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See Page 33

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Oceanology International 33
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Growth

The growth for companies in hydrography has two sides. On the one hand, there is growth because the industry is penetrating into other fields such as large infrastructural projects developing ports and harbours, the oil and gas industry expanding their field of attention to further and deeper parts of the oceans, and the offshore wind parks that are being planned everywhere around the globe. These fields are all looking to hydrography to provide them with good bathymetric data. The developments are taking place at a rapid pace and on a scale never seen before. Then on the other hand, the growth is no longer just in the Northern Atlantic, but also the Southern Atlantic and the African as well as the South American coastal waters are booming with activity. The same goes for the Chinese waters and other large parts of the Pacific.

It’s exactly those two paths to growth that the new CEO of QPS Tomas Hjelmberg sees for the Dutch hydrographic software producer QPS (see the interview with Hjelmberg on page 10). His strategy will be to focus on designing a seamless and total workflow for users in different applications and fields of work related to hydrography in all parts of the world. Hjelmberg sees mother company Saab and its extensive network as a tool in meeting the goals of the future. It wouldn’t be bad advice for others to just follow this strategy to make the most out of the growing need for hydrographic data.

After launching our new comparison website Geo-matching.com during Ocean Business in Southampton last year, most of you are sure to have encountered the website that wants to guide you through the maze of specifications of hardware and software in hydrography. Over the past year, we have added many new product categories, so it is worth checking the website regularly. This issue includes a survey of Autonomous Unmanned Vehicles and lots more information, reviews, videos and brochures can be found at www.geo-matching.com.

I also have the pleasure of introducing two new contributing editors of Hydro INTERNATIONAL, Mark Smitt from the Royal Netherlands Institute of Sea Research (NIOZ) and Jelle Roders, freelance hydrographic consultant, have joined our editorial board and will, together with their fellow editors, ensure that you receive an up to date overview of developments in the field. We welcome Mark and Jelle and wish them lots of luck!

It’s time once again for the following exhibition in hydrography and oceanography that takes place every two years: Oceanology International is on from 11 to 13 March at the London ExCeL Centre. You will find an extensive preview of the show in this issue. Many members of Hydro INTERNATIONAL’s team will be present at the show. Please come and visit us at booth M10 to pick up an extra issue of Hydro INTERNATIONAL, to take a look at our Geo-matching survey on AUVs or just to have a chat with one of our team members. We look forward to seeing you!
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4. ROTV Solution for Magnetometer Surveys - bit.ly/1bi4nPC
5. IMarEST 2014 Events Programme Launched - bit.ly/1bi3PJx

Hydro 14 Call for Papers

Abstracts of papers for presentation at the International Federation of Hydrographic Societies’ 22nd conference and exhibition at Aberdeen’s Exhibition & Conference Centre, UK, from 28-30 October 2014 are now invited by the organisers, The Hydrographic Society UK. With its theme, Energy & Enterprise, the three-day event is expected to attract a wide international audience drawn from all sectors of the hydrographic and related professions.

Success for Montenegro’s Capacity Building

After signing an RENC membership agreement with the Institute of Hydrometeorology and Seismology Montenegro (IHMS) in November 2013, PRIMAR and the Norwegian Hydrographic Service have teamed up with SevenCs for capacity building. Funded by the Norwegian Hydrographic Service, PRIMAR was able to provide its latest member with a full ENC production environment plus training.

Underwater Heritage in the North Sea

As a partner in the IWT project SeArch, the Flanders Marine Institute (VLIZ) developed a website for this marine archaeology project that will guide visitors through the research and legislation of cultural heritage items, including a timeline and maps of the heritage sites: www.sea-arch.be.

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Crowdfunding Success for Radioactive Ocean Website

In view of growing public concern about the plume of radioactive ocean water from Fukushima arriving on the western shores of North America and with no US government or international plan to monitor it, a new project by Woods Hole Oceanographic Institution (WHOI) is filling an information gap. Through the ‘How Radioactive Is Our Ocean’ website, the public can support the monitoring of radiation in the ocean by making tax-deductible donations to fund the analysis of collected seawater samples. The public can also propose new locations and fund sample taking and the analysis of samples from those sites at Ken Buesseler’s lab in Woods Hole.

bit.ly/1bi2ZfX

Overview of locations where research on radioactive fallout in the ocean is being funded.

IFHS Reflects on a Successful Year

The International Federation of Hydrographic Societies (IFHS) reports to have had a very productive 2013. Two new member societies were welcomed (Italy and Korea) and a successful conference was hosted in the UK in cooperation with the IHO. An attractive Student Awards Scheme was launched to run alongside the world-renowned Hydro conference series – the first prizes will be presented at Hydro14 in Aberdeen (from 28 to 30 October 2014). Most recently, a biannual digital newsletter was launched – IFHS News.

bit.ly/1bhXNIV

Applications Sought for GEBCO/Nippon Foundation Training Programme

The Nippon Foundation of Japan has provided GEBCO with funds to train a new generation of scientists and hydrographers in ocean bathymetry at the University of New Hampshire, USA (2014-2015). Applications are now sought for entry onto the course, leading to a postgraduate certificate in Ocean Bathymetry (PCOB), starting in August 2014. The closing date for applications is 31 March 2014.

bit.ly/1bhZ9na

Fugro Innovations Recognised for Arctic Efforts

Organisers of the Arctic Technology Conference (ATC) have announced Fugro as the recipient of two 2014 ‘Spotlight on Arctic Technology’ awards. Its integrated 3D iceberg mapping technique, which defines complex iceberg properties using high-precision subsea imaging systems and above-water imaging techniques, is one of the innovations. The other award is for Fugro’s GeoSAR sea-ice mapping system which is mounted on a Gulfstream II jet aircraft. The Spotlight Awards were presented at ATC on Monday 10 February 2014 during an evening reception at the George R. Brown Convention Center in Houston, TX, USA.

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New Era for Hydrographic Software Company

Hydro INTERNATIONAL Interviews Tomas Hjelmberg

After a string of acquisitions and mergers in the last few years, QPS, as part of the HITT group of companies, became part of the Swedish Saab group more than a year ago. Dutch founders Bert Jeeninga and Peter Das retired last December and Tomas Hjelmberg took over as leader of the Dutch company specialising in industry leading software for collection, post processing and visualisation of maritime geomatic data. Time for Hydro INTERNATIONAL to talk to the Swede, now residing in Holland, about his strategy for the software company, located in Zeist.

Could you tell our readers a bit more about your background? Who is Tomas Hjelmberg in 3 sentences or 10 words? I have a Master of Science in Applied Physics and an MBA. I have been working in the defence industry for 28 years now, which is most of my career. I have held different management positions, working with mergers and acquisitions and integrating other companies into the Saab group, the latter probably being one of the reasons that I was selected for this job. I have been living in the Netherlands for 6 months, coming from Sweden, and I enjoy it very much.

You have been with QPS for six months. How do you look upon the achievements of the company over the past 25 years?
It is an incredible company that was created by two, at the time young, engineers with a lot of vision. It was basically created from nothing and has developed into a steadily growing company, providing good products. It merged with IVS a few years ago and then became an even more international company than it already was.

What do you think of the techniques used by QPS?
I am impressed by the fact that QPS has three well established core software products (QINSy, Fledermaus and Qastor) that serve so many customers well and across a broad range of applications. We provide one version that is used by so many clients in many different specialists fields, that this is an achievement in itself.

When you got this job, it was said that you intended to take QPS to the next level. What is the next level?
Both from a company and a product perspective, the next level is to manage and develop the tight integration of the business units (Development, Sales, and Support) and to deliver products that share key technologies and seamlessly work together. We will tie our products QINSy, Fledermaus and Qastor in to that one workflow.

What geographical focus areas have you identified for the next few years?
We want to be more visible in markets we are currently not so visible in, for instance the Americas – to further capitalise on the merger with IVS a while ago. We are focusing on America, the United States and Canada, but also South America, specifically Brazil. Now being part of Saab gives us a big advantage – to further capitalise on the merger with IVS a while ago.

What do you bring from your former position at Saab?
QPS, since the merger with IVS, has become much more of a distributive company with different offices all over the globe, having different cultures and different ways of doing business. I am bringing more than twenty-five years of management experience in a distributive company. Together with my experience, my network within Saab makes it possible to tap into resources for QPS much more easily, finding integration opportunities and synergies.

The modern day hydrographer may be less of an adventurer than his predecessors.

What specific part of Saab will QPS fall under in the organisation?
We will be part of the Maritime Traffic Management division, which is the division that all of HITT falls under, like a company that has been with Saab for many years, Saab Transponder Tech. In addition, there are connections to other companies within the group, like Saab Seaya. Although they belong to a different business unit, we will be working together seeking synergies with them. Another example of a company we will be working with is Vricon. Vricon delivers high-resolution geospatial 3D models based on aerial imagery from manned aircraft, UAVs or satellites.

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2013 was the first full year that we have not seen the full benefit yet. We both feel that the cooperation with Esri even more over the past few years, one of them. You have been working with partners in the Netherlands, UK, France, Italy, Germany and Australia to name just a few. It is very important for us to be able to tap into this calibre of people, and it is a good reference for those interested in joining QPS. We are always keen to hear from both recent graduates and experienced developers, especially now that we have development centres on both sides of the Atlantic.

Autonomous Unmanned Vehicles are a hot topic in hydrography. How do you view this development?

The AUV market is expected to experience incremental growth over the next 10 years as their payload and endurance increases. AUV technology is no longer in its infancy although AUVs still tend to be used for military and scientific work, but are starting to be utilised in the Offshore Energy sector, particularly for pipeline inspection surveys. Accordingly, we will continue our cooperation especially with Saab Seabed and also with other AUV manufacturers, where we have our software integrated into the vehicles and we will move further towards near real-time processing of data and smart storage of data.

Those obstacles are increasingly being overcome, with the development and modern hydrographers have an important role to play. Autonomous Unmanned Vehicles are a hot topic in hydrography. How do you view this development?

The AUV market is expected to experience incremental growth over the next 10 years as their payload and endurance increases. AUV technology is no longer in its infancy although AUVs still tend to be used for military and scientific work, but are starting to be utilised in the Offshore Energy sector, particularly for pipeline inspection surveys. Accordingly, we will continue our cooperation especially with Saab Seabed and also with other AUV manufacturers, where we have our software integrated into the vehicles and we will move further towards near real-time processing of data and smart storage of data.

Oceans are drivers for economies globally, and modern hydrographers have an important role to play.

Sailing is a hobby of mine, so I realise that traditionally hydrographers concerned themselves with acquiring the precise location of least depths, to warn mariners of dangers to navigation, and to record the precise location of aids to navigation.

I read with interest about The Blue Growth strategy, namely the long-term plan to support sustainable growth in the marine and maritime sectors as a whole. The strategy recognises that seas and oceans are drivers for a number of economies globally, with great potential for innovation and growth, and modern hydrographers surely have an important role to play in this respect.
Amplified Sediment Waves in the Irish Sea (AmSedIS)

Understanding Big Sand Wave Behaviour

Large sediment waves are striking yet poorly understood seabed features in many shelf seas. Very large sediment waves (3–18m in height) have been documented to migrate up to 70m per year in the Irish Sea and some sand waves reach heights of up to 36m (Figure 1). Such transport of enormous sediment volumes can endanger the stability of submarine pylons, cables and pipes and they cause a highly mobile benthic habitat.

Excess of mobile sediment supply seems to allow for ‘extreme’ sediment wave growth

TO UNDERSTAND THE DYNAMICS of these sediment waves, we identified that we need to focus our investigation on the effects of sediment grain size variability, the availability of mobile sediment and gas seepage.

Amplified Sediment Waves in the Irish Sea (AmSedIS)

As part of the AmSedIS project, a team of marine geoscientists, geochemists and numerical modellers from the UK, Italy, Switzerland and Ireland embarked on an 11-day survey on the RV Celtic Voyager in April 2012 to survey various sites in the Irish Sea. We set out to
1. investigate the role of sediment grain size distribution and sediment availability on both ‘extreme’ and ‘normal’ sediment wave development and
2. investigate the potential association of methane derived carbonate formation with extreme sediment wave growth.

The dataset collected includes swath bathymetry data, boomer and sparker seismic profiles, CTD transects, water sampling and Shipek grab sampling in transects over the sediment waves.

The Survey and the Equipment

The RV Celtic Voyager is a 31.4m multi-purpose research vessel. The vessel’s wet, dry and chemical laboratories were used extensively by the 7 to 8 scientists on board. The horizontal accuracy of the swath bathymetry data is mostly defined by the vessel’s positioning system. The Celtic Voyager’s position is monitored with a Trimble NT Differential GPS and Kongsberg Simrad Seapath 200 motion reference unit (IMU). The dGPS gives a positional accuracy of less than 1m and data for attitude (pitch, roll and heave) via the IMU have accuracies of 0.03% or 5cm, whichever is greater. The combined horizontal error will therefore be 1.1m at its absolute maximum, which is satisfactory for our indicative measurements in this study.

The combined horizontal error will therefore be 1.1m at its absolute maximum, which is satisfactory for our indicative measurements in this study.

The multibeam echo sounder is a Kongsberg Simrad EM1002. During the survey the frequency was 95kHz, with a ping rate of ~208Hz and a beam angle of 65° on both port and starboard side, giving a seabed footprint of maximum about 4.3 times the water depth. Acquisition was done via Kongsberg’s Seafloor Information System (SIS) version 3.8.3.

Overall, the EM1002 and SIS performed well. The SIS PC crashed on 3 to 4 occasions, the EM1002 once. The DB error bug occurred once and the READ ME file on the desktop resolved this error. These crashes often occur when plugging in a USB storage device whilst pinging and logging.

Water depths in this study have been reduced to lowest astronomical tide (LAT). Tidal information was provided by tidal model runs from the National Oceanography Centre, Liverpool (previously Proudman Oceanographic Laboratory) for the various survey sites, using licensed POLPRED software.

Also, a Kongsberg Simrad EA400 single beam hydrographic echo sounder (SBES) was used, with transducers at frequencies of 38kHz.
and 200kHz. The system performed well, used and logged in tandem with the EM1002 at both frequencies.

An IKB-SEISTEC boomer seismic profiler was provided by Bangor University, with a Delph seismic acquisition system (Figure 3). The general towing speed was 3 knots; it was towed 5m aft of starboard quarter. Shots of 175J were repeated with 4Hz, at a sampling frequency of 24kHz. The system performed well.

A Geo-Source 400 1.5kJ FW sparker seismic profiler was provided by Geo Marine survey systems, with a Mini-Trace 2 duo-channel 24-bit GeoSuite seismic acquisition system. A 1.5kJ Geo-Pulse power supply fed a 200 tips -Geo-Spark pulse source and an 8 elements mini-streamer towed behind the vessel receives the signal. The towing configuration was a source 5m aft of centre, and a receiver 10m aft of starboard quarter. The shot repetition rate was 1Hz with a sampling frequency of 10kHz. The system performed well, even in very poor weather.

