SEABED GAZETTE

april 2016

A trip to Asia

Up, Up and Away with Skeye

Positioning through the years

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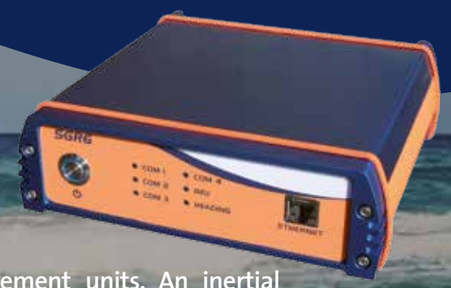
Getting to the bottom of things

www.seabed.nl

Seabed inertial measurement units



The Seabed-IMU-S family are submersible inertial measurement units. An inertial measurement unit, or IMU, is an electronic device that measures and reports a vessel/vehicle's velocity, orientation, and gravitational forces, using a combination of accelerometers and gyroscopes, sometimes also magnetometers.
When integrated with SPAN technology, the SBD-IMU-S family is ideal for maritime, airborne and ground applications that require accurate 3D position, velocity and attitude (roll, pitch and azimuth) data.

SBD-IMU-S1
mems based

SBD-IMU-S2
mems + fog based

SBD-IMU-S3
mems + fog based

Accuracy up to 0.005°

Benefits
- Tactical grade IMU performance
- Commercially exportable IMU
- Ideal for size constrained applications
- Continuous, stable positioning

SEABED

Getting to the bottom of things

CONTENTS

Getting to the bottom of things

Founded in 2004, Seabed started off with three employees and a range of approximately twenty products. Over the years, the company has evolved into a full-grown company that employs 7 professionals and offers a broader range of products. From the early start, the representation of several companies combined with Seabed's technical know-how proved to be of major importance. That forms the key to its success.

Seabed aims to create the perfect balance between sales, support and engineering. The company offers a combination of technical knowledge, practical experience and a broad sales network to support its clients. Its team consists of young professionals with a variety of educational and specialist backgrounds. Their combined expertise contributes to Seabed's high-quality product development, support and engineering.

We are pleased to support you in finding the right solution for specific applications. We offer total system integration

Both in the offshore- and onshore industries, innovations are introduced in rapid succession.

Seabed is specialized in technical services aimed at the development and implementation of both hardware and software. Besides a highly qualified staff, the company offers a wide range of high-quality instruments, such as GPS equipment (official NovAtel dealer within the Benelux) as well as a broad variety of hydrographic tools such as Multibeams, Inertial Measurement Units, Tide Gauges and much more. To offer the complete package Seabed can also supply geotechnical equipment for soil sampling, such as our in-house developed electrical vibrocorer.

Seabed's scope of operations mainly covers hydrographic survey projects, dredging operations and services for the offshore industries.

Its main clients are governmental organizations, port authorities and dredging contractors.

Meet our mascotte: Champ!

Meet... Hans Tuinman

Sales

Date of birth? And what is it you like to do on your birthday?
18th December. Have some drinks and eating out at a good restaurant with family and friends.

Single, in a relationship or married?
Happily living together with Evelien, Vera Sohpie (4) en Lucia (0).

Any hobbies?
Seabed. Working in the garden. Salsa.

Fast food, bistro or Michelin starred restaurant?
Michelin starred reastaurant with a nice glass of wine, bistro as a prelude to a spectacular evening and fast food every tuesday night between 11 and 12 pm ;-).

Netflix or the cinema? And what is your favourite TV-series or movie?
Both. At the cinema you have to keep awake. Netflix can be very handy if you can't. I'm a Trekkie for life!

What kind of job did you want growing up?
Astronaut

What is it you like most about your current job?
Dynamic, versatile and always a challenge to create the best solutions for our clients.

What do you learn from your colleagues?
Having patience. They 've got more of that. I have a lot of respect for them. I get a great sense of enthusiasm, motivation and loyalty from within the group.

If you would win the lottery, what would your life look like?
Even more colorful!

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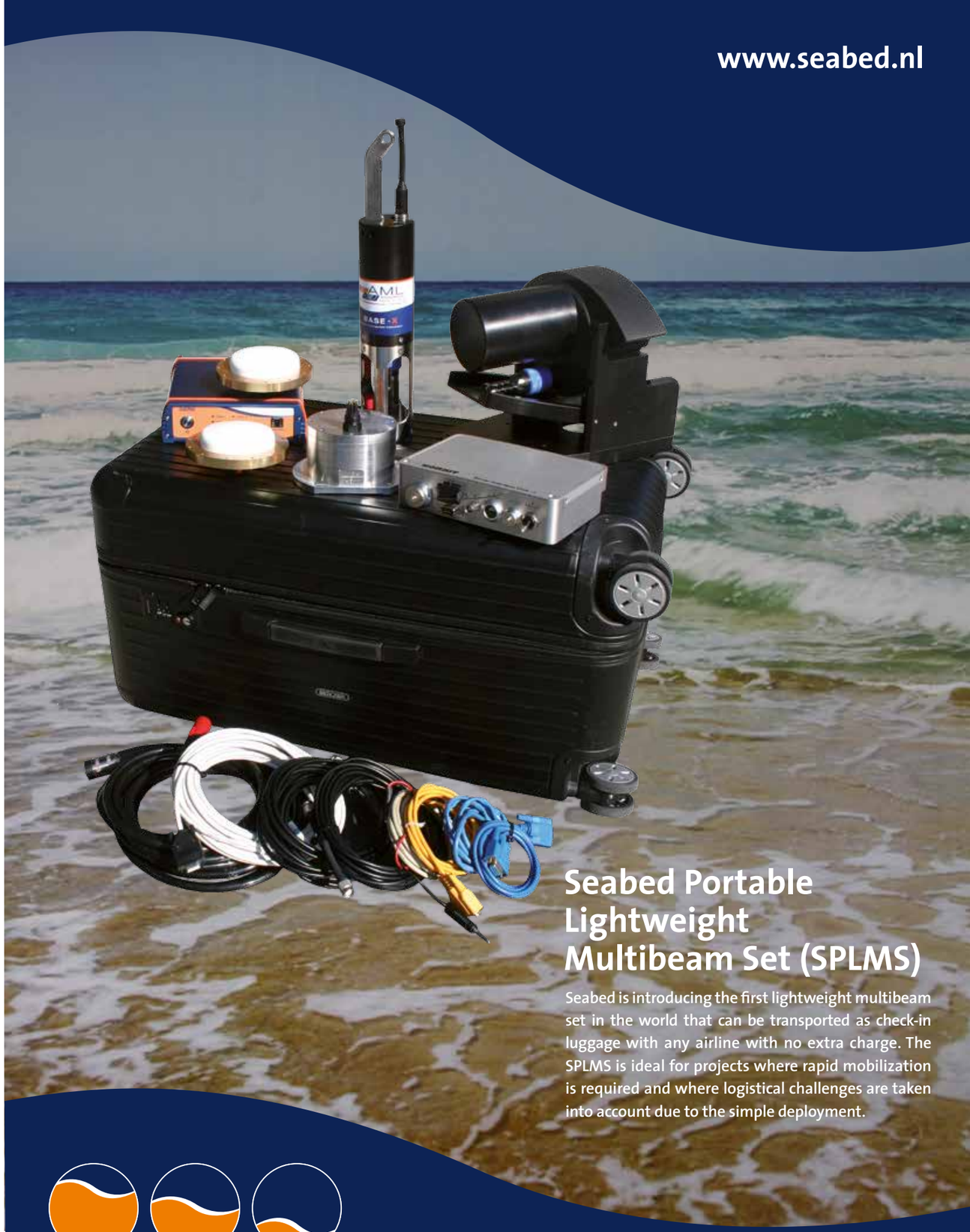


