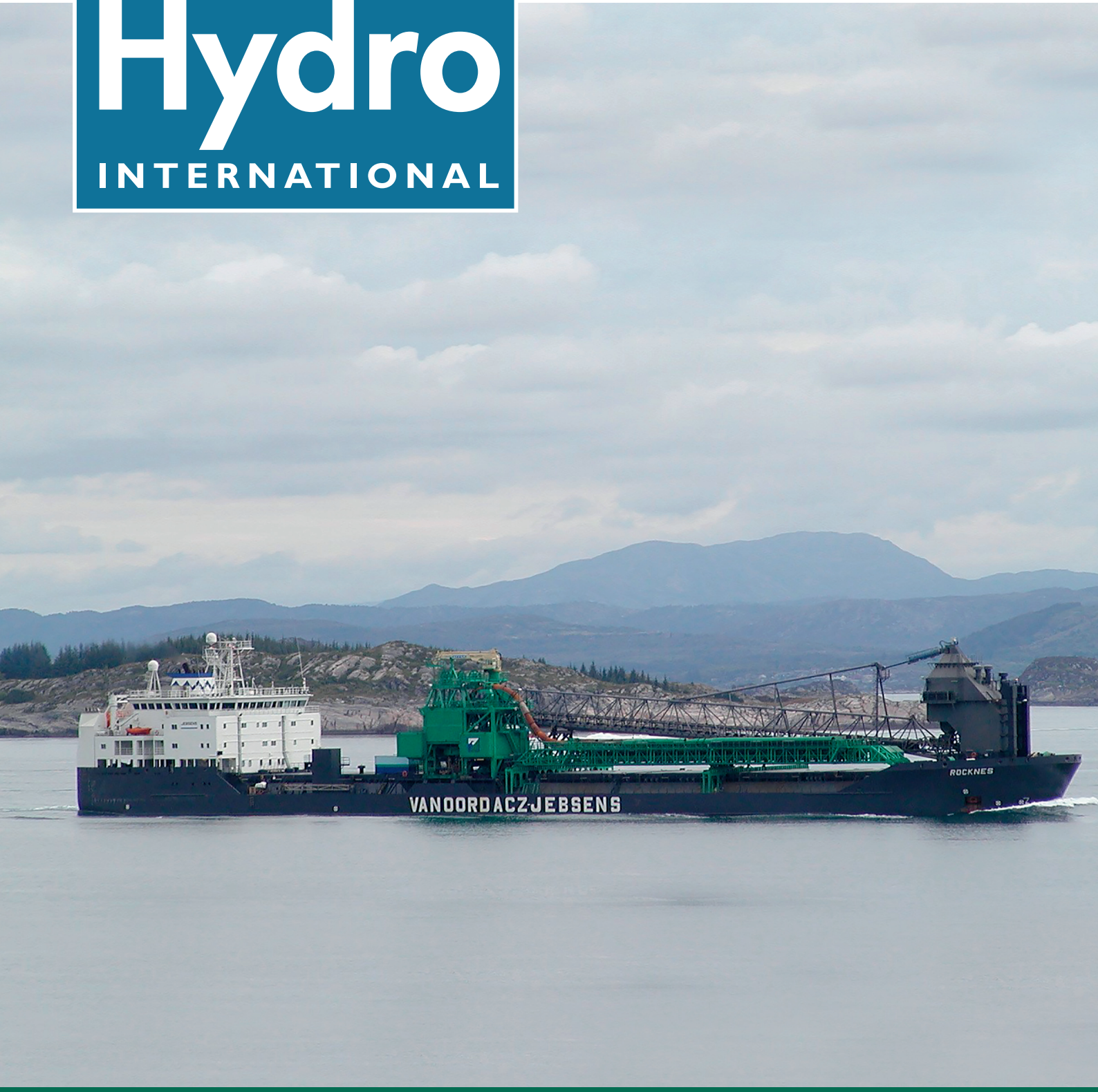
JULY/AUGUST 2014 > VOLUME 18 > NUMBER 5 > WWW.HYDRO-INTERNATIONAL.COM

Hydro INTERNATIONAL



UAS at the Beach

Merging UAS DEM and Bathymetric Depths to Monitor Breakwater Subsidence and Erosion

Ice-jam Floods

River Ice-jams Cause Severe Flooding in Tom River, Western Siberia

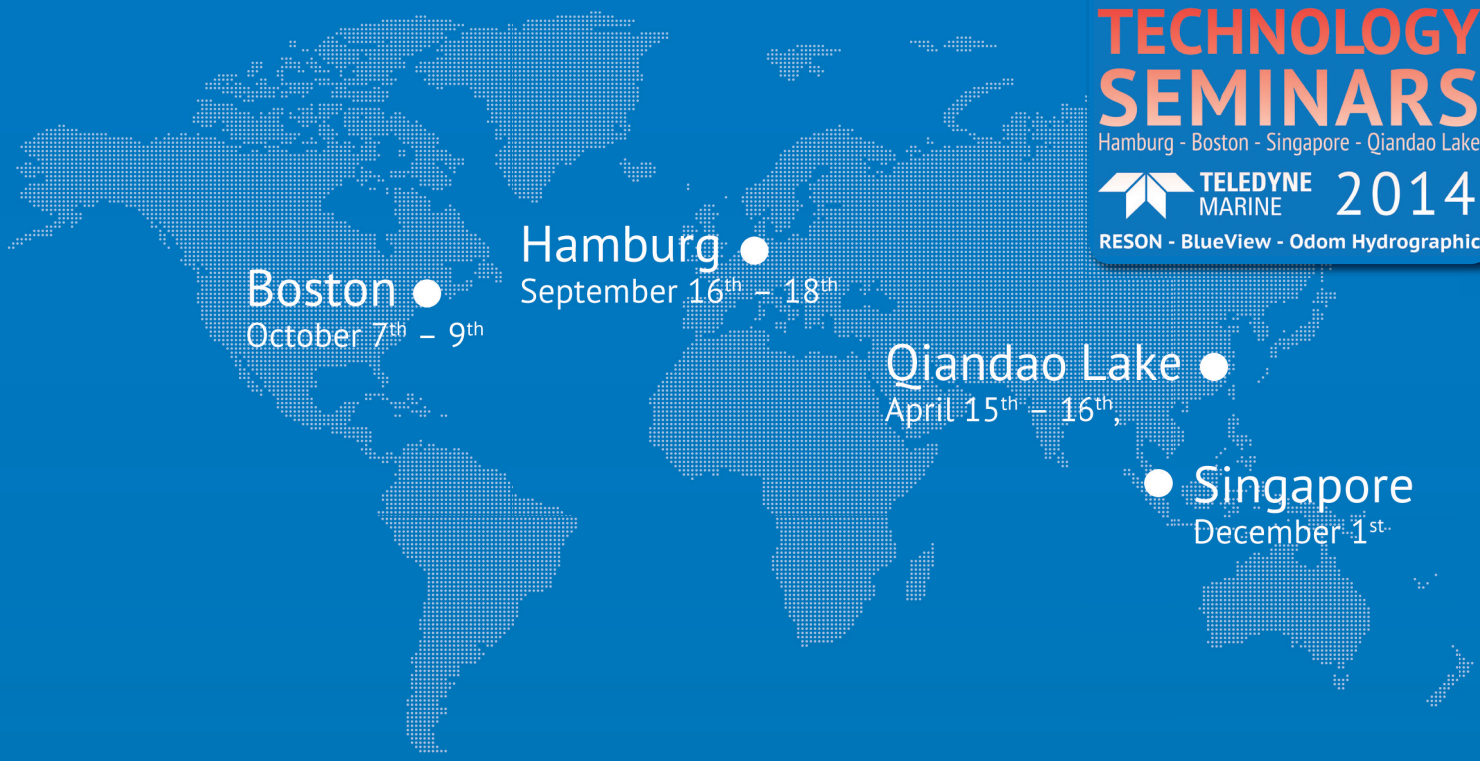
A Chartmaker's Retrospect

The *Rocknes* Casualty 2004

geomares publishing

Teledyne Marine

All the sonars you need, in one place



Broaden your business potential at the Underwater Technology Seminar 2014

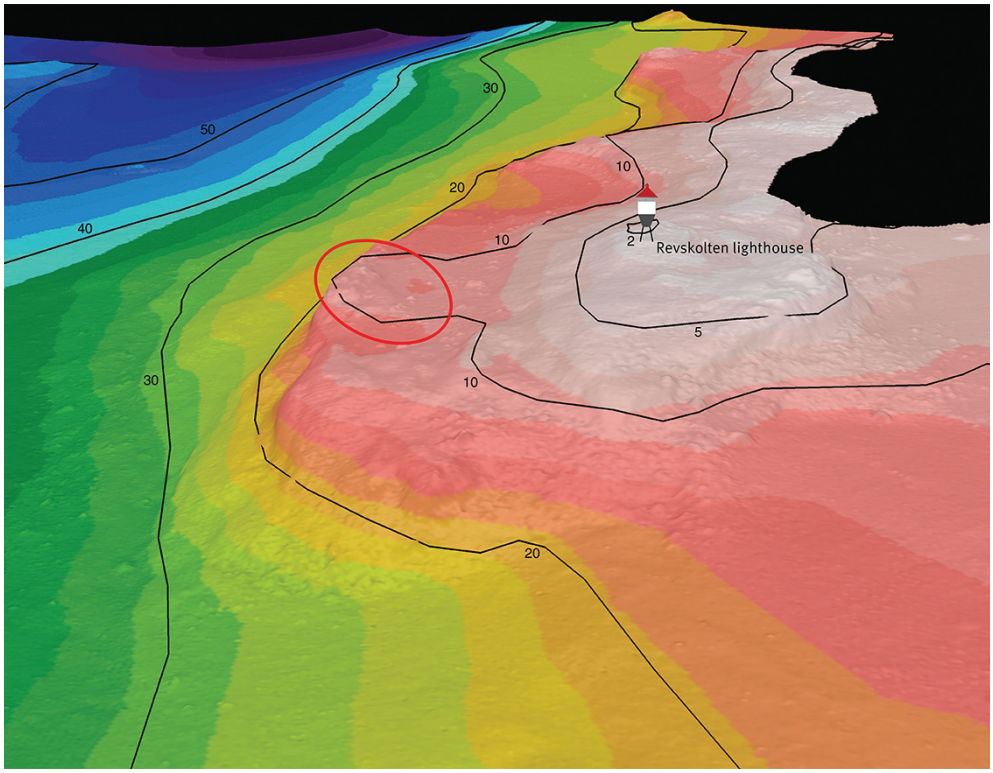
The deeper you understand how today's multibeam sonar solutions can benefit your business, the clearer your opportunities will become.
For sharper insight, join us at one of our seminars to discover the latest innovations and our wide range of sonars with hands-on training, workshops, boat demos, dock site demos and presentations from distinguished guest speakers.

www.U-T-S.info

TELEDYNE MARINE
Everywhereyoulook™
RESON • BlueView • Odom Hydrographic

No 3495

Contents



JULY-AUGUST 2014
VOLUME18 > NUMBER5

The MV *Rocknes* en route from Eikefet, Norway to Emden, Germany, hit a shoal in Vatlestraumen, Norway on 19 January 2004. In this issue: a retrospect by the Norwegian Hydrographic Service. (Image courtesy: Per S. Lindtner).

Get your back issues in the store

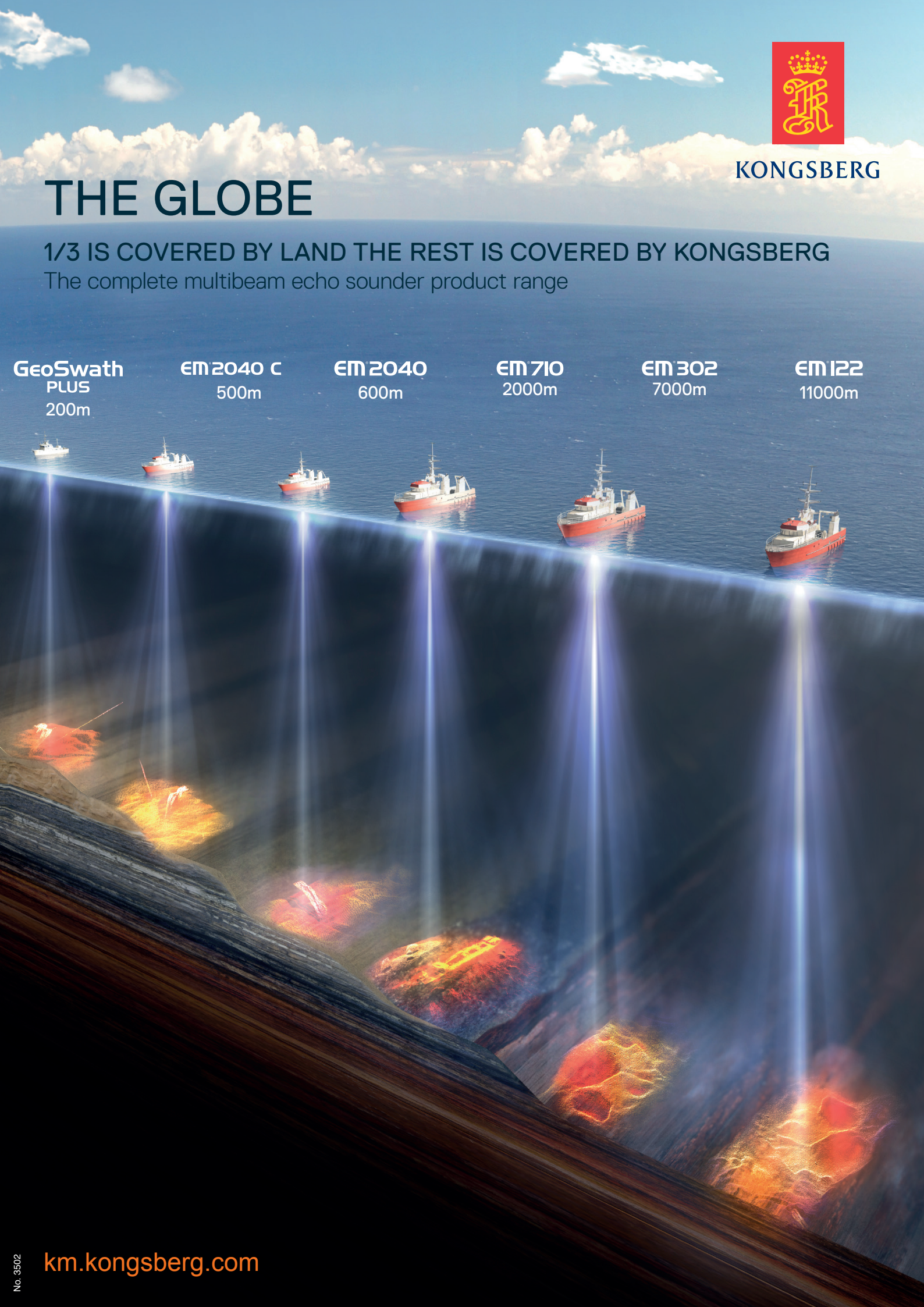
www.geomares.nl/store

KONGSBERG

THE GLOBE

1/3 IS COVERED BY LAND THE REST IS COVERED BY KONGSBERG

The complete multibeam echo sounder product range



km.kongsberg.com

No. 3502

Hydro INTERNATIONAL

Hydro INTERNATIONAL is an independent international magazine published 8 times a year by Geomares Publishing. The magazine and related e-newsletter inform worldwide professional, industrial and governmental readers of the latest news and developments in the hydrographic, surveying, marine cartographic and geomatics world. Hydro INTERNATIONAL encompasses all aspects, activities and equipment related to the acquisition, processing, presentation, control and management of hydrographic and surveying-related activities.

geomares PUBLISHING

Publishing Company:
Geomares Publishing
P.O. Box 112, 8530 AC Lemmer, The Netherlands
Phone: +31 (0) 514 56 18 54, Fax: +31 (0) 514 56 38 98
info@geomares.nl
www.geomares.nl

BPA WORLDWIDE BUSINESS

No material may be reproduced in whole or in part without written permission from Geomares Publishing
Copyright © 2014, Geomares Publishing, The Netherlands
All rights reserved. ISSN 1385-4569

Publishing Director: Durk Haarsma
Financial Director: Meine van der Bijl
Contributing Editors: RADM Giuseppe Angrisano (retd) of the Italian Navy, Dr. ir. Leendert Dorst, Andrew Gerrard, MSc, Dr Ronald Koomans, Mark Pronk, BSc, Marck Smit, Capt. Albert 'Skip' Theberge, NOAA Corps (retd.)
Editorial Board: Cor Beemster, Ir. Sicco Kamminga, Ir. Rob van Ree
Regional Correspondents: Andrew Armstrong (USA), Gary Chisholm (New Zealand), Safaruddin Kamaruddin (Malaysia), Cdr Ayodeji Olugbode (Nigeria), Andrew Leyzack (Canada)
Editorial Manager: Drs. Joost Boers
Copy Editor: Kirsten van Hasselt
Account Manager: Herma Lenten
Marketing Assistant: Trea Fledderus
Circulation Manager: Adrian Holland
Design: Verheul Media Supporters BV, Alphen aan den Rijn, www.vrhl.nl

Advertisements
Information about advertising is available in the media planner on our website or by contacting our account manager (herma.lenten@geomares.nl).

Buyers Guide
Hydrography is booming – survey companies, data specialists, hydrographers, cartographers, oceanographers . . . they are all working hard to get the job done. And they need to invest for an improved handling of their clients requests. Time is scarce . . . that's why Hydro INTERNATIONAL is preparing a Buyer's Guide to facilitate communication between you and your clients.
The Buyer's Guide features Company Profiles, Contact Details and an online directory with a categorised overview of suppliers. The Buyer's Guide is distributed among subscribers of Hydro INTERNATIONAL, visitors to international trade shows throughout the year and is available from www.hydro-international.com/buyersguide – thus it is a valuable information source to consult regularly throughout the year. For further information, please contact herma.lenten@geomares.nl

Paid Subscription
Hydro INTERNATIONAL is available bi-monthly on a subscription basis. The annual subscription rate for Hydro INTERNATIONAL is €100 within the European Union, and €145 for non-European countries. Subscription can commence at any time, by arrangement via our website or by contacting Abonnementenland, a Dutch subscription administration company. Subscriptions are automatically renewed upon expiry, unless Abonnementenland receives written notification of cancellation at least 60 days before expiry date. Prices and conditions may be subject to change. For multi-year subscription rates or information on current paid subscriptions, contact Abonnementenland, Postbus 20, 1910 AA Uitgeest, Netherlands, +31 (0)251-257926 , (09.00-17.00 hrs, UTC +1) paidsubscription@geomares.nl

Editorial Contributions
All material submitted to the publisher (Geomares Publishing) and relating to Hydro INTERNATIONAL will be treated as unconditionally assigned for publication under copyright subject to the Editor's unrestricted right to edit and offer editorial comment. Geomares Publishing assumes no responsibility for unsolicited material or for the accuracy of information thus received. Geomares Publishing assumes, in addition, no obligation for return postage of material if not explicitly requested. Contributions must be sent to the editorial manager joost.boers@geomares.nl.

Reprints
Printed copies of all articles (including those published in earlier issues) can be ordered. For more information, please contact trea.fledderus@geomares.nl

PHOTOGRAPHY: ARIE BRUINSMA (WWW.ARIEBRUINSMA.NL)

Outreach

Durk Haarsma
durk.haarsma@geomares.nl

Blue Economy is the buzzword of the last year in hydrography and oceanography. It mainly refers to that part of the economy that derives its revenues from the oceans, the seas, ports and harbours all over the globe. It's the economy of tankers shipping goods such as toys, shoes and electronics from China to Europe, bananas and mangoes from South America to the United States and oil and grain basically all over the world; more than 90 percent of all goods being transported from one country to another is shipped by sea. And although the maritime industry has been in a slump for some years now, suffering from both the economic crisis and burden of investment due to new regulations, shipping is still the most sustainable part of the transport sector and shows the most growth globally. The Blue Economy also includes the quest for energy. Above, under and through the waves of those same oceans: by offshore wind farms, oil & gas and renewables like tidal energy, humanity is trying to find new sources in order to be able to uphold their usage of energy. The Blue Economy is also the economy of tourism, a cruise is no longer the prerogative of a happy few in the Western world: the sector is booming and cruise liners are sailing seas that were, not so long ago, unsafe to navigate. On the other side of the spectrum, one finds the many thousands of leisure sailing yachts going about the lakes and coastal areas, watched by millions of others celebrating their holidays on beaches. Enough said about the immense role the ocean plays in the daily life of the majority of the people living on our planet. Time to go to the role that hydrography plays. Hydrography is basically underpinning all of the abovementioned and more: providing for nautical charts enabling safe navigation for all those mega tankers, measuring the foundations of all those search efforts for energy in and at sea and making tourism possible in places where it wasn't possible before. The difficulty of hydrography nowadays is its poor marketing: while we are all convinced of our own important role, others are not; from policymakers cutting budgets for surveying to young people not knowing what hydrography is and therefore not choosing it as a career. Underlying the poor marketing is a lack of outreach. While the buzz is about Blue Economy, it is still too difficult for the industry, and the institutes and societies representing hydrography, and maybe universities and colleges also – with some exceptions– to bring forward the message of hydrography. Main reason for this lack of knowledge in the outside world is, in my opinion, the fact that hydrography as a field that keeps preaching to the converted about all the aspects of the profession – in conferences and meeting rooms all over the globe we keep talking to each other about the need to reach out to the outer world. It's now time to practice what we preach: let's take up the challenge and tell everybody about the great fun, but also about the very necessary, highly sophisticated and increasingly important products hydrography provides for.

PS I would be delighted if we could share ideas and chat about how we could reinfore the outreach on www.hydro-international.com (*bit.ly/HYD2014-05-outreach*). Let me know in the comment box on that page what you think!

