. This is an important milestone as it is the first new plough system we have supplied to the submarine telecoms indus-

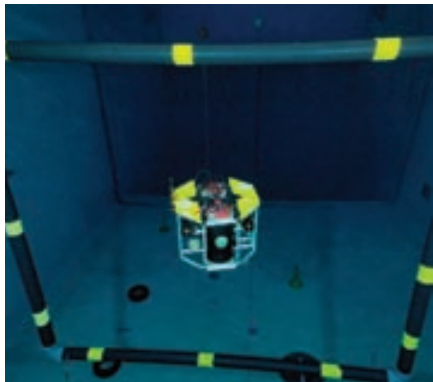
try since the 2001 collapse, and the order highlights both the resurgence of this industry, and the technical superiority of the Sea Stallion plough technology."

The new plough being built on Tyneside for Tyco Telecommunications will be capable of burial up to 3m, able to work in water depths up to 2000m, be supplied with a buoyant umbilical to shorten launch and recovery times and improve productivity; and feature an advanced control system in a 20-ft, air conditioned control cabin.

**DANICE: Connecting Denmark to Iceland**

The Icelandic submarine cable operator E-Farice, together with Tyco Telecommunications, started the Iceland segment of the DANICE submarine cable system. With the completion of the Denmark shore-end lay installation at Blaabjerg in Denmark late August, the system is quickly approaching its planned completion at the end of December 2008. The subsea DANICE Cable System is 2,300 km in length.

## Heriot-Watt University Wins Student Competition



'Nessie' performs at the competition.  
(Photo by Yves Gladu)

The Heriot-Watt University team won the third edition of the Student Autonomous Underwater Competition — Europe (SAUC-E 2008), held at the IFREMER deep wave tank near Brest, France. This year the event was hosted by La Délégation Générale pour l'Armement (DGA). The Heriot-Watt University team designed a hover capable Autonomous Underwater Vehicle (AUV) capable of carrying out a complex in-water mission with no direct human control. The team's hard work paid off as for the first time in the history of the competition the AUV, named



Winning Heriot-Watt University team.  
(Photo by Crown)

[www.seadiscovery.com](http://www.seadiscovery.com)

"Nessie," completed all of the tasks which included touching a submerged buoy, dropping markers on a target on the tank floor, and surfacing in a marked zone above two tyres. Each year the competing teams rely

on sponsorship from industry to develop their AUVs. Nessie was sponsored by BP and SeeByte, and this support was crucial in enabling the team to produce such a successful entry.

# 30% land. 70% opportunity.



The deep sea holds the key to our future. The quest for food, energy, minerals and knowledge is creating a need for new subsea sensing, communications and imaging technologies.

At Marport, we've developed software defined acoustics technology that delivers innovative solutions for commercial fisheries, offshore energy, defence and ocean science.

For more information please visit us at [www.marport.com](http://www.marport.com)

**MARPORT**  
DEEP SEA TECHNOLOGY

## New AUV Surveys the Deep

Scientists and engineers from the Woods Hole Oceanographic Institution (WHOI) and the University of Washington (UW) completed the first scientific mission with Sentry, a newly developed robot capable of diving as deep as 5,000 m (3.1 miles) into the ocean. The vehicle surveyed and helped pinpoint several proposed deep-water sites for seafloor instruments that will be deployed in the National Science Foundation's (NSF) Ocean Observatories Initiative (OOI).

Sentry is a state-of-the-art, free-swimming underwater robot that can operate independently, without tethers. The AUV is pre-programmed with guidance for deep-water surveying, but it can also make its own decisions about navigation on the mountainous volcanic terrain of the seafloor.

Working in tandem with sonar instruments on the UW-operated research vessel Thomas G. Thompson and with photo-mapping by WHOI's TowCam seafloor imaging system, Sentry gathered the most

precise maps to date of seafloor features known as Hydrate Ridge and Axial Volcano, around the edges of the Juan de Fuca tectonic plate off the coast of Oregon and Washington. Two nodes of a pioneering deep-ocean observatory are being planned for those locations.

"This investment into emerging technologies is paying off in delivering state-of-the-art science support," said Julie Morris, Director of NSF's Division of Ocean Sciences. "In the near future, Sentry will conduct high-resolution oceanographic surveys that would be otherwise impossible."

The WHOI-built AUV— which was largely funded by NSF — made six dives during the July 22 to August 5 expedition. Sentry surveyed 212 linear km of seafloor, or about 53 sq. km.

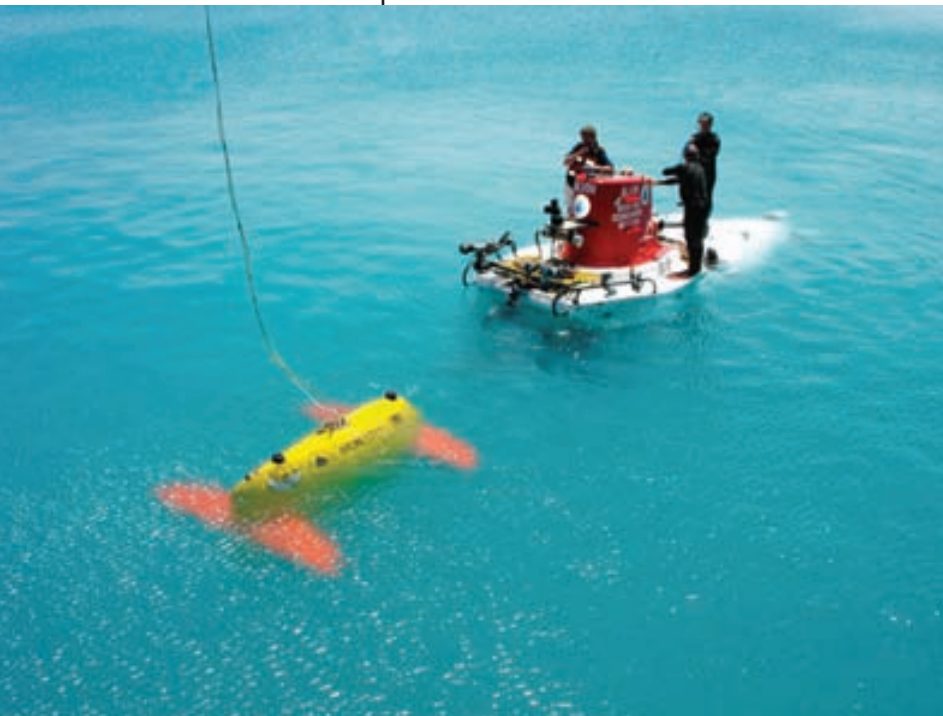
"Sentry had a very successful introduction," said Dana Yoerger, the lead WHOI engineer for Sentry. "We had tested the AUV as best we could before we got out here, but the steep terrain of the deep sea is quite a different matter. Our engineering team and our vehicle all performed very well under the stresses of putting a complex system into the ocean for the first time."

The AUV can collect the data needed to make seafloor maps at a resolution of less than one meter. On this first cruise, Sentry collected as many as 60 million individual soundings of seafloor depth in a single dive.

Sentry is designed to swim like a fish or fly like a helicopter through the water.

The vehicle has thrusters built into its foils, or wings. Like an airplane, the foils

**Sentry meets the submersible Alvin during a testing expedition off Bermuda. Sentry is a robotic underwater vehicle used for exploring the deep ocean; it is likely to be used to complement Alvin and other ocean exploration vehicles by surveying large swaths of ocean floor. (Photo by Chris German, WHOI)**

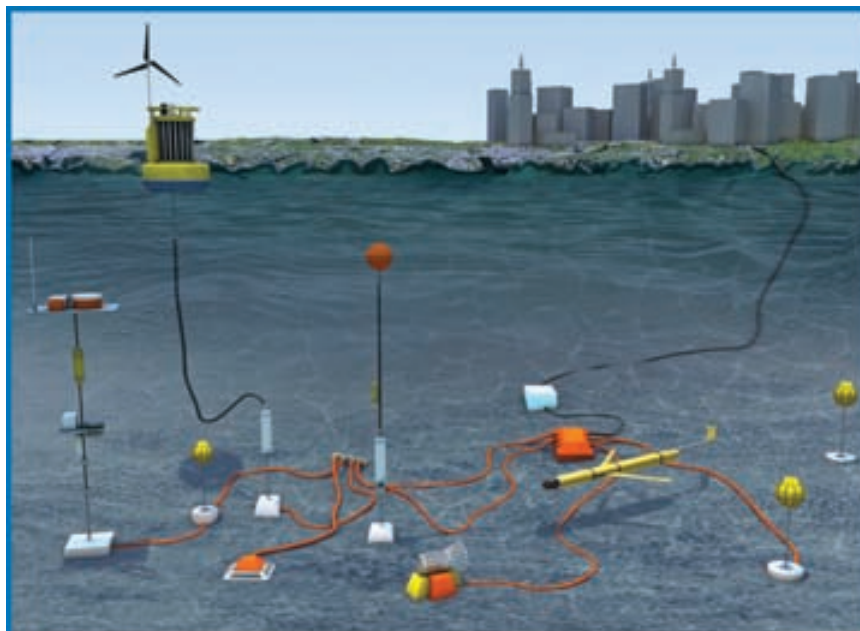


allow the vehicle to gain lift or drag or directional momentum, as needed. When necessary, the AUV also can hover over the bottom for close-up inspections, navigational decision-making, and for rising up and down over rugged seafloor terrain. The design allows the vehicle to start, stop, and change directions. "We chose the body shape, the tilting foils, and the location of the thrusters to give Sentry a favorable combination of maneuverability over a wide range of speed, as well as hydrodynamic efficiency," said Yoerger.

The AUV steers itself with a magnetic compass; long-baseline (LBL) navigation triangulated from underwater beacons; a sophisticated inertial guidance system (INS); and, when within 200 meters of the bottom, an acoustic sensor that can track the vehicles' direction and speed with incredible precision.

"Sentry is a true robot, functioning on its own in the deep water," said Rod Catanach, a WHOI engineer who works with Sentry. "The vehicle is completely on its own from the time it is unplugged on the deck and cut loose in the water. We can send a few simple commands, but there is no room to micromanage."

Funding for the development of Sentry was provided by the Ocean Sciences Division of the National Science Foundation (NSF), The Russell Family Foundation, WHOI's Deep Ocean Exploration Institute, the Comer Science and Education Foundation, and WHOI's Access to the Sea program. Funding for the OOI mapping cruise was provided by NSF through the Consortium for Ocean Leadership; by the Arizona State University; and by the UW School of Oceanography.



## Connect. Measure. Communicate. Recover.

Whether you're installing a new Ocean Observatory Network or updating equipment on an existing one, Teledyne Marine companies deliver the innovative products, experience and support you need to ensure your program's success today... and tomorrow.

- **Connect** and transmit power and data with ODI's high reliability Wet-Mate electric, fiber optic, & hybrid interconnect assembly solutions.
- **Measure** current profiles and waves with Teledyne RD Instruments' Acoustic Doppler Current Profilers (ADCPs).
- **Communicate** wirelessly with underwater equipment using Teledyne Benthos' acoustic modems and wireless nodes.
- **Recover** equipment remotely with Teledyne Benthos' acoustic releases.



**Teledyne Marine**

*Solution Providers for Shallow Water  
to Deep Sea Data Collection.*

**TELEDYNE  
BENTHOS**

+1 508.563.1000  
www.benthos.com

**ODI**

+1 386.236.0780  
www.odi.com

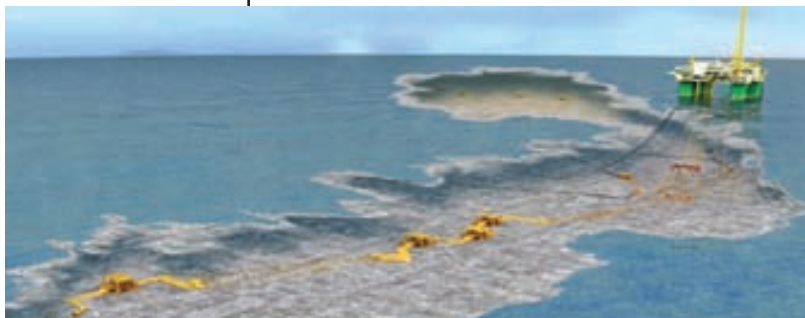
**TELEDYNE  
RD INSTRUMENTS**

+1 858.842.2600  
www.rdinstruments.com

[www.teledynemarine.com](http://www.teledynemarine.com)

# Gjøa Takes Shape on Seabed

(Source: Statoil Hydro)



## Gjøa Facts

- Gjøa, including the Vega satellite development, is the largest project in the North Sea today.
- Gjøa is being developed with a semi-submersible production platform and five subsea templates.
- Gjøa will be StatoilHydro's first floating platform to get its electricity from the mainland. This will mean a reduction in emissions to the environment of 250,000 tons of CO2 per year.
- StatoilHydro is the operator for the Gjøa development, while Gaz de France Norge will assume operatorship at production start-up.
- Gjøa lies in blocks 35/9 and 36/7. The field was proven in 1989. Reserves are estimated to be 82 million barrels of oil and condensate and 40 billion cu. m. of gas.
- Gjøa is expected to come on stream in 2010. A cable running from the new power plant at Mongstad, north of Bergen, will supply the platform with electricity.

The templates on the Gjøa field in the North Sea have been installed and are ready for drilling start-up in the middle of November. "During September we have completed the most comprehensive marine operations this year," said Ole J Nordahl, head of marine operations in the Gjøa project. "Four integrated templates and a satellite structure have been installed on the seabed."

The offshore operations have been conducted as planned. Five vessels and around 450 workers have been involved in the first installations on Gjøa. "Our suppliers have done a good job," said Bjørn Midttun, proj-

ect manager for Gjøa subsea and pipes. "Gjøa is a complicated puzzle, and we are totally dependent on the work being carried out according to agreement in order to obtain a smooth transfer from one supplier to another. Thanks to good weather we have also avoided any delays."

The biggest challenge during the installation was posed by a completely new construction vessel with new systems, a new large crane and a new crew.

"We had some challenges in the beginning and we had to do some testing, but clever personnel handled these challenges well. The procedures and working methods we have introduced during the year will be optimized and form the basis for the 2009 operations, which will be an important year for the Gjøa project. Next year, 15-20 vessels will be in operation and we are talking about roughly 1,000 vessel days."

Production start is expected in the autumn of 2010.

## PSS Wins DOF Subsea Deal

Perry Slingsby Systems (PSS) secured a fast-track contract to supply a new generation Triton XLX ROV system to DOF Subsea for delivery before the end of the year. This contract comes six months after the offshore survey, IMR, construction support and engineering contractor awarded a multi-million dollar contract to PSS to deliver 10 TXLX systems for delivery throughout 2009 and 2010. It brings the total number of PSS systems contracted by the company in the last three years to 22. PSS has committed to deliver the latest 3,000m TXLX 38 mobile system for use across DOF Subsea's operations by December 2008. Each TXLX is equipped with the all new ICE (Integrated Controls Engine) real-time control system,

proportional tooling systems and advanced survey systems.

## Subsea 7 Gets \$30m Order

Subsea 7 received a \$30m contract, a project that is a call-off under the existing Pan European USC frame agreement held with Shell. The project is related to Shell's installation of a new type of Tanker Loading System, which will replace an existing tanker loading unit. The Subsea 7 operation will disconnect two 15 in. flexible risers, then install two new 16 in. flexible pipelines to connect the subsea infrastructure with a new Subsea Loading System, and associated equipment to complete the Tanker Loading System. Engineering and project management will commence immediately and be



delivered from Subsea 7's Stavanger office in Norway. The offshore phase will be carried out by the company's latest state-of-the-art deepwater Flex / J-lay vessel, the Seven Seas, and an ROV support vessel from the Subsea 7 fleet during 2009. The Draugen field is located in License PL093 in the Haltenbanken area approximately 140 km north of Kristiansund. The partners in the licence are Norske Shell (26.2%), BP (18.36%), Chevron (7.56%) and Petoro (47.88%).

### Seven Seas Completes Installation

Subsea 7 said that its latest deepwater Flex/J-lay vessel, the Seven Seas, has completed its first major installation project for StatoilHydro's Yttergryta field in the

Norwegian sector of the North Sea. As part of the StatoilHydro frame-agreement, the Seven Seas carried out two offshore campaigns where a 130Te PLEM, 25Te Flowbase and 6 km dual lay umbilical/3-in. MEG line and three spools were installed. The Seven Seas will complete mobilization at Dusavik, Norway for her next project at the BC-10 development in the Campos Basin, Brazil. The vessel has been designed to perform highly specialized subsea laying, construction and engineering work for the deepwater global offshore pipe oil and gas industry and is capable of operating in water depths of up to 3,000m. Having joined the Subsea 7 fleet in June, the Seven Seas is the fourth in a series of eight new vessels joining the fleet between 2007 and 2010, representing a total investment of over \$1.8bn.

**Tritech** **NEW Micron Data Modem**

...We are a compact and low power...  
 ... networking solution for subsea, acoustic telemetry...  
 ...at ranges up to 1km!  
 ...How did we get so good?

Actual Size

Tritech International Limited, Peregrine Road, Westhill Business Park, Aberdeen, AB32 6JL, United Kingdom  
 T: +44 (0) 1224 744111  
 F: +44 (0) 1224 741771  
 Email: sales@tritech.co.uk  
 Web: www.tritech.co.uk

## Singapore Invests \$280m in Offshore Expansion

Singapore's Minister for Trade and Industry launched a \$280 million, five year development of the country's offshore petroleum services facility, declaring it will "further enhance" the nation as a leading oil and gas center "next to Houston and Aberdeen."

Minister of State Lee Yi Shyan ceremonially "broke the ground" at the Loyang Offshore base using a gold shovel. In a speech to invited industry heads at the newly named TOPS (Toll's Offshore Petroleum Services, formerly known as SOPS) offshore service facility, he said: "We want to work with our world class shipyards, companies offering complex oil and gas systems and offshore-related services to build new capabilities.

"We want to encourage them to undertake a wider range of activities, encompassing manufacturing, headquarter services, training, research and development, engineering and regional distribution."

Hallin Marine is leading the move to the new complex, already committing to a new, purpose built 8,000 sq. m. waterside center for its Eastern Operations Division, and

expects to move to the facility in 18 months time.