Seabed Portable Lightweight Multibeam Set (SPLMS)

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

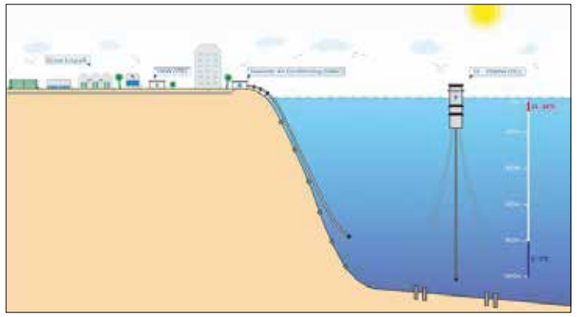
SEABED

Getting to the bottom of things

A trip to Asia

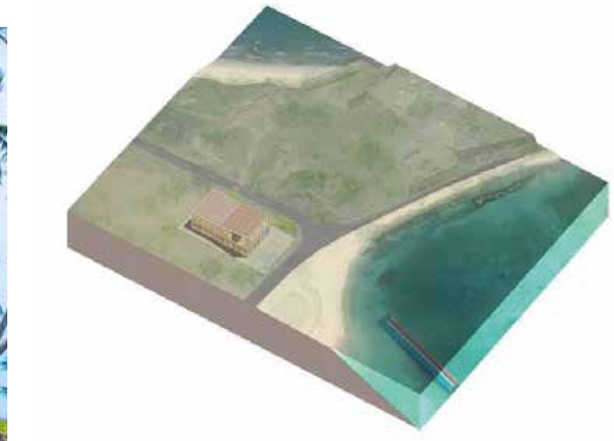
On April 25th 2015 Seabed flew to Asia for a "small" test survey. We received an old map of the waters to be surveyed. Read the full story on the next page.

Bluerise is a company based in Delft that specialises in Ocean Thermal Energy Conversion. OTEC is a marine renewable energy technology that harnesses the solar energy absorbed by the ocean. The energy gets derived from the difference in temperature between the cold deep and the warm surface water of the ocean. In cooperation with the Delft University of Technology, Bluerise has built a small version of this the OTEC power plant as "proof of principle", a real innovation in demo size plants. Bluerise is now working on larger, industrial scale projects.



On April 25th 2015 Seabed flew to Asia for a "small" test survey. Seabed received an old map of the waters to be surveyed. This map indicated the depths that were needed for the OTEC power plant. Early on that year Bluerise had rented a MI-NOS-X to do temperature, depth and salinity readings in the same area. The only issue was that the map that they had was measured using the classic hand lead, and it showed huge drop offs. For an OTEC plant to be constructed they have to lay a pipe line towards the coast. Laying such a pipe over a steep slope is not favorable. They had come to Seabed to see if we could help find a good location for the pipe and to measure up to depths of 2000 meters. For Seabed it would be a great opportunity to test the SPLMS in harsh environments.

After checking in 190 kilos of equipment and making the long trip to Asia, we started the hard week of surveying onboard the beautiful vessel of opportunity. In the end we had a good outcome and the terrain model was well put together for Bluerise to have an indication on where they could possibly install a pipe line.



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Meet...

Elice Collewijn
Sales

Date of birth? And what is it you like to do on your birthday?
5th October. Party with friends and family!!

Single, in a relationship or married?
Living together with my boyfriend Walter and doggie Champ.

Any hobbies?
Going to concerts with friends, skiing, holiday in the sun or in the snow. Traveling with my boat through the canals of Amsterdam on a nice summer's evening.

Fast food, bistro or Michelin starred restaurant?
For sure bistro. I prefer the ambience.

Netflix or the cinema? And what is your favourite TV-series or movie?
Netflix, so I can fall asleep during the movie without worrying if I'll miss anything.

I do not have a favourite movie or series. I had a good laugh with The Hangover though.

What kind of job did you want growing up?
A Singer but unfortunately my voice did not agree.

What is it you like most about your current job?
My colleagues! We have a great team!

What do you learn from your colleagues?
A lot! Everyone has his or hers own speciality and they teach me how to combine these specialities to get to the best result!

If you would win the lottery, what would your life look like?
I would like to share my fortune with the people I love. So nice holidays with the whole bunch would definitely be a part of that.

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SGR6 Receiver

From standalone metre-level to AdVance® RTK centimetre-level positioning, the SGR6 is flexible to meet your positioning needs. With 240 channels and comprehensive support for all current and planned GNSS signals, the SGR is fieldupgradeable to eliminate the need for future hardware changes.

SEABED

Getting to the bottom of things

InteLAS™ - Mobile LiDAR System

The InteLAS™ (Integrated Laser Acquisition System) mobile mapping system represents the very latest in dynamic geospatial data collection technology. The system comes fully calibrated and ready to operate, complete with its own 3D data acquisition and visualisation software.

APPLICATIONS

The system is ideally suited to any number of applications including; highway planning, bridge, height and width, asset management, railroad surveys, corridor mapping, power line surveys, pipeline surveys , volumes and much more.

BENEFITS

The compact form factor and light weight of the INTELAS™ allows the system to be fitted to almost any type of vehicle, vessel or mobile platform in a matter of minutes.

The system has been designed to be simple to mobilize and easy to operate without the need for specialized training or qualifications. Being able to rapidly acquire accurate geospatial data in real time, without the need for post processing, not only offers a number of cost and efficiency benefits to existing operations, it also helps create new business and market opportunities.

FULLY CALIBRATED

The INTELAS™ is delivered as a fully calibrated ready to go mobile mapping system, complete with PC and software. The system requires no user calibration or configuration and can be mounted on any type of mobile platform and be ready to acquire accurate 3D Geospatial data within minutes.

Onsite training is included with every system together with 12 months 24/7 telephone and remote internet support.

MODEL OPTIONS

The InteLAS™ can be provided in any of the following models. At any time can a model be changed to a different one with the exchange of the laser unit. A factory re-calibration will be required.

