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INTERVIEW: JOHN RAMSDEN, SONARDYNE

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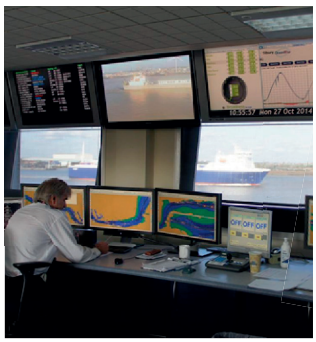

April 2015 Volume 19 #3

Hydrographic surveyors post-processing data onboard the Edda Flora *for Deep Ocean Engineering. She was used for inspection, maintenance and repair jobs and ROV services. Image courtesy: Atlas Professionals.*

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PHOTOGRAPHY: ARIE BRUINSMA (WWW.ARIEBRUINSMA.NL)

Different **Destiny**

Hydrography is en route to different destinies in different fields. It's an exciting journey that originates from less poetic causes. The low oil price, for instance, is having quite some consequences for the hydrographic sector. Because of the low price the search for new oil & gas fields is not a priority, resulting in a lot less work for survey companies for exploration purposes. No one knows what the oil price will do, as today more factors than ever weigh in establishing the oil price compared to years ago. This is a reason why the oil & gas may stay volatile from quite some time. Also, from 2009 on, when the global economic crisis started, governments have slashed budgets throughout the public sector, leaving fewer funds for surveying and resurveying for nautical charting. And although economies seem to be recovering throughout Europe, the United States and other parts of the world, it's not very likely that budgets will increase dramatically soon.

Still, spring is on its way in this part of the world and that is always a time of optimism– and I already mentioned that it is an exciting journey for hydrography. Spring is also traditionally the time of conferences and tradeshows. At a large offshore wind conference in Denmark I met many hydrographic companies that were reasonably optimistic about the entrepreneurial opportunities in the field of renewable energy in general and offshore wind specifically. Despite the crisis, this field of application has seen major growth over the past few years. Offshore wind has reached an installed capacity of 7GW in Europe and according to Ernst & Young forecasts in their report *Offshore Wind in Europe – Walking the tightrope to success* of March 2015, the capacity will triple to 23.5GW in the coming decade. This will surely be a task that will have great impact on all separate parts of the value chain in offshore wind projects. It looks like surveying is creating a major role for itself in that chain: not just for the initial surveys to identify the best possible site, but also for resurveying in maintenance and monitoring of that 7GW (and fast growing) capacity of wind energy.

This issue of *Hydro International* contains a preview of the Ocean Business event that will be held from 14-16 April at the National Oceanography Centre in Southampton, UK. Ocean Business has already grown into a key marketing point on the two-yearly calendar of tradeshows in the field of hydrography and oceanography. I am sure that during Ocean Business – on the show floor – and during Offshore Survey – the conference part – many of the discussions will focus on new opportunities and new destinies for hydrography. We would very much like to be included in those discussions. During the Ocean Business event there will be ample opportunity to meet up with the team of *Hydro International*, so please give us your feedback, remarks and suggestions or just stop by at Stand R4 to catch up. And of course if you're not in Southampton this year, there's always the open invite to email me at durk.haarsma@geomares.nl to let me know what you think the destiny of hydrography will be!

Durk Haarsma durk.haarsma@geomares.nl

The **Value** is in the **Data Usage**

We are living in times where the commodisation of data is reaching the maritime world. Years ago, I purchased my first GPS for hiking in Germany. In order to use the tool, I bought a detailed terrestrial dataset at a price that was double that of the GPS unit. Today I use an iPhone app, which has a free data layer. You can see this trend in other industries as well. The demand on the market for expensive datasets is decreasing.

▲ *Michael Bergmann.*

While we do not see this in the marine industry, especially the commercial shipping market, the trend is going in this direction. The fact that, for example, Inland ENCs are becoming increasingly available free of charge is a manifestation of this development, which will have effects. But even as we see ourselves moving towards a commodisation of hydrographic data, this does not reduce or eliminate the value of these datasets, but shifts the focus. The perceived value is seen on the data usage (i.e. activity with data) and the data actually in use (rather than whole datasets). The question is not "What data can I get?" but "What can I do with the data, what value does it generate for me?". So, the more I can use a certain dataset, the more value it has.

Datasets are becoming an essential asset countries cannot miss

It is simply expected that the charting data layers are available. This is a fact that becomes more and more obvious. The classical use of hydrographic data for those charting products may no longer be seen as the highest value. But when we look at growing issues that are developing in the maritime environment I can see a growing demand of use cases for hydrographic datasets. The need for Maritime Spatial Planning is obvious. Hydrographic data is not an option, but a requirement to perform this task. Forecasting the effects of an increasing sea level, preparation for disasters like flooding or oil spills need hydrographic datasets as well. Business applications, like offshore planning and supply provision is another area of effects. This additional data usage generates value, which is much greater than the use of hydrographic data in purely charting products had been. The datasets will help to protect countries ecological and economical environment and are becoming an essential asset countries cannot miss. For businesses like offshore wind farms and fish farms this data will be a value generator. The more usage we find for hydrographic data, the more value it will generate.
This brings up a question I hear when having discussions about this topic: "If this is true, how can I get more money for my data? Will I be able to sell it for a higher price?" But this view is too short-sighted. It reduces value of the data and the return of investment for the data generating governmental bodies, for the HOs. It does not take into account the value generated for the society in comparison to the money spent on producing the data. Some countries are actually reducing the price for hydrographic datasets or even looking into giving it for free to increase the usage of the data and therewith increasing the value generation for the society.
I think it is time we start looking into strategies to increase the usage of hydrographic data for the benefit of a broader society rather than looking for ways to increase the pure monetary return for HOs on sales of the data in a closed environment. ◀

Tidal Turbines in Dutch Sea Defences

Tocardo Tidal Turbines, producer of tidal and free-flow water turbines, has installed three of its T1 tidal turbines in the Dutch Afsluitdijk, a 32km-long primary sea defence. The turbines are the first to be installed close together in an array. Dutch Tidal Testing Centre, a long-standing partner of Tocardo, will manage the project. All electricity produced will be fed into the grid.

▸ ***http://bit.ly/1HuMmJK***

▲ *The tidal turbines.*

Turbulence beneath Arctic Ice Investigated

Using Royal Navy submarine data, researchers at the National Oceanography Centre (NOC, UK) have investigated the nature of turbulence in the ocean beneath the Arctic sea-ice. Recent decreases in Arctic sea-ice may have a big impact on the circulation, chemistry and biology of the Arctic Ocean, due to ice-free waters becoming more turbulent. By revealing more about how these turbulent motions distribute energy within the ocean, the findings from this study provide information that is important for accurate predictions of the future of the Arctic Ocean.

▸ ***http://bit.ly/1HuLQeJ***

European Marine Sand and Gravel Group Conference

The European Marine Sand and Gravel Group's 5th EMSAGG conference programme builds on the success of the four previous EMSAGG conferences, bringing together those actively involved in the area to share knowledge, research and best-practice case studies. The conference is to take place from 4-5 June 2015 in Delft, The Netherlands.

▸ ***http://bit.ly/1GqtCtP***

Autonomy Demo System for UK's MoD

SeeByte, UK, has received an order from the United Kingdom's (UK) Ministry of Defence (MoD) Defence Equipment and Support (DE&S) to deliver a maritime autonomy demonstration system. The demonstration system will consist of Unmanned Underwater Vehicles (UUVs) equipped with SeeByte's SeeTrack Neptune software, an open architecture enabling autonomous multi-vehicle collaboration.

▸ ***http://bit.ly/1HuKlgI***

▲ *The Iver3 AUVs used for the demo.*

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Fugro Launches G4 Satellite Positioning Augmentation Service — bit.ly/1HuOIbm

Fugro Expands AUV Fleet

Fugro took delivery of the Hugin 1000 Autonomous Underwater Vehicle (AUV), the *Echo Surveyor VII*, in December 2014. Depth rated to 4,500 metres, the new AUV now holds the record for the deepest Hugin AUV dive, surveying in water depths surpassing 4,200 metres.

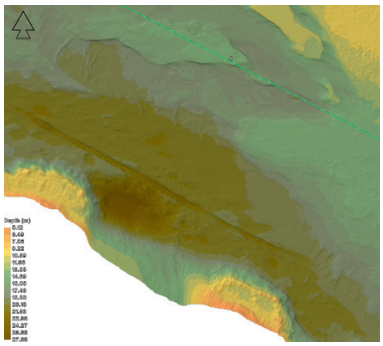
▸ ***http://bit.ly/1HuIAzZ***

▲ *The* Echo Surveyor VII *sets a depth record for Fugro.*

COBRAcable HVDC Cable Crossing Surveys

MMT, Sweden, was contracted by OMM (Offshore Marine Management) to perform geophysical, geotechnical and cable crossing surveys in preparation for the installation of the COBRAcable on behalf of end client TenneT. The project was successfully completed with a four vessel solution between early September and late November 2014.

▸ ***http://bit.ly/1HuId8B***



▲ *Image: Seafloor Surface outside landfall in Eemshaven.*

Shallow Survey 2015 Calls for Papers and Delegates

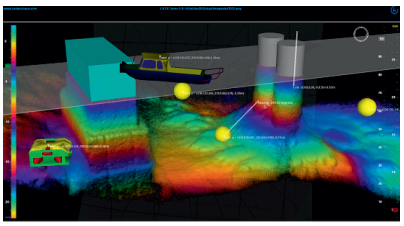
The 7th International Conference on High Resolution Surveys in Shallow Water is being organised by the United Kingdom Hydrographic Office and the Maritime & Coastguard Agency in partnership with Plymouth University, and will take place on the University Campus from 14 to 18 September 2015. Delegates will be able to register and a call for papers has been issued.

▸ ***http://bit.ly/1HuJvR7***

Underwater Survey Explorer Enhancements

Coda Octopus, UK, has upgraded the Models+ software package, which forms an optional module within its Underwater Survey Explorer platform. The capabilities of this version enable real-time live sonar data to be supplemented by static and dynamic models to allow full visualisation and management of the user's subsea '3D workspace'.

▸ ***http://bit.ly/1HuKZuA***



▲ *Models+ screen.*

Tritech Sensor Selected for Student AUV

Tritech's Micron sonar has been selected for the latest academic Autonomous Underwater Vehicle (AUV). The acoustic design team at McGill Robotics, McGill University, Montreal, Canada, chose to incorporate a mechanical scanning sonar into their new-build AUV. The team now plan to integrate the Micron sonar into their software system in order to assist close-range positioning and to detect objects in low-visibility environments. The team have also updated their AUV with new thrusters and are carrying out modifications to the frame and the pressure vessels.

▸ ***http://bit.ly/1HuLrZK***

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International Exchange Programme

INSTALL, Italy, in collaboration with Assomineraria, hosted a group of students from the 'Eduardo Mondlane' University of Maputo, Mozambique in its premises. The initiative was born as an international cultural exchange in which INSTALL played an active part by organising a one-day course at the INSTALL ACADEMY. During the lesson, INSTALL instructors illustrated the methods and theory of the activities carried out in the offshore survey to the students from Mozambique.

▸ ***http://bit.ly/1HuIZCB***

▲ *The delegates visiting the INSTALL training.*

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Teledyne Atlas Hydrographic SeaCat	bit.ly/1z1RmkF

Clear Call during US Hydro

During the opening keynote speeches of US Hydro in National Harbor, USA, US Senator Sheldon Whitehouse called upon the audience of American hydrographers to combine their voices with those of our oceans. Every day they are signalling the hugely damaging impact of pollution and climate change on the Earth's seas, its flora and fauna and hence the planet as a whole. At the same time the senator also emphasised the need for federal funding for research and science to recover and undo the influences of climate change.

▸ ***http://bit.ly/1O99AcX***

Hydro International Interviews John Ramsden, Managing Director of Sonardyne International Ltd

A Company with a **Deeper Understanding**

Sonardyne is an organisastion at the forefront of acoustic, inertial, sonar and optical subsea technology development. It takes vision, a sustained focus on research and development and strong leadership to get there. *Hydro International* interviews John Ramsden, managing director of Sonardyne, for an in-depth look at adapting to the diverse nature of subsea operations and where the company that is now 43 years young, is headed next.

John Ramsden

You have now served as MD for five years and been with the organisation for a total of 20 years, achieving growth in all of Sonardyne's business divisions. What drives you?

Being part of a business that is not content with standing still or resting on its achievements. For many years we were known exclusively for our acoustic positioning technology. However, over the last six or seven years, all this has changed. We have diversified into sonar imaging, wireless communications and inertial navigation technologies – all of which have emerged from our in-house research programmes. As you read this we will have revealed our next development – a high performance DVL called Syrinx. All this new and exciting technology, coupled with my unwavering belief in the ability of all of our employees in our offices worldwide, means that we are uniquely placed to cement and extend our leadership position.

You have a strong track record, having worked at other Sonardyne offices for several years, one of which was Singapore. How has this experience shaped you?

There is no substitute for first-hand experience to help improve your level of understanding of the daily challenges that regional offices have to deal with. There, you are completely immersed in the offshore industry 24/7, where customers are often your office neighbours. This has allowed me to gain a unique and

extensive insight into our remote operations and the sorts of decisions that need to be made to ensure a successful outcome for our customers and the business.

What is the overall philosophy in developing new products?
There are so many things to address when we set out to manufacture and market new products. But first and foremost, we need to invest in the technology in-house and thoroughly understand the applications for the new products. When we put it into the market place, we ensure that it is well supported so that we continue to provide reliable cost-effective solutions for our customers.

What do you consider to be your latest and greatest technical developments in the field?
Tough to say as there are several notable products, both in our current stable and among those under development. But if I had to single out just two, I would have to say SPRINT and our new DVL – Syrinx.

Beginning with SPRINT. It is an acoustically aided inertial navigation system for ROVs that makes use of aiding data from USBL and/or LBL acoustics and other sensors. For users, this improves position accuracy, precision, reliability and integrity while reducing operational time and vessel costs.

And then there is Syrinx – a 600kHz DVL that employs full linear signal processing to provide very low noise, high-precision velocity measurement in a wide range of seabed bottom types. It is almost three sensors in one, providing the comparable range to a 300kHz DVL and the precision of a 1200kHz product. So the customer gets the best of both worlds; high-altitude performance and high-accuracy velocity measurements close to the seabed. In addition, Syrinx is also designed to integrate seamlessly into our inertial navigation systems.

Which further innovations have you seen emerging that are driven by customer demand?
I would have to say BlueComm. It is an optical communications system that uses high-power LEDs, which flash millions of times per second to wirelessly transfer subsea data from A to B. This enables data rates equivalent to current broadband internet speeds, hence the ability to transfer large amounts of data or video streams subsea over significant distances of up to 200 metres. In short, BlueComm is a game changer, enabling real-time wireless control of subsea vehicles and extraction of large quantities of data from subsea nodes.

Focusing on Ocean Science and hydrography, acoustic tracking is where Sonardyne first started. Do you expect further innovations in this area?
Underwater acoustics remains at the heart of what we develop so we will always invest and expand our capability in this area. Last year our 6G platform won the Queen's Award for Enterprise in Innovation which was great recognition of the contribution it has made to improving the efficiency of underwater operations around the world. The product family is expanding all the time and visitors to the upcoming Ocean Business exhibition in Southampton will be amongst the first to see our latest developments.

Automation will create new possibilities (upcoming AUVs, gliders, ASVs). How is Sonardyne capitalising on this trend, how will you contribute to further automating tasks for these platforms, and what can we expect from the company in the near future?
The technology found within 6G means that we have been able to satisfy demands for autonomy for quite some time now. Equipment can be deployed and left to carry out its task unsupervised, often for years at a time. This reduces the risk and costs associated with sending crew and vessels to sea.

Our AMTs (Autonomous Monitoring Transponders), for example, are being used by Shell as part of an uninterrupted production monitoring study lasting six years. Every few hours, each AMT wakes up, collects readings from sensors, logs the data and then goes back to sleep. So far they have logged and downloaded acoustically more than a quarter of a billion measurements.

The data gathered by instruments like AMT can now be quickly and reliably harvested using platforms such as Wave Glider or C-Worker. We work with all the major vehicle manufacturers to integrate our technology into their payloads, optimising them for weight and power.

What are the biggest challenges to developing (ultra) deepwater positioning further?
As a business we are very well positioned (so to speak) to meet these challenges. Water depths of 3,000 metres are routine operating territory for our LBL, USBL and LUSBL acoustic instruments. As we manufacture everything in-house, when our clients need

▲ *Celebrating the Queen's Award for Enterprise.*


▲ *Compatt 6 transponders prepared for mobilisation.*

to go deeper (and they regularly do) we are able to design, supply and test the most appropriate and even bespoke subsea housing materials and transducers to withstand the immense pressures and ensure that acoustic signals from far below are reliably received at the surface.

The geographical remoteness of the ultra-deepwater fields produces a big challenge for supporting the products. However, our investments in technical support, quality and training are paying dividends.

How can Sonardyne help improve mapping of the deepest oceans?
We are always pushing the positioning accuracy of our systems in deep water – this enables more accurate navigation of ROVs and AUVs subsea on which imaging sensors are installed. We also supply our own high-resolution side-scan bathymetry sonar, Solstice, which is extremely low power and hence enables AUVs to cover much larger areas from a single dive.