Toll Holdings, the owner of the Offshore Supply Base, is behind the huge development. Managing Director Paul Little said: "This site is one of only three of its type in the world and the only one in the (Asia) region.

"It is a world-class land asset and, as a result of this redevelopment, Toll is helping to guarantee its future prominence.

Minister of State Lee Yi Shyan said the outlook remains positive for the offshore oil and gas sector "for the next few years" and quoted statistics outlining Singapore's success.

"Last year the sector achieved an output of \$9.1billion, a substantial 27% growth over 2006," he said.

"Today, besides being one of the world's premier ship repair and ship conversion centers, Singapore is also a global leader in the building of jack-up rigs and the conversion of FPSO units.

"We are also the largest manufacturer of offshore oil rigs, with a 70 percent market share."

**Customer-Specific Battery Packs**

- + High Capacity Li-Ion Polymer
- + Rechargeable Underwater
- + Direct Recharging From Solar Panel
- No Charge/Load Regulator Required
- + Pressure Tested To 10,000 Feet
- + Continuous Cell Balancing Maximizes Reliability
- + Hybrid Battery Fuel Cell

SINCE 1964  
HIGH REL QUALITY & SERVICE

**SWE** SOUTHWEST ELECTRONIC ENERGY GROUP [www.swe.com](http://www.swe.com) ISO 9001:2000

# R You Connected?

Communicate with our Sensors,  
Anywhere, Anytime

Depth  
Software  
Manageable  
Pressure  
Data Hosting  
Conductivity  
Field  
Upgradable  
Temperature



Dissolved  
Oxygen  
Versatile  
PAR  
Rugged  
Fluorometer  
Web Enabled  
Turbidity  
Telemetry  
pH

**Single & Multi-Channel  
Data Loggers**

**Precision Instrumentation**

**Real-Time or Logged  
Monitoring of:**

- Cytospheric Zones
- Estuaries, Lakes and Rivers
- Deep Oceans
- Coastal Zones

**GLOBAL PRESENCE,  
LOCAL SERVICE**

# RBR

[www.rbr-global.com](http://www.rbr-global.com)



*Conor T. Warde, an Associate at Blank Rome, concentrates his practice in maritime law, commercial transactions, and international trade law. Before joining Blank Rome, Mr. Warde served as associate general counsel to International Registries, Inc., which administers the Marshall Islands Maritime Registry. Email: Warde-C@Blankrome.com*

## Whales, Dolphins and the U.S. Navy

# The Battle Over Naval Sonar

By **Conor Warde**

The whale is one of the primary symbols of marine life to much of the world's public. Controversial issues, such as the hunting of whales by some merchant fleets and whale strikes by commercial vessels in coastal areas around the world, draw intense scrutiny and criticism. Another issue involving whales may now be making its way to the forefront of the public's consciousness — the use of sonar by the United States Navy and its effect on whales and other marine animals.

On June 23, 2008, the U.S. Supreme Court granted the petition of the government in the case of *Winter v. Natural Resources Defense Council, Inc.* and will hear arguments in the case this October 2008. The primary issue in this case is whether the President of the United States may exempt the military from environmental rules and regulations in the name of national security. The ruling by the Supreme Court may also have significant lasting impacts not only on the balance between national security and the environment, but also on the impact of using sonar and other acoustic technologies in ocean waters by the military and the maritime industry as well.

### Sonar and Whales

The issues before the Supreme Court are, of course, essentially purely legal in nature. Supreme Court arguments and decisions are generally centered on matters of law rather than the underlying facts of a particular case. The facts in this case, however, should be of significant interest to those involved in subsea technology and its relationship to the environment.

The Navy has long used sonar as a means to protect its vessels and to detect enemy submarines. At the risk of oversimplifying the technology, the active sonar used by Navy vessels emits a sound blast into the water. As

the soundwaves bounce off of objects in the vicinity, the sonar operators on board the vessels attempt to interpret these soundwaves to determine what may be in the waters near those vessels.

Following the end of the Cold War, the apparent need for this technology declined. However, as other potential threats arose from countries like Iran and North Korea, the need to improve sonar technology, and even retrain sonar operators, has taken on more immediate urgency. Therefore, recent years have seen the U.S. Navy begin to expand its sonar training operations off the West Coast of the United States and elsewhere.

This reinvigorated sonar training by the Navy has drawn the attention of environmental groups. There is evidence, although disputed by the Navy in its accuracy and scope, that the soundwaves emitted in sonar operations have serious, even fatal, effects on whales and dolphins. Marine biologists claim that sonar can cause hemorrhaging near the eardrums of marine mammals that can lead to disorientation and cause the affected animals to alter their diving habits. This could result in the deaths of such marine mammals.

### The Legal Challenge

On January 3, 2008, a federal judge signed an injunction that limited the Navy's planned sonar training exercises off the coast of Southern California. The ruling, which had revised an earlier, even more restrictive order issued by the judge, stated that the mid-frequency sonar used by the Navy would harm whales and other marine mammals if proper controls were not in place and that such use would violate the National Environmental Policy Act and other environmental statutes. Specifically, the judge ruled that the Navy could not use mid-frequency sonar within twelve nautical miles of the California coast

*See What You've  
Been Missing*

**"We still did not have optimum conditions, visibility was poor & currents were strong, so we relied on the BlueView sonar for much of the dive."**

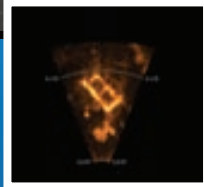
*From offshore ROV operator after resuming operations with a BlueView sonar.*



**Search and  
Navigation**



**Underwater  
Inspection**



**Zero Visibility  
Operations**

# BlueView<sup>®</sup>

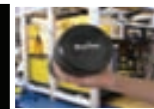
TECHNOLOGIES

## Miniature Multibeam Imaging Sonar

- Frequencies from 450 kHz - 2.25 MHz
- 45° or 90° Fields-of-View Available
- Dual Frequency Systems
- Shallow and Deep Systems



**High-Resolution Imagery • Compact • Low Power  
Cost Effective • Easy to Use • Easy to Integrate**



[www.blueview.com](http://www.blueview.com) Seattle, WA

# LED Multi-SeaLite<sup>®</sup>

Bright White, Blue and  
Green colors available

Choice of Spot or  
Flood Reflectors

Vibration and  
Shock Resistant

6000M Depth Rating

Plug Compatible with  
Standard Multi-SeaLites<sup>®</sup>

Uses Standard  
Multi-SeaLite<sup>®</sup> Mount

 **DEEPCSEA**  
Power & Light  
[www.deepsea.com](http://www.deepsea.com) 1-800-487-3775

*See us at  
Underwater  
Intervention '09!*

and in certain other locations, that the sonar must be deactivated when a marine mammal was within 2,200 yards of the sonar source, and that two National Marine Fisheries Service-trained lookouts must be posted during sonar operations to monitor the presence of marine mammals.

President Bush signed a waiver on January 15, 2008, attempting to exempt the Navy and these planned sonar operations from the judge's injunction. However, the federal judge who had issued the injunction ruled that the President did not have the authority to grant such a waiver.

Environmental groups, led by the Natural Resources Defense Council, which had filed the original lawsuit to prevent the Navy from conducting these sonar training exercises, were certainly pleased with the ruling and claimed that the proper balance between national security and the environment had been achieved. The White House believed that national security had been seriously

compromised at the expense of unproven science and environmentalism.

### Looking Forward

The Supreme Court has now decided to review this matter during its October 2008 term. Although the case is ostensibly about sonar and its effect on marine mammals, the underlying issues involving the right of the President to place national security concerns ahead of environmental laws will be the lasting impact of the Court's decision. As sonar technology regains its importance in military strategy, the ability of the Navy to detect underwater threats will now be measured against the potential harm to the wildlife which shares the ocean with the Navy fleet.

The appropriate balance between security, technology, and the environment will likely continue to involve spirited debate between the military, the offshore industry, environmental advocates, and other interested parties. A resolution of this debate will have a significant impact on everyone involved.

**Underwater noise — from all man-made sources — and its effects on marine life continues to be a controversial topic.**



# Can't see? Let DIDSON be your eyes

## Four Different Models



3000 meter  
Titanium DIDSON



300 meter DIDSON

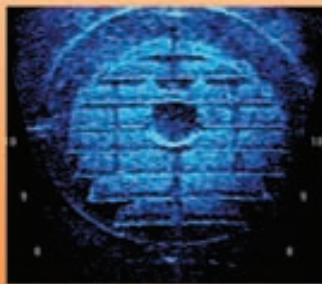


Diver Held 100 meter DIDSON

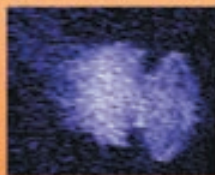


1000 meter DIDSON

## Same Great Images



Hull Intake



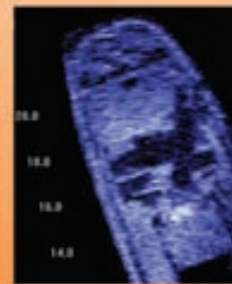
Jellyfish



Giant Grouper



Boat & Milfoil



Shipwreck



For complete information about DIDSON visit [www.soundmetrics.com](http://www.soundmetrics.com)

For sales, rentals and demonstrations contact Ocean Marine Industries  
[www.oceanmarineinc.com](http://www.oceanmarineinc.com) • [info@oceanmarineinc.com](mailto:info@oceanmarineinc.com) • 757.382.7616

## WITH ITC, A SILENT THREAT IS UNHEARD OF.



The last thing you want is an undersea threat to slip by unreported. So the first thing you need is an ITC transducer. Like our ITC-3148.

With unlimited depth, a low cost and hemispherical beam pattern, it's ideal for telemetry usage in distributed sensor networks anywhere in the ocean. Like next to the United States.

For trust you can hear, contact ITC today.



**International Transducer Corporation**

869 Ward Drive • Santa Barbara, CA 93111  
805.683.2575 • 805.967.8199 FAX

[www.itc-transducers.com](http://www.itc-transducers.com)

COTS

*The Science of Sound Performance*

# Naval Sub and Drift Software Aid North Sea Hunt for *Bonhomme Richard*

As the search for the famous Bonhomme Richard Revolutionary War ship wreck continues, ASA's custom drift simulation software is credited for providing promising targets for the current phase of the search using a Nuclear Naval Submarine to survey identified sites on the ocean floor.

The Bonhomme Richard, captained by American naval



hero John Paul Jones, sank in the North Sea in 1779, after claiming victory over the British ship HMS Serapis in one of the most pivotal battles of the Revolutionary War. An intense shipwreck search effort organized by the nonprofit Ocean Technology Foundation (OTF) in Groton, Connecticut, and the Naval Historical Center (NHC) in Washington, D.C. has been underway since 2006. As part of the high-tech approach used in the recent search efforts, OTF brought Applied Science Associates (ASA) and JMS Naval Architects & Salvage Engineers onto the project to help pinpoint the wreck site as well as now is getting help from another technological powerhouse: a nuclear submarine.

The NR-1, the U.S. Navy's only nuclear-powered research submarine, is in the North Sea using powerful sonar and underwater cameras to search for the famed Bonhomme Richard.

The effort dramatizes how software — and now, nuclear technology — is aiding the search for sunken relics of world history.

Melissa Ryan, lead project manager for the Ocean Technology Foundation in Groton, Conn., said the Navy assigned the Navy's only nuclear-powered research submarine, manned by a crew of 11 submariners, to the expedition. OTF has spent the last three summers hunting for the remains of the Bonhomme Richard.

The expedition has identified several wrecks that might be Jones' ship since the hunt began in 2006. But the team has been unable to positively identify its target. "Sometimes there's no replacement for a pair of human eyes," Chris Cooper, another project scientist with the OTF said.

"Navy experts will be able to visually inspect spots on the sea floor where ship timbers and other features have been located by sonar signals," he says.

This assignment will likely be the last for the NR-1 sub, as the U.S. Navy announced it is on the brink of retirement. The Navy holds special interest in the project. A heavy underdog, and outgunned in the vicious battle, uttering the famous quote, "I have not yet begun to fight," despite dire circumstances, John Paul Jones is credited as the founding father of the U.S. Navy.





# SHADOWS



## REVOLUTIONARY!

### Real-time & Precise Seabed Mapping



Call us now • NORTH AMERICA : +1 (781) 937 8800 • EMEA : +33 1 30 08 98 88 • ASIA : +65 6747 4912 • info@ixsea.com • www.ixsea.com

# Piezoelectric Ceramics



Since 1959

## The heart of YOUR system

Quality  
Delivery  
Solutions



[www.channelindustries.com](http://www.channelindustries.com)

839 Ward Drive . Santa Barbara . CA . 93111

(805) 967-0171 . FAX (805) 683-3420 . ciisales@channeltech.com

The intact bow of a North Sea wreck.  
(Photo Credit: Ocean Technology Foundation)



Deck frames and a hatch are visible on this wreck.  
(Photo Credit: Ocean Technology Foundation)

### Submerged in the North Sea

Jones' missing ship and the NR-1 are separated by more than 200 years of history and couldn't be more different, says Joseph Callo, the author of a prize-winning biography of John Paul Jones.

"(But) there's an instructive match between today's U.S. Navy sailors and those who fought a horrific battle and won with John Paul Jones on Bonhomme Richard," Callo

said. The NR-1, which is capable of diving thousands of feet, will be operating at relatively shallow depths of about 175 feet. The North Sea is known for its strong currents and poor underwater visibility.

The sub's nuclear reactor lets it submerge for long periods and cover large swathes of ocean bottom. "She can stay down and operate 24/7," Cooper said.

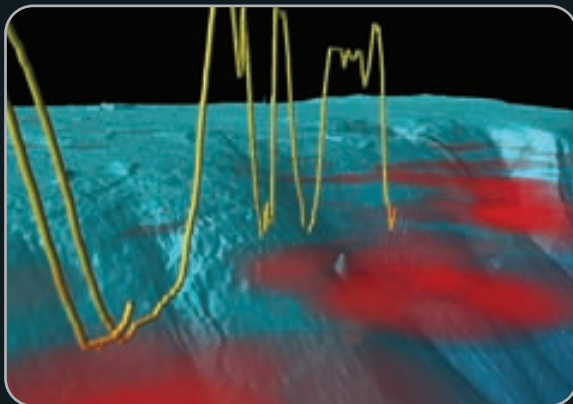
The sub is equipped with thick glass view-ports and

NR1 cruises out of Portsmouth, U.K. The British ship HMS Victory is visible in the background.  
(Photo Credit: Ocean Technology Foundation)





## 4D Environmental Data Analysis ...with Vision!



- Manipulate and visualize time-varying spatial data
- Streamline the integration of large and diverse data sets
- Explore and analyze relationships among multiple variables
- Easily communicate complex results in an engaging way

### Find out more

**web** [www.eonfusion.myriax.com](http://www.eonfusion.myriax.com)  
**email** [info@eonfusion.myriax.com](mailto:info@eonfusion.myriax.com)

[www.myriax.com](http://www.myriax.com)

Myriax

LYYN

[WWW.LYYN.COM](http://WWW.LYYN.COM)

Want to see  
what **we** see?

We give you a clearer vision!

In any situation where you need to see clearly, you need LYYN™ Visibility Enhancement Technology.



You can enhance visibility in color video in real-time as well as in stored material.



Every single video frame is optimized for the human eye in real-time, reducing visibility problems in subsea environment, as well as in fog, snow, dust, sand and low light.



Europe: +46 46 286 57 90  
North America: 805 798 0277  
Asia-Pacific: +61 406 996 183  
Other: +46 46 286 57 90

Or contact us on [www.lyyn.com](http://www.lyyn.com) and we'll help clear up things for you.

Seeing is believing.

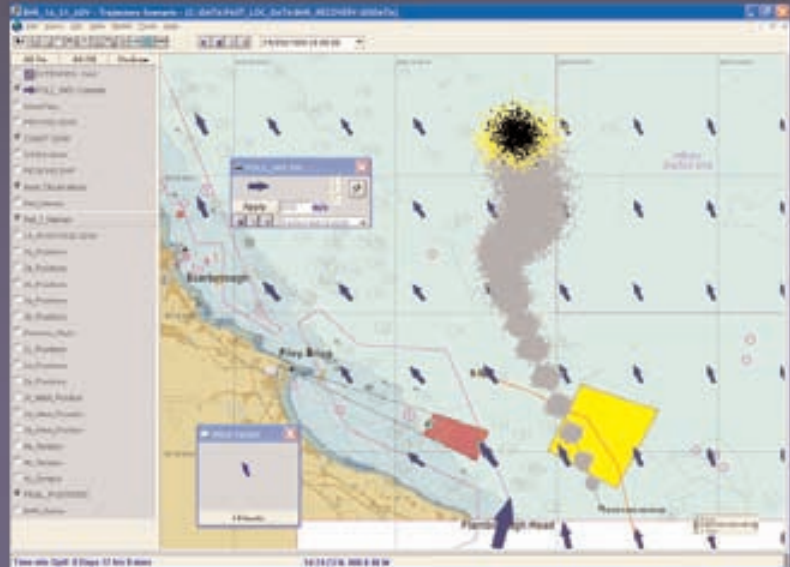
# ASA's Data Integration in GIS Framework



Key factor: "best-guess" of the storyboard or time-line of events, observations, records

## Integration into GIS Interface

- Historic wind records
- Modeled tidal currents
- Observed positions of BHR, Serapis and mast debris
- Time-related information



banks of underwater lights that can illuminate submerged objects. It also carries 16 different TV cameras that operate in low light, as well as advanced electronics and computers that aid in locating objects. Besides the use of the NR-1, the National Oceanic and Atmospheric Administration also donated a large research ship and crew last year to help in the search. Cooper says the NR-1 arrived aboard a support ship at a site off Flamborough Head, Britain, in June 2008 and has been searching various sites during the summer. Researchers say they're close to figuring out where the ship lies by sifting through sonar data and zeroing in on the probable wreck site through process of elimination and an already focused area due to the help of another key hi-tech tool.