InteLAS™HD

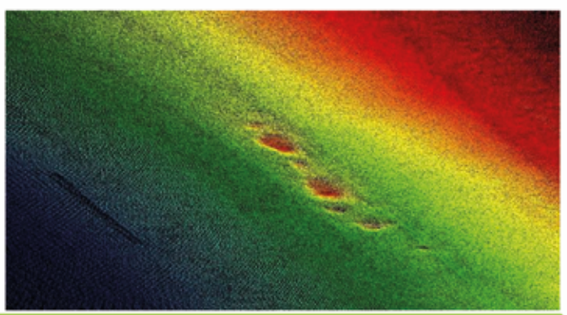
- 700,000 Points Per Second
- ± 1 cm Accuracy
- 100 m Range
- Integrated GNSS, IMU, FOG
- Requires No Calibration
- Works at Highway Speeds
- Real Time Geospatial Data
- Software Included

InteLAS™

- 300,000 Points Per Second
- ± 3 cm Accuracy
- 100 m Range
- Integrated GNSS, IMU, FOG
- Requires No Calibration
- Works at Highway Speeds
- Real Time Geospatial Data
- Software Included

InteLAS™LR

- 36,000 Points Per Second
- ± 1 cm Accuracy
- 250 m Range
- Integrated GNSS, IMU, FOG
- Requires No Calibration
- Real Time Geospatial Data
- Software Included



www.ilinks.us

iLinks GEOSOLUTIONS

iLinks case study

1 INTRODUCTION

iLinks Geosolutions LLC, a privately owned ISO9001 accredited company that specializes in the design and production of rugged all-weather survey quality mobile LiDAR systems, and the provision of high quality hydrographic and topographic survey services.

iLinks own and operate a small fleet of rapid deployment survey vessels which have been designed specifically to conduct highly detailed 3D hydrographic and topographic survey operations using the latest sonar and LiDAR technologies. In addition to the mobility through a trailer, the vessels are designed and built to be deployed from a mother ship or barge at short notice.

iLinks InteLAS™ (Integrated LiDAR Acquisition System) is a mobile mapping system which represents the very latest in dynamic geospatial data collection technology. The system comes fully calibrated and ready to operate. This system has been fully designed by iLinks and is built in the iLinks factory.

2 RAPID DEPLOYMENT SURVEY VESSELS

iLinks' rapid deployment survey vessels offer flexible deployment options including deployment from a larger support vessel or barge, offering a viable solution for remote locations where it is difficult to mobilize a survey vessel at short notice, or indeed find a reliable source of survey services. This method of operating allows the iLinks survey vessels to operate safely at much greater distances from shore than they would normally be able to reach, and has the added advantage of being able to survey safely in shallow areas where a larger vessel cannot safely operate.

All of the positioning and survey systems on the rapid deployment vessels are permanently fitted and maintained by iLinks in a fully calibrated and ready to operate state, negating the usual requirements for lengthy mobilizations and calibration and significantly reducing data acquisition times. A permanently fitted vessel also significantly improves overall data quality and turnaround times.

3 CLEARLAKE CHANNEL SURVEY

iLinks utilized one of their rapid deployment survey vessel to map the Clearlake Channel where it opens into the Galveston Bay at Kemah, TX.

1.1 Mobilization

Mobilization consisted of trailering the survey vessel to Kemah and launching it at the local public boat ramp conveniently located next to the survey area. After launching all systems were initialized and surveying commenced immediately after the IMU had established its highest accuracy level. Typically this requires 15 minutes after a cold start. It is safe to say that including a sound velocity profile measurement taken in the survey area the first end-result data was collected 20 minutes after launching the vessel.

1.2 Multibeam
Multibeam data was collected in two phases. The first phase was conducted with the transducer head mounted in the traditional horizontal position. Full coverage was achieved covering the channel bank to bank.
The second phase was done by rotating the transducer head sideways 25 allowing the sonar to shoot up to the waterline where it meets the LiDAR data which doesn't penetrate the water surface.

1.3 LiDAR
LiDAR data was captured of the shoreline using the InteLAS™ mounted on the iLinks Shadow. The LiDAR data was captured simultaneously with the multibeam data.

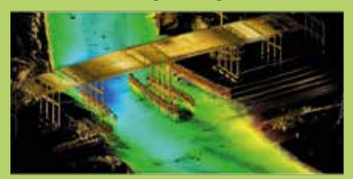
1.4 Positioning and Attitude
The GNSS/IMU combination inside the InteLASTM was used to both position the survey vessel as well as establish its attitude. The GNSS receiver was provided RTK corrections using the Leica SmartNet VRS network.

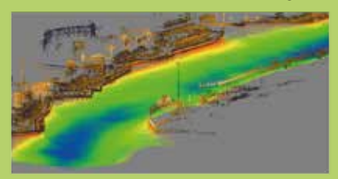
1.5 Post-Processing
Apart from cleaning out multibeam noise and outliers from the sonar data and some hits the LiDAR system picked up from the water surface, no post-processing was done whatsoever. The survey area included a highway bridge that was passed under several times. All end-product data was collected in real-time during acquisition.

1.6 Survey Statistics
The total time of acquisition once the system was initialized was limited to 35 minutes with the transducer head mounted horizontally. All iLinks rapid deployment survey vessels are mounted with Universal Sonar Mounts. This allows us to physically rotate the head in less than 5 minutes. After rotating the head 25 sideways the banks of the channel were surveyed in less than 20 minutes.
Total survey time: 1 hour
Initialization time:15 minutes
Channel length: 700 meters
Channel width: 85 meters
Average depth: 7 meters
Multibeam data: 8.538.910 points
LiDAR data: 14.571.424 points

4 DATA EXAMPLES

The following images show the end-result data of the survey





5 CONCLUSION

Without the use of a permanently fitted, ready-to-launch survey vessel as are operated by iLinks it is impossible to acquire data with the speed this survey was done. It is equally impossible to achieve the accuracies achieved during this survey with a vessel of opportunity.

Meet...

Evert Bootsman
Engineer

Date of birth? And what is it you like to do on your birthday?
My birthday is on the 21st of January, I usually don't do anything special on my birthday. In general I hope to be back home at a decent time so I can celebrate it with my girlfriend, family and friends.

Single, in a relationship or married?
In a relationship.

Any hobbies?
My hobbies are diving, fitness, taekwondo, skiing

Fast food, bistro or Michelin starred restaurant?
I don't have any preferences in regards to what type of restaurant, if I have to make a choice I think I would prefer to eat at a diner.

Netflix or the cinema? And what is your favourite TV-series or movie?
On a regular basis I go to the cinema with my girlfriend, but we also do Netflix and chill. So no preferences in that regard as well. I don't have a favorite movie, but I like movies like: The Dark Knight, Saving Private Ryan, Inception, The Godfather and Inglorious Basterds.

What kind of job did you want growing up?
I didn't have a dream job in my childhood. Perhaps a racecar driver. I think that's the basis of where all the speeding fines originated.

What is it you like most about your current job?
What I like about my job is the diversity of one day working on the water with our multibeam with laser, the other day installing a Vibrocorer in Turkey.

What do you learn from your colleagues?
We have a team that has a diversity in experiences, so if you're willing you can learn endlessly.

If you would win the lottery, what would your life look like?
If I win the lottery I would give every family member a nice amount. Buy a new car for my girlfriend. I would keep on working, but take more time off.