Since* Deepwater Horizon*, there has been a focus on preventing and monitoring oil spills. How is Sonardyne technology contributing to lessening the severity of such ecological disasters?
Firstly, there is our Automatic Leak Detection Sonar (ALDS), which continuously monitors

for hydrocarbon leaks around subsea oil and gas assets and is sensitive enough to detect leaks below one barrel per day at a radius in excess of 500 metres in deep water. Secondly, we design and manufacture high security wireless acoustic BOP control systems, which enable a well to be remotely shut in the event the primary umbilical systems were to fail. As a business, we have implemented OHSAS 18001 globally to ensure our customers have confidence in our approach to safety.

What opportunities do you see in renewable energy (for example, wave, tidal, offshore wind farms)? Will this be an incentive for completely new products, solutions and services?

When it comes to traditional products the opportunities may be limited, however we do see a market developing for shallow-water acoustics as the renewable energy industry matures.

Are young people still interested in technical professions and wanting to come and work for companies like Sonardyne?

It has been difficult in more recent years to find well qualified engineers and that has forced us in some instances to look further afield. However, once we find them, we tend to hang on to them due to the interesting nature of our work, which can literally take you anywhere in the world. This includes posts in our overseas offices, coupled with the opportunity to become a product or technology specialist.

To help uncover and support young engineering talent, The Sonardyne Foundation, has been established to provide financial and practical support to the best and brightest students in the UK. Through the Foundation, we are able to offer industrial placements and mentoring at our research and development centre in Yateley where we seek to further develop the technical and professional skills of aspiring engineers.

What is your message to hydrographic professionals?

There is a big world out there that needs mapping, make sure that you use the right tools for the job. Come and talk to us about your particular application and we will support you along the way to help you reduce your risk and cost. That may come from an off-the-shelf solution, or by virtue of us working together to come up with a tailor-made solution. Either way, we will make it happen.

How can the hydrographic profession continue to attract more young people?

By actively promoting the industry and why it is a rewarding profession to dedicate your life to. The old days of people beating down your door to come and work for you are long gone. One needs to go looking for fresh talent with a strong and clear message of why it pays to be a part of this addictive subsea industry that gets us out of bed in the mornings. ◂

John Ramsden

John Ramsden joined Sonardyne in 1996 during the early years of Sonardyne's expansion in the Asia Pacific region, where he led the Singapore office group from 2006 to 2009. In October 2009, he was appointed managing director.

Safer Navigation with Wider Adoption of FLS

Forward Looking Sonar for Navigation

An increasing number of ships are venturing into areas where the only hydrographic data available do not meet the standard many of these vessels require for safe navigation. A number of recent and some not so recent marine casualties have resulted from encounters with uncharted, isolated seabed features (Russell, 2014). The situation is recognised by the IHO; but the necessary improvement to the hydrographic data will take years. Meanwhile, the informed use of Forward Looking Sonar (FLS) could contribute to safer navigation in inadequately charted areas.

Present-day commercial FLS developed from its use by fishing vessels and for obstacle avoidance by underwater vehicles. It is now a mature and robust technology successfully deployed in a range of surface vessels. In coastal waters, current phased array 3D and scanning 2D systems are capable of providing adequate warning of isolated dangers ahead of vessels under 200m in length travelling at speeds commensurate with the navigational situation. Scanning sonars are less effective in shallow-water and harbour environments.

Background

In 2007, the US National Institute of Standards and Technology (NIST) funded a 3-year project to develop a Forward Looking 3D Sonar System for Navigation and Collision Avoidance, in order to improve the efficiency and safety of marine cargo transport. The optimal system design parameters were for Long Range (2M) and High Speed (35kts) applications. The participant manufacturer commented that the Department of Commerce appreciated the potential of the technology more so than the Navy. The speed criteria have been realised in terms of the robustness and hydrodynamics of the installation and transducer design. Current production systems only have a maximum range of 1,000m.

In 2009, the owners of one tanker fleet were contracted for the development of a 3D FLS with a 1,000m detection range and installed the prototype in one of their vessels. An Indication that in some commercial quarters at least the benefit of FLS has received serious consideration.

▲ *Figure 1: MS* The World – *Residential Cruise Ship.*

A 2013 study into the cost effectiveness of installing FLS in tankers of various sizes (Tzannos, 2013) found that;

The longest detection range sonar currently available is technically suitable but cost ineffective for the smaller size oil carriers. With regard to the larger ships, sonar systems of extended detection ranges can become available shortly at a cost which will render them cost effective for oil-spill risk reduction caused by powered groundings.

In this study the Cost of Averting a Ton Spilled is the criterion for the economic assessment of the sonar system. If this is the sole factor, analysis is biased towards the higher capacity vessels. These transit oceanic routes between major terminals. It ignores the higher probability of smaller vessels grounding in coastal waters. Following a discussion with one of the authors it was accepted that the area of vessel operation should have been addressed since grounding risks are spatially dependent. A vessel's operating profile often defines vessel size. Smaller-sized ships, such as Handymax (40-50,000DWT and typical length150 - 200m) usually serve local and regional markets implying more time in coastal waters. Hydrographic data quality then becomes another determinant of risk.

A more conservative assessment of the time required for target verification and OOW reaction was not available to the author of the paper. Required sonar ranges at the given

speed of 14kts are therefore understated. Such a speed would exceed that dictated by situations in which use of FLS could be beneficial.

Current Applications: Polar Navigation and Luxury Yachts

For several adventure cruise ships operating in Polar Regions FLS is already making a significant contribution to safer navigation. In 2012, MS *The World* (Figure 1) made a successful transit of the North West Passage. In addition to providing warning of uncharted shoals, her phased array 3D FLS was used to assist in ice navigation and in the detection of marine mammals. While experienced ice navigators discount the effectiveness of FLS for the detection of drifting ice there is support for its use in the detection of hazardous seabed features.

The owners of luxury yachts are increasingly installing FLS to safeguard their expensive acquisitions, as they seek to provide unique experiences for their guests in remote and exotic areas. Such experiences have even included transits of the NW passage. There are lessons to be learned from yacht designers in bridge systems integration and Human Machine Interfacing.

User Comment

Captain Leif Skog, vice president of Marine Operations Linblad Expeditions, fully endorses the use of FLS, subject to the following reservations:

1. While officers with previous experience in fishing vessels can readily adapt to using FLS for navigation, there is a steep learning curve for other users.
2. Optimal operation of scanning FLS requires a protracted period of regular use of the system.
3. The system remains far from intuitive and requires considerable user intervention to adjust for varying seabed and water conditions.

He states that, once navigating officers are fully familiar with the system, it is "an outstanding tool and we use it all the time in remote areas". While conceding that the particular system in use is less effective in water depths under 20m, "and very little support in harbours", he stresses that it has proved an "excellent tool to avoid surprises in deeper waters not that well charted".

Positive, albeit qualified, feedback from other scanning sonar users relates to installations in small (>100m) expedition cruise ships with traditional propulsion systems.

▲ *Figure 2: Comparison of sailing distances between Asia and Europe between the Northern Sea Route and NE Passage and the Suez Canal.*

Michael Prince (Australian Hydrographic Service) found that the 3D FLS provided a much clearer image of the seabed than the 2D system, "just like taking away the water". However, both systems enabled the user to visualise the surrounding seafloor significantly better than the interpretation of depth contours on the chart. This can heighten situational awareness and increase the watch keepers' level of engagement.

General Comment

However, John Ritchie at CSmart observes; *The shift in the ECDIS narrative towards 'ECDIS-assisted groundings' is representative of how technology needs to be both well designed and correctly operated to be effective. At the moment, in normal conditions, over 10 systems must be continuously monitored by bridge officers, and that doesn't count those that require direct interaction. Even if the sonar does present an unambiguous picture from which to make decisions, it will add further to that workload. If it has an alarm function, that would add to the number and frequency of bridge alarms, which is already generally accepted as too high.*

Former UK National Hydrographer Rear Admiral Nick Lambert and Ian Halls (AHS), while acknowledging these reservations, consider that any additional aid to situational awareness merits serious consideration. Captain Skog and Professor Norvald Kjerstad – Aarlsund University College feel that in certain circumstances its use should be mandatory.

Some Issues

It is encouraging to record that the organisers of the e-Navigation Revolution conferences are sympathetic to including consideration of FLS on the agenda in future. The potential for FLS to aid navigation has been recognised by most of the author's correspondents. Effective sonar use generally requires more training than its manufacturers acknowledge together with sustained operational experience. Possibly for these reasons the shipping industry as a whole appears reluctant to embrace the capability of FLS. Users may object to yet another contribution to bridge information overload.

Proponents of 2D scanning sonars acknowledge that its effective use requires an extended familiarisation period and regular operational use. Current array processing systems, providing real-time intuitive 3D representation of the seabed and water column, are essentially operator neutral and therefore require minimal familiarisation.

Effective Sonar Ranges

Presently advertised maximum sonar ranges for 3D and 2D FLS are 1,000m and 3,000m respectively in optimum operating conditions. These ranges will not be achievable in shallow coastal waters, particularly in the tropics. With this proviso, they are still adequate for vessels up to 200m in length proceeding at speeds commensurate with the navigational situation and their manoeuvrability. 2D systems perform at their best in waters over 20m deep. The 3D systems are less affected by shallow-water effects other than temperature gradients although the latest scanning sonars claim to be more suitable for shallow-water use.

The existence of uncharted seamounts rising close to the surface could make a case for FLS to be fitted in VLCC, in anticipation of such vessels departing from their regular ocean routes. If so, there would be a requirement for effective sonar ranges to be extended beyond those currently available.

Regulation

With the continuing retreat of the Arctic ice cap, an increase in the use of both the NW Passage and the Northern Sea Route by bulk and crude carriers can be anticipated. National Maritime strategies of Arctic nations

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No. 3633

acknowledge this probability. In the drafts of the IMO Polar Code and new Ch. XIV of SOLAS, the unsatisfactory state of charting in Polar Waters is cited as a potential navigational hazard, but there is no mention of FLS.

The potential for more regular use of the Northern Sea Route (Figure 2) and the NW Passage might cause fleet operators to seriously consider the limited introduction of FLS. Marine administrations in Arctic Council Member States and insurers of transiting vessels could also influence this decision.

FLS can provide an important addition to the navigation suite

Mandating FLS, even in prescribed circumstances, is unlikely. This would inevitably be a protracted process. As with ECDIS, this could generate inflexible standards embedding today's technology rather than providing for future developments. The IMO and all components of the shipping industry are at present fully engaged in the implementation of e-Navigation, making it most unlikely that FLS will merit much attention in the near future. Nevertheless, it should at least rate a mention in the ratified version of the Polar Code.

Potential

FLS is already fitted in a number of super yachts, 'adventure' cruise ships and research and survey vessels. The largest such user at present appears to be MS *The World* (l.o.a. 196m). These vessels are more manoeuvrable than crude carriers and pose less of a threat to the environment if grounded. Nonetheless, the financial and human cost of a major casualty could be just as significant.
Assessment of the benefits of installing FLS should include the nature and location of the vessel's area of operation, the status of charting, remoteness from SAR services, climate and environmental sensitivity. An effective sonar range of 1,000m should prove sufficient for vessels up to 200 metres in length provided their speed and situation awareness are commensurate with the threat of encountering uncharted hazards.

The investigation into the grounding of the *Clipper Adventure* in the Canadian Arctic in 2010 noted that although the carriage of a forward looking sonar is not mandatory by Canadian Regulations "the unserviceable condition of the forward looking sonar deprived the bridge team of an additional source of valuable information".

Conclusions

While FLS alone cannot guarantee a vessel's safety in uncharted waters or where charting is derived from legacy hydrographic data, it can provide an important addition to the navigation suite. There is qualified support for this view; but issues of training, integration with existing navigation systems and cost effectiveness are recurrent concerns. One commercial driver might be the increasing use of the NW Passage and Northern Sea Route and the further opening up of Arctic waters to hydrocarbon exploration and extraction (Figure 3).

There can be no doubt that for certain applications such as coastal hydrographic surveying, littoral warfare and expedition cruising in Polar Seas FLS could be an invaluable aid to safer navigation. Installations in super yachts point to the possibility of improved integration of FLS displays and intuitive operation. In common with observed development trends in technology, FLS unit costs can be expected to decrease and capabilities and functionality increase. While the technology is already proven the case for wider adoption has yet to be made. It is hoped that this article will encourage an informed debate.

▲ *Figure 3: Russian icebreaking shuttle tanker* Vasily Dinkov *70,000 DWT.*

Acknowledgements

Particular thanks are due to Cheryl Zimmerman – CEO FarSounder Inc. for providing detailed responses to numerous questions as also to Dennis Soderberg WESMAR VP, Captain Leif Skog of Linblad Expeditions and Brian Evans, director - Marine Electronics Ltd. In addition to other individuals cited in the article, thanks are due to the following for generously responding to the author's enquiries: Neil Dulling - MOL LNG Transport (Europe) Ltd.; Steve Monk – managing director Da Gama Maritime and organiser of e-Navigation Conference series and Professor Ernestos Tzannatos – Dean, Dept. of Maritime Studies – University of Piraeus, Greece.
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Further Reading

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Ian Russell

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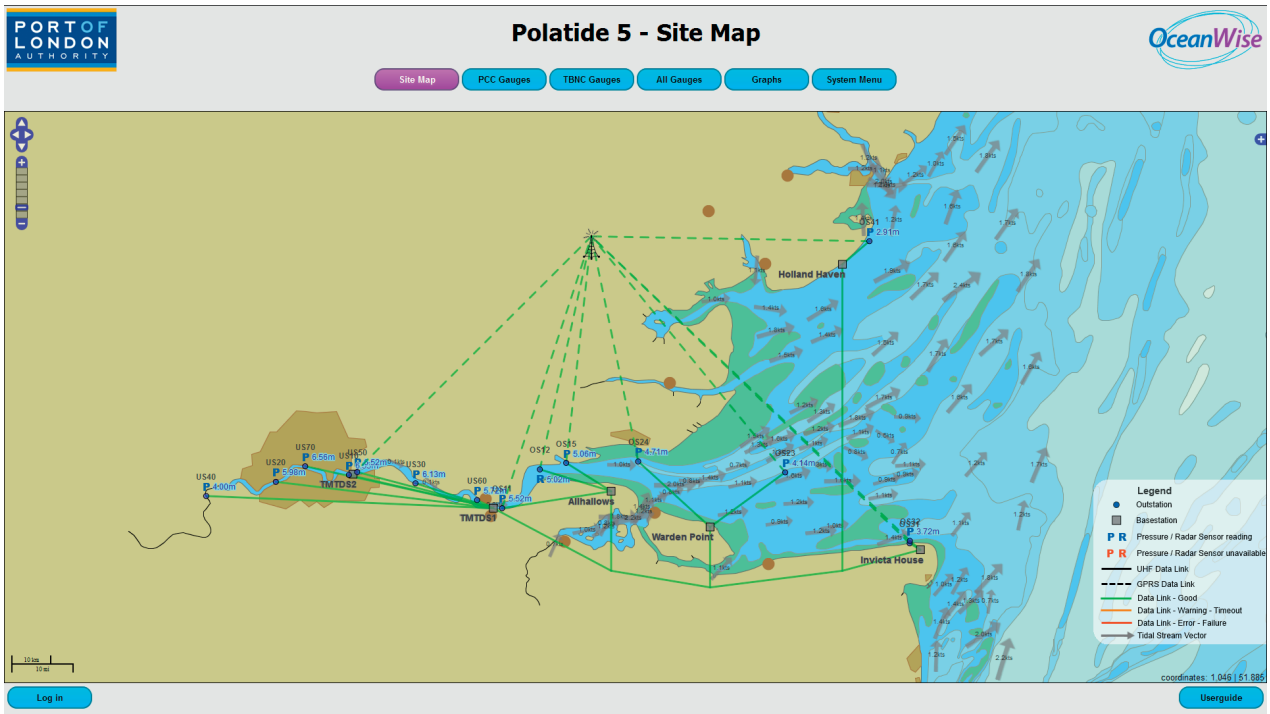
A New Tidal Monitoring System for Port of London Authority

Environmental **Data Sharing** and **Publishing**

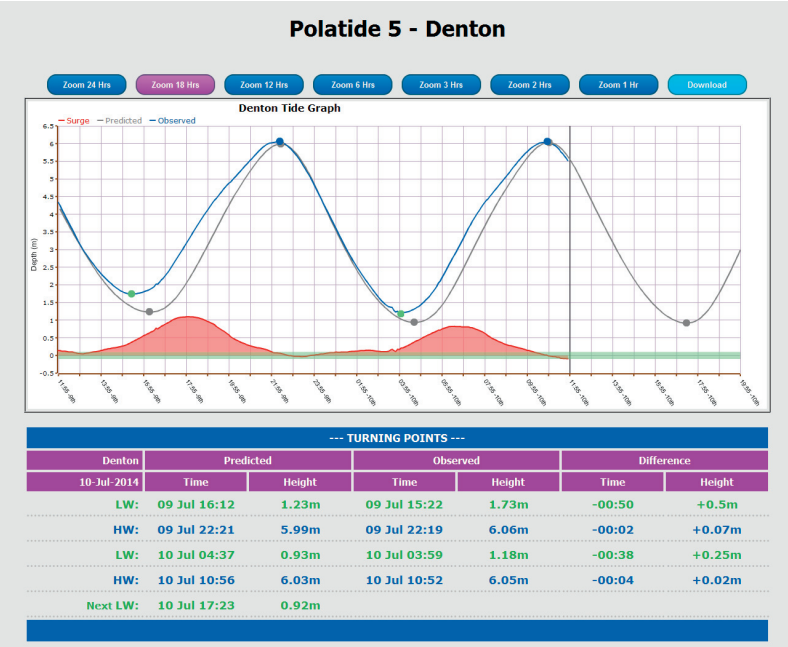
The Port of London Authority (PLA) has had an extensive tide gauge network for many years. However, the existing system, installed in the 1990s was becoming increasingly unreliable providing inconsistent information due to a number of factors. There was a pressing need to develop a state of the art tidal monitoring system across the outer area of the PLA responsibility utilising the latest communications technology whilst ensuring resilience to guarantee 24/7 working of the port could be maintained at all times. OceanWise, working with Valeport, was asked in 2013 to design, build, install and test a new monitoring system to replace the existing facility that included tide gauges, telemetry equipment, servers, databases, system control, data management and display software.

