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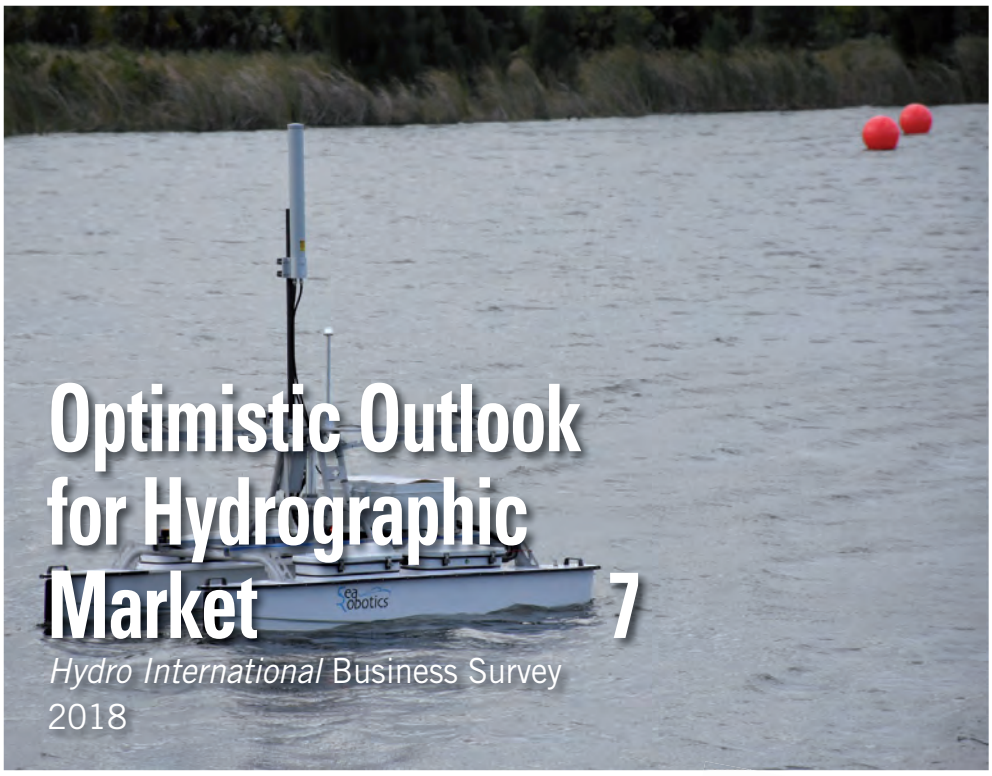

5 Questions to…

Mobilisation of a Teledyne Gavia AUV. Articles in this Hydro International *Business Guide point out that amongst the important factors in the hydrograhic business, the availability of qualified professionals and adoption of technology will make a difference.*

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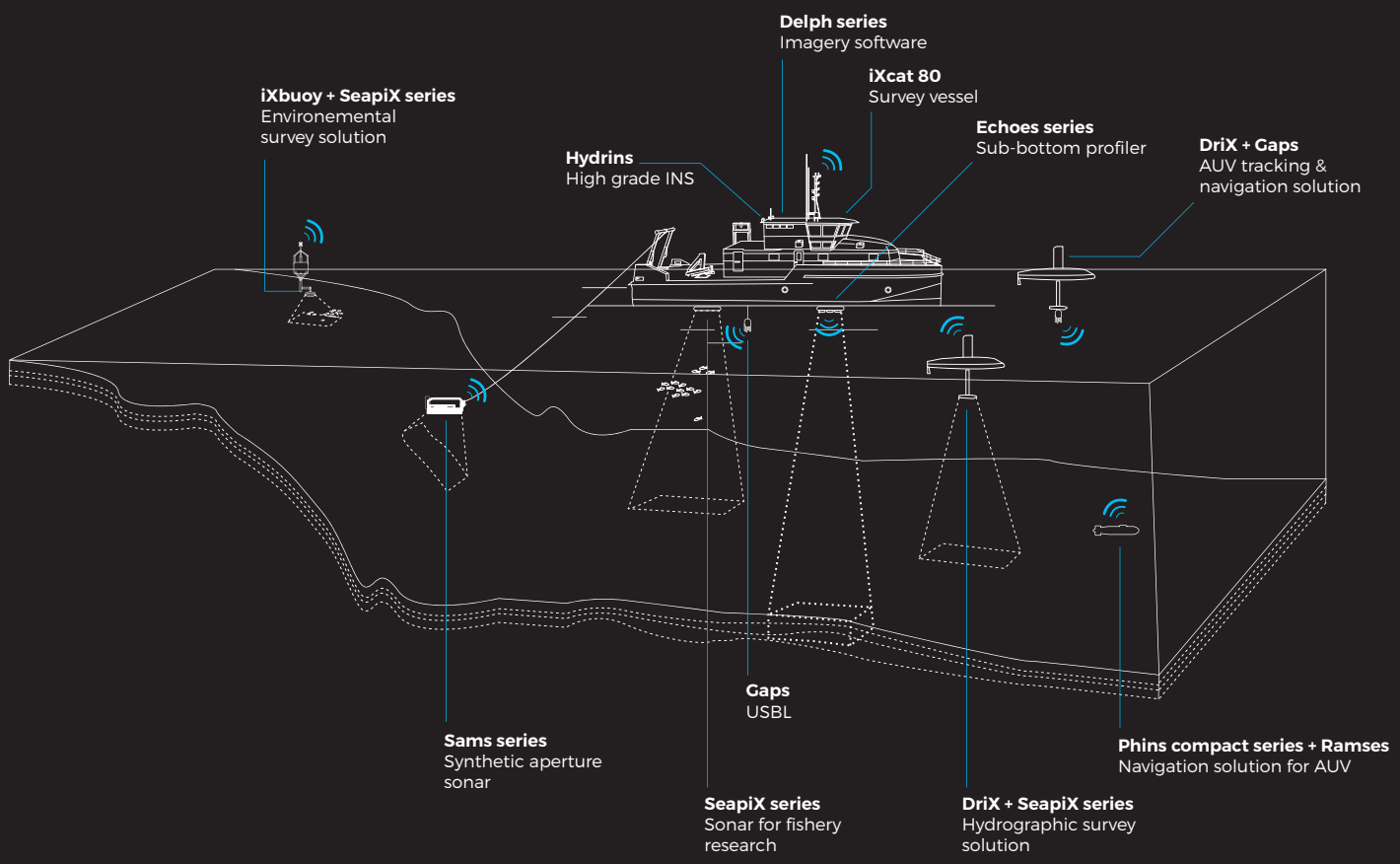

iXblue

Hydro INTERNATIONAL

Hydro International is an independent international magazine published 6 times a year by Geomares Publishing. The magazine and related e-newsletter inform worldwide professional, industrial and governmental readers of the latest news and developments in the hydrographic, surveying, marine cartographic and geomatics world. Hydro International encompasses all aspects, activities and equipment related to the acquisition, processing, presentation, control and management of hydrographic and surveying-related activities.

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

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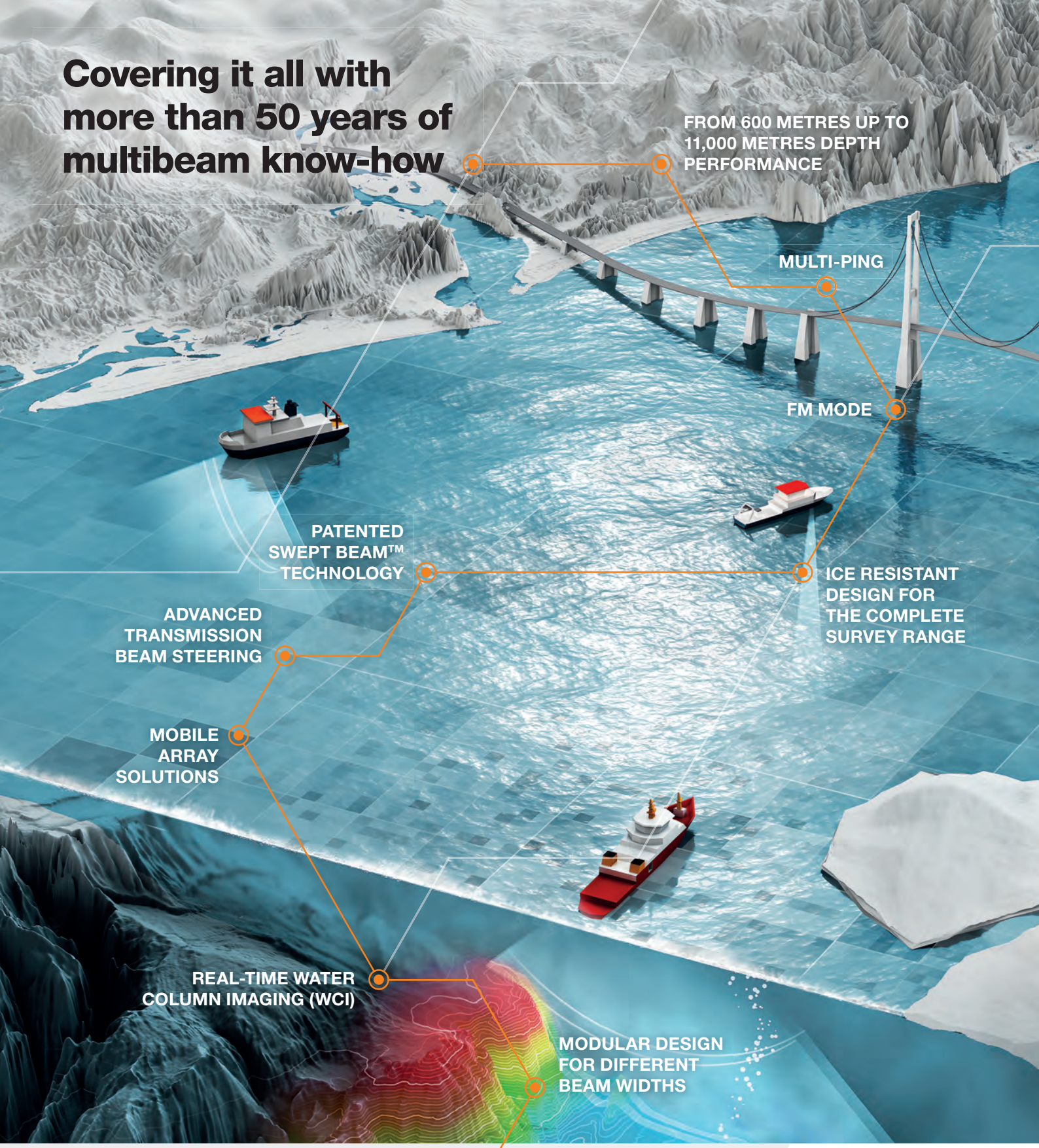
Right track

This years' Business Guide contains a mix of feature articles that will help you do better business in 2018! Topics we cover include recruitment and management for companies active in our industry, which is a very important factor in the successful lifecycle of a company. We also give you an update of the latest insights *Hydro International* gathered by surveying our community. How will the business develop in 2018 and beyond? I can assure you that it's by no means all doom and gloom! On page 41 of this Business Guide Emma Campbell, business manager with Atlas Professionals, shares her views on how to successfully recruit. A few of her golden tips: give good feedback, also to candidates you are not hiring (and not just because they need it, but also because it is bad for your reputation not to!); and ensure that human contact is a major factor in the recruiting process. There's still no better method when hiring somebody fit for the job, than talking to them in person. Both tips seem rather obvious, but when things get busy, they are often forgotten. Jos Anneveld of Aerovision in the Netherlands has written a story for managers in geo-companies on management and entrepreneurship, based on decades of managerial experience, amongst others with Fugro. For entrepreneurs in hydrography I would like to highlight at least one tip: incorporate the blue ocean strategy. Again, it sounds obvious, but when developing new services and products, go for those that can be positioned with as little as possible competition. Otherwise you become easy prey for the sharks of the competition in the red ocean. For more, see page 35. Content manager Joost Boers gives you a heads up on the newest data and insights that *Hydro International* gathered on where the business is heading according to the community on page 7. Good news is that the trend is up, according to our respondents! As many as 52,5% of the respondents expect moderate growth of between 0-10% in the next three years. I know that this is quite a broad range and that growth of just 1 or 2 percent will barely make up for the increase of cost base, but we need to be optimistic and work towards that double-digit figure of a 10% increase. We asked our respondents about factors holding back growth. Interestingly enough, besides the much lamented slow oil and gas industry, it is the availability of well-trained staff that seems to be a major problem. It is difficult to find and to retain well-skilled personnel. And this brings us back to the first point made: recruitment and management. Finding the right tools to recruit good people and subsequently being able to keep them loyal to your company for years to get the best out of them and contribute to growth! We hope this Business Guide will help put you on the right track or convince you that you are already!