Up, Up and Away

On January 26th of Seabed went flying with Skeye. Skeye is a company that specializes in aerial surveys, Orthophoto mosaics, drone inspections and much more, mostly air related specialties. Skeye had shown interest in doing an comparison test during the creation of Orthophoto Mosaics. An orthophoto mosaic is a single aerial image created from many individual aerial images corrected for color and scale, similar to Google Earth imagery. This makes it possible to derive the coordinates of every pixel in the image. In the present method Skeye has to place a large amount of markers on the ground in order to achieve required accuracies. Skeye wanted to test if the use of an SGR6-D IMU S1 for accurately positioning the camera would reduce the number of ground control points and thus save valuable time. The position of the aircraft was derived by post-processing (ppk).

The results have just come in and Skeye can significantly reduce the placement of ground control points in the future by using the SGR6-D IMU S1. Besides the good results Seabed and Skeye had a fun and productive day of testing and flying.

Here's to the future

Seabed has on an average two students per semester to join our team for their internship.We find it very important to be a part of their education, as they are part of ours.

With great enthusiasm we welcome them in our team and let them experience all the aspects we are operating in. They will join our engineers in the field as well as behind the workbench. Engineer Evert Bootsman and hydrographic surveyor Eva Brans started their job at Seabed after they finished their internship with Seabed and graduated. Nowadays they travel around the world for Seabed and are an example for the other interns on how divers this industry can be.

Current Interns are Marjolijn and Sjors. Sjors is in the last year of his study Electro Technical Engineering. Marjolijn is in the last year of her study Ocean Technology.

SUB-BOTTOM PROFILING SYSTEMS AND TRANSDUCERS

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Sensors – Systems - Service

Ocean Business 2015

Ice Coastal Management 2015

Intergeo 2015

Hydro 2015 Capetown

TusExpo The Hague 2016

Seabed **at the** Expos

Where can you find us in 2016?

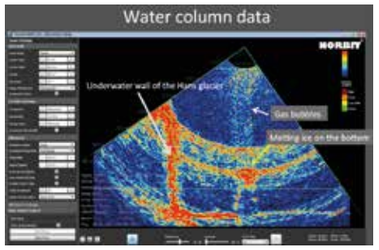
Oceanology International
Geo Business
Wodcon
Intergeo
Hydro

Norbit - MBES In Arctic Conditions Case Study

In the summer of 2014 the mapping of Hornsund fjord glaciers took place by Norbit and the Institute of Oceanology, Polish Academy of Sciences in Spitsbergen, the Arctic. Norbit and the Institute of Oceanology chose to use QINSy for data acquisition for this.

The purposes of the survey were threefold:
- To test Norbit compact MBES in the difficult Arctic conditions,
- To map tide-glaciers front walls and measure bathymetry of post-glacial bays,
- As well as detect tide-glaciers underwater outflows detection based on MBES water column data.

The works were conducted in frames of the Polish-Norwegian projects 'Arctic Climate System Study of Ocean, Sea Ice and Glacier Interactions in Svalbard Area' (AWAKE2) and 'Glaciers as Arctic Ecosystem Refugia' (GLAERE) in the Polish Polar Station in Hornsbund (Svalbard).



Water column image from the Norbit showing showing features in the water column

Using an aluminum small boat, a pole mounted Norbit integrated wideband multibeam sonar (iWBMS), pole mounted POSMV, with QINSy software (for acquisition and data processing) installed on a laptop, all powered by a compact Honda 20i generator.

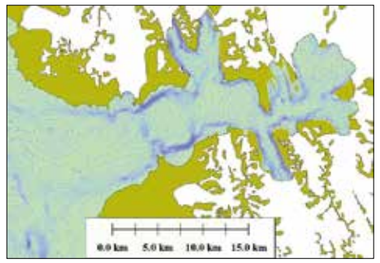
QINSy is an excellent tool for multibeam data acquisition. The philosophy with QINSy is to do things right, first time. This means that QINSy is able to deliver pre-cleaned data by using smart blocking parameters and online spike filters. When used, smart blocking and online de-spike filters, QINSy can deliver a 95% clean dataset.

Although not used for this project, further processing of the multibeam data can be done in QPS's new product, Qimera, which is fully focused on handling and processing large multibeam datasets with access to raw data and having the ability of reprocessing multibeam results.

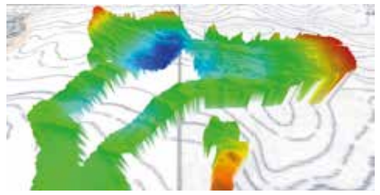
The processed data can be loaded into Fledermaus for 4D visualization and analysis. Due to the straight forward software setup and the high quality data that was captured, the data was very well suited for scientific purposes.

Taken during data collection, shows the equipment set up onboard

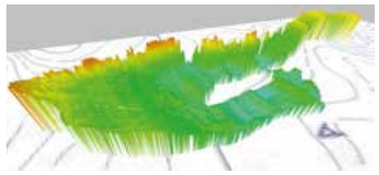
The survey resulted in two of the main glaciers in Hornsund fjord being mapped; seabed bathymetry as well as underwater walls structure. Very promising results of water column data analysis were obtained for future detection of freshwater outflows from below the glacier.