The Port of London is the UK's second largest port handling over 46 million tons of cargo per year with 30,000 shipping movements and stretches from the tidal limit in West London out to the southern North Sea covering over 400 sq. miles. With up to 8m tidal range, reliable real-time tide observations are critical to the safe operation of the port, reducing survey and dredging operations, and improving tidal analysis and predictions. System installation and rigorous testing was completed in April 2014. The system, colloquially known as 'POLATIDE 5', demonstrated how OceanWise and Valeport collaborated with PLA to create a robust and reliable system that met PLA's stringent requirements. The output is now available as an EMC certified, 'off-the-shelf' system, easily and efficiently deployed at any similar maritime organisation worldwide.



▲ *Figure 1: Overview map of the PLA POLATIDE system with tidal stream vectors.*

▲ *Figure 2: Port-Log system in use in the PLA VTS Centre, Gravesend.*



--- TURNING POINTS ---

Denton	Predicted		Observed		Difference	
10-Jul-2014	Time	Height	Time	Height	Time	Height
LW:	09 Jul 16:12	1.23m	09 Jul 15:22	1.73m	-00:50	+0.5m
HW:	09 Jul 22:21	5.99m	09 Jul 22:19	6.06m	-00:02	+0.07m
LW:	10 Jul 04:37	0.93m	10 Jul 03:59	1.18m	-00:38	+0.25m
HW:	10 Jul 10:56	6.03m	10 Jul 10:52	6.05m	-00:04	+0.02m
Next LW:	10 Jul 17:23	0.92m				

▲ *Figure 3: Tidal cycles; actual against predicted.*

System Design

The POLATIDE V system includes eight monitoring stations, four base stations and a data feed from seven existing upriver tide gauges operated by England's Environment Agency, as well as the Port of London. OceanWise acted as system designer and integrator and provided all of the system control, data management and web-based user display and administration software. Valeport assisted with the system design and provided the monitoring equipment, battery chargers and waterproof enclosures.

Hardware

Valeport's TideMaster water level recorders are used at each tidal monitoring outstation with Druck pressure transducers and/or the VRS-20 Water Level Radars used as sensors. Output from the TideMaster provides data input to a dual telemetry system, which uses UHF radio modem and a serial to Ethernet/GSM transceiver. The dual system provides backup data telemetry and allows the TideMaster to be interrogated and controlled remotely.

Power to the monitoring outstations is provided by a battery charged from AC power, solar panel and/or wind turbine and designed to meet PLA's requirement to collect data for up to 7 days. All equipment, battery and charging units are housed in reinforced wall-mounted enclosures providing IP 66 protection to IEC 60529 standards and resistant to external mechanical impacts. A locking device outside the sealed area guarantees the tightness of IP 66 over time. Door switches are cabled to the modems to trigger alarms, doors are opened or closed. Each enclosure design was EMC tested and all sensors, antennae and other external cables connected through the enclosure, ensuring water tightness. UHF telemetry data transmission uses modems installed at four base stations around the Thames Estuary co-housed with PLA radar stations and connected to the PLA local area network (LAN), which sends data to the POLATIDE 5 data servers installed at Gravesend and the Thames Barrier. A secondary telemetry system transmits via GSM/GPRS on a purpose-built Mobile to Mobile Virtual Private Network (M2M VPN) providing data security and ensuring modems retain the same IP address and contactable by the POLATIDE servers. Data is sent from the M2M VPN to the servers via the PLA Internet gateway and firewall.

Software

Data loading, management and display components installed on the POLATIDE 5 data servers use OceanWise off-the-shelf Ocean Database (ODB) and Port-Log software products. ODB is a complete data management solution that loads and stores most types of simple and complex marine and environmental monitoring data. ODB is accessed through a variety of software applications including GIS, Microsoft Excel and MATLAB, as well as through Port-Log web pages. Full administration of users, stations, sensors, quality assurance parameters, tidal predictions and surge and synchronisation of all data between the two databases is included. Components were improved during delivery of the system in response to feedback from PLA vessel traffic service (VTS) and Navigation System Users.

Deliverables

Port-Log software provides views on the system and data through a map interface showing the status of the overall system, each outstation, sensors and telemetry units and provides an access point to the actual data. It is able to handle different base maps and overlays stored locally within ODB or from OceanWise ENC Web Map Service. Alerts and triggers are generated according to editable parameters and thresholds (e.g. battery levels, data

▲ *Figure 4: View of enclosure c/w Valeport pressure sensor and ip-Buffer.*

BIBBY
HYDROMAP

Osiris Projects becomes Bibby HydroMap

We are pleased to announce that Bibby HydroMap is the new name for Osiris Projects.

As Bibby HydroMap, the company will continue to build upon its clearly defined values of quality, relationship, commitment and integrity. With the dual-launch of our second vessel under the Bibby flag 'Bibby Athena' and new remote survey platform d'ROP, now is the time to advance our reputation as the seabed survey company of choice.

Meet us at Ocean Business to learn more about our next phase of growth.

Come and see us at: Q8

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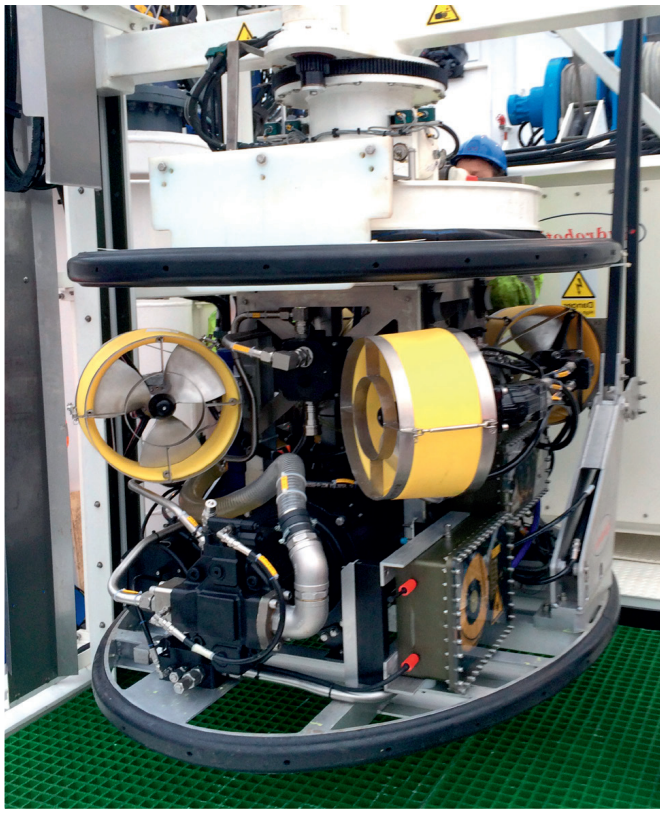

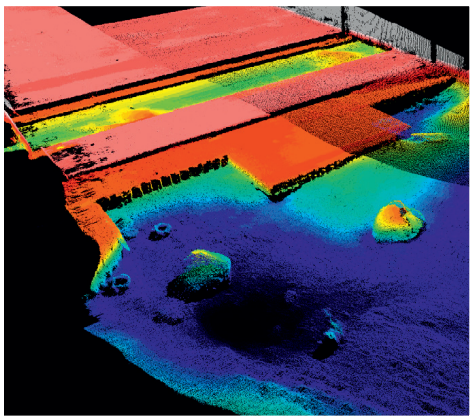

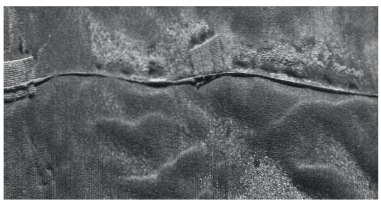

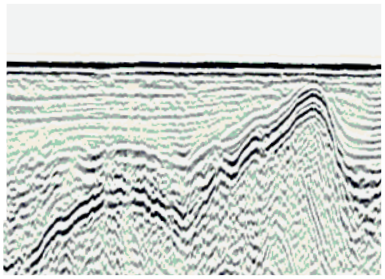

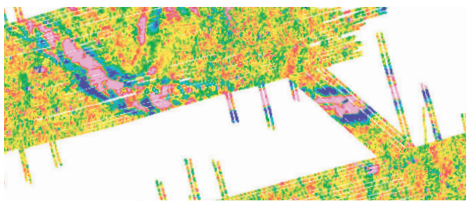

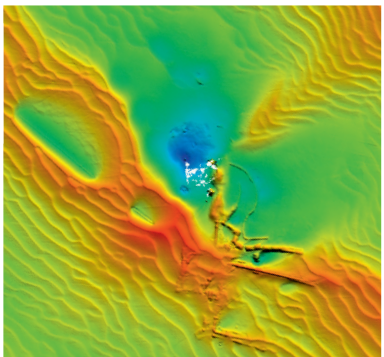

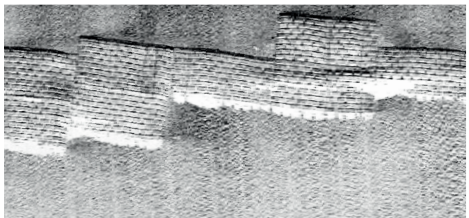

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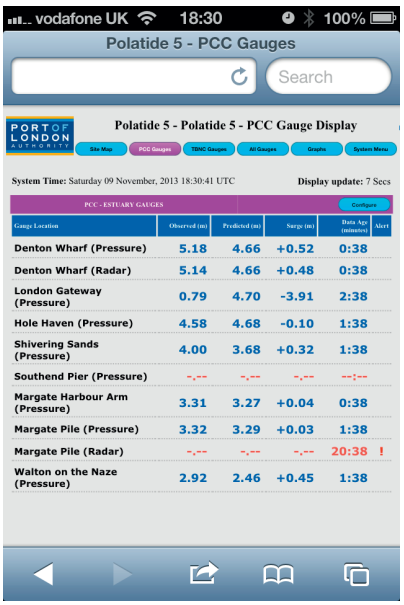
transmission rates, QA failures, water levels). Port-Log provides total control, administration and comprehensive visualisation of system performance and scientific data, as well as access to external systems and websites. Once the outstations became operational, the main QC, logging and data retrieval and display components were installed and tested.



Gauge Location	Observed (m)	Predicted (m)	Surge (m)	Data Age (minutes)	Alert
Denton Wharf (Pressure)	5.18	4.66	+0.52	0:38	
Denton Wharf (Radar)	5.14	4.66	+0.48	0:38	
London Gateway (Pressure)	0.79	4.70	-3.91	2:38	
Hole Haven (Pressure)	4.58	4.68	-0.10	1:38	
Shivering Sands (Pressure)	4.00	3.68	+0.32	1:38	
Southend Pier (Pressure)	-.--	-.--	-.--	--:--	
Margate Harbour Arm (Pressure)	3.31	3.27	+0.04	0:38	
Margate Pile (Pressure)	3.32	3.29	+0.03	1:38	
Margate Pile (Radar)	-.--	-.--	-.--	20:38	!
Walton on the Naze (Pressure)	2.92	2.46	+0.45	1:38	

Figure 5; Example of Port-Log mobile web page as seen on smartphone displays.

Conclusions

The complexity of designing and installing a tidal system over such a large geographic area, with sensors in remote and inhospitable sites, whilst maintaining an existing 24/7 operation over linked radio systems running in parallel, should not be underestimated. Doing so served as a safeguard for PLA operations staff. POLATIDE 5 has been fully operational now for 9 months and outages due to atmospheric interference and equipment failure have been dramatically reduced. PLA staff are now taking advantage of a more intuitive and interactive interface which it hopes to pass to the general public in future using a web-based system designed for wider community access.

More information
www.demo.port-log.net
www.oceanwise.eu

John Pepper

John Pepper is the marketing director at OceanWise Ltd. John has over 35 years' public and private sector experience working in the geospatial information industry, specialising in data collection and management, policy and strategy, new business development and marketing in the UK and overseas. He holds professional qualifications in Surveying Science and Geodesy from NELP, and Marketing and Strategic Planning from Bournemouth Business School.
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John Pinder

John Pinder is Port Hydrographer at Port of London Authority. John went to sea with P&O as a deck officer cadet in 1975, serving as a deck officer for 12 years and gaining his Master Mariner certificate prior to coming ashore and doing a BSc in Nautical Studies at Plymouth. After a short time in command of a small Thames-based training ship he joined the PLA as an Hydrographic Surveyor in 1989, where he has been ever since, serving as Port Hydrographer for the last 14 years.
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Mapping the Future

Osiris Projects becomes **Bibby HydroMap**

Against a backdrop of increasing focus on cost efficiency and innovation, UK-based Osiris Projects has rebranded as Bibby HydroMap. It's nearly three years since Bibby Line Group, one of the oldest names in international shipping, acquired Osiris Projects, who specialise in hydrographic and geophysical survey, geotechnical sampling and ROV/AUV survey.

Founded in 1997 by Andrew McLeay, now managing director at Bibby HydroMap and Jim Walters, technical director, the company has witnessed significant changes, not least of which are an outcome of the North Sea oil and gas downturn. Andy McLeay explains the thinking behind the rebrand, "Being part of a larger group has helped us to develop a wider range of services, and, perhaps more importantly, our investment in R&D has helped us to exploit new technologies to deliver cost efficiencies while optimising quality outputs. From a customer perspective, it really does widen and strengthen our offer."

Current Profile

Since being acquired by Bibby in May 2012, Bibby HydroMap has grown organically from 40 to over 100 full-time staff, most of whom are based at their offices near Liverpool or on board one of their five custom-built vessels.

▲ *Figure 1: Sir Michael Bibby with Andy McLeay, managing director at Bibby HydroMap. Image courtesy: John Houlihan.*

The company has traditionally been driven by its clearly defined values of relationship, commitment, quality and integrity, guided by their mission statement to be the seabed survey company of choice. Turning over GBP10m a year, Bibby HydroMap serves a range of clients mainly from the Oil and Gas and offshore renewables industries. Parent company Bibby Line Group is a GBP1.59bn turnover business that employs over 6,000 people across 20 countries worldwide.

International and Global Scope

Having served the UK offshore renewables sector for almost 15 years, Bibby HydroMap is keen to increase their involvement in European wind, particularly in Germany, the Netherlands and Denmark. The company's 24hr semi-SWATH catamarans *Bibby Athena* and *Bibby Tethra* were designed to address the challenges associated with the next phase of offshore wind sites, providing a stable platform for hydrographic and geophysical survey, geotechnical sampling and ROV inspection.

Subsea power and telecom cables forms another key sector for the company. Bibby HydroMap recently launched their remotely operated survey platform d'ROP, designed initially for depth of burial surveying, with plans to support various sensors including

▲ *Figure 2: The new* Bibby Athena.

multibeam echo sounder, side-scan sonar, sub-bottom profiler and magnetometer. The d'ROP is currently mobilised to *Bibby Athena*, deploying through the moonpool using a custom-built LARS.

Bibby HydroMap has operated within the UK Oil and Gas industry since inception, working with clients including Shell, ENI and Centrica, typically offering pipeline/asset surveys, debris clearance surveys and ROV inspection. In this sector, the company is planning to exploit the cost-savings associated with their vessels in comparison to traditional offshore vessels, whilst developing relations with other Oil and Gas focused companies within the Bibby Line Group.

Bibby Marine managing director Jon Osborne comments, "The specialist work of Osiris Projects has always been highly valued in the coastal surveying industry. As Osiris Projects, they have deservedly built up a reputation for innovation, technical expertise and outstanding customer service. As part of the wider Bibby group, we look forward to helping them to grow and to forging new strategic alliances."

View on the Future

Innovation is at the heart of the company, that firmly believes new technologies such as remote and autonomous survey platforms hold the key to optimising survey efficiency. With an increasing emphasis on cost reduction spanning all offshore industries, investment should focus on methods that seek to minimise weather susceptibility whilst delivering quality survey outcomes, safely and efficiently. The UK is well-placed in this respect to proactively exploit their marine engineering heritage.