Durk Haarsma durk.haarsma@geomares.nl



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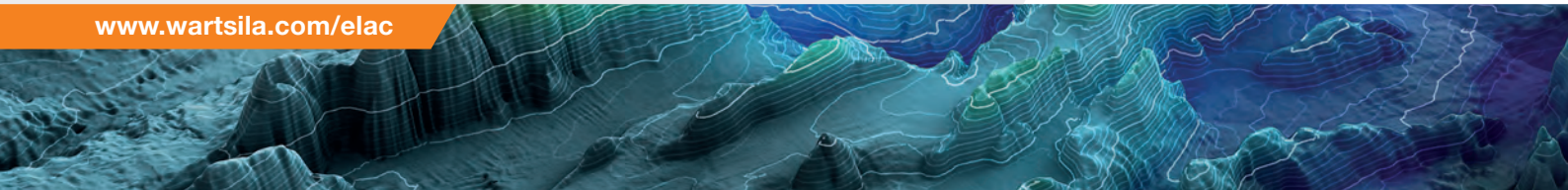


Hydro International Business Survey 2018

Optimistic Outlook for **Hydrographic Market**

How is the hydrographic profession doing as a business? Running up to the start of 2018, *Hydro International* decided to turn its sounder on and to listen to the voice of professionals. What do they think of the market position? What are the commonly felt challenges? And what are the opportunities in the near future? Does the sector have plans to expand and are there investment initiatives? We are proud to present the outcomes of our survey in this article.

In preparation for the *Hydro International* Business Guide 2018, a business survey was conducted to see how the hydrographic business is evolving. One of the goals was to see if the traditional concept that we have of the hydrographic surveying business matches reality – where the profession is moving and of course, where opportunities can be found. A total of 311 professionals contributed to the results that are discussed in this article.

Keep up to date with technology advances

Maritime Mapping Clearly First

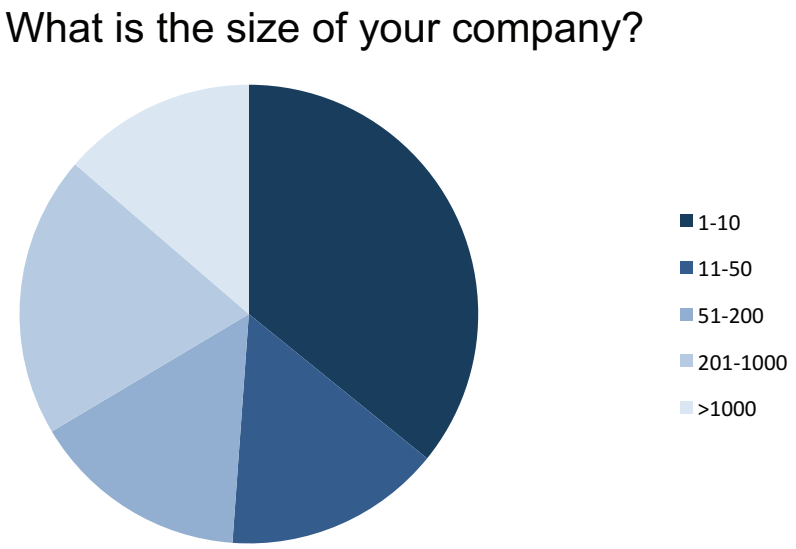
A majority of the respondents (42%) indicated that they work in hydrographic surveying, and if we add to this the categories 'Mapping' (5.18%), Electronic Charting/GIS (4.21%) and cartography (1.94%), the traditional scope of hydrography, being surveying for safe navigation, is covered quite well. Environmental research is the next biggest category, 6.15% of the respondents are active in this field. If we consider the construction sectors, engineering surveying was indicated by 5.18% as their main activity, followed by offshore construction (3.56%) and construction surveying (2.27%). Dredging is the activity of 2.59% of the respondents. Looking at the systems that are used for surveying, remote sensing and Lidar were each mentioned as the main occupancy 2.27% of the times – satellite bathymetry was not named. Another category that was named specifically was positioning, metrology (1.29%) and GNSS (1.29%). Professionals that included their own description were in education and training, (software) research and development, or indicated to be in more than one category.

Looking at company sizes, most respondents work in organisations that employ less than 10 employees (35.8%) – or bigger organisations: 201-1000 employees (19.9%) and more (13.7%).

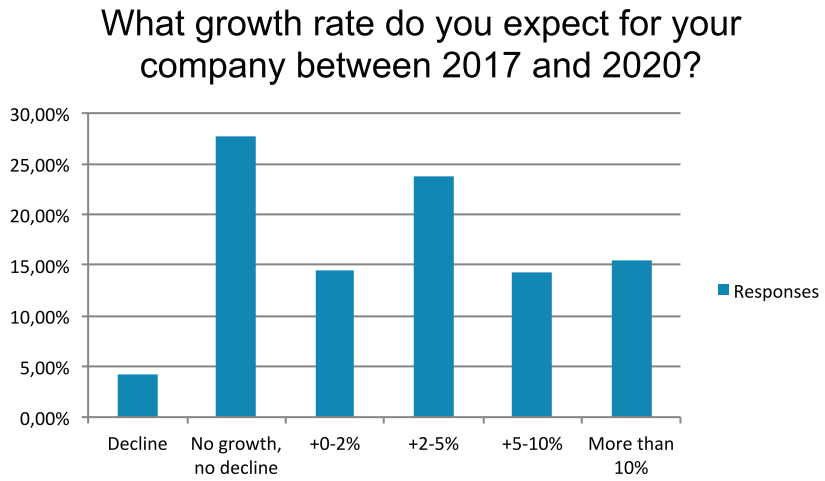
Trend is Up

As many people are talking of a decline in the hydrographic economy, our survey results showed optimism. Only 4.29% expects a decline for their company in the next three years; 27.7% foresees a steady situation with no growth or decline. However, more than half (52.5%) anticipates a light growth (0-10%). There were also quite some confident businesses, with 15.5% indicating that they are working to achieve a growth over 10% towards 2020.

What is driving this growth? The key drivers named were unmanned vehicles (surface,



▲ *Figure 1: Sizes of companies.*



▲ *Figure 2: Expected business growth rates from 2017-2020.*

▲ *Figure 3: Unmanned vehicles are named as a key market trend and driver of hydrography. Image courtesy: 4D Ocean.*

underwater and aerial) and drones. Also multibeam echo sounders (MBES) is an area that is considered to give a push to the developments that are important in the coming years. Interesting that a few mentioned coupled multibeam echo sounders. Another factor that was mentioned often is real-time processing, which is currently in its infancy but is anticipated to take off and gain interest. Lidar and satellite-derived bathymetry are also considered to be drivers for growth in hydrography. In addition, some mentioned 'Lidar with drones' – which can be promising although this will require miniaturisation of the technology – or increase the payload options for the UAS (unmanned aerial systems).

You are now probably thinking: 'what about the data?' This was mentioned on several occasions, including data management, and data analytics, however it did not feature as prominently as the previously mentioned aspects. Which makes us believe that it will be an important factor, but that it is considered to be a facility supporting the other technologies. One respondent mentioned that the ability to manage huge datasets on portable computing facilities is an aspect not to be underestimated. Furthermore, developments in underwater broadband communication and communication systems like Google's Loons, and the increasing number of communication satellites will also take the profession ahead.

Asked to mention the technological advancements that are likely to be important for organisations reflects the answers to the last question. Remarkable is that 'crowdsourced data' was mentioned more often as was artificial intelligence. We also found answers like 'Instruction' and 'remain up to date with modern survey technology, data acquisition and processing'. This indicates that (permanent) education can make the difference and that this should be integrated in the work processes of businesses.

Challenges to Growth

Having said this, what is holding back the growth in the sector? Surprisingly, when we look to the earlier responses, the oil and gas industry decline was quite prominently represented. It was not the most important though. That was the availability of well-trained staff. The hydrographic profession needs people with the right skills and according to the survey answers it is important to find them. One person added that the reduction in offshore companies created an influx of freelance surveyors, making staff retainability a challenge. And we should carefully monitor the developments in IT as efficient data management was considered a challenge for about one third of the professionals. We need to keep up with IT developments, but we must also adopt them and make the IT work. Open data is another challenge and it's worth finding out why this was mentioned as being a challenge. Is enough data available in an open licence? Can we find it? Is it the data we are looking for? It would be interesting to look deeper into this.

Looking at the rather personal additions, there were a couple of mentions pointing to conservatism and 'old-school thinking'. This may also indicate that some of the respondents are looking forward to faster adoption of new technology and workflows.

Equip yourself to be multi-tasking with extensive knowledge of hydrography

Promising Sectors for Hydrographic Surveying

Are there opportunities to pursue? Of course there are. The highest expectations are in coastal zone management – more than two thirds of the respondents mentioned this sector as one with growth potential. You can also think

of renewables. Most of the respondents rate tidal and wave energy (33.44%) higher than wind farms (28.81%) for further business opportunities. The next most promising sectors are deep ocean mapping and construction monitoring, and decommissioning (22.85% each). Staying in the dark waters, deep-sea mining is promising (18.9%) followed by land reclamation (11.92%). Looking at the number of replies to this question, the hydrographic profession is ready to look beyond the traditional activities for further expansion – and in new to explore areas.

Is it surprising that there are plans for investments for the coming year? Hardly! Hydrographic equipment like sonar, GNSS receivers and underwater positioning are leading – 43.2% of the respondents anticipate acquiring new survey equipment. Hydrographic software will also be in demand, with 34.8% of the respondents indicating that they expect to buy packages. Unmanned survey systems (including AUVs) also are high on the list. There is still room to purchase traditional survey vessels as they were on the wish list of 18% of the people who completed the survey.

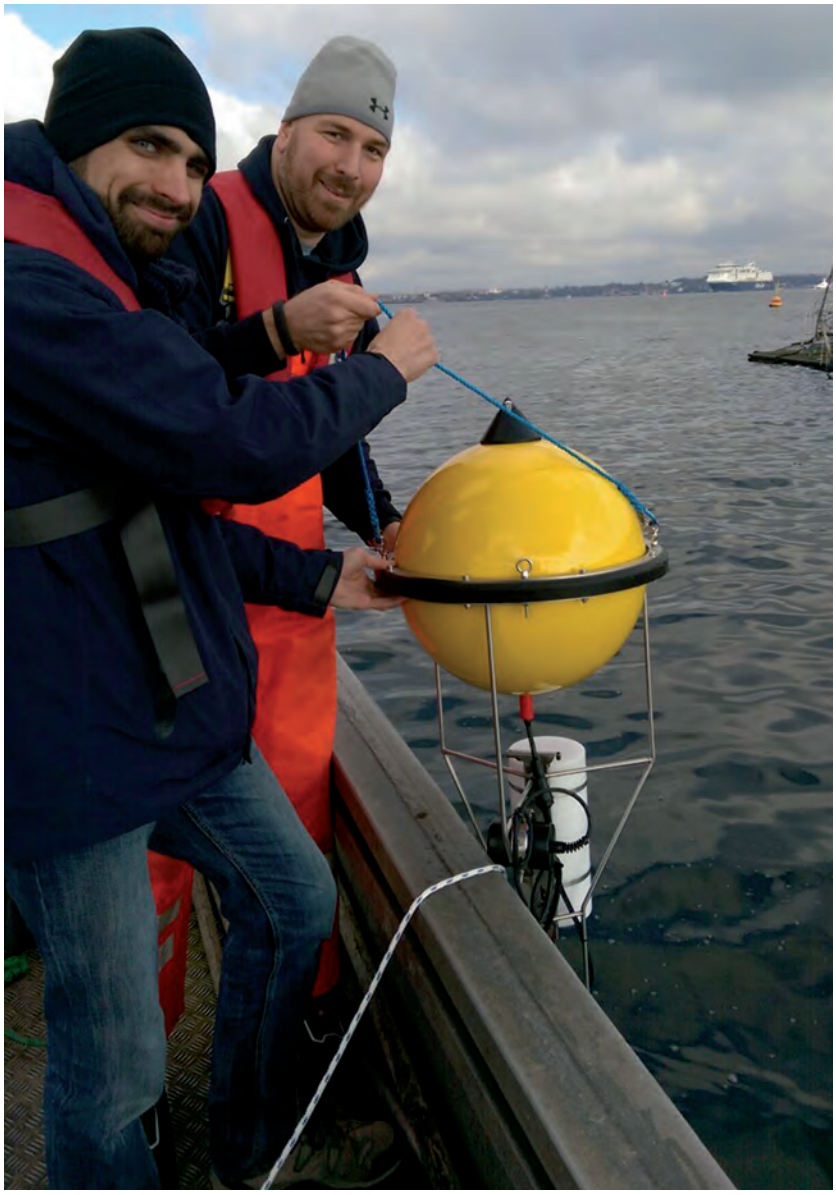
Also high on the list was staff and training. Hydrographic survey staff and training are part of the expansion plans for 33% of the respondents, being slightly higher than the number for Processing and GIS staff and training. The fact that these figures do not differ much indicates that the software part of the profession is important.