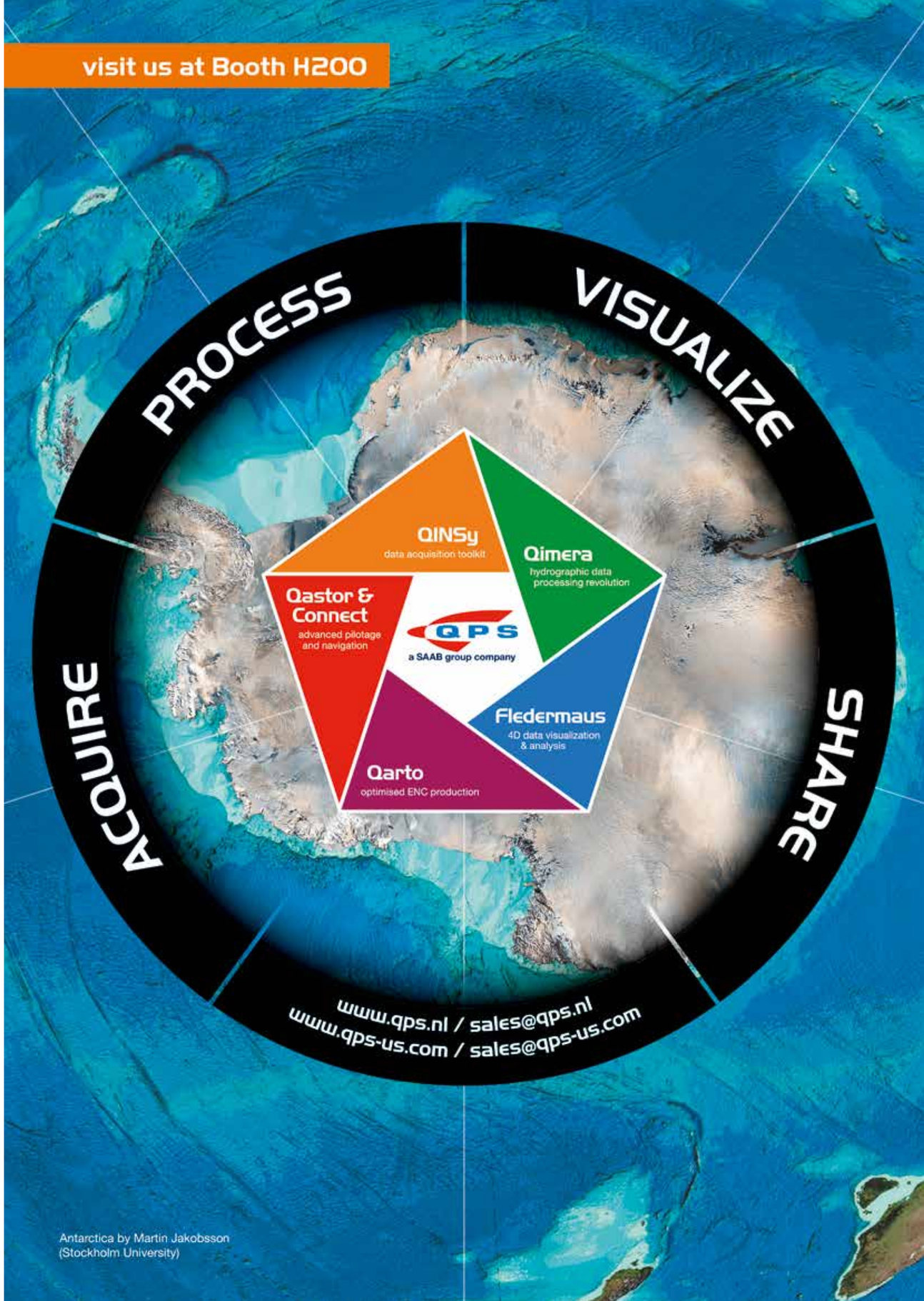
Location map of the survey regions



Hansbreen glacier, provisional data results



Samarinbreen glacier, provisional data results



Meet...

Eva Brans
Hydrographic Surveyor

Date of birth? And what is it you like to do on your birthday?
I was born on May 14th. I love spending my birthday with my family.

Single, in a relationship or married?
Married.

Any hobbies?
I play the mandolin and I love to snowboard, sky dive and swim.

Fast food, bistro or Michelin starred restaurant?
I love The Campus Cafe in Alamosa CO USA for a good Cinnamon Roll and the real American feel of the place.

Netflix or the cinema? And what is your favourite TV-series or movie?
I prefer the Movies. My favorite television show is Band of Brothers and my favorite movie is Apollo 13 or Twelve angry men.

What kind of job did you want growing up?
I wanted to be a surgeon.

What is it you like most about your current job?
I like the variety of the job, the team and I learn a lot from the different projects. It is always a challenge and I am never bored.

What do you learn from your colleagues?
Everybody in the team has their own strong points and expertise. So you learn a lot of different things from each other.

If you would win the lottery, what would your life look like?
I guess not much different. I would still work, I hate being bored. My vacation would be different though. I would probably go further away on vacation, drive a red 1964 Mercury Comet rag top, live in a bigger house and pay of the student loans of all my family members.

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

That leaves 95% for you.

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

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

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Maintenance of Folger Pinnacle platform. Photo courtesy: Ocean Networks Canada

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Don't let biofouling dictate a project's schedule. Deploy with **UV • Xchange** or Cabled UV to expand monitoring timelines, reduce maintenance costs, and experience superior sensor performance. AML CTDs deployed with UV • Xchange deliver month after month of consistent data.

UV • Xchange

Auto-ranging Turbidity Sensor

Eliminating the need for multiple sensors to accommodate large variation in turbidity, new **Tu • Xchange** automatically adjusts to the appropriate range while in operation. As a result, high accuracy is achieved over the entire 0-3000 NTU range. For long-term deployments in sediment rich areas, a wiper option is now available.

Tu • Xchange

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Positioning through the years

Nowadays you can find your position using a simple application on a smartphone. This works fine when you are on land and within the reach of your phone provider. But when you're at sea, with no phone reception, finding your position is a whole other story.

Before the smart phones people at sea could estimate their position using the sun, stars, moon and planets. During the discovery age, in the 15th century, open seas-navigation using the compass and astrolabe. The basic concept mariners used to calculate the latitude in the northern hemisphere is by sighting the north star, called Polaris, using a sextant. The observed height has to be corrected for height of eye, northern hemisphere correction and the sight reduction tables has to be used.

Mariners used to have a lot of trouble calculating the longitude, this was because the precise time of the sighting has to be known. The chronometer was unavailable until the late 18th century and affordable in the 19th century, so before the chronometer the mariners used the lunar distance to calculate the time at zero longitude (Greenwich).

In the 19th century, using the chronometer, the time was very important. Time still is an essential factor to determine our position in the modern days. When the US army's GNSS system named NAVSTAR became available for civilian use a new era of positioning was born. There is not only the American NAVSTAR system, also known as GPS (global position system), but there are more GNSS systems like Galileo (European), BeiDou (Chinese) and GLONASS (Russia). All these systems need receivers.

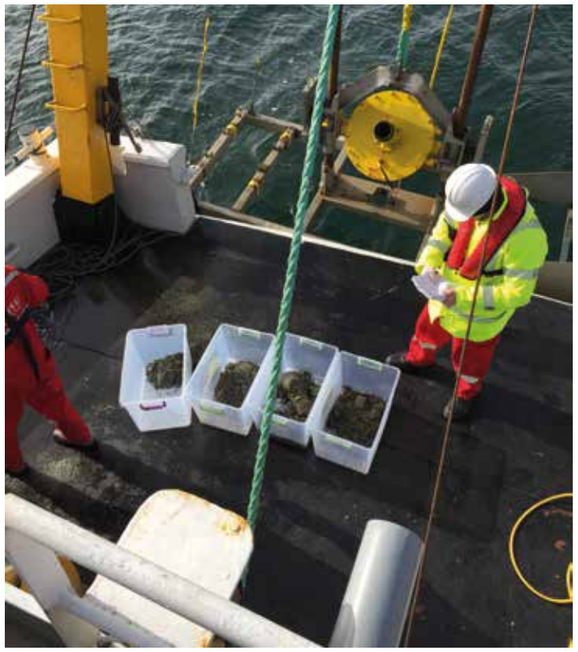
Seabed's GNSS receiver platform offers multi-constellation, multi-frequency tracking and features flexibility, low power consumption, field upgradeable software and comprehensive message suites for ease of configuration and data logging. The SGR6 receiver is future-proofed with current and upcoming GNSS signal support, like Galileo and BeiDou. The housing of the SGR6 is rugged for reliable use in harsh environments.

Vibro this!

In February and June 2015 Seabed rented their Vibrocorer (SVC500E) with engineer to operate in Turkey and Bahrein.