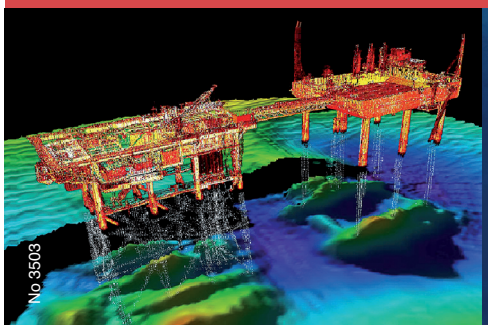
WE ARE MMT

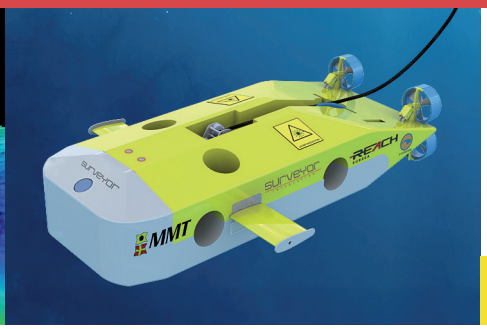
We are the professional and expert solution to your marine surveying needs, specialising in the oil & gas, renewable & marine cable and hydrography sectors.

We have teams of qualified and experienced specialists, who are leaders in their fields, offering you the very best service, without exception. Pioneering and developing new techniques and using the latest equipment, in order to meet the market's high demands.

We work closely with you, with expert dedication, every step of the way.

MEET US AT HYDRO14, STAND 51, ABERDEEN EXHIBITION AND CONFERENCE CENTRE, UK, 28-30TH OCTOBER 2014 OR OFFSHORE ENERGY 14, STAND 9.006, AMSTERDAM, THE NETHERLANDS, 28-29 OCTOBER 2014.





No 3503

MMT

Read more at www.mmt.se

CEEPULSE™ 100 series

Next generation 'black box' survey echo sounder

Advanced features:

- 0.3 - 100 m (0.98 - 328.1 ft) depth capability
- Membrane interface with 6 status LEDs
- Shallow Auto, Auto and Manual echo sounder modes
- Capable of up to 20 Hz ping rate
- Bluetooth connectivity
- Manufactured using high quality components

CEE HydroSystems™

www.ceehydrosystems.com

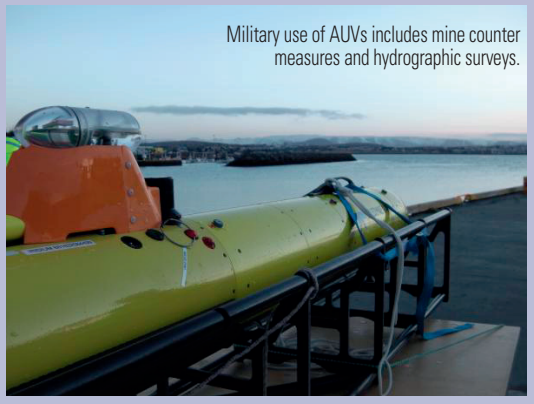
No 3510

Most Shared

Most shared during the last month from www.hydro-international.com

1. Hydrographic Survey of the Normandy Beaches - http://bit.ly/1onSGKy
2. NOCS Displays Robot Ocean Craft - http://bit.ly/1onSKKf
3. Flood Protection Solutions for Bangladesh - http://bit.ly/1ql2EOa
4. Global AUV Fleet to Increase 42% by 2018 - http://bit.ly/1ql2KFz
5. WHD 2014: Hydrography Much More Than Just Nautical Charts - http://bit.ly/1onU7IQ

Global AUV Fleet to Increase 42% by 2018



Military use of AUVs includes mine counter measures and hydrographic surveys.

Douglas-Westwood (DW, headquartered in the UK) forecasts that the global AUV (autonomous underwater vehicle) fleet will increase by 42% in the 2014-2018 period, compared to the previous five years. The fleet is forecast to total 825 units in 2018, led by strong demand in the military sector (taking 50% of the demand) and with research and environmental monitoring representing 47% of the total market.
http://bit.ly/1ql2KFz

NOCS Displays Robot Ocean Craft

Two oceangoing unmanned surface vehicles designed for long-endurance scientific research were showcased at the National Oceanography Centre on Friday 6 June 2014. Two companies were awarded funding to design and develop the vehicles as part of a GBP1million initiative to produce rugged and reliable marine autonomous systems to gather data from the open ocean over periods of several months, in support of UK marine scientific research.
http://bit.ly/1onSKKf

The ASV C-Enduro was ordered by the NOCS following the event.

Flood Protection Solutions for Bangladesh

Royal HaskoningDHV, the Netherlands, is leading a consortium to develop sustainable coastal protection solutions for Bhola, located at the mouth of the Meghna River and home to 1.7 million Bangladeshis. An innovative Erosion Early Warning System (EEWS) is part of the project. An EEWS including underwater acoustic detection will detect faults and weak points in the underwater protection works in a very early stage and allow the responsible agencies to respond appropriately to strengthen them.
http://bit.ly/1ql2EOa

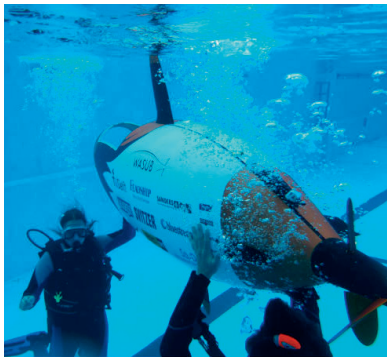
Eroded shores of the Meghna River.

EIVA Expanding in India

Denmark-based EIVA has chosen to expand its activities in India, as the offshore specialist is seeing an increasing interest in its solutions in the country. As a result, EIVA has entered into an agreement with Pan India Consultants, making it an authorised EIVA reseller.
http://bit.ly/1onRl6e

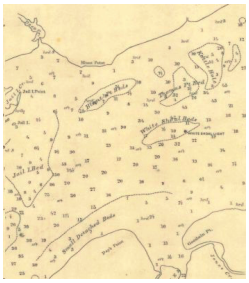
Women Engineers in Submarine Races

With over a hundred young people from eleven universities from six countries on three continents taking part in the European International Submarine Races, which took place in QinetiQ's Ocean Basin at Gosport, UK, from 7 to 11 July 2014, the organisers celebrated National Women in Engineering Day 2014 on 23 June by highlighting the strength of involvement of women in the teams.
http://bit.ly/1onUnaC



A challenge underwater: a race for human powered submarines.

World Hydrography Day Example of Broader Hydrographic Data Use



1878 USA surveys of oyster beds.

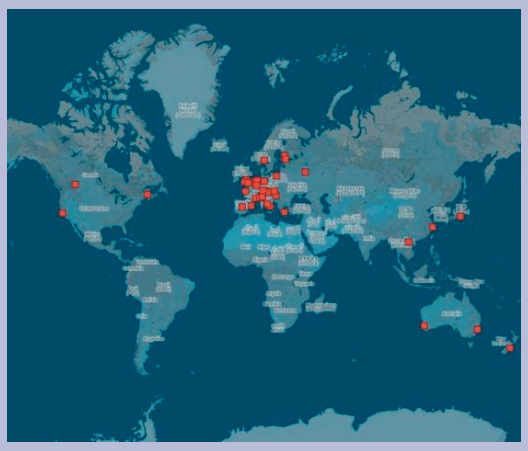
In line with tradition, World Hydrography Day was celebrated on 21 June. The 2014 theme, established by the International Hydrographic Organization, was 'Hydrography – much more than just nautical charts'. To further the discussion, NOAA's Office of Coast Survey invited the public to contribute articles that illustrate the theme, hosting an EPUB and a PDF of the collection of articles.
http://bit.ly/1onVrvk

Underwater Search Efforts during 2014 Franklin Expedition

Kraken Sonar Systems, Canada, is to collaborate with organisations from public, private and non-profit sectors to locate the historic ships of the ill-fated 1845 Franklin Expedition. The use of multiple platforms has the potential to significantly increase the amount of Arctic seabed mapped this summer. Ice and weather conditions permitting, the team could exceed significantly the amount of ocean floor scanned and mapped during previous expeditions.
http://bit.ly/1onUYJF

The AUV used in the project.

First Galileo GNSS Fixes Receive Certificates



Locations of the Galileo fixes.

Billions of GNSS position fixes are performed daily, but determining your place in the world using Europe's Galileo system is still quite novel. Therefore, ESA offered certificates to the first 50 Galileo fixes – provoking responses from across the globe. The extent of Galileo's reach was surprising: while half the applications came from Galileo's home continent, the others came from the rest of the world, including Australia, Canada, China, Egypt, New Zealand, Russia, USA and Vietnam.
http://bit.ly/1onVPdh

WHD 2014: Hydrography – Much More Than Just Nautical Charts

The International Hydrographic Organization (IHO) celebrated World Hydrography Day during the week of 16-21 June 2014 with the theme 'Hydrography – much more than just nautical charts'. A reception, by invitation only, took place on this occasion at the permanent headquarters of the IHO, alongside Port Hercule in Monaco, on Wednesday 18 June. Visits were arranged on board the French Naval Hydrographic Ship *La Pérouse* from 18 to 20 June.
http://bit.ly/1onU7IQ

Large Glider Experiment in the Sardinian Sea


Releasing a glider.

The REP14-MED sea trial includes 21 partners from six nations. From 6 to 26 June 2014, on board NRV *Alliance* and German vessel *Planet*, and at research centres ashore, experts from these institutions worked on the future of ocean monitoring and seabed characterisation. The Sardinian Sea will be the site of the REP14-MED experiment, led by the NATO Centre for Maritime Research and Experimentation (CMRE), part of the NATO Science and Technology Organization. *http://bit.ly/1ql8uz4*

Examining Ocean Current Power

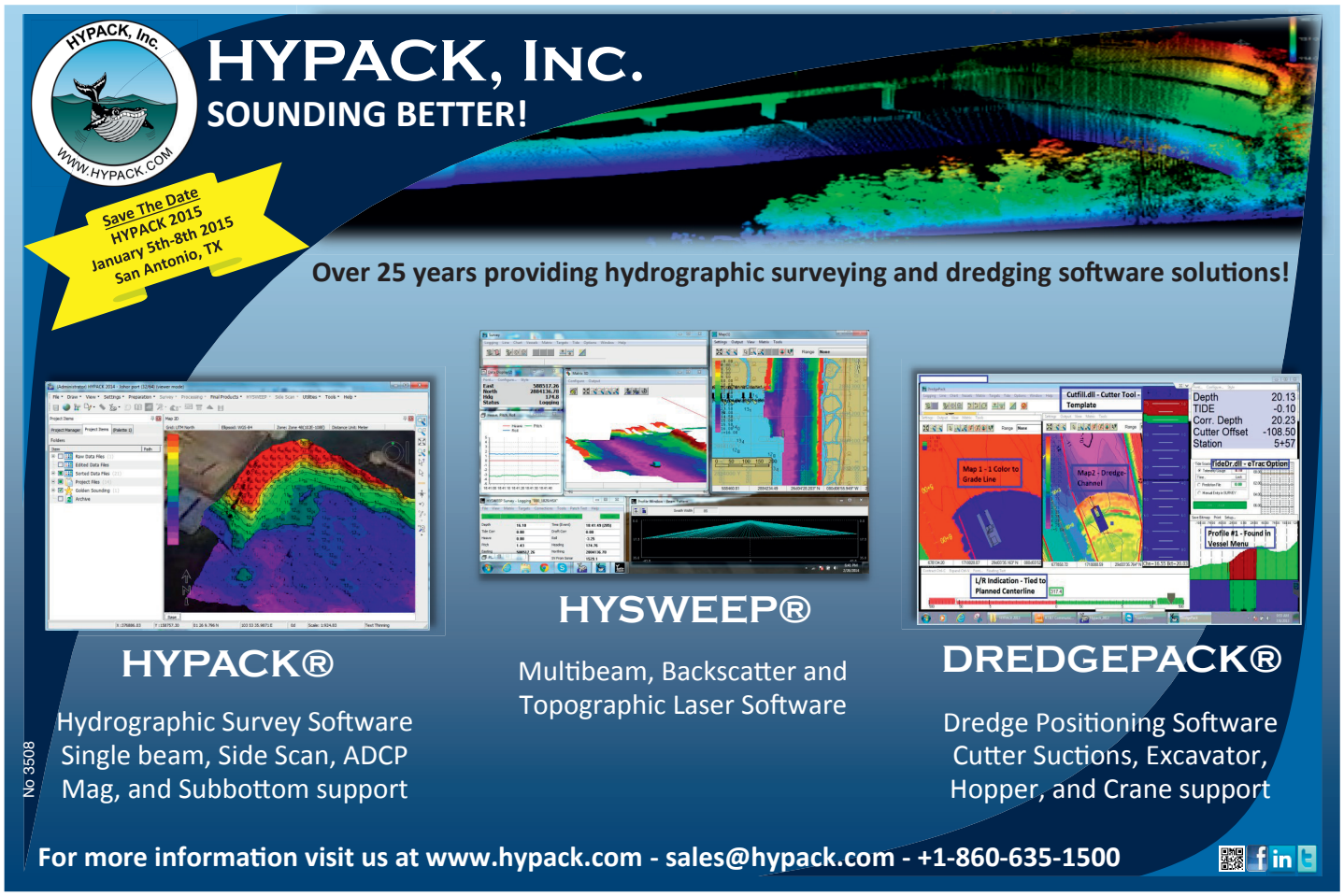

The Minesto ocean current power set-up.

Swedish marine energy technology company Minesto, developer of the Deep Green tidal and ocean current power plant, has signed a Memorandum of Understanding (MoU) with Florida Atlantic University. The purpose is to examine the technical, environmental and economic feasibility to install demonstration and commercial power plants in the Florida current. *http://bit.ly/1ql81wP*

Hydrographic Project Support for Bayanat

A division of Unique Maritime Group (UMG), Unique System FZE (UAE), has recently supported a hydrographic project that included the installation of Kongsberg's EM 2040 multibeam echo sounder units for Bayanat for Mapping & Surveying Services (Bayanat) in two different vessels at Abu Dhabi, UAE. The auxiliary sensors, such as the motion sensor, gyro, GPS unit, etc., fixed on board the vessels helped facilitate the additional information required to carry out the surveys at different project sites. *http://bit.ly/1onUKlA*

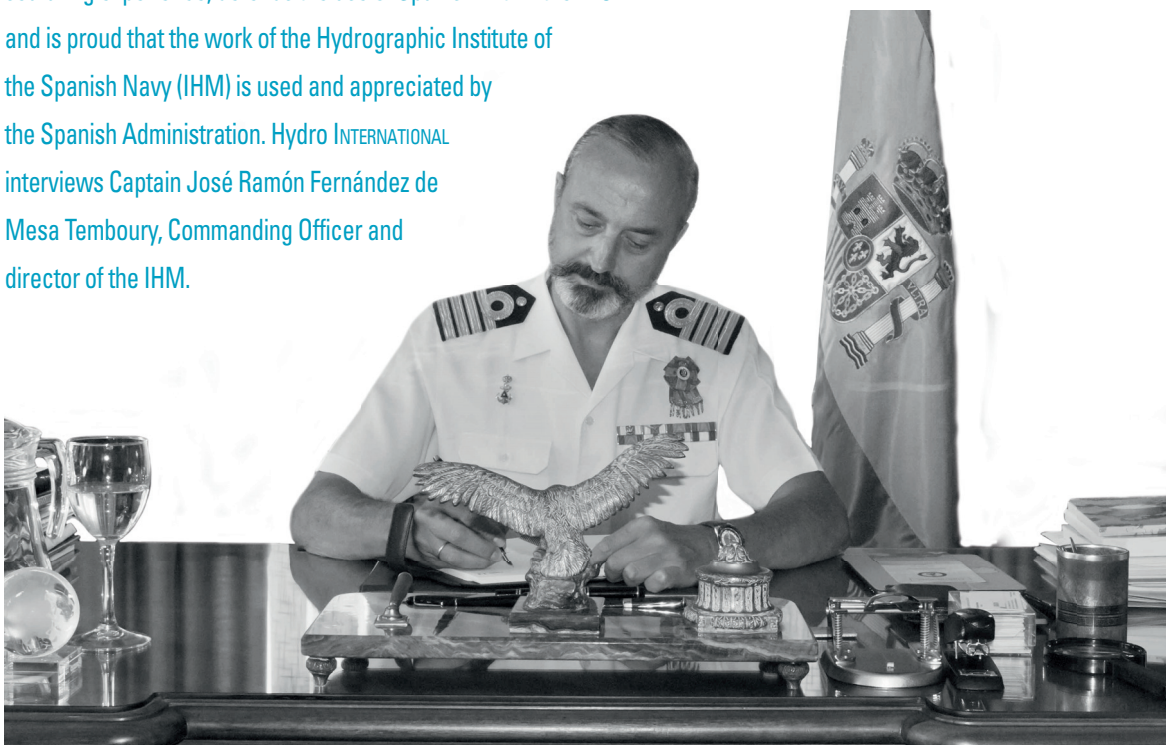
More news
www.hydro-international.com/news/news.php



Improve Capacity Building in Spanish Speaking Countries

Hydro International Interviews Captain José Ramón Fernandez de Mesa Temboury

The Spanish Hydrographer, a gentleman from Madrid with extensive seafaring experience, defends the use of Spanish within the IHO and is proud that the work of the Hydrographic Institute of the Spanish Navy (IHM) is used and appreciated by the Spanish Administration. Hydro International interviews Captain José Ramón Fernández de Mesa Temboury, Commanding Officer and director of the IHM.



Giuseppe Angrisano
Contributing editor, Hydro International

The IHM represents Spain in the International Hydrographic Organization (IHO) and is one of its founders (1921). What is your commitment to supporting IHO's activities?

This IHM, as an organisation of the Spanish Navy, enjoys full support for our role as the Spanish representatives to the IHO. We try to take part in as many working groups and committees as possible within our budget and personnel limitations. The IHM currently participates in 14 bodies, such as hydrographic commissions, committees and working groups. To date, the IHM has contributed 79 charts (in addition to national series charts) to the international paper chart catalogue. Furthermore, several collaboration arrangements with foreign hydrographic offices have made Spanish national series paper cartography available to international shipping. With regard to electronic charts (ENC), the IHM currently maintains 211 ENCs, available through the IC-ENC RENC. In addition, IHM is the long-range radio navigational warning coordinator for the NAVAREA III area (Mediterranean and Black Seas).

Spanish is the one of the three most-widely spoken languages in the world. What is your opinion about the use of it in the IHO?

When we list IHO Member States by their official language, their tonnage and their participation in the organisation, the Spanish speaking section is among the top three. We appreciate the effort by the IHB to make documents available in Spanish, and the IHM contributes to this enterprise by translating several publications, and we encourage them to keep up with this work. Nevertheless, I think that there is still much to be done in the field of Hydrography to make general and technical publications available in Spanish. A major effort in this area would improve capacity building in Spanish speaking countries where an extensive working knowledge of the English language is still lacking.

The IHM provides training in hydrography and nautical cartography to Spanish and foreign students. What

is the government policy on offering such education within Spain and outside the country?
The School of Hydrography of the Spanish Navy is located within the IHM facilities and headed by the Commander Director. This school provides hydrographic training at several levels, validated by the International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) to attain the diplomas of hydrographer categories A and B. There are also other specific courses on hydrography and related fields.

Currently, category A and B courses are attended by officers and petty officers of the Spanish Navy and also from foreign navies whose countries have entered into training cooperation arrangements with the Spanish Ministry of Defence. These courses are taught in Spanish and provided to military personnel.

Furthermore, some IHM hydrographers may attend higher courses (labelled as Hydrographic Engineer by the Spanish Navy), usually two-year Master courses, at Spanish or foreign teaching institutions related to Hydrography, Cartography and Oceanography.

How does IHM reduce expenses and increase cost recovery?
The IHM is a non-profit public interest organisation and its main task is to contribute to the safety of navigation by producing and updating nautical charts. This task is achieved with a budget managed by the Spanish Navy and the Ministry of Defence, who establish relevant criteria regarding the sale of IHM products according to relevant national and European regulations.

The optimisation of public resources demands that the IHM obtain the highest return from its work with available resources. Plus, there are arrangements with other state organisations in Spain having vessels with hydrographic capabilities for the IHM to contribute hydrographic staff to their cruises to make it possible to obtain bathymetry covering areas of interest following the criteria required to validate these works.

How do you see the presence of the industry in charting activities, especially in the production of electronic charts? What technical and/or economic advantages can the industry give to the government institutions?
I consider the role of industry in the field of nautical cartography as fundamental. From data acquisition to processing equipment, as well as production and distribution, cartographic organisations rely on industry developments to provide marine users with quality products.

There is a very wide range of end-users, including merchant shipping and recreational sailors, harbour management and traffic control. Very few state hydrographic offices are currently capable of covering all the requirements of nautical cartography, especially electronic charts.

The industry sector that takes part directly in data acquisition and cartographic production by state organisations, and that part of industry that generates derived products, complement each other and cover the demand for nautical cartography. Always maintaining the highest quality standards in our products, of course.

Spain defines its Exclusive Economic Zone in the Atlantic Ocean and in the Mediterranean Sea. In what way does the IHM support the government? Does the IHM cooperate with the Hydrographic Institutions of neighbouring Nations to achieve this?
There is a research plan for the Spanish Exclusive Economic Zone directed by the Spanish Ministry of Defence, and the IHM participates by carrying out hydrographic surveys in that area for one month a year. The Spanish Ministry of Foreign Affairs and Cooperation is responsible for defining the EEZ. The role of the IHM in this definition is restricted to technical advice and its depiction on nautical cartography. Cooperation with neighbouring countries is articulated among the Ministries of Foreign Affairs of the relevant states, which have established commissions on territorial limits.

Which Ministries, in addition to the MoD, need the Hydrographic data and the support of the IHM?
Due to the singular nature of its operations, the IHM is directly or indirectly linked to almost all Spanish Ministries: after the Ministry of Defence our closest relationship is with the Ministry of Public Works and Transport, which oversees the Spanish Geographic Institute, the Merchant Marine Directorate and State Ports. There is also a close connection with the Ministry of Economy and Competitiveness through its dependent research organisations, in matters related to bathymetry acquisition and oceanography, such as the Spanish Oceanographic Institute, and the Balearic Islands Coastal Observing and Forecasting System; the Ministry of Agriculture, Food and the Environment in matters related to coastal management and bathymetry acquisition; and the Ministry of Education, Culture and Sport regarding agreements with universities, historic archives and protection of underwater archaeological heritage. Finally, there is the aforementioned relationship with the Ministry of Foreign Affairs and Cooperation for the delimitation of territorial boundaries.