### The High-Tech Advantage: Drift Simulation Software

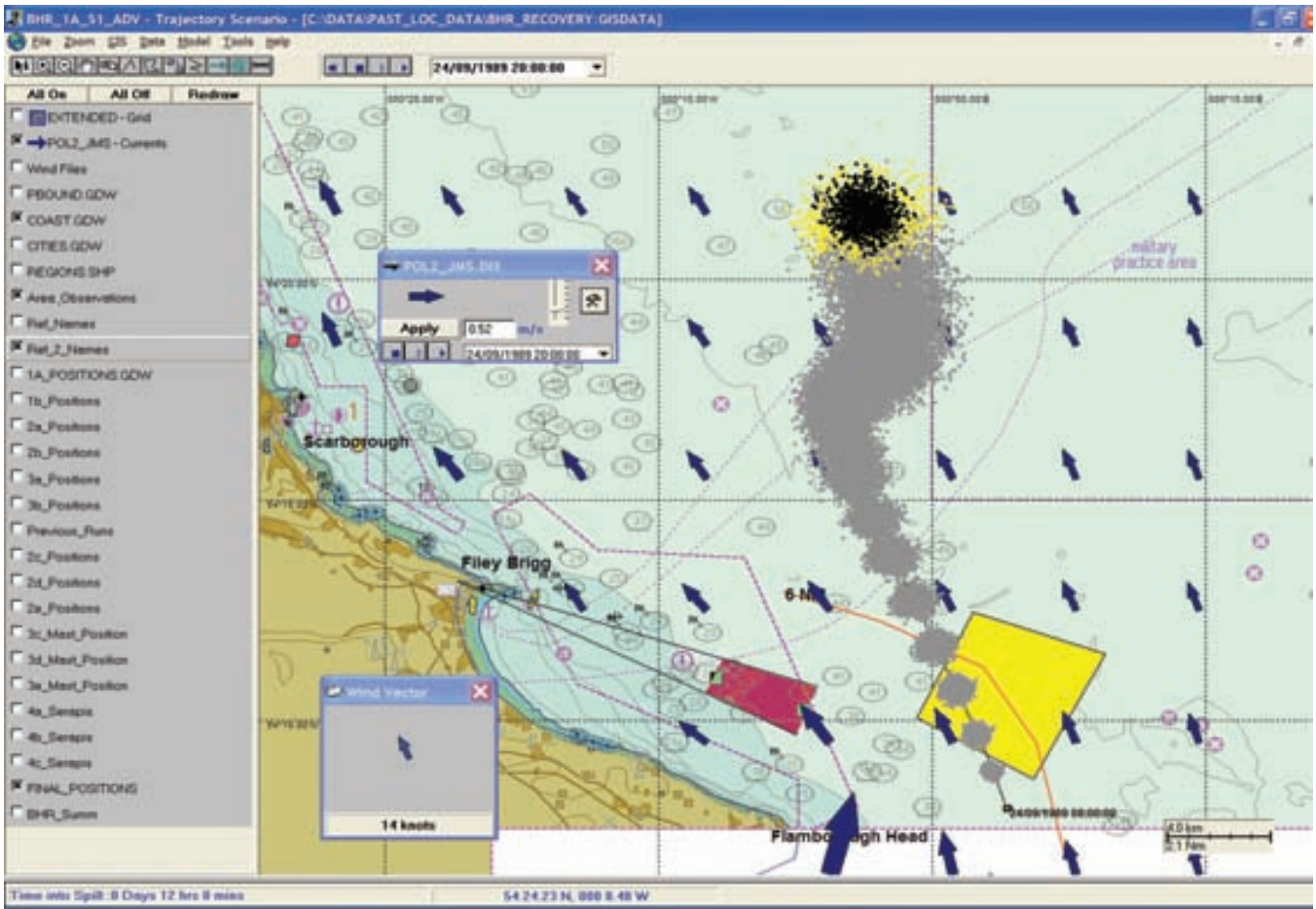
The Bonhomme Richard search is drawing scientific interest because it's using cutting-edge software that creates what's called a drift simulation model. The model incorporates tidal, wind and historical data from the day

the battle was fought to find where the ship lies.

Rick Fernandes, a naval graphics expert, says it's the first time this type of software has been used to search for the wreck of an 18th-century ship.

"What we needed to do existed in two separate software programs, so ASA built us a hybrid application — combining their oil spill prediction software and their Coast Guard search and rescue software," says Rick Fernandes, a naval graphics expert at JMS aiding in the project. "The software uses physical laws, as well as tidal and wind data from the period, times and locations given by eyewitnesses," to plot the most probable resting place of the vessel. Eric Comerma, a Ph.D. senior researcher at ASA, led the complex challenge of data integration into a geographical information systems (GIS) framework and he insists that "collaborating with this dedicated team in the search for the Bonhomme Richard is such fulfilling work because it is both challenging as well as historically significant."

Assisting ASA's Eric Comerma, was U.S. Coast Guard Special Operations Search & Rescue expert, Art Allen,



who played a key role in the development of the object drift modeling methodology that was integrated into the modeling. This was data integration never before brought in to models of this purpose and was used to more accurately represent the effects of the wind and current on the slowly sinking vessel. Due to the complexity of the battle circumstances, which consisted of a large ship taking on water and damage, sails burning, yet becoming fully disabled while trying to sail over a period of 36 hours, new and additional factors were integrated by the team. With key knowledge and experience from Art Allen, one of the world's leading experts on disabled vessels at sea, this modeling software is first of its kind.

The software was developed by Applied Science Associates of Narragansett, R.I., an environmental and technology consulting firm that makes software for marine and underwater uses.

"We're figuring out the location of a ship that was half afloat, with sails burning, while taking into account tides and currents," Lee Dooley ASA's Marketing & Communications Director said of the Bonhomme

Richard search custom software development.

A lot of the "heavy lifting" by the software was done on earlier expeditions, he added. "This is why they're using a submarine this time around to inspect the actual sites they've identified using our drift software."

The OTF and NHC have a Web site, [bonhomme-richard.org](http://bonhomme-richard.org) that provides more details on the ongoing search effort.

*This story was contributed by Applied Science Associates, Inc. (ASA), as they continue to collaborate with Ocean Technology Foundation in the search for the Bonhomme Richard. ASA is a science & technology solutions company specializing in metocean data integration and environmental modeling technology. For more about ASA, visit [www.asascience.com](http://www.asascience.com) or contact Lee Dooley, [ldooley@asascience.com](mailto:ldooley@asascience.com).*

# Virtualizing Physical Measurements Using Wireless Sensor Technology

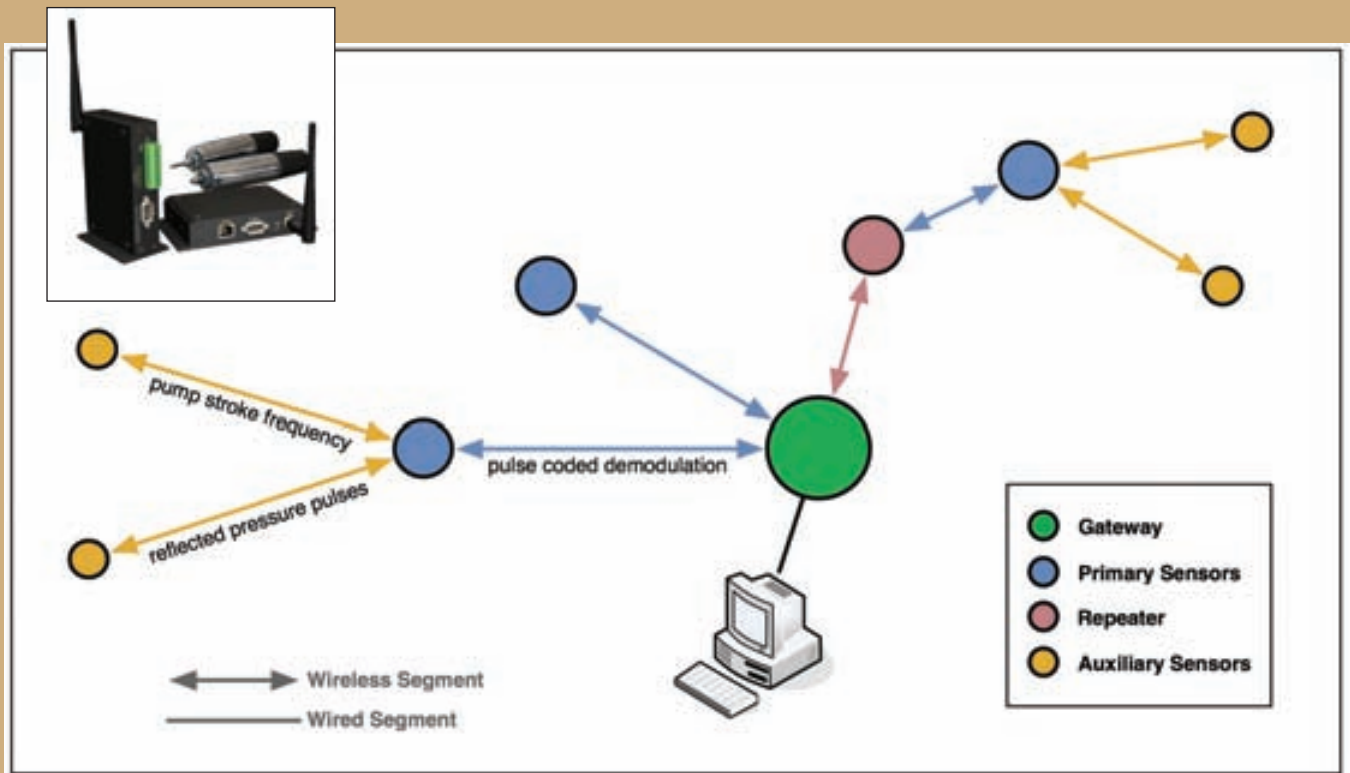
by Tom Skwara

Virtualizing physical measurements using wireless sensor technology brings new solution choices to mission challenges. Wireless sensors are smart devices that realize measurements without the using external data acquisition (DAQ) equipment or external power sources. The hardware needed to directly digitize low-level signals, resides within each sensor. The analog-to-digital converter (ADC) found in a highly integrated microcontroller is typically accompanied by a multiplexer (MUX) and programmable gain amplifier (PGA). Further inclusion of other mixed-signal peripherals such as comparators and digital-to-analog converters (DAC), promote the sensor as a complete measurement processing system.

The self-contained sensor can buffer consecutive high-speed measurements within its internal memory in preparation for sophisticated post-processing analytics. A Fourier transform (FFT) for example can be applied to the

captured waveform for conversion to a magnitude and phase component of each frequency. This analysis in the frequency domain reveals which frequencies are present in the waveform and builds a characterization model that describes the waveform's signature. It is this signature as opposed to raw measurement data that can be communicated wirelessly to destination hardware in the sensor network pathway. There is an important benefit to this approach. The power required to periodically transmit high-level descriptive information is magnitudes less than what is required to continuously stream raw measurement data. Since the wireless sensor is battery-powered, energy savings is critical.

Ultimately the waveform signature description is received by another device that can conceivably be another sensor. A sensor that receives high-level description data from another sensor could use this auxiliary informa-



tion to improve its own accuracy by discriminating against the frequencies of the first sensor. Alternately, the destination device may be a gateway that reconstructs the waveform from the descriptive signature transmitted from one or more sensors in the network. The waveform in turn can be fed to the inputs of a legacy DAQ system that would otherwise see the sensor's direct output.

Before considering the details of data acquisition, post-processing and RF transmission, one must review the type of physical measurement that is being made and select the appropriate fundamental sensing method.

Pressure measurement can be accomplished using conventional sputtered film technology where a metal diaphragm deflects under pressure and its surface tension and compression regions affect change in the resistive legs of a Wheatstone bridge. A constant current or voltage generated by the microcontroller's DAC provides excitation to the bridge, whereby a small differential voltage is developed that is proportional to the pressure on the diaphragm. The ADC converts the differential signal with the assistance of the MUX and PGA as previously described.

Temperature measurement can be accomplished using a platinum RTD that changes its resistance proportional to its temperature. A constant current sourced by the microcontroller's DAC provides excitation to the RTD, whereby a small voltage is developed that is proportional to the RTD temperature. The ADC converts the signal with the assistance of the MUX and PGA as previously described.

Flow measurement can be accomplished using a turbine flow meter whereby impeller fins disrupt a magnetic field. The field disruption is detected by a proximity switch that triggers a comparator within the microcontroller at a rate proportional to the rotational speed of the impeller. The frequency of the comparator output is measured using the microcontroller's accurate time base.

Signal conversion to the digital domain within the sensor enables realization of the measurement in engineering units when correlated to internally stored calibration values. In addition to using post-processing methods to derive complex meaning of measurements (e.g. pump stroke signatures), the sensor may simply be delegated to reporting measurements in engineering units or percentages of full scale. This can occur on a fixed cadence, or in response to a programmed threshold of change. In either case, the receiving hardware is faced with some important decisions to make should the reporting interval be interrupted, or vary due to special circumstances such as a static measurement becoming dynamic

Virtualizing physical measurements using wireless sensor technology relies on deterministic behavior of the sensor network, but must also have agility to react gracefully under fault conditions. Receiving hardware relies on regular updates from sourcing hardware in order to preserve the integrity of the original physical measurement. If a sensor's transmission is blocked or is disrupted momentarily, the downstream receiving hardware must have the ability to properly handle the exception. Additionally, mesh sensor networks may dynamically reform themselves based on link quality and other factors, and so the resulting delay forces receiving hardware to handle the exception. An exception handling strategy is a system requirement since the nature of a disconnected system is that where disruptions are bound to occur. For instance, the system designer may establish an acceptance tolerance on the number of consecutive lost updates. Lost updates within the acceptable tolerance band may be interpolated, while an out-of-tolerance reporting condition may initiate a special sequence of events or generate an alarm.

While there are several RF technologies to consider for use in wireless sensor networks, it is ZigBee technology that represents the best combination of features that fit the needs of measurement virtualization solutions. ZigBee is a global standard, highly reliable, low cost, low power, low data rate, and highly secure. The mesh network topology that ZigBee technology enables provides reliability and agility when faced with changing environmental conditions.

Mission-critical systems using wireless sensor technology require a reliable power source within each sensor. Important criteria for battery selection includes superior energy density, long shelf life, low self-discharge rate and low weight. Lithium cells offer the best combination of these attributes. Several types of lithium batteries can be considered, including lithium thionyl chloride, manganese dioxide, and sulfur chloride.

Virtualizing physical measurements using wireless sensor technology enables a host of new solution choices. The elimination of wired connections and external data acquisition equipment is the obvious benefit, but the true power of measurement virtualization lies in the advanced signal processing capabilities within each sensor. The ability to communicate descriptive information between sensors to enhance measurements or enable complex system measurements, adds to the possibilities. Understanding virtualization concepts, selecting the best hardware, and making the right design choices all play a critical role in helping ensure your critical mission is a success.

*Transforming the ocean sciences through cabled observatories*

# NEPTUNE

## *Canada Project*

*by Chris Barnes, Mairi Best, Fern Johnson, Peter Phibbs and Benoit Pirenne*

For more than a century, ocean science data have been gathered primarily through ship borne measurements with a limited ability to develop long time series and real time data return. With the advent of cabled ocean observatories, the ocean sciences will be transformed at a time when the world desperately needs abundant, sound ocean data for a host of scientific, commercial and public policy decisions. Bringing abundant power and high bandwidth to diverse ocean environments, establishing a vast data archive, and enabling multidisciplinary interactive experiments in real time will transform the ocean sciences and complement other ocean observing systems.

The installation of the world's first regional cabled ocean observatory by NEPTUNE Canada (NC) with its principal contractor, Alcatel-Lucent (A-L), across the northern Juan de Fuca plate with five observatory nodes is planned for the summer 2009 weather window (the sixth node at Middle Valley is as yet only partly funded). A-L will mobilise a cable ship to Victoria to complete installation of the five nodes in May-June 2009 and will also

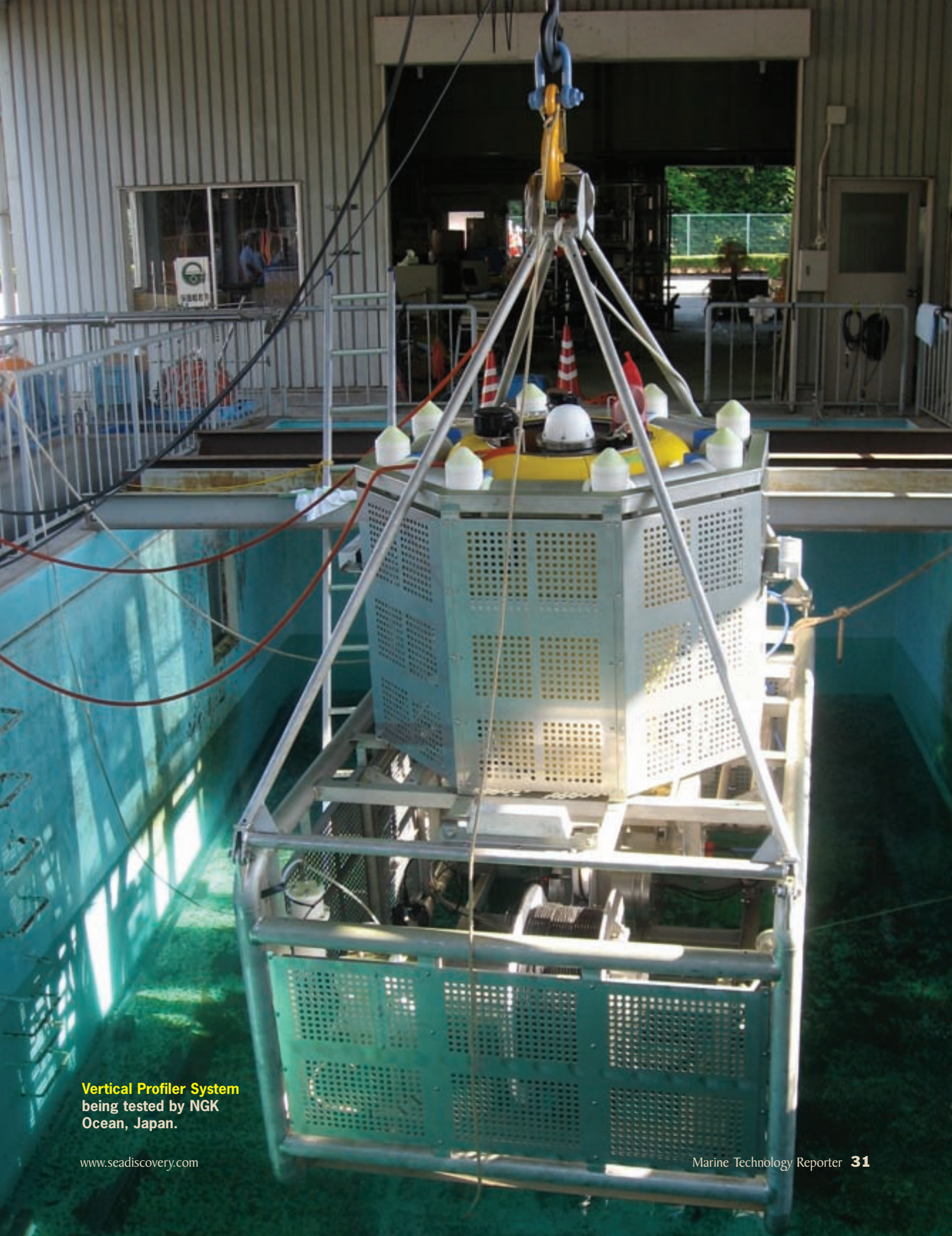
deploy the ROPOS ROV to assist with subsea connections. NC will arrange deployment of extension cables, junction boxes and instruments between July and September 2009, dependent on securing sufficient ship time with one or more suitable vessels and the ROPOS ROV.