Best Advice

We were also interested in finding out what advice you would give your colleagues. Most frequently mentioned advice included 'Keep your knowledge up to date' and training. Keep up with standards. But also: be ready to change, stay up to date, keep an open mind for new technologies and adopt them. The world is changing and you need to keep up with the new technologies and changes that are out there. You must also not be afraid to multitask, change role or be flexible in how you do the job. So at least try new technology so as to keep up to date with it! However, if technology doesn't work, don't be afraid to admit this. You should know the background and choose the technology that works best for you. Some suggested looking for a mentor to help you with your personal development.

On a final note, one of the respondents recommended reading *Hydro International*. We couldn't agree more. ◀

▲ *Figure 4: Tidal and Wave energy are considered as drivers for the near future of hydrography.*



▲ *Figure 5: Well-trained staff is essential for business development.*

5 Questions to…

Gary Gysin

President and SEO, Liquid Robotics

Gary Gysin is the president and CEO of Liquid Robotics, a Boeing company. He is an innovative executive with a reputation for transforming start-ups into global businesses. His company is fundamentally changing the way the world collects and monitors ocean data through the innovative use of ocean robots.

Technology and societal needs are changing rapidly. How is your company adapting to these changes?

At Liquid Robotics our employees have the opportunity to do something really meaningful. Our ability to contribute to the needs of our planet and society is through technology, with our ocean robot called the Wave Glider. We see the ocean as the next frontier. It holds the promise for new industries, new discoveries and the answers to many of the biggest challenges facing our planet (increased global threats, dwindling food populations and climate change). The stakes are high with our dependency on a healthy ocean for our weather, over USD 4 trillion in commerce and the primary food source for over 1 billion people. However, the barrier to a healthy, thriving ocean is the lack of information. We only understand 5% of the ocean and its ecosystems. Autonomous systems can help fill the information gap that exists due to the high cost and risks of traditional ocean exploration and monitoring.

Which applications does your company focus its research and development activities on?

Five years ago, the challenge was narrowing our focus. Today, we're focused on the markets with the greatest opportunities and where we believe the use of autonomous systems is a strategic imperative. Our focus areas are:

- Defence – Anti-Submarine Warfare (ASW), intelligence, surveillance, and reconnaissance (ISR), and other military applications
- Maritime Security – maritime border protection such as dark target identification, illegal fish monitoring, trafficking and smuggling support, and marine protected area (MPA) monitoring
- Environmental Assessment – meteorology and oceanographic monitoring to support science and commercial projects across areas such as climate, weather and offshore energy operations.

What is your company's growth strategy?

Our growth strategy is straightforward and rooted in partnerships. We collaborate with strategic and industry partners to apply our expertise in long duration ocean robots with our partners' expertise in sensor technologies, applications, data analysis, and sales / go-to-market. Together, we can develop and deploy solutions to help our customers become more efficient, reduce costs and solve problems.

Additionally, as a wholly owned subsidiary of the Boeing Company, we have the opportunity to leverage their expertise and sales organisation to further grow opportunities.

Finally, our long-range vision to help build the Digital Ocean. Through the Digital Ocean, we will help create a 'system of systems', the IoT for the ocean, connecting manned and unmanned assets, sensors and devices to provide ubiquitous access to ocean information.

How would you describe the hydrographic market these days?

The hydrographic market is in a period of flux and growth. The future growth in the market is projected to the rise in maritime trade and the increased use of unmanned systems to conduct hydrographic and oil & gas surveys.

Software and hardware innovations of the last decade have allowed for more accurate, repeatable surveys. In the next ten years we believe that unmanned systems of all shapes and sizes will be used to conduct surveys more efficiently. Seabed 2030, high-resolution mapping of the entire ocean floor, is a great project. The use of long duration unmanned technologies, like the Wave Glider, will play an important role to collect and communicate data from the most remote harsh portions of the ocean.

What is your golden advice for doing business in hydrography and offshore surveying?

I'll share two recommendations. First, never stop developing and adopting new technology and embracing new ways to solve challenges. Technology, especially unmanned systems technology, will have a major impact on hydrography over the next ten years.

Second, challenge the status quo. It can sometimes be hard and viewed as risky. But those that are comfortable pushing on the status quo with new technologies will be rewarded. I believe that those taking these risks will make a tremendous impact on our future. The key is to closely partner with proven companies, share your challenges and what success looks like. Approach your challenges together and you will find success.

5 Questions to…

Fabien Napolitano

Chief Operating Officer, iXblue

Fabien Napolitano joined iXblue in 2000 when the company was founded. His initial task was to develop iXblue's first Inertial Navigation Systems. He was then successively head of the acoustic activity, head of the inertial navigation activity and CTO. Since June 2017 Fabien is Chief Operating Officer of iXblue.

Technology and societal needs are changing rapidly. How is your company adapting to these changes?

iXblue has gone through tremendous changes since its inception in 2000. We have always sought to adapt to the changing needs of our customers by developing new products and technologies. We have learnt to understand the applications of our customers better and we have explored many new markets.

What we have learnt from our experience is that the most decisive factor to be able to change and stay ahead is the human being. Beyond our technologies and products are the women and men who are passionate about what they do and about the work of our customers. It is thanks to their passion that we invent original solutions and explore new territories.

Because the human factor is an essential part of innovation, we are currently promoting and implementing an even more open, collaborative and agile culture at iXblue.

Which applications does your company focus its research and development activities on?

Our vision focuses on three key domains: the exploration of marine resources the autonomy technologies and the photonic technologies. For every single one of those themes, we are seeking to develop new solutions by pushing the technologies to their limits and/or by combining complementary technologies that we master.

For 2018, we are actively working on new positioning systems combining acoustic and inertial technologies. We are also working on a new kind of sonar derived from the sonar we developed a few years ago for industrial fishing. We cannot unveil too much yet but we are convinced that when they are released, those new products will open up new possibilities.

Our big news right now is the launch of DriX, our new Autonomous Unmanned Surface Vehicle designed specifically for hydrography and offshore surveys. It encompasses almost everything we have worked for at iXblue over the past 15 years.

What is your company's growth strategy?

iXblue does not have a 'growth strategy', so to speak. For 15 years iXblue has grown by combining internal and external growth, seizing opportunities as they arise and patience. More than in a 'growth strategy' we believe in some fundamentals such as the importance of human beings in the success of a company; the vertical integration of technologies to push performance to the limits and to offer unique features, and the cross-fertilisation between the 'market-driven' and the 'techno-push'.

How would you describe the hydrographic market these days?

Waiting for a change… for 15 years the price of equipment has gone down and the necessary skills needed are more widespread. However, the way hydrography is done today is not much different from the way it was done before. Besides the skills of hydrographers and oceanographers, hydrographic operations remain complex, costly and sometimes difficult in some areas.

Meanwhile in the car industry, a true revolution is underway and tends towards intelligent autonomous cars filled with sensors of very high performance at a very low cost. Following this trend there is a brand new vision to develop in the hydrographic industry, with the use of intelligent sensors and autonomy technologies becoming more accessible and widespread, driving a real change in the way we operate every single day. This is one of the reasons why we developed DriX, making for smarter sea operations.

What is your golden advice for doing business in hydrography and offshore surveying?

My golden advice is to build an open ecosystem. To make sea operations simpler, more cost-efficient and safer, there is a need for a growing number of diverse technologies and skills to merge.

I strongly believe that customers should be able to choose and use systems from competing companies in a seamless way, with each system being able to exchange data with the others.

At iXblue we believe that the successful companies will be those able to do 'coopetition'. Competing companies that will form partnerships and that will develop open solutions allowing customers to choose and operate in the best conditions possible. It will then be up to each company to try to offer the best technology and service in order to succeed in this stimulating and productive environment.

APACHE 5

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5 Questions to…

Jeppe Nielsen

Chief Executive Officer, EIVA

Jeppe Nielsen has been the CEO at EIVA a/s since 2011. Prior to his position at EIVA, he was senior vice president at the software engineering company Systematic. Jeppe Nielsen has a Master's degree in computer science from Aalborg University, Denmark.

Technology and societal needs are changing rapidly. How is your company adapting to these changes?

Being a software provider, it is vital to us that we are in the forefront of applying and making new technologies available to our customers. Nowadays, this entails a particular focus on deep learning, cloud services, autonomous vehicles and virtual reality. We have already implemented some of these in our NaviSuite software products, and we're just getting started. We want to make sure that we join, and as far as possible lead, the ride, consequently allowing our customers to adapt to the changes in technology before they're outpaced by their competitors. In addition, an increasing number of our customers are involved in projects centred on meeting the changing societal needs. This includes shallow-water construction operations for expansion of harbour and urban infrastructure; offshore operations for the expanding demand for energy; seabed mapping operations to accommodate the shipping industry; and environmental surveys; just to mention a few – all of which can be made far more efficient through the possibilities brought by the changes we see with the technological development.

Which applications does your company focus its research and development activities on?

The short answer is automation throughout the survey data workflow. Automation in acquisition, i.e. control and behaviour adjustment of autonomous platforms (from mission planning and runline creation to complete automation during operations). Automation in processing, i.e. providing software that is able to automatically process data in only minutes, which otherwise would have required numerous man-hours to process. Automation in interpretation: in 2017, we established a new team which is solely focused on harvesting the benefits from machine vision, machine learning and deep learning. This focus on automation has already led to a number of new features in the NaviSuite products, and many more will come in the future.

What is your company's growth strategy?

EIVA offers high-end software products in all the segments we are active in – software and complete solutions that enable our customers to operate more effectively and efficiently. Our product strategy and development roadmap are closely aligned with our key customers' strategies. This means that they can depend on EIVA continuously being a key partner, also in the future. We reinvest a large portion of our install base revenue in R&D and are continually increasing our R&D team size as our install base increases. The team has been increased by 60% in 2017 alone.

EIVA is currently experiencing strong growth, which is coming from all segments, including oil and gas, offshore wind, construction and dredging, ocean research and hydrography. We have in recent years focused on segments such as shallow water, dredging and related segments, and we will continue to expand into other segments where we believe we can be a significant player.

Moreover, EIVA operates through many channels – direct, sales partners, OEM / private label – and are increasing our presence on social media and digital media in general, where we can see a lot of our customers are also active.

How would you describe the hydrographic market these days?

The commercial parties are eager to adapt to new technology, seeing the benefits it brings in terms of moving towards a far more cost-efficient operation setup, where the software is doing the hard work, saving the human touch for the last details. It seems that the commercial parties in the industry have been more eager than the official actors, although we're now seeing a growing interest from their side as well in exploiting what new technology can bring to the table.

What is your golden advice for doing business in hydrography and offshore surveying?

Always keep in mind that your customers work with mission critical operations and often on a 24/7 basis, and structure your organisation and offerings accordingly. Be prepared to be available to assist regardless of time zone differences and normal work hours, whether it be with support or other services that will keep downtime to a minimum. Strive to constantly build on and strengthen the relation to your customers. Working closely together with them means that you will understand the challenges they face better, allowing you to ensure that the delivered solution matches their needs and helps them create the most value from their assets.

Applanix

Applanix Corporation, a wholly owned subsidiary of Trimble, designs, builds, delivers, and supports products and solutions designed specifically for the hydrographic survey industry. Even in the harshest marine environments, our products and solutions provide robust, reliable, and repeatable positioning and motion compensation solutions from moving boats and vessels. Marine-based mobile mapping and positioning with Applanix technology not only cuts costs associated with marine surveys, it also delivers tremendous accuracy with faster times to completion and improved quality of data.

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- POS MV OceanMaster
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All POS MV models are designed for use with multibeam sonar systems, enabling adherence to IHO standards on sonar swath widths of greater than ± 75 degrees under all dynamic conditions. Benefits of POS MV include:

- More robust georeferencing in the most difficult GNSS environments
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- Increased productivity
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- No timing errors

To learn more about Applanix and our products and services, visit our website at www.applanix.com or email marine@applanix.com

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Atlas Professionals

Atlas Professionals is a leading international recruitment company. Since 1982, Atlas has played a major role in the provision of professionals to the Energy, Marine and Renewables industries worldwide. We have grown to become a dependable HR service provider with a mission to turn complex personnel challenges into transparent and reliable solutions.

If quality and reliability are key for your business, then Atlas is the partner you need for qualified personnel in specialist areas such as Survey, ROV, Diving & Inspection, Management & QC and Renewables. We pride ourselves on representing the largest and most highly skilled pool of survey professionals globally – ranging from personnel for shipyard (Dimensional Control) surveys through to deepwater construction specialists.

Our company is centred on high-quality, single point of contact account management with in-depth knowledge of each of the industries' specialist disciplines. Our high regard for continuing the professional development of our contractors is shown through our regular training courses, whether this is through our global training providers, or calling upon our in-house expertise. In line with our focus to provide a competent workforce, Atlas established the Atlas Competency Programme (ACP), a programme that follows the accredited IMCA framework, allowing professionals to develop and grow within their chosen discipline.