In Turkey Seabed's engineer assisted in offshore operations near Canakkale where several drillings where successfully performed.

In Bahrein Seabed's engineer was requested to assist because there were problems penetrating the rough sediment. Due to the harsh terrain and the problems that arose Seabed made a few amendments on the system, such as enlarging the diameter of the corebarrel, to make future drillings easier. As a result the customer bought a new vibrocorer and full training on site.



www.seabed.nl

Seabed Electric
Vibrocoror (SVC) series

The SVC-series have a long track record and are successfully being used by our clients world wide on various types of soil including soils containing gravel.
The Seabed vibrocorer has been designed to obtain cylindricalcores in soft, cohesive soils at a maximum water depth of 200 meters.

SEABED

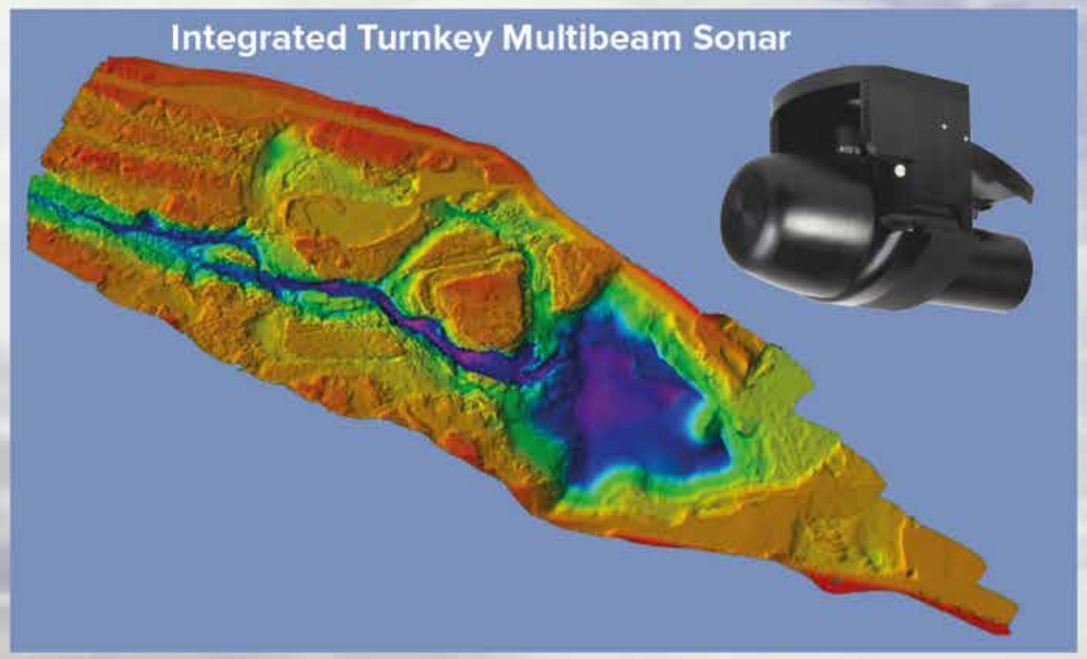
Getting to the bottom of things

NORBIT

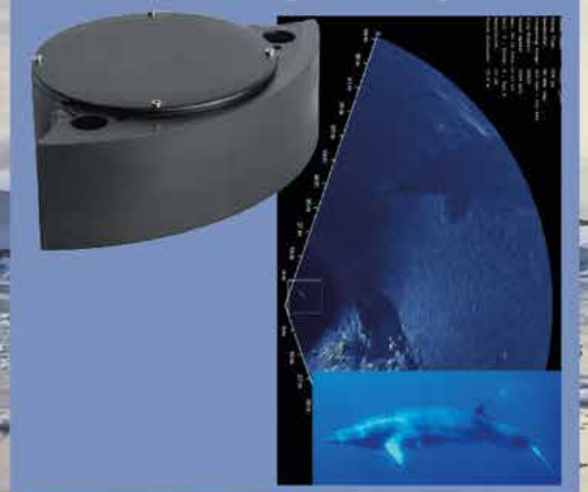
- explore more -

NORBIT HIGH RESOLUTION SONARS

Integrated Turnkey Multibeam Sonar



Forward Looking Sonar Systems



Oil & Gas,
Leakage Detection
Solutions

Meet...

Jolanda de Cock
Financial Assistant

Date of birth? And what is it you like to do on yor birthday?
Februari 12th. On my birthday I prefer to have a summer garden party.

Single, in a relationship or married?
I live together with my husband and two children.

Any hobbies?
Playing tennis, going outdoors, open air festivals, socializing with family and friends.

Fast food, bistro or Michelin starred restaurant?
Bistro definitely!

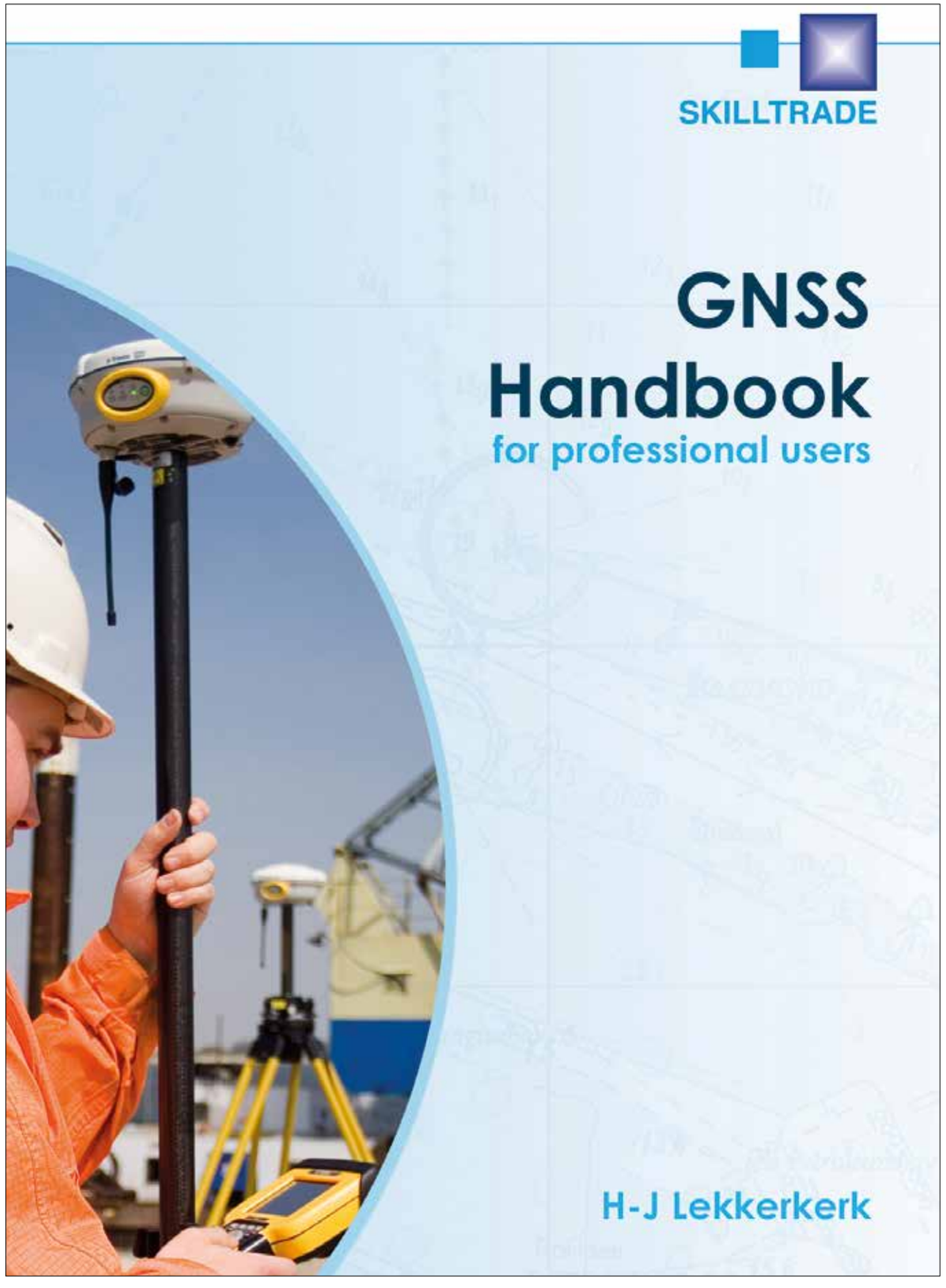
Netflix or the cinema? And what is your favourite TV-series or movie?
Both. Favourite movie: Crash!