### **Engineering developments**

Alcatel-Lucent continues its work on three significant development challenges related to the node that transforms the 10kVDC power to 400VDC: the low voltage power board, medium voltage converter, and wet mate connector. The remaining technical problems should be resolved in the next few months.

A recent significant achievement was the production of the first set of the 14 Junction Boxes by OceanWorks International, Vancouver. At the end of July, NC engineers led by Peter Phibbs, together with engineers from OceanWorks and Alcatel-Lucent successfully tested the integration of the OceanWorks junction box with an A-L





**Vertical Profiler System**  
being tested by NGK  
Ocean, Japan.

node. After over 40 successful test procedures, only minor adjustments remained for OceanWorks. One of the first Junction Boxes is now working successfully on an instrument test platform in Saanich Inlet powered from the VENUS node. A similar NC group, together with specialists from A-L and the Canadian Scientific Submersible Facility (CSSF; ROPOS ROV), recently met with A-L's subcontractor L3 MariPro in Santa Barbara to agree on the final adjustments in the design and initial manufacture of the trawl resistant frame for the nodes and on the node/TRF integration work. They also considered the significant challenges in the deployment of each node/TRF at the different sites (ranging from 100m to 2660m water depths), each weighing over six tons in air.

#### **Testing and integration of scientific instruments, extensions and junction boxes**

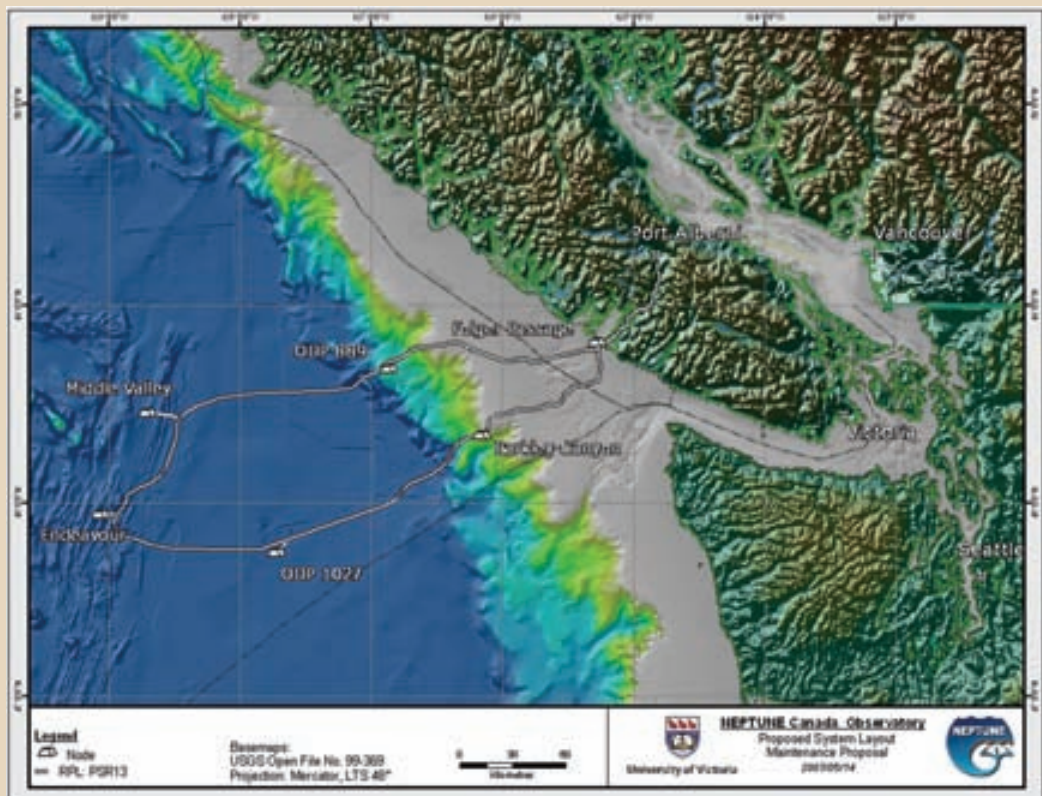
The bench and initial wet testing of the 130 individual instruments is now largely complete, coordinated by Mairi Best, and the next phase is their integration with the

junction boxes on research platforms and frames, together with DMAS connectivity, to support the various experiments near the main node sites. Highland Technologies, Sidney, is contracted to undertake much of this work. More advanced wet testing is underway undertaken using the VENUS node and UVic's Ocean Technology Test Bed in Saanich Inlet. Testing procedures include integration of junction boxes, instruments and software to ensure successful deployment in 2009. Considerable planning is underway for the necessary ship and ROV time and the coordination of the many complex activities within the May-September 2009 weather window. Delivery of the extensions, connectors and whips is ongoing, managed by Cheryl Katnick in coordination with the science team and Highland Technologies. The Saanich Inlet deployment in September was successful and involves examples of most of the components of next year's full deployment — an extension, an instrument frame, a junction box, and a variety of instruments and their associated whips.

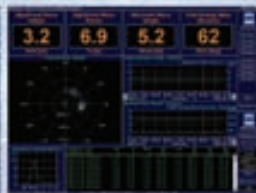
#### **Ifremer's TEMPO-mini camera and sensors for Endeavour Ridge volcanic.**



NEPTUNE Canada  
cabled ocean  
observatory route and  
node locations.



## WAVE RADARS



### DIRECTIONAL WAVE AND CURRENT MONITORING

**SM-050 WAVE AND CURRENT RADAR**  
Microwave Doppler Radar of High Accuracy.

**WAVEX**  
Wave and Current Extractor for Marine Radars. Type approved by DNV.

**DIRECTIONAL WAVE AND CURRENT RADARS ARE WELL SUITED FOR:**

- Offshore structures and vessels.
- Catamarans and high speed vessels.
- Naval and merchant vessels.
- Research and service vessels.
- Shore installations for ports and coastal stations.

### NON-DIRECTIONAL WAVE MONITORING, AIR GAP AND TIDE GAUGE

**SM-048 ALTIMETER AND SM-094 RANGE FINDER,**  
High Performance Microwave Sensors.

**NON-DIRECTIONAL MIROS RANGE FINDERS FEATURE:**

- Wave profile and air gap from vessels and offshore structures.
- Sea level and tide measurements, water level in ports and canals etc.
- Bridge clearance monitoring.
- 10, 20, 50 and 85 meter range.
- No influence by fog, rain or water spray.



## OIL SPILL DETECTION



**OIL SPILL DETECTION BY MARINE X-BAND RADARS, A NEW SYSTEM BASED ON PROCESSING OF DIGITIZED RADAR IMAGES**

**MAIN FEATURES:**

- Early detection of oil spills.
- Enables 24 hours a day skimmer operations.
- Prediction of oil spill drift.
- Flexible user interface.
- Add-on to the WAVEX system, providing additional sea state information.

**AREAS OF USE:**

- Stand-by and oil recovery vessels participating in oil spill clean up operations.
- Coast guard vessels for oil spill monitoring.
- Oils rigs, FPSOs and tankers for oil spill monitoring.
- Oil terminals and refineries for oil spill monitoring in the terminal area.

*Developed in cooperation with NOFO –  
Norwegian Clean Seas Association for Operating Companies*



Solbråveien 32, P.O. Box 364, NO-1372 Asker, Norway  
Tel: (+47) 66 98 75 00, Fax: (+47) 66 90 41 70  
E-mail: office@miros.no, Web site: www.miros.no

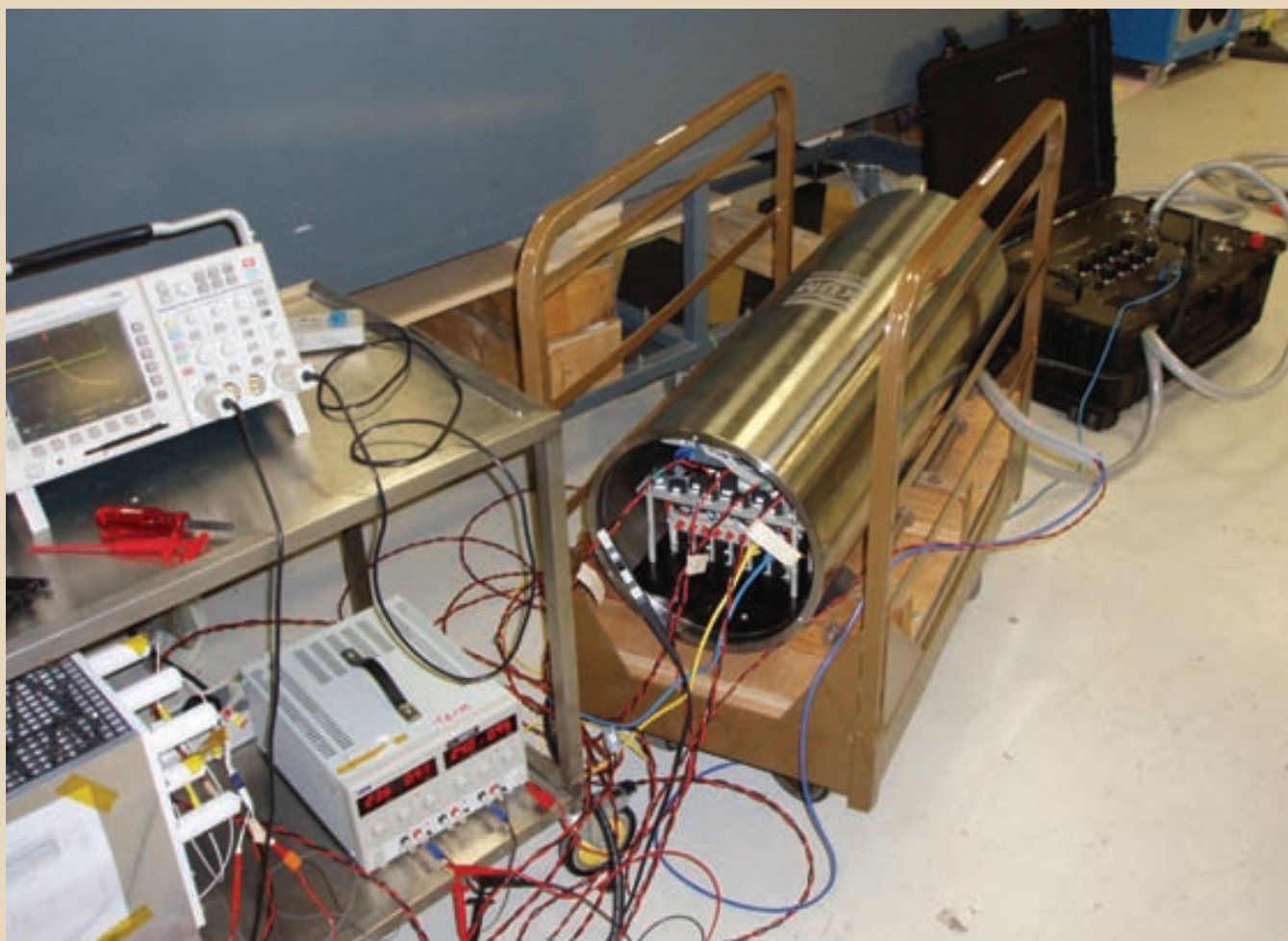
measuring the ocean surface

Excellent progress is occurring with the development of two large pioneering instrument developments: the crawler and the Vertical Profiler System (VPS). In June, the crawler (from Jacobs University, Bremen) was first tested off a dock where the camera, motor controls and sensor input all worked flawlessly. The next month saw an actual crawl along the gas hydrate outcrops in Barkley Canyon in 850m water-depth — the crawler's ultimate operational destination. It was deployed with an umbilical from the ROPOS ROV and it hosted a variety of instruments including an HD video camera and a methane analyzer. One unique feature is its control interface, which connects directly into the Web. Its out-of-water weight of 275kg is reduced to 40kg in water with the attachment of syntactic foam floatation blocks. The crawler has been returned to Germany for modifications to its power and

trackway systems. The Vertical Profiler System (VPS) passed the Factory Acceptance Tests following more than a year of design and manufacturing effort by Nichiyu Giken Kogyo Co. (NGK), Saitama, Japan. The VPS will arrive in Victoria in October, be tested locally over the winter, and deployed next summer near the shelf-break north of Barkley Canyon. The 400m VPS consists of a base platform and a tethered float, weighing 2 tons in air. A winch system controls the depth of the float, which houses the science instruments. Traveling between the sea surface and the seabed in about two hours, instruments on the float will capture data at various water depths. Information gathered will include water properties, such as salinity, temperature, dissolved gases and nutrients, oceanographic currents, concentrations of plankton and fish, and acoustic data related to marine mammals.

Loading of **test instrument platform**, Saanich Inlet, Vancouver Island.





**Junction Box testing, OceanWorks International.**

The VPS has been interesting from an engineering standpoint because it employs mechanical systems as well as power and communications. Designing the winch system to operate within reasonable power limitations and the integration of the science instruments into the VPS have been particularly challenging.

#### **Developments with the Data Management and Archive System (DMAS)**

Nearly all the additional equipment (power feed equipment and laser-based communication and security systems) and physical modifications at the Port Alberni Shore station, acquired for NEPTUNE Canada in 2004, have been completed and the 10Gbps connection to the UVic Data Centre fully tested.

The DMAS group, led by Benoît Pirenne, continues to expand and is now developing the Oceans 2.0 social network software, with funding from CANARIE, and will address three areas of development:

- Interoperability between VENUS and NEPTUNE

Canada and a few other selected data centres

- A Web 2.0 environment that will allow users to search and discover data, work with colleagues on-line on a scientific project involving ocean-related data and interact with instrumentation
- Set up and integrate an underwater HDTV camera with high-quality compression and with controls available in the Web 2.0 environment

Additional DMAS equipment in support of observatory operations includes about 25 servers. The latter will soon be joined by storage for the database and the operational systems as well as by network switches. The conversion from Sybase to Oracle is progressing well. At an international Interoperability Workshop, organized at UVic in September 2008, it was agreed to develop pilot projects for interoperability among selected observatories.

#### **US funding status and collaboration**

With the delay in funding, U.S. scientists are beginning



**Shore station at Port Alberni, Vancouver Island.**

to seize the opportunity to request funds for instruments and experiments on the NC observatory. One such successful National Science Foundation application approved this month was \$1.2M awarded to Russ White (University of Washington) and Peter Rona (Rutgers University): Acoustic instrumentation for imaging and quantifying hydrothermal flow in NEPTUNE Canada Regional Cabled Observatory at Main Endeavour Field, Juan de Fuca Ridge).

This instrumentation will acoustically image time series of the changing 3D geometry, flow rate and volume flux of buoyant plumes discharging from vents and areal distribution of diffuse flow from the surrounding seafloor. Connection to NC will provide the power and bandwidth to extend the present technically proven capability of imaging from days/weeks (ROV or battery power) to months/years. This temporal extension will enable monitoring of fluxes of hydrothermal flow and detecting linkages with external forcing processes from tidal cycles to geologic events (earthquakes, volcanic activity). The proposed new instrumentation, the Cabled Observatory Imaging Sonar System (COVIS), is designed as an ideal instrument for NC's power and data bandwidth and will adapt to NC's mechanical, electrical, and software functional requirements. The 3-axis angular translation system will allow operators to precisely position the multi-beam sonar head into observing positions for both plume and diffuse flow measurements, will be adaptable to changes of the flow orientations, will be capable of autonomous response to significant geophysical events detected by other NC instrumentation via shore based control software, and will have scope to be moved within the vent field.

## Summary

With the installation for the backbone cable system last year and the nodes and instruments next year, and with the development of the sophisticated DMAS, NEPTUNE Canada is transitioning from the installation phase to the operational phase. The emergence of the world's first regional cabled ocean observatory will transform the ocean sciences and will be followed by several others over the next decade being planned in the US, Japan, Taiwan, China, India and the European Union. The NC observatory, designed to be expandable in its footprint, nodes and instruments, offers an exceptional facility for testing scientific and commercial prototypes of new technologies, monitored and demonstrated in real time. NEPTUNE Canada ([neptune@uvic.ca](mailto:neptune@uvic.ca)) invites new scientific and industrial participation, experiments, instrumentation and data services.

## About the Authors

*Chris Barnes, Project Director, NEPTUNE Canada, University of Victoria, was previously at the University of Waterloo, Memorial University of Newfoundland, and Geological Survey of Canada and was Director, Centre of Earth and Ocean Research and School of Earth and Ocean Sciences at UVic. [crbarnes@uvic.ca](mailto:crbarnes@uvic.ca)*

*Mairi Best, Associate Director Science, NEPTUNE Canada was formerly an Assistant Professor at McGill University, with research interests in the preservation of calcium carbonate skeletons, cycling of biogenic carbonate and ocean acidification.*

*Fern Johnson, Associate Director, Finance and Administration with NEPTUNE Canada, is a Certified General Accountant who manages the finances and also provides oversight management of facilities, central office operation, and human resources.*

*Peter Phibbs, Associate Director, Engineering and Operations for NEPTUNE Canada, had prior experience with 360Networks managing complex deepwater construction projects, including submarine telecommunications systems in the Atlantic Ocean; he is particularly responsible for the Alcatel and OceanWorks contracts.*

*Benoît Pirenne, Associate Director, Information Technology, previously had 18 years experience at the European Southern Observatory (ESO) in charge of science data archive of Hubble Space Telescope and ESO's telescopes.*

# Glider joins Rapid-Watch Ocean Monitoring Program

On September 16, 2008, a team from the National Oceanography Centre, Southampton, UK launched an underwater glider in the Eastern Atlantic, with the aim to understand better the interaction between oceans and climate.