In addition, a CTD profiler with O₂ sensor and rosette water sampler with 12 Niskin bottles was used (Figure 5). The CTD was used for vertical and horizontal profiling, performing well. The files were processed to include as many output variables as possible: water depth, density, pressure, salinity, temperature, position, O₂ concentration and saturation, transmission, fluorescence, sound velocity, conductivity, plume anomaly, specific volume anomaly and thermosteric anomaly.

A Duncan & Associates Shipek sampler was used to sample seafloor sediments. The sampler scoops a sediment sample from the top 10cm of the seabed. Live clams sitting on the surface of a sample acknowledged the undisturbed nature of the sample with preservation of original seabed layering. The Shipek grab was deployed on the starboard winch midship and performed very well.

**Preliminary Results**

1. The crests of unusually high and trochoidal sediment waves still

---

**Figure 1:** Unusually high sediment waves in the central Irish Sea with their typical trochoidal shape (see profile).

**Figure 2:** Geographic setting of the survey area in the Irish Sea.

**Figure 3:** Deployment of the IKB-SEISTEC™ boomer seismic profiler via the A-frame.

**Figure 4:** The boomer seismic profiler towed behind the vessel at typically 4 knots.
migrate over several metres per year. Repeated swath bathymetry data permits sediment wave sizes and migration rates to be documented. Sediment waves of all sizes typically migrated a few metres per year, locally amplified where currents are deflected around regional bathymetric changes. In the deep central Irish Sea, the largest of Irish Sea sediment waves (25–36m high - Figure 1) are still mobile. The migration of the lateral sediment wave edges is usually significantly higher than the migration of the highest part – the middle part – of the sediment wave. These lateral edges thus seem important in the overall sediment transport mechanism from one bedform to another.

2. Unusually high and trochoidal sediment waves consist of coarser, more poorly sorted sediments in comparison to the 'normal' sediment waves. From 22 sediment waves in various places of the Irish Sea, sediment grabs were collected in transect and analysed for variations in grain size distribution. The coarsest sediments – coarse sands to fine gravels – are found in the central Irish Sea, where also the largest bedforms occur (Figure 2). Particle size distributions of sediments of the trochoidal sediment waves are multi-modal, while the neighbouring 'normal' sediment waves are mostly composed of uni-modal sediments. With likely stronger currents in the past, perhaps the initially poorly sorted sediments would have strengthened sediment wave growth due to the hiding-exposure effect. This effect occurs where larger grains 'stick out' in a mixture of sediments and as they are more exposed, they are more easily picked up ('entrained') by the flow. The smaller grains in between the larger grains are relatively hidden and are not entrained as easily as you would expect. This hiding-exposure effect alters the threshold of entrainment of differently sized sediment and favours the mobility of the coarser sediment fraction.

3. Methane seepage may not be a factor in extreme sediment wave development. Some bad luck stood in the way of collecting vibrocores, which would have provided more conclusive data. However, the surficial sediments from the unusually high sediment waves in the Irish Sea did not contain methane-derived authigenic carbonates (MDACs). Neither the sediments nor the water column showed any increase in methane concentrations compared to background values. In the Croker MDAC slabs (Special Area of Conservation in the central Irish Sea), shallow gas was clearly observed underneath sediment waves (Figure 6). High concentrations of methane were found near sediment waves, but no increase in methane values were found in the actual sediments that make up the unusually high sediment waves.
4. The excess of mobile sediment supply seems to allow for ‘extreme’ sediment wave growth, and is linked to palaeo-tunnel valleys and the finer sediments that fill them or with converging sediment transport pathways. The spatial relationship of tunnel valleys (as delineated by the British Geological Survey) and unusually high sediment waves suggests that the infill of flooded landscapes scoured by glacial processes in the Irish Sea increases the amount of mobile sediment available for sediment wave formation.

5. The variation in sediment from sediment wave trough to crest to trough will form the basis for more advanced numerical modelling. Our dataset is envisaged to allow for more advanced numerical modelling of sediment wave development in these particular circumstances (bi-directional rectilinear tides and multi-modal sediment mixtures). This is on-going work with colleagues at the Universities of Ghent and Genoa.

Acknowledgments

The research leading to these results has received funding from the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement n° [228344], [EUROFLEETS]. Extra ship time on the RV Celtic Voyager was funded (via Peter Croker) by the Petroleum Affairs Division, which is part of the Department of Communications, Energy and Natural Resources that regulates, protects and develops the Natural Resources of Ireland. The project partners at Bangor University (Dei Huws), the University of Liverpool (Claire Mellett and Dave Hodgson), Universität Basel (Helge Niemann and Lea Steinle), and the Universität degli Studi di Genova (Giovanni Besio) funded a supplementary day offshore and are funding all the data analyses. Many thanks also to cruise participants Shane O’Reilly and David Williams.

Further Reading


The Author

After a degree in Marine Geology at Ghent University, Belgium, Katrien van Landeghem started studying and mapping the seafloor of the Irish Sea during her PhD at University College Cork (Ireland) and Cardiff University (UK). She continued to study changing seafloor morphology during a research fellowship at the University of Liverpool and was appointed lecturer in Marine Geology and Geophysics at Bangor University in 2012, benefitting from the marine geophysical equipment on the university’s own research vessels and a bridge of expertise across the various oceanographic, geological and biological disciplines in the School of Ocean Sciences.

Further Reading


The Author

After a degree in Marine Geology at Ghent University, Belgium, Katrien van Landeghem started studying and mapping the seafloor of the Irish Sea during her PhD at University College Cork (Ireland) and Cardiff University (UK). She continued to study changing seafloor morphology during a research fellowship at the University of Liverpool and was appointed lecturer in Marine Geology and Geophysics at Bangor University in 2012, benefitting from the marine geophysical equipment on the university’s own research vessels and a bridge of expertise across the various oceanographic, geological and biological disciplines in the School of Ocean Sciences.
Swimming, Swarming and Sensing

Bio-inspired Underwater Robotics

For operations in complex underwater environments, bio-inspired robots offer manoeuvrability, stealth and autonomy. They integrate propulsion and control systems into one multi-purpose undulatory propeller. By generating large counteracting forces, undulating fins generate a wide range of net torques and accelerations. Bio-inspired designs can provide stealth by imitating the motion patterns of organisms. Bio-inspiration provides strategies to integrate multimodal sensory information, and algorithms on how to form robot swarms. Multimodal sensing and swarming facilitate navigation during indeterminate tasks, such as surveying or maintenance, provide robot redundancy, and increase the temporal and spatial resolution of a mission.

Nature has inspired locomotory science and engineering for centuries, yet progress has not been uniform across the three main locomotory modes – walking, flying and swimming, Figure 1. Walking is the most intuitive locomotory mode in terms of propulsion mechanics, sensory control and stability; consequently, scientific progress has been swift. While the first walking robots had complex actuated joints, making them slow, energy-inefficient and not particularly stable, locomotion scientists were quick to point out that animals swing their legs largely passively. This insight led to the design of passive dynamic walkers, whose legs swing like a pendulum. This type of passive-swing walking made walking robots not only more efficient but also faster and more stable, able to walk in rough terrain.

Human intuition is less helpful when developing bio-inspired flying and swimming robots. Here, advances rely more heavily on progress in fundamental and applied scientific research. Experimental and computational flow visualisation, combined with high-speed videography, has helped scientists to identify novel lift-generating mechanisms in insects, the smallest active flapping flyers. These insights have led to flapping micro-air vehicles, Figure 1. The wing and flow dynamics during flapping flight not only provide lift and thrust but also passive control and stability. Studies on knifefish locomotion by Cowan and MacIver, and our own studies on seahorses and cuttlefish, have revealed a similar degree of integration in swimmers. Yet this integration to achieve both manoeuvrability and stability comes at the cost of lower efficiency. While walking and flying robots already integrate propulsion and control to achieve both manoeuvrability and
stability, this design strategy has not yet been applied in commercialised, bio-inspired swimming robots.

Bio-inspired robots have also greatly benefited from technological advances brought on by commercialisation. Piezo-electric motors, smart materials and shape memory alloys allow engineers to mimic musculoskeletal structures. Flying robots depend on extra-light materials to reduce weight and on energy-dense batteries to carry their power on board. Artificial muscles have comparable or higher power and work densities than electrical motors and even real muscle. While mobile devices have driven battery technology, and nanotechnology is helping to develop power-dense motors, we still lack flexible materials that are also durable in corrosive, high-fatigue, high-stress environments. Many bio-inspired designs require highly flexible yet robust materials to allow large-scale deformations for wing morphing and undulatory fin swimming.

With the advent of 3D printing, the miniaturisation of mechanical and electronic parts, and new composites, we will soon be able to scale down current oversized bio-inspired designs and mimic tissue-specific properties to mass-produce cost-effective robots that can operate in deep-sea environments.

### Underwater Propulsion

Underwater exploration is particularly challenging because oceans are not only chemically and physically harsh, but many missions take place in cluttered and unpredictable environments. Bio-inspired robots might be adept at navigating sites such as estuaries, oil rigs and harbours, Figure 2.

A high priority during monitoring and rescue tasks at vulnerable and unstable sites is to minimise physical disturbance. Examples are archaeological sites, coral reefs and catastrophes. For low-mechanical-impact tasks, undulatory fins are more suitable than rotating propellers – they do not get ensnared by cables or kelp. Their slow, undulating movements can generate high hydrodynamic forces and torque without fast-rotating blades and without a strong, swirling hydrodynamic wake. For high-agility tasks, multiple fins can generate counter-acting forces and torques for both high stability and manoeuvrability. Fins are highly tuneable: they can modulate hydrodynamic force and torque by modulating wave speed, direction, amplitude and frequency. This redundancy allows such undulatory propellers to adapt their control strategy to constraints imposed by their tasks or environment.

### Bio-inspired designs minimise visual disturbance

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Bio-inspired designs also minimise visual disturbance. Surveillance tasks often require blending to avoid detection. Robots with undulatory fins gain stealth by imitating the motion patterns and centre-of-mass dynamics of aquatic organisms.

Seahorses are an example of a highly manoeuvrable, yet low-disturbance

---

**Figure 1:**
Swimming has the longest evolutionary period of development, yet bio-inspired underwater robotics lag behind their terrestrial and flying counterparts.
design. Their integrated propulsive system comprises three undulatory fins and a swim bladder to perform hovering, on-the-spot turning, slow swimming, and fast pitch and yaw acceleration. Small changes in the relative contributions of their multiple fins allow seahorses to accelerate and pivot quickly in any direction.

Another inspiration is cuttlefish, which have two undulatory fins and one siphon that acts as a thrust vectored jet. Fast changes in undulation frequency and amplitude, reversal of wave direction, and counter-propagating waves enable cuttlefish to execute on-the-spot, tilted, 360° yaw turns, and to swim backwards into a hole. Cuttlefish can climb almost vertically, head down or up, using their fins plus siphon to gain extra vectored propulsive power.

Knife-fish are an example of a single-fin design. Their fin carries counter-propagating waves, allowing knife-fish to execute precision manoeuvres while hunting prey that is hiding in the sand. Studying the hydrodynamics of these fins revealed that horizontal counter-propagating waves generate both horizontal and vertical forces, allowing the knife-fish to translate and rotate quickly in all directions. Current underwater robots do not yet use counter-propagating waves, Figure 3, but this strategy will greatly enhance the already considerable manoeuvrability of undulatory-fin robots.

**Underwater Sensing**

Surveillance requires robots to navigate through changing and unpredictable environments without getting lost. Distributed sensing – multiple robots sharing information in a swarm – is particularly suited for indeterminate and dynamic tasks, such as prospecting and tracing plumes, when the robots must find their way without the benefit of maps.

Fish schools are an example of collective intelligence through distributed sensing. Golden Shiners school in shallow water and seek out patches of shade in which to hide. With increasing school size, the time that each fish gets to spend in the shade increases dramatically. This collective intelligence emerges when the individual fish implement two simple rules: ‘when I am in the shade, I slow down’ and ‘I follow my conspecifics’. The same studies also show that individual fish do not respond to gradients, yet the entire school does track light gradients effectively. Only rudimentary cognition is required to track and find a patch of shade when fish operate in schools.

An analogous engineering application is the tracking of underwater plumes, either for prospecting or to identify sources of pollution. Here again, mapping of gradients is difficult and
Bio-informed Design

Neither mimicry nor inspiration is a sound engineering strategy. Undulatory propulsion and distributed sensing show that fundamental biological physics can inform engineering in a systematic way, leading to unexpected new mechanisms and algorithms. An exciting frontier is the ability of simple organisms to function in noisy environments with an apparent dearth of sensory information and processing power. Current thinking in biology and robotics stresses that limited resources are best used to integrate multiple low-resolution modes of perception, and thus dispense with the need for high-resolution sensors and mental maps. Such insights are already reflected in the multi-modal control strategies developed by Campolo and his collaborators for a robotic fly. The design of swimming robots is currently focused on propulsion systems controlled by functionally separate sensors, Figure 3. Meanwhile, biologists at the University of Chicago have shown that fish in fact integrate sensing and propulsion in their fins, which will probably be the future of bio-informed mechanical swimmers.

Further Reading
www.scholarpedia.org/article/Biologically_inspired_robotics


IMCA Guidance on Subsea Metrology

A Comparison of Five Main Metrology Techniques in Use Today

Subsea metrology is the process of acquiring accurate measurements for the connection of subsea structures and pipelines. IMCA’s guidance covers the most commonly used techniques in use today. These are Long baseline (LBL) acoustics; both diver taut wire and digital taut wire; photogrammetry, and inertial navigation systems (INS). Basic principles are covered, along with engineering requirements, different methods and technologies, and some of the advantages and limitations for each technique.

Acoustic metrology is currently the most widely used technique

THE OBJECTIVE OF SUBSEA metrology is to determine accurately the relative horizontal and vertical distance between subsea assets, as well as their relative heading and attitude. Absolute positioning is not necessary as the objective is to know the three-dimensional range and bearing between relative hubs or flanges. A primary issue is defining the measurement point on the hub or flange. Ideally, it should be as close as possible to the centre, but this is not always possible. The hub might have a pressure cap, the instrument package might be too big to fit on to the hub or access to the hub might be restricted. An offset sensor mounting is then created, called the observation point. There are many different solutions for mounting sensors, depending on the instrument – how much it weighs, what measurement procedure is required, etc. For many subsea applications the most widely used solution is a female receptacle on the structure and the instrument mounted on a male stab.