In April 2014, the IHM was involved in a complex operation to retrieve the wreck of a military helicopter in the waters of the Canary Islands. What was IHM's contribution to that operation and the importance of the hydrographic data used?
Our hydrographic vessel *Malaspina*, fitted with a multibeam echo sounder

Captain **José Ramón Fernández de Mesa Temboury**, Commanding Officer and director of the Hydrographic Institute of the Spanish Navy (IHM) graduated from the Navy School in 1983 and was promoted to his current rank of Captain in 2010. During the more than 13 years that he was appointed to surface vessels, he carried out many hydrographic cruises all over the Spanish Coast, North Africa and Antarctica. He was in command of the Spanish Hydrographic Vessels *Rigel* and *Tofiño*, and executive officer on *Tofiño* and the corvette *Vencedora*. He held several posts on land, both in the Navy and the Ministry of Defence. Having specialised in Hydrography and gained a Bachelor Degree in Human Resources, he was appointed as the Commander Director of the IHM and director of the School of Hydrography 'Alejandro Malaspina' in July 2012.

Spanish Navy Hydrographic Vessel *Tofino* in Monaco during the XVIII International Hydrographic Conference.

EM302, was dispatched to the area where the helicopter went missing, between the islands of Gran Canaria and Fuerteventura. This vessel was tasked with a very detailed exploration of the seafloor to obtain as precise a digital terrain model (DTM) as possible to help locate the missing craft. Please note that this accident happened in waters over 2,300 metres deep. They completed a 10 x 10 nautical mile survey centred in the reported position of the crash. The lines for this survey were 500 metres apart, and the beam of the echo sounder was set up to sweep 700 metres to port and 700 metres to starboard, so the area was covered twice. The end result was a very detailed DTM of this area, and we believe that it contributed to the detection and recovery of the helicopter.

In recent months, some fishing vessels were lost in Spanish waters. Do you have suggestions on how to concur with IHM's electronic charts for the safety of this type of vessel?

It has not been determined whether these tragedies involved the incorrect use of nautical cartography. In any case, the Spanish Ministry of Public Works and Transport, following the regulations in the Convention for the Safety of Life at Sea (SOLAS) in which Spain is a signatory, implements a set of rules covering the carriage and use of nautical cartography in Spanish seas according to the type of vessel and the area to be navigated.

Currently, the use of official electronic nautical charts cannot replace the use of nautical paper charts in every case, as it depends on the type of craft. Most fishing vessels belong to this group, and in this case, even though mariners may use electronic charts (ENC or derivatives), they must carry on board a set of fully updated official nautical paper charts adequate for the trip they are undertaking.

IMO, IHO and IALA are now developing e-navigation, adopting a new standard for the production of the electronic charts so as to be able to insert a multiplicity of information aimed at enhancing the navigation safety. How is the IHM involved in this? Can private industry help?
For nautical cartography, the concept of e-navigation involves the use of the S-100 standard in electronic cartography. This means that hydrographic offices must progressively adapt their electronic cartographic production to this standard. In fact, once e-navigation is fully implemented, it may mean a drastic change to the traditional concept of internal cartographic production and maintenance within hydrographic offices.

The IHM participated in the correspondence e-navigation working group in the recent past, as well as in specific working groups developing S-10X standards (tides and currents). We are willing to adapt to the implementation phases of several S-10X standards, and just like most other hydrographic offices, we will reach out to industry technical developments for support.

Hydrographic Offices must adapt their electronic cartographic production

Spain is engaged in surveying and charting an area of the Antarctic waters. Can you summarise the task of the IHM as part of the Spanish Antarctic Expeditions?
Spain became a member of the Hydrographic Commission on Antarctica in 2003. Spanish hydrographic activities in the Antarctic had started a few years earlier in 1988, to provide for safe navigation to two Spanish scientific bases established on the Livingston and Deception islands, part of the South Shetland Islands.

The first Spanish hydrographic survey was carried out that same year using a vessel hired from a Chilean company. Oceanographic vessels from the Spanish Navy started working in the following austral summer. Surveying progressed at a good rate up to year 2000, combined with other scientific cruises. After that there was a nine year lull until hydrographic work restarted in 2009.

The latest systematic hydrographic survey was completed early in 2012, with a notable improvement of the bathymetry in several areas off Livingston and Deception islands.

To date, the IHM has published six nautical paper charts and one ENC covering this area.

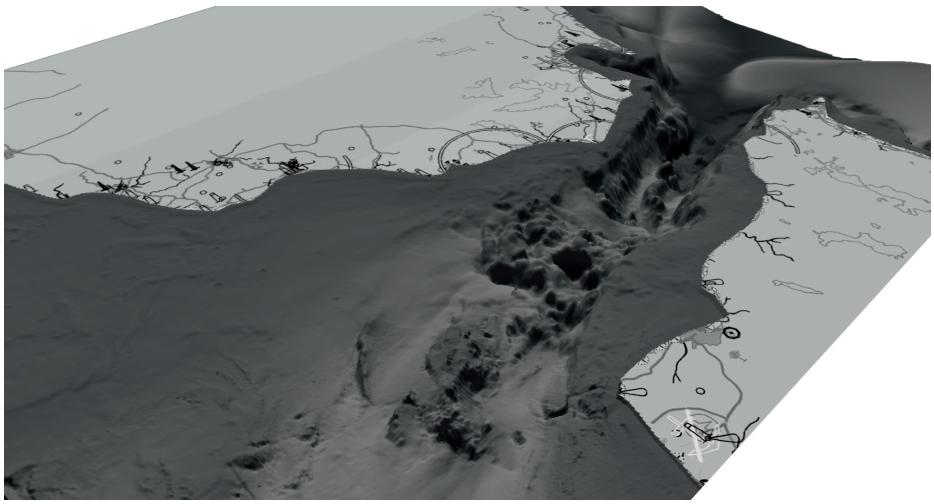
It is never easy to detract time off Antarctic scientific cruises and devote it exclusively to Hydrography. Especially when the current budgetary situation demands strict prioritisation when assigning financial resources. We hope to be able to continue making hydrographic surveys in Antarctica as soon as possible.

The IHO has a programme of technical cooperation with many countries, especially in the African Continent. How does the IHM contribute to this programme?
Spain is a member of the Eastern Atlantic Hydrographic Commission (EAtHC) and the Mediterranean and Black Seas Hydrographic Commission (MBSHC). These commissions consider capacity building initiatives following IHO policy. To date, this IHM has contributed to capacity building with the aforementioned training courses at the Spanish Navy School of Hydrography. We have had 32 students from African countries (Algeria, Morocco, Mauritania and Tunisia) attending these courses since 1969.

In addition, there were several hydrographic cruises in cooperation with the Moroccan hydrographic office in the recent past.

Finally, can you tell us how young hydrographers of the Spanish Navy see their career and what do young people in Spain in general think of a career in hydrography?
Spanish Navy hydrographers, both officers and petty officers, generally find their work compelling and rewarding. The fact that they belong to the Navy, which directs their career paths, implies that it is not always possible for them to stay in hydrographic posts continuously for long. Nevertheless, I find that being a hydrographer is seen as a vocation, and many of them get to develop most of their career in this field.

The application of Hydrography to produce official nautical charts is a prerogative of this IHM. There is not a degree in Hydrography as such at Spanish universities. However, there are a number of activities in Spain that feature bathymetric work (in a way similar to, for example, topographic work) which could become an objective for young people in Spain.



DTM of the Strait of Gibraltar.


applanix
A TRIMBLE COMPANY
capture everything. precisely.
Applanix...
the PARTNER
you TRUST
Come see us at
Oceanology International China 2014,
Booth B20.
www.applanix.com
No. 3509

The *Rocknes* Casualty 2004

A Chartmaker's Retrospect

The MV *Rocknes* (about 17,000 GRT (Gross Register Tons), draught approximately 10.5m, see Figure 1), en route from Eikefet, Norway to Emden, Germany, hit a shoal in Vatlestraumen, Norway on 19 January 2004. The vessel carried a pilot from the Norwegian Coastal Administration (NCA). Soon after the grounding the ship capsized with the loss of 18 crew. 12 crew were rescued. Norwegian Hydrographic Service (NHS) was blamed for not publishing its knowledge of a presumed new shoal in the Vatlestraumen. Three subsequent lawsuits were necessary to establish a credible explanation of the accident's root causes. 10 years after the serious accident, it is appropriate to present to the hydrographic and maritime environments a unified and comprehensive picture of this incident. This may lead to a greater common understanding of the roles of the mariner and the hydrographic offices, the latter being responsible for charts and nautical publications, which are so important for safe navigation.

Ole B. Kvamme
Production Director, retd., Norway

Odd Breivik
Section Manager, retd., Norway

Terje Langvik
Deputy Director, retd., Norway

IN THIS CASE, TWO Norwegian charts were involved. Firstly, the outdated paper chart no. 21 from 1941 that was based on surveys from 1926-1934 and later updated through standard mechanisms (see Figure 2). Secondly, the new official chart no. 21 from 2003 that was issued about one year before the accident. The publication of the new chart no. 21, see Figure 3, made the old chart no. 21 obsolete. The bathymetry of the Vatlestraumen area in the new chart no. 21 is based on surveys from 1995-1997. The presentation of the information in areas with new surveys, utilises modern compilation and presentation techniques using, among others, depth curves (i.e. isobaths). A few days after the accident, the area around Revskolten was resurveyed by NHS. No discrepancies in this area were found. At the time of the accident the (new) chart no. 21 was the only official Norwegian chart of the Vatlestraumen on this scale. It has been documented beyond any doubt that this chart was available at the bridge of MV *Rocknes* during her voyage.

Initial Investigations and Maritime Inquiry

A few days after the accident, rumours indicated that there was an unknown shoal in the Vatlestraumen in the vicinity of Revskolten lighthouse and that this unpublished shoal was the cause of the accident. A representative of the Norwegian Pilots' Association (NPA) even maintained that there was a shoal slightly SW of the 29m sounding in the old chart. Fingers pointed without reservation directly at NHS and its employees. These premature explanations put forward through the media influenced NCA as well as NHS, straining the discussions on the accident between the management of NCA and the management of NHS.

The NHS management rapidly established an internal Ad Hoc Committee to analyse all aspects of NHS production routines regarding chart no. 21. NHS achieved 2003 ISO certification (NS-EN ISO 9001:2000) and emphasised that a systemic approach should be followed by analysing all relevant production routines together with verification of their application and final result with relevance to chart no. 21 in general and the area around Revskolten in particular. No discrepancies regarding NHS processes and products with relevance to the accident were found. In addition to the obligations according to the ISO certification, NHS has adopted the guidelines of TQM (Total Quality Management).

The Maritime Inquiry took place from 26 to 31 January 2004. 28 witnesses were heard. The pilot was the only surviving member of the bridge team that had 5 members. The pilot stated that his intention was to follow the recommended track given by the pilot's guide lines, see Figure 3, and maintained that he had achieved this, although slightly to starboard. No track record of the voyage was available at that time. The inquiry did not manage to reveal probable root causes of the accident. Differences between the pilot, the NCA and the NHS regarding the interpretation of charts and chart regime were observed. In the media, the alleged insufficient coordination and exchange of information between NCA and NHS was often quoted as an important cause of the accident.

The police carried out their own investigation in accordance with the Norwegian Criminal Code. The investigation concluded with a recommended indictment against NHS. The indictment was rejected by the public prosecutor.

Figure 1: MV *Rocknes*. Notice the large sight reducing structures on deck. (Image courtesy Per S. Lindtner).

Several Reports Produced

The report from the regional office of the Norwegian Maritime Administration (NMA) did not present a conclusive analysis, but discussed various factors which may have influenced the voyage through Vatlestraumen. However, the report contained a plot that proved crucial to the further development: the actual track followed by MV *Rocknes* as recovered from the Electronic Chart System (ECS) on board. NMA also published a report stating that the ship had substandard stability due to the amount of cargo and ballast in addition to insufficient trimming of the cargo.

The report published by the Flag State (Antigua and Barbuda W.I.) dug deeper and pointed towards several important factors which may have caused the accident.

NCA published its report in November 2004. At the time of the publication, the plot showing the track followed by MV *Rocknes* was well known. The report contained no reference to the actual track. Regarding the navigation through Vatlestraumen, the report primarily discussed the recommended track as given by the pilot's guide lines. The chart regime was interpreted in an erroneous way, as indicated below. The report recommended a merger between NHS and NCA, mainly due to presumed, insufficient coordination between the two organisations.

Recovery of the ECS

Fortunately, the ECS was rescued from the shipwreck and it was possible to read its content, see Figure 3. The figure shows a considerable deviation from the recommended track given by the pilot's guide lines leading to a too close passage of the Revskolten area. In addition, the ship was within the red sector of the Hilleren lighthouse. This ship, with a draught exceeding 10m, should not have crossed the 20m depth curves. Figure 3 shows that MV *Rocknes* was inside the 10m depth curve causing the grounding. Figure 4 shows an enlarged excerpt of the area around Revskolten lighthouse. Figure 5 shows a bathymetric model of the area around Revskolten lighthouse.

Chart Regime

A main point of discussion has been the interpretation of the chart regime in force at the time of the accident. A New Chart is defined in the regulations (at that time denoted Publication M4) given by the IHO (International Hydrographic Organization). NHS stated that the new chart no. 21 made the old chart no. 21 obsolete, a mechanism well known to the professional maritime community. The NtM (Notices to Mariners) refer exclusively to the New Chart after its publication. NCA and the NPA in particular stated that the old chart may remain valid using NtM. The obsolete chart no. 21 and the new chart no. 21 show differences of which the geodetic datum difference and differences related to bathymetry, coastline and positioning of objects important to navigation, are of highest significance (see Figures 2 and 3). The transformation of NtM to the old chart would obviously be an awkward and error prone process. The interpretation put forward by NCA and NPA may lead to dangerous situations and NHS warned against this.

Another statement put forward was that the new chart no. 21 should not contain information significant to navigation which was not previously published in NtM, interpreting the collection of relevant NtM as a 'preliminary chart'. This misunderstanding is caused by an erroneous mixture of the concepts

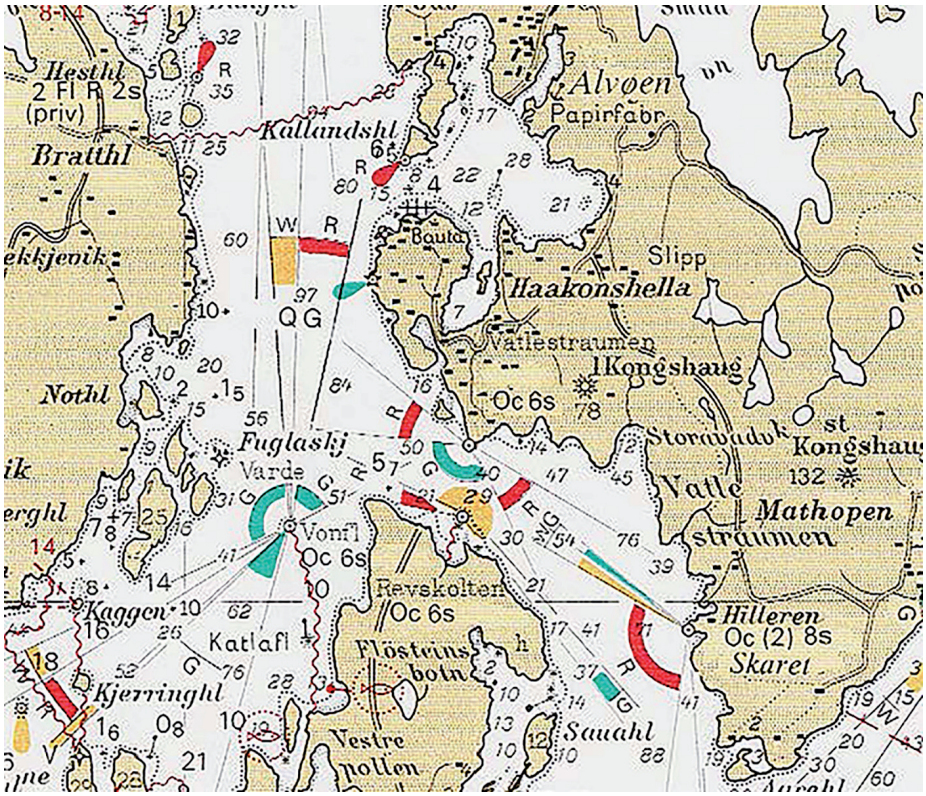


Figure 2: Extract from old, obsolete chart no. 21 of 1941 showing the Vatlestraumen area. Notice the dotted danger line around Revskolten lighthouse indicating a depth of 6m. The presentation is typical of charts based on old survey technology.

New Chart/New Edition and Reprint. Of course, a New Chart contains a lot of information which is only effectively communicable using graphical presentation, i.e. a chart in paper or electronic form.

Claims against the Norwegian State

The first lawsuit took place in the Oslo District Court, from 2 February to 20 March 2009. The parties were the ship owner and several insurance companies versus the Norwegian State.

NHS maintained that the non-publication of its knowledge of the bathymetry obtained in 1995 and 1997 was caused by the proximity of this new information to the danger line of the old chart no. 21 and that the new information represented no additional danger to the mariner. Further to this, NHS stated that the area in question was located in the red sector of Hilleren lighthouse and very close to the dangerous area around Revskolten lighthouse. Finally, NHS explained that the new chart no. 21 was compiled and maintained to modern standards and that this chart was the only valid Norwegian official chart on this scale at the time of the accident. The claimant's inversion of the chart regime (i.e. making NtM the primary source and the chart the secondary) was rejected by NHS.

Differences between pilot, NCA and NHS regarding the interpretation of charts and chart regime were observed

The documentation put before The District Court amounted to 8,400 pages. 31 witnesses were heard. The District Court decided that the State was responsible for 3.75% of the claim (approx. 545 million NOK in total), mainly due to the non-publishing of the NHS knowledge of the bathymetry around Revskolten. The existence of the New Chart almost one year before the accident did not according to the Court remedy the situation. Although the State's liability was a rather small fraction of the claim, the State disagreed with the main premises behind the judgement and the State appealed the District Court's judgement. The claimant also appealed the Court's judgement maintaining that the State should bear the whole liability for the accident.

The lawsuit in the Court of Appeal took place from 28 September to 25 November 2010. The documentation had increased to 12,700 pages. 39 witnesses were heard. A large amount of work within NHS was necessary to prepare for the court proceedings. The *Rocknes* case required a total of about 13 man-years within NHS.

These court proceedings were far more penetrating with regard to the root causes of the accident. The Court's inspection of the Vatlestraumen obtained during two sailings proved very valuable to the Court's understanding of the accident. One sailing was done with a smaller ship following the track of MV *Rocknes*, the other with

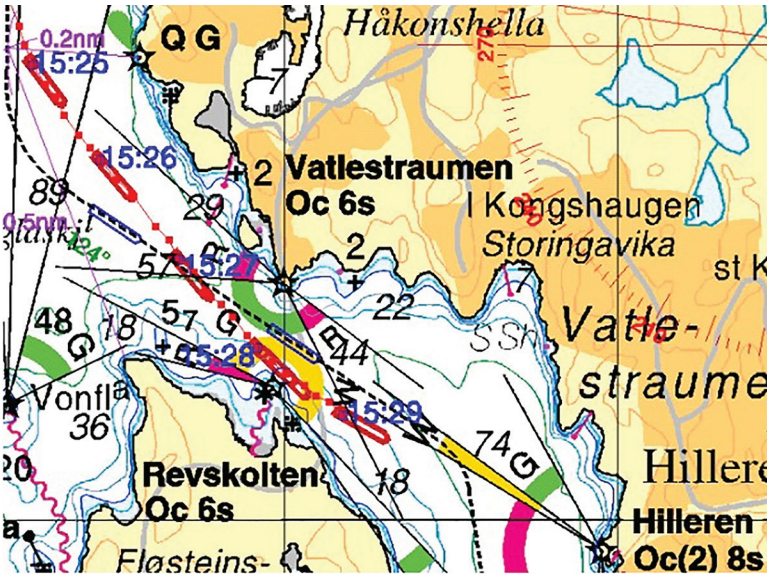


Figure 3: Extract from chart no. 21 of 2003 showing the Vatlestraumen area. The black dashed line with ship symbol (in blue) shows pilot's recommended track correctly to scale. The red line with ship symbol (in red) shows MV *Rocknes* track reconstructed from the ECS on board. The 5m, 10m and 20m etc. depth curves are shown. Notice that areas with depths 10m or less are shown by the light blue colour.

the reconstructed and improved MV *Rocknes* (called MV *Nordnes*). First-hand witnesses accustomed to observing ships' normal sailings through Vatlestraumen, described their observations of MV *Rocknes* when entering Vatlestraumen.

The Court concluded after its proceedings that the State was not liable, i.e. neither NHS nor NCA were to be blamed or had in any way contributed to the accident.

About half of the claimants (among others, 6 of the in total 13 insurance companies from the Court of Appeal) appealed to the Supreme Court. This appeal was rejected. The judgement of the Court of Appeal was final, about 7.5 years after the accident.

The Probable Root Causes

The Court stated that erroneous navigation by the bridge team is the most probable main cause of the accident.

Insufficient visibility from the bridge, insufficient/sub-standard stability, difficult manoeuvring characteristics, insufficient BRM (Bridge Resource Management) and influence of the currents are factors which may have contributed to the erroneous navigation. The bridge team, including the pilot, did not have a proper understanding of the ship's position and dangers in the area. They did not detect the deviation from the intended track in time, which in turn prevented them from taking proper actions. The chart and the chart regime bear no liability in this case.

See Figure 6 for an illustration of the voyage of the MV *Rocknes* through Vatlestraumen reconstructed from the ECS using an air photo of the sound.

Lessons Learned as seen from NHS

The detailed and penetrating analyses of all aspects of the case, internal as well as through the court proceedings, revealed potential improvements of NHS processes and products. These were thoroughly analysed and the relevant production processes were reviewed and amended as necessary. An important lesson learned was that more effort should be dedicated to obtain full consistency, precision and completeness of all published information, through NtM, the charts or otherwise. Such information should nevertheless be easy to understand for the mariner, who often has to perceive the information under less favourable work conditions.