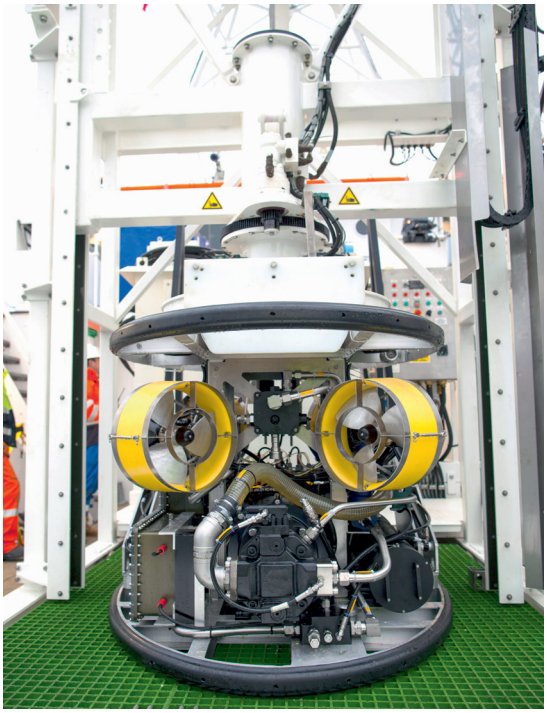
The UK leads the world in offshore wind technology and expertise, and UK-based companies are in a strong position to take advantage of the growing European offshore renewables industry. Standardisation, achieved through horizontal and vertical collaboration, will help to reduce costs throughout the supply chain and improve competitiveness.

Bibby HydroMap has ambitious plans for growth, focusing on Europe, fleet expansion and development of the d'ROP system. Defined by their company values and new company slogan 'Committed to Quality and Innovation', Bibby HydroMap will move forward building upon the strong foundation provided by Osiris Projects.

The company are exhibiting at Ocean Business, Stand Q8. ◀

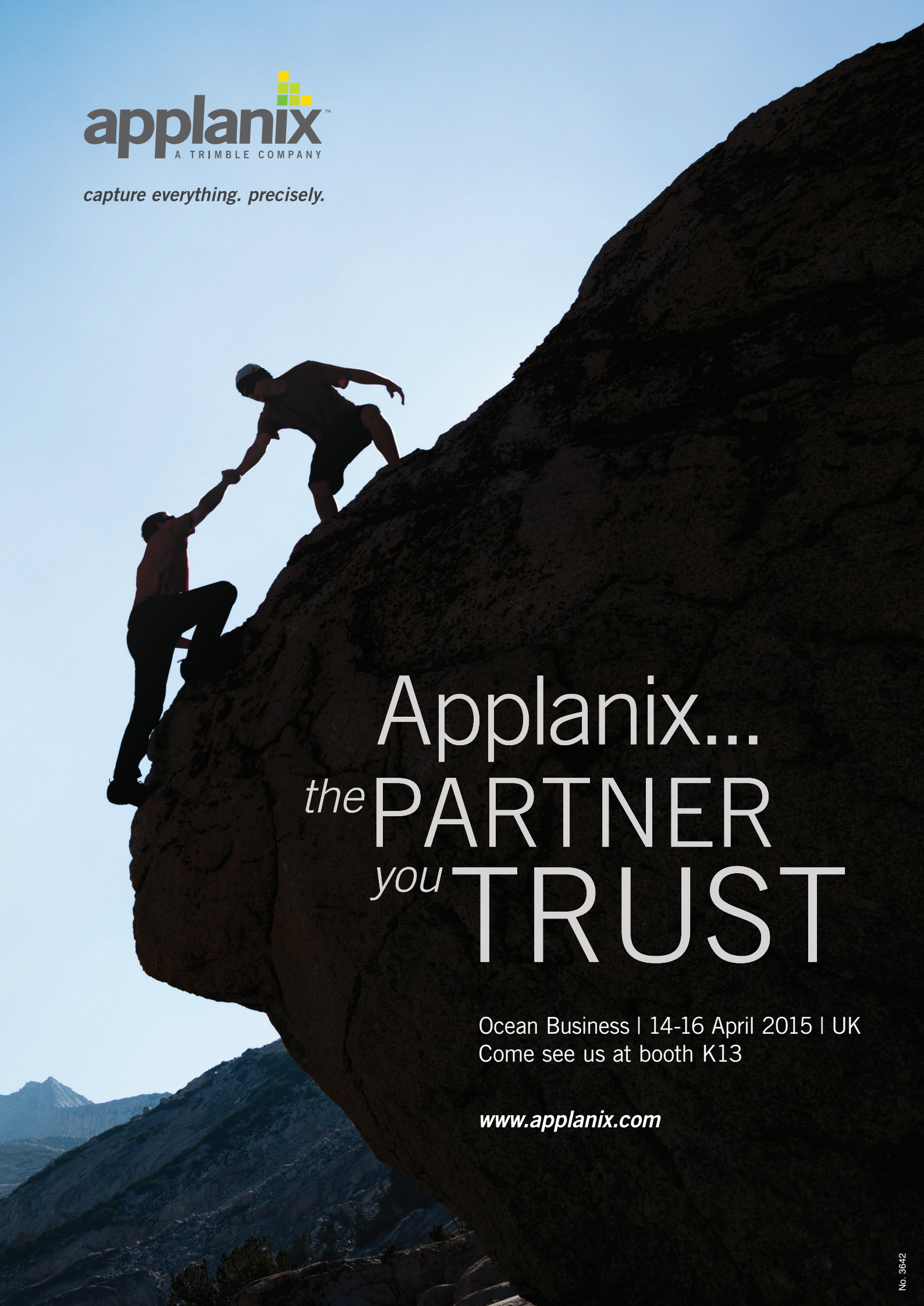
More information
www.bibbyhydromap.com

▲ *Figure 3: A visit to* Bibby Athena's *bridge.*



▲ *Figure 4: The d'ROP ROV.*

▲ *Figure 5: Deploying the d'ROP through the moonpool.*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Southampton is 'Capital of Ocean Science' for Three Days

Ocean Business Promises to be Great

Every second year, the National Oceanography Centre Southampton, UK, welcomes thousands of visitors during the three-day Ocean Business tradeshow and Offshore Survey conference. The newest edition of this event will be held from 14-16 April 2015. The organisers expect nearly 350 businesses to be represented, 180 hours of training and demonstrations to be presented and more than 5,000 networking visitors and delegates to attend. The registration for the trade show and demonstrations are free, a fee is required for the conference offshore survey. This preview gives an impression of what to expect.

4D Nav, F2

4D Nav, a supplier of software engineering solutions for the offshore industry, announces the release of its newest software package NavView Pipe Lay. NavView Pipe Lay includes all the features of the existing NavView general navigation and positioning package along with new features that allow users to monitor pipelay operations in real time including fatigue analysis. NavView Pipe Lay will begin field trials with select customers in April.

ACSM, W5

ACSM provides global marine services as well as complete ROV services for offshore projects worldwide. ACSM operates and also provides ROV vehicles and personnel. For over 15 years, we have worked with many different ROV systems, as well as with submersible cable ploughs. Our Senior Technical Department has extensive experience in international offshore projects providing support to subsea projects including ROV & Plough supply, mobilisation, operation and maintenance, and supervision of the offshore activities and our ROV personnel. ACSM will announce a Titanium Manipulator 'TitanROB' for medium WROV systems.

Agile Sensor Technology, C9 D1

The AgilPose Intelligent Camera was developed to incorporate onboard algorithms for 'Pose Estimation' that can be processed in real-time aboard an unmanned vehicle. This enables real-time updates of position and orientation of the vehicle or object that it is mounted on, relative to an appropriately marked 'target' such as an underwater structure or docking station. An application-specific version of the camera can be used for hovering and docking of autonomous ROVs and AUVs using Agile Sensor Technology's active infrared target.

▲ *Ocean Business - also this year the stage for meeting professionals, training and seeing equipment in action.*

Airborne Hydrography, V2

Airborne Hydrography markets and sells airborne laser survey systems for nautical charting, coastal zone mapping and protection of the coastal zone environment. HawkEye III and Chiroptera II simultaneously surveys land and seafloor terrain creating seamless full waveform data. HawkEye III integrates three Lidars; one deep channel (<50m), one shallow channel (<15m) and topo (<1,600m). Using Lidar Survey Studio and its Point Cloud Generation toolbox allows post-processing and cleaning of multiple missions. Included are features such as automatic water surface detection, land/water classification and seafloor vegetation analysis (reflectance data).

AML Oceanographic, K8

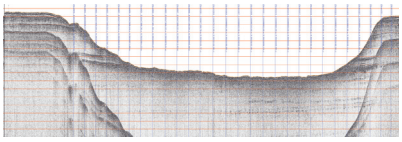
Simplify data collection workflow with the leader of AML's Ocean Business lineup, the newly released Data•Xchange. It brings WiFi data transfer and GPS to X•Series survey

profilers. See Data•Xchange in action at the Test Tank between 10:30 and 11:30 am on Thursday 16 April 2015. AML Oceanographic presents UV biofouling control products, UV•Xchange and Cabled UV. In addition to preventing biofouling-induced drift in CTD data, they are ideal for protecting third-party sensors, ADCPs, camera lenses, lights, hydrophones and more. AML's X•Series and XchangeTM field-swappable sensor lines will also be on display.

AML Oceanographic's Data•Xchange with WiFi.

Applied Acoustics, Q1

Applied Acoustics will be unveiling its deep tow sparker, the DTS-500. It extends the company's range of sub-bottom profiling systems and will increase data resolution, up to 15cm, in waters up to 500m in depth. Designed for high and ultra-high resolution geophysical surveys, the DTS-500 operates with a single industry standard coaxial tow cable up to 2,000m in length, has long-life durable electrodes and integral hydrophone receivers. Consisting of a rack-mount surface console, cable and robust tow fish, the system easily interfaces with standard data loggers and benefits from full operational safety interlocks.



The type of high resolution possible with the DTS-500 deep-tow sparker.

Argus Remote Systems, W9

Argus Remote Systems, Norway, has been manufacturing electric propulsion ROV for the last 20 years, due to its increased efficiency in comparison with hydraulic propulsion ROVs: their weight and smaller design offers increased flexibility for additional applications. Argus Remote Systems specialises in the design and manufacture of ROVs for offshore and marine industries. The company has a wide variety of systems, from the Argus Rover to the large work-class Argus Worker XL.

Atlas Professionals, D10

Atlas Professionals represents the largest and most highly skilled pool of survey professionals within the offshore survey & construction industry. In line with Atlas' goal to invest in people, 2014-15 was a crucial year. We started the Atlas Competency Scheme and implemented our first trial of professionals through the programme. Our Offshore Survey team also became an official sponsor of Ocean Valour, where two survey professionals will row across the North Atlantic to raise money for charity.

Balmoral Offshore Engineering, V12

ROVs/AUVs are becoming progressively more sophisticated and a growing demand for vehicles has seen Balmoral overhaul its ROV buoyancy production capability into a dedicated centre of excellence. Following a GBP1m+ investment, Jim Milne, chairman and MD, said: "The increase in demand for ROVs helped us make the decision to refurbish our buoyancy facility and increase

production capacity. Our impressive new milling and boring CNC capability has made a huge difference to manufacturing tolerances as well as product processing time." The new end-to-end facility includes design, testing, curing and a state of the art buoyancy block boring and milling plant.

Briggs Marine, W27

Briggs Marine will have their Coastal Survey Vessel M/V *Solent Guardian* docked alongside the waterfront, used by R2Sonic to demonstrate their Sonic 2026 Wideband Multibeam System. Briggs Marine have over 40 years experience in supplying services to the marine sector including vessel charter and management, submarine cable installation, repair and maintenance, survey services, diving services, environmental consultancy, emergency oil spill response, Aids to Navigation, salvage and wreck removal.

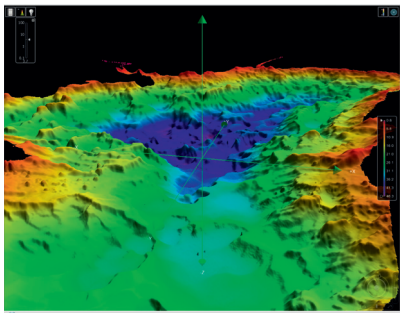
M/V Solent Guardian *will be demonstrating R2Sonic's Sonic 2026.*

Cadden, 5Ea

Following the success of GEOD BALI, an easy-to-use, autonomous and portable bathymetric system, GEOD BALI RTK will be presented. This solution adds the RTK capability and WiFi connection to our hydrographic survey tool, without compromising compactness, robustness and simplicity, key features of the GEOD BALI product family. In addition, take the opportunity to see a hydrographic drone in the French Pavilion, which is unique in its use of aircraft-type propeller, operated or autonomous, with GEOD BALI or multibeam echo sounder system embedded. This drone also offers a patented sterile over-hull, guaranteeing the non-contamination of the environment.

CARIS, N10

CARIS will launch CARIS Onboard for offshore surveys. Built on decades of hydrographic data processing expertise and supported by the highly scalable CSAR framework, it enables users to process data from a range of sensors efficiently in near real-time resulting in minimised data conversion and processing times. CARIS will host a workshop introducing CARIS Onboard on Tuesday 14 April at 9:30 am in the Access Grid room. To pre-register your interest, email onboard@caris.com as space is limited.



CARIS enables near real-time processing.

Cefas, J3

The Centre for Environment, Fisheries and Aquaculture Science (Cefas) will be exhibiting for the first time in 2015. With over 500 staff distributed across a number of UK and international offices, laboratories and a purpose-built research and survey vessel (RV *Cefas Endeavour*), Cefas offers world-leading resource and expertise across a range of industry sectors and scientific topics. Cefas provides a range of services including consultancy and advice, laboratory analysis, numerical modelling and specialist surveys, in addition to programme management and training.

Chelsea Technology Group, T8

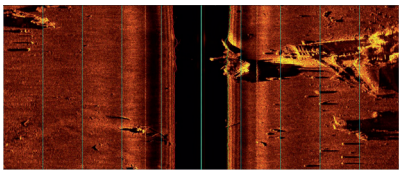
Justin Dunning will present an overview of fluorescence measurements and their applications to water quality on board RV *Callista*. He will demonstrate CTG's range of fluorometers configured to measure hydrocarbons, faecal contamination, algae blooms, optical brighteners & CDOM. Also on board RV *Callista*, Dr Kevin Oxborough will demonstrate the FastOcean FRR fluorometer system and the new Act2 modular system for probing phytoplankton photosynthesis. He will show the FastOcean ambient plus dark profiling system in action providing real-time data acquisition. In a classroom session, Richard Burt will outline our new water quality monitors for ballast water treatment & exhaust gas cleaning systems.

Chesapeake Technology, S5

Chesapeake Technology is launching the new SonarWiz, including developments such as backscatter post-processing for bathymetry data, advanced gridding options, a fresh new look and much more! Register at our booth to experience SonarWiz in action on the water with EdgeTech or Klein. Or sign up for the one-day training workshop on 17 April on-location and get a free trial plus the new user manual – register at www.cheesapeaketech.com.

C-Max, K7

C-MAX will be demonstrating the latest improvements in the resolution and range of their CM2 series side-scan sonar.



The wreckage of battleship HMS Vanguard *in Scapa Flow.*

Coda Octopus, R1

The Coda Octopus team is available to answer your questions on all of our existing product range. We will be launching a host of new products including: compact Echoscope series C500 and C250; F175 variants designed to work with high-end GNSS receivers; a sonar solution to provide real-time forward looking imaging combined with real-time 3D seafloor bathymetry in a single sensor; single axis rotator and new versions of our USE software. And there will be more, including updates to our leading GEO software.

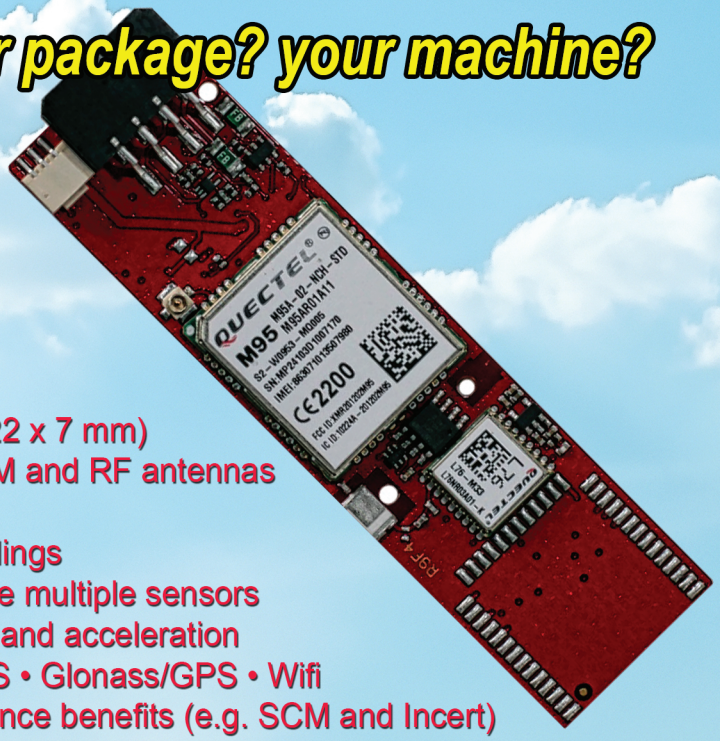
CONTROS, F14

CONTROS will be displaying products out of the HydroC, HydroB, HydroFlash and HydroFIA family. Come and visit us and get to know our newest and current products and find out about possible application opportunities. Learn more and register for our training session 'CO_2, CH_4, O_2 and Total Alkalinity (TA) measurements in water' taking place in classroom Node Room 1 on Tuesday 14 April at 3:30pm.