With over 35 years of experience, we meet the demands of the industries by offering a full suite of taxation, administration, logistics and legal services – including up-to-date compliance advice. For further information about our specialist areas and offices worldwide, please visit our website: www.atlasprofessionals.com.

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CHC

CHC Navigation designs, manufactures and markets a wide range of competitive and reliable GNSS receivers and provides complete positioning solutions for any application in more than 80 countries.

CHC is today one of the fastest growing manufacturers and providers of GNSS products and solutions, developing a significant international presence and employing more than 1000 professionals worldwide.

Committing to Quality

CHC Navigation has a FULL quality management system, which has passed ISO9001, ISO14001, GBT28001, GJB9001 quality system certification. The complete participation of a quality management department covers the entire procedure of product development and supply chain, including R & D quality management, supplier quality management, process quality management and customer quality management.

Global Reach

CHC products and solutions are widely used in all regions, from the Americas to Europe, the Middle East, Africa and Asia-Pacific. CHC's international partner's network brings dedicated and professional support to end-users regardless of where they are located in the world.

Featured Product

CHC offers bundled solutions from 'i' series receivers with HCE series controllers and the pre-installed LandStar field software to the CHC Geomatics Office (CGO) desktop workstation. CORS algorithm solutions are developed for larger area precision services. CHC also provides the Apache series unmanned boat for hydrographic and marine surveys. For high accuracy construction and farming applications, CHC has leading solutions of the MC series Machine Control and the NX series Precision Agriculture Systems.

CHC Navigation sales@chcnav.com, www.chcnav.com, China (Shanghai) – USA (Salt-Lake City) – Hungary (Budapest) – Kazakhstan (Alma-Ata) - Hongkong, China (Hongkong)

EdgeTech

EdgeTech designs, manufactures, sells and supports industry-leading underwater technology solutions. The company has been serving the marine industry for over 50 years with commercial off the shelf and customised underwater systems. EdgeTech sonar systems include side-scan sonars, sub-bottom profilers, bathymetry systems and combined and modular systems. The solutions are available in a range of configurations for towed, deep towed, AUV, USV, ROV, ROTV and custom platforms. The company's underwater actuated and transponding solutions include highly advanced and reliable USBL acoustic tracking and positioning systems, transponder beacons, deep-sea acoustic releases, shallow - water and long life acoustic releases, underwater acoustic command and control systems and custom-engineered acoustic products.

EdgeTech is known worldwide for its high-quality products and superior customer service. With its global network, EdgeTech serves and services customers including the US military, foreign militaries, survey firms, fisheries groups, offshore construction customers, oceanographic researchers and the oil and gas and renewable energy industry around the world. The company employs over 100 people between two locations in Wareham, Massachusetts and Boca Raton, Florida and has extensive in-house design, manufacturing and test facilities including test pools, acoustic test tanks, pressure test chambers and two company research vessels for sea trials.

EdgeTech, 4 Little Brook Rd., West Wareham, MA 02576, USA. Phone: +1-508-291-0057, info@edgetech.com, www.edgetech.com

EvoLogics GmbH

EvoLogics GmbH is a German high-tech enterprise founded in 2000 by a group of leading international scientists and R&D experts. The company is on a mission to develop innovative technologies for maritime and offshore industries through interdisciplinary cooperation between engineering and life sciences.

EvoLogics' core values are rooted in bionic concepts that combine state of the art engineering with the best ideas found in nature. The team took a bionic approach when solving the common problems of transmitting data in the dynamic underwater environment.
The resulting S2C spread-spectrum communication technology became the basis for the company's commercial products. Over the past 8 years it grew into a whole 'ecosystem' that includes several lines of underwater acoustic modems, positioning systems and novel robotic solutions.

Research and innovation remain the cornerstones of EvoLogics - the company is active in multiple national and international R&D projects that drive development of novel technologies.

Communication and Positioning - the S2C Technology
EvoLogics offers highly reliable, flexible and cost-effective solutions for multiple underwater communication, positioning, navigation and monitoring applications. EvoLogics' acoustic telemetry provides an independent bidirectional data link with simultaneous positioning, broadcasting and networking.
S2C-based systems have been carefully designed for operations in harsh underwater conditions and are enhanced with special algorithms for signal processing and data management. The company's extensive experience with sensor integration makes turnkey solutions possible for customers. These range from accurate positioning systems for subsea assets to underwater acoustic sensor networks for monitoring multiple environmental parameters and remotely controlling complex processes from the surface.

Evologics GmbH, Ackerstrasse 76, 13355 Berlin, Germany. Phone: +49 304679862-0, sales@evologics.de, www.evologics.de

Fugro Marinestar GNSS

Marinestar high-performance positioning products and services delivered to you by Fugro Satellite Positioning are able to meet a varied range of applications in dredging & marine construction, wind farm installation, cable laying, and naval and hydrographic/ oceanographic surveys.

Marinestar services deliver up to 8cm (vertical, sigma 2) accuracy in high availability using eight overlapping L-band satellite beams. With GPS, GLONASS, Beidou and Galileo constellations, redundancies as well as precision gains are made available. One of our most recent developments is the fixing of ambiguities of the GPS constellation leading to the G2+ or G4+ L-band service.

Our redundant infrastructure and 7x24 global customer service makes this precise positioning service the exact tool you need!

When positioning counts…….count on Marinestar!

www.fugro.com/marinestar

Fugro Marinestar, Dillenburgsingel 69, 2263 HW Leidschendam, The Netherlands. Phone: +31 70 3170960, marinestar@fugro.com, www.fugro.com/marinestar

Geomares Education

Geomares Education is the dedicated webstore for all your subscriptions, magazines and books related to hydrography, satellite navigation, geomatics and electronical navigation!

The webstore includes not only titles such as Handbooks of Offshore Surveying, GNSS Survey & Engineering, The Electronic Chart, etc., but also magazines and subscriptions to *Hydro International*, *GIM International*, *GIS Professional*, etc.

We invite you to explore the Geomares Education webstore and use the special 15% Business Guide Discount (code: BG18) on www.geomares-education.com

See you soon!

Geomares Education, Vuurtorenweg 18b, 8531 HJ Lemmer, The Netherlands. Phone: +31 514 561854, webshop@geomares.nl, www.geomares-education.com

INNOMAR Technologie GmbH

INNOMAR Technologie GmbH has been providing efficient underwater acoustic survey equipment and associated software tailored to customer requirements for more than 20 years.

The 'INNOMAR SES-2000' series of parametric sub-bottom profilers (SBP) with more than 300 units sold is perfectly suited for exploring the sub-seafloor at high resolution in water depths between less than one metre and full ocean depth. Applications include visualising sediment structures for dredging and geological surveys as well as mapping buried pipelines/cables or prospective offshore building sites.

All the different 'INNOMAR SES-2000' models feature a narrow sound beam to give results at very high resolution and quality. The delivery includes user-friendly data acquisition and control software as well as dedicated post-processing software. All data are recorded digitally, but analogue outputs are available too. Transmit pulse properties can easily be adjusted by the user to fit specific survey requirements. Transducers are available for installation in the vessel's hull and over the side pole-mounting.
There are also 'INNOMAR SES-2000' models incorporating a narrow-beam parametric SBP and a dual-frequency side-scan sonar for simultaneous operation. New developments include a multi-transducer SBP providing high data density suitable for 3D visualisation and tracking of buried pipelines/cables, a towed SBP, a survey catamaran (USV) for remote operation in protected or extremely shallow areas as well as a low-frequency parametric sub-bottom profiler for operation up to 11,000 metres water depth.

INNOMAR's quality management has been certified by DIN EN ISO 9001 for more than 15 years.

INNOMAR Technologie GmbH, Schutower Ringstr. 4, 18069 Rostock, Germany. Phone: +49 381 44079 0, info@innomar.com, www.innomar.com

INSTALL

Established in Naples, Italy, by a young and experienced team of ICT, Geophysicist and Marine Survey Engineers in 2009, INSTALL provide services and technologies for the Earth Sciences.
INSTALL focuses on marine geophysical, environmental surveys and technical support worldwide to companies and organisations operating in aquatic or other environments.
Our reference markets include renewable energies, environmental, submarine cables, port and coastal, scientific research, marine technologies and other related business including a training centre.

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 visualisation systems (SVS).
INSTALL srl has been approved and accredited by: RINA to ISO 9001:2008, OHSAS 18001, ISO 14001:2004 and SA8000.
The company is member of Assomineraria, Achilles, Pole Mer Bretagne Atlantique, Marine Technology Society and AISEPS and cooperates with important international research centres and universities to develop innovative solutions for the protection of the environment especially in the marine areas.
Please visit our website and follow us on social media for up to date information about our company.

Install srl, Via Antiniana 2G-2, 80078 Pozzuoli, Naples, Italy. Phone: +39 081 8683218, info@installsrl.it, www.installsrl.it

iXblue

iXblue is a global leader in the design and manufacturing of innovative solutions devoted to navigation, positioning and underwater imaging, as well as shipbuilding. Using its unique in-house technology, the company offers turnkey solutions to its Civil and Defence customers to carry out their sea, land and space operations with optimum efficiency and reliability.
iXblue is recognised throughout the industry for its pioneering work on the development of fibre optic gyroscope (FOG) technology which has revolutionised inertial navigation systems in the last decade, providing unequalled performance and cost of ownership benefits.
Employing a workforce of 600 people worldwide, iXblue has a global footprint and conducts its business with over 35 countries.

iXblue - 34 rue de la Croix de Fer, 78105 Saint-Germain en Laye, France. Phone: +33 1 30 08 88 88, contact@ixblue.com - www.ixblue.com,

Kongsberg Maritime

Kongsberg Maritime is a global marine technology company providing innovative and reliable technology solutions for all marine industry sectors including merchant, offshore, subsea and naval. Headquartered in Kongsberg, Norway, the company has manufacturing, sales and service facilities in 20 countries and a total of 65 worldwide offices.

Kongsberg Maritime developed systems for vessels covering all aspects of automation, control, navigation, safety and dynamic positioning. Kongsberg Maritime also develops subsea solutions covering systems for Underwater Mapping, Underwater Navigation, Subsea Monitoring and Marine Robotics in addition to underwater cameras.

Solutions for digital transformation, marine and offshore training simulators, LNG equipment, information management software, position reference systems, integrated aquaculture technology and advanced products to support seismic and drilling operations are also part of the company's diverse portfolio.

In parallel with its extensive technology portfolio, Kongsberg Maritime provides services within EIT (Electro, Instrument & Telecom) engineering and system integration, on an EPC (Engineering, Procurement & Construction) basis.

Kongsberg Maritime delivers solutions that cover all aspects of technology underwater and on the water, aboard new build and retrofit vessels, and on offshore platforms and rigs, often under a single supplier strategy called 'The Full Picture'.

Kongsberg Maritime is part of Kongsberg Gruppen (KONGSBERG), an international, knowledge-based group that celebrated 200 years in business in 2014.
KONGSBERG supplies high-technology systems and solutions to customers in the oil and gas industry, the merchant marine, and the defence and aerospace industries.

Kongsberg Maritime AS, Kirkegaardsveien 45, NO-3616 Kongsberg, Norway. Phone: +47 32285000, km.sales@kongsberg.com, www.km.kongsberg.com

Leica Geosystems

Leica Geosystems develops and sells airborne Lidar survey systems for various applications in the field of airborne hydrography. The product line includes the Leica Chiroptera II and Leica HawkEye III sensors for combined bathymetry and topography.

Seamless Data From Sea to Land
By integrating multiple sensors into the survey systems, Leica Geosystems has optimised the survey efficiency and performance. For everyday nearshore surveys, the Chiroptera II will collect seamless data from a water depth of 25 metres onto land. When fitted with the HawkEye III deep bathymetric module, the survey water penetration depths can be increased to 50m with the highest possible efficiency.

Colourised RGBN Point Clouds
All Leica Geosystems airborne Lidar sensors are equipped with the Leica RCD30 high-resolution 80-megapixel camera for 3D imaging and documentation enabling RGBN colouring of Lidar point clouds and production of ortho image mosaics in RGB or CIR.

Integrated Processing of Lidar data
The Leica Lidar Survey Studio (Leica LSS) allows simultaneous processing and quality assurance of all sensor data, therefore increasing productivity. Users can quickly create coverage plots, check accuracy and point density, 3D visualise the data, and review and extract Q/A reports. Tools such as automatic calibration, data classification, water refraction correction, data cleaning, turbid water enhancement, point cloud colourisation, point cloud matching, import of reference points and quality assurance statistics analysis are integrated.

Contact us for a demo or to find out how you can benefit from a more efficient workflow and reduced training costs.