What kind of job did want growing up?
Working in France and Spain and learning the languages.

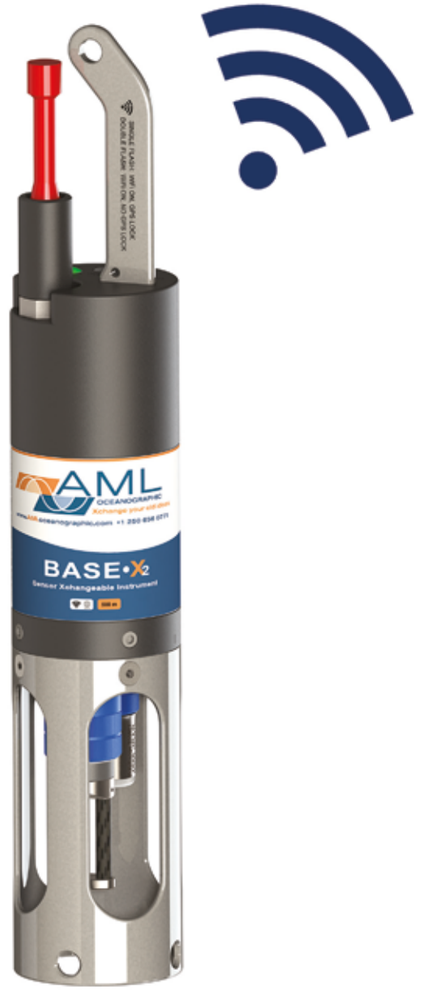
What is it you like most about your current job?
Working together with our super team on great products and services used worldwide.

What do you learn from your colleagues?
Allround knowledge about our products, staying relaxed and being flexible.

If you would win the lottery, what would your life look like?
Mostly the same but with more summer and ski holidays. And maybe celebrating my birthday in Spain and taking al my friends with me.



Skilltrade New issue GNSS handbook
An update of our previous GPS book and now divided in 9 Chapters and concludes 229 pages. The book is designed to support also our E Learning GNSS module.
Available at skilltrade.nl/bookstore and stand G 600 of N Sea during Oceanology OI16.During OI16 we will lecture in the morning "Introduction of Hydrography" (registration required in advance or at N Sea stand) For more information about Skilltrade "Hydrographic Survey training" please visit our website www.skilltrade.nl



Base•X2

Profiling has never been so simple.

The latest generation of AML profilers, Base•X2 presents the best profiler technology of today in a compact form. Available in 100m and 500m versions, Base•X2 retains the size of its predecessor while gaining WiFi connectivity and GPS cast geo-referencing. Data is automatically downloaded and processed into desired manufacturer formats, saving valuable time for the operator.

SVP or CTD

With AML's new combined conductivity and temperature sensor, CT•Xchange, Base•X2 converts from an SVP to a compact, cost-effective CTD profiler with the switch of a single sensor head.

AML OCEANOGRAPHIC
Xchange your old ideas

sound velocity / pressure / conductivity - temperature / turbidity / biofouling control

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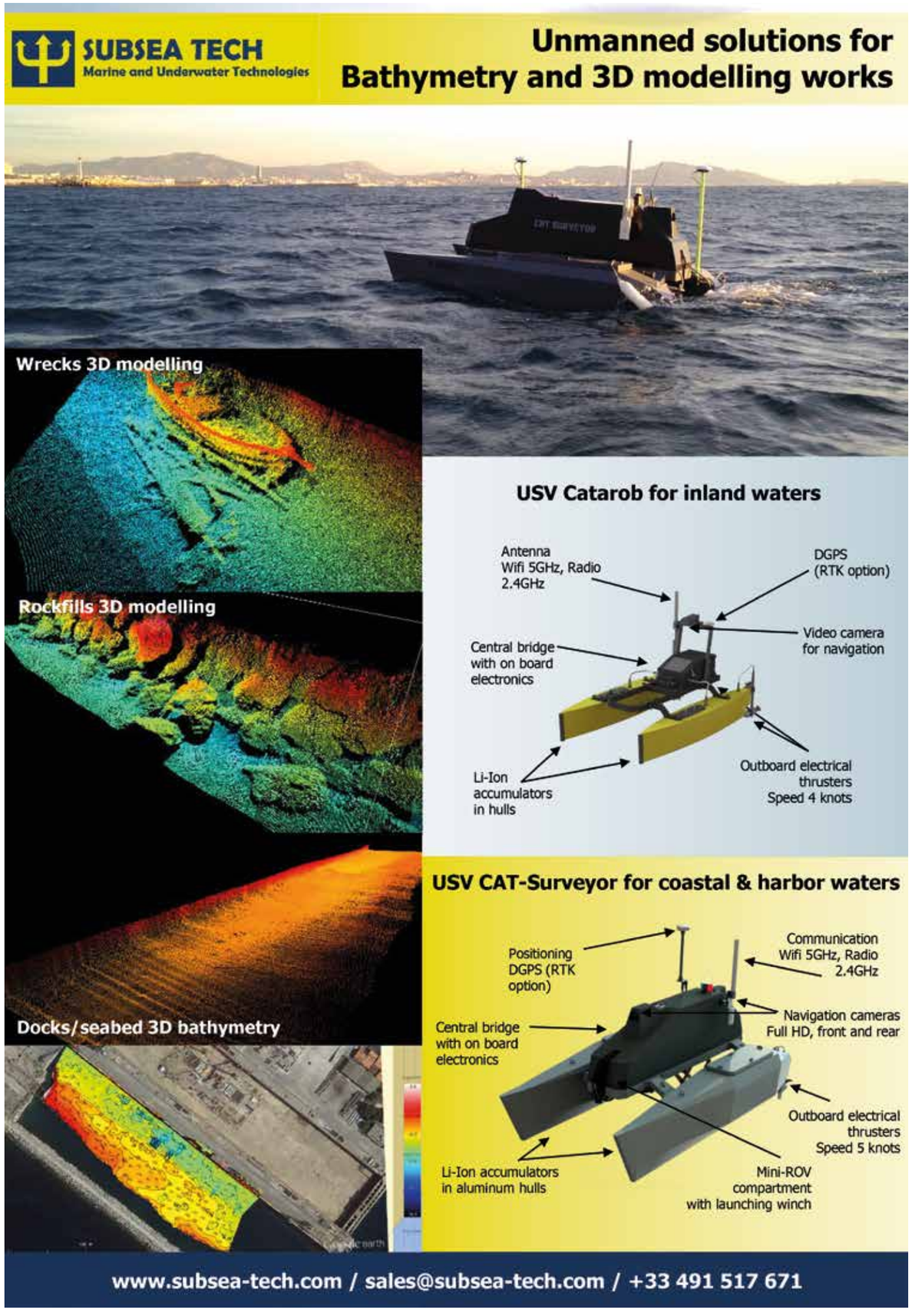