For 90 days the vehicle is scheduled to travel about 2,300 km, sampling more than 1,000 profiles of temperature, salinity and currents in the upper km of the ocean. The results will be used in the 'Rapid-Watch' program that monitors the meridional overturning circulation of the Atlantic.

Also known as the 'Atlantic heat conveyor' this is the system of ocean currents that transports heat polewards, thereby influencing European climate.

The use of research ships to make these measurements or deploy moorings is increasingly expensive. But during the last decade there have been great strides in the development of autonomous underwater vehicles. Gliders are set to become the most widely used of these. "Glider is one of the technological developments that are changing the way we observe the ocean and it very exciting for us to be at the forefront of their application in ocean and climate science," said David Smeed of the National Oceanography Centre.

Glider is propelled by changing their volume and hence their buoyancy. This is done by pumping oil from

an inner reservoir in to an expanding external bladder to make the glider rise, and letting the oil flow back into the reservoir at the surface to make the glider sink.

The hull is designed to have compressibility similar to that of water thus increasing the efficiency of this mechanism. Wings enable a glider to move horizontally as it dives or climbs and a rudder is used to control the direction. The vehicles used by the National Oceanography Centre were designed and built by Teledyne Webb Research Corporation.

Using an average of just 1.5 Watts, less power than most bicycle lamps, gliders have been designed for endurance. They are typically able to 'fly' from the surface to 1,000-m depth and back to the surface, while travelling about 4 km horizontally, in around 3 hours.

While at sea the gliders surface several times a day and transmit the data they have collected via satellite communications. Scientists are also able to send new instructions to the gliders. This is a very flexible way of working. As conditions change during the deployment the sampling strategy and location can be varied to make the best use of the vehicles.

The Rapid-Watch program — which uses a wide array of instrumentation — is funded by the Natural Environment Research Council and will allow the observation in the Atlantic to continue until 2014.



# Imaging Plankton at 5 Knots

## Biological Oceanography and near Real Time Processing

*by Charles Cousin & Cedric Guigand*

In 2005, Bellamare, LLC and the Rosenstiel School for Marine and Atmospheric Science of the University of Miami started collaborating on the development of a new plankton imaging instrument for fisheries research. Dr. R. Cowen and C. Guigand originated an optical scanning system, based on machine vision technology and back lighting techniques (shadowgraphy). Bellamare was in charge of integrating the instrument, by packaging the precision optical and electronic components of the system into pressure rated enclosures, and designing a robust and reliable oceanic towed vehicle for field demonstration. The instrument is dubbed ISIIS for "In Situ Ichthyoplankton Imaging System."

ISIIS was developed to fulfill a demand for better sampling techniques. Current larval fish sampling studies are typically carried out with towed net systems, which offer limited versatility and data analysis. Nets collect organisms over the sampling distance/depth profile(s) and hence do not provide a fine scale resolution of organism population. Net tows also require massive sums of time to perform data analysis — approximately one man-year of post-processing work for every two days at sea. These limitations have spurred many attempts to develop in situ imaging systems and a number of systems already exist - each having their particular focus. While successful, these systems often are limited in the volume of water sampled or imaging capabilities, making it difficult to study relatively rare organisms (i.e. fish larvae).

ISIIS technology presents a notable advancement which allows for a wide spread of application, as the vehicle and its imaging system are configurable and give the versatility needed for studying a range of organisms - from small, abundant plankton, to larger and more rare specimens. The first prototype, as described in an article in the journal of *Limnology and Oceanography: Methods* 6, 2008 126-132 by Dr. R. Cowen and C. Guigand, has already demonstrated, sampling close to 10% of the volume fil-

tered by net systems, which was an improvement over previous in situ imaging systems, by more than an order of magnitude. The ISIIS prototype also quantified densities of fish larvae equal to, or better than 1 sq. m. and 4 sq. m. MOCNESS net samples, taken in the same location and at the same time of year.

Moreover ISIIS allows for:

- Categorization of fish larvae and other meso-zooplankters
- Identification of the organism taxonomy as the larvae are see-through and their features can be easily recognized
- Observation of their In Situ orientation
- Analysis of aggregation and their relation to the environmental conditions
- Studies of behavioral/orientation relevant to feeding, floating, diurnal rhythm and vertical migration.
- The gathering of data pertaining to spawning and stock assessment via the measurement of egg abundance over large areas.

To enhance ISIIS's sampling and data analysis capabilities in real-time mode, an image recognition software is being developed by Dr. Gavriil Tsechpenakis of the Department of Electrical and Computer Engineering at the University of Miami.

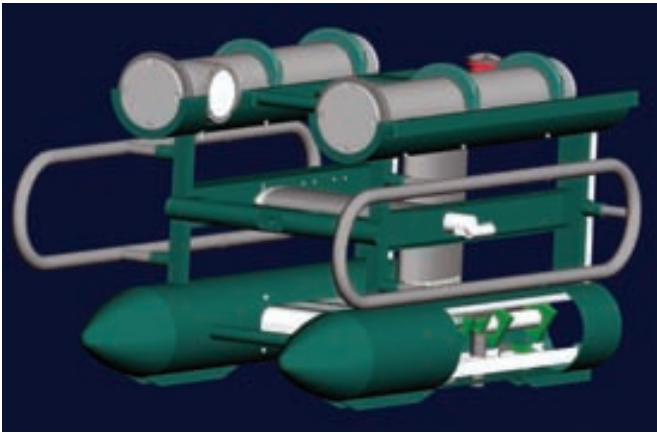
Since the completion and testing of the first prototype, a variety of system optimizations have been incorporated, including RSMAS's success in generating an enhanced depth of field for ISIIS's camera equipment and Bellamare's successes in improving the vehicle's configuration, thereby reducing the equipment's environmental disturbance, and most importantly, developing capabilities for pre-programmed undulation.

Bellamare's engineering efforts have focused on adding undulation capabilities to ISIIS, so that it could map a preset section of the water column and provide a fine scale resolution of the distribution of organisms at different depths. The vehicle's 200 m depth-rated design mini-

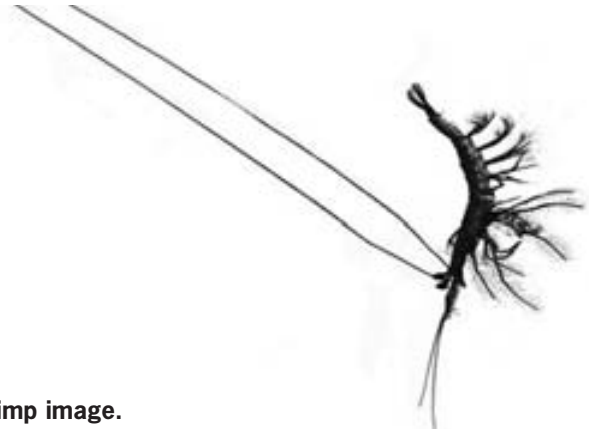




ISIS was developed to fulfill a demand for better sampling techniques.



Shrimp image.



mizes vibrations affecting image resolution and allows a near-completely undisturbed view of larval organisms, due to both the frame's advanced hydrodynamic features, and towing the platform from the side of a ship rather than from the stern, thereby moving the tether out of the path of ISIIS's sensitive camera equipment.

The vehicle frame is divided into four compartmentalized enclosures with imaging and optical equipment seamlessly integrated into ISIIS's ventral housings and environmental sensors and electronics in the dorsal housings. The sensitive instrument equipment is isolated from the aluminum frame by using separating suspension and vibration absorbing materials, and the vehicle's tether is secured to the frame with shock absorbing component.

The vehicle navigates with the use of a controlling elevator wing, that receives feedback from a position sensor, capable of performing water depth soundings. A second wing serves as a rudder and provides towing ability from a side of the supporting ship.

At the normal operating towing speed of 5 knots, the Matlab simulations predict a required tether length of 700 m, in order to reach 200m operational depth. A LabView based interface allows ISIIS's undulating depth profiles to be pre-programmed before deployment.

In order to optimize the ISIIS configuration and operational profile, Bellamare has performed extensive computational fluid dynamics simulations. The results have demonstrated that the vehicle generates enough lift to reach target water depths. Similar simulations have confirmed the preliminary drag estimates, used to structurally engineer the vehicle, while under hydrodynamic loading. Additionally, the CFD simulations have proven that virtually entirely undisturbed water flows through the imaging volume of the vehicle, providing a near-completely natural view of the target organisms.

The structural analysis of the ISIIS includes static and dynamic evaluations and was performed using ANSYS. The integrity of the pressure enclosures and the optical glass view-port design have also been validated for the operational conditions.

RSMAS and Bellamare view ISIIS as a truly modern solution for the scientific fisheries research community. Capable of real time data analysis and the opportunity to re-analyze data at will, ISIIS brings thoroughly desired speed to ichthyoplankton research and the field of biological oceanography in general.

Bellamare has created a survey to help define the needs of the scientific community for the successful application of this instrument and invites all interested parties to participate in order to ensure that ISIIS will be available to everyone in need.

[www.bellamare-us.com](http://www.bellamare-us.com)

#### About the Authors

*Charles Cousin is the president and co-founder of Bellamare LLC. Since completion of his MSE in Naval Architecture and Marine Engineering at the University of Michigan, Ann Arbor 1999, he has been leading the design and manufacturing of oceanographic instruments, towed vehicles and manned acrylic submersible. Charles can be contacted at [charles@bellamare-us.com](mailto:charles@bellamare-us.com).*

*Visit [www.bellamare-us.com](http://www.bellamare-us.com)*

*Cedric Guigand is a Senior Research Associate at the Rosenstiel School of Marine and Atmospheric Science in Miami. He is mainly responsible for biological instrument design and system integration as well as facilitating dialogue between oceanographers and engineers.*

*[www.rsmas.miami.edu](http://www.rsmas.miami.edu)*

# OTE '08: Post Show Report

The Rhode Island Convention Center in Providence, Rhode Island, once again proved to be an ideal location for the industry to gather in the autumn, as OceanTech Expo (OTE) — which ran from October 1-3, 2008 — recorded another solid performance, serving as the venue where industry, government and academia came together to discuss the business of subsea technology.

Rhode Island Governor Donald Carcieri again opened the festivities, addressing OTE delegates and performing the traditional ribbon cutting ceremony.

Highlights of the three days in Providence were plentiful, and overall a steady flow of visitors kept the exhibition floor and Industry Outlook Session conferences busy.

A large group booth from Newfoundland Labrador anchored the exhibition floor, a space which helped to highlight the many facets of the region's subsea expertise, particularly in contending with very harsh, very cold and icy environments.

OTE's opening day was highlighted by the presentation of Marine Technology Reporter's inaugural "SeaMaster"

Award to Thomas S. Chance, President and CEO of C&C Technologies, which was presented at the OTE Exhibitor Reception and included the presentation of a crystal trophy and an Omega Seamaster watch to mark the occasion.

The Industry Outlook Panel discussions again proved to be a big draw, highlighted by a top-flight "Underwater Vehicles" panel, chaired by David Kelly, CEO of Bluefin Robotics, and including presentations by Tyler Schilling of Schilling Robotics and Andy Bown of Woods Hole Oceanographic.

This year's line-up includes a conference schedule packed with interesting topics, with insightful updates from industry leaders in government, industry and academia.

OceanTech Expo 2009 (OTE '09) is scheduled for October 7-9, 2009, in Providence, Rhode Island.

**For information on securing exhibition space, contact Rob Howard at: Email: [howard@marinelink.com](mailto:howard@marinelink.com) or tel: 561-732-4368.**



## OTE '08 is Open!

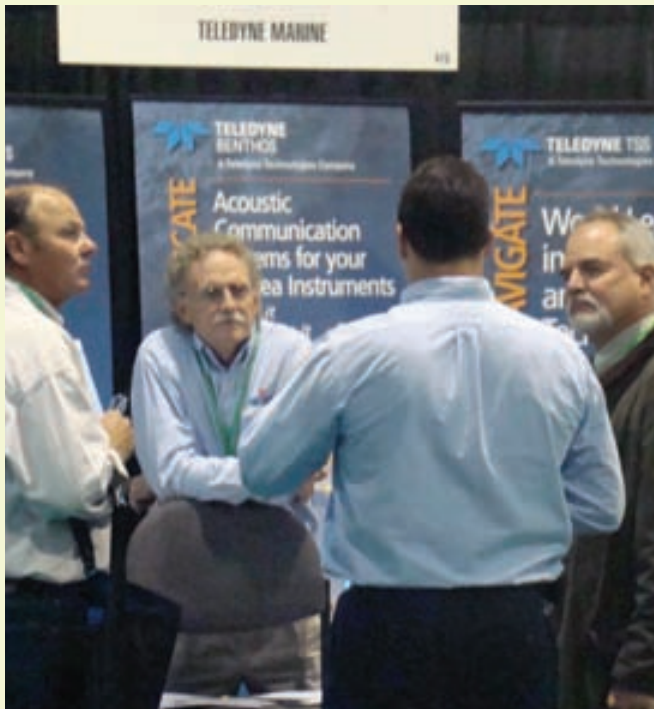
From Left: Rob Howard, OTE Show Director; Greg Trauthwein, Editor, Marine Technology Reporter; Saul Kaplan, Executive Director, Rhode Island Economic Development Corp. (RIEDC); John O'Malley, New Wave Media; Rhode Island Governor Donald Carcieri; Steve Withrow, Trinity International Consultants; and John Riendeau, Defense Industry Manager, RIEDC.

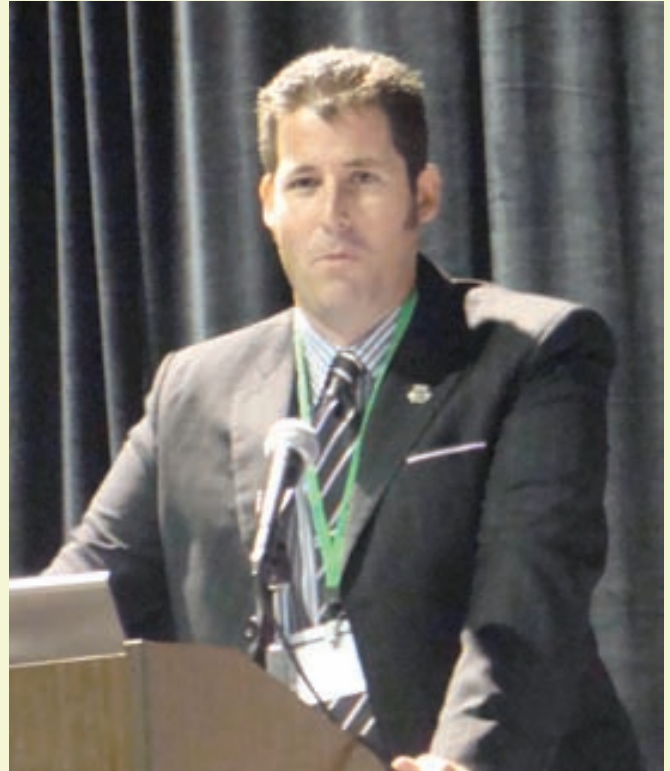


In his comments to open Ocean Tech Expo 2008, Rhode Island Governor Donald Carcieri noted the importance the ocean industry to Rhode Island's economy, and specifically singled out the state's partnership with government and business leaders from Newfoundland & Labrador.



The OTE Show floor stayed steadily busy, with visitors able to try their hand at navigating a Seabotix ROV (left), or simply stopping by to talk shop or catch up with colleagues.







Insightful Industry Outlook Sessions again proved a strong draw for OTE, as leaders from government, industry and academia came together to discuss trends and technology needs.

Opposite page  
 (starting top left and proceeding clockwise:)  
 Dr. Glen Blackwood, Memorial University of Newfoundland; Captain Christopher Hearn, director, Center for Marine Simulation, School of Maritime Studies at the Marine Institute; Katy Croff, University of Rhode Island; and Marianne Molchan, Molchan Marine Sciences, Inc.

Above  
 Tyler Schilling (left) of Schilling Robotics and David Kelly of Bluefin Robotics at the **“Growing Markets and Applications for Underwater Vehicles”** session.

Right  
 Steve Withrow’s Trinity International Consultant sponsored the **“Accessing International Markets Global Market Representatives Luncheon,”** a packed house with presentations from, among others, TOYO Corp. of Japan; and Pan India Consultants of India.





**Marine Technology Reporter presents its “SeaMaster” Award. From Left: Steve Withrow, Trinity International Consultants; John O’Malley, New Wave Media; Thomas S. Chance, President & CEO of C&C Technologies and MTR’s 2008 SeaMaster Award Recipient; Greg Trauthwein, Associate Publisher & Editor, Marine Technology Reporter; and Rob Howard, Vice President Sales & Marketing, Marine Technology Reporter and OTE Show Directory.**



The “SeaMaster” award was presented at the Exhibitor’s reception.



The “SeaMaster” award presentation included a crystal trophy and an Omega Seamaster watch.





# OceanTech Expo '09

October 7-9, 2009  
Providence, RI

## Explore the Business of Ocean Technology

*The annual OceanTech Expo is a unique, industry-led exposition that will feature new equipment, training and live demonstration of the most current technology available to the growing ocean technology and marine science industry in North America. OceanTech will bring exhibitors and attendees together in an interactive, "hands-on" environment to share and learn about the most current technology available.*

*OceanTech Expo provides participating ocean technology and marine science companies an international event to connect with and educate key decision makers, increase brand awareness and build meaningful relationships with professionals from this growing industry. This format will also allow attendees from state and federal government agencies, academic institutions, oil & gas companies and offshore service contractors a venue to identify, learn about and acquire the latest technology and equipment available to them - all in one location!*

Visit [www.oceantechexpo.com](http://www.oceantechexpo.com) for more information!

## Marine Renewable Energy

### **Aqua Survey, Inc.**

469 Pt. Breeze Rd.  
Flemington, NJ 08822  
Rick Reichard, Asst. Project Manager  
Phone: 908-788-8700  
Fax: 908-788-9165  
Email: reichard@aquasurvey.com  
URL: www.aquasurvey.com  
Product: Underwater sediment sampling, offshore wind farm studies.