Leica Geosystems, Geospatial Solutions Division, Klubbhusgatan 15, 553 03 Jönköping, Sweden. Phone: +46 361 966 80, info.gsd@leica-geosystems.com, www.leica-geosystems.com/products/airborne-systems

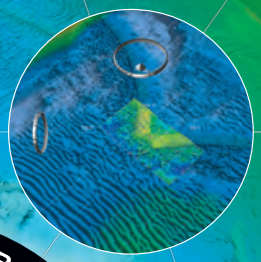
SPECIALISTS IN SOFTWARE FOR MARINE GEOSPATIAL DATA

QINSy

QPS QINSy is navigation / positioning and reporting software used on board offshore construction vessels, pipe-lay barges, drilling rigs, seismic research vessels and all manner of hydrographic survey vessels (Surface and sub-surface). QPS is a market leader in the offshore renewable energy industry, the dredging industry and port communities.

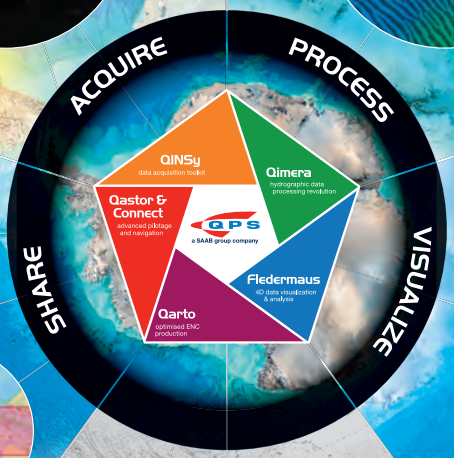
Qimera

QPS Qimera is probably the simplest yet most powerful post processing application available. Built on the strengths of QINSy and Fledermaus and optimized for the latest computing technology, Qimera is feature rich and extremely easy to use. Able to work with QINSy data files, plus many other raw sonar file formats, the Qimera Dynamic Workflow revolutionizes the efficiency with which post processing can be completed.



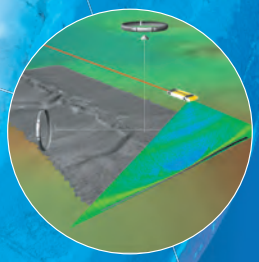
Qastor/ Connect Server

Precise navigation - Using wired or wireless methods, QPS Qastor interfaces to most devices outputting NMEA data strings to AIS transponders/receivers and to the QPS Connect Server. Connect typically supplies ENC updates and meteorological data feeds to Qastor users, but is also capable of distributing other types of information (like VTS feeds or Qastor common files).



Fledermaus

QPS Fledermaus is an industry leading interactive 4D geospatial visualization and analysis tool. Commercial, academic and government clients use Fledermaus to interact with massive geographical datasets of numerous data types for ocean mapping and land-based projects. The intuitive 4D display allows clients to rapidly gain insight and extract more information from their underlying data. This provides our clients with added value in data interpretation efficiency, quality control accuracy, data analysis completeness and project integration. All of which promotes clear communication.



Qarto

The strength of Qarto is the very fast and automated ENC production. Qarto makes possible the short turn-around times from survey to chart that are necessary for the safe operation of the busy waterways. Qarto vn3 distinguishes itself by its efficient way of data storage and by its principle based on semi-static base cells that are updated with highly dynamic hydrographic data. Completely updated ENC base cells are ready for distribution avery shortly after the survey being completed.

www.qps.nl (sales@qps.nl)
www.qps-us.com (sales@qps-us.com)

QPS is focused on the system integration of survey sensors, the development of software used for maritime geomatic surveys, Portable Pilot Units and Electronic Navigation Charts (ENC) production. QPS is seen as market leader in these fields.

QPS
a SAAB group company

MMT

Specialising in high-resolution seabed mapping, MMT offers multi sensor solutions to a wide range of clients in the offshore industry, primarily within oil & gas, renewable energy, marine cable and hydrography. We collect, process and visualise the conditions of the seabed and the targets on it and beneath. Our services include pre-lay and route surveys for cables and pipelines, site surveys for platforms and wind farms and pipeline and cable inspections. We also offer IMR services with our trusted partners.
MMT possess the only Survey ROVs capable of collecting high-quality data and processing with up to 50% time spare compared to traditional ROV surveys. Surveyor Interceptor no. 2 will be ready for delivery for work from Q2 2018. SROV no. 2 is underway!
An increased expansion of offshore installations has required a new and innovative approach to UXO detection and clearance, from possible minefield to ALARP certification. As part of the risk assessment for all submarine installations, we offer detection, verification, excavation and clearance services for UXOs in a cost-effective combination with our geophysical, geotechnical and environmental services that are conducted from MMT's vessels, state of the art equipment and marine survey specialists.
We always have your needs in mind to deliver accurate survey data, safe offshore operations and reports on time. We work closely with you, with expert dedication, every step of the way.

MMT Head Office. MMT Sweden AB, Sven Källfelts Gata 11, SE 426 71 Västra Frölunda, Sweden. Phone +46 (0)31 762 03 00, info@mmt.se, www.mmt.se
UK Office: MMT (UK) Ltd, 2A Banbury Office Village, Noral Way, Banbury, Oxon, OX162SB, UK; Norway Office: MMT Norway AS, Postboks 1393 5507 Haugesund, Norway

NovAtel

Marine integrators have been relying on NovAtel's world leading Global Navigation Satellite System (GNSS) OEM positioning technology for over two decades to ensure their equipment performs when needed most. Our GNSS receivers, antennas, inertial systems, correction services and post-processing software provides precise, accurate, reliable positioning measurements for diverse marine applications.
NovAtel's ATEX qualified marine GNSS antennas are designed with INMARSAT interference rejection for optimal performance in challenging conditions. Our low profile compact antennas offer a variety of form factors and configurations suitable for space constrained applications.
Our Oceanix GNSS correction services deliver exceptional sub-decimetre positioning for marine applications such as dredging, hydrographic survey and mapping. Oceanix corrections also provide high accuracy positioning and aid rapid re-convergence following GNSS signal interruptions.
Select SPAN® receivers offer NovAtel's real-time motion compensation algorithm to eliminate the effects of wave and swell movements from hydrographic measurement data, reducing measurement error and therefore providing more accurate, coherent results in hydrographic survey applications.
Inertial Explorer® software from NovAtel's Waypoint®, post-processes data ensuring the most accurate positioning data.
NovAtel products have been tested, evaluated and accepted in sea trials by major hydrographic equipment manufacturers. We offer application developers many options for system performance, size and cost to meet their unique marine requirements. NovAtel provides a single source for purchase and customer support for all aspects of a marine positioning solution. To learn more, visit www.novatel.com/marine.

NovAtel Inc., 1120 - 68th Avenue N.E., Calgary, Alberta T2E 8S5, Canada. Phone: +1 403-295-4500 /+1-800-668-2835, sales@novatel.com, www.novatel.com/marine.

OceanWise

We are an independent UK company operating worldwide that specialises in all aspects of marine environmental data acquisition, data management, GIS and other services. Our highly skilled team has expertise in oceanography, hydrography, information technology, system integration and software development so are well placed to assist you in solving your offshore environmental and engineering challenges by providing cost-effective end-to-end solutions.
Our Enterprise GIS and Productivity Tools allow you to modernise your approach to data management using our software productivity tools to streamline your processes and workflows and, in doing so, support situational analysis and improved decision support.
OceanWise is able to offer a variety of solutions for your Monitoring needs. Being independent from any manufacturer or provider means you will get the best system for your needs. Our Environmental Data Monitoring capability delivers:

- Optimised outputs from the simplest to the most complex monitoring needs
- Easy visualisation and sharing of real-time data from multiple sensors
- Secure archiving of all types of environmental data
- Data accuracy, integrity and reliability with system status monitoring and alerts

Our Intelligent Marine and Coastal Mapping Data is fit for purpose, in the right format, accurate and up to date. Designed to be compatible with all leading Geographical Information Systems (GIS), our data products and web services are quick and easy to use in planning, engineering, asset management, operations, regulation and a multitude of other applications.

So don't let poor data management put your operations at risk!
Enjoy the confidence of working with marine data experts; where your data really matters.

OceanWise Ltd, Dovedale House, 16 Butts Road, Alton, Hampshire, GU34 1NB, UK. Phone: +44 1420 768262, info@oceanwise.eu, www.oceanwise.eu

QPS

QPS BV (Quality Positioning Services) makes industry leading software for collection, post-processing and visualisation of maritime geomatic data. Our products QPS QINSy, QPS Qimera and QPS Fledermaus seamlessly partner ArcGIS for Maritime, to solve problems and gain efficiencies for maritime related business. QPS QINSy is a software suite used for many types of maritime geomatic surveys, ranging from simple single beam surveys up to very complex offshore construction works. QPS Qimera is an evolution in hydrographic data processing, and it combines the core technologies of QINSy and Fledermaus. QPS Fledermaus is a powerful tool used by commercial, academic and government clients worldwide to interact in 4D with geographical datasets.
Our product QPS Qastor is Electronic Chart Software (ECS) that enables navigation, piloting and precise docking, as well as several other applications such as Oil & Gas FPSO/SPM mooring, patrol vessel and tugboat operations. Using wired or wireless methods, Qastor interfaces to most devices outputting NMEA data strings, to AIS units, and to the QPS Qastor Connect Server, which supplies meteorological data, VTS targets and ENC updates to Qastor users.
QPS is an independent software company that has been headquartered in the Netherlands since 1986, and now with subsidiary offices in the USA, Canada and the UK. In 2012, QPS became a member of the SAAB (Sweden) group of companies (Traffic Management division).

QPS, Huis ter Heideweg 16, 3705 LZ Zeist, The Netherlands, phone: +31 306941200, sales@qps.nl, www.qps.nl

RIEGL Laser Measurement Systems

RIEGL Laser Measurement Systems is an international leading provider of cutting edge Waveform-Lidar technology in airborne, mobile, terrestrial, industrial and unmanned laser scanning solutions. RIEGL's innovative hardware and software products provide powerful solutions for multiple applications in surveying. For combined hydrographic and topographic surveying RIEGL offers the fully integrated airborne laser scanning systems VQ-880-G and VQ-880-GH. Providing a water penetration of 1.5 Secchi depth, they are ideally suited for coastline and shallow-water mapping, river bed profiling, measurement of aggradation zones, hydro-archaeological surveying, etc.
The turnkey surveying systems include a high-end IMU/GNSS unit and an RGB camera and are fully calibrated off-factory. The integrated infrared laser scanner complements the data from the green laser scanner and supports the detection of the water surface. The compact and robust housing is compliant with typical aircraft hatches and stabilised platforms. Additionally, the VQ-880-GH's form factor with reduced height is specially optimised for helicopter integration.
Besides the fully integrated systems, RIEGL offers the topo-hydrographic airborne laser scanner engine, the VQ-820-G, especially where small form factor and/or flexibility of integration are required.
Additionally, the BathyCopter, the world's first small-UAV-based surveying system for bathymetric surveying complements RIEGL's topo-hydrographic portfolio. It is capable of measuring through the water surface and it is ideally suited for generating profiles of rivers or water reservoirs. The robust and reliable platform design integrates the RIEGL BDF-1 bathymetric depth finder - with tilt compensator, IMU/GNSS unit, control unit, and up to two digital cameras - on RIEGL's RiCOPTER.

RIEGL Laser Measurement Systems GmbH, Riedenburgstrasse 48, A-3580 Horn, Austria. Phone +43 2982 4211, office@riegl.com, www.riegl.com

Rowe Technologies

Rowe Technologies designs and manufactures state of the art, industry leading, Acoustic Doppler Current Profilers (ADCPs) and Doppler Velocity Logs (DVLs), applicable to an array of current measuring and navigational deployments for worldwide use in oceans, lakes and rivers.
Rowe Technologies 7,100 ft^2 development, manufacturing, service, and support headquarters is located in San Diego California and was founded in 2009 by Dan and Steve Rowe, the sons of Fran Rowe, the originator of the Acoustic Doppler Current Profiler (ADCP) and co-founder of Teledyne RDI.
Rowe Technologies employs a highly experienced, innovative staff of 21 employees with over 250 + years of Doppler system development experience and are listed on more ADCP patents than any other company.

With operating frequencies from 38kHz to 1200kHz inclusive, and available in 300 to 6,000 metre depth rated capsules, Rowe Technologies portfolio of products can record all-encompassing current flow data from up to 200 cells worry-free on an industry leading 32GB internal memory card. Following deployment, rapid downloads are facilitated via standard Ethernet port into customisable data formats in MATLAB, CSV and PD0.