Deep Ocean Engineering, W1

Deep Ocean Engineering proudly announces its participation in the first comprehensive multibeam survey of the USS *Arizona* and the USS *Utah* at the World War II Valor in the Pacific National Monument in Pearl Harbor, Hawaii. During the week of 20 October 2014, team members from Deep Ocean Engineering, Inc, R2Sonic, Autodesk, and eTrac travelled to Oahu to conduct these surveys with Deep Ocean's H-1750 USV and an R2Sonic 2020. The survey's goals were reached and 100% high-resolution sonar coverage was obtained

Where is your vehicle? your package? your machine?
Find it with TraceME!

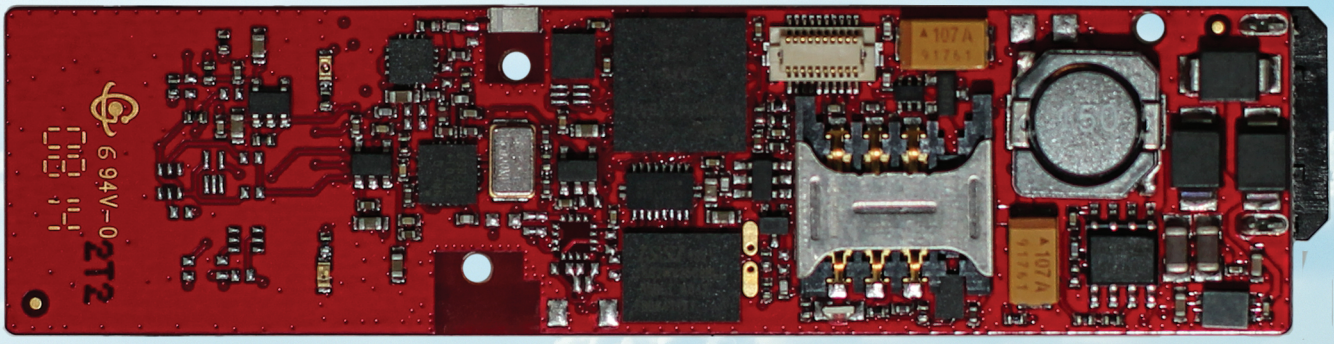


Introducing the new TM-203

The TM-203 is the newest addition
to our family of TraceME products.

Unique features:

- Very small fully-featured GPS Tracker (87 x 22 x 7 mm)
- Weighs only 15.5 grams, including GPS, GSM and RF antennas
- Advanced power saving, down to 3uA
- Location-based positioning (LBS) inside buildings
- Portable or externally connectable to integrate multiple sensors
- On-board sensors for compass, temperature and acceleration
- Worldwide coverage: Quad-band GSM/GPRS • Glonass/GPS • Wifi
- Complies with additional standards for insurance benefits (e.g. SCM and Incert)
- Complies with automotive safety standard (E-mark)



We would like to invite you to have a look around our website and get inspired by the possibilities of what KCS TraceME products can bring to your project. Whether you need a solution for personal tracking, trace and control vehicles, object protection or more advanced M2M solutions, KCS TraceME can deliver it.

GPS/GPRS enabled GPS Tracker with advanced I/O. This will allow you to remotely track & trace and/or control a huge diversity of objects, machines and/or vehicles. KCS TraceME is absolutely the most versatile and adaptive Track-n-Trace solution in the market today. Our clients use the TraceME hardware for the most diverse tasks. It is truly an all-round performer and exceeds anything in the market currently available.

- KCS TraceME is available in different form factors (Key fob, OEM., Aluminum & custom made casing);
- GPRS, UMTS, SMS, GSM, Wi-FI, RFID, E-mail;
- Fully configurable administration tool;
- Event driven, can run custom code, remotely configurable;
- Connect M2M to any device;
- G-shock detection, temperatures, tilt, motion, iButtons, mobile phones, camera's;
- See the rest of the site for the full options!

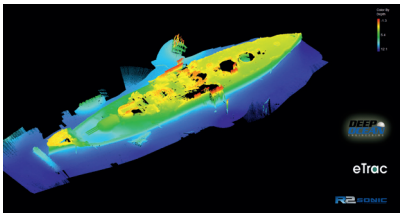
Please contact us if you want to discuss your ideas!

OEM & Distributor requests are welcome!

www.Trace.ME

No. 3604

of both sunken warships to replace the artists' rendition surveys from some 30 years prior.



Multibeam image of the Pearl Harbor survey.

Deep Trekker, C2
Deep Trekker will be releasing their newest product line of Remotely Operated Vehicles (ROVs). Along with their 200 gallon water tank and their flagship product the DTG2 ROV, the Deep Trekker team will unveil all details of their new product line. The product is based on the innovative designs of the DTG2 system, which is the world's only completely portable, affordable and easy to use remotely operated vehicle system.

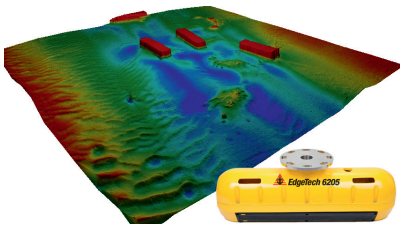
develogic, E2
develogic, Germany, develops and manufactures turn-key customised data-acquisition and telemetry solutions for marine monitoring. Our building block system contains all elements for collecting data anywhere in the ocean and transporting it to the customer's office, such as pressure housings, data loggers, acoustic modems, seafloor landers and sensor/telemetry buoys. Customers are research institutes, navies and offshore renewable energy/oil and gas companies. develogic exhibits a 6,000m rated compact seafloor lander (test tank Tuesday 2:00pm) with acoustic communication and sensor package, acoustic/seismic recording systems, acoustic modems, a real-time satellite gateway buoy with inductive/acoustic communication, a sound source and a video camera.

dotOcean, L14
dotOcean is specialised in underwater sediment profilers and sensor integration for the dredging market, ports and authorities. The current products consist of a free fall penetrometer (GraviProbe) and an X-ray density meter (DensX). A new product has been added this year, an intelligent sounding pole. With this manual mud/sediment profiler it is possible to analyse underwater soil layers in small waterways and rivers by manually pushing the instrument into the soil. This results in a profile of the soft underwater layer from fluid mud to hard bottom. The collected data supports accurate planning for dredging and maintenance of small waterways.

Dynamic Load Monitoring, V35
DLM are designers and manufacturers of load cells, load monitoring systems and specialist offshore equipment. Successfully trading for over 20 years and with a proven track record in supplying high-quality and reliable products, DLM have grown to be the leading supplier of shear pin load cells and systems to the offshore industry. With a comprehensive range of standard products including tensile link load cells, running line monitors and compressive load cells, DLM can cater for all load monitoring requirements. Recent developments include an Acoustic Bite Release hook and Acoustic Subsea Shackle that will be exhibited.

ECA Group, N8
ECA Group produces advanced solutions in the maritime sector for the Oil & Gas, Subsea, Hydrographic, Oceanographic and equipment industries. Highly specialised in automation and control technologies, ECA Group provides remote applications. From deepwater exploration to pipeline inspection, seabed survey to mission training, ECA Group is actively engaged across the full range of maritime activity. ECA Group offers an array of services, global expertise and innovative solutions supported by tailored customer support. With this dynamic and flexible approach to the customer, ECA Group ensures success in the most demanding of environments.

EdgeTech, B9
EdgeTech will be conducting on-water demonstrations from the *High Life II* of the EdgeTech 6205 Multi Phase Echo Sounder (MPES). The system provides 200° IHO quality bathymetric coverage and co-registered simultaneous dual-frequency side-scan sonar data. EdgeTech's 6205 is the next generation of technology for traditional multibeam users. *High Life II* is 14m long and accommodates 12 guests. In addition to the on-water demonstrations there will be a classroom session on the EdgeTech 6205 scheduled for Tuesday 14 April at 12:30 pm.



EdgeTech 6205 multiphase echo sounder and sonar image.

EOMAP, A16
EOMAP, the technology leader and largest producer of Satellite Derived Bathymetry maps for shallow-water areas, has developed an error model capturing the main uncertainty sources of SDB. At the recent IHO conferences in Monaco and Manzanillo/Mexico, this was marked as inflection point for the uptake of SDB in hydrographical applications. Consequently, EOMAP has submitted a concept proposal to extend the existing IHO standards with supplementary order classes, specifically applicable to state-of-the-art SDB.

Epson Electronics, N9
The proprietary QMEMS technology has enabled Epson to develop a range of high-precision, fully calibrated and compensated 6 DoF (degree of freedom) motion sensors, so-called IMUs. Together with Epson's in-house low power semiconductor technology a combination of high precision, very small size and ultra-low power consumption is achieved. Flagship of a growing range of IMUs is the M-G362 with incredible 3°/h gyro in run bias stability and a low power consumption of 100mW enabling high-precision stabilisation and navigation applications even under battery operation. Implemented SPI and UART interfaces allow easy connection to most MCU systems.

Evologics, W22
EvoLogics, German manufacturers of underwater communication and positioning systems, will showcase its latest developments. Among the highlights is the high-speed underwater acoustic modem, capable of transmitting data at 62.5kbps over 300m range. EvoLogics will reveal its acoustic release device, now available for beacons and in OEM configurations for seamless system integration. A standalone modem emulator extends the line of developer solutions, offering a flexible framework for design and training. EvoLogics will showcase the upgraded Sonobot - autonomous unmanned surface vehicle, as well as report on latest R&D projects.

Falmouth Scientific, Inc (FSI), W33
Falmouth Scientific, Inc (FSI) designs and manufactures precision oceanographic instrumentation and systems including: portable and hull mounted acoustic seismic systems; current, wave, and tide meters; side-scan sonar imaging systems; specialised acoustic transducers; location beacons and tracking systems and engineered systems and support. Bubble Gun portable seismic sub-bottom systems are ideal for single- and

multi-channel reflection surveys in transition zones, coastal areas and fresh water. Very low-frequency signals from unique wideband acoustic transducers provide superior signal penetration through many sediment types. Visitors are invited to attend our info session and in-water demonstrations.

Forum Energy Technologies, H6

In the challenging global Offshore Oil and Gas industry, Forum Subsea Technologies continues to lead the way by providing our customers with an extensive range of world class products and services. Our product suite includes ROVs, Launch & Recovery Systems, Tether Management systems, surface and subsea equipment rentals, staffing, Visualsoft software, geosciences analysis services, ROV tooling and components. VisualSoft is a developer of digital video and data-acquisition systems for the subsea industry. VisualSoft Suite is a modular collection of software applications designed to acquire, edit and review subsea video and data using a common user interface. Forum Subsea Rentals can offer an extensive range of specialist survey and ROV equipment to assist global customers in meeting all their project requirements including all the latest technology in a fast moving environment.

Fugro Satellite Positioning, V13

Matthew Goode, geodesist at Fugro Intersite, is to present new developments in precise offshore positioning. Fugro has extended the Precise Point Positioning (PPP) technique to utilise integer ambiguity resolution (IAR). This significant development enables the user to achieve an increase in real-time accuracy. The strength of combining these two techniques will then be demonstrated by the case study of PPP-IAR in the Asia-Pacific region with ambiguity fixing for GPS and BeiDou. The presentation will be given on 16 April 2015, 2:10 pm in the Lecture Theatre during Offshore Survey.

Gardline, C6

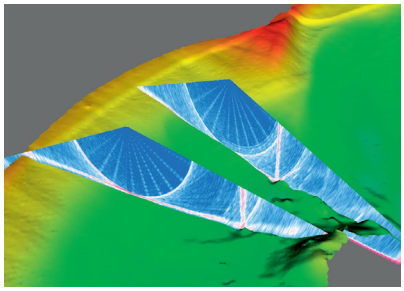
Gardline is a marine contractor specialising in geophysical, hydrographic, environmental, geotechnical, geochemical and oceanographic surveys. Gardline provides a wide range of integrated marine science services. Our principal offices are based in Great Yarmouth, UK with additional offices established in Ireland, the USA, Middle East, South America, Africa, Far East and Australia.

GAS, E7

GAS has over 25 years of solid experience worldwide in Geophysical, Geotechnical and Environmental Support to Construction Surveys and has developed a team of experts in the acquisition, interpretation and presentation of highly accurate and precise seabed and subsea data. Our company is always improving its skills and using the latest technology to meet the offshore market's increasing demand. Counting on teams of qualified and experienced professionals, offering customers the best service without exception, GAS prides itself for the reputation in reliability and expertise built over the 25 years of its existence. GAS employs more than 150 people worldwide.

Geocap, J2

Geocap provides software and services for hydrographic institutions, for the O&G industry and for UNCLOS Article 76 work. Geocap Seafloor processes and edits survey data from multibeam echo sounders. It can also import shallow seismic and convert to depth and combine with the bathymetry. Geocap Ground Model is used for ground model construction in all stages of project development; from project inception and desktop study through to operation and maintenance, the ground model informs all activities involving resource assessment and engineering intrusive works. The Geocap DataLink for ArcGIS allows project data to be easily shared in ArcGIS.



Geocap water column data from an EM3002D.

Geosoft, J6

Geosoft will feature its UXO Marine software for geophysical survey work. Geosoft UXO Marine provides a purpose-built workflow and specialised tools for processing, detecting and analysing buried objects using single magnetometer, magnetic gradiometers and multi-sensor arrays. Global consultants and marine survey companies can locate and classify buried pipelines, cables, unexploded

ordnance (UXO) and other seabed contamination. Geosoft provides commercial software, training, custom development and data management.

Geospace Offshore, W31d
Geospace Offshore, a division of Geospace Technologies, designs, engineers and manufactures cables and umbilicals for the Offshore, Oil & Gas, Marine, Subsea Survey and Specialty cable markets. Product lines include: offshore oil production cables, SSIVs, electrical and optical cables, BOP/MUX cables, armoured umbilicals, lead-in cables, airgun umbilicals, ROV tethers and main lift umbilicals, survey and sonar cables, as well as custom designed specialty cables and umbilicals to fit each application. Geospace Offshore is an ISO9001:2008 certified company located in Houston, TX. Certifications for products include ABS, API, CSA, DNV and are committed to providing cables that comply with industry standards.

GeoTeam, K4
GeoTeam is the answer to any offshore development within the Oil & Gas, Renewables and Telco fields. From project conception to completion, from the shore line to full ocean depth. GeoTeam is a forefront supplier of a wide array of integrated services: positioning, survey, ROV, UAV, geotechnical. The Group strengths are project management, technological expertise and experience from having positively served primary Oil & Gas, Offshore Construction and Telecommunications firms during the past fifteen years. GeoTeam, with you at depth. In depth.

GEOxyz, U11
In December 2014, *Geo Ocean II*, a 40m specialist offshore vessel accommodating 23 personnel and crew was completed, featuring enlarged survey facilities enabling her to exercise geo physical surveys, ROV operations, environmental surveillance and geotechnical sampling. In addition, GEOxyz has introduced a containerised solution with the addition of *GeoSurveyor I* and *GeoSurveyor XII*. These 5.5m and 6.5m survey vessels allow for delivery anywhere across the globe in a safe, efficient and cost effective manner. These vessels have already seen service in France and the Bahamas and are available for 3rd party charterers.

GSE Rentals , T1
GSE Rentals is a supplier of high-quality marine survey equipment from industry leading manufacturers backed up with high-quality technical support. With over 100 years combined service at GSE Rentals, the technical team ensure that every system leaving the workshop is well presented, fully tested and fit for purpose. We are sales and service agents for A.G.O. Single Phase Winches; Knudsen echo sounders; Neptune sonar acoustic transducers; Optimal Ranging Inc. and Yale Cordage YaleGrips. Systems are available for sale or for rental from GSE Rentals in Aberdeen.

Horizon Geosciences, W18
Headquartered in the UAE, Horizon Geosciences provides marine survey and geotechnical services to clients around the world. Working through our network of offices, we support every stage of offshore and nearshore projects via our range of marine scientific services and fully equipped vessels. Meet Horizon Geosciences and speak to our UK team specifically about our continued operation in the North Sea and how our investment in technology and specialised equipment has ensured our DP2 vessel, the *Horizon Geobay*, has remained highly sought after for oil & gas and renewables projects in the North Sea and beyond.

Hydro-Bios, W24
The Automatic Fluid Injection Sampler AFISsingle opens up new vistas in water sampling technology. Any freely chosen fluid can be injected in-situ to receive accurate water samples for the analysis of microbially driven biogeochemical processes. Immediate injection can also be used to fix biological matters, gases or other chemical substances. Spherical closures avoid physical impact on the sample due to pressure gradients. AFISsingle can be used inside common rosette/carousel systems or as standalone instrument and provides various triggering and setting options for individual sampling routines. The AFIS technology results from cooperation with Leibniz-Institute for Baltic Sea Research Warnemünde.

Hydroid, P1
Located in the US, Hydroid is a subsidiary of Kongsberg Maritime, the manufacturer of advanced Autonomous Underwater Vehicles (AUVs). The REMUS, HUGIN and Seaglider AUVs provide innovative and reliable full-picture AUV solutions for the marine research, defence, hydrographic and offshore/energy markets. Together, they represent the most advanced, diversified and field-proven family of AUVs and AUV support systems in the world.

Idronaut, V21

Idronaut is introducing the Full Ocean Blue Cap DO_2 optical sensor, based on the Redflash technology, characterised by a user replaceable membrane cap and simple calibration. They also present the Full Ocean Conductivity Sensor integrating a UV sterilisation. Thanks to the transparent quartz cell, the UV-LED radiates the water sample sterilising it and eliminating the early growth of bio-fouling. The third 'first' will be a Reference sensor for long-term monitoring of seawater pH at full ocean depth. The stability and increased lifetime are possible thanks to a unique geometry that gives an increased volume of NaCl electrolyte gel.