LBL Acoustic Metrology
Acoustic metrology is the most widely used technique in use today. It is a flexible technique; the equipment is extensively available, supported by the majority of offshore survey contractors and is not solely used for metrology. Long baseline (LBL) techniques are employed to provide an accurate hub to hub range. A pressure/depth survey then determines the hub depths, and subsea gyros and instrumented transponders are used to measure the hub pair’s attitudes. Accurate knowledge of the speed of sound in seawater is essential. This method is most widely used because it is adaptable, has redundancy and the results can be processed within hours. Arrays can be pre-planned to encompass multiple metrologies and seabed structures. It is also attractive because the results can be referenced to an absolute datum. Another advantage is that the equipment may already be in use for structure installation so a separate mobilisation of equipment and personnel may not be necessary. The disadvantages are that it is susceptible to subsea noise, and it is equipment and time intensive.

Diver Taut Wire Metrology
Diver taut wire metrology is essentially a tape measurement of the direct distance between hubs. This method was the first subsea metrology procedure employed by divers and is still widely used today. The metrology system consists of two ‘jig’ plates with protractor markings etched on them, mounted directly above each of the hubs in a stab-receptacle assembly or bolted onto one of the flange bolts. One jig plate is the anchor and the other is the reel.
be measured. Sagging of the taut wire will of course increase with length, affecting the accuracy of direct distance measurement.

**Digital Taut Wire Metrology**

Digital taut wire is a more sophisticated version of the diver’s tape measurements. Additional sensors provide a more accurate distance measurement; depth is also resolved with pressure sensors and relative hub attitude with digital inclinometers. However, it still requires line of sight and is not redundant. As with diver taut wire metrology, there is a limitation on the length of spool that can be measured as the weight of the wire deployed causes sagging. The digital technique has been primarily developed for ROV operations, but can be diver operated. The tension of the wire is measured digitally and is calibrated before each deployment. The system can also measure vertical and horizontal wire departure angles, and the inclination of the hub is measured with digital inclinometers inside the sensor package. The system has the same anchor-reel principle as does the diver taut wire technique; however, the system needs to be powered via the ROV or a dedicated umbilical.

The digital taut wire method can also be augmented with pressure sensor measurements and gyro observations of hub attitude.

**Photogrammetry**

Photogrammetric metrology is a highly specialised application for subsea metrology applications. The basis of photogrammetry is to build a three-dimensional model based on a sequence of two-dimensional photographs. Measuring bars placed on the seabed and reflective markers on the structures provide scaling and reference. Cameras are deployed on an ROV and sequences of photographs taken along the intended spool route. The images are processed using software to derive a three-dimensional model of the positions of the hubs, the seabed and other points of interest on the subsea structures. The advantages of this system are the...
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potential high accuracy of the results, and the fact that in a single survey a very high quantity of information can be gathered. The disadvantages they do not require line of sight and they are not affected by poor subsea visibility or a noisy subsea acoustic environment. The main drawback of such factors as required accuracy: water depth; vessel availability; costs and client preference. A balance must be struck between widely used and understood techniques on the one hand, and new and more unusual techniques on the other. Environmental conditions - subsea noise and visibility - will play a part, as well. An important conclusion is that any of these techniques might be merged or used in combination with another. This is particularly true of INS, which, as noted above, is used primarily in hybrid or aided form with other positioning systems.

Techniques can be merged or used in combination with others

are that image processing makes very intensive demands on computer time; good subsea visibility is required, and also specialist personnel and equipment.

**INS Metrology**

INS metrology is relatively new to the offshore industry and the use and availability of inertial navigation systems has greatly increased in recent years. Inertial navigation systems (INS) use three accelerometers and three gyros to compute a position based on a known start point and the measured changes in velocity and attitude. Unaided INS do not need an outside signal or reference to compute a position; because they are self-contained INS metrology is that without such external references, it is subject to cumulative error over time, referred to as INS drift. In order to mitigate these cumulative errors and maintain accuracy, INS technology offshore is generally used in hybrid or aided form with other positioning systems. Data input from existing positioning systems is used to augment INS data to provide a more robust and accurate overall positioning solution than would otherwise be possible.

**Conclusion**

Every spool design is different, and hence every metrology project is different. There may be one or more metrology techniques that provide an optimal solution, depending on the factors as required accuracy: water depth; vessel availability; costs and client preference. A balance must be struck between widely used and understood techniques on the one hand, and new and more unusual techniques on the other. Environmental conditions - subsea noise and visibility - will play a part, as well. An important conclusion is that any of these techniques might be merged or used in combination with another. This is particularly true of INS, which, as noted above, is used primarily in hybrid or aided form with other positioning systems.

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THE SUCCESS OF THE TUSCARORA began with the experiments of the great physicist Sir William Thomson, later Lord Kelvin, who was the first to develop a successful piano-wire sounding machine. Prior to his investigations in the early 1870s, at least three attempts had been made to sound with wire, all of them failures. While developing his system, his friend and colleague J. P. Joule happened upon him and was astounded to see great lengths of piano-wire. On asking Thomson what he was doing, Thomson replied “Sounding.” When Joule asked “What note?” Thomson responded, “The deep C.”

Thomson's machine was based on the principle that “the art of deep-sea sounding is to put such a resistance on the reel as shall secure that at the moment the weight reaches the bottom the reel will stop.” Kelvin first tested this machine in the Bay of Biscay on board his yacht, the Lalla Rookh, in June 1872. After twenty-five hundred fathoms of line had run out, Thomson felt a twinge of misgiving but “the wheel suddenly stopped revolving as I had expected it to do a good deal sooner. The impression on the men engaged was that something had broken, and nobody on board, except myself, had, I believe the slightest faith that the bottom had been reached ... until the brass tube with valve was unscrewed from the sinker and showed an abundant specimen of soft gray ooze .... That one trial was quite enough to show that the difficulties which had seemed to

Prior to the year 1874, the Pacific Ocean was a blank slate with regard to the nature and depths of its seafloor. A few sporadic soundings had been attempted in the 1850s and Alexander Dallas Bache, Superintendent of the US Coast Survey, had derived an average depth for the North Pacific Ocean of 2,000 fathoms from tidal marigrams that had recorded the tsunami signature of the great 1854 Japanese Tokai earthquake. This in itself was a remarkable feat but provided no indication of the nature of the seafloor and the location of individual bathymetric features. However, this was about to change due to the convergence of a new technology coupled with two remarkable expeditions. The first of these is well-known, namely the Challenger Expedition, which entered the Pacific in 1875 and obtained its deepest sounding in what is now known as the Mariana Trench on 23 March 1875. The second expedition, the Tuscarora Telegraph Sounding Expedition of the North Pacific Ocean commanded by Captain George E. Belknap on the USS Tuscarora, marked both the beginning of the scientific mapping of the Pacific Ocean sea floor and a revolution in sounding technology.
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make the idea of sounding by wire a
mere impracticable piece of theory
have been altogether got over."

Thomson’s piano-wire
sounding machine had been
proved beyond a doubt

With this proof of concept, Thom-
son sent a copy of the machine to the
British navy for use on the Challenger
Expedition. However, there were some
design flaws remaining and its use
was declined until the machine could
be perfected. Simultaneously, Com-
modore Daniel Ammen, chief of the
United States Navy Bureau of Navi-
gation, ordered one of the machines
from Thomson. This was subsequently
placed on the USS Tuscarora which
was in San Francisco in the summer
of 1873. The ship was being outfitted
to take a series of soundings across
the Pacific Ocean "for scientific pur-
poses, and for the purpose of deter-

Under Commander Belknap, the
machine was tested in August 1873
off San Francisco in depths approach-
ing 2,000 fathoms. It was discovered
that the reel had to be strengthened
but with the construction of a new
and larger reel, the machine was
ready to use.

The original survey plan was to run a
line of soundings from Cape Flattery,
mining the practicability of laying a
telegraph cable between those points.

"But a rude awakening was soon to
occur, for hardly had the ship gotten
a fairly good offing when at a distance
of only 100 miles from the coast, a
sounding was made in 3,247 fath-
oms, the waters having deepened
more than 1,800 fathoms in a run of
30 miles. The next cast was still more
startling, for when 4,643 fathoms of
wire had run out it broke without bot-

The ship was also in the Kuroshio
Current at this point so he ran back
inshore as he believed that both cur-
rent and great depth at that point
would preclude laying a telegraph
cable. Picking up the great circle again
at 40 degrees North, Belknap relates,
"... but here the water also deepened
rapidly, and at the third cast from the
initial curve of departure, the lead
dropped to 3,439 fathoms, followed
by depths of 3,587 and 3,507 fathoms,
40 and 80 miles further on. Then, in
the next 40 miles the lead was found
to drop to the great depth of 3,440
fathoms, and the Miller Casella Ther-
mometer came up a perfect wreck
from the resultant pressure! The next
six soundings, at intervals of 40 miles
apart, revealed depths of 4,356, 4,041,
4,234, 4,120, 4,411 and 4,655 fathoms
respectively...."

The ship had discovered the Kuril-
Kamchatka Trench, one of the great
boundary trenches of the Pacific
Ocean, as well as having discovered
the deepest verifiable depths discov-
ered up to that time. The deepest reli-
able depth measured up to that time,
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3,875 fathoms, had been measured 80 miles north of the Virgin Islands by the Challenger in 1873 on its outward bound voyage and it would be almost another year before that expedition measured its deepest depth on the fringes of the Mariana Trench in 4,475 fathoms. Thus Belknap's measurement was the deepest depth yet measured and stood as a record for twenty years. Belknap was not yet done as when he proceeded north he was also the first to sound in the Aleutian Trench and made a number of deep soundings, the deepest being 4,037 fathoms. Thus Belknap's measurement was the deepest depth yet measured and stood as a record for twenty years. Belknap was not yet done as when he proceeded north he was also the first to sound in the Aleutian Trench and made a number of deep soundings, the deepest being 4,037 fathoms. Thus in this one cruise, he was the first to sound in over 4,000 fathoms and discovered indications of two of the great trenches. The cruise ended in August 1874 off of Cape Flattery. The usefulness of Thomson's piano-wire sounding machine had been proved beyond a doubt and Belknap had established himself as one of the great ocean explorers of the 19th Century. Commemorating his work, the German geographer Augustus Petermann produced the first bathymetric map of the Pacific in 1877 and gave the names Tuscarora Deep to the Kuril-Kamchatka Trench area and the name Belknap Deep to an area south of the Hawaiian Islands. Neither name survives today.

Belknap's ocean exploration had not yet ended as in 1881 while in command of the USS Alaska, cruising off the west coast of South America, he sounded in the deepest water yet found south of the Equator in any ocean with a sounding of 3,367 fathoms off the coast of Peru. This was the first indication of the Peru-Chile Trench. He also sounded on the Chile Rise at this time. He named both after his ship - Alaska Deep and Alaska Rise. Fortunately for confused geographers and school children, these names were not retained.

The USS Alaska command ended Belknap's exploring days. He went on to become a rear admiral in the United States Navy. Looking back on his career as a whole, he was a remarkable individual who at various times in his career was warrior, sailor, scientist, surveyor, engineer, and diplomat – a 19th Century Renaissance man. In an address to the Asiatic Society of Japan at Yokohama in 1890, then Rear Admiral Belknap related in almost lyrical terms his experiences in deep ocean sounding with the Thomson sounding machine: "... one never tired of watching the workings of the reel at its place in the gangway, so noiseless and perfect in its action, and the wire so fine that it could hardly be seen from the poop deck in cloudy weather or when passing clouds threw shadows over the ship. Sometimes, at the approach of evening, the writer stood in the cabin doorway watching in the deepening twilight the movements of the drum.... At night too, the gleams of the lantern flashing on the drum, only needed for the reading of the counter and the noting of the splices, recording the amount of wire out, revealed its motions and indications at the far ends of the ship equally well...." With a few changes of words, that could also describe the modern sea surveyor mesmerised as the seafloor is revealed while our multibeam sounding systems do their work.

George Belknap was a sea surveyor and explorer of the first rank. Notches on his sounding plummet included the first sounding lines across the North Pacific Ocean, one of the first isolated seamounts (Erben Seamount) discovered and sounded out between California and Honolulu, first discovery of an oceanic trench - that being the Kuril-Kamchatka Trench, first soundings in the Aleutian Trench, first soundings in the Peru-Chile Trench, and the first soundings on what has come to be called the Juan de Fuca Ridge. Perhaps more importantly, while in command of the USS Tuscarora in 1874, he was the pioneer in the use of Sir William Thomson's piano-wire sounding machine. Until the advent of acoustical sounding instruments, machines based on Thomson's principles of operation were used to sound out and delineate most of the large features of the ocean basins.
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Hydro INTERNATIONAL’s team will ensure that all visitors are well informed by publishing a daily newsletter during Oceanology International, created from the show floor. But they are also keen to hear about developments within your company or organisation for future coverage. Or why not discuss how you can improve your visibility?

Meet publishing director Durk Haarsma, financial director Meine van der Bijl, editorial manager Joost Boers, account manager Herma Lenten, marketing assistant Trea Fledderus and Geo-Matching.com community manager Aliëtte Miedema during the show!

The team will be supported by editorial manager Wim van Wegen and graphic designer Dorine van Oostwaard who will be involved in the creation of OI2014 Daily. So be sure to visit us at stand M10 to say hello.