Rowe Technologies, Inc, 12655 Danielson Court, Suite 306, Poway, CA 92064, USA. Phone: +1 8588423020, www.rowetechinc.com

RTsys

RTsys is specialised in passive and active underwater acoustics and drones. We have more than 30 years of expertise and extensive business experience in the development of high-tech products. Our innovations are used not only in the civil sector, but also for the defence sector, and are equipped with SDA (Synchronous Data Acquisition) technology, developed by our R&D team.
Within a context of increased monitoring of the marine environment, in connection with reducing noise pollution, we are the front-runners in acoustic monitoring, following huge investments in research and development, and in cooperation with the scientific community. Our recognised expertise in the defence sector and close collaboration with the French Navy enable us to develop innovative underwater detection tools and drones for use in anti-submarine warfare.
The 'Powered by SDA' core is used in all RTsys products. The SDA card is full of cutting edge reliable technology for active and passive acoustic applications. It offers substantial calculations capacity, in a compact and portable format whilst remaining highly energy efficient. Used in conjunction with a Linux operating system, it really is a unique product given its calculation capacity, its compact size and its low energy use.
RTsys is involved in many European projects (MSFD, JOMOPANS…) and has developed adapted solutions for its customers. Our recorders and buoys can have 4 channels (synchronous acquisition) and record at a high sampling rate.
We invite you to check our brand new website with our range of products and software dedicated for underwater needs: https://rtsys.eu

RTsys, 25 Rue Michel Marion, 56850 Caudan, France. Phone: +33 (0)2 97 89 85 80, info@rtsys.eu, www.rtsys.eu

SBG Systems

SBG Systems is a leading supplier of compact, high-performance & cost-effective MEMS-based inertial motion sensing solutions. Our Motion Sensors and Inertial Navigation Systems are ideal for hydrographic applications, ship motion monitoring, Lidar and Buoy orientation and positioning; ROV & AUV control; camera stabilisation, and antenna tracking.

NEW: QINERTIA, The Next-generation INS/GNSS Post-processing Software
For more than 10 years, SBG Systems has been designing inertial navigation systems from the internal Inertial Measurement Unit to the filtering with GNSS data. Expert in real-time data fusion, the company takes another step in the surveying industry by unveiling Qinertia, a fully in-house Post-Processing Kinematic (PPK) software. After the survey, this full-feature software gives access to offline RTK corrections, and process inertial and GNSS raw data to further enhance accuracy and secure the survey.

Two Product Lines Dedicated to Hydrographic Survey
The Ekinox 2 Series is a line of survey-grade compact inertial sensors that shows an impressive performance/price ratio. This second generation is twice as accurate as the initial one, now providing a Roll and Pitch accurate to 0.02°, additionally to Position, Heading and Heave.
The Apogee Series is the most accurate line of inertial navigation systems based on the robust and cost-effective MEMS technology. It provides a Roll and Pitch accurate to 0.005° in real-time, Heading and Heave. Depending on the model, the Apogee integrates or connects to a tri-frequency GNSS receiver that receives RTK, Marinestar, OmniSTAR, TerraStar, Veripos, etc.

SBG Systems S.A.S., 1, Avenue Eiffel, 78420 Carrières-sur-Seine, France. Phone: +33 1 80 88 45 00, sales@sbg-systems.com, www.sbg-systems.com

Seabed

Seabed (founded in 2004, and based in Amsterdam, The Netherlands) is a company specialised in equipment for surveying and dredging. Our highly qualified engineers develop and produce products for the offshore as well as the onshore industry.
With our complete team of developers, support engineers, hydrographic surveyors and the sales team we aim for the right balance in Sales, Support and Engineering. This, together with dealerships of well-known global brands offering equipment of a very high standard, makes Seabed a reliable partner for all your needs.

We offer the following products: positioning solutions, Sonar/Bathymetry, mobile mapping, underwater sensors, hydrophones, density probes, bottom sampling, crane systems, software solutions, telemetric solutions and cables, connectors and housing.

All these products are available for rental as well. In addition to the standard product line, Seabed is also very strong in system integration based on specific customer requests. Seabed organises demo days yearly in September, where all the latest equipment is demonstrated. If you wish to attend, please mail rsvp@seabed.nl. For more information check out our Seabed Gazette or visit our website: www.seabed.nl

Seabed, Asterweg 117, 1031 HM Amsterdam, The Netherlands. Phone: +31 20 6368443, sales@seabed.nl, www.seabed.nl

Swathe Services

Swathe Services is a leading hydrographic support organisation for marine survey industries across the globe. We work with oil and gas, renewables, offshore and coastal industries.

With over 35 years of expertise in the field, we provide innovative technology and equipment, rental services, personnel, consultancy, training and support. What sets us apart is our integrated and flexible approach to each client's survey requirements.

Hydrographic charting requires data of the highest resolution. The equipment we sell produces exceptional quality, high-resolution data, with ultimate efficiency. Using the latest single or multibeam technologies our products are robust, reliable, cost effective and high quality.

Survey equipment is available for hire as a standalone solution or together with our qualified and experienced personnel who can assist with installation, calibration, operation, training or complete project management.

Our hydrographic surveyors are some of the best in the world. They can be contracted to work with your existing teams or work independently. Each surveyor is rigorously selected for their professionalism and excellence. We only work with the best.

Swathe Services provide the equipment, the people, the expertise and the technology to support any hydrographic survey. Our integrated yet flexible approach means we deliver the right survey solution, first time, every time.

Swathe Services, Unit 7, Hayle Marine Renewables Business Park, North Quay, Hayle, Cornwall, TR27 4DD, UK. Phone: +44 1872275642, info@swathe-services.com, www.swathe-services.com

Teledyne CARIS

For over 35 years, Teledyne CARIS™ has been making software designed for the marine GIS community. Not only renowned for its product, but also for outstanding customer service, Teledyne CARIS offers a comprehensive level of support through training sessions and consulting, online technical support, email and multilingual telephone support.
Developed in cooperation with hydrographic clients and universities, the CARIS™ toolset provides clients with resource optimisation and a true operational advantage. Known for the Ping-to-Chart™ solution, we offer a comprehensive portfolio of products, from the processing of the echo sounder ping to the production and distribution of the chart.
The newest product in the toolset, CARIS Onboard™, is a near real-time and autonomous data processing package which has been developed with autonomous underwater vehicles (AUVs) and unmanned surface vehicles (USVs) in mind. This solution acts as a force multiplier when used on survey vessels by fitting seamlessly into the Ping-to-Chart suite of software, and reducing the overall product creation timeline.
Find out why CARIS software is selected by national mapping and charting agencies, survey companies, port and waterway authorities, oil and gas companies, and academic institutions worldwide by visiting www.teledynecaris.com.

Teledyne CARIS, Inc., 115 Waggoners Lane, Fredericton, NB E3B 2L4, Canada. Phone: +1 506 458 8533 / Toll free +1 800 567 5005, caris-info@teledyne.com, www.teledynecaris.com .

Teledyne Marine

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Valeport

Valeport are the UK's leading manufacturer of Hydrographic and Oceanographic instrumentation which include Sound Velocity Probes / Sensors, Altimeters, Radar Level Sensor, Current Meters, Tide Gauges, Fluorometers, Wave Recorders, CTDs, Multi-Parameter CTDs and GPS Echo Sounders.
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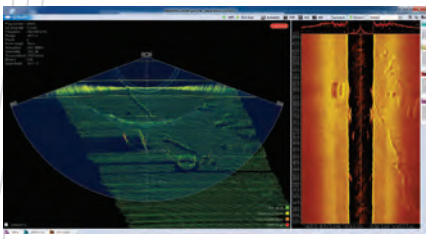
The Ideal Solution for Advanced Surveying in Remote or Hazardous Environments

Save Time, Expand Access, Increase Safety



The Rugged Z-Boat 1800-MB2

Outfitted with the MB2 Multibeam sonar from Teledyne Odom Hydrographic, the **Teledyne Oceanscience** Z-Boat 1800 MB2 unmanned hydrographic survey boat is the best option for high resolution shallow water coastal or inland hydrographic surveying. With both autonomous and remote operation modes, the Z-Boat 1800 MB2 offers superior data in a rugged, high quality vehicle.

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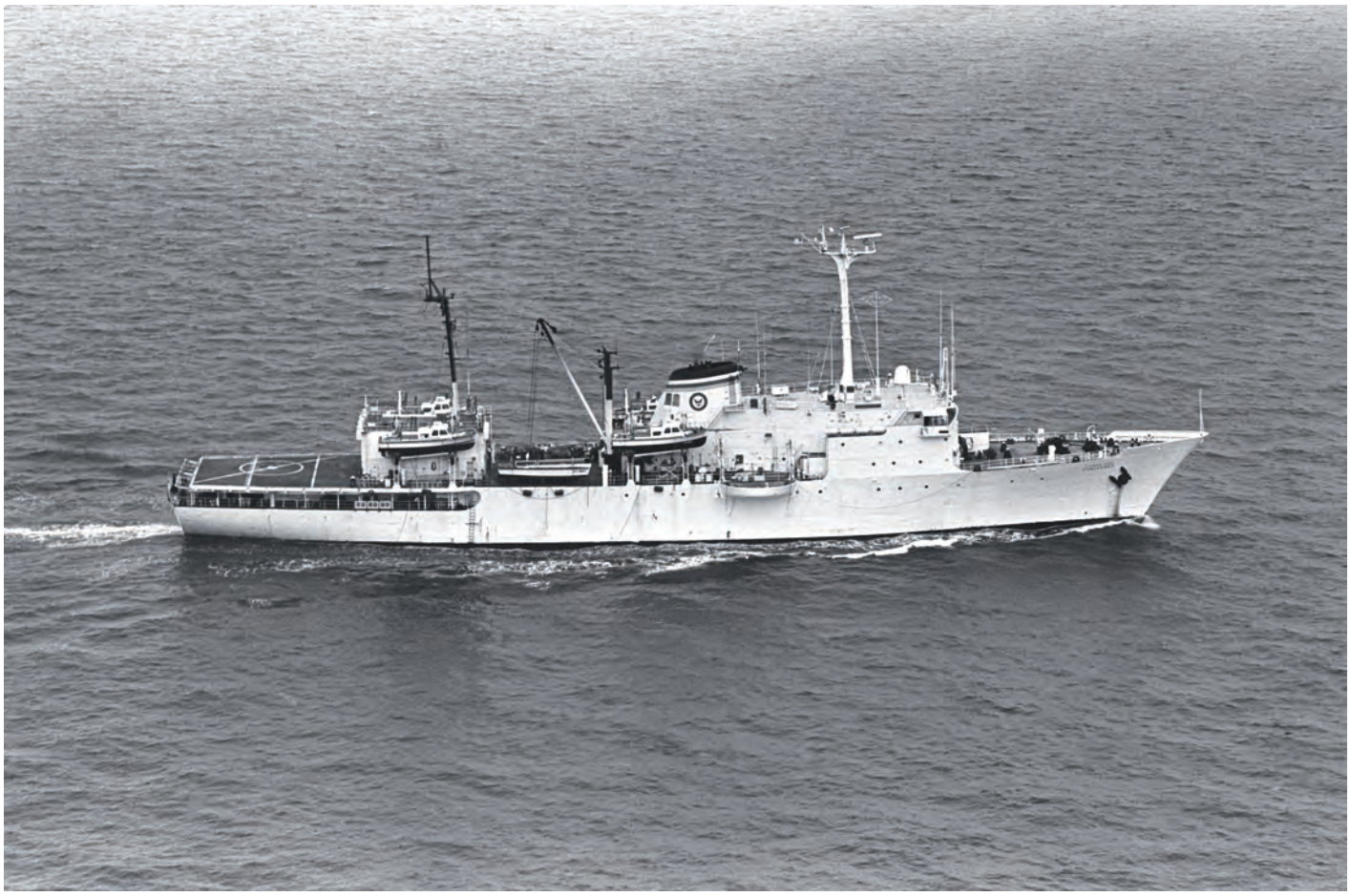
The Art and Craft of Making Useful Hydrography

Hydrographic Data Science

Everywhere we are seeing the introduction and application of automated technologies that supplant the common and accepted ways of doing jobs. The content of articles in this publication often dominate the pages. Most of us will have an experience to relate or a comparison to make between 'Then and Now'.

When I reported on board at the Naval Oceanographic Office in 1971, we had just taken delivery of two AMAZING new hydrographic surveying ships: USNS *Harkness* and USNS *Chauvenet*. They were 390ft long, 54ft beam and 31ft draft. On board they carried about 200 personnel, including the ship's merchant crew, US Navy, NAVOCEANO Surveyors and Cartographers, helicopter and crew, Navigational Aids Support Unit, and a US Marine Corps Topographic Platoon. The ship maintained and operated four 36ft Hydrographic Survey Launches, two Landing Craft, one helicopter, vehicles, and manned three shore based radio positioning sites providing electronic positioning for the ships. They carried the latest survey equipment suites including echo sounders, gravity meters, magnetometers, and among the first survey automation computers. There was a large format camera and a colour printing press to compile, print and distribute charts to the US Navy fleet while at sea. We had wet and dry labs for processing oceanography observations and cores taken on board. They had more hydrographic capabilities afloat than most coastal states in their home offices.

These ships were the sea surveyor's equivalent of Noah's Ark in their manning and equipping. They operated for about 20 years as the US Navy's main source of hydrographic survey data. In that period, using the best technology available (pre MBES), both ships provided



▲ *Figure 1: USNS* Chauvenet *(TAGS-29) underway in 1985. Image courtesy: Wikimedia.*

▲ *Figure 2: Teledyne Oceanscience Z-Boat. Image courtesy: Geometius.*

relatively small amounts, less than 1 million soundings, to our military mapping agency for charting purposes.