Although hydrographic offices intend to present information in the charts in a consistent and perceivable way, it may be demanding for the navigator to comprehend the information. NHS learned during this case (among others, from statements from witnesses) that the ability of several navigators and pilots to interpret the charts was less than optimal. A chart covering shallow and narrow waters should of course be minutely studied as part of the planning process prior to the voyage. This is well known to the professional navigator. The relevant depth curves should be interpreted as danger curves for the actual ship and certainly not interpreted loosely as 'portrayal information' of the bottom topography. NHS and other hydrographic offices should take measures, among others, in collaboration with maritime schools and with the maritime community in general to enhance competence in chart interpretation. The challenge is more or less the same regardless of whether the chart in question is in electronic form or is a traditional paper chart.

Organisational and Interinstitutional Issues

Especially during the early phases, there was substantial media pressure. NHS decided that the organisation should not contribute to the speculations and the public hunt for a scapegoat. Only facts related to the NHS area of responsibility and competence were released by NHS. The handling of media was exclusively taken care of by the director and his

NCA and NHS were deeply involved in the investigations of the accident and in the subsequent lawsuits

deputy. All information released was thoroughly checked. These measures ensured that the information released was consistent and in accordance with the communication strategy. Possible lawsuits were seen in the horizon and this observation had a strong impact on the works. It may be said that the low profile media strategy created a vacuum which could be utilised by others with less constructive objectives. These interests may then grow into the said vacuum contributing to partial irrational public communication. NHS was well aware of this danger. Nevertheless, NHS felt that the real issues around the accident would probably be settled in the court rooms and not in the media. The efforts were gradually directed towards the envisaged lawsuits.

The rapidly established Ad Hoc group was NHS's main tool for analysing all relevant aspects of the accident. The organisational rationality achieved in this challenging situation, avoided the jump into the trenches. The analyses should be based on facts without any prejudice or conjectures whatsoever. The objective of NHS work in this respect was limited to analysing the possible role of NHS products and services in the context of the accident. This approach is consistent with the requirements of the ISO approved quality system. The objective of NHS was certainly not to find the cause of the accident; an objective that is outside the NHS area of responsibility.

An important aspect is the integrity of the organisation. When facing a situation like this where the products and services of a hydrographic office may play a role, the situation should be met with an open mind. It is of great importance to maintain the openness and frankness of the organisation ensuring that all relevant aspects surface properly, whether beneficial to the organisation or not. It is very important that the actions taken by the management are consistent with this strategy. There is no contradiction between these objectives and the chosen media strategy.

It is important that when you do analyses of possible discrepancies within an organisation with an operational quality system (e.g. ISO approved) this is done by analyses of processes, i.e. their appropriateness, application and their input and outcome (particularly regarding chart no. 21). This is a requirement of the quality system. All this is in contrast to the traditional hunt for an, often simplistic, explanation/scapegoat contaminated by conjectures, speculations, etc. The systemic (holistic) approach is essential in this respect.

When NHS realised that the ship owners, insurance companies, etc. would probably initiate lawsuits against the Norwegian State, NHS sought high-quality judicial assistance. This advisory service was very useful and proved to be crucial throughout the more than 7- year long process. The lawyers were fast learners grasping the many complexities of the various disciplines relevant to this case.

Work on the *Rocknes* case has been beneficial to the mariner and contributes to enhancing safety in Norwegian waters

The top management of NHS followed the case closely. After the analyses and clarification of the possible role of NHS processes, products and services, the Ad Hoc group was disbanded. The subsequent comprehensive preparations for the upcoming lawsuits were carried out by NHS employees having relevant expertise. A small group at management level coordinated these works to ensure quality and consistency. The collaboration with the attorney general (this office takes care of civilian lawsuits where government bodies are involved) was taken care of by this group. In addition, important analyses were done by external consultants, among others, on stability, visibility from the bridge, chart interpretation, current conditions and human factors. All of these were of high value during the proceedings of the Court of Appeal.

Several years of experience with an operational quality system had previously been accumulated throughout the entire organisation. The experience and competence accumulated from a number of investigations and analyses of

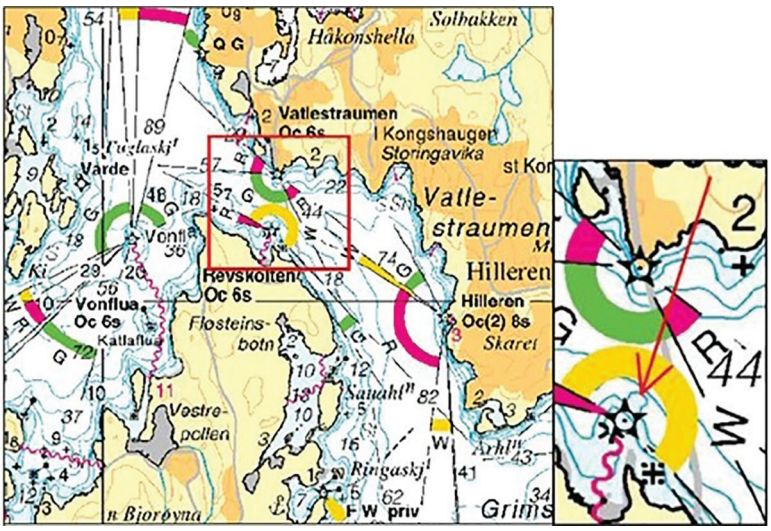


Figure 4: Extract from chart no. 21 of 2003 showing the Vatlestraumen area with the area around Revskolten lighthouse enlarged. Red arrow indicates the 10m depth curve. MV *Rocknes* touched bottom in this area.

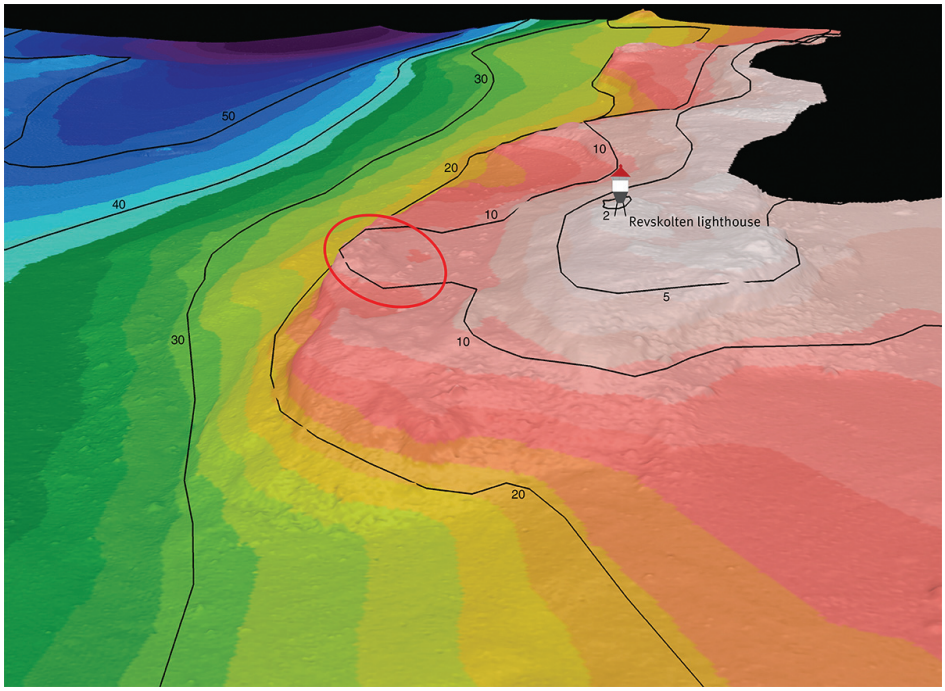


Figure 5: Bathymetric model showing the area around Revskolten lykt (Lighthouse). Depth curves from ENC corresponding to 5m, 10m, 20m, 40m and 50m are shown.

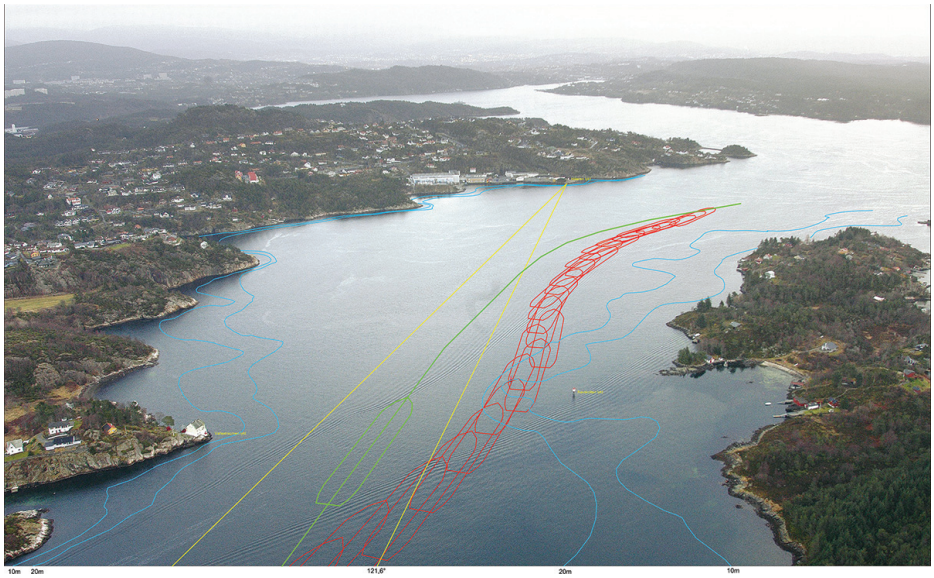


Figure 6: Aerial view of the reconstructed voyage of MV *Rocknes* through Vatlestraumen on 19 January 2004. The yellow lines show the white sector from the Hilleren lighthouse. The green line shows the recommended track together with ship symbol. The real track is indicated in red with a ship symbol correct to scale. Blue lines indicate 10m and 20m depth curves. Notice Revskolten lighthouse at starboard side and Vatlestraumen lighthouse at port side. The figure was constructed using aerial photogrammetric techniques. (Photo courtesy Tor Sponga).

deviations and accidents, proved to be crucial to our case, because this enabled NHS to do the analyses rapidly, efficiently and without prejudice or conjectures. The importance of an operational quality system together with skilled employees in a situation such as this can hardly be overestimated, because this ensured reliable, objective analyses of which outcomes are based on facts. Regarding the analysis of the production of chart no. 21, it was essential that the various production steps were traceable and well documented. Within a comprehensive digital production system, it is important that the bookkeeping of the various production steps is in first class order.

NCA and NHS were deeply involved in the investigations of the accident and in the subsequent lawsuits. NCA and NHS have collaborated closely for decades to the benefits of the mariner. The early phases caused NHS to believe that NCA was influenced by the NPA which sought to protect the pilot, the only surviving member of the bridge team. As NHS, after the analyses of the Ad Hoc group, suspected that the root causes of the accident were closely linked to a navigation error, the discussions between the two organisations became difficult. The NCA report of November 2004, written under the guidance of its general director of

that time, enhanced the difficulties considerably and was fuel for the claimant. However, the management of both organisations decided shortly after the accident that 'business as usual' should be observed independent of the discussions and outcome of the Rocknes case. This was actually achieved which is to the credit of both organisations.

When several institutions are involved with different areas of responsibility but share common interfaces, it is of utmost importance that the top managements keep the communication channels open and rational from day one. Even when substantial challenges prevail, openness and frankness should be observed supporting the integrity of participating organisations.

Definition of IHO Chart Regime as of 2004, B128 of M4

Terms when issuing charts

New Chart (NC): The first publication of a national chart embracing an area not previously charted by that nation to the scale shown, or embracing an area different from any existing chart of that nation.

New Edition and/or Large Correction (NE,LC): A new issue of an existing chart, containing amendments essential to navigation, which may include changes additional to those in Notices to Mariners, making existing editions obsolete. The chart number normally remains unchanged.

Reprint: A new print of the current edition of a chart incorporating no amendments of navigational significance other than those previously in Notices to Mariners, if any. It may also contain amendments from other sources provided they are not essential to navigation. Previous printings of the current edition always remain in force.

Chartlet/Block/Patch: A small auxiliary chart giving new details of a particular area, to be pasted on the chart by the user. Chartlets are normally included in Notices to Mariners.

Remark 1: The publication M4 has been amended and improved several times, among others, in order to achieve higher precision, consistency and clarity. The mariner should always consult Notices to Mariners of the nation responsible for charts covering relevant waters in order to be informed of the chart regime in force.

Remark 2: Detailed information regarding new chart no. 21 was published in Norwegian NtM No 6/2003.

Conclusions

The NHS work on the *Rocknes* case has contributed to significant improvements of the NHS quality system, processes and products. This has been beneficial to the mariner and contributes to enhancing safety when sailing in Norwegian waters. A specific example of improvements as a result of the *Rocknes* accident is an agreement between the NHS and the NCA regarding pilots' access to ENC (Electronic Navigational Chart). This agreement provides all Norwegian pilots continuous access to the complete and fully updated Norwegian ENC portfolio. All ENCs can be viewed at all times by the pilots from their personal laptop with ECDIS (Electronic Chart Display Information System) software.

It is beyond any doubt that without proper traceability and documentation, necessary and reliable facts for the analyses would be difficult to establish. The subsequent analyses would in turn be defective and in general less suitable for revealing possible roles of NHS's products and services regarding the accident.

The *Rocknes* accident could have been avoided by proper ship management and by prudent navigation and manoeuvring. Detailed planning, including, among others, thorough analyses of all available nautical documents, high-quality BRM together with proper inclusion of the pilot into the bridge team and establishment of a common and well understood passage plan for the actual voyage, are measures that contribute to ensuring a safe voyage.

NHS work on the *Rocknes* case has contributed to significant quality improvements

The Authors

Ole B. Kvamme worked in various positions at NHS from 1977 to 2013. He holds a Dr. Scient. in oceanography and a master's degree in applied mathematics. He was production director at NHS from 1995 to 2013.

Terje Langvik has a degree from the Royal Norwegian Naval Academy. He served as naval officer from 1965 to 1970 and was senior engineer at the Norwegian Lighthouse Authority from 1970 to 1974. He worked in various positions at NHS from 1974 to 2007. He was deputy director from 1987 to 2007.

Odd Breivik worked in various positions at NHS from 1972 to 2009. He has a maritime background with the Merchant Marine. He was section manager for the Chart Production Section from 1995 to 2008.

Acknowledgements

The *Rocknes* accident was one disaster too many. 10 years after the accident, our thoughts go to the 18 deceased crew members, to their relatives and to others who experienced the accident up close and/or sought to minimise its consequences. The substantial efforts by the employees of NCA and NHS and cooperating consultants to determine the accident's causes together with the strategic and judicial counselling provided by the attorney general are highly appreciated.

Further Reading

Bergen Tingrett, Case no.: 04-00001 B/02, Maritime Inquiry, January 31, 2004.

Borgarting Court of Appeal: Judgement, Case No.: 09-163221ASD-BORG/03; January 11, 2011; Unofficial translation.

Hydro International, News: *Rocknes* Claims Appeal Dismissed, May 2011.

Lusk, B. M., 2009. MV *Rocknes*: Laying the Blame. Hydro International November 2009, Volume 13, Number 09.

Oslo District Court: Claim for compensation following a shipwreck; Case no.: 04-016361TVI-OTIR/04; 08-011585 TVI-OTIR/04; 04-011882 TVI-OTIR/04; May 29, 2009; Unofficial translation.

Smit, A. W., 2009. The 2004 *Rocknes* Drama. Hydro International April 2009, Volume 13, Number 03.

TELEDYNE TSS WORLD LEADERS IN MARINE NAVIGATION

SATURN

A new generation of **Marine Navigation Systems.**

Introducing the new Saturn range of fibre optic gyro-based AHRS and INS systems to meet and exceed the demanding requirements of maritime operations both surface and subsea.

Features of the new product range include:

- Teledyne's own fibre optic gyro technology
- Titanium subsea housing – lighter, smaller and non-corrosive
- Thermal calibration process to ensure performance stability

Saturn AHRS and INS systems – requirements to meet the exacting standards of marine navigation – everywhere you go.

100 years of World-leading navigation equipment.

To find out just how far - call: +44 (0)1923 216020

TELEDYNE TSS
Everywhereyoulook™

www.teledyne-tss.com

For further information on any TSS products please email us at: **tss_salesenquiries@teledyne.com**

No. 3501

Ice-jam Floods

River Ice-jams cause Severe Flooding in Tom River, Western Siberia

The large, poleward flowing rivers of Siberia, such as the Ob River, experience persistent and severe floods when river ice breaks up in the spring. Ice-jams are common on the Tom River, a tributary of the Ob, resulting in a rapid rise in water levels upstream of the jam and submergence of thousands of homes. Sudden failure of the ice-jam releases a flood wave that can cause extensive damage downstream.

Ray A. Kostaschuk, Department of Geography, Simon Fraser University, Burnaby, BC, Canada.

Dmitriy A. Vershinin, Department of Hydrology, Tomsk State University, Tomsk, Western Siberia, Russia.

Valeri A. Zemtsov, Department of Hydrology, Tomsk State University, Tomsk, Western Siberia, Russia.

FLOODS IN LARGE RIVERS ARE caused by a variety of processes. River flows may rise to flood levels at different rates, from a few minutes to several weeks, depending on the type of river and the source of the increased flow. Slow rising floods most commonly occur in large rivers where the increase in flow may be the result of sustained rainfall or rapid snowmelt. Localised flooding may be caused or enhanced by channel obstructions such as landslides or ice. Land use changes, such as urbanisation or deforestation, can exacerbate natural flooding. Rivers that are frozen for part of the year may flood as a result of ice-jams in the channel. Ice-jam floods commonly occur during the transitional periods of freeze-up and break-up, which mark the beginning and the end of an ice cover season. There are several kinds of ice-jams, depending on their formation mode, season of occurrence, spatial extent and state of evolution. At freeze-up, cold weather cools the river water to produce slush and ice pans, while at break-up, warm weather and increased runoff lead to fracture of the winter ice cover. In both cases ice slush, ice pans and ice blocks are transported on or near the water surface. If the movement of ice stops because it encounters an existing ice cover, or the ice transport capacity of the river is reduced locally, an ice-jam may form. Once initiated, jams propagate upstream in ways that are dictated by flow and channel conditions as well as by internal strength of the accumulation of ice slush and floes. Owing to larger flows, break-up jams typically have greater flooding potential than freeze-up ones. Ice-jam floods are particularly destructive because they cause water levels to rise higher and more frequently upstream of the jam compared to floods under open-water conditions.

Tom River

Persistent ice-jams occur in a reach of the Tom River approximately 15 km upstream of the city of Tomsk (Figures 2, 3). Scientists at the Hydrology Department of Tomsk State University have been monitoring this site and measuring stream flow since 1984, most recently using a standard, non-ruggedised Sontek 1000kHz acoustic Doppler current profiler (ADCP). The ADCP measures 3D current velocity by monitoring the Doppler shift of sound waves scattered from particles within the water. It is not possible to measure flow in the study reach during an ice-jam event so data are collected immediately after the area is clear of ice. Cross-sections of velocity and depth are routinely collected at the upstream and downstream ends of all of the channels. The measurements from 2009 that are reported here, however, focused on the confluences of the Svetlaya, Kaltaiskaya and Pankova branches (Figure 2) where sediment waves, or gravel dunes are generated (Figure 3).

Figure 1: Surveying on the Tom River.

NEW!

ECDIS BASICS

SUPPORTING YOUR TRANSITION TO ECDIS NAVIGATION

A GUIDE TO THE OPERATIONAL USE OF ELECTRONIC CHART DISPLAY AND INFORMATION

- Achieve practical hands-on knowledge about ECDIS.
- Gain a valuable overview of the principles of ECDIS navigation.

Based upon the IMO Model Course 1.27.
Written by Professor Ralph Becker-Heins.

ORDER YOUR COPY AT **GEOMARES.NL/ECDIS-BASICS**

geomares PUBLISHING

No. MH009

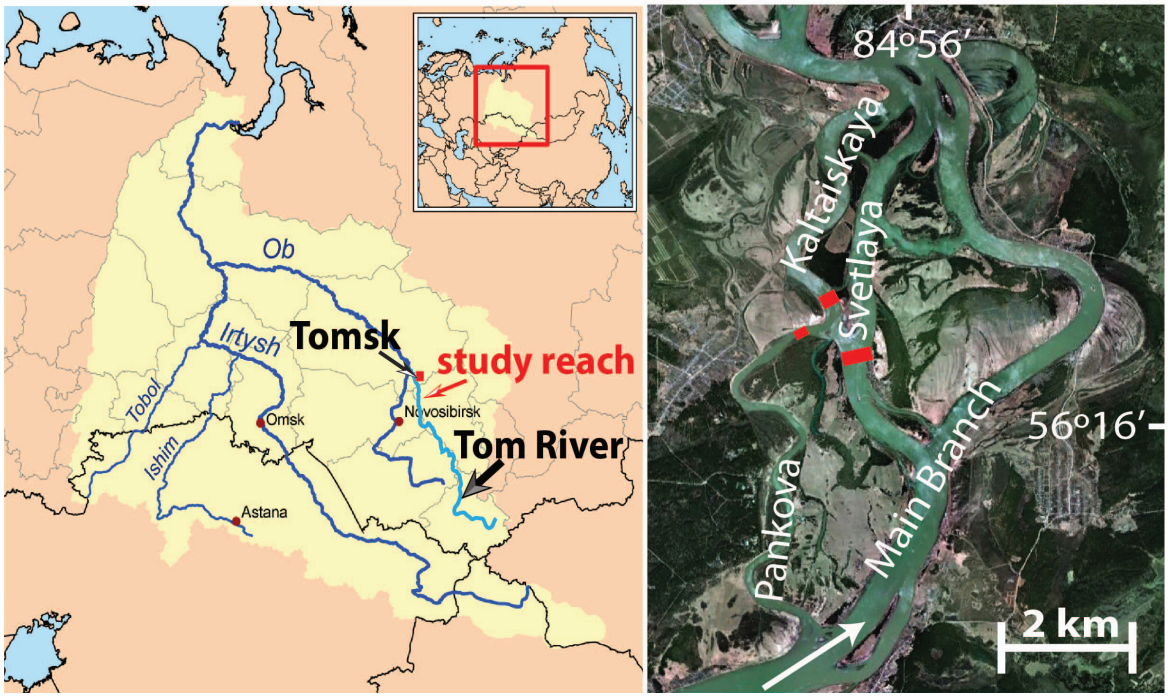


Figure 2: Left: Ob River watershed showing the location of the study reach on the Tom River. Right: study reach on the Tom River. Red lines mark the positions of acoustic Doppler current profiler (ADCP) cross-sections.