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Email: marinestar@fugro.com
www.fugromarinestar.com
any instrumentation configuration. A custom design can also be easily provided. In addition, BMTI provides flexible modular buoyancy solutions, in which each element can be reused to match different uplift requirements. www.bmti-alcen.com

Stand N350

Brone Group
THE BRONE Group consists of Brone Positioning & Survey Limited, Brone Geo Solutions Limited, Brone Marine Services and Brone Positioning LLC. Our core operations range from geophysical, geotechnical and hydrographic solutions for all offshore and deepwater operations; to construction support, provision of specialised vessels and geological field appraisal studies. Over the years, with an enviable track record cutting across international boundaries from Nigeria to other African countries, Brone has distinguished itself by providing customer-focused solutions to all client genres. With a broad spectrum of sophisticated differential DGPS services, underwater acoustic positioning services, geotechnical and marine mapping services for over thirteen years on all levels of projects, Brone has participated in several legacy projects for international oil companies and the Nigerian government. www.brone-survey.com

Stand N120

CARIS
CARIS and Safe Software have announced that support for the CARIS Spatial Archive (CSAR) raster format for gridded bathymetry and elevation data will be included in FME 2014, released January 2014. FME users will now have direct access to the cutting edge data storage technology designed by CARIS for efficient storage and visualisation of high volume raster data. FME 2014 can now read and write CSAR raster files, and can also read raster data directly from CARIS Bathy DataBase (BDB), allowing CSAR rasters to be transformed and manipulated in FME workflows. www.caris.com

Stand E601

Chesapeake Technology
Chesapeake Technology’s flagship software, SonarWiz has evolved with numerous enhancements just this year. SonarWiz now processes multibeam echo sounder and interferometric bathymetry systems, while continuing to offer its side-scan, sub-bottom and magnetometer options. Whatever sonar data you have, SonarWiz can do it with more efficiency and better results. Interested professionals are invited to join Chesapeake for the one-day training following OI, on Friday 14 March 2014 aboard the HHS Wellington. www.chesapeake tec.com

Stand L9

Cidco
As part of its R&D activities, CIDCO (Canada) has developed an autonomous, robust and easy to use acquisition solution for providing IHO-class bathymetric data in white waters (rivers) and ultra-coastal zones (isobaths 0m-2m). Dropped upstream, the HydroBall buoy will acquire data throughout its drift, to provide the bathymetry of the riverbed. Mounted on a sled, it will allow the production of continuous range land-sea profiles and thus help merging hydrographic and topographic data. The HydroBall buoy is the new essential tool for all surveyors working on lakes, rivers and coastal areas. www.cidco.ca

Stand P200

Codar Ocean Sensors
The Brahan Project, under the leadership of Marine Scotland, aims to showcase the unique features, benefits and utility that SeaSonde HF Radar monitoring and added value applications can provide to the UK ocean community and UK society at large. The main project deliverable is a fully operational Long Range SeaSonde HF radar system in the Shetland-Orkney area in Northern Scotland manufactured by CODAR Ocean Sensors of California, which measures the speed and direction of ocean surface currents in near real time in an hourly basis and also provides information about wave parameters. Access to data is freely available through www.thebrahanproject.com/ access-to-data/, www.codaros.com

Stand F10

Cygnus
Cygnus is pleased to announce the launch of the new underwater wrist-mountable thickness gauge, Cygnus DIVE Mk2, a robust gauge which provides a free hand while performing metal thickness measurements. Operation couldn’t be simpler, only two buttons for easy navigation of the intuitive clear menus. The new, large, bright colour AMOLED display is easily viewable from all angles by the diver and his camera, even in poor visibility. Another new feature is the flexibility of single-echo mode using twin crystal probes, useful in situations such as uncoated surfaces with extreme front-face and back-wall corrosion, anchor chain links and highly attenuative materials.

www.cygnus-instruments.com

Stand R101

dotOcean
dotOcean offers innovative measurement instruments and rapid development services to the maritime and offshore industry. Today, these instruments are used by major European ports and the dredging industry. One of the products, the GraviProbe, is a fast and light rheological profiling system used for quick assessments. Another one, the DensX, is a very accurate mud density profiling system based on X-Ray. Both instruments are used for evaluating and optimising the access of muddy shipping channels. At Oceanology International 2014 we will be exhibiting these and
FIRST-CLASS SURVEY AND GEOTECHNICAL SERVICES
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km.kongsberg.com
related products (e.g. a portable survey winch) on our stand. www.dotoccean.eu

Stand F500

The DensX Graviprobe.

Echologger
Two new products are to be launched at this OI2014. MRS900 is an ultra-compact imaging sonar system with CHIRP technology. This new product is very suitable for mini-ROV/AUV. It boasts high-resolution imaging and ultra-high scanning speed.

EA400 is a fully self-contained autonomous sonar echo sounder with a big memory capacity. It can collect accurate backscatter data along full water columns. These new products along with their existing products will be actively sought after by researchers and surveyors who need affordable and compact sonar devices.

www.echologger.com
Stand L11

EdgeTech
EdgeTech will be exhibiting many of its well-known underwater technology solutions at Oceanology International in March 2014. Additionally, the company plans to provide a glimpse of some of the products that are planned for release in 2014. The company is known worldwide for its high-quality products which include: side-scan sonar, sub-bottom profilers, bathymetry systems, AUV and ROV-based sonar systems, combined and customised solutions. In addition to the full line of underwater survey products, EdgeTech provides reliable USBL systems, transponder beacons, deep-sea acoustic releases, shallow-water and long-life acoustic releases, MRUs and customised underwater acoustic command and control systems.

www.edgetech.com
Stand H150

Underwater lights produced by Ezze Marine.

Ezze Marine
Ezze Marine is a global subsea service and equipment provider with its manufacturing, sales and training facility in Cape Town, South Africa. Key activities include the design, manufacture, sales, rental and operation of Underwater Tooling, Survey and Work Class ROVs and Air and Saturation Dive Systems. We offer the project management and personnel for offshore projects. The Ezze Marine Offshore education centre provides quality training, ensuring the provision of competent subsea recruits. To meet the expanding needs our facility incorporates a 10 student electronics lab and a 10 student mechanical workshop all under 2000m².

www.ezze-marine.com
Stand E455

Underwater lights produced by Ezze Marine.

Emma technologies
Emma technologies (Germany) is a leading manufacturer, supplier and system integrator of environmental monitoring and measuring applications for multidisciplinary marine tasks. Customers can take advantage of our know-how and expertise in many ways, i.e. emma technologies develops new products and innovative applications; manufactures customised products; modifies existing products to meet client-specific specifications; supplies premium third party equipment; sources matching systems and components; integrates systems and components to secure a smooth workflow and provides in-depth training, support, service and maintenance. Simply ask emma - we’ll see to the rest.

www.emma-technologies.com
Stand G201

Fastwave
Fastwave has developed a new telemetry buoy system that will enhance real-time data acquisition from remote offshore locations. The Triton telemetry buoy offers broadband data acquisition from sensors located on the buoy, suspended in the water column or on the sea floor, depending on application requirements. It is designed for extended coastal and offshore moored deployments, with solar and battery power systems to support multiple sensor payloads. The satellite broadband data system used by the Triton has global coverage.

The Triton can also act as a data gateway for subsea acoustic networks, hydrophone monitoring and AUV data transfer.

www.fastwave.com.au
Stand P150

The Triton has global coverage.

Geo-matching.com
Geo-matching.com has recently added new hydrographic & oceanographic instruments to its spectrum of product...
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categories: bottom pressure gauges, magnetometers, sediment classification software and sub-bottom profilers. They complement the existing online categories of ADCPs, AUVs, CTD Systems, GNSS Receivers, Imaging Sonars, INS, Multibeam Echo Sounders, ROVs, Side-scan Sonar, Single beam Echo Sounders and Unmanned Aerial Vehicles. Geo-matching.com is an independent product comparison website featuring detailed spec-based product comparisons and user reviews for more than 600 products. Visit www.geo-matching.com to browse through the products or to leave a review.

**Germano and Associates**

Deepwater Wind was the winner of the first competitive lease auction by the Bureau of Ocean Energy Management for two parcels, totalling more than 164,000 acres, roughly 17 miles south of Rhode Island. Germano and Associates, Inc. has been assisting Deepwater Wind with site studies and strategic planning including cable route siting, baseline benthic characterisation and desktop geological surveys. Deepwater Wind plans to develop a utility-scale wind farm of up to 200 turbines with a regional transmission system linking New York to New England. This is the largest and deepest water offshore wind farm ever planned in the US.

**GeoTeam**

GeoTeam provides the offshore industry with a wide array of integrated services, including Positioning; Metrology; Geophysical and Oceanographic Surveys; Geotechnical Sampling and Testing; ROV Survey, Inspections, Interventions; and Construction Support & Light Construction Services. Present in six countries around the world with a unique goal: to exceed client’s expectations. GeoTeam: at depth, in depth.

**GeoXYZ**

GEOxyz is an independent company specialised in hydrographic, geophysical and geotechnical surveys, site investigations, offshore renewable energy support and crew transfers. We provide our services to local authorities, dredging and marine construction companies, consulting companies and research centers. Working throughout Europe, GEOxyz is using professional highly-specialised staff, advanced technologies and state of the art survey systems. A fleet of dedicated survey vessels allows us to reply to the most demanding requests.

**Horizon Survey Company**

As of 1 December 2013, Horizon Survey Company (headquartered in the UAE) acquired a controlling interest in UK-based Pelydryn Ltd. It is planned that the two companies will retain their individual identities and continue to operate independently. Where beneficial, Horizon and Pelydryn may combine services to provide their clients with comprehensive marine and airborne survey solutions. Horizon and Pelydryn are represented worldwide and this relationship capitalises on the existing range of specialist services that can be delivered, including marine survey and geotechnical services and airborne bathymetric and topographic Lidar surveys. Horizon Survey also recently took delivery of the 65m DP2 geotechnical drillship Quest Horizon, following last year’s purchase of the 82, DP2 vessel Horizon Geobay.

**Hydro-Bios**

The Automatic Fluid Injection Sampler AFISsingle provides a novel technique to enhance sampling technology for studying microbiotically driven biogeochemical processes in the environment by the analysis of metatranscriptomes. Transcripts degrade fast within seconds to minutes. It is known that their abundance patterns are subject to considerable modification as a result of sampling procedures. To eliminate this, AFIS takes samples and rapidly fixes water in the original environment. AFISsingle has been designed to operate in common rosette water sampling systems or as stand-alone instrument. AFIS resulted from a cooperation with Leibniz-Institute for Baltic Sea Research Warnemünde IOW.

**Hydrographic Society UK**

An official supporter of OI 14, the Society also represents its parent organisation, the International Federation of Hydrographic Societies (IFHS) comprising other member societies in Australasia, Benelux, Denmark, Germany, Germany. 
QINSy

The modular design, user friendly user interface, comprehensive help and support of international standards and exchange formats, mean QINSy is equally well suited to less complex bathymetric surveys as it is to highly complex multi-vessel and multi-sensor offshore construction projects.

Hydrographic
Laser scanning
Rig moves
Dredging
Pipe laying
Rock dumping
Offshore
Sidescan Sonar
ROV inspection
Marine Data Management

Fledermaus

Fledermaus is the industry leading interactive 4D geospatial processing and analysis tool. The intuitive user interface allows users to rapidly gain insight and extract more information from their data, that in turn promotes data processing efficiency, quality control accuracy, and data analysis completeness.

Coastal mapping
Environmental
Exploration
Geological
Habitat mapping
Hydrographic
Academic
Offshore
Marine construction
Marine Data Management

For details contact: sales@qps.nl
Italy, Korea and South Africa. On display is an extensive range of literature available for individuals, institutes and companies with an interest in hydrographic surveying and associated disciplines. Also available are full details on Hydro14, the IFHS’s 18th European conference at Aberdeen’s Exhibition & Conference Centre from 28-30 October. Organised by the Society, proceedings are supported by a major exhibition of equipment and services in addition to practical demonstrations and technical workshops.

www.ths.org.uk
Stand D701

**HYPACK**

HYPACK is looking forward to meeting and networking with customers and partners in the international hydrographic community. During the show, HYPACK will demonstrate the latest features of HYPACK 2014 hydrographic survey software. Among the new features of HYPACK 2014 are the ability to access outside web servers to get background files automatically, a new HYPACK Shell design with multi-select, drag-and-drop, etc. A combined hardware program eliminates the need for separate Hypack, Hysweep and Side-scan configuration programs. A new Hydrographic Data Base has been integrated into HYPACK 2014.

www.hypack.com
Stand G10

**Imagenex**

Imagenex Technology, Canada, will be exhibiting on stand F700 with their UK representative, Hydro Products. Imagenex is well 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 881L-GS, which has 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.

www.imagenex.com
Stand F700

**Innovative Technology Projects**

Manufactured by BAe Systems for iTP, the MkX Acoustic Systems Trainer was first exhibited at OI China Shanghai. The MkX can now work as a R&D platform with a new powerful Sonar Signal Analyser operating at 500Ms/sec with burst and sweep modes. Exercises include CW transmission; passive sonar; active pulse sonar; Doppler; beam steering; CTFM sonar; stealth demonstration; propeller cavitation and underwater sound analysis.

www.itp101.com
Stand P650

**Innovatum**

At OI 14, Innovatum will offer, for the first time ever, real-time, in-water magnetic cable tracking demonstrations with Smartrak, from catamaran Coral Wind (Technical Marine Services Ltd.) on a cable length dropped into Victoria Dock. Smartrak will be operated on a Saab Seabed Falcom ROV. Please come to our stand, I155, to book a place.

www.innovatum.co.uk
Stand I155

**Install**

Install enters the front door of the Oceanology 2014 with an increased wealth of experience on the field thanks to the international project involving Install. Install offer a wide range of services applied to the oil and gas industry and also to the renewable energy market. Together with pipeline inspection, seabed mapping and geotechnical survey and installation Install can offer high-quality data management and rapidly offer reports and charts at client’s request. The company has extensive international experience and is a market leader in low-logistics
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autonomous surface vehicles (ASV) and underwater vehicles (UUV) surveys and real-time 3D subsea visualisation systems (SVS).

www.installsrl.it
Stand R150

James Fisher Runic
James Fisher Runic has been supplying offshore personnel to the oil, gas, telecom and renewable industries since the formation of Rumic in 1984. Now a part of James Fisher and Sons, we provide ROV, plough and trencher personnel including pilot technicians, supervisors, superintendents, client representatives and offshore managers. We have an extensive database of suitably qualified and experienced personnel located worldwide and we provide logistics support for travel and visas, with a 24 hour, 7 days a week call out service for out of hours assistance.

www.rumic.co.uk
Stand N400

JFE Advantech
JFE Advantech is a sensor manufacturer in Japan with more than 35 years' experience. Many customers have been using our CTD, flow meter, DO, Turbidity, Chlorophyll and wave height sensors for more than 10 years, because of the design robustness and our service availability. Recently, we have released a new underwater camera which can be easily used for a long period of time. Our RINKO (optical DO sensor with fast response time) has been integrated into many platforms, such as CTDs, gliders, floats, etc.

www.jfe-advantech.co.jp
Stand I200

Jifmar
Jifmar provides long-term IMR service contracts for offshore oil & gas terminal operators and owners, providing maintenance above and below water on CALMs and SPMs, floating and subsea hose, cable, moorings and PLEMIs. It works in the defence sector and has operations in the marine renewables. We tend to carry out operations in areas where it can be difficult to work and our ROVs are set up for deepwater operations down to 2,000 metres. The oil and gas industry and the marine renewables are where Jifmar has seen the most demand for ROVs over 2013. The contracts that Jifmar won in 2013 were in Africa, Europe and also in South America.

www.jifmar.fr
Stand P101

Jospa
Jospa will feature ‘3 Improvements’ – novel technologies to increase displacement, bandwidth and controllability of wave energy devices. The test facility reported on one of these: “most wave energy devices capture 10 to 20% of available energy – with ACF the 10 may become 34% and the 20 may become 44%”. The ACF can also stabilise a service boat at low cost. The other improvements are ‘Buoyant Fulcrum’ and ‘Flip-Flop’. Jospa will also feature its ‘Cluster’ that accelerates part of the wave as a basis for their two distinct WEC technologies, the ITC and the Vortex Turbine, and the WECs themselves.