Idronaut's optical O_2 Sensor.

Imagenex, M7

Imagenex, Canada, will be exhibiting with their UK representative, Hydro Products. Imagenex is known for designing and manufacturing compact and affordable sonar systems. Featured products will include multibeam, side-scan and mechanically scanning sonar. New additions to the Imagenex product line will be showcased, such as the 882-GS and 881A/L-GS, which have an advanced, low drift gyro integrated directly into the sonar head, allowing for compensation of vehicle motion in real time. Also on display will be the DT101 Multibeam Profiling Sonar, a single instrument integrating the sonar, motion reference unit (MRU) and sound velocity sensor into one sleek and compact unit, requiring only one cable for all three sensors.

iSurvey Group, K10

iSURVEY is a provider of survey and positioning services to the global Oil and Gas, Renewables and Telecommunication sectors. The technical team provide a fully integrated service for marine construction projects, rig and mooring operations and seabed surveys. Tasks such as ROV operations, cable installation, trenching and dredging and pipe lay can be supported, as can all types of rig-moving and mooring operations. The Group launched a base in Aberdeen in January 2014 and now has over 100 employees, with a turnover of GBP14million in 2013. Global clients include Statoil, Maersk, Nexans, Bibby Offshore and Jumbo Offshore.

iTp, W43

See a demonstration of the latest add-on to the Acoustic Systems Trainer, the Wave Maker Powerhead which can produce randomised water currents and waves to simulate various sea states. The demonstration shows how electric energy can be generated to activate a rotating propeller. Other demonstrations include – Active Sonar, Passive Sonar, ASW Noise Jamming, and Underwater Sound Analysis. To see it on YouTube, please go to www.youtube.com/watch?v=O5XMiYynZxM .

Kongsberg Maritime, N1, P2

Kongsberg Maritime will be demonstrating its developments in underwater mapping and subsea positioning technology for survey and subsea construction applications aboard the RV *Calista* and *Bill Conway* vessels. A third vessel, *Geomotion*, will host demonstrations of Kongsberg Maritime's extensive multibeam technology portfolio. Visit Kongsberg Maritime (N1) to book a demo. Whilst there, find out more about the range of subsea equipment on show, including the latest sonar from Kongsberg Mesotech, subsea transponders and communication technology and the range of KONGSBERG underwater cameras.

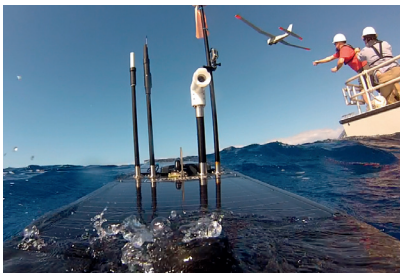
L-3 ELAC Nautik, L3

L-3 ELAC Nautik develops and manufactures systems for precise charting of the seafloor topography. In close cooperation with hydrographic institutes and scientific authorities as well as commercial survey companies worldwide, L-3 ELAC Nautik produces multibeam and single beam systems, hydrographic survey sounders and customer-specific hard- and software solutions. Scientific systems on modern research vessels require complex sensor and data management systems. L-3 ELAC Nautik fulfils these requirements from single components to complete turnkey solutions. A competent service team supports the customer during installation as well as during survey operations and data processing.

Liquid Robotics, G1

Join Liquid Robotics and RS Aqua to learn about the innovative solutions for monitoring, measurement and assessment of Marine Protected Areas (MPAs) and environment ecosystems. Based on the Liquid Robotics

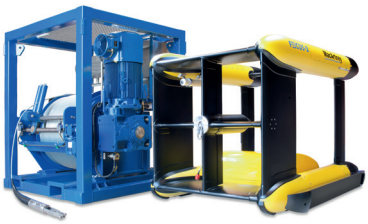
Wave Glider wave powered, unmanned ocean robot, these solutions provide persistent monitoring through the harshest of conditions while collecting and transmitting data from the seafloor to space. Whether you're interested in MPA monitoring/measurement; METOC, fisheries management or maritime security, Liquid Robotics and RS Aqua will have the experts to discuss your requirements. Come by and meet the Wave Glider and see what everyone is talking about!



WaveGlider working with PUMA UAV.

MacArtney, B1

MacArtney specialises in the design, manufacture, sale and service of underwater technology solutions to Offshore Oil, Gas and Marine Renewable Energy industries, oceanographic institutes, survey and subsea contractors, civil engineering and navy clients. MacArtney offers a variety of products and integrated systems, all designed and tested to perform in challenging underwater environments. MacArtney brands include SubConn, OptoLink, TrustLink and GreenLink connectivity solutions, NEXUS telemetry systems, CORMAC and MERMAC winch systems, FOCUS-2, TRIAXUS and FLEXUS ROTVs and LUXUS underwater cameras and lights. MacArtney has operations in Denmark (HQ), UK, Norway, France, the Netherlands, Germany, USA, Canada, Singapore and Australia.



MERMAC S and FOCUS-2 ROTV - an efficient subsea survey solution.

Marine Electronics, L12

Marine Electronics will be launching their range of 2D forward looking Multibeam Sonar which are compact, light and cost effective for installation on the smallest of ROVs. Having a 192 beam composite transducer array, the compact sonar will display targets up to 100m in range with across track resolution of 0.5°. Also on display will be a range of 3D Multibeam Sonar having applications such as obstacle avoidance, mine hunting, diver detection, and harbour surveillance plus a range of high-resolution mechanically scanning sonar measuring seabed transportation and Multi Return Altimeters.

Marine Robotics, V26

Maritime Robotics will present a turnkey Unmanned Surface Vehicle system (USV) for bathymetric surveying. Through years of technology development the company has been developing their USV products, but see no a clearer demand for finalised turn-key solutions with integrated sensors and concept of operation. "The USV market has been slow but gradually emerging, and we are now happy to present a complete system solution to the market", says Maritime Robotics CEO, Vegard Evjen Hovstein.

Marine Sampling Holland, F600

Marine Sampling Holland is a worldwide operating company specialised in marine geotechnical and environmental research and advice. A range of advanced devices are available: advanced coring systems with 4 or 6m core barrels with a PVC liner and real-time penetration registration, a 22 tons Manta CPT with a penetration of 20+m, Mini-CPTs with a maximum penetration of 10m in the seabed and superficial sampling equipment. Geotechnical testing is carried out in the MSH geotechnical laboratory. The combined geotechnical and geological knowledge of MSH and state of the art equipment, makes MSH the right partner for nearshore to far offshore investigations.

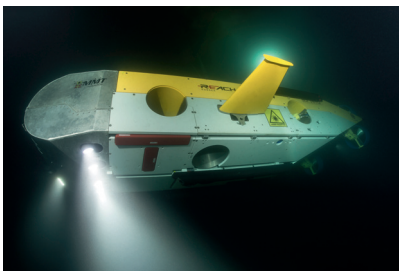
Marine Sampling Holland equipment mobilised.

MetOcean Data Systems, C9 D1

For over 30 years, MetOcean has been a world leader in the development and manufacture of integrated systems used for real-time monitoring. MetOcean offers a complete line of profiling floats - NOVA, DOVA, NAMI and PABLO, designed to meet specific industry requirements. MetOcean profilers are rugged subsurface profiling floats, extremely compact, lightweight (~50lbs), do not require ballasting prior to deployment, and are configured with Bluetooth technology and use Iridium satellite telemetry. Capable of operating autonomously for extended periods of time, the MetOcean group of profilers are innovative and effective solutions that bring ocean profiling to a whole new level.

MMT, K1

Together with Reach Subsea, MMT have launched a survey ROV: Surveyor Interceptor ROV (SROV). It is designed for pipeline inspection and seabed surveys. The ROV provides MMT´s clients with improved, accurate data to a much higher speed resulting in substantially better inspection quality at a lower cost per km. Duncan Mallace, managing director MMT UK, will present "Faster, more accurate, higher resolution pipeline inspection" at Ocean Survey; Hydrographic and Seabed session, on Wednesday 16 April, at 4:55 pm.



The Surveyor Interceptor ROV.

MOST, V19

AutoNaut, the storm-proven unmanned surface vessel (USV) manufactured by MOST (Autonomous Vessels) will be on display. Wave propelled and designed for very long endurance missions gathering scientific, commercial and military data, this USV is silent, low profile, and scalable 1 to 10m. Multiple sensors can be deployed on a mast, through the hull, and towed.

Nautikaris, S1

Nautikaris has been supplying various hydrographic systems and is a qualified and experienced sales and service company. Since its foundation in 1965, Nautikaris serves the needs for hydrographic, meteorological and oceanographic systems, GNSS positioning equipment, underwater connectors, rugged data collectors, marine LED navigation lights,

underwater robotics and wireless small band radio telemetry networks. All equipment is of top quality and put through rigorous testing and evaluation before distribution. Nautikaris provides consultancy services, training and after sales support. We have Acoustic Real-Time 3D Imaging Systems for rental with experienced operators. Our customers count on us for the high quality of our products combined with ease of use and a flexible and professional support team.

Nautronix , V3

Nautronix is a 'Global Leader in Through Water Communication and Positioning Technology for the Offshore Industry', offering its ADS2 (Acoustic Digital Spread Spectrum) technology-based solutions and products including NASNet positioning systems, NASCoM wireless controls, NASDrill vessel systems, NASDive diver communications and Survey Services to the Offshore Market. Nautronix is headquartered in Aberdeen, Scotland, with sales offices in Houston, US, Rio de Janeiro and Macaé, Brazil and Stavanger, Norway.

NETmc Marine, J1

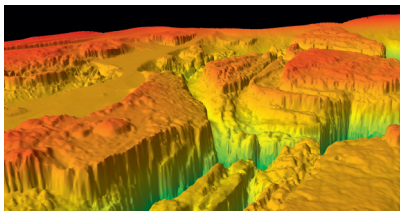
Starting at under GBP3000, NETmc Marine produce digital video recorders for almost every aspect of the offshore market, from single channel portable units to multi-channel pipeline racked systems. Our DDL software, free for our existing DVR Inspector owners, is an electronic dive log with integrated eventing and reporting to replace manual logs or eventing inspection operations. Our DVCi camera system is a step change solution in HD video imaging and capture for ROVs and divers. Our 'videoSEE' service is a secure cost-effective video streaming service. We also provide video overlays and diver video systems (including cameras and lamps).

nke Instrumentation, E5f

nke Instrumentation designs, manufactures and sells instruments and systems for the monitoring of seawater. Our product range includes autonomous data loggers, automated systems, autonomous buoys, deep floats and profilers. This year's innovation is NOSS sensor. An underwater sensor for in-situ refractive index measurement also capable of detecting salinity anomalies of seawater. NOSS sensor has been designed for use even in harsh environments, down to 2,000m. The NOSS sensor can be embedded on CTD probes, buoys, gliders, AUV, drifting-profiling floats for operational oceanography and another possible use is an alternative solution to classical CTD.

Norbit Subsea, V27

NORBIT-Subsea, manufacturer of wideband curved-array multibeam sonar sensors for bathymetry and forward looking sonar pioneers another industry solution. Join us for the launch of the multi-sensing concept that combines multiple tightly integrated sensors into one hardware platform with a single LAN connection to survey laptop. Supported sensors include any combination of bathymetric multibeam echo sounder, forward looking sonar and Lidar. The ability to couple a forward looking bottom detection sonar opens doors for obstacle avoidance while safely carrying out a coastal survey along rugged coastlines or combining bathymetric multibeam with Lidar. Allowing you to... Explore more with Norbit.



Survey results using a Norbit multibeam echo sounder.

Norcom Technology, S10

Norcom Technology has launched an eChart navigational software package, combining up-to-date information from different sources including wreck, cable, tide and geographical data for navigational charts, making it ideal for use by companies carrying out desktop studies prior to installation of offshore structures, cables, pipelines and vessel monitoring. For computational packages, the easy to use software will be made available on a 10.1" Windows 8 Tablet. The software is a web (available April 2015) or PC based app which replaces the ARCS Skipper service, withdrawn by the UK Government Hydrographic Office (UKHO) in 2013.

Ocean Sonics, C9, D1

Ocean Sonics launched its second generation battery pack, with features that make the pack easy to handle and service. The lightweight glass fibre composite case eliminates cathodic issues found with metal cans. The endcap connector guard doubles as a lever making the release of the endcap a low-effort and safe procedure. The pack can be configured for different chemistries, including alkaline, lithium primary and nickel-metal. Ocean Sonics also offers a 128GB data memory. Users can take advantage of this expanded memory to increase flexibility with their projects and research. Ocean Sonics manufactures the world's quietest hydrophones, icListen.

Oceanwise, R5

Port-Log provides a complete environmental monitoring system comprising instrumentation, telemetry equipment, servers, databases, system control, data management and web-based display software. It incorporates the Ocean Database (ODB) model to efficiently store and present data to users via an advanced web-based information/control panel. Port-Log real-time environmental system can be deployed as a full system, using new or existing hardware, IT, database architectures, cable and telemetry infrastructure and sensor and data logger products providing flexibility to clients; or as a subscription service, with client infrastructure connected to the Port-Log cloud server providing all the functionality and control of the system operation without the IT overheads.

Ohmex, W12

Ohmex will be showing the latest version of their HydroLite portable hydrographic echo sounder system used in shallow-water surveys. Featured will be the HyDrone RCV from Seafloor Systems. This remote control vessel is used in conjunction with the HydroLite to conduct hydrographic surveys in ponds, lakes, rivers and streams. Also on the booth will be new products from Trimble to enable precision GPS on Android BYOD (Bring Your Own Device) phones using Ohmex data collection software.

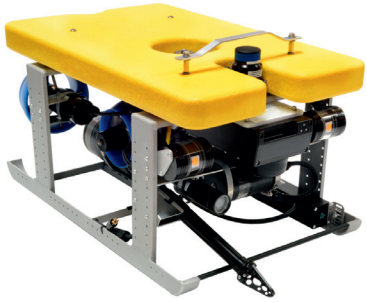
OSIL, C1

Ocean Scientific International (OSIL) produce uniquely tailored, instrumented, fully integrated systems for environmental monitoring in all applications. OSIL will feature the ultra compact 0.3m Micro Field Buoy, and 1.2m Tern buoy, and will demonstrate the extensive range of sediment corers and other systems available. The stand will also feature OSIL's unique range of IAPSO Standard Seawater products, and other seawater standards.

Outland Technology, V11

Outland ROV 2000. Standard features shown include 360 degree tilting camera, 80Lbs of forward thrust, 300m depth capability and High Output LED Lights. This ROV is shown with several options: MicronNav USBL, Gemini

Multibeam Sonar, Micron EchoSounder, and Manipulator Arm.



The Outland Technology ROV2000.

Planet Ocean, G12

Planet Ocean will be showcasing developments from leading scientific instrument manufacturers like the Deep Trekker DTG-2 mini-ROV and the new DTX2 vectored-thrust ROV; both systems will be demonstrated on Wednesday 15 April, 10:30am, Dockside. AXYS Technologies will also be with us showing the TRIAXYS NextWave-II directional wave buoy with currents. A talk on the next generation of wave and data buoys will be held Tuesday 14 April, 2:00pm, Room 044/11. Also available are Sequoia Scientific to discuss developments in the LISST product range; world-class sensors for in-situ particle measurement.

PREVCO Subsea Housings, J7

Following a move last year to a much larger building, Prevco subsea has added a new 15,000psi pressure test chamber to increase their pressure testing capabilities. The installation took place on Thursday 18 December 2014 when a 297 ton crane manoeuvred the vessel through the roof of the building and onto a specially designed mounting stand. The new vessel joins two other test tanks and increases the in-house capability and services offered to outside companies.

The installation of the test tank in the building.

ProteusGeo, W37

Based in Abu Dhabi, UAE, and Bristol, UK, Proteus offers full turn-key global mapping solutions produced from very high-resolution satellite imagery. We provide customers with products for environment, agriculture, forestry and marine use. Our bathymetry and marine habitat mapping products are derived from very high-resolution DigitalGlobe WorldView-2 imagery, allowing for easy access to complex areas while ensuring rapid delivery of highly accurate datasets. Proteus is Information Partner Program (IPP) partners with DigitalGlobe and resellers of Blackbridge RapidEye satellite imagery.

R2 Sonic, J8

R2Sonic is to demonstrate the Sonic 2026 Wideband Multibeam System on Briggs Marine M/V *Solent Guardian*. The Sonic 2026 is the most advanced broadband – wideband multibeam sonar of its kind. With beam widths as narrow as 0.5° x 0.5°, wide selectable operating frequencies from 200-400kHz and optional 100kHz with max range setting to 1200m, the user has flexibility to achieve the highest resolution surveys in shallow

water and productive swath coverage down to medium water depths, all from a single, compact and portable system.

Radac, S1

We are a Dutch company, based in Delft. We have been developing, manufacturing and marketing The WaveGuide since 1996. This high-quality radar system monitors waves, tide and water levels. Mounted high above the water the WaveGuide is equipped to measure waves regardless of conditions. Waves are the main cause of downtime in offshore operations. Reliable wave data are essential for maximised use of weather windows, increased operational efficiency and improved safety during operations. Our main clients include oil companies, offshore wind farm operators, harbours and shipping.