Spring ice-jam floods at the study reach in the Tom River have occurred annually about 40% of the time over the period 1998-2011. Ice-jams in the reach follow three typical patterns (Fig. 2). Firstly, the obstruction occurs in the meander bend of the Tom River. The ice accumulates in the Tom and extends upstream to the entrance to the Svetlaya branch. Flow in the Tom is diverted primarily into the Svetlaya branch, which rejoins the main channel downstream of the bend. Secondly, ice accumulates at the downstream end of the Svetlaya branch, diverting flow into the Kaltaiskaya branch. Thirdly, ice accumulates in the Tom River and blocks the entrance to the Svetlaya, diverting flow into the Pankova branch and then the Kaltaiskaya branch. The ice is eventually flushed through the reach and all of the channels actively flow.

Runoff of northern rivers in Russia will increase significantly by the middle of the 21st Century

Flow measured with the ADCP in 2009 is largest in the Svetlaya, followed by Kaltaiskaya and Pankova. Channel width ranged from 117 to 330m, mean depth from 5 to 7.3m, velocity from 0.7 to 1.6m/s and discharge (width*mean depth*mean velocity) from 670 to 2966m^3/s.

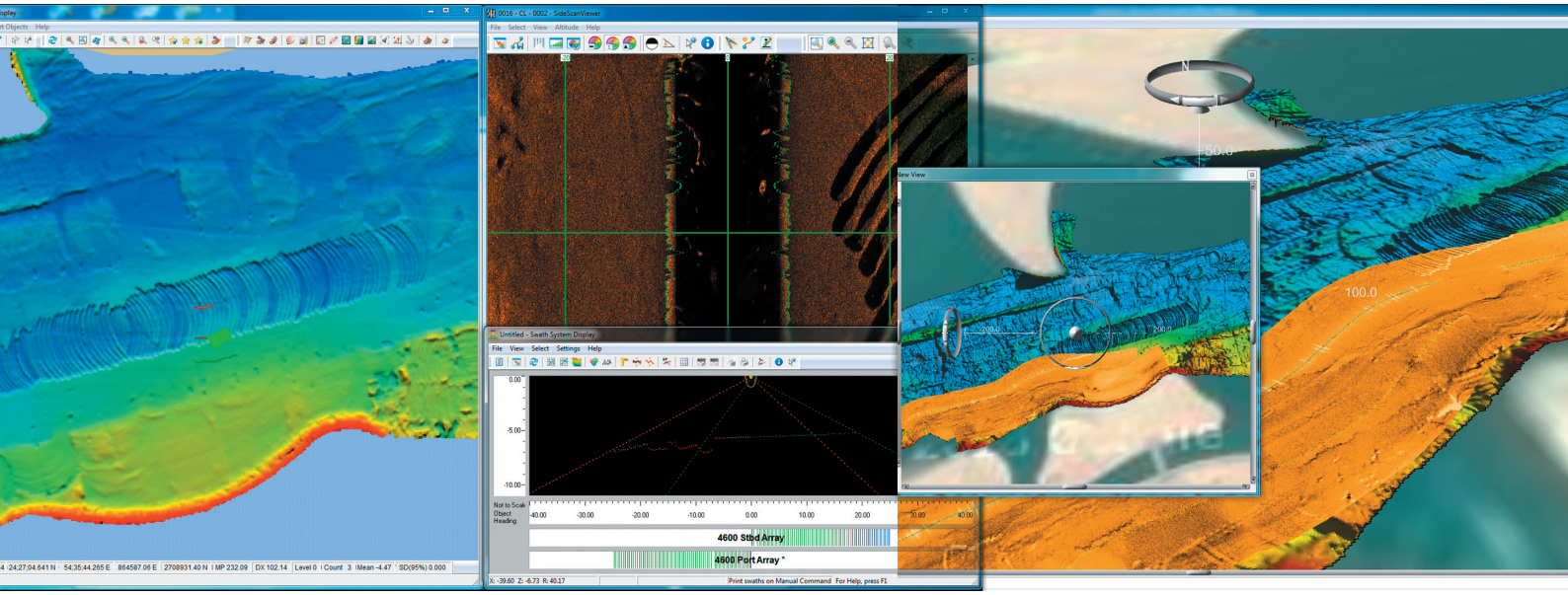
Gravel Dunes

Crestal areas of dunes often display scours caused by ice blocks. Measurements in 2009 showed that dunes were largest in the Pankova branch, followed by the Kaltaiskaya and the Svetlaya. Mean dune length at the sites ranged from 6 to 18m and mean height from 0.15 to 0.6m. Median sediment size was 0.01m in the gravel range at all sites. Simple, empirical dune models were used to estimate the flow conditions that created the dunes on the basis of dune and sediment properties measured at the three sites. Flow depth was estimated to be 0.9 to 2.4m, width from 118 to 463m, velocity from 1.7 to 2.4m/s and discharge from 670 to 711m^3/s.

Flow depth is smaller and mean velocity is larger when estimated

Figure 3: Left: oblique aerial photograph of an ice-jam flood in the study reach on 30 April 2010. Right: Gravel dunes in the Svetlaya branch in May 2012 after an ice-jam flood.

GEOSPATIAL TOOLBOX



Our geospatial toolbox is a powerful enabler for acquiring, processing and sharing maritime geospatial data. We are working with those engaged globally in maritime projects to have seamless systems that meet needs for integrated tools to improve effectiveness in data management and production. The modern maritime geomatic business process starts with data collection and input, through validation and visualisation, to producing and sharing data deliverables. Fundamental to this workflow is the use of common data files and the avoidance of intermediate exchange data files.

Acquisition – use QPS QINSy to collect once and use many times

Modern maritime mapping projects often simultaneously collect data from multiple survey sensors, and then the data from one survey sensor is used a number of times.

Validation – use QPS Fledermaus for true space and time 4d environment

The industry leading interactive true 4D geospatial processing and analysis tool that is used by commercial, academic and government organizations to interact with massive geospatial datasets of numerous data types for ocean mapping and land-based projects.

Sharing – the power of geospatial information systems

GIS is being applied to a wide range of maritime activities, including maritime information systems, nautical and electronic chart systems, vessel monitoring and tracking, port management, port security, facility management, environmental monitoring and management, and coastal zone management.

Seamless workflow - Acquisition - Validation - Sharing

QINSy acquisition data files become Fledermaus processing data files, and Fledermaus exchanges survey results directly with the GIS system.

QPS DELIVERS PRODUCTS TO **ACQUIRE, PROCESS, VISUALIZE, SHARE**

The solutions for your maritime geomatics data and maritime projects
Contact: sales@qps.nl or sales@qps-us.com

www.qps.nl

No. 3500

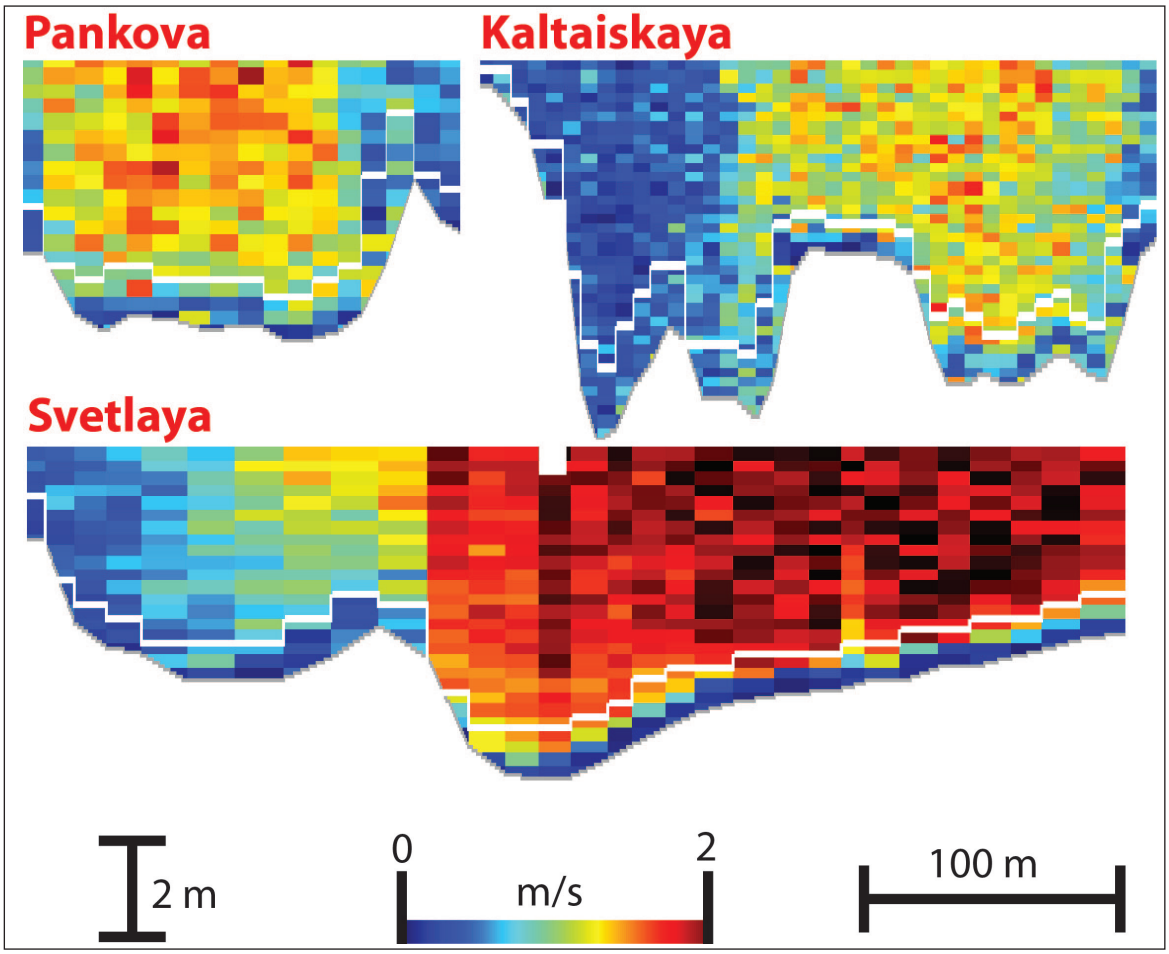


Figure 4: Acoustic Doppler current profiler (ADCP) records of study site on 7 May 2009. The cross-sections are facing downstream.

from the dune models compared to the ADCP measurements. Discharge estimated from the dune models is consistent for all three sites but is much less than the ADCP measurements.

These results indicate that the dunes measured in 2009 were generated by much shallower and faster flows than those measured with the ADCP. It therefore seems likely that the flows that created the dunes occurred during the falling stages of the flood when the depth was lower and the velocity higher.

Climate Change

The Centre for Climate Adaptation in Europe reports that the runoff of northern rivers in Russia, including the Ob, will increase significantly by the middle of the 21st Century. In particular, flows will be higher in the early spring due to more rapid snowmelt. This could lead to an increase in ice-jam floods and the duration of floodplain inundation may double by 2030. Observations from our study site on the Tom River support this scenario as ice-jam floods have become more frequent in the past decade, causing damage to local villages and engineering structures. An improved understanding of ice-jam flood characteristics is thus critical for planning.

Acknowledgements

We would like to thank the students and staff at the Department of Hydrology of Tomsk State University, particularly N. Inishev and Y. Korotkova for their able assistance. Funding was provided by the Russian Foundation for Basic Research (Grant 10-05-00625a) and the Natural Sciences and Engineering Research Council of Canada (Discovery Grant 400313).

Further Reading

Centre for Climate Adaptation in Europe: (http://www.climateadaptation.eu/russia/river-floods/).

Dobrovol'skii, S. G. and Istomina, M. N. (2009) Characteristics of Floods on the Territory of Russia with Regard to Their Natural and Socioeconomic Parameters. ISSN 0097-8078, Water Resources, 2009, Vol. 36, No. 5, pp. 491–506. Pleiades Publishing, Ltd., 2009.

Papa, F., Prigent, C. and Rossow, W. B. (2007) Ob' River flood inundations from satellite observations: A relationship with winter snow parameters and river runoff. Journal of Geophysical Research, Vol. 112, D18103, doi:10.1029/2007JD008451

The Authors

Ray Kostachuk's research focuses on collaborative field experiments on sedimentary processes in rivers, estuaries and lakes. He is currently working on sand and gravel dunes in rivers and density currents in glacial lakes, developing and applying instrumentation for fluvial research, including the acoustic Doppler current profiler (ADCP), acoustic Doppler velocimeter (ADV), laser in-situ sediment scattering transmissometer (LISST) and multibeam echo sounder (MBES).

Dmitry A. Vershinin is head of the Research Laboratory of Hydrological and Ecological Problems and Associate Professor of the Department of Hydrology at Tomsk State University, Russia. He is an engineer/hydrologist and Candidate of Science (Geology). His research interests include fluvial processes, sediment transport, ice-jams, and modelling of hydrologic processes. He has more than 40 research publications and 20 reports.

Valery A. Zemtsov is head of the Hydrology Department at Tomsk State University, Russia. He is an engineer/hydrologist, Doctor of Science (Hydrology), and Professor. His research interests include engineering and environmental hydrology, hydrological implications of climate change, modelling of hydrologic processes, hydraulic modelling and management of water resources. He has more than 100 research publications and 5 monographs.

UAS at the Beach

Merging UAS DEM and Bathymetric Depths to Monitor Breakwater Subsidence and Erosion

The North Sea Canal connects the Port of Amsterdam with the sea. The two breakwaters at the mouth of the harbour in IJmuiden, The Netherlands, are usually monitored on displacement of basalt block by airborne Lidar and on subsidence by annual levelling of permanent points. Could a camera-equipped UAS survey conducted simultaneously with a bathymetric survey provide information of equivalent accuracy? Here, the author shows that it could. Time series of 3D models of the breakwaters are useful for erosion and subsidence monitoring.

Pieter Franken, Skeye BV, The Netherlands

MONITORING OF THE breakwaters in IJmuiden, the Netherlands, is currently carried out using airborne Lidar together with spirit level / total station measurements. Airborne Lidar is excellent but very expensive when projects are small such as a breakwater survey. A UAS survey is a proper, and much more affordable, alternative.

GCPs and Check Points

Prior to the actual UAS survey, conducted in August 2013, 20 circular disks with a diameter of 35cm were placed as ground control points (GCPs) regularly distributed over a distance of 1,000 metres along the breakwater and measured with RTK GPS. GCPs are indispensable since onboard GPS only picks up

Figure 1: MD4-1000 operating above the breakwater in IJmuiden.

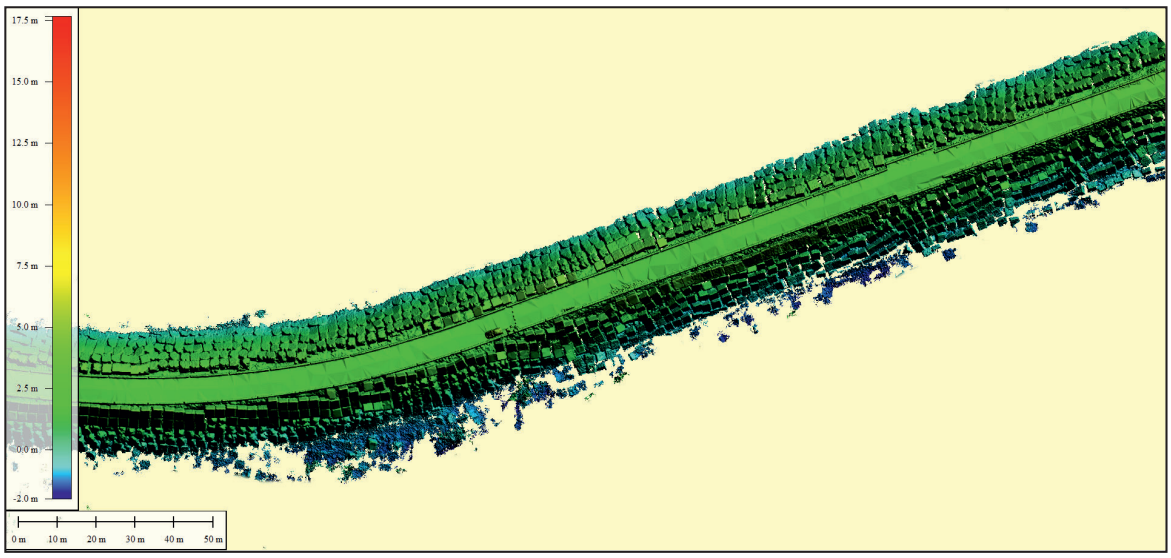


Figure 2: UAS DEM of the breakwater.

the L1 signal and the IMU provides orientation at an accuracy of just one degree. Although sufficient for conducting a flight autonomously when a flight plan is uploaded, the use of the GPS / IMU alone is not accurate enough to create high-quality digital elevation models (DEMs).

The GCPs were measured with a 72-channel Novatel Frog GPS that uses commercial correction signals from the '06-GPS' network with an accuracy of 2cm in X and Y and 3cm in height. To assess the quality of the final DEM the 35 permanent points, which are measured yearly with total stations and levels to monitor subsidence of the breakwater, were also measured with RTK GPS.

Image matching resulted in a DEM with nearly 100 points per m^2

UAS and Bathymetric Survey

After laying out the GCPs, the UAS survey was conducted with 80% along and across track overlap at low tide to ensure sufficient overlap with a multibeam echo sounder dataset simultaneously collected at high tide. The overlap enabled mutual checks of both datasets. The UAS used, a Microdrone MD4-1000 equipped with a 24MP Sony NEX7, can stay airborne for 45 minutes (Figure 1).

Figure 3: Aerial image of the breakwater.

GET THE MOST OUT OF OUR OEM&ODM SERVICE

IS YOUR COMPANY AT RISK WITH THOSE HIGH EXPENSES?

TraceME modules can save your business a lot of money because:

- They let you track and trace all your possessions, big or small, from birds to vehicles, shipping containers, etc.
- They can keep track of your machinery's status and send warnings to your selection of mobile numbers and servers.
- They allow you to send customized updates wirelessly from a server to any of your TraceMEs in the field.
- They have countless onboard sensors and advanced software to reduce battery consumption to support all your operations. Sensors such as RFID, G-force, altitude, speed, temperature, etc.
- They are fully customizable to suit any situation.

46 x 21mm

MAIN FEATURES

GPRS AND HSDPA+
GPS AND GLONASS
RF (2KM RANGE)
MULTIPLE SENSORS

7 grams

We have a worldwide distribution and support network

No 3486

www.trace.me

Email: trade@kcs-trade.com | Fax: +31-(0)20-5248130
Kuipershaven 22, 3311 AL Dordrecht, The Netherlands

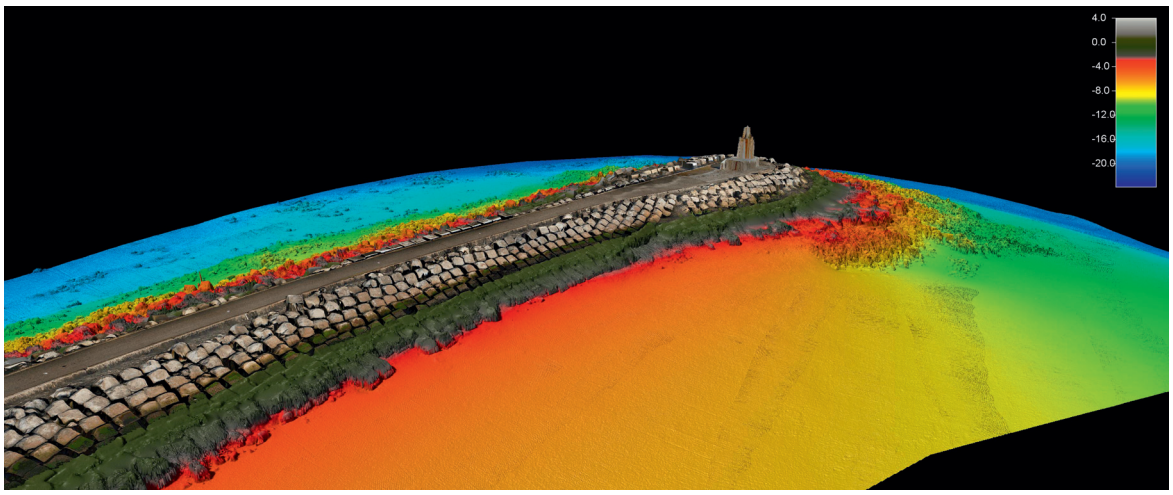


Figure 4: DEM generated from combining bathymetric depths and UAS heights.

Three parallel flight lines at a height of 50 metres resulted in 433 images. After flight the camera was calibrated using specialised software and the values were used in the bundle block adjustment. Image matching resulted in the identification of around 4,000 tie points per image and a DEM with nearly 100 points per m^2 on average (Figure 2). A seamless orthomosaic with a ground sample distance (GSD) of 2cm was created from the DEM. The vessel used for the bathymetric survey was equipped with RTK GPS, a motion sensor, a probe to measure the speed of sound in water and an ultra high-resolution R2Sonic 2024 multibeam echo sounder. The survey was carried out by the Amsterdam-based company Deep BV at high tide to ensure the maximal overlap between UAS heights and bathymetric depths. The latter were resampled to a grid cell size of 10cm.

	GPS RTK check points			Leveling / total station check points		
	Easting [mm]	Northing [mm]	Elevation [mm	Easting [mm]	Northing [mm]	Elevation [mm]
Average of absolute differences	14	13	13	18	11	11
Standard deviation	12	11	7	13	8	10

Table 1: Accuracy assessment using GPS RTK and levelling/total station check points.