Stand B300
www.jospa.ie

Kongsberg Maritime
A cross-section of Kongsberg’s subsea portfolio will be highlighted at OI including new products – HUB and the HD PATZ Camera. The Kongsberg AUV range will be represented with HUGIN, MUNIN, REMUS and Seaglider whilst the compact multibeam, EM2040C, will be shown alongside Kongsberg Mesotech and GeoAcoustics survey technology. The proven HiPAP sensor and gyro compass developed by Kongsberg Seatex will be launched. Visitors are encouraged to sign-up for the Kongsberg Maritime demo boat, to see much of the company’s leading technology in action on the water outside ExCel.

www.km.kongsberg.com
Stand E600

L-3 Klein Associates
L-3 Klein presents their HydroChart 3500.

L-3 Klein will be demonstrating their HydroChart 3500 which is a professional bathymetry and side-scan sonar for shallow-water operation with the exceptional performance expected from an L-3 Klein system at an extremely competitive price. The system was developed based on the latest proprietary ‘Wideband Technology’ providing unmatched range and resolution performance in a compact, lightweight system which is easy to install, set up and operate. The system produces data which exceeds international survey standards (IHO-SP-44, Special Order), and when combined with our proven uncertainty model, allows for ‘automated/intelligent’ data processing. For more information and to register for our on-water live demonstration of the HydroChart 3500, please visit stand G500.

www.l-3klein.com
Stand G500

Marine Sampling Holland
Marine Sampling Holland is a worldwide operating company specialised in geotechnical and environmental site investigation and advice. It has a wide range of drilling and sampling equipment with a heavy 22 ton Manta CPT with a penetration of 20+ m, and Mini-CPT’s with maximum 10m penetration below seabed available. Geotechnical laboratory work is done in the MSH laboratory. The combined geo-technical and geological knowledge of MSH, together with state of the art equipment, makes MSH the right partner for investigations in a wide range of offshore projects, both nearshore and far offshore.

www.marinexplore.co.uk
Stand G600

Marinexplore
Marinexplore presents marineOS, a revolutionary cloud-based data management solution that streamlines data flows within a single extensible platform. MarineOS helps offshore and maritime businesses reduce their data handling time five-fold by improving data reliability to enable faster, more informed
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Visit the Teledyne Marine companies at OI 2014 on booths D100, G100, E400, and K150

www.teledynemarine.com
decision-making. MarineOS delivers powerful, easy to use tools for ingesting, organising, analysing, visualising, and securely distributing ocean data to partners, clients, and internal teams. Visit Marinexplore booth M120 to experience working with point, model, satellite, radar and ADCP data in one platform. www.marinexplore.com Stand M120

Maritech Consultants 2014 will see Maritech Consultants celebrating 25 years in the offshore survey business, having been a regular exhibitor at Oceanology International. Maritech Consultants is a leading provider of survey and geophysical consultancy services to the offshore survey, construction support and energy industries. Over the years, the company has gained a reputation for quality and efficiency in its ability to provide qualified, experienced and competent personnel to support seabed survey, inspection and construction projects worldwide. Personnel available include: geophysicists, geologists, hydrographic surveyors, marine scientists, survey engineers and technicians, ROV personnel, party leaders, client representatives, gun mechanics and safety consultants. Maritech also provides technical survey support including assistance with desk studies, bid evaluations tender preparation and equipment review. www.maritech.co.uk Stand E701

Maritime Robotics OceanEye provides 24/7 maritime aerial surveillance to locate, monitor and respond to oil spills reducing health, safety and environmental (HSE) risk. OceanEye downsizes crew and vessel requirements drastically decreasing response operation costs. Tethered to an oil spill response vessel (OSRV), a weather-proof, helium-filled balloon carries a triad-sensor unit capable of producing high-resolution day and night (EO/IR) imagery and geo-location coordinates with embedded AIS (Automatic Identification System) receiver. With customised OverView software, the hand-held, touch-screen terminal displays daylight and infrared. www.marinerobotics.com Stand T110

MetOcean Data Systems MetOcean Data Systems designs and produces state of the art data acquisition and telemetry systems. Established in 1985, MetOcean has been a global leader in integrated systems used for real-time monitoring and have developed niche markets to support a wide array of commercial and scientific applications. In 2010, MetOcean acquired the NOVATECH product line, adding Satellite and Radio Beacons, and Xenon Flashers to its product line. Building on this continued success, MetOcean is excited to announce the new Mini Iridium Beacon launch, displayed at MetOceanBooth #6 - Atlantic Canada Pavilion. Come check us out to see what all the flash is about. www.metcean.com Stand F300

Metocean Services International (MSI) Metocean Services International (MSI) was
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www.seatechweek-brest.org

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formed in 2003 and provides meteorological and oceanographic measurement services and consulting on a worldwide basis. Since company inception, we have conducted projects in over 40 countries, and both the South African and Australian offices have ISO-certified Quality Management Systems. Focused primarily on physical measurements, our services include current, wave, water level and meteorological measurements, ranging from shallow to very deep water. Data telemetry and system integration are often provided to address client and project-specific issues. Through partner companies we also provide desktop studies and weather forecasting. www.metooceanservices.com

**Stand J500**

**Metros**

Metros is a world leading supplier of remote sensing equipment for wave monitoring and oil spill detection for the marine and offshore industries. Metros develops and delivers systems and services for collecting and analysing environmental data in the offshore, maritime and marine environments. Metros manufactures different types of sensors suitable for various applications. The new shipboard wave monitoring system, WaveFinder, is Metros’ most accurate wave height monitoring system for offshore subsea/construction vessels, for use during marine operations. Wave height and wave period accuracy is in line with DNV’s Offshore Standard NV-OS-H101 requirements for an increase of the α-factor. www.metros.no

**Stand J555**

**MMT**

A new generation of high-speed survey ROV, the ‘Surveyor’. Together with the engineering company Kystsdesign AS, MMT (Sweden) have developed and recently started production of a new generation, innovative survey ROV, the ‘Surveyor’ that is specially designed for pipeline inspection and seabed surveys. The new asset will be delivered during the summer 2014 and will be operated in close cooperation with Reach Subsea on board a suitable vessel. MMT will give a presentation about the ‘Surveyor’ in their stand G601 at the exhibition Oceanology International (London, UK). www.mmt.se

**Stand G601**

**Norcom Technology**

The software displays charts in GeoTIFF, Georeferenced Jpeg, BSB, and ARCS format with chart packs for Northern Europe, Mediterranean and with other areas available on request. The software can display Shape files and import data from other data formats including Excel spreadsheets, CSV and UKOOGA P1/90 and there is overlay data available including, North European Wrecks, UK Cables, Military Exercise Areas. Import AutoCAD DXF data and convert grid coordinates to WGS84 geometricals for display purposes. All data is stored in Shape file format. www.norcom-technology.co.uk

**Stand A525**

**Novacavi**

At Oceanology International 2014, Novacavi is to launch Aquacable, a wide range of specialist bespoke cables for maritime and underwater technologies. ROV cables, Fibre Optic hybrid cables, umbilicals, subsea armoured cables, subsea detection and instrumentation cables to be suitable in any harsh environment conditions while guaranteeing the requested performance. Among them the high-tech custom tailored cables for the positioning and survey systems in use in the progressing operation of Costa Concordia shipwrecking salvage project since the parbuckling phase. www.novacavi.it

**Stand L 155**

**Novatel**

Novatel UIMU-LCI, a tactical grade IMU from Northrop-Grumman Litel, delivering a 3D position, velocity and attitude solution. NovAtel supplies high-precision OEM positioning technology to the marine industry. Developed for efficient and rapid integration, our Global Navigation Satellite System (GNSS) technology is used for positioning, relative positioning and hydrographic survey applications. Our core marine technology is SPAN, which combines GNSS positioning and Inertial Navigation Systems (INS). The result is the accuracy of GNSS and the stability of IMU measurements, providing exceptional 3D navigation and attitude that is stable and continuously available. NovAtel is based in Calgary, Canada and is part of the Hexagon Group, Sweden. www.novate.com

**Stand E555**

**Ocean Power Technologies**

Ocean Power Technologies (OPT), stand K703, the world’s leading supplier of moored, floating buoys that harvest energy from waves, will be presenting how its enabling technology is increasingly being applied to produce innovative marine applications in a number of differing market sectors. The Powerbuoy technology has already been transferred from the renewables to the defence sector and is now attracting increasing attention from the oil & gas industry due to its inherent ability to solve the continued issue of how to deliver large amounts of reliable and persistent energy to enable cost effective operations in the hostile offshore marine environment. www.oceanpowertechnology.com

**Stand K703**

**Oceanscience**

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**Stand K703**

**Oceanscience**

The Oceanscience Z-Boat surveys in very shallow and difficult to reach waters.

The Oceanscience Z-Boat 1800 remotely-operated hydrographic survey boat is now available with the latest high definition Tritech 450kHz or 900kHz StarFish side-scan imaging sonar. After two years of production, Z-Boats with single beam echo sounders are in operation all around the world performing hydrographic surveys in natural and industrial water environments.
A unique opportunity to develop the skills required to carry out offshore multidisciplinary works.

Offshore@INSTALL multidisciplinary courses in offshore operations are taking place every month in Naples INSTALL ACADEMY.

Intensive two or three weeks courses onboard our Academy are aimed at undergraduate and postgraduate students of marine-related sciences, technology and engineering, as well as researchers, technical staff and industry professionals.

Participants have the opportunity to gain practical experience in offshore industry methods with an emphasis on a multidisciplinary approach to studying the marine environment.

Special emphasis is placed on the cross-disciplinary skills involved in Oil & Gas and renewable energies.

Deployment and operation of equipment and instrumentation, and data acquisition and interpretation.

Join us at:
Corso Umberto I, 90 – 80070 Monte di Procida - Napoli, Italy
phone +39 0818683218 - email academy@installsr.it

www.installsr.it

INSTALL was born in 2010 and is now a leading Italian Company providing global survey and positioning services to the offshore markets, including the upstream oil, gas and renewable energy sectors, survey in barren and polluted environments, marine and remotely operated vehicle (ROV) contractors.

The Company has extensive international experience and is a market leader in low-logistics autonomous surface vehicles (ASV) and underwater vehicle (AUV) surveys and real-time 3D subsea visualization systems (SVS).

INSTALL has been approved and accredited by CSQ to ISO 9661:2008 standard. The Company is registered with Assominera.

INSTALL core business is the provision of rig & tug positioning, vessel & barge positioning, jacket & subsea installations, pipe & cable lay support, trenching & burial support, ASV and AUV surveys & inspections, data processing, GIS and cartography, real-time subsea visualization, dredging support, DSV support, ROV support, visual inspection surveys, apool metrology, software development and R&D.

Nautikaris
Marine Survey & Equipment

When your client depends on you, you want to depend on us

Nautikaris by
Margaretstraat 36
1976 EJ Lmuiden
The Netherlands
+31 (0) 255 820200
+31 (0) 255 820222
info@nautikaris.com
www.nautikaris.com
Adding side-scan capability for remote object detection was a natural progression for OceanScience. Surveyors can gather bottom imaging and hydrographic data at the same time in locations inaccessible to conventional survey boats. www.oceanscience.com

Stand C550

OceanServer Technology
OceanServer Technology is a leading provider of man-portable Autonomous Underwater Vehicles (AUVs) with over 200 AUVs deployed worldwide. The Iver AUV is an affordable, commercial vehicle used for general survey and subsurface security work, and serves as a research platform for autonomy, behavioural and sensor development studies at universities and navy research facilities. OceanServer has recently launched two new Iver3 AUV models for display at Oceanology. www.iver-auv.com

Stand P620

OceanSonics
The new Webserver is a key feature of the icListen Smart Hydrophone and is accessible on a local network or on the Internet using a web browser. Cell phone users with a browser can also access icListen via the Webserver. With this easy to use web interface users can configure data collection, set triggers and check status of the icListen. The Webserver shows live real-time spectral data and provides a page to retrieve logged data files from the Smart Hydrophone. Stop by our booth in the Atlantic Canada Pavilion for a Webserver demonstration. www.oceansonics.com

Stand F300

Osean
Osean is launching its new generation of profilers at O214 in London. Able to cover seismic, meteorology and marine mammal fields at the same time, this innovative float can continuously analyse acoustic signals and detects major seismic events, weather phenomena and whale migrations while drifting. It carries 3 times more batteries than competitors and dives as deep as 3,000m and drift for up to 5 years. The last trials were filmed by Euronews journalists in January 2014. OSEAN is also showcasing versatile, programmable data loggers for renewables-impact studies, construction monitoring and marine mammals studies. www.osean.fr

Stand B300

Osiris Projects
Osiris Projects will showcase the latest company developments and emerging technologies. On their stand Osiris Projects will detail progress on their latest custom built survey vessel Bibby Athena, as well as presenting their new R&D project which is designed to address the challenge of surveying subsea cables. www.osirisprojects.co.uk

Stand C250

Outland Technology
Based in Slidell, Louisiana, USA, Outland’s design and manufacturing facility ships a broad range of high-quality video and audio products worldwide to customers in the marine, military and industrial markets. New products in 2014 include: Dive Cameras — HD 1080p camera; DAQ camera; Dive/ROV LED lights — Brighter; Color Options; Stainless/Titanium; Dive Systems – DAQ Console w/ GPS, Depth, CP; Portable 2 Diver and AC/DC System w/ Hard Drive DVR and ROVs – Outland 2000, 2x the power of the Outland 1000; Modular Consoles; HD Camera(option); Auto-Altitude; Cruise Control. www.outlandtech.com.

Stand H701

Periplus Group
Periplus Group, based in Amsterdam, the Netherlands, is a consultancy organisation providing specialised advice and knowledge in the field of hydrography and related disciplines such as geology, geophysics, marine archaeology, GIS, data processing and database design & development. At Periplus we focus on exploration and construction support for the oil and gas industry; operational support for offshore survey projects; in-house processing of hydrographical and geophysical data and providing marine archaeological advice and reporting for environmental impact assessments. Our clients include oil and gas operators, dredging companies, offshore survey companies, the national corps of engineers and several port and government authorities. www.periplus.nl/home/en/

Stand G600

Planet Ocean
Planet Ocean will again be exhibiting at the world’s leading ocean exhibition, Oceanology 2014. The company represents some of the world’s leading manufacturers of marine scientific equipment as well as providing bespoke integrated Metocean data systems. Exhibiting on stand J501, Planet Ocean will be showcasing technology partners CONTROS from Germany, Star- Oddi from Iceland and Sequoia Scientific from the USA. In addition, we will be showing new offerings from AXYS, Ocean Sonics, Sea Bird Scientific and XEOS. Planet Ocean will be launching their latest version of the popular BUOYTRACKER GPS-GlobalStar surface monitoring beacon, the Elkins Oceanic QuickClamp and enhancements to their range of push corers. www.planet-ocean.co.uk

Stand J501

QPS
QPS QINSy and Fledermaus with Eari ArcGIS is the seamless workflow solution for your Maritime Geomatic Data. For those engaged in hydrographic surveying, either for ports or coastal areas, we offer the software tools to collect a number of different data sorts and then seamlessly process and visualise their data, and then use the tools of ArcGIS for Maritime to manage and disseminate the results. QPS
Topcon’s MR-1 receiver and MG-A8 antenna deliver high performance RTK positioning and heading in harsh environments, while not being susceptible to signal jamming.