### **AR ENGINEERING**

84 Center Street  
Shelton, CT 06484  
Aaron Albert, Engineer  
Phone: 203 924 5649  
Fax: 203 924 5649  
Email: arengineering@snet.net  
URL: www.marinecomp.com  
Product: Computer and Integrated System Design and Manufacture Specialists. Control, monitoring, and recording of all applications

### **Bourne Energy**

Box 2761  
Malibu, CA 90265  
C.S.Catlin, CEO  
Phone: 310-456-8112  
Fax: 310-456-1928  
Email: contact@bourneenergy.com  
URL: www.bourneenergy.com  
Product: River, tidal and ocean energy systems

### **Climate Chemistry Laboratory**

PO Box 6000 9860 W. Saanich Road  
Sidney, V8L 4B2 Canada  
Chi-Shing Wong, Senior Scientist/Team Leader  
Phone: 250-363-6407  
Fax: 250-363-6476  
Email: Chi-SHING.Wong@pac.dfo-mpo.gc.ca  
Product: Marine Research/Institute of Ocean Sciences

### **Hydraulics and Maritime Research Centre**

Part of University College Cork Western Road  
Cork, Ireland  
Raymond Alcorn Research Manager  
Phone: +353214250021  
Fax: +353214321003  
Email: r.alcorn@ucc.ie  
URL: http://hmrc.ucc.ie  
Product: HMRC specialize in Ocean Energy and Coastal Engineering. We have an ocean wave basin and a wave flume along with around 20 staff all experienced in the area. Our key competencies are in the following areas. - Physical Device model testing in basin or flume - Resource assess-

ment - Coastal Engineering - Computational Fluid dynamics - Numerical modeling - Analytical Modelling - Electrical and Control Systems - Instrumentation and Data acquisition - Field Data Acquisition - Turbo-machines - Hydraulic power take-off modeling and control

### **Ocean Space Inc.**

CEO Hyun Chung  
Rm 1023, Changkang Bldg, 22 Dohwa-Dong, Mapo-Gu  
Seoul, 121-763 \\  
South Korea  
Phone: 82-2-6352-1315  
Fax: 82-2-6352-1316  
Email: hchung@oceanspace.com  
URL: www.oceanspace.com  
Product: Tidal & OTEC energy development, engineering, manufacturing, installation, construction, O&M

### **OWEMES Association**

President Gaetano Gaudiosi  
Via Antonio Serra 62  
Roma, 00191 Italy  
Phone: +39 06 45426060  
Fax: +39 06 45426060  
Email: gaudiosi@owemes.org  
URL: http://www.owemes.org  
Product: Marine Renewable Energies resources, technologies consultancy, conferences, courses, e-courses

### **Pelamis Wave Power**

104 Commercial Street  
Edinburgh, EH6 6NF  
Scotland. UK  
Tel: +44 (0) 131 554 8444  
Fax: +44 (0) 131 554 8544  
E-mail: enquiries@pelamiswave.com  
Descr: Pelamis Wave Power Ltd. is the manufacturer of a unique system to generate renewable electricity from ocean waves.  
The Pelamis Wave Energy Converter is a revolutionary concept, the result of many years of engineering development by PWP. It was the world's first commercial scale machine to generate electricity into the grid from offshore wave energy and the first to be used in commercial wave farm projects.

### **State Scientific Centre Yuzhmoregeologiya**

Commercialization Manager Tanya Kalatch  
20, Krymskaya St  
Gelendzhik, 353461 Russia  
Phone: 7 - 86141- 94577  
Fax: 7 - 86141- 94577  
Email: kalatch@ymg.ru  
URL: www.ymg.ru

Product: Founded in 1959 on the Black Sea coast, the State Scientific Centre YUZH-MORGEOLGIYA specializes in marine geophysics, geology and ecology. The company designs and produces underwater survey equipment as well as providing services with in-house or foreign survey systems: site and pipeline/cable surveys; prospecting for mineral resources; monitoring of underwater drilling; searching for sunken objects; ecology. Research tools: side scan sonars (sub surface long range, deep tow and shelf models); echo sounders; sub-bottom acoustic profilers; gravity corers and samplers ; gravimeters & magnetometers; long/short/ultra short baseline underwater navigation systems; integrated GPS navigation systems; seismic data acquisition systems; certified geochemical laboratory; photo/TV deep-tow systems; ROVs for inspection & intervention of in-house design (working depths down to 500m, 1000m and 6000m). YUZH-MORGEOLGIYA possess reserach vessels and carries out contracting work for many Russian and foreign agencies and companies including: Ministry of Natural Resources of Russia, Russian Navy, Gazprom, Lukoil, Rosneft, BP, Total Fina Elf, Eni, JKX, British Gas, Fugro, Coparex, Ixsea, Deepocean, NOAA, KORDI etc.

**Trident Energy Limited**

Unit 2, 536 Sutton Road,  
 Southend on Sea, Essex, SS2 5PW  
 Tel: +44 (0) 1702 614900  
 Fax: +44 (0) 1702 614900  
 Email: info@tridentenergy.co.uk  
 URL: www.tridentenergy.co.uk

Descr: Trident Energy is a marine renewables energy company that has developed a unique and patented system for converting sea wave energy directly into electricity. The system, known as the Direct Energy Conversion Method (DECM), has only one moving part. Floats placed in the sea are used to drive linear generators, resulting in the immediate generation of electricity. No hydraulic equipment or air compression is required. Trident Energy is currently working on its first offshore trials.

**Verdant Power Inc.**

New York  
 The Octagon  
 888 Main Street, Suite 1  
 New York, NY 10044-021  
 URL: www.verdantpower.com

Descr: Verdant Power is a world leader in the design and application of marine renewable energy solutions. Simple and modular in design, Verdant Power systems employ underwater turbines to generate renewable and reliable clean energy from the natural water currents of rivers, tides and manmade channels. In addition to designing and commercializing its own technology, Verdant Power also develops projects around the world

**Don't Miss the Boat in 2009!**

In every edition, Marine Technology Reporter publishes a products and services guide.

Your company can occupy this space **FOR FREE**, but you must register on-line to qualify.

Simply Visit: [www.SeaDiscovery.com](http://www.SeaDiscovery.com) and click the "DIRECTORY" tab to submit information on your company for free publication.

**Coming in 2009:**

<b>Edition</b>	<b>Directory</b>
January . . . . .	Deck Machinery
March . . . . .	Hydrographic & Coastal Survey
April . . . . .	Work Class ROVs & Auxiliaries
May . . . . .	Power Supply, Cables, Connectors
June . . . . .	Shallow Water Survey
July . . . . .	ROV Manipulators
September . . . . .	Umbilicals, Cables & Connectors
October . . . . .	Training & Education
November . . . . .	VPS, GPS & Satellite Communication

## Gilman Named Interim CEO of DMT

Deep Marine Technology, Inc. said that Bruce C. Gilman began his tenure as Interim Chief Executive Officer beginning September 8, 2008. Gilman's four decade subsea career is highlighted with professional accomplishments such as President of both Perry Offshore & Oceaneering International, Inc.; President and Founder of Sonat Subsea Services; President, CEO, & Director of Sonsub Inc.; and Chairman and President of Saipem, Inc., the U.S. Subsidiary of Saipem SpA. Gilman is a graduate of the Polytechnic University of Brooklyn in Aeronautical Engineering; a registered Professional Engineer (PE); and Marine Technology Society President and Fellow.



## Marport Appoints Gross

Marport appointed Peter Gross to the position of Senior Product Manager, Search & Survey Sonar. He will operate from Vancouver, BC, from where he will be responsible for analyzing and understanding search and survey sonar market needs, developing product requirements, executing product roadmaps, conducting competitive analysis and creating strong market positioning. He will also serve as Senior Product Manager for AquaPix — Marport's upcoming multibeam swath bathymetry sonar. He graduated from Ryerson

University in 1988 with a degree in Electrical Engineering and received his Masters degree in Physics from Queen's University in 1993.

## NUWC Engineer Honored

The Society of Hispanic Professional Engineers (SHPE) named Carlos Godoy of Naval Undersea Warfare Center (NUWC) Division Newport, a field activity of Naval Sea Systems Command (NAVSEA), the winner of the Hispanics in Technology Award on Sept. 15 in Los Angeles, Calif.

The award recognizes Hispanic engineers who have made outstanding contributions to their field through a single significant contribution or through the leadership of a major technical project. Godoy is the only Navy civilian honored in this year's SHPE Technical Achievement Recognition Awards program.

"Carlos continues to maintain a record of professional excellence while working to increase opportunities for the Hispanic community," said Capt. Michael Byman, Commander, NUWC Division Newport. "His commitment to the Navy, NUWC Newport, and the next generation of engineers and scientists is extraordinary."

Godoy currently serves as the Chief Scientist for NUWC Division Newport's Weapons Analysis Facility, the most advanced torpedo modeling and simulation environment in the Navy. He also recently earned the prestigious Hispanic Engineering National Achievement Award Conference award based on his record of innovative research during his 35-year career with NUWC Division Newport, as well as his commitment

to increasing the number of Hispanic professionals in the Navy workforce. Godoy's research in the specialized field of target physics is widely recognized and highly respected in the defense community.

Godoy will be among the winners honored during the 2008 SHPE Conference in Phoenix, Ariz. in November.

## StatoilHydro Executive Committee Changes

Executive vice president for Exploration and Production Norway (EPN), Tore Torvund, and executive vice president for Projects, Morten Ruud, are resigning from their present posts and StatoilHydro's corporate executive committee immediately. Øystein Michelsen and Helga Nes have been appointed acting executive vice presidents for Exploration & Production Norway and Projects respectively. Both will join StatoilHydro's corporate executive committee. Øystein Michelsen has been senior vice president for Operations North in the EPN business area since the merger. Helga Nes has been vice president for the Projects business area in charge of human relations and health, safety and the environment since the merger.

## Sonardyne Appoints Collins

Sonardyne promoted Spencer Collins to the position of senior vice president, international strategic sales. Spencer joined Sonardyne in 1999, establishing the company's operational support and sales office in Brazil. Relocating to Houston in 2004, Spencer has added tremendous

value to the growth of the region as VP Americas. Spencer will continue to be based in Sonardyne's Houston offices and will report directly to the company's UK group sales director, Richard Binks. To further strengthen and promote Sonardyne's successful growth in the U.S., a new vice president North America will be recruited along with additional resources to the business development team.

### **MTS Elects Three**

Jerry Boatman has been elected president-elect of the Marine Technology Society (MTS). Boatman is director of ocean science and technology for Planning Systems, Inc., and is based at Stennis Space Center, Miss. For the past five years Boatman has served on the MTS Board of Directors, first as vice president of finance, then as treasurer and vice president of budget and finance. The two-year president-elect position starts January 1, 2009, and will culminate in Boatman assuming the international society's presidency in 2011.

Kevin Hardy has been elected to the position of vice president of section affairs, which focuses on the society's professional and college sections. Hardy is vice-president of DeepSea Power and Light in San Diego, Calif., and was with the Scripps Institution of Oceanography there for 34 years. He was named Engineer-of-the-Year for 2007 by the Society of Manufacturing Engineers-San Diego. He has held numerous other positions within MTS since he joined in 1975, including chair of the San Diego Section.

Debra Kill of Port Coquitlam, British Columbia, Canada, won the

### **Trident to Test Wave Power Device**

Renewables developer Trident Energy began a year-long trial of its wave power technology off the coast of East Anglia, with a view to developing a 1MW commercial-scale rig, according to a report on <http://newenergyfocus.com>. The wave power converter was constructed at the site six miles off the coast of Southwold by Lowestoft-based marine engineers Small & Co.

Founded in December 2003, Trident Energy has been working on the development of a low-cost, environmentally low-impact commercial marine power generator since April 2004.

position of treasurer and vice president of budget and finance. Kill is a certified management accountant with over 30 years of financial management experience in consulting engineering services, and in shipping terminal and chemicals manufacturing industries. Hardy and Kill will both assume their positions on January 1, 2009.

### **IXSEA Appoints Titcomb**

IXSEA appointed Jim Titcomb as Global Technical Manager for the company's new offshore division.

With 18 years experience in the offshore industry, Titcomb has worked worldwide in senior technical positions. Prior to IXSEA, he was Geophysical Technical Manager with UTEC Survey where he oversaw the expansion of the geophysical engineering team by 300% in 14 months.

### **Hallin Hires Zwinkels**

Hallin Marine continues to beef up its operations team with the appointment of Rik Zwinkels as a project director for the company's East division. Zwinkels, 37, will be responsible for the safe execution and result of operations in the eastern division of the Hallin group and joins its management team. Zwinkels qualified as

an engineer after leaving college in Rotterdam and has recently worked for Vroon Offshore and SMIT and has operational experience in both the Far East and the Netherlands.

### **L-3 Klein's New Website**

L-3 Klein Associates launched its new web site, found at [www.L-3Klein.com](http://www.L-3Klein.com). It has been improved to allow easier navigation for all three of the company's business segments. The new web site contains all current product information, specifications and detailed descriptions.

[www.L-3Klein.com](http://www.L-3Klein.com)

### **Hallin Acquires Prospect Flow Solutions**

Hallin Marine, the AIM quoted provider of subsea solutions to the oil and gas industry, has acquired the entire issued share capital of Prospect Flow Solutions Ltd.

Prospect is an engineering consultancy service company to the energy sector, with a strong track record in analysis and design for subsea, offshore and onshore projects.

Prospect was formed in 1999 and employs some 40 people, based in offices in Aberdeen, Derby, Stavanger and Houston. It is established as a

## Teledyne TSS Cuts Gyro Compass Delivery Times



New manufacturing techniques and streamlined product design are enabling Teledyne TSS to deliver new gyro compasses in less than six weeks. High demand combined with the complexity and precision manufacture of TSS and S G Brown gyrocompasses had traditionally required delivery lead times of several months. The transformation is a result of a combination of factors arising from the application of modern manufacturing techniques, including the use of improved materials management and just-in-time delivery to ensure that components are available when required but without the accumulation of expensive stock. Changes have also been made to designs of the gyros themselves which have had their electronics upgraded to make manufacture quicker and easier. A new facility also ensures that the testing of gyro compasses is able to match the higher output from the factory floor. Because of these new techniques, productivity has nearly doubled from 30 gyros per month to 53.

### Teledyne TSS Opens New Facility in Singapore

Teledyne TSS has expanded its global sales and support network with the opening of a new facility in Singapore. The new premises are located with the Teledyne Geophysical facility at Loyang Base in Singapore and are being used initially for sales and customer liaison. This is scheduled for expansion into a full service facility that will provide customers with technical support for all products in the TSS and S G Brown product ranges.

The new Teledyne TSS facility is being managed by Anthony Gleeson, who has moved from the UK and taken-up permanent residence in Singapore to ensure that customers benefit from the continuity of a regular contact. Sales support from the new Teledyne TSS Singapore office will be available for products that include the company's new Orion inertial navigation system, the S G Brown and TSS ranges of gyrocompasses and the TSS range of motion sensors and pipe and cable trackers. All of these products are manufactured at the company's modern UK factory but will be supported in Singapore when the new facility is fully established.

[www.teledyne.com](http://www.teledyne.com)

leading engineering solutions provider to the oil, gas and renewable energy sectors and is a specialist in computer-aided engineering.

The acquisition will give the company exposure to projects at the early stage of development and, in the future, will enable Hallin to offer its clients total solution packages. Prospect will benefit from being part of a well managed and financed group and the access to Hallin's clients, especially in the Asia Pacific region, where it is not currently represented.

The acquisition of Prospect is for an initial consideration of \$5.2m, consisting of \$2.6m in cash, financed from existing cash balances, and Hallin shares to the value of \$2.6m, being 887,574 ordinary 1p shares in the company, issued at a price of 169 pence per ordinary share.

An additional consideration of up to \$2.8m will be payable based on material growth in the financial performance of Prospect over the period to December 31, 2010.

Prospect's unaudited financial statements for the 12 months to 31 December 2007 showed turnover of \$4.4m and operating profits of \$362,398.

Prospect's chief executive and management team will continue to run the business and its name will not change, except to be branded as part of the Hallin group. All the senior management team has signed two year service contracts.

Following the issue of the Consideration Shares, the company will have 41,202,574 ordinary 1p shares in issue. The Company has made application for the Consideration Shares to be admitted

to trading on AIM, and dealings in the Consideration Shares are expected to commence on September 3, 2008.

### **Teledyne Benthos Gets "Key Partner Award"**

Teledyne Benthos, Inc., was presented with a "Key Partner Award" from the IceCube Research Center at University of Wisconsin-Madison. Teledyne Benthos was selected for the Key Partner award because of the company's collaboration with scientists to design and manufacture over 5,500 specialized glass housings for their equipment. The glass spheres house scientific monitoring equipment that is buried in strings up to 1.5 miles deep in the Antarctic ice at the South Pole. The glass spheres are designed to withstand severe temperature and pressure conditions in the ice, meet very specific optical requirements, and safely house the equipment for many years.

### **Hallin Wins \$10m Contract**

Hallin Marine won a \$10m contract to supply saturation diving support for the Pipeline Replacement personnel for subsea construction work activities, deploying its equipment, consumables and skilled diving personnel on board client designated vessels for the Pipelines Replacement Project (PRP2).

PRP2 is being undertaken for the Oil and Natural Gas Corporation Ltd (ONGC), Asia's largest oil and gas exploration and production company, by construction giant Leighton in a US\$720 million contract.

The contract covers the supply and installation of 208.8 km of rigid and

flexible oil and gas pipelines and associated topsides facilities in 39 segments over 3 seasons/years some 160km offshore Mumbai.

Leighton has awarded the first year saturation diving contract to the Singapore based East Operating Division of Hallin. Work is scheduled to commence during October this year and run through to April 2009.