Fast forward to 2015. In a demonstration survey at an IHO conference in the Caribbean using a 2-metre long radio controlled boat outfitted with multibeam echo sounder, GPS, and one hydrographer driving the boat from shore collected and automatically processed about 200,000 soundings in several hours which were then decimated, and transmitted to a cartographer updating the relevant chart and returned the updated chart to the authority the next day.

The Rush to Innovative Technologies is On

Modernisation and new thinking are being applied to dramatically change the way hydrography is collected, processed and served out to users. With new techniques and equipment in constant development it is possible to see hydrographers who are office bound and do not go to sea at all. Here are three examples that are currently in use that point toward a significantly reduced hydrographic corps at sea.

Unmanned technology which has been proven with remotely operated vehicles (ROV) and Autonomous Underwater vehicles (AUV) to collect seafloor and oceanographic information has been proven. Unmanned Surface Platforms (USP) have now been proven for hydrography. On-board batch data processing of multibeam data has been proven to provide near real-time hydrographic data reduced for sound velocity corrections, tide, draft, and other motion. One only needs to see the many articles in *Hydro International* dealing with unmanned technologies. Examples in transportation, medicine, fast food show robots and innovation will erase recognisable professions as we know them today.

Satellite - derived bathymetry (SDB) has become increasingly useful and is now recognised as a good reconnaissance tool for nearshore bathymetry. It is can be utilised in areas where surveying assets have not been deployed for a long period or in areas where they will likely never be deployed. The refinement of SDB processing by applying a bathymetry algorithm to Landsat 7 and 8 as well as Worldview 2 imagery is strengthening the case for SDB and eventually leading to use on charts.

Slightly more controversial is Crowd Sourced Bathymetry (CSB). CSB is data collection by volunteers on ships and boats of opportunity. CSB is gaining recognition and popularity as a source of data that strongly supplements the work of traditional hydrography. One major benefit of CSB is that the data are gathered by vessels that are already transiting in the area of interest. The IHO has established a Working Group to develop a CSB policy and guidelines which will allow Hydrographic Offices to utilise CSB as they see fit.

We must suspend old thinking, prepare for and embrace new while maintaining quality services and products that we have provided over the years. The time for smart charts developed from data centric environments, and user designed navigation tools that are updated from the cloud in real-time is coming – with and without the Traditional Hydrographer and Cartographer.

Open Data and Big Data

More and more data is becoming available at all levels, from new sources, and all disciplines. Making data available and useful to all starts with the principles described by the G8 Open Data Charter of 2013 and the US Executive Order which say that open, machine readable data are the new default. The United States Open Data Policy requires US government agencies to collect or create information that supports downstream information processing and dissemination activities. In the Age of Exploration raw materials were the drivers of advancements in the world. Now the Age of Data data is what will drive success by making more available from all commercial and government sources.

Hydrographers of the future will be office bound and are likely not to go to sea at all

Rising alongside Open Data and Big Data is the increasing trend to recognise Data Science as a way to exploit data. The Data Scientist will exploit data through the access, integration, predictive analytics, and assimilation of multi discipline datasets. Challenges are dealing with Data Volume, Data Variety, Pace of Data Collection, Data Variability, Data Fidelity, Data Complexity and understanding data value and pricing to negotiate data purchases needed for adding value to products, maintaining records and cooperating with other institution's management

activities required to maintain data long-term for archiving - in other words Data Curation.

Data Science

Data Science is the extraction of knowledge from large volumes of data that are structured or unstructured, known as Knowledge Discovery and Data Mining. Every aspect of our lives, from life-saving disease treatments, to national security, safety of navigation, to economic stability and even the convenience of selecting a restaurant, can be improved by creating better data analytics through Data Science.

The Hydrographic Data Scientist

A Data Scientist with a solid foundation, typically in computer science and applications, modelling, statistics, analytics and math represents an evolution from the strict data analyst role. A Data Scientist is somebody who is curious, who can concentrate on data and identify trends, an individual who really wants to bring change to an organisation. With the advances in sea surveying technologies such as Autonomous Surface and Subsurface Vessels, Satellite Derived Bathymetry, and Crowdsourcing, the days of at sea hydrographers are going to be limited more and more.

Rather than deployment on board our professionals will be office bound, staring at data and putting new uses and applications into the hands of users and decision makers.

Hydrographic Data Scientists (HDS) will use their domain experience, together with computer science, and mathematics/statistics education to create data. While important, there will be less emphasis on traditional hydrographic data collection skills and experience. Traditionally collected data will often be a small segment of the dataset. Whereas a traditional data analyst may look only at data from a single source - an HO dataset, for example – an HDS will most likely explore and examine data from multiple disparate sources. The HDS will sift through incoming data from current survey collection operations, on several different levels depending on the immediate mission. His role on the immediate requirement will be discovering previously hidden trends and provide insight, which in turn can provide a solution to a technical problem, provide a competitive advantage or address a pressing business problem. Access to old data and relevant but not directly related data such as Marine Information Overlays will inform his work. An HDS does not simply collect and report on data, but also looks at it from many angles, determines what it means, then recommends ways to apply the data. An HDS explores, asking questions, doing 'what if' analysis, questioning existing assumptions and processes and will then communicate informed conclusions and recommendations across an organisation's leadership structure.

Summary

The predictable growth and integration of new methods and thinking is at once exciting and cause for concern in our community. In many cases one can see there is no longer a need for a complete crew of hydrographers at sea. With the challenge of reduced resources the likelihood of non-traditional methods for collecting data will grow to support the ever increasing needs and uses for hydrographic/bathymetric data for purposes other than safety of navigation. The development of the Hydrographic Data Scientist will meet that challenge, but who is going to meet the challenges for education, training, implementation, standardisation and creation of official products. That will fall squarely on the shoulders of academia, industry, government and international organisations. That quartet must work together, be interoperable, be inter communicative, and be interchanging. ◂

The predictable growth and integration of new methods is both exciting and cause for concern in our community

Paul R. Cooper retired from the US Naval Oceanographic Office as director of the International Program after 35 years and then joined private industry before retiring in 2016. He is active in the Pan American Institute of Geography and History, the Hydrographic Society of America, and the IHO Crowd Source Bathymetry WG and Group on Earth Observations.
✉ prcooper10@gmail.com

General Management at Geo-ICT Companies and Data Acquisition Companies

There is much generic literature on general management but not specifically about management at geo-ICT companies or data acquisition companies, which is why the author has written this article. It covers the various aspects of general management at geo-ICT companies and data acquisition companies, and addresses the priorities that need to be chosen. This article is intended for current or future 'ultimate responsible persons' (URPs) within geo-ICT companies and data acquisition companies, and their advisors, including within geo-related units in the non-profit sector. The URP can differ from one company to another, although one can usually indicate this intuitively (director-major shareholder, managing partner, general manager, managing director, director, departmental manager, etc.).

When considering a geo-ICT company or data acquisition company, it is important to determine whether general management is about entrepreneurship or about management. Entrepreneurship is externally oriented, is focused on the 'what' (effectiveness) and is market oriented, whereas management is internally oriented, is focused on the 'how' (efficiency) and is oriented towards business management.

In the following aspects of general management, the emphasis is mainly on (external) entrepreneurship:

- Mission and vision
- Marketing (product-market combinations [PMCs])
- Sales (PMCs)
- Research & development / business development (new PMCs)
- Maintenance (PMCs)
- Acquisitions

In the following aspects of general management, the emphasis is mainly on (internal) management:

- Strategy
- Housing
- Finance
- Production of geo-ICT software or geodata
- Human resources
- Organisation
- Quality assurance regarding geo-ICT software or geodata
- Risk management regarding geo-ICT software or geodata
- Communication with shareholders and works council

The above distribution of aspects of general management to entrepreneurship (external) and management (internal) is somewhat arbitrary; many aspects contain both an entrepreneurial and a management component. Therefore, it is important that the URP of a geo-ICT company or data acquisition company has the characteristics of both an entrepreneur and a manager. In general, however, it is more important for the URP to be structurally involved with external (entrepreneurial) aspects than with internal (management) aspects. Wrong external decisions usually result in more severe damage to the company's image, cost more money and are more difficult to reverse than wrong internal decisions. In practice, therefore, the URP will often take most of the external aspects for his/her account and will often delegate most of the internal aspects to a deputy.

In advance

It is advisable for the URP to do as much thinking as possible in advance, both when

▲ *Figure 1: The Ultimate Responsible Person can differ between companies.*

▲ *Figure 2: Situational management.*

using own staff and when hiring specialists from outside. Doing as much as possible in advance has several advantages: it increases the URP's control and boosts the cultural unity, as well as saving costs in the case of hiring an external expert.

In a situational management approach, the employee is managed according to the situation (to be classified in one of the four items: directing, guiding, supporting, delegating). This approach is relevant in geo-ICT companies and data acquisition companies too; employees must be managed depending on the situation rather than on the person.

General Management Priorities

Of course, it is not possible for the URP at a geo-ICT company or data acquisition company to continuously focus on all aspects of general management. Therefore he /she will have to set priorities. To begin with, some aspects of general management only need occasional attention.

For example, once the mission, vision and strategy have been established – often after an intensive and time-consuming process – it will usually be sufficient to check and maintain them just once or twice a year (at fixed times) for several years afterwards. Similarly, when it comes to housing, in the case of rented business premises this issue only demands attention towards the end of a rental period, and if the property is owned it usually requires even less frequent attention. It is wise to terminate the contract immediately at the start of the rental period to avoid having to remember the notice period. But for the short period of time that the issue of housing requires attention (whether for rent or purchase), it makes intensive demands on a manager's time! During this process, it is important to estimate the right number of square metres needed because the company will be renting/buying for the long term.

Conversely, finance is an issue that needs the URP's constant attention. After all, ultimately the URP is always responsible for making sufficient profits. Furthermore, the URP must have some affinity (and his/her deputy must have great affinity)with the production of geosoftware and geodata. Firstly, that affinity will enable the URP to stay alert to a potential conflict of interests between the production department and other areas of the company.
Secondly, it will help the URP to keep or get critical projects on track. This is good for risk management and gives the URP internal and external authority, contributing to a high-quality image for the company in the market. Thirdly, the URP must be able to decide what has to be executed within the company and what can be structurally outsourced. It is important that so much is executed within the company itself, that sufficient competences remain in place to translate client wishes into production and to guide the outsourcing, including the important aspect of quality assurance. Fourthly, it is important to have a realistic picture of the costs/ hours of production. Much work is outsourced to low-cost countries by geo-ICT companies and data acquisition companies. Thanks to increasing automation, the share of manual production is decreasing, making labour costs less significant. Having said that, outsourcing decisions are not made based on production aspects alone. Another important aspect is whether the activities concern the core business or not.

External View

It is very important that the URP approaches his/her company with an external view in order to see the opportunities and threats for the company in the market (external) and strengths and weaknesses within the company (internal). By having a feeling for these elements of the SWOT analysis, the URP has an even stronger sense of the company's mission, vision, strategy and positioning. The URP also has an understanding of the choice of products and services in the market (PMCs) and/or clusters thereof which must be in line with the SWOT analysis, the mission, vision, strategy and positioning of the company. The aim is to logically subdivide the company's activities into PMCs/clusters of PMCs that are as unique as possible, since the choice of PMCs determines the current and future market position of the geo-ICT or data acquisition company.

Marketing

The PMCs then have to be marketed and sold. Technical people sometimes associate marketing with nothing more than presence at trade shows. However, marketing revolves around creating coherence and alignment between all aspects so that the geo-ICT or data acquisition products or services can be sold at the maximum price. Some people do not realise that marketing is different from sales; in fact, marketing is the preparatory work for sales! The influence of marketing should already be felt in the choices regarding development. The company should strive to develop new services or products that can be positioned with as little competition as possible. This is called the 'blue ocean' strategy, in contrast to the 'red ocean' in which there are too many fish (i.e. too much competition) and they attack each other, turning the water red.

Another advantage of early contact between the Marketing and Development departments is that this is good for the balance between the technology push (technological development) and market pull (marketing on basis of market needs). The geo-ICT and data acquisition sectors are both driven by continuous technological advancements, but there must be a (latent) need from the market!

Importance of PMC decisions

It is important to choose the PMCs, and to cluster similar PMCs, to optimally meet the following requirements:

- The PMCs must remain unchanged for at least two or three years to facilitate financial monitoring
- Similar PMCs should be grouped together to form a stable cluster from which PMCs are produced and/or sold. Such a cluster needs to be healthy and managed by a cluster manager. People and other resources have to be allocated for a reasonable time (two to three years) with budgets for development, sales, software production, maintenance, etc.
- Everything that the cluster manager cannot influence must be financed from outside the cluster (general overheads, part of the costs for housing, human resources management, office automation costs, etc.)