You need positioning, we have the solution. Learn more at oem.topconpositioning.com/marine
Fledermaus Midwater extended by CCOM Plug-ins are recently released plug-ins that improve the supervised detection of features in MBES water column data by normalising and filtering the data to minimise sidelobes and noise.

www.gps.nl
Stand I100

RADAC
RADAC from the Netherlands has been developing, producing and marketing the WaveGuide since 1997. This oceanographic instrument measures wave height, wave direction and tide using radar. Versions available are: Free Space, Stilling Well, On Board and Wave Direction. The Wave direction option was announced at OI 2012. It has been commercially available since the end of 2012 and is in operation in Chinese and Korean waters and at installations in the North Sea. A comparison study between WaveGuide direction and the directional Waverider from Datwell will be available at the show.

www.radac.nl
Stand G600

RIEGL
RIEGL Laser Measurement System will present its sophisticated marine surveying solution, the ‘VMY-250, with 360° FOV and up to 500m measurement range. Its compact and rugged design enables flexible and rapid installation and seamless integration. Offering a seawater resistant protective case for storage and a protective cover for operational use, it is optimally prepared for working in the demanding marine environment. The VMY-250 is available as complete, fully calibrated system with full INS integration, but also as stand-alone system for integration with a multitude of existing INS solutions. Additionally, a fully integrated and calibrated camera system comprising of 2x5 MPix industrial cameras is offered.

www.riegl.com
Stand M200

RS Aqua
Several new products will feature on the RS Aqua booth at OI14. The ICAM (Integrated Cavity Absorption Meter) in-situ absorption meter from California based Turner Designs offers a configuration of nine wavelengths to acquire absorption measurements over a wide spectrum. Examples from the extensive range of DVL (Doppler Velocity Log) sensors from Rowe Technologies Inc will be on display along with two new products from Canadian manufacturer MetOcean Data Systems Ltd. Being seen for the first time in the UK, will be the MM1-7500 mini Iridium, 7500m rated location beacon and the PABLO open ocean acoustic source profiler.

www.rsqua.co.uk
Stand F550

RTsys
RTsys has successfully integrated the EXO2 multiparameter sonde to its EASDA14 multi-hydrophone recorder. This EASDA14 system now offers two applications in one. Indeed EXO2 is synchronised with the hydrophone data monitored by the EASDA14, and thus permits it to combine underwater acoustics with water quality parameters such as turbidity, oxygen salinity, CTD, etc. These systems can run autonomously and be accessed in real time. EASDA14 and EXO2 offers a very compact solution gathering package of data dedicated to many applications such as offshore operations (dredging, piling) or mammal studies (detection, localisation).

www.rtsys.eu
Stand L550

RU CO
NETmc Marine DVCi-HD camera and recorder.

On our stand we will be demonstrating the NETmc Marine DVCi, an integrated HD digital video camera and recording system. The video is encoded in the camera at a relatively low bit-rate and so the full HD video images can be sent up a twisted pair, coax or over Ethernet, no fibre is required. The video files are about 1/10th the size of files generated by other HD encoders. Furthermore, the DVCi accepts audio from a standard PC microphone at the topside, encoding it to the video files.

www.ruco.co.uk
Stand D601

SBG Systems
SBG Systems will present the new Ekinox Subsea Series at OI14, a product family of survey-grade inertial systems designed for underwater applications – up to 6,000m. The series includes the Ekinox-M, a Motion Reference Unit (MRU), and the Ekinox-U, an Inertial Navigation System (INS). Ekinox Subsea Series outputs survey-grade roll, pitch, and heading (0.05°), real-time and delayed heave (2.5 cm), making it compliant with IHO standards. The Extended Kalman Filter fuses in real-time inertial and aiding information (DVL, RTK GPS, etc.) for accurate navigation. Available in stainless steel or titanium, both models are operational up to 6,000m.

www.sbg-systems.com
Stand K200

Seac on Europe
SBG Ekinox-U subsea INS system.

SBG Systems will present the new Ekinox Subsea Series at OI14, a product family of survey-grade inertial systems designed for underwater applications – up to 6,000m. The series includes the Ekinox-M, a Motion Reference Unit (MRU), and the Ekinox-U, an Inertial Navigation System (INS). Ekinox Subsea Series outputs survey-grade roll, pitch, and heading (0.05°), real-time and delayed heave (2.5 cm), making it compliant with IHO standards. The Extended Kalman Filter fuses in real-time inertial and aiding information (DVL, RTK GPS, etc.) for accurate navigation. Available in stainless steel or titanium, both models are operational up to 6,000m.

www.sbg-systems.com
Stand K200
Reshaping the limits of positioning.

Refined GNSS Heading and Positioning for safer work at sea.

Eliminating marine radio interference

Our marine rugged receivers are designed for continuous GNSS operations including receiving L-Band PPP corrections even during nearby Iridium transmissions.

Sensing the environment for optimized accuracies

Septentrio’s novel RTK models constantly sense their environment to optimally adapt to situations where GNSS signals can be distorted by reflective surfaces.

Compensating for high solar activity

Our GNSS firmware features unique countermeasures to ionospheric disturbances, maintaining accurate and stable measurements during solar storms.

Visit us at www.septentrio.com
The Seacon Group are world leaders in underwater connector technology and manufacture and supply an extensive and diverse range of electrical, optical and hybrid connector assemblies, submersible switches and cable system solutions for many applications within the oceanographic, oil and gas, defence, and environmental markets. On display at Oceanology will be our vast range including new product developments.

www.seaconworldwide.com
Stand F650.

Sensor Technology

Sensor Technology is bringing its broad portfolio of custom-made acoustic transducers, hydrophones and piezoelectric ceramics to Oceanology 2014. Recent projects include food-safe hydrophones for leak detection in potable water lines, Kevlar-bodied transducers for use in a CO₂ environment, transducers for use in oil well monitoring & fish net positioning applications, a low-current preamp for battery-powered applications, a battery-powered communications system transmitting at 1.6kHz and a broadband preamplifier with a useable frequency range from 1Hz - 2.5MHz.

Stand N201

SENSYS

SENSYS, a German manufacturer of fluxgates and survey equipment, will showcase its FGM3D UW series. The sensitive triaxial fluxgate sensors are encased in an ultra-compact housing, suitable for deployment in depths of up to 600m. With a weight of less than 500g and a length of 260mm, the probes can be integrated into existing systems. With the SENSYS toolbox approach, customers can shape their own solution and operate the probes with a data acquisition and digitiser unit. Each unit can take up to 10 triaxial probes at sampling rates of 2.000Hz. The units are cascadable and can be integrated into customer’s solutions due to an Ethernet interface. SENSYS offers probes and electronics and complete survey solutions.

www.sensys.de
Stand H250

Septentrio

Septentrio is featuring the upgraded AsteRx line of compact GNSS receivers at Oceanology International 2014. The new AsteRx receivers have been designed for continuous GNSS operations including receiving L-Band PPP corrections even during nearby Iridium transmissions. These receivers integrate novel RTK models that constantly sense their environment to optimally adapt to situations where GNSS signals can be distorted by reflective surfaces and to continuously deliver optimised accuracies. Additionally, the upgraded receivers include unique countermeasures to ionospheric disturbances, maintaining accurate and stable measurements during high solar storms.

www.septentrio.com
Stand R155

SIG France

SIG France is launching its new energy source for sparker-boomer seismics. The SIG Pulse power supplies use a new charging technology, for faster charging at 2000 joules per second. Intelligent electronics controls and secures the charge, discharge and short circuits. A big generator is no longer needed, no peak currents. 2000 joules in less than 50 kilos, makes it the easiest mob-demb sparker system on the market. Robust case with increased safety. This new energy source will replace the SIG 2mille which has spread on oceanographic research vessels over the past 10 years. For a good compromise of penetration/resolution in the seabed.

www.marine-seismic-equipments.com
Stand C300

TE Connectivity

TE Connectivity (TE) has developed a torque sensor module for ISO type torque tools. Remoted operated vehicles (ROV) use these sensors in critical offshore subsea applications for the control of the valves, gates or any pipeline management systems. With the SENSYS sensor module for ISO type torque tools, TE Connectivity has provided Hydrographic Survey training since 2000. At OI14 we will introduce our new approach to training by E-Learning. Currently available is the Bathymetry module: 7 subsets covering all aspects of this subject. Each subset includes queries, tasks and support that can be obtained via email and teleconferencing. A Skilltrade certificate will be issued upon successful completion. The 2 subsequent modules covering the subjects of GPS and Geodesy will be available later this year. Skilltrade provides Hydrographic Survey training from a two-day Introduction course to a full Hydrographic Survey Category B course in 12 weeks as accredited by IHO standards.

www.skilltrade.nl
Stand G600
Sonardyne International

On stand G300, Sonardyne’s new Connect software for LBL metrology campaigns will be making its debut along with the latest updates for Ranger 2 USBL. SensorView, a new software application developed for accessing raw sensor data direct from 6G instruments will also be displayed whilst optical and acoustic communications technologies, BlueComm and uComm, will be demonstrating wireless video and imagery transmission. Daily demonstrations will take place on board Sonardyne’s vessel where visitors can discover more about SPRINT INS, 6G LBL and USBL positioning technologies. Sonardyne is also presenting papers and participating in panel discussions in the Underwater Communications and Underwater Positioning and Metrology conference streams.

www.sonardyne.com
Stand G300

Skilltrade

Skilltrade has provided Hydrographic Survey training since 2000. At OI14 we will introduce our new approach to training by E-Learning. Currently available is the Bathymetry module: 7 subsets covering all aspects of this subject. Each subset includes queries, tasks and support that can be obtained via email and teleconferencing. A Skilltrade certificate will be issued upon successful completion. The 2 subsequent modules covering the subjects ofGPS and Geodesy will be available later this year. Skilltrade provides Hydrographic Survey training from a two-day Introduction course to a full Hydrographic Survey Category B course in 12 weeks as accredited by IHO standards.

www.skilltrade.nl
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www.sonardyne.com
Stand G300

TE Connectivity

TE Connectivity (TE) has developed a torque sensor module for ISO type torque tools. Remoted operated vehicles (ROV) use these sensors in critical offshore subsea applications for the control of the valves, gates or any pipeline management devices in deep seabeds. The sensor module is designed for robustness and high reliability. The device uses proven metal foil strain gauge technology in a Wheatstone bridge configuration for better accuracy and is complemented with TE’s superior harness design for robustness. The sensors offer high stability against shock, vibrations and humid corrosive environment. The product can be extended to variable sizes and applications of similar nature.

www.te.com
Stand L350
Teledyne Marine
Phase and Amplitude Detection
120° swath width
User defined beam distribution and angles
Sidescan and snippets
24 Bit Resolution water column backscatter data
Uncertainty Estimation

Raw data logging for post processing, beam forming, bottom detection
Titanium and Acetal construction
Field serviceable/upgradeable
Optional integrated Motion Sensor
Optional integrated GNSS/Heading Solution

Explore the entire feature-set of MB1 at www.odomhydrographic.com or call +1(225)769-3051.
During Oceanology International, Teledyne Marine will be hosting a series of 20-minute product introduction and training sessions in their stand. Participating companies will include Teledyne RD Instruments, Teledyne TSS, Teledyne CDL, Teledyne Benthos, Teledyne Webb and Teledyne Gavia. Also, visitors can look forward to new product presentations.

**Tritex NDT**

Tritex NDT will be showing their Multiple Echo Multigauge 3000 Underwater Thickness Gauge, which is a simple, robust underwater ultrasonic thickness gauge designed to survive extremely harsh conditions. The gauge uses multiple echo allowing measurements without the need to remove coatings, and the bright 10mm LED display ensures the display can be seen by the diver, even in poor visibility. The battery has a 55 hour run time. The gauge can be easily upgraded to a topside repeater by exchanging the end cap. The gauge will be shown alongside their ROV mountable thickness gauges fitting onto most ROVs allowing measurements to be taken at 1,000m and 4,000m. A dedicated probe holder ensures accurate presentation of the probe.

www.tritexndt.com

Stand E400

**Unique System (UK)**

Unique System (UK), a Unique Maritime Group company, is proud to be participating at Oceanology International 2014. Unique System (UK) will be displaying an array of products such as the Klein sonar, Tritech, Ixsea and Sonardyne 6G equipment, Unique Sealess Air Lift bags, etc. A major attraction will be the newly designed Unique Hydra eDMS100 dive monitoring system, which is the first fully integrated surface diver monitoring system; operating via a PLC/PC based unit that is housed in a standard 19" electronics rack with remote ‘Sensor Stations’ located at key areas around the dive system. The unit can be tailored to fit almost all current IMCA compliant diving systems.

www.uniquegroup.com

Stand J601

**Valeport**

Valeport is entering the optical sensor market introducing a chlorophyll fluorometer, which will be closely followed by a Turbidity sensor. The 0901 series optical technology has been developed following work carried out to enhance the Valeport-manufactured CTD sensor tags with a fluorometer for the Sea Mammal Research Unit, UK. The fast profiling miniCTD will allow integrated addition of the fluorometer or turbidity sensor. A revised conductivity cell and the addition of a fast response thermistor, coupled with a pressure sensor will appeal to users requiring high-quality data. For AUV and ROV users, the UV-SVP is a compact direct reading package. Already fitted to the Bluefin 9, the UV-SVP makes it ideal for survey operations. For OEM users, the ultraSV offers reduced size, low power and data rates up to 300Hz.

www.valeport.co.uk

Stand J301

**UltraSV**

UltraSV has been developed with OEM users in mind.