Accuracy Assessment

After integration of the UAS DEM and the bathymetric depths, the two datasets showed high resemblance so that a seamless DEM could be created (Figure 4).The 35 check points revealed a planar accuracy of 14mm and a height accuracy of 13mm. A further check using levelling and total station data supplied by the Ministry of Infrastructure and the Environment showed a height accuracy of 11mm (Table 1).

Legislation

In the Netherlands, commercial UAS operation requires a permit from the Ministry of Infrastructure and the Environment. Permits are given to individual projects or to companies and Skeye is the first and, at present, the only UAS operator with a permanent company permit. To obtain this status all aircraft were checked on airworthiness, had to be insured for third-party liability and had to be registered in the National Aircraft Registry. Added to this, the pilots have to be BNUC-S licensed and operate according to the rules of the UK and NL Civil Aviation Authorities. However, a permit does not warrant operation everywhere at any time, since other airspace users have to be notified and provincial authorities require permission for take-off and landing outside an airfield.

Concluding Remarks

UAS can achieve accuracies up to the centimetre level, which is higher than expected as the GCPs were measured with an accuracy of 2 to 3cm. Measuring the GCPs with higher accuracy may reveal even better results.

Figure 5: Skeye's Microdrone MD4-1000.

The Authors

Pieter Franken has trained as a Naval radio officer and obtained postgraduate degrees in GIS, business administration and IT. He is co-founder and managing director of Skeye BV which is specialised in UAS surveys. Prior to this, he was sales director for Vision in Dubai and general manager for Aeroprecisa in Nigeria.

info@skeyebv.nl

This article was originally written for, and published in the UAS special 2014 of *GIM International*, a sister publication of *Hydro International*.

Adam Sumner

Peter Thompson

A Hydrographic Resourcer with Big Ideas

Precise Consultants

Michael Giner
Copywriter, UK

Based in Shoreditch at the vibrant heart of East London (UK), Precise Consultants is a resourcing firm focused on the hydrographic sector. Working to match talented freelancers with clients from around the globe, Precise Consultants was set up by former hydrographic surveyor Peter Thompson and financial analyst Adam Sumner.

AFTER NEARLY A DECADE AS A freelancer in the hydrographic industry, Peter wanted to shake-up how resourcing and talent supply works across the sector. So, he matched his hydrographic industry experience to the financial and strategic background of business partner Adam Sumner to help bring the company to life in early 2013.

The ethos behind the Precise project is to create a warmer, more people-focused approach to hydrographic resourcing. As such, both Peter and Adam have set about instilling a transparency to their resourcing process that they hope will soothe the anxieties of a freelancing community they feel will benefit from a more holistic, rounded service.

Current Profile

The fundamental business mission of Precise Consultants is to work onshore to help hydrographic freelancers and professionals find their next challenge in the offshore world. Their client base is global, and they work on a range of disciplines throughout the hydrographic sector.

The Precise team – which currently numbers six in total - works as a personnel support service to clients whose operational need for freelance staff can really vary. They source hydrographic professionals to come on board across project lifecycles, with clients relying on them to provide the skillsets they lack, and which are required to fulfil challenging assignments.

There is also a great desire within the company to engage with the broader needs of their freelancer base, because in doing so they believe they can build lasting relationships. With broad in-house industry experience of the offshore environment, Precise feels well placed to meet the everyday needs of their freelancers, rather than just playing the role of a resourcer that limits itself to a placement service.

As such, Peter and Adam have focused on offering broader support to freelancers. They offer in-house expertise on global taxation issues, they have devised a comprehensive insurance service to safeguard freelancers against potential legal issues, and they provide smoother transitions to distant work assignments.

> A busy year looks set to get even busier and even better

International and Global Scope / View On the Future

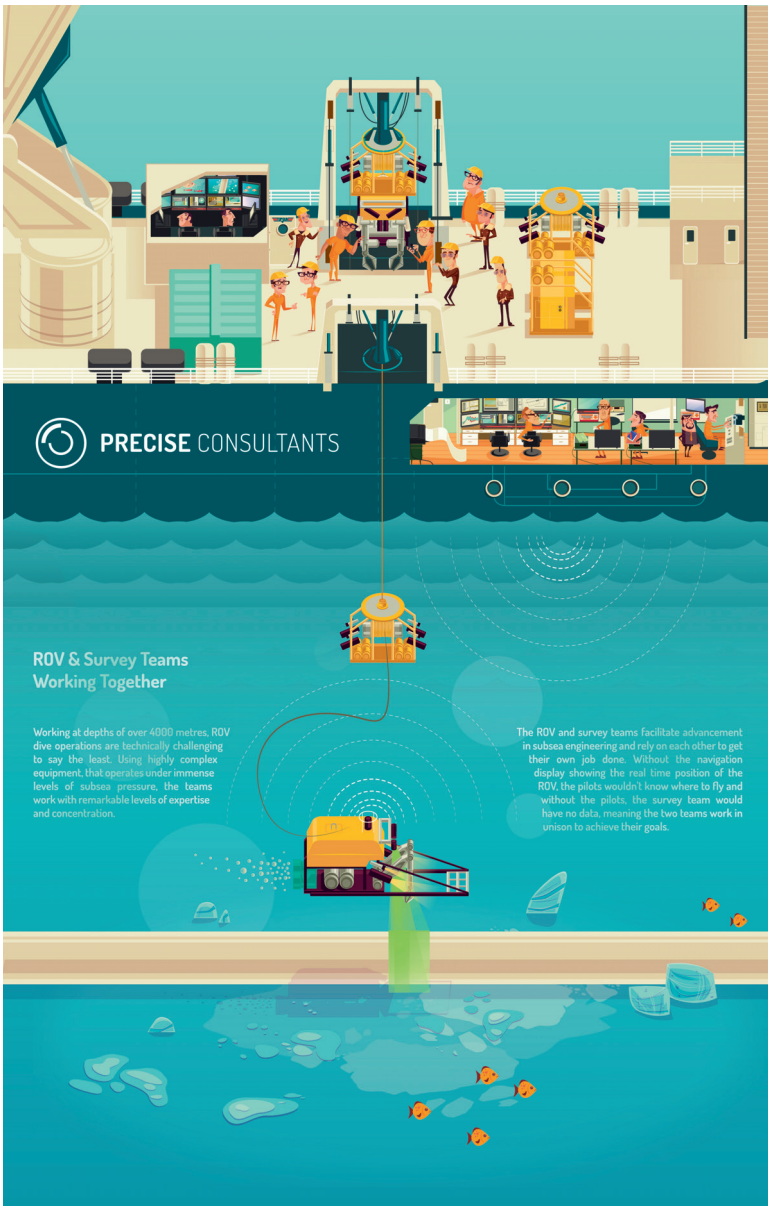
As an offshore world, hydrography is totally global in scope and Precise Consultants places freelancers throughout various geographies. As such, there are plans to expand the business into the Middle East in the near future.

Both Precise founders recently spent some time in the region to source locations for new office space in Abu Dhabi. Additionally, they found time to liaise with clients to determine

resourcing requirements, as well as gaining valuable market insight in how the Middle East, and Abu Dhabi in particular, expects to develop over the next few years.

The buoyancy of the oil and gas sector will see Abu Dhabi seeking to increase production capacity of oil to 3 million barrels per day over the next three years. The investment will form the backbone of the Abu Dhabi 2030 infrastructure plan, which seeks to redefine the shape of the Emirate. The focus will be on robust and sustainable energy production that will work to help fund wider community and urban planning, with the hope that this will further bolster the economy and improve quality of life across the region.

The overwhelmingly positive mood this level of projected investment and improved economic performance has created meant that the Precise team encountered a strong buzz in terms of business opportunities in hydrographic resourcing following their recent visit.



Infographic of the cooperation between offshore disciplines.

Clients reported their busiest working calendars for some time, with rolling recruitment drives spanning the entire year. Hydrographic disciplines across the board are strongly sought after, with Peter and Adam expecting to be especially active in sourcing personnel for party chief, geophysicist and surveyor roles.

Clients reported their busiest working calendars for some time

Closer to home, the Precise Consultants team is also looking to expand and take on new talent internally. There is the added excitement of an impending office move to new premises in London to cater for their growing staff numbers.

Brief Conclusion

With the global economy broadly in buoyant mood, the expansion plans of the company sit neatly with the wider industry picture going into the second half of 2014.

As well as burgeoning resource requirements in the Middle East, clients elsewhere are reporting 2014 to have been amongst the busiest years they can recall. Work in the areas of construction and inspection amongst the hydrographic sector has seen significant demand.

The Precise team believes that new field discoveries reaching exploitation stage are driving this demand for personnel, with clients needing specific expertise to help them mature these opportunities.

The future, then, looks bright for Precise Consultants, with an expanded team coming online and the chance to develop further into the booming Middle Eastern economy. A busy year looks set to get even busier and even better.

www.preciseconsultants.co.uk

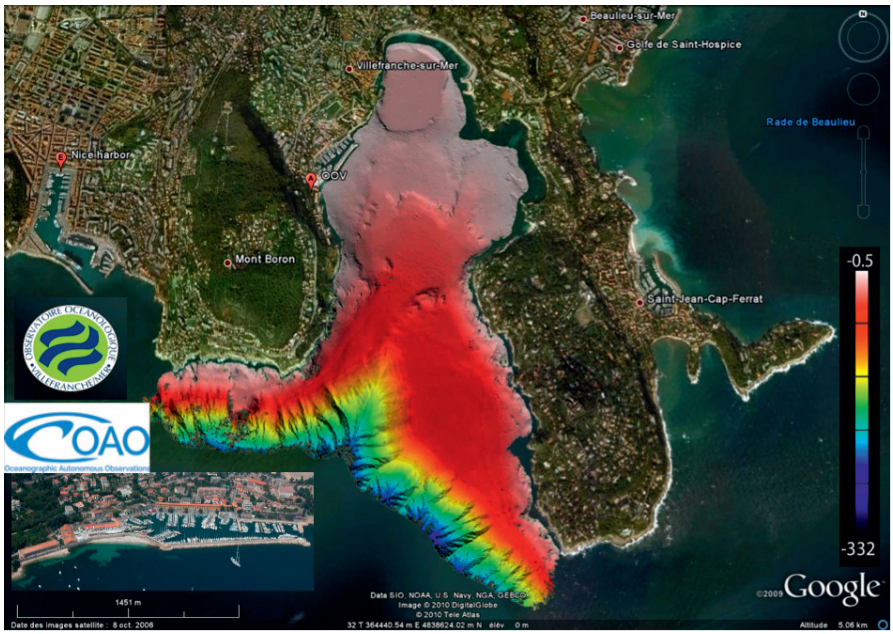


Figure 1: Location of the lab facilities and direct access to open ocean.

Image courtesy: Alexandro Dano, GeoAzur, Cadden.

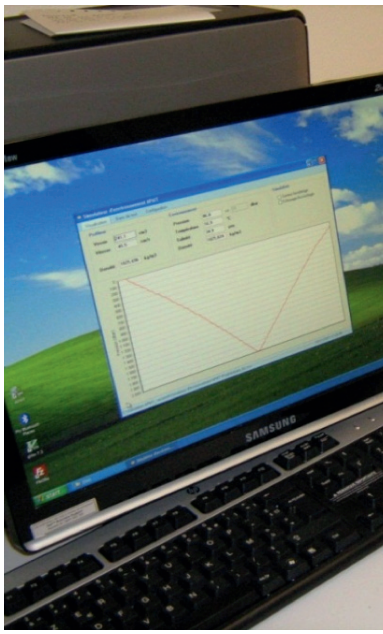


Figure 2: Simulation bench for sensor platform interfacing.

Enhancing Open Ocean Observatories Services

Marine Optics Lab, Remote Sensing and Biogeochemical Applications, Oceanographic Observatory of Villefranche-sur-Mer

Vincent Taillandier, Marine Optics Lab, France

Ocean observing systems maintain real-time surveys and high-quality measurements of the ocean state with the aim of monitoring marine ecosystems exposed to changing climate and human pressures. The Marine Optics Lab of Villefranche is one of the leading groups that coordinate this observational effort and, thanks to their partnerships with industrial projects for innovation, contribute to the enhancement of marine services.

ON BEHALF OF THE Oceanographic Observatory of Villefranche-sur-Mer (CNRS / UPMC), the Marine Optics Lab develops non-intrusive optical methods to describe the stocks of particulate and dissolved material in the ocean, and to study the underlying biogeochemical processes that drive their spatial and temporal variations.

The Marine Optics Lab's past and current research projects have benefited from staff expertise covering hydrological and optical sensing metrology, oceanographic instrumentation, data management, low-consumption electronics and embedded computing; as well as lab facilities (ballast pool, laser chamber, chromatographic bench, ships) and a geographic situation favourable for rapid access to open sea conditions.

For these reasons, the Ligurian Sea has become a hotspot for conducting ocean monitoring together with R&D activities. Recurrent observational efforts were initiated there during the 1980s by monthly CTD-Rosette sampling along a 30nm cross-shore transect, augmented since 2000 with an instrumented taut mooring for vicarious calibration of ocean colour satellites. Presence at sea has drastically increased since 2006 with the routine use of autonomous mobile vehicles (profiling floats and gliders) embarking bio-optical and biogeochemical sensors.

Expected adoption of novel sensors and autonomous platforms for assessing scientifically required accuracy of measurements among the Ligurian observing system, have been internationally acknowledged as a significant contribution to capacity building for in-situ ocean monitoring.

Developing Glider Technology with the Business

The glider SeaExplorer illustrates the recent achievements that came from the synergy with industrial consortiums, like the French company ACSA. The Marine Optics Lab was involved at every stage of this 6-year project, from the vehicle conception to its field testing, from data flow management to sharing the processing tools with end-users.

Figure 3: Deployment of the SeaExplorer glider in the bay of Villefranche.

On the basis of our experience on glider operations, we were initially in charge of defining the general characteristics of what should be a glider mission dedicated to multi-disciplinary observation. These specifications ranged from specificity related to the platforms (e.g. depth range and resolution, mission duration, speed) to the typical scientific payload the platform should accommodate, i.e. a suite of sensors that would efficiently address the core parameters routinely sampled in open-ocean observing systems, based on the non-intrusive measurement of physical and optical seawater properties. Sensor specifications were formulated with respect to metrological characteristics (accuracy, sensitivity, ruggedness, dynamic response) from a large panel of sensor technologies tested in the lab and during in-situ surveys, clamped with the CTD-Rosette. This activity was extended to novel sensing purposes dedicated to water quality assessment, such as the measurement of nitrate concentration with an UV spectrophotometer or the detection of plastic debris and jellyfish with a video camera.

Our experience on interfacing sensors with autonomous platforms was appreciated for the design of the glider payload. This interactive part of the project reviewed some technical solutions about mechanics (available volumes and inlet configurations given degrees of miniaturisation and customisation, pressure limits and light exposure) and electronics (consumption versus sampling rate to resolve gradients, complexity of embedded data processing versus real-time transmission) that make the SeaExplorer stand out from the other gliders.

Field testing of glider prototypes has been one of the main activities of the Ligurian observing system since September 2013. In this temperate area, ecosystems follow seasonal patterns that are significantly modulated by smaller scale features triggered at the edge of the geostrophic jet following the Riviera coast or in response to wind bursts. The SeaExplorer showed its ability to sample these various situations, whether marked by strong density gradients during mixing events, intense currents neighbouring fronts, or abrupt changes in meandering structures. Hydrological measurements were properly compared with shipborne SeaBird's 911plus CTD at match up points. Assessment of interoperability with an emerging Mediterranean Bio-Argo network revealed the glider efficiency to chart spatial variations around the seasonal signal acquired by a biogeochemical profiling float, also developed in the context of an industrial partnership with the French company NKE.

Designing Ocean Observing Systems of Tomorrow

One decade ago, the Marine Optics Lab proposed dedicated field surveys of various open ocean ecosystems, welcoming trans-disciplinary studies on board a single research vessel and providing management facilities for quality-controlled datasets. These concerns remain today, even though the way to observe has changed thanks to technological innovation. We ensure the interoperability of in-situ and remote sensing platforms that have extended the coverage over the years and oceanic basins; we watch for intercalibration of sensors where instrumental drifts and nominal accuracy need to be constantly assessed.

Challenges for observing systems encompass various environmental impacts of human pressure on marine resources, which range from exploitation of seafloors to climate change. These challenges aim to preserve high standards of measurement, high sampling rate, high presence at sea in order to catch the development and the fate of such perturbations and to allow anthropic perturbations to be identified from long time-series. They require more flexible and reliable platforms, larger and interchangeable sensor payloads, more efficient embedded computing to submit real-time summaries and navigation commands of detected events, more permissive data management policy to feed research and operational oceanographic services. From this perspective, the Marine Optics Lab appears to be one of today's indisputable partners for designing solutions for open ocean monitoring.

www.oao.obs-vlfr.fr

REMUS

HYDROID
A KONGSBERG COMPANY

Intelligent Marine Robots You Can Rely On

For more information about our REMUS AUVs, please contact us at **+1 508-563-6565** or sales@hydroid.com

HYDROID.com

No 3512

Ekinox-D: Dual Antenna INS/GPS

SURVEY GRADE MEMS

Inertial Navigation System

ITAR Free

0.05°

HIGH PERFORMANCE
& COST-EFFECTIVE

- Real-time and Post-processed Roll, Pitch, Heading, Heave, and Position
- Web Interface for easy configuration
- Ethernet for large-scale data delivery

DVL, LBL, USBL, EM Log

No 3485

www.sbg-systems.com

SBG SYSTEMS

International Hydrographic Organization

Hydrography is Much More than Just Nautical Charts for the IHO

The theme for this year's World Hydrography Day, which is also the 93rd anniversary of the establishment of the IHO, is 'Hydrography - much more than just nautical charts'.

Hydrography is more than nautical charts.

The rapid growth and development of the so-called Blue Economy is making hydrography more important than ever before. The seas and oceans are now major contributors to the world economy and this is set to grow. Over 90% of the world's trade travels by sea. In addition, the seas and oceans represent a vast reservoir for food, mineral resources, energy, water, bio-medicines and infrastructure. But these potential resources are hard to exploit safely, cost effectively and sustainably without knowing the depth of the water, the shape of the seafloor and the hazards that lie below the surface. This is the importance of hydrography - an underpinning element to every human activity that takes place in, on or under the sea.

To make the best use of the hydrographic data and information that is collected, it is imperative to make it easily available through interconnected digital geo-referenced databases. This is the reason that the IHO is revising or replacing some of its existing standards and placing an increased emphasis on assisting all its Member States to contribute to, and in many cases lead, the establishment of marine spatial data infrastructures (MSDI) at both a national and regional level. At the same time, having contemporary digital data exchange standards is also important to support the e-Navigation concept, currently being finalised by the International Maritime Organization (IMO). e-Navigation promises to become 'the maritime intranet'.

Pointing to a chart printed on a window.

As part of its aims to make hydrographic data and information as widely used as possible, the IHO continues to work on a number of new data standards. S-100 - *The IHO Universal Hydrographic Data Model* - underpins this work. The S-100 base standard is derived from and compatible with the ISO 19100 geographic data standards and enables hydrographic data to be easily merged and used with other non-hydrographic geospatial data - especially in geographic information systems (GIS).

As well as the IHO, a growing number of international organisations with diverse maritime interests are now taking up S-100 as a data exchange standard, such as the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), the Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM) of the World Meteorological Organization (WMO), the Intergovernmental Oceanographic Commission (IOC) of UNESCO and the Inland ENC Harmonization Group (IEHG).

At the last meeting of the IHO's technical coordination committee - the Hydrographic Standards and Services Committee (HSSC), various proposals to develop S-100 based standards were endorsed. These were allocated titles and numbers in the S-100 series:

- IHO S-101 Electronic Navigational Chart (ENC)
- IHO S-102 Bathymetric Surface
- IHO S-103 Sub-surface Navigation
- IHO S-111 Surface currents
- IHO S-121 Maritime limits and boundaries
- IHO S-122 Marine Protected Areas
- IHO S-123 Radio Services
- IHO S-124 Navigational warnings
- IHO S-125 Navigational services
- IHO S-126 Physical Environment
- IHO S-127 Traffic Management
- IHO S-1xx Marine Services
- IHO S-1xx Digital Mariner Routeing Guide
- IHO S-1xx Harbour Infrastructure
- IHO S-1xx (Social/Political)
- IALA S-201 Aid to Navigation Information
- IALA S-20x Inter-VTS Exchange Format
- IALA S-20x Application Specific Messages
- IALA S-20x (Maritime Safety Information)
- IEHG S-401 Inland ENC
- JCOMM S-411 Sea ice
- JCOMM S-412 Met-ocean forecasts

One can see from the list above that for the IHO, hydrography really is much more than just nautical charts.

1. www.iho.int

ADCPs in Action in the Netherlands

Aqua Vision, Teledyne RD Instruments' representative in the Netherlands, has been hosting local ADCP (Acoustic Doppler Current Profiler) Workshops where users were able to share information, attend training and learn about Aqua Vision and Teledyne RDI's latest product and software advancements. This year's biennial event took place from 11 to 12 June 2014 at Hotel Mitland. The event attracted 80 attendees from 17 countries, spanning 5 continents.

Figure 1: On-water demonstrations of the ADCPs took place on the second day of the workshop.