RIEGL, W10

RIEGL, manufacturer of Lidar sensors and systems, presents the turn-key VQ-880-G Airborne Laser Scanning System for combined hydrographic and topographic surveying of coastlines, shallow waters and river beds. The system integrates a high-end IMU/GNSS unit and cameras to supplement the Lidar data. Its design allows flexible adaption of these components to specific application requirements. The VQ-880-G provides a measurement range of 1.5 Secchi depth for hydrography and up to 3,600m for topography. Complemented by a data recorder, the complete Lidar system can be installed on various platforms in a straightforward way.

Rock Seven, V43

With its new RockFLEET tracking and communication system used aboard scientific vessels, and an enthusiastic research and maritime safety user-base, Rock Seven is keen to show what its low-cost yet innovative technology can do. RockFLEET breaks the mould of traditional vessel trackers, by doubling up as a smart interface for machine-to-machine communication. Rock Seven's RockBLOCK allows integrators to add two-way satcom to sensors and other offshore equipment and is already used on scientific buoys. The possibilities of Rock Seven's new Iridium-based technology are practically limitless and low equipment/operational costs, with no airtime contracts, make it an attractive proposition for diverse applications.

RTsys, V18

RTsys is specialised in underwater sound recording systems, adapted to several applications such as offshore and environmental noise control or mammal monitoring. RTsys will present the PR-SDA14 for acoustic propagation measurement at the Dockside on Tuesday 14 April at 11:00 am. This system is an ultra-compact acoustic recorder weighing 1.7kg. It has 3 actions: calibrated acoustic emissions sequences, celerity and temperature and passive acoustic recording. RTsys will also present the Live Monitor software for real-time passive acoustic signal analysis and displaying on Thursday 16 April at 3:00 pm, also at the Dockside.

St Andrews Instrumentation, V38

The St Andrews Instrumentation cost effective Data Acquisition (DAQ) Device is available as a standalone product with 4, 8 or 12 channels and complete with standard Windows 7/8 drivers. Contained in a metal case, the DAQ Device is easy to use for analogue audio data collection by connecting a hydrophone or microphone or other inputs and loading the PAMGuard software (other software will be available soon). A DAQ PC board is available, providing the option to build into any bespoke system as an OEM solution.

Satel, W36

Satel is a Finnish telecommunications company specialising in the design, manufacturing and sales of radio modems for wireless data communication. Satel is one of the leading suppliers in the world, operating globally through their extensive distribution network. SATEL Compact-Proof is Satel's latest IP67 classified radio modem with battery pack. Based on SATELLINE-EASy modems, it provides a compact and flexible solution for a wide range of applications. It is well-suited for outdoor use in applications with harsh environments.

SBG Systems, E5c

SBG SYSTEMS releases the Apogee Series, its most accurate inertial navigation systems based on the robust and cost-effective MEMS technology. This INS/GNSS integrates the last generation of MEMS sensors and Tri-frequency GNSS receiver. Apogee delivers attitude data accurate to 0.008° in real-time, and 0.005° in post-processing. With two antennas, it delivers a robust and precise heading. Heave calculation achieves 5cm in real-time and 2cm thanks to a specific algorithm causing a little delay. Apogee supports RTK and PPP services (Marinestar, TerraStar, etc.). Already compatible with QINSy and Hypack, Apogee is ready to deliver its extreme precision.

SBG Systems Apogee Series.

Seabed, V42

Seabed is introducing the first lightweight multibeam set in the world that can be transported as check-in luggage with any airline with no extra charge. The SPLMS is ideal for projects where rapid mobilisation is required and where logistical challenges are taken into account due to the simple deployment.

Seabed's lightweight multibeam package.

Seatronics, K15

The Predator, a 300m depth-rated inspection class ROV has been developed to meet the demanding markets for rugged and reliable underwater viewing systems. It uses the latest technology for maximum operating efficiency in marine operations. Reliability has been foremost in the development of the ROV package and with the inclusion of SeeByte's SeeTrack CoPilot software, a network control system and a comprehensive diagnostics system, the functional design will assure continuous performance in all operations.

Seebyte, V1

SeeByte, creating smart software for unmanned maritime systems, has been awarded a contract by the Small Business Research Initiative (SBRI) to undertake work in collaboration with Autonomous Surface Vehicles (ASV) and the Marine Biological Association (UK). The work seeks to provide a flexible Autonomy Framework for the range of oceanographic and environmental scenarios outlined in the SBRI AAOSN call.

SENSYS Sensorik & Systemtechnologie, V25

SENSYS Sensorik & Systemtechnologie is a premium manufacturer of professional detection and measurement equipment, which is used worldwide for magnetic and electromagnetic surveys in the area of UXO/IED search, pipe detection and monitoring, scientific surveys as well as security measurements; matching land, down hole or offshore conditions. Meet us to see our latest developments of superior magnetometry measurement systems and to discuss with us the solutions we have available for your specific application.

Septentrio, W40

Septentrio is featuring AsteRx receivers that have been designed for continuous GNSS operations integrating novel positioning models to optimally adapt to situations where GNSS signals can be distorted, thus maintaining accurate and stable measurement at all time.

SIDUS Solutions, A15

As full-service provider, serving the Subsea, Oil & Gas, Scientific Research, Military and Nuclear industries, SIDUS Solutions designs, manufactures and installs industrial video cameras, lighting and robotic positioning devices for the most extreme of environments. SIDUS has many years of technical experience making them the perfect choice for application-specific end-to-end systems. Their world-class engineering staff provide seamless integration, design, installation, documentation and commissioning for all systems. From seafloor observation platforms, to surveillance systems for drilling rigs, to sonar deployment systems - SIDUS is a field proven solution.

Silicon Sensing Systems, W35

Two all-new IMUs from Silicon Sensing Systems are enhancing their range of MEMS inertial products to be featured. DMU10 provides a low-cost 6-DOF solution delivering sub-15°/hr and 50µg output stability. First of a family of High Performance IMUs (HPIMU) due for release in the summer of 2015; DMU30 combines dual-axis capacitive MEMS accelerometers with novel blending of outputs from VSG3QMAX and VSG5 gyro sensors on each axis. DMU30 creates a ground breaking, non-ITAR, MEMS IMU alternative to more costly 'FOG-grade' IMUs for use in exacting marine motion sensing applications.

Sonardyne, E1

Sonardyne unveils important additions to its award-winning 6G acoustic product family – all of which are aimed at increasing precision, lowering risk and reducing operational costs. The Mini RovNav 6 LBL transceiver, Wideband Release Transponder, Mini Ranger 2 USBL and WSM6+ make their debut and can be seen in action during one of Sonardyne's daily vessel-based demonstrations. Sonardyne's vessel is also the place to witness Syrinx, the company's first ever Doppler Velocity Log, demonstrating its performance capabilities. Attendees will gain an understanding of the features that make Syrinx stand out from its rivals.

Southampton Marine and Maritime Institute, V14

The Southampton Marine and Maritime Institute (SMMI) is an internationally recognised centre of excellence where experts from all disciplines come together to tackle global maritime challenges, in partnership with business, civic and industrial societies. We have 1000+ researchers working on cutting edge maritime projects, all with a passion to change the world through their research collaborations with global partners.

SPEGC, W5

The Island of Gran Canaria (Canary Islands, Spain), through its Official Stand together with 6 Canarian firms, aims to promote its potential & capacities with regard to marine-and-ocean-related services & technology. In the past few years, Las Palmas Port in Gran Canaria has become an important support platform for the offshore oil and gas activities in the Atlantic Coast of Africa, with a growing number of oil and gas platforms using this Port as their logistics base for African operations. As a consequence, a dynamic market of companies specialised in the sector has arisen on Gran Canaria.

STS Subsea, W2

STS Subsea, previously known as EMUS, NBA Controls and Oceanspace, has supplied products and services to the subsea industry for over 30 years. Alongside a proven range of connector products, we design and manufacture highly specialised, bespoke connectors, penetrators, cables, sensors and systems for all harsh environments. Offering a complete prototyping service from design and manufacture to electrical and pressure testing, with overmoulding capability for Polyurethane, Neoprene and Polyethylene

components. Product lines include Fibre optic, RF/UHF and Ethernet connectivity, termination and encapsulation of sensitive devices and transducers from our two UK manufacturing sites.

Swale Oceanographic, A6

It's 'all change' for Swale Oceanographic this year. In the last two years they've added four new suppliers - including Teledyne Benthos, LinkQuest, Mooring Systems Inc and Ocean Sensor Systems - so there'll be a lot to talk about. New in the lineup are ADCPs, acoustic modems, transponders and releases, hydrophones, pop-up buoys, tide and wave recorders and floats of all descriptions – to name just a few. They've also designed a new brochure, new website and even a new exhibition stand!

Teledyne BlueView, T5

Teledyne BlueView will highlight the 2D family upgrade to the M-Series, QuickStitch software, MotionScan software and will be conducting product demonstrations and training sessions. The M-Series has advanced sonar controls such as automatic/manual acoustic transmit power control, smaller weight and size and an integrated hardware trigger. QuickStitch offers easy reviewing, cleaning and aligning of multiple scan locations. MotionScan provides operators the capability to conduct 3D scans from a platform in motion. To find out more about these latest advancements meet a BlueView representative and sign up for a product demonstration or training.

Teledyne Marine, B2, H5, T5, U5, V28

Teledyne Marine will be out in force with 5 booths and 18 Teledyne companies exhibiting the latest in oceanographic technology. From the surface to the seafloor, from tiny connectors to full-size AUV platforms, the Teledyne Marine companies have a standalone and/or integrated solution to meet your unique oceanographic needs. The Teledyne companies will be hosting a wide array of classroom training sessions, dock-side demos, and on-water demos throughout the event; supplemented by 30-minute sessions hosted via our Teledyne Marine Learning Centre on booth V28. Teledyne is also honoured to be hosting our many valued friends and customers as the sole sponsor of the Ocean Business Gala dinner event. Exhibiting Teledyne companies include: Atlas Hydrographic, Benthos, Bowtech, BlueView, CDL, DGO, Gavia, Impulse, Oceanscience, ODI, Odom, RD Instruments, Reson, SeaBotix, Storm Cable, TSS, and Webb Research.

Teledyne Oceanscience, T5

Teledyne Oceanscience will have new features and products to show and discuss for the oceanographic community. They look forward to discussing the Underway Systems and some of these new products and features in the classroom sessions on Tuesday 14 March at 3:30pm and Thursday 16 March at 10:30am. This year Teledyne Oceanscience will also demonstrate the Z-Boat 1800 Remote Bathymetric Survey Boat on Tuesday 14 at 12:30pm and Wednesday 15 March at 3:00pm defining its capabilities with different instruments and autonomy packages.

Teledyne RD Instruments, T5

The Doppler manufacturer Teledyne RD Instruments will have a full suite of instrumentation on display, including the enhanced 5-beam Sentinel V Acoustic Doppler Current Profiler (ADCP) and our industry-standard Workhorse ADCPs for precision current profiling and waves measurement; our Explorer and Pioneer Doppler Velocity Logs (DVLs), representing the leading edge in underwater navigation; and our Citadel CTD products for Conductivity, Temperature and Depth measurements. Teledyne RDI will also be hosting two classroom training sessions, one highlighting the recent technology advancements in our Sentinel V ADCP, and a training session on DVL navigation.

Teledyne RESON, T5

Teledyne RESON will present the T20-P sonar in a new dual-head configuration on the stand and on the demo vessel. It maximises vessel operations through a powerful combination of portability, performance and efficiency. Shaped by user's feedback, the SeaBat T20-P always delivers fast and precise survey results. With effective user-friendly management tools, the new Full Rate Dual-head configuration provides wider swath coverage, cleaner data, and a more versatile Multibeam Echo sounder system.

The Teledyne RESON T20-P Dual-head seen from below.

Transmark Subsea, M12

Located in Bergen, Norway, Transmark Subsea is a worldwide supplier of cable and connector systems, offering solutions for power and signal transmission for components and structures subsea as well as seabed seismic applications. The company offers MURENE, a complete, in-house developed family of components for oil filled pressure balanced systems. Transmark Subsea has a staff of experienced subsea engineers to solve deep-sea sealing and communication challenges. It carries a large stock of connectors and cables, taking pride in offering tailored solutions.

Tritex NDT, J5

The Mark 2 Tritex Multigauge 3000 Underwater Thickness Gauge, from UK-based Tritex NDT, uses multiple echo to ignore coatings up to 20mm thick; only the metal thickness is measured. All measurements are error checked to ensure accuracy, even on uncoated metal. The gauge is simple to use, with little operator input, and has a large bright 10mm display making it highly visible even in murky water. It is built rugged to withstand harsh conditions. The integral battery lasts 55 hours and the gauge can be easily upgraded to a topside repeater by exchanging the end cap. It has a 3-year warranty and free annual calibration for the life of the gauge.

Valeport, M1

Valeport is launching a sound velocity profiler SWIFT SVP, adding to their portfolio of sound velocity sensors and profilers. This compact unit will feature high-accuracy SV, Pressure and Temperature, plus integral GPS, rechargeable battery, LED status indications for GPS, battery and communications, Bluetooth interface and operation via a free app or standard software. The SWIFT SVP is aimed at the popular shallow-water market (0 – 100m).

Wish Software, L15

Wish Software is launching its VisualGIS Server. This gives users access to digital video and accompanying survey data across an organisation and the Web, via HTML5 compatible browser-based viewers on desktops, tablets or iPads. Our trusted software solutions are available on our stand. AutoChart automates the production of hydrographic survey charts, HydroGIS imports a wide range of hydrographic data directly into PODS/SSDM and VisualGIS adds value to Subsea Asset Inspection datasets by synchronising digital video with GIS data. We'll also be hosting free demonstrations at the show. Check the training programme for dates/times. ◀

More information
www.oceanbusiness.com

Standards of Competence for Hydrographic Surveyors and Nautical Cartographers

Major Review Underway

The IHO, together with the International Federation of Surveyors (FIG) and the International Cartographic Association (ICA), contribute to the important work of promoting, developing and maintaining global standards for hydrographic surveyors and nautical cartographers. The FIG/IHO/ICA International Board for Standards of Competence (IBSC) generates and maintains these standards, namely S-5 - *Standards of Competence for Hydrographic Surveyors* and S-8 - *Standards of Competence for Nautical Cartographers*. These are the standards against which internationally recognised courses in hydrography and nautical cartography are evaluated.

▲ *Cat A Course students at the Hafen Universität Hamburg, Germany.*

The Standards recognise two levels of hydrographic and cartographic competences. Category B programmes provide practical comprehension, along with the essential theoretical background, necessary for individuals to carry out the various hydrographic survey or nautical cartographic tasks. Category A programmes offer a comprehensive and broad-based knowledge in all aspects of the theory and practice of hydrography or nautical cartography.

Until now, the standards have been structured so that Category B programmes provide technical education to support a set of fundamental and practical competencies while Category A includes all the Category B competencies plus additional detailed-level competencies. In practice this means that Category B is a subset of Category A, and the Standards are structured accordingly.

The IBSC is now in the process of revising S-5 and S-8, following a broad consultation of the stakeholders. This revision will provide a fundamental change. In future, there will be a separation of Category A and Category B into two distinct programmes. In practice, this means that Category B will not be a pre-requisite for Category A. The intended outcomes of the revised Category A and Category B education/training syllabi are:

Category A hydrographic surveyors and nautical cartographers will be project leaders. They will design and plan surveys or cartographic products and services, choosing appropriate technology and methods, and will select and supervise the team completing the work. They should be completely familiar with the underlying physics and mathematics of the survey or cartographic systems employed, and should be able to evaluate results against expectations. In the Navy, this would be the hydrographer in charge of a major survey unit, or a supervising cartographer. In industry, this would be the lead hydrographer or cartographer for a major project.

Category B hydrographic surveyors and nautical cartographers will be watch leaders on a survey vessel or cartographic team leaders. In the Navy, this might be a junior officer who is in charge of a survey launch or a senior petty officer who manages the data for a survey unit. In the private sector, it might be a team leader in charge of a small survey vessel for harbour or localised surveys, or a watch leader on a large survey operation. They will typically report to a Category A qualified project leader. Category B standards will be aimed at setting the basic educational and training requirements for hydrographic and cartographic technicians.

The revision of S-5 and S-8 will also acknowledge that blended, direct and distance learning approaches together with modular programme design are all possible.

The expected delivery of the new Standards for Hydrographic Surveyors is November 2015 and for Nautical Cartographers is 2017.

Details of the work of the IBSC are available on the IHO website. ◀

More information
www.iho.int

Nautikaris

Service Provider Moves Beyond the Box

Nautikaris will be celebrating its 50th anniversary during Ocean Business. The company is now led by the third generation, Sander Karis, and the organisation's headcount is 7. Nautikaris is a service provider that keeps in mind that not all clients in the hydrographic sector are looking for an off the shelf solution offered by manufacturers. When additional expertise or custom solutions are required, Nautikaris will make a proposal that looks beyond the box, fulfilling the need of the client.