### **OSIL Reports Brisk Sensor Sales**



OSIL (Ocean Scientific International Limited) reported an increase in sales across the range of AML (Applied Microsystems Ltd.) Sound Velocity instruments. Specifically, OSIL have noted increases in sales of the AML CTD SV Sensor, the AML SV Smart Sensor, and the Micro SV Sensor. AML's updated version of their CTD SV Plus is for measuring conductivity, temperature, pressure and sound velocity during long-term monitoring and profiling work. The AML SV Sensor is an intelligent active probe, designed for direct measurements of sound velocity in water using an innovative technique that measures 'time of flight' of a single acoustic pulse. Finally, AML's new Micro SV provides its customers with lower servicing costs and longer calibration periods than any previous SV sensor, while incorporating radical advances

### **Hallin Expands ROV Fleet**

Hallin Marine is continuing to grow its fleet of remote operated vehicles (ROVs) with a commitment to invest \$15.3m in a total of seven new work class machines, manufacturing four of the vehicles itself and purchasing externally the remainder. The expansion follows the success of the Company's existing fleet of eight work class and seven inspection class ROVs - every vehicle the company has manufactured or purchased has immediately been deployed on profitable projects. The company's first in-house designed and manufactured vehicle, the C-ROV1 (pronounced Sea Rov 1), has now successfully completed more than 100 operational dives while working off of Vietnam and C-ROV2 has been successfully deployed on a Hallin project immediately following the completion of its post-build testing in Singapore.

Hallin's manufacturing division will now complete the build of C-ROVs 3 and 4 for the company's operational divisions. The board has agreed to the subsequent build of C-ROVs 5 and 6, also for Hallin's own operation. Additionally the East Division has placed an order for a Saab Seaeye Panther XT ROV.

The West Division is currently placing an order that confirms its letter of intent for two Quasar 125 HSP 3,000-m ROVs from the Tyne & Wear based manufacturer SMD Hydrovision. The funding for the ROVs will be met by a combination of Hallin's internal resources and bank borrowing that has already been fully secured.

in 'time-of-flight' sound velocity measurement.

## **SERPENT Joins Forces**

The Scientific and Environmental ROV Partnership using Existing Industrial Technology (SERPENT) project is expanding its very remotely operated vehicle (ROV) operations to include the new generation of platforms, autonomous underwater vehicles (AUV). These systems contain computers that are programmed to carry out missions without any operator intervention. SERPENT has teamed up with the Autonomous Systems Laboratory (ASL) at the Virginia Institute of Marine Science in the U.S. to carry out some unique investigations in the shallow hydrothermal vents off Iceland. Dr Mark Patterson, the director of the ASL, is delighted with the partnership, he explains "combining expertise in ROV and AUV science is vital in understanding remote marine ecosystems, technology is leading many of the developments in this field".

## **Navy Donates Research Sub**

The U.S. Navy officially transferred the decommissioned research submarine ex-Dolphin (AGSS 555) to the Maritime Museum of San Diego (MMSD) during a donation contract signing ceremony in the Washington office of U.S. Rep. Susan Davis. Ex-Dolphin was decommissioned in 2007 after more than 30 years of service supporting naval research activities from her homeport in San Diego.

"As a museum, Dolphin will highlight America's technical expertise and dedication to the advancement of

science," said Capt. David Tungett, program manager for the Navy's Inactive Ships Program. "Visitors to the museum will also learn more about the submarine's unique history and important scientific contributions to the country."

Ex-Dolphin was one of the world's deepest diving submarines with a maximum operating depth in excess of 3,000 feet. The 65-foot diesel-electric submarine was designed and used for research, development, test, and evaluation and was equipped with an extensive instrumentation suite that supported missions such as acoustic deep-water and littoral research, near-bottom and ocean surveys, weapons launches, sensor trials, and engineering evaluations. It was the last operational diesel-electric submarine in the U.S. Navy.

## **USNS Pathfinder Participates in at-Sea Demonstration**

Military Sealift Command oceanographic survey ship USNS Pathfinder arrived in Sevastopol, Ukraine, to pick up Ukrainian personnel and members of the U.S.-based Institute for Exploration for an upcoming at-sea capabilities demonstration with Ukraine's Department of Underwater Heritage.

In April 2008, the Ukrainian government invited the U.S. Navy's 6th Fleet to demonstrate U.S. Navy hydrographic survey capabilities and to help search for SS Armenia, a sunken, World War II Soviet hospital ship.

During the at-sea demonstration, civilian surveyors from the Naval Oceanographic Office Institute for Exploration and Ukraine's

Department of Underwater Heritage will work together to search for the downed vessel. Pathfinder is one of seven oceanographic survey ships operated by the U.S. Navy's Military Sealift Command. These noncombatant ships are a unique part of the U.S. Navy's fleet tasked with learning more about the world's oceans and undersea environment.

## **Teledyne RDI Sponsors Student Memberships**

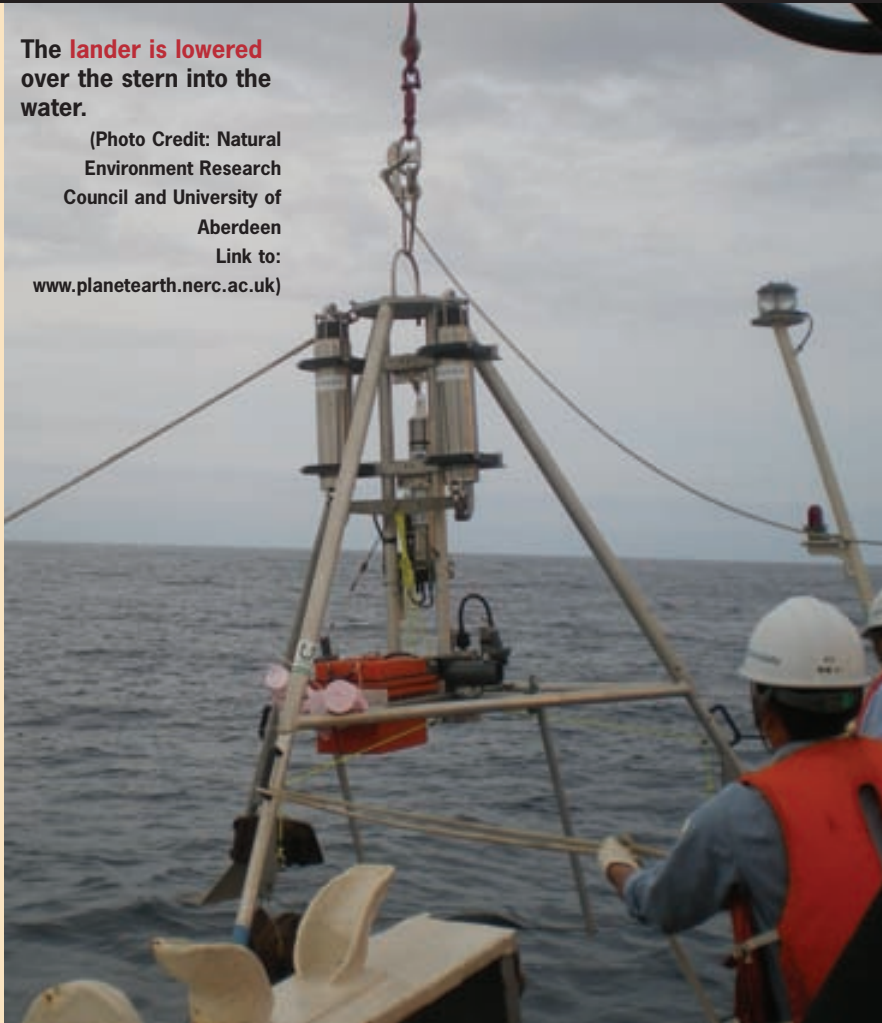
The Marine Technology Society (MTS) said that Teledyne RD Instruments has become the first and exclusive sponsor of a new annual program to provide 100 students with memberships in MTS. The goal is to make MTS accessible to all students with an interest in marine science and technology regardless of their economic status or financial situation.

"One of the most important goals of the Marine Technology Society is to increase our membership, particularly among the younger generation," MTS President Bruce C. Gilman, P.E., said. Harry Maxfield, Teledyne RDI's vice president of sales and marketing added "Many of us, including myself, have grown up in this industry. It's truly an honor to now be in a position to provide the next generation of ocean scientists and engineers with the opportunity to join MTS. This program will allow selected students to gain valuable industry knowledge and networking opportunities with others within their field of expertise." Teledyne RD Instruments ([www.rdinstruments.com](http://www.rdinstruments.com)) is the leading manufacturer of Acoustic Doppler Current Profilers and Doppler Velocity Logs for scientific, commercial and military use.



The lander is lowered over the stern into the water.

(Photo Credit: Natural Environment Research Council and University of Aberdeen  
Link to: [www.planeteearth.nerc.ac.uk](http://www.planeteearth.nerc.ac.uk))



## World's Deepest Fish Filmed For the First Time

The world's deepest living fishes have been filmed for the first time. Scientists filming in one of the world's deepest ocean trenches have found groups of highly sociable snailfish swarming over their bait, nearly five miles (7,700 m) beneath the surface of the Pacific Ocean -- reportedly the first time cameras have been sent to this depth.

"We got some absolutely amazing footage from 7700 m. More fish than we or anyone in the world would ever have thought possible at these depths," said project leader Dr. Alan Jamieson of the University of Aberdeen's Oceanlab, on board the Japanese research ship the Hakuho-Maru.

"It's incredible. These videos vastly exceed all our expectations from this research. We thought the deepest fishes would be motionless, solitary, fragile individuals eking out an existence in a food-sparse environment," said Professor Monty Priede, director of Oceanlab.

"But these fish aren't loners. The images show groups that are sociable and active — possibly even families - feeding on little shrimp, yet living in one of the most extreme environments on Earth.

Although some species of snailfish live in shallow water and even rock pools, the hadal snailfish are found exclusively below 6000 m. Here they have to contend with total darkness, near freezing temperatures and immense water pressure - at this depth the pressure is 8,000 tons per sq. m., equivalent to that of 1600 elephants standing on the roof of a Mini car.

The work is part of Oceanlab's

Top of view of the liparid (Snailfish) *Psuedoliparis amblystomopsis* recovered from the giant trap at 7700m in the Japan Trench.

(Photo Credit: Natural Environment Research Council and University of Aberdeen. Link to: [www.planeteearth.nerc.ac.uk](http://www.planeteearth.nerc.ac.uk))



HADEEP project — a collaborative research program with the University of Tokyo — devised by Priede to investigate life in the hadal region of the ocean, which is anything below 6000 m down. The expedition, funded by the Natural Environment Research Council and the Nippon Foundation in Japan, started on September 24 and ended October 6, 2008.

The deep-sea equipment needed to survive the extreme pressure at these depths was designed and built by the Oceanlab team specifically for this mission. The submersible camera platforms, or 'landers', take five hours to reach the depths of the trenches and remain on the seafloor for two days before the signal is given for them to surface.

### Blackwater Vision

The Clearview System is an integration of equipment and processes permitting divers to visually penetrate the most opaque water conditions to see in clear and vivid detail at close-in ranges utilizing an adaptable color camera system at a fraction of the cost of synthesized imagery. The Clearview System incorporates equipment necessary to both record the visual inspection and hear instructions from the surface. Pending designs will also allow the diver to control surface support equipment from the diver's underwater location.

[www.blackwatervision.com](http://www.blackwatervision.com)



### New Multi-Standard Underwater HD Camera

Kongsberg Maritime's offers a new compact multi-standard HDTV component color zoom camera. The oe14-502A underwater HDTV camera is small in size and offers multi-standard video capability, enabling users to quickly and easily swap between settings, according to the requirements of the ROV inspection task and the area the work is being carried out.



Switching between video output standards on the oe14-502A can be done with the new remote control or via the software GUI. This enables users to switch from standard composite video to 1080i or 720p HD video as and when the work demands. The oe14-502A can also be easily set to PAL or NTSC or in the case of HD, from 50 to 60 Hz, which means the same camera can be used anywhere in the world.

[www.kongsberg.com](http://www.kongsberg.com)

### Lyyn

LYYN T38 boasts visibility enhancement in real-time in a



live video stream. The LYYN T38 can enhance the feed from a live video system, e.g. in a ROV or a surveillance system, or to enhance a video tape in a camera brought back to office after some fieldwork, or wherever you need to see more with video.

[www.lyyn.com](http://www.lyyn.com)

### OPT Adds to Underwater Camera Family

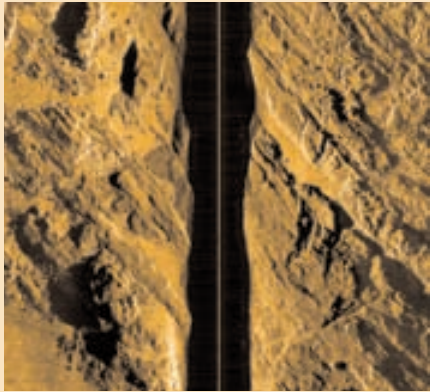
Ocean Presence Technologies (OPT), Santa Cruz, Calif., introduced three new products to its family of underwater IP video products. The wireless float now has the ability to transmit for 24 hours or more on a single charge of the battery pack. This expanded capacity allows for operation for

periods of up to four days during daylight hours and 24 hours when powering the underwater lighting array. Fresh batteries can be replaced without removing the camera from the bottom.

A new high-powered 20 LED light array now increases the underwater lighting options. The adjustable light modules allow for better positioning of the cone of light. A new light controller provides for two levels of illumination. The low beam can be used to aid the camera in using its motion detection feature. Once motion is detected, the high beam will illuminate the subject. Both low and high beam can each be remotely controlled over the wireless network. The third new product is a Data Video Recorder (DVR) that can be used to record when out of network range. The DVR records for extended periods and is initially configured to capture up to one week of continuous video.

Email [robert@oceanpresence.com](mailto:robert@oceanpresence.com)

## L-3 Klein's 5000 V2



L-3 Communications Klein Associates, Inc. introduced the upgraded version of the System 5000. The company has completed a major upgrade and technology refresh to the 5000 and are introducing the new L-3 Klein 5000 V-2. L-3 Klein has added a new Reconnaissance Mode which extends long range coverage to 250 m per side while maintaining along track resolution at 10 cm to 38m, 20 cm to 75m increasing to 36 cm to 150m and 50 cm to 250m. It added Frequency modulated Chirp, which is designed to yield consistent cross track resolution at all range settings and speeds. L-3 Klein has further reduced noise to offer better imaging.

[www.L-3Klein.com](http://www.L-3Klein.com)

## US Patent to OceanLED

OceanLED has been granted a U.S. patent for its LED underwater lighting products. The patent has enabled OceanLED to own the rights of using



[www.seadiscovery.com](http://www.seadiscovery.com)

## New HydroC CO<sup>2</sup> Sensor

Contros Systems & Solutions launched a new optical-based underwater CO<sup>2</sup> sensor, HydroC. The Titanium housed instrument is rated to 2000m, with a 6000m deepwater option. Analog and digital outputs enable users to connect the HydroC to most proprietary dataloggers, laptops, and controllers, and interfacing to most existing subsea technologies and networks is designed for ease. The instrument is also available with an internal Datalogger. The HydroC weighs 4.2 kgs (2000m rated) and is designed as a sensor for environmental monitoring, oceanographic research and CO<sub>2</sub> sequestration applications. Detectable gas molecules diffuse through special membranes to a detector chamber where the concentration is optically measured.

Email [d.esser@contros.eu](mailto:d.esser@contros.eu)



optical collimators with LEDs for underwater lighting. A collimator placed over an LED uses total internal reflection to intensify the light leaving the fixture by over 500% -

[www.oceanled.com](http://www.oceanled.com)

## Myriax Releases Eonfusion 1.0

Myriax, Inc. announced the initial release of its Eonfusion product, a unique application designed to provide cutting-edge 4-D analysis and visualization of time-varying spatial data. It allows users to streamline the integration of large and diverse data sets, explore relationships among multiple variables, and easily communicate complex results in an engaging way.

Eonfusion is designed to handle large data sets that are diverse in nature and fuse them together, enabling users to easily assemble sets of attributes of interest. Not only can it combine vector and raster data, but it can also synchronize video with time-referenced vector data. These capabilities are key enablers for ground-truth applications such as environment and habitat mapping and remote species identification which in the past have proven to be very time consuming or impractical.

Eonfusion integrates temporal and spatial data in a single robust 4-D visualization space, making it ideal for identifying and exploring interactions between complex multi-dimensional data sets.

Email: [Chris.Malzone@myriax.com](mailto:Chris.Malzone@myriax.com)

### New Gravity Corer

OSIL (Ocean Scientific International Limited) presents its new sediment sampler - the Gravity Corer, which is designed as simple and reliable instrument for collecting sediment cores from coastal and deep-water sites for sample analysis. The corer uses gravity's pull to penetrate deep into the seabed using its carbon steel core barrel, which can collect samples of up to 3m long.



The Gravity Corer is customizable and comes with lead weights comprising of four layers, each weighing 67 kg. Each layer comes in two segments and the total added weight is 268kg.

[www.osil.co.uk](http://www.osil.co.uk)

### FlowQuest Current Profiler

The sale of LinkQuest's FlowQuest line of acoustic current profilers has grown rapidly since its introduction. An extensive line of models has been used for a large number applications worldwide. LinkQuest recently provided Columbia University with a FlowQuest 600 system with WaveQuest directional wave measurement option, bottom tracking option, and Data Fusion function interfacing to a third party sensor and a FlowQuest 300 system with bottom tracking option and Data Fusion

### Sonardyne Lodestar Gets Wheelmark

The Sonardyne Lodestar has reportedly become the first marine AHRS (Attitude Heading and Reference System) using "strapdown" inertial sensors to receive the Wheelmark approval. Such sensors are rigidly strapped down, or attached, to the body of the unit resulting in size and weight reductions, lower cost, and greater reliability. The Wheelmark is the European standard that confirms it has been designed and approved to meet performance standards of Resolution A424(XI) and A694(17) of the IMO (International Maritime Organization). The certification followed an intensive testing program and now enables ship operators to use the gyro compass output of the Lodestar for a range of applications. These can include primary navigation and as a feed for helm, autopilot, radar and ECDIS (Electronic Chart Display and Information System.)

Lodestar is a solid state AHRS incorporating six sensing elements, three ring laser gyros (RLG) and three linear accelerometers. It is an extension of the Sonardyne product range and was developed for seamless integration with the company's widely used LBL (Long BaseLine) and USBL (Ultra-Short BaseLine) acoustic positioning systems. Lodestar is available in surface or subsea configurations depth rated up to 5,000 m.