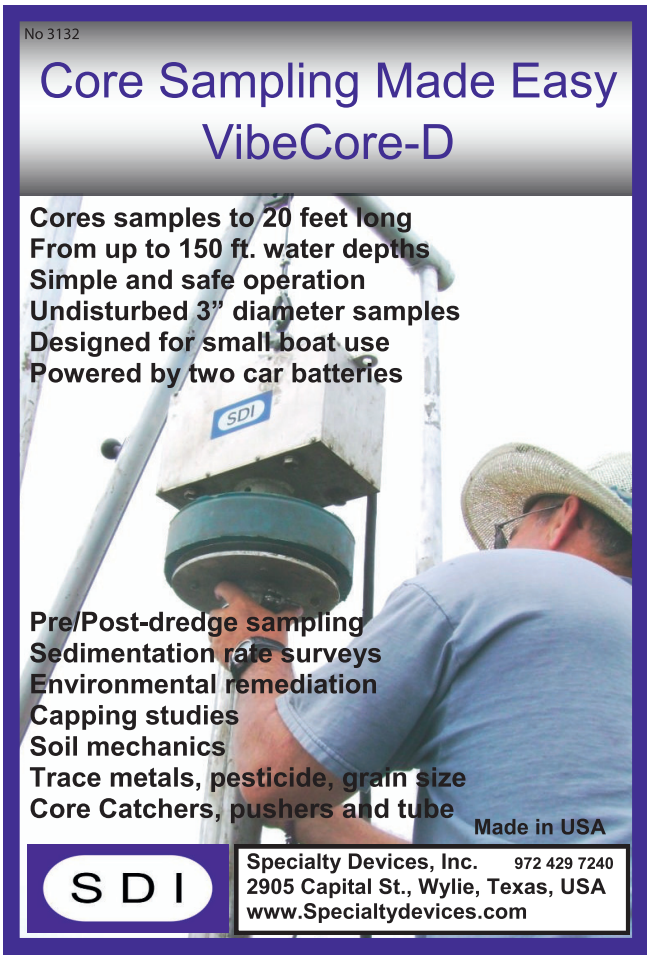
WHAT BEGAN AS A meeting in 1994 to train the Dutch Ministry for Transport and Public Works and the Belgian Ministry of the Flemish Community on newly introduced ADCP technology, has since evolved into a global 2-day event attracting attendees from around the globe.

Day one was dedicated to 7 customer presentations detailing their local ADCP projects. These contributions ranged from dredging support and water management to environmental monitoring. Day two was broken up into four concurrent training workshops, including one dedicated to on-water demonstrations.

Event sponsors included Teledyne RDI, iXblue, Codar, Deep Water Buoyance and Seabed.

This event is one of three global ADCP Users' conferences that Teledyne RDI will co-host with their local representatives in 2014. Teledyne RDI's Users' conferences are also scheduled for Australia and India in September 2014.

1. www.rdinstruments.com/aia2014/



New Periods Arrive at CARIS Conference

During the 15th CARIS Users' Conference it became evident that GIS technology is becoming a standard within the hydrographic industry. Development of the Blue Economy brought the 176 hydrographic participants together at the CARIS Users' Conference. The event covered two days of hands-on CARIS workshops, two-day conference sessions and on the last day the participants were given a tour of the SHOM premises.

Figure 1: An aerial view over the reception area.

Figure 2: IHB Technical director Gilles Bessero pronounced the closing remarks.

CARIS HIGHLIGHTED ONCE more that it plays an innovative role within the hydrographic environment. Within the Pacific, together with Teledyne Odom and Liquid Robotics CARIS developed an automatic on board processing technology and showed that unmanned surveying is possible and around the corner. Together with the direct access to the Marine bathymetric databases for further distribution via the World Wide Web, CARIS has also shifted its attention slightly. In addition to the always strong presence in the Hydrographic Offices domain, CARIS now also focuses more on the oil and gas industry.

A wide range of topics were covered during the conference session programme. A number of customers shared their experiences on implementing their database for the management of bathymetry within CARIS BDB as well as the spatial information within CARIS HPD. Large as well as small organisations seem to be in final stages of migration towards a digital database approach in contrast to the more survey and chart-oriented production workflows.

The participants were able to visit one of the many exhibitors during the breaks. Several exhibitors also presented their solutions. A particularly interesting session was when different producers, including Kongsberg and Kraken, gave presentations on Synthetic Aperture sonar systems. The Synthetic Aperture Sonar systems can reach a very high resolution independently of the range.

The many posters on research projects conducted across the world give a good overview. Unfortunately, this magnificent information and these images have not yet been made more public via the digital world. This could provide more support and interest in our oceans and the wonders we have down there.

Figure 3: The Icebreaker party offered beautiful views over Brest.

Extraordinary Quality
High Affordability

- Highly Robust and Accurate Acoustic Doppler Technology
- Significantly Longer Range
- Highly User Friendly And Cost Competitive

FlowQuest Acoustic Current Profilers

- Range: up to **900 m**
- Depth: up to 6,000 m
- Accuracy: up to 0.25% ± 2.5 mm/s
- Data Fusion and Acoustic Modem Options

- The World's Smallest DVL
- Ideal For Underwater Precision Navigation
- Significantly Longer Range
- Smallest Minimum Altitude

NavQuest Doppler Velocity Logs (DVL)

- Range: up to **300 m**
- Minimum Altitude: 0.3 m
- Depth: up to 6,000 m
- Accuracy: up to 0.2% ± 1 mm/s

- The Best Selling USBL Systems In The World
- Broadband Acoustic Spread Spectrum Technology
- Highly Accurate, Robust and Cost Effective

TrackLink USBL Tracking Systems

- Range: up to 11,000 m
- Depth: up to 7,000 m
- Targets: up to 16
- Accuracy: up to 0.15 degree
- Price: from $15,000

- The Best Selling Acoustic Modems In The World
- Broadband Acoustic Spread Spectrum Technology
- Transport 95% of The World's Acoustic Communication Data

High Speed Underwater Acoustic Modems

- Data Rate: up to 38,400 baud
- Bit Error Rate: < 10^{-9}
- Range: up to 10,000 m
- Depth: up to 7,000 m

- Highly Robust, Accurate and Power Efficient
- Broadband Acoustic Spread Spectrum Technology
- Integrated High Speed Acoustic Modem Functions

PinPoint LBL Acoustic Positioning Systems

- Accuracy: up to 0.05 m
- Range: up to 10,000 m

LinkQuest Inc. www.link-quest.com

Tel: (858) 623-9900, 623-9916 Fax: (858) 623-9918
6749 Top Gun Street, San Diego, CA 92121
Email: sales@link-quest.com

ENC Tools Production Software Goes Modular

Maritime software company SevenCs based in Hamburg, Germany, has announced the official release of the new generation of ENC Tools. This ENC production software has already been presented at OI 2014.The software is available as a tailored solution and consists of seven individual modules. This approach allows clients to use individual software modules for data validation and optimisation either within an existing chart production environment, or to utilise the entire software suite as a complete production environment.
http://bit.ly/1qlftIh

Geo-matching.com Widget for Direct Access to Product Comparisons

Geo-matching.com, the product comparison website for professional hardware and software for geomatics, hydrography and adjacent fields, has released a widget to make it easier for industry partners to add a Geo-matching search box to their own websites.
http://bit.ly/1qlfBYv

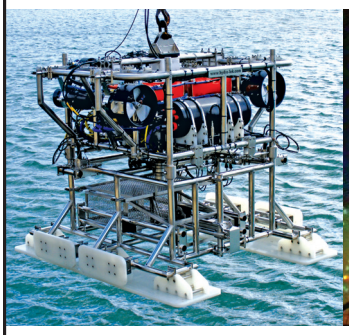
The widget available on the Hydro International website.

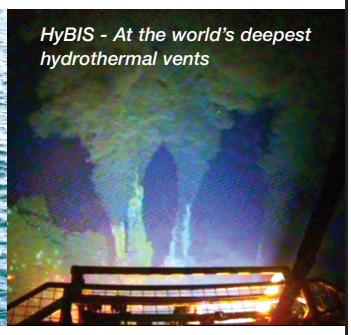
TRIAXUS ROTV for CSIRO

MacArtney (Denmark) has supplied a TRIAXUS remotely operated towed underwater vehicle to the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia's national science agency, and one of the largest and most diverse agencies in the world. The TRIAXUS underwater vehicle will be utilised on Australia's Marine National Facility research vessel, the *Investigator*, in a diverse range of oceanographic research activities. Currently fitted with a CTD, laser optical plankton counter, transmissometer, fluorescence and PAR sensors, the TRIAXUS is suited to many aspects of plankton research, however, utilising the CTD the TRIAXUS is also intended to be used in investigations of frontal features, air sea interactions and much more.
http://bit.ly/1qlcTlz

HyBIS

Inspection and sampling to 6000 metres





- Deployed from a wide range of research vessels
- Uses onboard winch and handling system normally used for towed sonar
- Requires minimum technical crew
- Flexible modules available for different missions
- Extremely cost effective

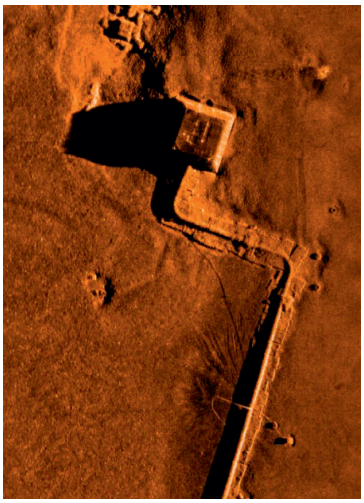
Tel: +44 (0) 118 9736903
Email: enquiries@hydro-lek.com
www.hydro-lek.com

HYDRO-LEK
REMOTE HANDLING SPECIALISTS
A SAAB SEAEYE COMPANY

No 3507

Solstice Side-scan Sonar Demonstrated with Bluefin-12 AUV

Following the integration of Sonardyne International's Solstice side-scan sonar with a Bluefin Robotics Bluefin-12 AUV, the results of recent payload testing have produced higher-quality imagery. The most recent trials of the Bluefin-12 AUV with integrated Solstice were conducted from Bluefin Robotics' headquarters in Quincy, Massachusetts, USA, where the AUV was deployed from Bluefin's vessel, the R/V *Resolution*, to perform short missions around the Boston Harbour area in approximately 15 metres of water.
http://bit.ly/1oo27cW



An example of the data acquired.

Only 5% of the world's oceans have been explored.

That leaves 95% for you.

NovAtel's SPAN® GNSS/INS marine positioning technology provides precise 3D position, velocity and attitude measurements – the perfect solution for systems exploring and mapping the ocean depths.

OEM options range from miniature, entry-level choices for compact, shallow-water systems to high-grade options for deep-water hydrographic surveys. Complete workflow solutions, with GNSS and IMU hardware and post-processing software, provide the performance your application demands.

Learn more at NovAtel.com/marine

NovAtel

Integrate success into your [redacted].

No 3319

Integrated Hydrographic Management System for Singapore

Jeppesen has been awarded a contract to develop and implement an Integrated Hydrographic Management System (IHMS) for the Maritime and Port Authority (MPA) of Singapore. The contract is for two years, with an optional three-year extension. The Jeppesen IHMS will provide multiple functionalities, including bathymetric data handling, management and storage integrated with Jeppesen's dKart Source Management system and dKart Office tools for ENC and paper chart production and maintenance.
http://bit.ly/1qlbUSy

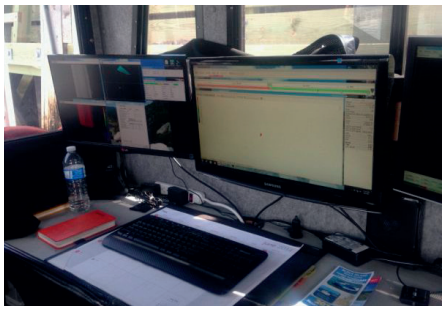
UTEC StarNet MD Awarded Major Accolade

Douglas Brown, the managing director of UTEC StarNet, has been awarded a Fellowship by the Royal Institution of Chartered Surveyors (RICS, UK) in recognition of 'significant experience and standing within the construction industry.' Sarah Speirs, director of RICS Scotland, commented that RICS eminent membership is only awarded to a select few individuals each year, following a robust nomination and review process.
http://bit.ly/1qleRlW

Douglas Brown (left) receives the award from Tom Barcley (right).

Hypack Used in Restoration and Cleanup after Sandy

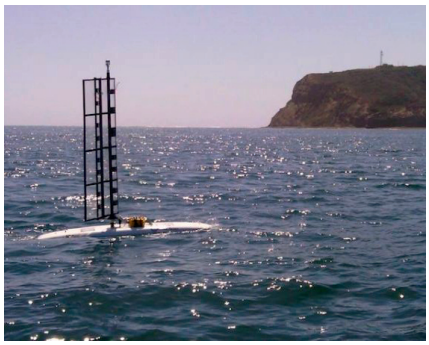
In 2012, the east shore of the USA was hit by one of the most memorable and destructive hurricanes yet, Hurricane Sandy. The USACE - New England is, two years on, restoring and cleaning the beaches and channels in Block Island, RI. The Corps is using a special dredge to make the entrance channel to the Harbor of Refuge by removing hazardous shoals in the channel. During this Block Island restoration project, Hypack Dregepack was used to maintain the channels and restore the beaches after Hurricane Sandy's major damage and erosion.
http://bit.ly/1qldxQ6



The Hypack configuration.

Submaran Underwater and Surface Vessel in Development

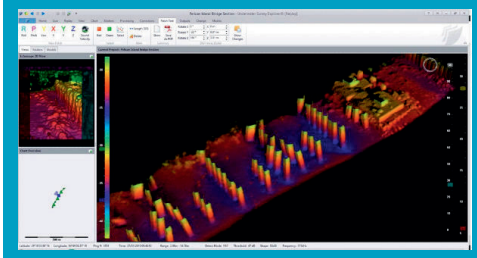
Ocean Aero from the USA is developing a Submaran Unmanned Underwater and Surface Vessel (UUSV). So far, four months of testing, modifications and more testing of the Submaran SP-1 prototype have been completed. The plan is to have surface demonstrators testing by the second quarter of 2015.
http://bit.ly/1qlgfFi



First tests of the surface-only Unmanned Underwater and Surface Vessel.

Underwater Survey Explorer Upgrade

Version 6 of Coda Octopus Underwater Survey Explorer is now available. This is a new major release of the visualisation and processing software suite for the Echoscope range of real-time 3D sonar systems. This version provides the next generation platform supporting the latest complementary hardware tools and features for improved capability, performance and precision.
http://bit.ly/1onYLGB



The patch test screen of the new Underwater Survey Explorer v6.

Challenging Underway Sound Speed Profiling Project in New Zealand

Two complete Oceanscience Underway SV systems, including the Valeport Rapid SV profiler, were recently supplied by Swathe Services (Australia) to IXSurvey Australia ahead of a challenging hydrographic survey project in the Fiordland National Park, New Zealand. Rapidly changing sound velocity caused by fresh water inflow from the numerous waterfalls and rivers, combined with a short timeframe allowed for completion of the project resulting from frequent extreme weather conditions, meant that the job was an ideal application for the underway profiling system.
http://bit.ly/1oo01to

The sound speed profiling project in New Zealand's Fiordland National Park.

ION Increases Ocean Bottom Seismic Activities

ION Geophysical Corporation (USA) has announced that it has entered into an agreement to increase to 100% its ownership of ocean bottom seismic (OBS) acquisition company OceanGeo BV, USA. OceanGeo was recently awarded a substantial survey offshore West Africa for an international oil company, having completed a 540-square-kilometre survey offshore Trinidad for Petroleum Company of Trinidad and Tobago Limited (Petrotrin) on time, on budget and with no QHSE incidents.
http://bit.ly/1qlgEaO

Actual size

Our new UV-SVP delivers you performance in sound velocity, pressure & temperature for your underwater vehicle.

UV-SUP

Provides the world's most accurate time of flight sound velocity, temperature and pressure (depth) parameters for underwater survey use. Aimed at AUV and ROV platforms due to its compact form, but can be fitted to other platforms where required. The stand alone, self-contained design allows for simple integration.

Specifications

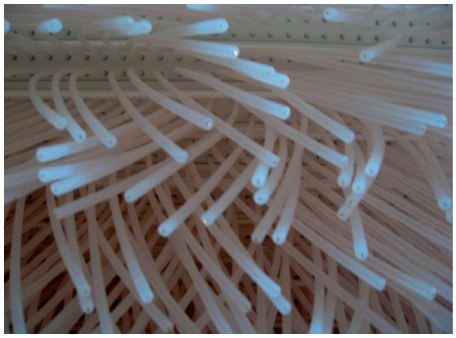
- High accuracy data in a compact titanium housing
- Lightweight, only 750g in air
- Wide DC power input of 9 - 30v DC
- RS232 & RS485 output
- Depth rated to 3000m as standard

T: +44 (0) 1803 869292 I F: +44 (0) 1803 869293 I E: sales@valeport.co.uk I W: www.valeport.co.uk

No. 3514

Successful Sea Trials for SIG Pulse M2 Sparker

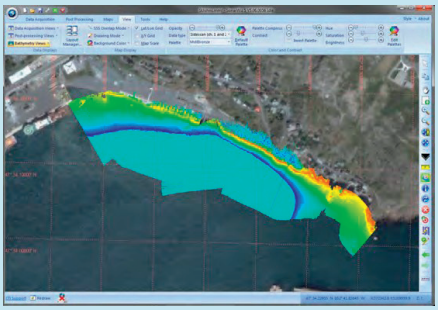
Guangzhou Waterway Bureau, China, has approved the performance of the new SIG Pulse M2. The sparker system has been tested on the site of the bridge project that will connect the west side of Hong Kong to Macau and the mainland Zhuhai. The Hong Kong-Zhuhai-Macau bridge will cross the Pearl River estuary. Part of the project is a subsea immersed tunnel of 6.7km. The project area must be covered by a seismic reflection sparker.
http://bit.ly/1qlemIR



The SIG Pulse M2 Sparker.

SonarWiz Support for EdgeTech Real-time Bathymetry Systems

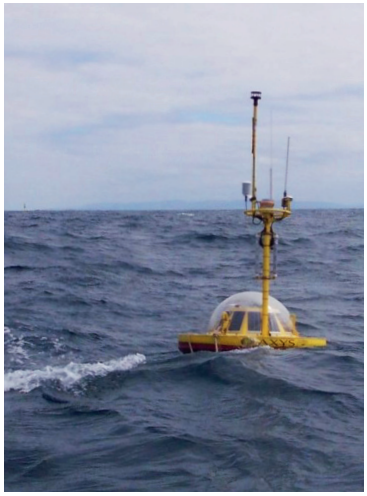
Chesapeake Technology (USA) has made further developments to its SonarWiz processing package with the addition of a Real-time Acquisition Server for the EdgeTech 4600 and recently introduced EdgeTech 6205 interferometric bathymetry systems. SonarWiz can now collect and map real-time bathy data along with the side-scan data. It opens a simpler way to collect and visualise the data in real-time.
http://bit.ly/1qlcu2O



A screenshot of the new integrated software.

Water-level Data for Safe Loading Operations

AXYS Technologies (Canada), through its Australian partner Metocean Services International (MSI), has recently delivered two buoy systems to assist PB Sea-Tow (Australia) with setting up the loading operations at Bing Bong, Northern Territory, Australia. Two systems are to be deployed: a WatchMate buoy equipped with Nortek 1MHz Z-Cell current profiler and AXYS' HydroLevel payload, and a TRIAXYS with Current Directional Wave Buoy.
http://bit.ly/1onZxDN



The WatchMate buoy.

Low-cost Release Beacon

A compact and lightweight acoustic release beacon has been launched by Applied Acoustic Engineering based in Great Yarmouth, UK. The model, the omni-directional 1519, is part of the company's 1500 Series that employs spread spectrum technology for added 'uplink' reliability. The release beacon can be operated by both the Applied Acoustics' Easytrak USBL system and a dedicated PAM 3510 Acoustic Command/Configure unit.
http://bit.ly/1qlgP5X

The Applied Acoustics 1519 release beacon.

Explorer DVL for Precision Navigation

Teledyne RD Instruments' (TRDI, USA) Explorer Doppler Velocity Log (DVL) has been specified by OceanServer to provide precision navigation on board its IVER2 and IVER3 autonomous underwater vehicles (AUVs). OceanServer has recently placed an order for 10 Teledyne RDI Explorer DVL products, bringing the total number of DVLs ordered for IVER systems to 22. The Explorer DVL provides a flexible solution for high-quality navigation aboard small underwater platforms such as IVER AUVs, gliders, disposable vehicles, inspection class ROVs and diver platforms.
http://bitl.ly/1slOHPr

More product news
www.hydro-international.com/news/productnews.php

Hydrographic Society Russia

Company Visit to Sevzapgidroproekt

A delegation of HSR members, headed by president N. Neronov, visited Sevzapgidroproekt. Chairman of the Board of Directors, Yuri Yushkov, gave a detailed talk about the company. Sevzapgidroproekt was founded in 2000 by a group of hydrographers, engineers, surveyors, geologists, marine cartographer and submarine cable operators. The team currently consists of about 30 people.

The company has:
- Multibeam echo souders Reson Seabat 8160, Seabat 8111, Seabat 7111, Seabat 8125
- Single beam dual-frequency echo sounder - Navisound 420
- High-resolution side-scan sonar for complex areal survey of the seabed - Cedar
- Acoustic and seismoacoustic profilographs with vibrators such as sparker and boomer
- Marine towed magnetometers
- Magis Marin and SeaSPY
- Sets of high-precision geodetic and navigation satellite equipment C-Nav2050, C-Nav3050 GNSS, Spectra Precision Epoch 50 GNSS, Trimble 5700, MS-750, MBX-3S
- Gyrocompasses - Octans III, Meridian, Meridian Surveyor and motion sensor iXBlue Octans IV
- Motion sensor - DMS 3-05 TSS;
- Gauges for the speed of sound and currents in sea water
- Tachometers and levels, optical theodolites, etc.

Figure 1: HSR members visit Sevzapgidroproekt. From left to right: V. Fomin, A. Charlamov, V. Myatelkov, N. Nesterov, N. Lozovsky, N. Neronov, Yu. Yushkov.

They also have two specially equipped boats and a hydrographic collapsible pontoon for drilling to perform research in the area of the Gulf of Finland. For the first time ever a company carried out more than 6,000 linear kilometres of unique complex engineering research on board the ice-class vessel *Kola* that followed in the wake of atomic-powered icebreaker *Soviet Union* in the Russian Arctic Seas - Barents, Kara, Laptev, East Siberian and Chukchi.

Sevzapgidroproekt is active in a vast area from Africa to the Arctic and from Chukotka to Kaliningrad.

Graduation Ceremony

The ceremony of graduates took place at the Admiral Makarov State University of Marine and River Fleet on 28 February 2014. There were a total of 45 hydrographers present, of whom 9 were girls. Four graduates obtained a degree with honours. The Hydrographic society president Nikolay Neronov awarded the Belobrov diplomas to Boris Kornilayev and Michael Burov. There were many guests at the ceremony: parents, representatives of shipping companies and firms. Most graduates are already employed and after the ceremony they went back to work.