Trade agency Nautikaris was founded in 1964 by Johan Karis out of frustration. He was hired in 1956 as commercial manager for ELAC Echosounders for Duiker Oliebranders, as agent. In nine years' time he managed to make fishery, hydrographic departments of dredging companies and the Netherlands Waterways Authority Rijkswaterstaat, pilots, the hydrographic vessels of the Royal Netherlands Navy and scientific institutions familiar with the ELAC brand. In 1964, he was told that Duiker Oliebranders had decided to terminate the representation. Johan Karis took on the representation and decided to start Nautikaris. Johan increased the turnover of ELAC Echosounders and expanded the business. In 1976, Rob joined the company and in 1982, Radio Holland became the agent for ELAC. After Johan passed away in 1983, Rob continued the business.

The range of products extended from the Topfil wire distance measuring device, the Vyner laser distance measurement device, jalons, measuring tape, Raytheon DE719 portable echo sounders, underwater connectors, cables, consumables, HYPACK software, Satel Radio modems, Hemisphere GNSS receivers, turbidity sensors, Knudsen echo sounders and Van Veen grabs – to name but a few.

In 2006, the third generation Karis, Sander, acquired the business and took it to where it is today. Clients range from hydrography, government, and dredging companies and research institutions. Geographically, there is an emphasis on the Netherlands and Belgium but in fact, the world is its oyster.

▲ *Figure 1: Sander Karis, owner and managing director of Nautikaris.*

Added Value

The most important aspect of Nautikaris nowadays is its experience as added value. A client who turns to the company finds a listening ear and as they know the products inside out, an optimal solution will be found for the application. Often, the solution will be chosen by looking beyond the specifications of the products. Or even by assisting in establishing the required specifications for a job. The next stage is selecting and sourcing the equipment followed by the implementation, including training of the staff if so needed. This will be achieved with a short lead time and delivered turn-key.

The organisation consists of 7 people, which means the lines of communication are short – decisions can be made and questions can be answered fairly quickly. Modules like Hemisphere GNSS boards, Knudsen single beam and multibeam echo sounders

▲ *Figure 2: The Nautikaris team. From left to right: Norbert Balm, Rolf Hoogenberk, Bianca Willems, Lieven Geers, Sander Karis, Cor Beemster and Lupko Kappert.*

or oceanographic sensors of Aanderaa and Vaisala can be fitted together for many applications. They can be applied in buoys or survey vessels – Nautikaris is regularly consulted by ship builders when installing a hydrograhic survey suite. The organisation is also flexible and can easily respond to changing demand. One of the most recent additions is a Coda Octopus Echoscope, which can be rented with the support of specialists. In fact, this has become an operational branch of Nautikaris: Underwater Imaging Consultancy, solving the issue that companies do not always want to own the equipment but require it for a single project.

Future is Towards Various Trends

Nautikaris has been aware of several trends that move the hydrographic world. There is a move towards renewables. Especially offshore wind farms, tidal and wave energy require specialised hydrographic knowledge for their operations and construction. Nautikaris sees additional opportunities, such as for the Gemini wind farm; the company recently supplied the temporary lighting. Also, the surveys need to be done in deeper waters and renewables are of increasing importance for Oil and Gas.

Looking at the equipment, there is a trend towards plug and play: the times of complicated installations and calibrations will be a thing of the past. More and more, sensors, GNSS and INS will be packaged in one box to be installed calibrated from the factory. At the same time, they will become smaller and even portable. This means flexibility in operation, which is especially important in the dredging industry. As Sander says: "The demand will be 'connect, switch on, ready'. It just needs to work, anywhere and at any time."

Another constant characteristic of Nautikaris, entrepreneurship, is there to stay. They see opportunities that benefit customers. The relationship with the clients leads to new ideas and innovations – which are followed up by a high service level.

Looking ahead to the next 50 years, Nautikaris is determined to add the same number of years to its lifespan. It is ready to use remote support and the expertise that the company has acquired over time. Operating as the 'specialists around the corner', customers are provided professional support that matches their ambitions and innovations that address their requests. That's how Nautikaris defines the added value it offers, in a close cooperative relationship. ◀

More information
www.nautikaris.com

▲ *Figure 3: The Nautikaris office.*

NATO SPS Project MODUM

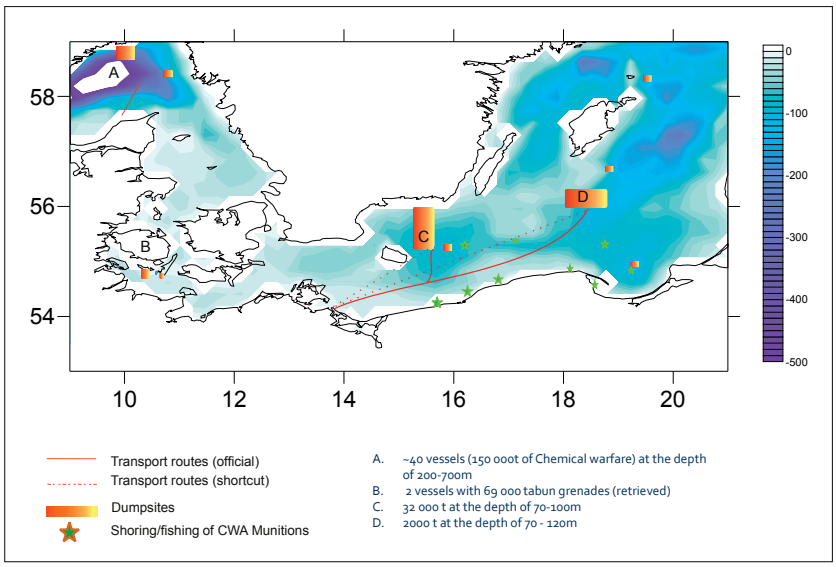
Towards Monitoring **Dumped Munition Threats**

MODUM project is financed by the NATO Science for Peace and Security programme. It unites 8 Institutions from Poland, Russia, Canada, Germany, Lithuania, Estonia, Sweden, Denmark and Finland. The goal of the project is the development of cost-effective and accurate methods for surveying, identifying and onboard analysis of dumped chemical munitions.

Dumped Chemical Weapons pose an actual environmental and security hazard in the Baltic Sea Region. Their actual positions are unknown, and pollution originating from corroded munitions can only be roughly estimated. Nowadays, with more and more Industrial Activities being performed in the Baltic Sea Area, the threat level is rising. The dumping operations occurred shortly after World War II and included captured German munitions. Operations with munitions from the Soviet occupation zone were performed by the Soviet Navy, operations with munitions from British and American occupation zones were performed in areas outside of the Baltic Sea (Skagerrak Strait); the fate of munitions from the French occupation zone was never reported. Due to difficult legal status of these munitions, and high costs of remediation and retrieval, removal of these weapons from the bottom of the Baltic Sea seems unlikely in the foreseeable future. Location of munition dumpsites is shown on Figure 1. Nevertheless, environmental and security

Fast access to large sonar files

challenges created by dumping operations need to be addressed by Baltic Sea countries. A possible low-cost solution is the creation of a monitoring network, providing information about exact locations and the environmental threat posed by sea dumped chemical weapons (CW).



▲ *Figure 1: The location of Baltic munition dumpsites.*

The project is directed jointly by Dr. Jacek Bełdowski from the Institute of Oceanology, Polish Academy of Sciences, and Professor Vadim Paka from the Shirshov Institute of Oceanology, Atlantic Branch, Russian Academy of Sciences. The other institutions involved include:

1. Aarhus University, Denmark
2. Thünen Institute of Fisheries Ecology, Germany
3. VERIFIN, Finland
4. International Dialogue on Underwater Munitions, Canada
5. Swedish Defence Research Agency, Sweden
6. Lithuanian Environmental Protection Agency, Lithuania
7. Tallin University of Technology, Estonia

Project end-users include the environmental protection agencies of Poland and Russia, and the maritime administration of Poland, namely:

1. Maritime office Gdynia, Poland
2. Chief Inspectorate for Environment Protection, Poland
3. Ministry of Natural Resources and Environment of the Russian Federation, Russia
4. Ministry of Emergency Situation of the Russian Federation, Russia

The project aims to establish a monitoring network to observe Chemical Weapons dumpsites in the Baltic Sea, using

Figure 2: MODUM team at the sea trials of IVER2 AUV aboard R/V Alliance. *From left to right: Marc-Olliver Aust (Thünen Institute of Fisheries Ecology - TI), Jacek Bełdowski (Institute of Oceanology, Polish Academy of Sciences – IOPAS), Thomas Lang (TI) and Zygmunt Klusek (IOPAS).*

Autonomous Underwater Vehicles (AUVs) and Remotely Operated Underwater Vehicles (ROVs), and utilising the existing research vessels of partner institutions as launching platforms. The AUV survey is based on the IVER2 platform by OceanServer, equipped with Klein 3500 side-scan sonar. The identification phase utilises several ROVs, equipped with targeting sonars, acoustic cameras capable of penetrating turbid bottom waters up to 20m, and visual HD cameras. A novel sediment sampling system, based on a camera and sonar equipped cassette sampler, has been developed to obtain surface sediments. The project consists of a test phase, which will involve choosing the best available solutions for the difficult Baltic Sea environment, a survey phase, which will locate the actual objects concerned, and a monitoring phase, which will concentrate on the collection of environmental data close to the objects concerned.

Three areas of concern were selected as study sites, differing in types of ammunition dumped and environmental settings. They are located in Gotland Deep, Bornholm Deep and Flensburg Fjord. The first two sites are deeper, ranging from 80 to 120m, while Flensburg Fiord is shallower, ranging from 12 to 40m. Deep sites are located offshore, which requires rugged survey and sampling equipment, while Flensburg Fiord is characterised by high velocity currents (up to 3 kn). Such variability requires careful selection of tools and ships, to be able to properly address all the challenges encountered.

The project will provide a solution for expanding such a network to all areas of concern in the Baltic Sea area, and other seas of concern. Monitoring activities performed will include habitat status evaluation, fish health studies and modelling of possible threats to adjacent areas. So far, a detailed survey of Gotland Deep site has been performed, revealing the existence of several bomb-like targets in an area where previous projects detected only a single bomb and traces of degraded warfare agents in sediments. This means that observed sediment pollution may originate from several diffuse sources rather than from a single source. This knowledge may be critical for future monitoring of this area.

Preliminary results point to some adverse effects on fish health

Biological surveys include cod health studies, as these provide a direct link between pollution and commercial fish stocks. To that end, a special scientific fishing vessel was used – *Walther Herwig III*, owned by Johan Wolfgang von Thünen Institute. Preliminary results point to some adverse effects on fish health in the Bronholm Area, but it is too early to definitely ascribe these effects to pollution originating from dumped munitions.

Because of very high costs of underwater research, core activities performed within the project will provide only limited information, but of a quality that will provide stakeholders with the ability to make well-founded decisions in addressing the security threat. At the same time, the project co-directors will seek national and international funds to further expand the level of detail of the performed investigations. Implementation of the project – meaning the creation of a long-term monitoring network covering all Baltic CW dumpsites - will be dealt with after successful project execution. As the costs of this solution exceed the funds available in the SPS Programme, other agencies (such as UNEP and EU) will be approached for the funding of this stage.

Data obtained during the project will be stored at IOPAS, a datacentre constructed especially to provide fast access to large sonar files, and will be available to stakeholders from the Baltic Sea area and NATO. This will help relevant stakeholders to design a monitoring network to cover all the Baltic dumpsites, and may also be used as an aid to decision making with regard to selective remediation strategies in areas where the existence of munitions creates adverse effects for the ecosystem or conflicts with the maritime economy.

Hydrographic Society Russia

Graduation Ceremony at Admiral Makarov State University

On 28 February, a great number of people witnessed the graduation ceremony at the Admiral Makarov State University of Marine and River Fleet. The hydrographic engineer degrees were awarded to 42 graduates. Seven graduates, which is more than from any other department, obtained a degree with honours, of whom 5 were girls. The best graduates received various presents.

The HSR Board decided to award the Belobrov Diplomas to Ivan Zudin and Sergey Skritsky. Diplomas were presented by the president of the HSR, Professor Nicolas Neronov.

The graduates were warmly congratulated by the chancellor Sergey Baryshnikov, the representatives of the Big Port of Saint Petersburg, Rosmorport, and Transas, the hosts of the ceremony. Most graduates will now be employed as qualified specialists.

Figure 1: Andrey Afonin, head of the Arctic department and member of the HSR giving a present to Natalia Potapova.

Figure 2: From left to right: I. Zudin, president of HSR Professor N. Neronov and S. Skritsky.

Canadian Hydrographic Association

Quebec Branch

The Quebec Branch has published the 2015 edition of its 'Carnet de Bord', which provides information on marinas and many items on boating safety. They continue to work with the public review 'Québec Yachting' by publishing a column on hydrography and nautical charting.

The 'Institut maritime du Québec' in Rimouski provides the Quebec Branch hydrography promotion and chart and nautical publication sales for the Canadian Hydrographic Service, in addition to selling topographic maps.

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OCEANS'15 MTS/IEEE Genova
Genoa, Italy
→ 18-21 May
For more information:
oceans15mtsieeegenova.org

JUNE

OTE 2015 - Offshore Oil & Gas Technology, Equipment Exhibition
Nantong, China
→ 12-15 June
For more information:
jennifer@uaec-expo.com
www.ote-china.com

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

JULY

56th Marine Measurement Forum
Liverpool, UK
→ 15 July
For more information:
www.mmf-uk.org

South East Asian Survey Congress (SEASC 2015)
Marina Bay Sands, Singapore
→ 28-31 July
For more information:
pat@eventspeople.com
www.seasc2015.org.sg/index.html

RIO Acoustics – Acoustics in Underwater Geoscience
Rio de Janeiro, Brazil
→ 29-31 July
For more information:
secretariat@rioacoustics.org
www.rioacoustics.org

SEPTEMBER

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

AUVX 2015
Annapolis, USA
→ 21-24 September
For more information:
AUVX@hydroid.com
www.auvx.com

OCTOBER

Teledyne Marine Technology Workshop
San Diego, CA, USA
→ 04-07 October
For more information:
www.teledynemarine.com

Kongsberg Maritime HiPAP Survey Engineer Training Course
Aberdeen, UK
→ 09-10 October
For more information:
km.training.aberdeen@kongsberg.com
www.km.kongsberg.com/training

Offshore Energy 2015
Amsterdam, The Netherlands
→ 13-14 October
For more information:
www.offshore-energy.biz

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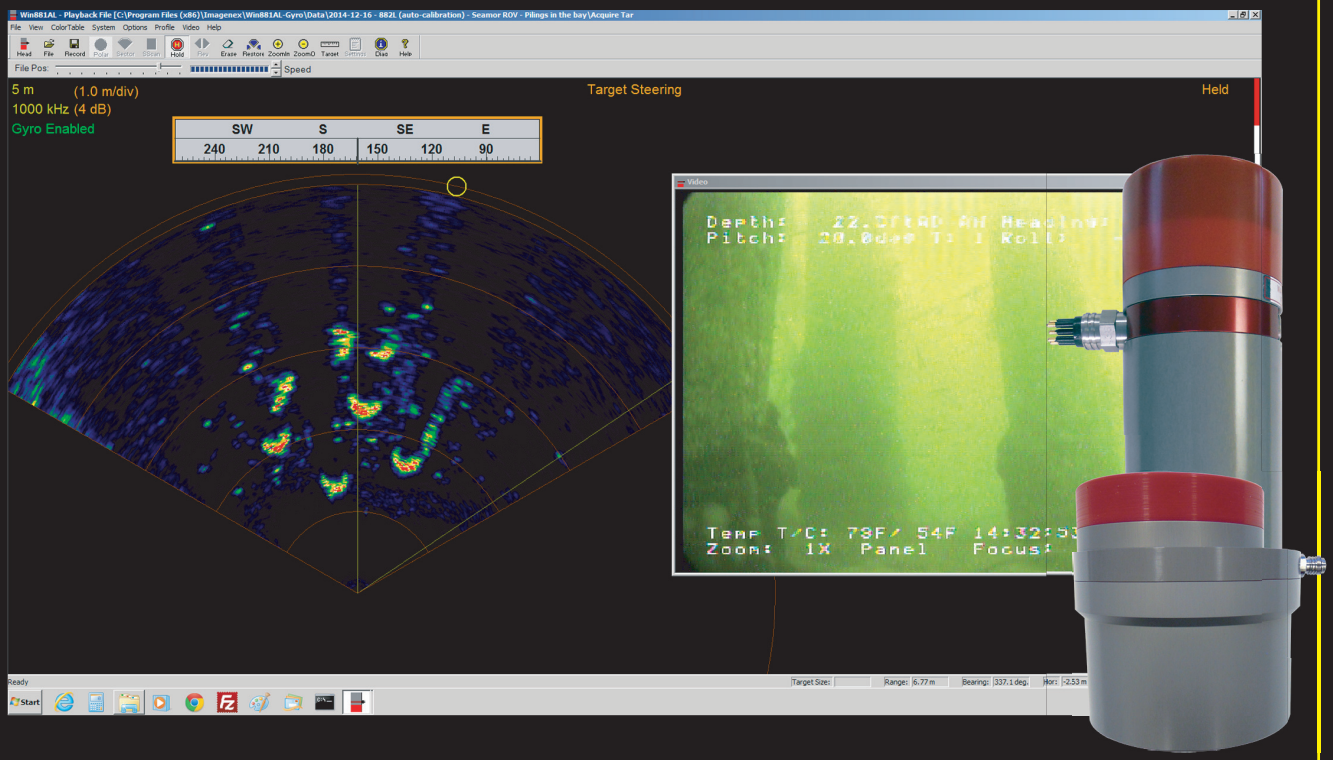

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