**Veripos**

Veripos, high-precision GNSS positioning specialists, are featuring a full range of worldwide capabilities headed by latest Apex2 and Ultra2 facilities providing dual GPS-Glonass sourced corrections, algorithms and availability of at least two satellites. Other main features include extensive ranges of proprietary software, including a new purpose-designed QC module providing inertially-aided solutions for DP applications developed in association with Sonardyne, Verify Axiom. Hardware exhibits comprise state of the art mobile receiver units including a new ruggedised 272-channel multi-frequency system compatible with both GPS and Glonass networks with provision for remote Ethernet access, the LD7.

www.veripos.com

Stand G400

**WASSP**

Designed and manufactured by ENI in New Zealand, WASSP is now one of the most widely deployed MBES in the world with 700+ systems reliably serving to a broad range of hydrographic and commercial applications. From fishing to dredging to complex mapping applications, WASSP provides a reliable and comprehensive real-time MBS solution at a very competitive price point.

WASSP Multibeam Sonar offers real-time or post-processing for reliable water column and seafloor mapping data in a very comprehensive package. It is capable of being operated as a standalone real-time system with its own Navigator software suite or interfaced to engineering suites such as QPS’s QINSy, Hypack or EIVA.

www.wassp.com

Stand G700

**WASSP MBES in GPS QINSy during harbour trials.**
Serving the world of Hydrography & Oceanography

- Tide Gauges
- Sound Velocity
- Current Meters
- CTD & Multi-Parameter
- Echo Sounders & Bathymetry
- Wave Recorders
- Telemetry Instruments
- Ocean Engineering

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Valeport Ltd • St Peter’s Quay • Totnes • Devon • TQ9 5EW • United Kingdom
www.valeport.co.uk
Xsens

Xsens, the leading innovator in 3D motion tracking technology and products, will show the entire range of its next generation MTi technology at Oceanology International in London. The Xsens MTi portfolio consists of 7 distinctive models including Inertial Measurement Units (IMU), Vertical Reference Units (VRU) and Attitude and Heading Reference Systems (AHRS). The Xsens MTi is a proven product for use in many maritime and oceanographic applications that require 3D orientation, 3D position, 3D velocity and 3D dynamic data. Visit Xsens at booth I350 for a live demonstration of our products.

www.xsens.com
Stand I350

Xylem Analytics

Xylem Analytics will be exhibiting at Oceanology International on stand G200 along with our manufacturers Aanderaa, Sontek and YSI. Highlights for the show will be the release of a new Doppler Current Profiler from Aanderaa with many enhanced features over previous instruments. YSI will be showcasing their EXO water quality sonde which has been very popular in the marine sector due to its large sensor payload, robust material construction and excellent anti-fouling capabilities. We will also be displaying one of our coastal buoy platforms, the EMM700, demonstrating how instruments from all the Xylem brands can be incorporated into a complete monitoring solution.

www.xylemanalytics.co.uk
Stand G200

Zodiac Milpro is the worldwide leader in commercial and professional Rigid Hull Inflatable Boats and inflatable boats.

Our products are designed and constructed in our ISO 9001 registered facilities to the highest international construction standards including EC, IMO SOLAS, and others.

Contact us to discuss how we may meet your operational requirements. Visit us at www.zodiaccmilpro.com or contact your local Zodiac Milpro dealer.
Install established its main office in Monte Di Procida, Naples, Italy in 2013, and this choice of location was not by chance. The proximity to Pozzuoli Port and the easy access of the harbour area make this a strategic location. Install focuses on subsea investigations and geophysical surveying.

Install is a private Italian company founded in Naples in the 2010 by two founders, Gennaro Illiano and Mimmo Pazzanese. At the start of its activities the core business of the company was supporting other survey companies in mobilisation and calibrations of vessels and technical consultancy services. After a year of activities, Install was awarded a contract with Construction Company Land Oil Company in 2011 providing the company with experience in the offshore market by performing prevalently geophysical and geotechnical surveys and pipeline inspections. Install’s founder is currently also the managing director and CEO of the company.

Install’s manifesto is to be a team and work as a team, we do not like solitary actions. We believe that our personnel working offshore must have a direct and a constant link with people onshore and they must be supported at all times during the project by the onshore management. This philosophy has come from the direct experience of the Install management on board vessels. This philosophy is also reflected in our office where the open plan office offers a direct response between the operational staff and management, removing distance and ‘walls’.

The core business of the company is:  
- Subsea pipeline/cable inspections, repair and maintenance  
- Subsea construction services  
- Geophysical and Geotechnical surveys  
- Aerophotogrammetry – using UAV systems  
- Dam inspections  
- Dangerous and restricted area inspections  
- Installation of offshore structures  
- Land surveys  
- Data Processing CAD and GIS  
- AUV surveys

Key positions within the company are currently held by: Gennaro Illiano, general director (Figure 1); Mimmo Pazzanese, director (Figure 2);
Frederich Le Floch, commercial manager (Figure 3); Paolo Attanasio, operations manager (Figure 4). The company has the following departments: logistics, data processing and reporting, offshore team and a technical assistance department with a total of 25 employees.

Install continues to look at the oil and gas market thanks to new field developments in areas like South America, West Africa and the Far East where the positive feedback from major oil companies has placed Install as a primary contractor for IMR and Geophysical services for those companies. As a member of the Italian Petroleum and Mining Industry Association, Assomineraria, Install has the opportunity to sit at the same table as major operators in the Mining sector, offering its technology as added value to enrich global success. A quote from their website: “...Assomineraria represents dynamic industrial sectors whose output is significant and, in many cases, growing in the international market. Their strengths - new projects, employment, investments and ongoing technological innovation - are always paired with the commitment to respect safety and the environment. Growth is based on two main guidelines: sustainability and full transparency with stakeholders and in operation areas. The activities carried out in Italy by Assomineraria and the companies it represents has led to the valorisation of very important underground resources from an economic and strategic point of view; it has also contributed to the development and implementation of operational and technological skills, which are strongly competitive on the global market. Re-launching these activities could be an important factor for our country in a moment of great economic difficulty and deep recession trend”.

As a survey company, Assomineraria has included Install under the headings Manufacturers and suppliers of Equipment and the Service sector to implement the investment for the Italian Hydrocarbon upstream programme. The energy, oil and gas sector is not the only sector where Install is placing its market strategy on renewable energy represented by offshore wind farms. The offshore wind capacity of Europe is increasing significantly yearly, with 2013 set for over 25% growth compared to 2012. So far in 2013, 1226.10MW worth of projects have entered full commissioning with a further 963.60MW of turbines installed and 3298.40MW under construction. For projects currently under construction, the capacity for the following graphs has been divided into what has not been installed (Figure 5).

Italy is following the European trend of endorsing several projects that are under construction and will be completed between 2015 and 2016. It should not be difficult for Install to enter the renewable energy market as Install can offer a number of services related to the development or installation of wind farm fields.

Part of Install’s international market strategy is the opening of new branches in countries where there is an increasing demand from international clients for Install to open new offices, for example, in Algeria in partnership with a local company, and in France, Indonesia, USA, Namibia, Congo and Ghana.

With regard to new technology, Install is developing a new solution for fast response surveys in shallow water using surface unmanned vehicles – GIS applications – Android RS232 advanced serial tester. Install is also continuing a project for training new recruits through the Install Academy training school – and is developing a navigation and hydrographic software simulator.
INIS Hydro Seabed Mapping Project

Maritime & Coastguard Agency

Since January 2011, an ambitious EU-funded seabed mapping project has been surveying and charting 7 key marine areas off the Republic of Ireland, Northern Ireland and the west coast of Scotland. Their mission?

To harmonise and integrate cross-border baseline marine data collection between the UK and Ireland.

LED BY THE UK’S MARITIME & Coastguard Agency (MCA), INIS Hydro is a groundbreaking scientific partnership between 7 leading marine organisations, drawn from across the British Isles:

- Agri-food & Biosciences Institute (AFBI);
- Geological Survey of Ireland (GSI);
- Irish Marine Institute (MI);
- Northern Lighthouse Board (NLB);
- Scottish Association for Marine Science (SAMS); and
- UK Hydrographic Office (UKHO).

Tasked with gathering over 1,400km² of high-quality seabed mapping data to the IHO Order 1a standard, the project partnership has been collecting high-resolution multibeam bathymetry, geo-coded backscatter and seabed sediment data off Ireland (Dundalk Bay), Northern Ireland (the south-east Mourne Coast, Carlingford Lough and Dundrum Bay), and Scotland (the Firth of Lorne and off the Mull of Kintyre), for the past 3 years.

Joint Irish Bathymetric Survey

An evolution of the earlier Joint Irish Bathymetric Survey (JIBS) pilot (an INTERREG IIIA Programme project delivered in partnership between the MI and MCA in 2008), INIS Hydro has built on the success of this previous work by bringing together a number of organisations for the first time, developing a common hydrographic survey requirement, and facilitating standardised data acquisition to maximise data re-use and in turn support the local cross-border blue economy.

Critical to the success of the project has been the common acquisition of high-quality, high-resolution multibeam data to rigorous international standards. In collecting this detailed, full coverage baseline seabed mapping data throughout the 7 focus areas, INIS Hydro has compiled data assets that have mass appeal across a number of marine sectors - truly ‘gather once; use many times’.

Underpinning all of this effort has been the outstanding level of
cooperation between the project partnership. Hydrographic experts from the GSI, MI and UKHO regularly supported their partners from Northern Ireland and Scotland, and latterly, the MCA also provided additional survey support with the loan of multibeam echo sounding equipment, and the extension of their Civil Hydrography Programme (CHP) services contract to facilitate data acquisition.

With survey operations now complete, the benefits realisation from INIS Hydro has begun in earnest. To highlight just a few examples of the project’s ongoing legacy:

- INIS Hydro data is being utilised by a renewables developer in the Kintyre region to form a valuable construction and engineering planning resource;
- Marine scientists at SAMS have surveyed the World’s 3rd largest naturally occurring whirlpool in the Gulf of Corryvrecken, and in the process have solved a ‘centuries old Scottish mystery’ by discovering that a suspected submarine pinnacle believed to be responsible for causing the whirlpool, was instead a steep sided buttress;
- Again at SAMS, 13 previously unknown wrecks in the Firth of Lorn have been found to include 2 flying boats - a Catalina and a Sunderland - dating back to the Second World War. These and other wrecks discovered by INIS Hydro are set to be investigated as part of Wessex Archaeology’s Scottish Atlantic Maritime Past; Heritage, Investigation, Research and Education (SAMPHIRE) project (↗ 2).
- INIS Hydro data is unsurprisingly being used to update nautical charts in the cross-border region covered by the 7 INIS focus areas. Once all data has passed validation and has been quality assured by the UKHO, the data will be incorporated onto new chart compilations, with corresponding updated chart editions being published shortly thereafter.

With the project shortly due to come to an end, the INIS Hydro partnership hosted a closing seminar at the impressive Titanic Belfast on 3 December 2013. Attracting around 60 attendees, the event marked the close of the project, and showcased its mapping and capacity building achievements, as well as presenting an exploration of the future uses of the project’s data. The event, with a keynote speech by the MCA’s chief executive, Sir Alan Massey, was particularly well received and concluded with an unveiling of a permanent display within the Titanic Belfast exhibition.

Looking to the future, the INIS Hydro partnership is already considering their next big project. With established links and a desire to collaborate, early work is already underway to identify survey priorities through the Irish Sea and into the North Channel, to add additional value to data gathered under JIBS and INIS Hydro - by filling the gaps between the two, and to augment national survey efforts under Ireland’s INFOMAR Programme and the UK’s CHP.

Results Available Online
INIS Hydro formerly closes on 31 March 2014. Along with the INIS Hydro survey specification, results of the project will be made freely available from the project website (↗ 1). Data downloads will be available directly from the UKHO’s INSPIRE and Bathymetry Data Archive Centre portal (↗ 3).

This work has been part-financed by the European Union’s INTERREG IVA Programme to promote cross-border collaboration for a more prosperous and sustainable region. Match funding has been provided by the Department of the Environment Northern Ireland (DoE), the MCA, the Natural Environment Research Council (NERC) and the NLB.

For more information on the INIS Hydro seabed mapping project or the work that the Project Partners undertake, visit [1].

1. www.inis-hydro.eu
2. blogs.wessexarch.co.uk/samphire
3. www.ukho.gov.uk/inspire
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Coordinating the Technical Programme of the IHO

The IHO’s technical programme covers the development, maintenance and extension of the international standards, specifications and guidelines that underpin the official products and services intended to meet the requirements of mariners and other users of hydrographic information. The technical programme is overseen by the IHO’s Hydrographic Services and Standards Committee (HSSC) composed of representatives of Member States, international organisations cooperating with the IHO, industry and academia. The HSSC meets annually and coordinates a number of working groups dealing with specific subjects. The fifth meeting of the HSSC took place in Shanghai, China from 4 to 8 November 2013.

**e-Navigation**

The IHO technical programme is facing major challenges with an explosion in new information technologies and the proliferation of new expectations and requirements. For example, the International Maritime Organization (IMO) e-Navigation project is a major initiative that depends on the existence of appropriate standards for chart services and associated products. Furthermore, the new IHO S-100 Universal Hydrographic Data Model has been designated as the preferred baseline data structure for other maritime information in e-Navigation.

**IHO S-100**

S-100 is a framework geospatial standard developed by the IHO. It specifies methods and tools for data management, processing, analysing, accessing, presenting and transferring hydrographic and related maritime information in digital form between different users, systems and locations. S-100 conforms as far as is reasonably possible to the ISO 19000 series of geographical information standards, and where necessary has been tailored to suit hydrographic requirements. The ongoing development work is conducted in close liaison with ISO and with other international organisations such as the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), the Intergovernmental Oceanographic Commission (IOC), and the World Meteorological Organization (WMO), all of which intend to use S-100.

The first edition of S-100 entered into force in January 2010. The HSSC is now overseeing the preparation of a second edition that will include additional content, and the development of associated product specifications, notably S-101, the product specification for a second generation of Electronic Navigational Charts (ENC). At its last meeting, the HSSC agreed on a S-100 master plan and a S-101 roadmap to guide these developments. They include a test-bed strategy incorporating, among others, projects presented by the Republic of Korea, and liaison with a new phase of the Marine Electronic Highway Project in the Straits of Malacca and Singapore to demonstrate the use of dynamic tides and proposed new chart quality indicators in ECDIS.

The Committee reviewed the coordination of S-100 related activities associated with the development of the IMO e-Navigation Strategy Implementation Plan and agreed that the implementation of e-Navigation is an important driver for the uptake of S-100 based products and services.

**Restructuring of IHO Technical Working Groups**

In order to respond to new challenges and to refocus its resources, the HSSC recently discussed the re-structuring of its working groups. It agreed on a number of principles intended to improve the efficiency of its working groups and to facilitate input from industry and other stakeholders. The Committee agreed to reduce the number of existing working groups and to establish time-limited project teams to undertake specific tasks. Noting the central role that the S-100 standard and associated product specifications will play in future activities of the IHO, it was agreed that a dedicated S-100 working group would be formed to support the standard.