The URP must be closely involved in the selection of PMCs and their marketing, sales and development. Such decisions should not be delegated. However, PMCs have far-reaching significance beyond these aspects. In fact, it is good to base all operations on the PMCs. These can be monitored very well financially and analysed using a BCG Matrix as question marks, stars, cash-cows or dogs. This indicates whether activities (development, marketing, sales, maintenance) have to be developed, consolidated, reduced or stopped for the respective PMC. As mentioned above, from a commercial point of view the PMCs should be positioned as uniquely as possible in order to minimise competition. Unique positioning is not only determined by the product (or service) itself, as technical people still often think, but also by the other 'P's in the marketing mix: price, place, promotion and personnel. One danger of the PMC approach is that one can be inclined to focus only on the existing PMCs, paying too little attention to new PMCs. Therefore it is good to make someone responsible for the development of new PMCs (i.e. business development) in addition to the employees responsible for existing PMCs.

The company should strive to develop new services or products that can be positioned with as little competition as possible

For those geo-ICT companies and data acquisition companies that work for government authorities – and many of them do – it is extremely important to closely follow the policies and developments within government and to align their PMCs with them. Both in companies and in government, the trend is shifting from georegistration to geomonitoring and then to geoprediction. Automation has made it possible to capture large quantities of geodata, e.g. through laser scanning.

Business Models

Generally speaking, the market is much more likely to accept a new product/service (P) than a new sub-market (M). Therefore, companies are advised to favour the development of new products and services for existing clients. If a company wants to enter a new market segment, this may be a reason to buy (part of) another company including its clients. With regard to acquisitions, it is worth mentioning that the leading Dutch quality newspaper *NRC* recently reported that "almost every industry has to deal with companies with business models like the start-ups of Airbnb and Uber". Why should this not be the case in our industry? Airbnb and Uber are built around the smart use of ICT, especially the use of apps. The size of the own workforce is minimal in these companies, and they frequently work with independent third-party professionals. There is one big difference with the geo-ICT and data acquisition sectors: in our industry, the necessary level of education is much higher. In the geo-ICT and data acquisition industry, only a few companies fit into the Airbnb and Uber trend. Longer-standing companies in geo-ICT and data are focused on ensuring quality. While quality is definitely an issue, it has become less important because of a lack of knowledge regarding how quality should be measured (e.g. using the Baarda method of testing). As the importance of quality decreases, the relevance of the seemingly easier-to-measure price increases. When it comes to quality, the old adage 'The devil is in the detail' often applies, and the quality (or lack of it) often only becomes apparent at stress moments. Longer-standing companies are more likely to have a quality system in place than start-ups. Those companies with a quality system usually improve their quality over time as they implement lessons learned in the quality system for subsequent projects.

Acquisitions

Although acquisition of (parts of) companies is a very complex topic that cannot be dealt with thoroughly here, it should be pointed out that

acquisitions are not commonplace and, when they do occur, they are always strategic decisions involving the senior management. In purchasing another business, the acquiring company's aim will often be to acquire PMCs that it does not currently have itself but which are essential for a healthy future. We see evidence of this when start-ups in the geo-ICT and data acquisition sector are taken over by longer-standing companies.

The geo-ICT aspect is becoming increasingly important for data acquisition companies too. However, it can be very difficult for data acquisition companies to find a geo-ICT company that is a good cultural fit and hence could be a potential takeover target. Without a cultural fit, the acquired employees will subsequently leave, resulting in the acquiring company buying a geo-ICT company – often at great expense – without a workforce, leaving little more than an empty shell! If there is a great risk of such a situation arising, data acquisition companies are recommended to build their own geo-ICT unit instead.

A company's culture is based largely on its approach to human resources and quality assurance. Therefore, it is important for the URP to make his or her mark in close consultation with the works council. This does not mean that the URP has to spend a lot of time on these issues; much of the workload can be absorbed by the human resources and quality assurance professionals, whether inside or outside the company. However, they need clear direction on policy from the URP. For example, in terms of quality assurance, the URP should proactively indicate how the company should position itself in terms of quality, i.e. high quality at a high price, or lower quality at a lower price.

Risk Management

Most geo-related projects involve high risks, so it is important to control and manage the risks, both before and during a project.

Risk management prior to the project:

- Adhere to the certification requirements relating to the main processes. Certification forces a systematic approach to work and a structured approach to communication. However, certification does not solve all problems. There are plenty of examples of the wrong work being done, albeit according to the certificate.

- Encourage continuing professional development, given the rapid technological developments in geo-ICT and data acquisition.
- Beware not to over-specify the contract. This has the following negative effects:
  1. There is little room left for the (innovative) input of the geo-ICT and data acquisition companies;
  2. Assignments become too complex;
  3. The project can be attributed to a specific contractor.
- Functional procurement approach: this has the big advantage that contractors can bring their innovative abilities into the project.
- Set the lower limit: It is in the contractor's interest that the projects are not too small and have an easy part so that the contractor can recoup the knowledge costs.
- Set the upper limit: On the other hand, there is also an upper limit for the contractor, since the bigger the project is, the more risk it entails. If the upper limit is exceeded, the risks are unacceptably high.
- Include cancellation and amendment clauses: A cancellation clause enables a contractor to stop a project without excessive consequences, for reasons beyond the company's control. In practice, this will not happen easily, but only after the contractor has incurred considerable costs. In terms of amendment clauses, clients are generally unwilling to accept a clause that enables the contract to be changed on the contractor's initiative.
- Pay attention to fines and bonus clauses: These are mainly included at the client's request, and the two (fines and bonuses) go together. For a contractor, a fine on a project

Figure 3: Microsoft Store. Image courtesy: Blake Patterson via Flickr.

that is not running well is usually just the tip of the iceberg because the contractor will also have already incurred high costs.

- Identify the risks and formulate solutions in advance: The contractor should consider various project scenarios and indicate the perceived risks, including how to minimise them and which actions will be taken if the risks arise. The contractor must discuss this with the client.

Risk management during the project:

- Arrange a trial delivery: A geo-ICT or data acquisition project usually involves large amounts of data, and it is essential that all types of project data appear in the trial delivery. The trial delivery is also a good way to match the expectations of the client and the contractor. Fast trial delivery is essential to prevent or eliminate many misunderstandings.
- Formulate critical projects that the contractor strictly monitors from above: While describing a project as 'critical' ensures it receives extra attention, there is also a risk of creating unnecessary bureaucracy. A loss-making project should definitely be labelled 'critical', but of course other criteria can be chosen too. For critical projects, improvement points should be formulated and it is a good idea to monitor progress weekly.
- Build in enough contact moments between contractor and client: A geo-ICT or data acquisition project to develop a product or service requires input from both parties. It is important that the contractor and the client have enough contact moments, starting from the very beginning of a project. Not all contact moments must be face to face; for example, the client and the contractor can keep a digital log, allowing them to specify the project in detail.
- Set a realistic deadline: Healthy time pressure is important in a geo-ICT or a data acquisition project, as in any other project. However, excessive time pressure leads to errors. Meanwhile, too little time pressure allows attention to fade and that can also cause errors. A quick trial delivery of a small part involving all the essential elements of the project helps to create healthy time pressure, and production is greatly increased when the trial delivery has expired. In the final phase of the project, production is much lower and a large part of the team can be removed from the project.
- Communicate with shareholders and the works council: Since the above-mentioned issues should be broadly summarised for the shareholders and the works council, this communication must always be coordinated by the URP. It is also extremely important that the URP is the first point of contact in case of initiatives by shareholders or works councils.

Concluding Remarks

General management of a geo-ICT company or data acquisition company involves many aspects. The ultimate responsible person (URP) must therefore set priorities. Some areas require only occasional attention, whereas other aspects must be handled by the URP or may be delegated by him/her within or outside the company. In the case of delegation, it is important that the URP thinks about the issues in as much detail as possible in advance in order to determine the policy and, in the case of delegation outside the company, to save costs.

More information

- Risico-management bij geodetische en Geo-ICT projecten, Jos Anneveld and Ronald Vroom, *Geo-Info* 2017-1; Marketing en sales bij Geo-ICT en data acquisitie bedrijven, Jos Anneveld, *Geo-Info* 2017-1, pp 24; Algemeen management bij Geo-ICT bedrijven en data acquisitie bedrijven, deel 1, Jos Anneveld, *Geo-Info* 2017-3 and Algemeen management bij Geo-ICT bedrijven en data acquisitie bedrijven, deel 2, Jos Anneveld, to be published in *Geo-Info*.
- Eliott Aronson, Timothy Wilson & Robin Akert, 2011, *Social Psychology* (7th Edition), Amsterdam: Pearson Education, Benelux.
- Wikipedia, strength-weakness analysis
- Wikipedia, BCG Matrix.

During his career, **Jos Anneveld** has gained extensive experience in formulating missions, visions and strategies for organisations and departments, and in implementing policy in line with these visions. In doing so, Jos has always aimed to achieve cohesion between positioning, marketing, sales, execution, technological development, organisation, personnel and finance. Jos is familiar with various public authorities, energy, water and telecom companies, contractors, and oil and gas companies. His area of expertise lies in setting up long-term international collaboration between government bodies, knowledge institutes and the private sector, with a special interest in solving complex problems at strategic, organisational and project level.

✉ jos.anneveld@aerovision.nl

WANTED! Clients and Professionals Looking for a Meaningful Partnership!

Freelance Professional Staff Should Be More Than Just Workforce

'Must have GWOs and be able to mobilise in the next 24 hours for 3 – 4 week cable project based in UK waters'. How often do you see these words on an advertisement? Let's consider this - is the fastest response the right response? Every day we see recruitment businesses posting advertisements online and on social media quoting URGENT, MUST HAVE, MOBILISE NOW! Of course, this often results in clients reaping the rewards of utilising a flexible workforce and having the skills when they need them.

Figure 1: Emma Campbell.

How do recruiters know who the right individual for the right job is? And how often do the clients really get the right individual?

Reactive Recruitment

With 20 years of experience working within the recruitment industry, Atlas Business Manager Emma Campbell has worked across a variety of sectors and has dealt with her fair share of diversity when it comes to talking about culture, strategy and how clients work.

"The offshore industry is one of the most challenging sectors I have worked in to date. With the pressure of compliance coupled with a competitive market place and complexities of travel, logistics, taxation and certifications, there is a constant need to be able to react to our clients' and professionals' needs quickly. This is requested with limited information. Job descriptions are fantastic but they are a list of wants and needs rather than the facts around what or who can solve the problem."

So How Can We Unravel this Puzzle?

"There has long been a preconception by clients of the recruitment industry that it is fairly irrelevant or unnecessary to share detailed information about the business culture, projects, team and fit. Therefore, comments such as "we just need someone with XYZ skills and an ABC certificate for a couple of weeks" or "the line manager doesn't have time to speak to you so I am doing it for him" are commonplace when we are conducting our daily business.

"All clients have to go on is a CV, which is uploaded onto an online system. A service that deals with people is delivered completely online with little human interaction, so how effective is this process?"

"When this method is used, the feedback comes through as follows: 'Great candidate good experience but just doesn't fit in.' The solution is to work in partnership with your provider and allow your partners to work closely with project leaders. When the time comes to select a candidate we can assure that they have the right skills and experience, they fit into the manager's team and they have an understanding of the company culture."

"Although online processing slightly retracts from the human element, we need to embrace digitalisation to improve productivity and ensure those future partnerships with our clients."

How to Deal with Feedback

"Recruitment businesses can be criticised by their contractors or candidates for the fact that the feedback they have received does not have the detailed information they would like. After all, the client has filled the position, the problem is solved and they are very happy with the service. Candidates are left in the dark and have no reason as to why they were not chosen for the project.

"Bad reviews are shared everywhere and now with social media this means that there has never been such an important time to ensure you maintain positive relationships and gain 'good reviews'."

"Communication will always be key when dealing with people and we all know reputations take years to build but moments to destroy. Working with your suppliers as a partner will give you the opportunity to agree upon a feedback regime and manage the expectations of your workforce."

In summary my recipe for a successful partnership where clients and professionals can realise the true value of having a recruitment partner are:

- Share information – what are the projects? Where are the projects? What is the schedule? What could go wrong? It's all relevant.
- Let recruiters act as your consultant – they have often spent some hours on the phone or in person with the client or perspective contractor/employee and they may have some valuable information you need to know.
- Let the recruiter have access to the people they can help. Who are the project leaders? What do they look for when recruiting on their project? What don't they want to see? Having an open forum is a great way to launch recruitment campaigns and really let your partners understand the team and the requirement.
- Clients and recruiters offer feedback – get a five star rating every time!
- Make the process 3 dimensional - CVs are great but nothing replaces human contact when dealing with people. Remember without the people, everyone loses.

"Work with your chosen provider, let them get close, make them a true partner and realise the value of a flexible, compliant and appropriately skilled workforce that shares the values of your organisation."

Figure 2: Working in partnership is important for recruitment and human resources.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EvoLogics GmbH
Ackerstrasse 76,
13355 Berlin, Germany

tel.: +49 30 4679 862-0
fax: +49 30 4679 862-01

sales@evologics.de
evologics.de