[www.sonardyne.com](http://www.sonardyne.com)

function. These systems, along with previously purchased FlowQuest 600 systems, will initially be used in current and wave studies in Indonesian Seas. All profilers are equipped with LinkQuest's acoustic modems for deployment assistance and periodic data collection. LinkQuest has also provided a vessel-mounted FlowQuest 75 ultra long-range acoustic current profiler to a U.S. organization for deepwater water surveying from a surface ship. Taiwan's National Museum of Marine Biology and Aquarium, and a Taiwanese national university, have recently purchased several FlowQuest 300, FlowQuest 600 and FlowQuest 1000 systems for current circulation and directional wave measurement studies. Elcome Marine Services in India has purchased a

FlowQuest 600 system for offshore current measurement projects. LinkQuest has also recently provided a FlowQuest 150 vessel-mounted long-range profiler to the Instituto de Investigaciones Pesqueras of Spain for offshore current survey and a FlowQuest 600 acoustic current profiler to C.I.M.A. S.L. in Canary Island.

Email: [sales@link-quest.com](mailto:sales@link-quest.com)



**JANUARY**

AD CLOSE DATE: December 21, 2009

**FEATURE:** **DEEP WATER TECHNOLOGY**  
High Tech underwater solutions for offshore oil and gas production

**PRODUCT:** COMMERCIAL DIVING EQUIPMENT

**DIRECTORY:** DECK MACHINERY

**BONUS DISTRIBUTION**  
Subsea 2009 \* February 11-15  
Underwater Intervention-UI 2009  
March 3-5

**MARCH**

AD CLOSE DATE: February 15, 2009

**FEATURE:** **AUV/ROV/UUV ANNUAL**

**PRODUCT:** OCEAN OBSERVATION SYSTEMS & INSTRUMENTS

**DIRECTORY:** HYDROGRAPHIC & COASTAL SURVEY

**BONUS DISTRIBUTION**  
Ocean Business

**APRIL**

AD CLOSE DATE: March 21, 2009

**FEATURE:** **OFFSHORE TECHNOLOGY**

**PRODUCT:** SONAR SYSTEMS

**DIRECTORY:** WORK CLASS ROV & AUXILIARY SYSTEMS

**BONUS DISTRIBUTION**  
OTC 2009 \* May 4-7  
Sea-Air Space \* May 4-6

**MAY**

AD CLOSE DATE: April 18, 2009

**FEATURE:** **UNSERSEA DEFENSE**  
From detection to response, MTR examines real-world implementation of subsea defense systems

**PRODUCT:** COMMUNICATIONS, TELEMETRY & DATA ACQUISITION & PROCESSING

**DIRECTORY:** POWER SUPPLY SYSTEM, CABLES & CONNECTORS

**JUNE**

AD CLOSE DATE: May 23, 2009

**FEATURE:** **FUTURE TECH**  
From software defined sonar to improved underwater communication, MTR examines emerging technology trends in the subsea sector

**PRODUCT:** MARINE RENEWABLE ENERGY

**DIRECTORY:** SHALLOW WATER SURVEY

**BONUS DISTRIBUTION**  
Seawork 2009 \* June 16-18

**JULY**

AD CLOSE DATE: June 20, 2009

**FEATURE:** **MTR 100**  
Profiles of 100 leading companies in the subsea technology marketplace

**PRODUCT:** UNDERWATER IMAGING

**DIRECTORY:** ROV MANIPULATORS

**BONUS DISTRIBUTION**  
Offshore Europe (OE) 2009  
September 8-11

**SEPTEMBER**

AD CLOSE DATE: August 15, 2009

**FEATURE:** **SUBSEA SCIENCE**  
Profiles of and progress reports in the world's most innovative subsea studies

**PRODUCT:** UNDERWATER EQUIPMENT FOR SALVAGE, SEARCH & RECOVERY

**DIRECTORY:** UMBILICALS, CABLES & CONNECTORS  
*SEAMASTER AWARD EDITION*

**BONUS DISTRIBUTION**  
OceanTech Expo  
October 7-9

**OCTOBER**

AD CLOSE DATE: September 19, 2009

**FEATURE:** **OCEAN ENGINEERING**  
Offshore oil & gas subsea structures

**PRODUCT:** INSTRUMENTATION: Measurement, Processing & Analysis

**DIRECTORY:** TRAINING & EDUCATION FACILITIES, SYSTEMS & PRODUCTS

**BONUS DISTRIBUTION**  
Oceans 09  
SNAME \* October 20-23

**NOVEMBER**

AD CLOSE DATE: October 19, 2009

**FEATURE:** **OCEAN OBSERVATION**  
Government & Industry explore solutions to record & analyze the world's waterways

**PRODUCT:** DATA ACQUISITION & PROCESSING

**DIRECTORY:** VPS, GPS & SATELLITE COMMUNICATION

**BONUS DISTRIBUTION**  
Marintec China \* December 1-4  
International Workboat Show  
December 2-4  
UUVVS  
AUVSI

**November 4-6, 2008**

**UDT Pacific 2008**

UDT Pacific 2008 will create a unique opportunity for undersea defense and dual use technology manufacturers, suppliers, contractors, distributors, consultants and research organisations to meet their hottest prospects. [www.udt-pacific.com](http://www.udt-pacific.com)

**November 12-14, 2008**

**MAST 2008**

The third annual global conference and trade-show for senior-level government, R&D, and academia, and industry leaders in maritime security and defence. [www.mastconfex.com](http://www.mastconfex.com)

**January 20-21, 2009**

**Underwater Battlespace**

Defense IQ's 7th annual Underwater Battlespace conference

will address the key challenges for underwater platforms to ensure that you have the critical capabilities for the roles of Mine warfare, Anti Submarine Warfare (ASW) and to influence a land campaign.

**February 5-6, 2009**

**Using Acoustic Tags to Track Fish**

This short course addresses all aspects of tracking fish movement with acoustic tags, including three-dimensional tracking with sub-meter resolution. \$300 per person. [www.htisonar.com](http://www.htisonar.com)

**February 12-13, 2009**

**Using Hydroacoustics for Fisheries Assessment**

The hydroacoustic short course covers mobile and fixed-location sur-

vey techniques, and subjects include basic hydroacoustic theory, deployment logistics, data collection and processing, as well as typical results. Split-beam, single-beam, and multi-beam frequency techniques are discussed in detail. Lunch is provided. Seating is limited.

<http://www.htisonar.com>

**March 31 - April 2, 2009**

**Ocean Business 2009**

Southampton, UK  
<http://www.oceanbusiness.com>

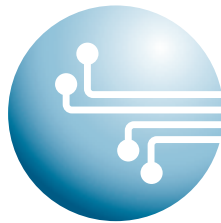
**May 21-23, 2009**

**OWEMES 2009**

Brindisi-Italy  
Marine Renewable Energies in the Mediterranean Sea (offshore wind, wave, current, tides, solar, etc.). [www.owemes.org](http://www.owemes.org)

**EXHIBITION SPACE  
NEARLY SOLD OUT!**

Contact Versha Carter  
T: +44 (0)1453 839228  
E: [info@intelligentexhibitions.com](mailto:info@intelligentexhibitions.com)



**ocean  
business 2009**

**The ocean technology training and procurement forum**

National Oceanography Centre, Southampton, UK • 31 March - 2 April 09

**The hands-on ocean technology exhibition**

incorporating in-classroom and on-water demonstrations and training sessions



[www.oceanbusiness.com](http://www.oceanbusiness.com)

We can take the pressure.



Subsea Instrumentation Housings and Junction Boxes

11 Plaza la Prensa, Suite 1, Santa Fe, NM 87507  
505-629-0800 • 505-629-0806 Fax  
noleaks@prevco.com • www.prevco.com

Avoid the high cost of switch failures  
**SWITCH** to the most dependable switches available  
Submersible Electric Switches – Solenoid Actuators – Solenoid Valves



Hydracon Company Inc., Anaheim, CA - USA  
Tel: +1 (714) 281-2460 • Fax: +1 (714) 281-1199  
WWW.HYDRACON.COM



**MARINE COMPUTERS**  
Compact DC Computers. Corrosion and Vibration Resistant. Engineered and interfaced to your application.

(203)924-5649 **Complete Integrated Systems**  
**AR Engineering** www.marinecomp.com

The World's Leading Manufacturer of Underwater Lift Bags




Available in lift capacities from 25 lbs. to 77,000 lbs. in open bottom and enclosed models.

Large inventory, ABS approved, IMCA Compliant.

**SUBSALVE USA**  
P.O. Box 2030  
North Kingstown, RI 02852 USA  
Ph: (401) 884-8801 Toll Free: (800) 466-6962  
Fx: (401) 884-8868  
www.SUBSALVE.com  
Richard@Subsalve.com

**UNDERWATER LIFT BAGS**  
ENGINEERED FROM THE BOTTOM UP!

**High Performance Ceramic Flotation**



SeaSpheres™ are engineered to be the highest performance buoyancy product available today. Suitable for ROV's, AUV's and instruments. SeaSpheres are strong and lightweight, made of high-purity alumina (aluminum oxide-Al<sub>2</sub>O<sub>3</sub>) for use at extreme depths. Available in 90mm (3.6"), 128mm (5.0"), 152mm (6.0"), 216mm (8.5"). Depths from 4000k to 11000k.

**DEEPSEA**  
Power & Light  
800-ITS DSPL (800-487-3775)  
www.deepsealighting.com



Product Hardware Kits for Cable Protection

- EVERGRIP™ Termination
- CABLE-GRIP™ Termination
- EVERFLEX™ Bending Strain Relief
- DYNA-HANGER™ Suspension System
- DAMBLOK™ Electrical Splice Kit
- PMI Armor Rods

Cable Systems & Testing Services

Engineered & Manufactured to your Specs!

www.pmiind.com

**PMI INDUSTRIES, INC.** Cleveland, OH (216) 881-4914

**SEA CATCH** TOGGLE RELEASE



Standard design for shackle release. Models from .65 to 600 ton SWL.

Standard Series

"M" Series for release of line or cable.

**McMillan DESIGN, INC.**

jmcmillan@seacatch.com Tel: (253) 858-1985  
www.seacatch.com Fax: (253) 858-1986



**Click us or flip us.**

**www.marinelink.com**



# Find Your Missing Piece

[www.MaritimeJobs.com](http://www.MaritimeJobs.com)

*The Industry's Essential Recruitment Tool*

## TARGETED

For nearly 70 years New Wave Media, producers of MaritimeJobs.com, has commanded the marine marketplace with its lead titles: *Maritime Reporter & Engineering News*, *MarineNews* and *Marine Technology Reporter*

## COST EFFECTIVE

Job postings start for just \$150, with many different job posting & resume search packages to fit most any need. The more jobs you post, the more money you save

## EFFICIENT

Post a Job today, get results today. In addition to traffic to [www.MaritimeJobs.com](http://www.MaritimeJobs.com), new positions are promoted Electronically, Daily via [www.MarineLink.com](http://www.MarineLink.com) and to more than 25,000 subscribers of our daily e-mail news service from [www.MaritimeToday.com](http://www.MaritimeToday.com)

## EXPOSURE

MaritimeJobs.com generates results, recording 46,164 Visits and 159,825 Pageviews per month.\* The two biggest hubs for visitors: Houston and Singapore

\*March 2007 Report

To find out how you can harness the power of all that MaritimeJobs.com has to offer, contact:

**Dawn Trauthwein in the U.S. at +1.631.868.3575 or  
Email: [dtrauthwein@marinelink.com](mailto:dtrauthwein@marinelink.com)**



# Advertiser's Index

For Fast, Free Information from Advertisers visit [www.maritimeequipment.com/mt](http://www.maritimeequipment.com/mt)

Page	Company	Website	Phone#
19	BlueView Technologies Inc.	www.blueview.com	(206) 545-7260
23	Channel Industries, Inc.	www.channelindustries.com	(805) 967-0171
9	C-NAV/C&C Technologies, Inc.	www.CnavGPS.com	(337) 210-0000
19	DeepSea Power & Light	www.deepsea.com	(800) 487-3775
C3	Imagenex Technology Corp.	www.imagenex.com	(604) 944-8248
60	Intelligent Exhibitions Ltd	www.oceanbusiness.com	44 (0) 1453 839228
21	International Transducer Corporation	www.itc-transducers.com	(805) 683-2575
23	Ixsea	www.ixsea.com	(781) 937-8800
25	LYYN AB	www.lyyn.com	46 46 286 57 90
C2	Marine Magnetics	www.marinemagnetics.com	(905) 479-9727
11	Marport	www.marport.com	(709) 757-5757
33	Miros AS	www.miros.no	47 66 98 75 00
C4	MSI/Material Systems Inc.	www.msitransducer.com	(978) 486-0404
25	Myriax Software Pty Ltd	www.eonfusion.myriax.com	Please visit us online
21	Ocean Marine Industries, Inc.	www.soundmetrics.com	(757) 382-7616
47	OceanTechExpo 2009	www.oceantechexpo.com	(561) 732-4368
17	RBR, Ltd.	www.rbr-global.com	(613) 233-1621
3	Reson A/S	www.reson.com	45 47 38 00 22
4	Sea-Bird Electronics, Inc.	www.seabird.com	(425) 643-9866
7	SeaBotix, Inc.	www.SeaBotix.com	(619) 450-4000
16	SouthWest Electronic Energy Group	www.swe.com	(281) 240-4000
1	Sub-Atlantic	www.sub-atlantic.com	(713) 329-8730
13	Teledyne Benthos	www.benthos.com	(508) 563-1000
5	Teledyne RD Instruments	www.rdinstruments.com	(858) 842-2600
15	Tritech International Limited	www.tritech.co.uk	44 (0) 1224 744111
9	YSI, Inc.	www.ysi.com/ecomapper	(800) 363-3269

## incredible images

Archeologists and scientists from NOAA's Stellwagen Bank National Marine Sanctuary and the National Undersea Research Center at the UConn have been **exploring the Frank A. Palmer shipwreck** since 2004 with the center's Hela ROV. This image conveys the site's excellent preservation as the toilet and sink remain in place within the Frank A. Palmer's aft cabin. The shipwreck of the 4-masted coal schooner Frank A. Palmer lies in over 300 feet of water off Massachusetts in NOAA's Stellwagen Bank National Marine Sanctuary. The Frank A. Palmer collided with the 5-masted coal schooner Louise B. Crary while en-route to Boston in December 1902. Photo courtesy of NOAA/SBNMS and NURC-UConn

Submitted by Deborah Marx, Maritime Archaeologist, Stellwagen Bank National Marine Sanctuary; Phone (781) 545-8026; Email: [Deborah.Marx@noaa.gov](mailto:Deborah.Marx@noaa.gov); <http://stellwagen.noaa.gov/>

This space is reserved each month for the month's most interesting, off-beat image. Submit your images (300 dpi/.jpg) and a short (approximate 100-word) description to Greg Trauthwein at [trauthwein@marinelink.com](mailto:trauthwein@marinelink.com).



# Multi-Frequency Digital Imaging & Profiling Sonars

REDEFINING IMAGE CLARITY

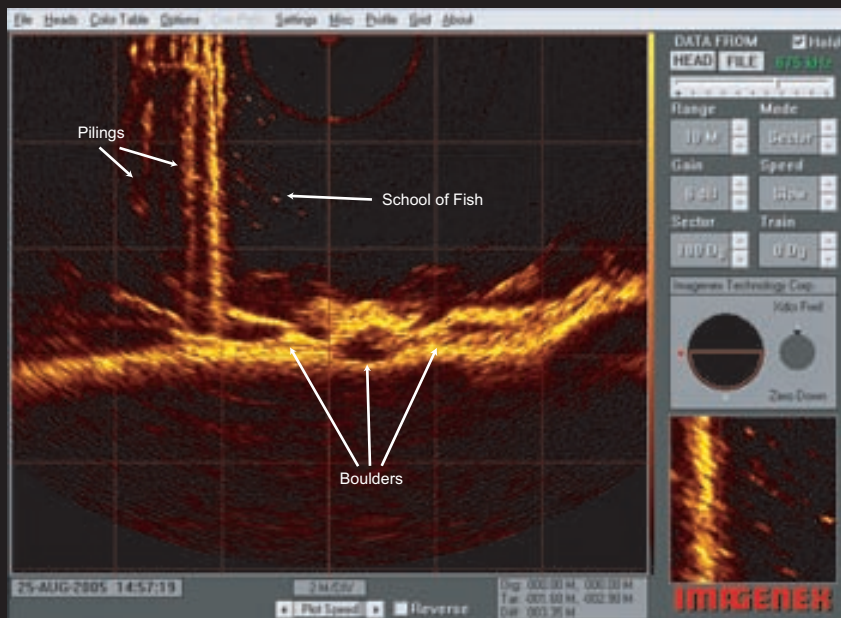
**The Imagenex 881A & 881L**  
Digital Multi-Frequency Sonar



881L Imaging



881A Profiling



Pilings and Riprap at Reed Point Marina in Port Moody, BC, Canada

## FEATURES OF THE 881A & 881L:

- Field Proven
- Compact Size
- High Performance
- RS-485 or RS-232 (881A)
- Ethernet Communications (881L)
- Communication Format Available to User

## IMAGENEX TECHNOLOGY CORP.

209-1875 Broadway Street • Port Coquitlam, BC • Canada V3C 4Z1  
Tel: (604) 944-8248 • Fax: (604) 944-8249

For more information on the 881A, 881L and other leading edge sonar products visit

[www.imagenex.com](http://www.imagenex.com)

I  
M  
A  
G  
E  
N  
E  
X

*For high definition  
acoustic imagery think **BROADBAND...***



*For broadband transmit and receive arrays... think **MSI***

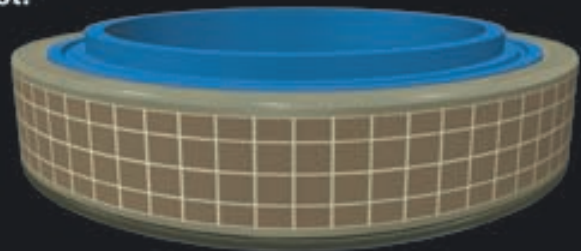
MSI's broadband injection molded piezocomposite arrays enable increased range and resolution in some of the world's most advanced sonar systems.

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 next generation sonar upgrades or existing sonar products, contact us first.

*MSI currently supplies transducer arrays for:*

- Port and Harbor Security
- Seabed Mapping
- Obstacle Avoidance
- Mine Hunting
- Underwater Acoustic Communications
- Sub-bottom Profiling



*ISO 9001 Certified*



*When acoustic performance matters*

*Sonar Transducers and Arrays*