**Next Meeting of HSSC**

The next meeting of the HSSC will take place from 10 to 14 November 2014, in Valparaiso, Chile.
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New Workcat for Survey Work in Baltic

Finnish survey company FCG (Finnish Consulting Group) has placed an order for a new GRP survey boat from Blyth Workcats, UK. The 14-metre catamaran will be known as the Nordic Sonar and it is being built to meet the specialised needs of the FCG survey teams. It will be based in Turku, Finland, and is being fitted with a comprehensive heating system and insulation suitable for its use in the demanding conditions off Finland and in the northern Baltic.

bit.ly/1bi5BKE

Drone for Aquatic Habitat Surveys

BioSonics and The Oceancience Group (USA) have released a portable, remotely operated habitat-mapping survey boat, the Z-Boat 1800MX. A combination of Oceancience’s remote hydrographic survey boat and BioSonics’ MX echo sounder, the Z-Boat 1800MX allows researchers to obtain quantitative measurements of aquatic vegetation and substrate distribution without the expense and effort of launching a manned boat.

bit.ly/1bi5RJP

Sonar Mosaic Tool for ROVs

SeeByte, UK, has presented a new multibeam imaging sonar mosaic tool for use with SeeTrack CoPilot software. Users of SeeTrack CoPilot are now able to generate a multibeam imaging sonar forward-look mosaic using a simple on/off button in the SeeTrack CoPilot interface. The tool can be used to quickly generate maps of the environment and improve ROV pilots’ situational awareness.

bit.ly/1bi6mDw

SBG Systems Unveils Ekinox Subsea Series

At SUBSEA EXPO (Aberdeen, UK), SBG Systems, France, unveiled the Ekinox Subsea Series, a product family of survey-grade inertial systems designed for underwater applications up to 6,000m. Based on the robust and cost-effective MEMS technology, the series includes the Ekinox-M, a Motion Reference Unit (MRU) and the Ekinox-U, an underwater Inertial Navigation System (INS).

bit.ly/N6goMT

Turbulence Profiler for Bergen University

Rockland Scientific, Canada, has been awarded a contract to deliver a VMP-250 Turbulence Profiler to the University of Bergen, Norway. The VMP-250 system includes a buoyancy collar and remote-controlled weight release mechanism, allowing the profiler to be operated in an uprising configuration.

bit.ly/1bi6tix

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bit.ly/1bi6tix

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Preparations Underway for Shallow Survey 2015

The United Kingdom Hydrographic Office (UKHO) and the Maritime and Coastguard Agency (MCA) will host 'Shallow Survey 2015', the 7th International Conference on High Resolution Surveys in Shallow Water, and a number of associated events in Plymouth, United Kingdom, from 14 to 18 September 2015. The conference is being held in conjunction with Plymouth University, which as principle sponsor has offered its facilities as the conference and exhibition venue. bit.ly/1bi67bO

Xchange Sensor Heads Now Calibrated in Europe

AML Oceanographic (AML, Canada) has partnered with OSIL to offer Xchange sensor recalibration services at OSIL’s facilities in the UK. With a European recalibration centre, field-swappable sensor heads become even more convenient for European users of oceanographic instrumentation. OSIL is expected to begin accepting Xchange sensor heads for recalibration by 1 March 2014. bit.ly/N6geV7

Habitat Classification Added to Echoview

With the 2014 release of Echoview 6 comes the module Habitat Classification that sees Echoview’s processing capabilities extended to acoustic bottom data. The Habitat Classification module will enable the user to classify river bed, lake bottom and seafloor types from single, dual and split beam echo sounder data. bit.ly/1bi5kH5


ADCPs and CTDs for Research

Teledyne RD Instruments, USA, has announced the official opening of its 2014 Academic Grant programme. Teledyne RDI will provide the academic oceanographic community with the opportunity to utilise these products free of charge for a near-term deployment via Teledyne RDI’s Academic Product Grant. Applications are due by 15 April 2014; awardees will be announced on 15 May 2014. http://bit.ly/1gk278b
Hugin AUV for Polish Navy Mine Countermeasures

Remontowa Shipbuilding in Gdansk, Poland, has selected Kongsberg Maritime to supply a HUGIN 1000 MR Autonomous Underwater Vehicle (AUV) and associated underwater communications and positioning equipment for mine countermeasures (MCM) applications, as part of a minehunter class vessel delivery for the Polish Navy. The delivery includes the HiPAP underwater communication and positioning system, which provides USBL updates and underwater data communication with the HUGIN 1000, or other underwater vehicles.

HUGIN 1000 AUV

HUGIN 1000 AUV

HYPACK 2014 Training Event Biggest Ever

HYPACK concluded its 21st HYPACK Training event which was held from 13 to 16 January 2014 in the heart of Mobile, USA - Alabama’s only saltwater port. With nearly 300 on-site attendees from over 15 different countries and 6 continents, and more than 1,900 remote viewers, this was HYPACK’s biggest event ever. USACE and NOAA participated at the event.

About 300 attendees for HYPACK 2014.

Long-range Ultra-high Resolution Side-scan Sonar

EdgeTech, USA, has introduced the 2205 AUV-based sonar system. The Teledyne Gavia AUVs delivered recently to the Polish Ministry of Defence for mine countermeasures (MCMs) were equipped with EdgeTech 600/1600kHz simultaneous dual-frequency side-scan sonar payloads. The very high frequency EdgeTech systems were selected for their long-range detection and ultra-high resolution classification capability for MLOs (mine-like objects).

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Hugin AUV for Polish Navy Mine Countermeasures

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HSR is happy to continue its cooperation and participation in activities of the historical-geographical club named Boris Vilkitsky at St. Petersburg school No. 43.

The last activity took place on 4 December 2013. It was devoted to the 200th anniversary of the outstanding Russian researcher of the Okhotskoe Sea, mouth of the river Amur, Tatar strait and Sakhalin island, admiral Gennady I. Nevelskoy (1813 - 1876).

The commemoration activities were carried out at the initiative of the club and took place close to the house where the Admiral lived and where a memorial plaque to the Admiral had been unveiled seven years ago.

Members of the club, school-boys, veterans of the Navy, historians, representatives of the city and citizens of St. Petersburg gathered here. HSR members rear-admiral (ret.) Grigory Baranov, rear-admiral (ret.) Vyacheslav Solodov, captain (ret.) Svyatoslav Mishin, captain (ret.) HSR Secretary Valentin Smirnov, Mr. Viktor Rybin and Mrs. Irina Tikhomirova were also present at the meeting.
At precisely midday, after the signal ‘Listen to all!’, HSR Secretary V. Smirnov declared the meeting open and made his opening speech after a performance by an orchestra of the Hymn of St. Petersburg.

Then young people and their senior colleagues took to the stage. Georguy Lazarev and Konstantin Monetov, students of school No. 43, read verses devoted to the Admiral. Another student, Cyril Vodolazsky, greeted everyone from the native land of Admiral, the Kostroma area. Andrey Saladin, a seafarer cadet trainee, also made a brilliant speech.

Others who took the floor included the assistant head of the St. Petersburg Primorsky district Administration, Mr. Igor Lyubchenko; the head of school No. 43, Lyudmila Rastorgueva; and also HSR members Svyatoslav Mishin, Grigory Baranov and Viktor Rybin. They all recalled the merits of Admiral Gennady Nevelskoy and expressed their gratitude to the head of school No. 43 and especially to the geography teacher, Elena Nazarenko, who has supervised the Club for more than 10 years. To end the meeting, Elena Nazarenko described the activities of the club.

Then two Navy seamen platoons conducted a ceremonial march past with their banners, accompanied by the orchestra. Participants then also laid flowers at the memorial to Admiral Gennady Nevelskoy.

Just one week after Oceanology International, on Wednesday 19 March 2014, the Hydrographic Society Benelux will gather at the Hogere Zeevaartschool Antwerpen (Belgium) for a workshop. This meeting will focus on the creation of the ‘Flemish Bays’, a series of islands in the North Sea serving various purposes. The most remarkable is an atoll that will act as a safe harbour for vessels in distress, with all the facilities to salvage and prevent further pollution in the sea, an area for high capacity windmills and a tidal generator. The internal lake will be able to fill itself when the tide rises, and to empty itself when the tide falls.

After a word of welcome by Capt P. Blondé, managing director of the Hogere Zeevaartschool, advisor for the North Sea at the Cabinet of Minister Vande Lanotte, Marijn Rabaut, will give a presentation, followed by a talk by Dr Walter Mondt, CEO of Ecorem.

The meeting will also include the Annual General Meeting of the Hydrographic Society Benelux and the presentation of the awards for the best thesis.

The workshop will take place in the afternoon. For further details and registration go to the website: www.hydrographicsocietybenelux.eu.
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HydroAgenda

MARCH

VLIZ Young Marine Scientists’ Day
Brugge, Belgium
→ 07 March
For more information:

Maritime Security 2014 East
Boston, USA
→ 10-12 March
For more information:
E: wlusk@maritimesecurity-outlook.com
W: www.maritimesecurityeast.com

Oceanology International 2014 (OII2014)
London, UK
→ 11-13 March
For more information:
W: www.oceanologyinternational.com

Hydroacoustic Workshop
Seattle, USA
→ 18-20 March
For more information:
E: sales@biosonicsinc.com
W: www.biosonicsinc.com/services-training.asp

Gastech 2014 Conference & Exhibition
South Korea
→ 24-27 March
For more information:
E: info@gastech.co.uk
W: www.gastechkorea.com

Offshore Technology conference Asia
Kuala Lumpur, Malaysia
→ 25-28 March
For more information:
W: www.otasia.org/2014/

APRIL

OCEANS’14 MTS/IEEE Taipei
Taipei, Taiwan
→ 07-10 April
For more information:
W: www.oceans14-mtsieee.org
GeoMaritime
London, UK
→ 08-09 April
For more information:
W: www.geomaritime.com

International Convention
Marine Renewable Energy
Cherbourg, France
→ 09-10 April
For more information:
W: www.theitis-emr.com

OTE & CIMPS
Nanjing, China
→ 05-11 April
For more information:
E: jennifer@vaec-expo.com
W: www.ote-china.com/en

ENC-GNSS 2014
Rotterdam, The Netherlands
→ 14-17 April
For more information:
W: www.enc-gns2014.com

Canadian Hydrographic Conference (CHC)
St. John’s, Canada
→ 15-17 April
For more information:
W: www.chc2014.ca

Underwater Acoustics & Advanced Courses in
Acoustic Monitoring of Marine Wildlife & Oil Industry,
Civil & Navy
Bath, UK
→ 28 April-02 May
For more information:
E: sarah@seiche.eu.com
W: www.seiche.com

MAY

EIVA NaviSuite User Group
Skanderborg, Denmark
→ 05 May
For more information:
E: nbi@eiva.com

AUVSI’s Unmanned Systems
Orlando, USA
→ 12-15 May
For more information:

IHO CBSC and IRCC
Brest, France
→ 14-16 May
For more information:
W: www.iho.int/mtg_docs/CBC/CBC11/CBS21+IRC25-registration.htm

JUNE

28. Hydrographentag
Lubeck, Germany
→ 02-04 June
For more information:
W: www.hdg.de/h2014

CARIS 2014
Brest, France
→ 02-06 June
For more information:
W: www.caris.com/caris2014

Energy Ocean
Atlantic City, NJ, USA
→ 03-05 June
For more information:
E: kkleighton@accessintel.com
W: www.energyocean.com/

GeoMaritime APAC
Singapore
→ 10-11 June
For more information:
W: www.geomaritimeapac.com

ADCPs in Action 2014
Utrecht, The Netherlands
→ 11-12 June
For more information:
E: info@aquavision.nl
W: www.aquavision.nl

OCEANS’14 MTS/IEEE
St. John’s, Newfoundland and Labrador, Canada
→ 14-19 September
For more information:
E: info@oceans14mtseest-johns.org
W: www.oceans14mtseest-johns.org

AUGUST

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

SEPTEMBER

Oceanology International China 2014
Shanghai, China
→ 03-05 September
For more information:

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

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

OCEANS’14 MTS/IEEE
St. John’s, Newfoundland and Labrador, Canada
→ 14-19 September
For more information:
E: info@oceans14mtseest-johns.org
W: www.oceans14mtseest-johns.org

OCTOBER

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

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

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

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

Calendar Notices
Please send notices at least 3 months before the event date to:
Trea Fledderus, marketing assistant
E: trea.fledderus@geomares.nl
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Sustainable Marine Environment and Habitat: Who is Responsible?

Marine environments offer different opportunities for varied aspects of human activities. On the one hand, these opportunities can be in terms of diversified natural and man-made resources both within and beneath the seabed. On the other hand, the activities are always on the increase, their importance must be geared towards effective and sustained uses of the ocean. There are different global trends of unsustainable use of the oceans, one of the questions that should come to mind is “Who is Responsible”?

For the Asia Pacific region, in Malaysia for instance, two of the agencies involved in the regulation and management of the marine environment and waters resources are the Department of Environment and the Marine Department of Malaysia.

These regulations are inherently important for both coastal and deep-sea navigations, as Malaysian waters serve as part of the global seaborne lanes for the transportation of goods and services. For example, the Strait of Malacca is one of busiest world lanes.

Sustainable use of the marine environment has been on the increase in many respects in Malaysian waters. However, the dumping of sediment on the Great Barrier Reef in Australia to pave the way for dredging activities for the expansion of a coal port has also recently been announced (31 January 2014).

In my view, it is the responsibility of all agencies and stakeholders, both private and public, with regulations that must be strictly obeyed and adhered to. It is also partly the responsibility of the stakeholders to ensure that there is adequate human capacity, training, and re-training in the face of information and communication technology.

For example, cases in which single beam surveys were used in some Asia Pacific regions by hydrographers where multibeam echo sounders should have been used for their hydrography campaigns should not be tolerated. The relevant authorities requesting for the survey for dredging work need to play their part in demanding that multibeam echo sounders must be used for the survey. Furthermore, the hydrographers can play their role in recommending that relevant authorities carry out multibeam surveys.

As such, hydrographers should be seen as part of the bedrock for sustainable marine environments. This is also one of the responsibilities of hydrographers. ☀️

Dr. Mohd Razali Mahmud
Universiti Teknologi, Malaysia

Marine environments offer different opportunities for varied aspects of human activities. On the one hand, these opportunities can be in terms of diversified natural and man-made resources both within and beneath the seabed. On the other hand, the activities are always on the increase, their importance must be geared towards effective and sustained uses of the ocean. There are different United Nations chapters and other regional national and local regulations and drivers that have been at the forefront of championing the course of sustainable marine environments. The United Nations Convention on the Law of the Sea and the Rio Declaration are a part of such declarations for the utmost administration and use of the seas and oceans of world.
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