Annual General Meeting

The 21st General meeting of the Hydrographic society was held at the Head Department of Navigation and Oceanography on 26 March 2014. The report was presented by the president Nikolay Neronov. In addition, the chairman of the Audit Commission V. Bahmutsky presented a report. V. Ustinov, V. Rybin, V. Panteleyev and the executive secretary V Smirnov participated in the debates on the report. This was followed by the election of the board. The result of the secret ballot was as follows: Dr Nikolay Neronov was again elected as president, Dr Nikolay Nesterov as vice-president, and Dr Valentin Smirnov as executive secretary. Andrey Leonov, Nikolay Lozovsky, Eugene Medvedkin, Alexander Kharlamov and Dmitry Schennikov were elected as members of the board by the open vote.

In addition, new members of the society were appointed: Vadim Kargayev (Divnogorsk, Krasoyarsk district) and Alexey Yevseyev (St. Petersburg). A photography session was followed by a reception.

85th Birthday of HSR President Neronov

The Hydrographic society president Nikolay Neronov celebrated his 85th birthday on 31 March 2014. On this day many people congratulated him at his main place of work – the State Scientific Research Institute of Navigation and Hydrography, where Mr. Neronov has been working for 50 years. Vladimir Tytlyanov, the deputy director of the Institute gave a speech in his honour. Andrey Sharkov, head of the Hydrology, Geodesy and Geophysics department, and member of the Hydrographic society also gave a speech. Many representatives of various companies also gave speeches: A. Popov (Chartpilot), V. Dzyuba (Marine Navigation Systems), Yu. Yushkov

Figure 2: From left to right: B. Kornilayev, N. Neronov and M. Burov.

Figure 3: Group portrait of the AGM delegates.

(Sevzapgidroproekt), V. Smolin (Marine Technology and Security) and also representatives of the scientific and educational institutions: the Ukrainian National Academy of Sciences (A. Gonchar), the Admiral Makarov State University of Marine and River Fleet (delegation of three representatives), the Higher Attestation Commission of the Ministry of Education and Science (V. Polovinkin), Peter the Great Marine Corps (K. Rukhovets and Yu. Zubritskiy).

N. Nesterov and V. Smirnov presented Mr. Neronov with an Italian globe bar on behalf of the Hydrographic Society.

Hydrographic Society Benelux

A Hydrographic Society Benelux Workshop was organised in Aalst, Belgium on 12 June 2014. It was hosted by the dredging company Jan De Nul and organised by HSB vice-chair Alain De Wulf. The theme of the workshop was 'WHD 2014: Hydrography – More than just charts'.

Presentations were given by:
- Emmanuel De Riddder and Alexandre Steffen (Survey Project Managers at Jan De Nul): 'Hydrography – much more than just nautical charts'
- Joost Mars (Beamworx): 'A New multibeam calibration tool'
- Dr. Peter Staelens (DotOcean): 'Hydrography and supercomputing: Will the availability of massive parallel miniature graphic processing units revolutionise hydrography?'
- Dr. Coen Stal (Ghent University): 'Applications of integrated bathymetry and geomatics: advanced intertidal surface modelling and accurate GNSS buoy measurements'.


The workshop presenters

Australasian Hydrographic Society

AHS Awards Scheme

The AHS Awards Scheme recognises those who have made significant contributions to our hydrographic industry.

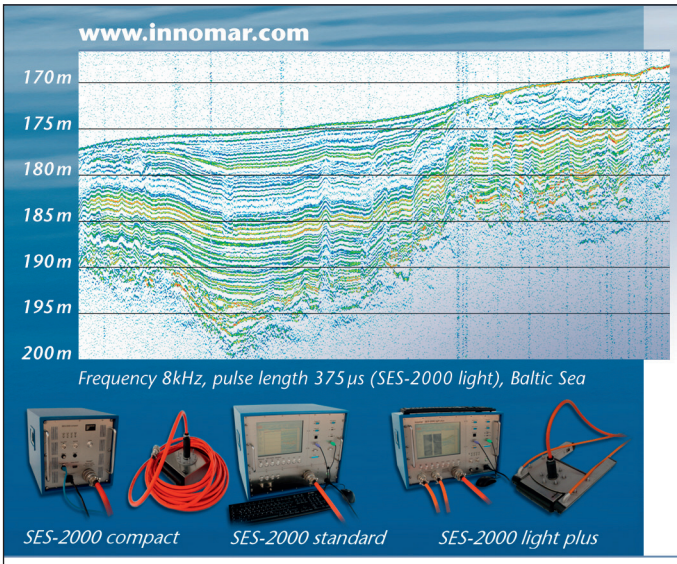
The first awards under this scheme were presented at HYDRO 2003 in Christchurch. The Awards Scheme panel are pleased to announce the recipients of the 2014 AHS Awards:
- Mr. Wayne Dunn (Australian Hydrographic Service) – Award of Merit – Career Achievement in Hydrography: for an outstanding contribution to hydrographic surveying and mine warfare operations support to the Royal Australian Navy (RAN) over a period spanning 45 years.
- Mr. John Mitchell (National Institute Water and Atmospheric Research, NZ) – Award of Merit – Career Achievement in Hydrography: for an outstanding contribution to marine science and hydrography spanning 40 years. John's achievements include major multi-disciplinary marine and hydrographic surveys for habitat, nearshore and Antarctic areas. John held a key role in New Zealand's UNCLOS survey programme and successful submission to the United Nations.

Australasian Hydrographic Symposium 2015

The AHS will be hosting the Australasian Hydrographic Symposium 2015 in warm, sunny Cairns in November 2015.

Cairns is the gateway to the Great Barrier Reef and is a beautiful, tropical city in northern Queensland – a great place to be, particularly for anyone in wintery northern climates..... We look forward to seeing you next year.

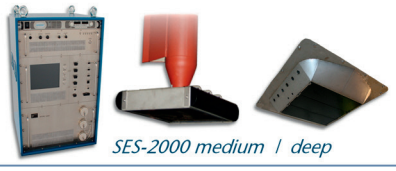
For more information, visit the AHS website at: *http://www.ahs.asn.au/conferences.html*



SES-2000 Parametric Sub-Bottom Profilers

Discover sub-seafloor structures and embedded objects with excellent resolution and determine exact water depth

- Different systems for shallow and deep water operation available
- Menu selectable frequency and pulse width
- Two-channel receiver for primary and secondary frequencies
- Narrow sound beam for all frequencies
- Sediment penetration up to 150 m (SES-2000 deep)
- User-friendly data acquisition and post-processing software
- Portable system components allow fast and easy mob/demob


SES-2000 medium / deep

Innomar

No 3511 **Innomar** Technologie GmbH ◦ Germany ◦ Schutower Ringstraße 4 ◦ D-18069 Rostock ◦ Phone (Fax) +49 (0)381-44079-0 (-299)

NEW

QuietSea™

MARINE MAMMAL MONITORING SYSTEM

Sercel announces QuietSea, its new passive acoustic monitoring system designed to monitor the presence of marine mammals during seismic surveys.
For environmentally responsible operations, QuietSea complies with the increasingly widespread marine mammals monitoring regulations worldwide.

// INTEGRATED ARCHITECTURE
Sensors within Sentinel® streamers
Interfacing Seal 428 & SeaPro Nav

// OPTIMIZED PRODUCTIVITY
No external devices to entangle streamer
False alarm rate reduction

// PRECISE MONITORING
Automated detection & localization algorithms
Objective decision-making

Sercel
Ahead of the Curve℠

Nantes, France
sales.nantes@sercel.com

Houston, USA
sales.houston@sercel.com

www.sercel.com

ANYWHERE. ANYTIME. EVERYTIME.

No 3505

Hydro14 | energy & enterprise

28-30th October 2014
Aberdeen Exhibition and Conference Centre, United Kingdom

energy & enterprise Hydro14 AECC Aberdeen

organised by The Hydrographic Society UK

Visit the website for further information about:

- Conference
- Exhibition
- Student Presentations
- Social Programme
- Delegate Registration
- Hotel Accommodation
- IHO Stakeholder Forum
- Workshops & Technical Visits
- Sponsorship Opportunities
- Travel
- and much more...

www.hydro14.org.uk | hydro14@ths.org.uk

No 3513

Hydro Agenda

JULY

Teledyne RESON Training
London, UK
→ 21-25 July
For more information:
W: http://bit.ly/1ic9yxb

AUGUST

Maritime Security 2014 West
Tacoma, USA
→ 18-20 August
For more information:
E: wlusk@maritimesecurity-outlook.com
W: www.maritimesecuritywest.com

Offshore Northern Seas
Stavanger, Norway
→ 25-28 August
For more information:
W: www.ons.no

SEPTEMBER

Oceanology International China 2014
Shanghai, China
→ 03-05 September
For more information:
W: www.oichina.com.cn/en/

SMM 2014
Hamburg, Germany
→ 09-12 September
For more information:
W: http://smm-hamburg.com/

Deep-Water Circulation Congress
Ghent, Belgium
→ 10-12 September
For more information:
E: 2dwc@ugent.be
W: www.2dwc.ugent.be

OCEANS'14 MTS/IEEE
St. John's, Newfoundland and Labrador, Canada
→ 14-19 September
For more information:
E: info@oceans14mtsieeest-johns.org
W: www.oceans14mtsieeest-johns.org

SEPTEMBER

Deep-Water Circulation Congress
Ghent, Belgium
→ 10-12 September
For more information:
E: 2dwc@ugent.be
W: www.2dwc.ugent.be

SAUC-E: Student AUV Challenge - Europe
La Spezia, Italy
→ 20-26 September
For more information:
E: info@sauc-europe.org
W: www.sauc-europe.org/

Edgetech Sonar Training Seminar
New Bedford, USA
→ 23-25 September
For more information:
E: Amy.Larose@EdgeTech.com

euRathlon 2014
La Spezia, Italy
→ 29 September-03 October
For more information:
E: eurathlon@uwe.ac.uk
W: www.eurathlon.eu/

OCTOBER

Ocean Energy Europe 2014
Paris, France
→ 01-02 October
For more information:
W: www.oceanenergy-europe.eu/index.php/en/

Extraordinary International Hydrographic Conference (EIHC)
Monaco
→ 06-10 October
For more information:
W: www.iho.int

Sea Tech Week 2014
Brest, France
→ 13-17 October
For more information:
E: seatechweek@brest-metropole-oceane.fr
W: www.seatechweek-brest.org

ACI's 15th Maritime HR & Crew Development
London, UK
→ 22-23 October
For more information:
E: mmulazzi@acieu.net
W: www.wplgroup.com/aci/conferences/eu-mhr15.asp

SEG Annual Meeting
Houston, TX, USA
→ 26-31 October
For more information:
W: www.seg.org/web/annual-meeting-2014/overview

Offshore Energy
Amsterdam, The Netherlands
→ 28-29 October
For more information:
E: oe@offshore-energy.biz
W: www.offshore-energy.biz

Hydro14
Aberdeen, UK
→ 28-30 October
For more information:
W: www.hydrographicsociety.org

NOVEMBER

Trimble Dimensions
Las Vegas, USA
→ 3-5 November
For more information:
E: trimble_dimensions@trimble.com
W: www.trimbledimensions.com

Seawork Asia
Shanghai, China
→ 04-06 November
For more information:
W: www.seaworkasia.com

Teledyne RESON Training
Santa Barbara, USA
→ 08-14 November
For more information:
W: http://bit.ly/1ic9QnS

E-Navigation Revolution
London, UK
→ 11-12 November
For more information:
E: alison@quaynote.com
W: bit.ly/1qqUWSI

2nd International Ocean Research Conference (IORC)
Barcelona, Spain
→ 17-21 November
For more information:
E: secretariatiorcbcn@fnob.org
W: www.iocunesco-oneplane-toneocean.fnob.org/

5th PLOCAN Glider School
Gran Canaria, Spain
→ 17-22 November
For more information:
W: www.gliderschool.eu

Inmartech
Corvallis, Oregon, USA
→ 18-21 November
For more information:
W: www.inmartech2014.com

DECEMBER

Ocean Tech South China Sea (SCS) Expo & Forum 2014
Guangzhou, China
→ 10-12 December
For more information:
E: daniel.shi@informa.com
W: www.maritimeshows.com/oceantech

JANUARY 2015

HYPACK 2015
San Antonio, TX, USA
→ 05-08 January
For more information:
E: sales@hypack.com
W: www.hypack.com

FEBRUARY

Euromaritime 2015
Paris, France
→ 03-05 February
For more information:
E: sabrina.jonas@euromaritime.fr
W: www.euromaritime-expos.com

Subsea Expo
Aberdeen, UK
→ 11-13 February
For more information:
W: www.subseaexpo.com/

MARCH

US Hydro 2015
Gaylord Hotel, National Harbor, USA
→ 16-19 March
For more information:
W: www.thsoa.org

APRIL

Ocean Business
Southampton, UK
→ 14-16 April
For more information:
W: www.oceanbusiness.com

MAY

RIEGL Lidar 2015
Guangzhou and Hong Kong, China
→ 05-08 May
For more information:
E: riegllidar2015@riegl.com
W: www.riegllidar.com

JUNE

TransNav 2015
Gdynia, Poland
→ 17-19 June
For more information:
W: http://transnav2015.am.gdynia.pl/

SEPTEMBER

Shallow Survey 2015
Plymouth, UK
→ 14-18 September
For more information:
W: www.shallowsurvey2015.org

TransNav 2015
Gdynia, Poland
→ 17-19 June
For more information:
W: http://transnav2015.am.gdynia.pl/

Calendar Notices
Please send notices at least 3 months before the event date to: Trea Fledderus, marketing assistant
E: trea.fledderus@geomares.nl
For extended information on the shows mentioned on this page, see our website: www.hydro-international.com

Hydro Alphabetical list of advertisers

Promoting the Blue Economy Concept

The International Federation of Surveyors (FIG) recently held its 25th Congress in Kuala Lumpur, Malaysia from 16 to 21 June 2014. Commission 4, focusing on hydrography, was well represented with six technical sessions, including one specifically dedicated to the concept of the Blue Economy. This important concept is not as widely known among the international hydrography community as one would desire, and so Commission 4 sought to expose the international audience in attendance. Noted speakers at the technical session included Mr. Gordon Johnston, Commission 4 vice-chair, Administration and Communication, and Admiral Mustpha Iptes, director of the International Hydrographic Organization (IHO), Monaco.

EAB
The Editorial Advisory Board (EAB) of Hydro INTERNATIONAL consists of professionals, from various fields, who independently make recommendations on potential authors and specific topics. The EAB members also contribute to this column. The EAB is served on a non-committal basis.

Rear admiral Chris Andreasen (retd)
NGA Maritime Safety Office (USA)

Michael Bergmann
Director Maritime Industry Affairs and Services, Jeppesen

Rear Admiral Gerd Glang
Director, Office of Coast Survey, National Oceanic and Atmospheric Administration, USA

Rear admiral Dr Neil Guy (retd)
Maritime affairs and hydrographic consultant (South Africa)

Dr John K. Hall (retd)
Geological Survey of Israel (Israel)

Capt Abri Kampfer
Hydrographer SA Navy (South Africa)

Nick Lambert
Director, Nick Lambert Associates Ltd (UK)

Prof. Dr Mohd Razali Mahmud
Director of the Centre for Hydrographic Studies, Faculty of Geoinformation Science and Engineering of the Universiti Teknologi Malaysia (Malaysia)

Edward J. Saade
President/managing director, Fugro Earth Data, Inc. (USA)

Luis Salgado
President, Desmar Ltd (Chile)

Mark Sinclair
Managing director Fugro LADS Corporation (Australia), and President Fugro LADS Incorporated (USA)

Dr Michael Sutherland, MRICS
University of the West Indies, Trididad & Tobago; Chair of FIG Commission 4 (Hydrography)

Robert Ward
President, Directing Committee of the International Hydrographic Bureau (Monaco)

David Whitcombe
Chief surveyor for Europe, Shell (UK)

What then is this 'Blue Economy' – from a hydrography point of view – and why is it important? A simplistic perspective of the Blue Economy concept is that nature operates holistically as systems, and that economically emulating those systems can provide new opportunities for innovation and social entrepreneurship, solving most of the world's problems where product-based economies have failed.

The Earth's water cycle systems impact upon inland waters and the world's oceans, which form the foci of hydrography. The IHO's definition of hydrography clearly positions the discipline as a major contribution to the Blue Economy:

Hydrography is the branch of applied sciences that deals with the measurement and description of the physical features of oceans, seas, coastal areas, lakes and rivers, as well as with the prediction of their change over time, for the primary purpose of safety of navigation and in support of all other marine activities, including economic development, security and defence, scientific research and environmental protection (see 1).

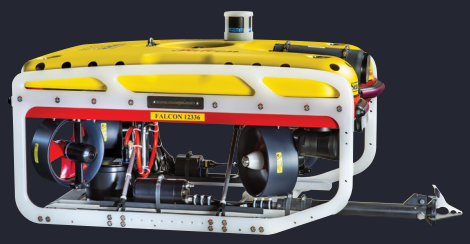
The FIG has taken a couple of steps to promote the Blue Economy among interested stakeholders: the organisation of a Blue Economy workshop, jointly with the IHO, at the National Oceanography Centre, on 9 April 2013 as part of Ocean Business 13; and the technical session at FIG 2014 mentioned above. Whether the concept will take root in the hydrography community, and bear socioeconomic fruit is left to be seen. No concept that holds possibilities for the improvement of lives, such as the Blue Economy, ought to be ignored, and Commission 4 seems set to keep our international hydrography community involved, at least for the time being.

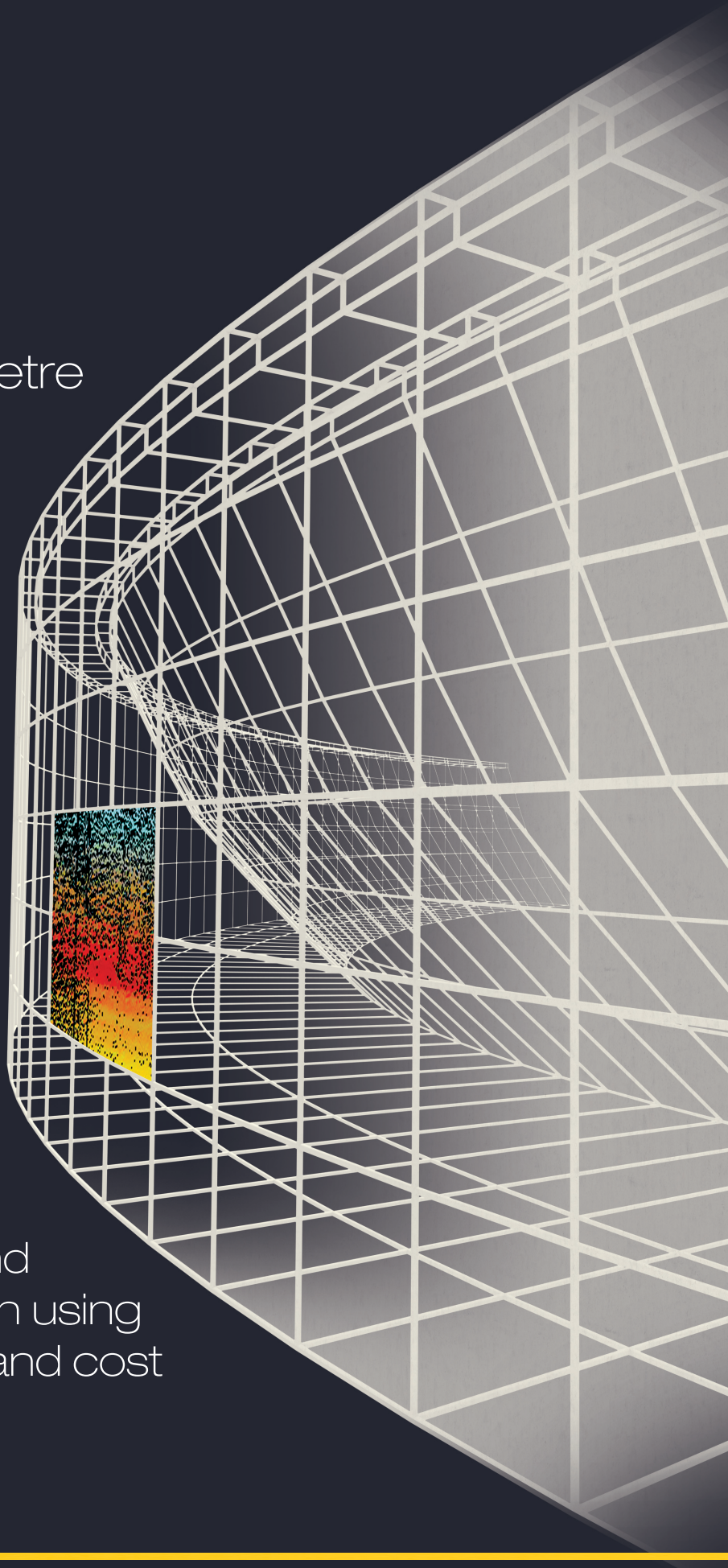
Dr. Michael Sutherland (Canada, and Trinidad and Tobago); chair (2011-2014), Commission 4, International Federation of Surveyors (FIG).

1. www.iho.int/srv1/index.php?option=com_content&view=article&id=613&Itemid=852

Dam Inspection

Check every millimetre





Detailed structural and operational inspection using the most advanced and cost effective technology

seaeye.com/hydro

SAAB TECHNOLOGIES

SAAB

No. 3506

UNDERWATER COMMUNICATION AND POSITIONING SOLUTIONS

EvoLogics®

S2C TECHNOLOGY: COMMUNICATION AND TRACKING COMBINED

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

USBL POSITIONING SYSTEMS

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

- SiNAPS software – USBL positioning made simple and flexible
- reliable data transmissions
- range: up to 8000 m
- accuracy: up to 0.04 degrees

UNDERWATER ACOUSTIC MODEMS

reliable data transmissions even in adverse conditions, speicial edition for developers, S2C communication and positioning emulator for free with every purchase

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

LBL POSITIONING SYSTEMS

highly accurate, precise and stable performance

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

NEW M-SERIES 'MINI' MODEMS

available late Q2, 2014

EvoLogics GmbH
Ackerstrasse 76,
13355 Berlin, Germany
tel.: +49 30 4679 862-0
fax: +49 30 4679 862-01
sales@evologics.de
evologics.de

No. 3483