CAT-Surveyor: Unmanned automated solution for harbor and inland waters hydrographic surveys

Developed in 2014, CAT-Surveyor was initially designed under an R&D contract with the French MOD to carry out the detection and classification of UXOs (Unexploded Ordnances) and underwater mines in harbor environment. For that purpose, it was equipped with a Teledyne Blueview M900 imaging sonar and a Tritech Starfish side scan sonar combined to an onboard mini ROV (Observer form Subsea Tech) which gives the system the capability to do real time visual identification of suspicious targets.

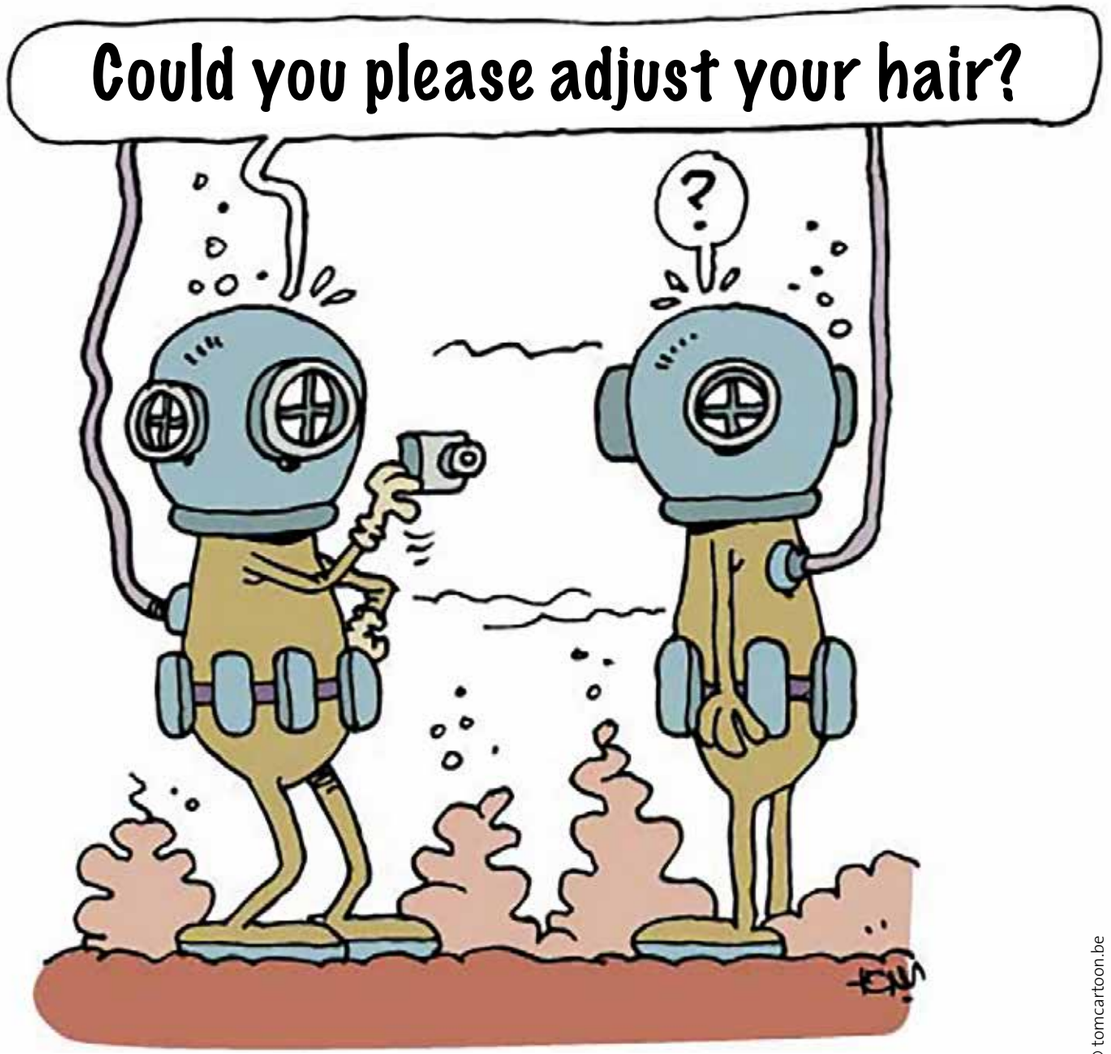
Besides its autonomous navigation system, CAT-Surveyor also hosts an automatic target detection and classification software, using the Blueview imaging sonar, which allows selecting targets of interest and guiding automatically the mini ROV to them.
Since last year, CAT-Surveyor has also been involved in several surveys such as dam bathymetry, bridge piles inspection in ultra-shallow waters and harbor dredging works monitoring using the Norbit WBMS multibeam echosounder and its associated INS and GPS RTK delivered by our partners SEABED from The Netherlands.

CAT-Surveyor offers several advantages over conventional surveys systems:

- Fully automated operation
- No operator at risk
- Ultra-shallow waters operations (< 0.4 m)
- Light craft (< 270 kg) easy to transport an deploy
- Real time sonar and video images onshore
- Minimum operating crew (2 operators max)
- All weather operations
- 12 hours autonomy (24 hours with extra batteries)
- On board PC with high bandwidth communication
- Easy integration of all kinds of survey sensors (80 kg payload)

Cat-Surveyor open new possibilities for safe and cost effective survey works, offering both video and sonar capabilities, with soon above water LIDAR 3D modeling to carry out global infrastructures monitoring.

Cat-Surveyor has been developed and is commercialized by Subsea Tech, a France (Marseilles) based engineering company which specializes in the design and the fabrication of underwater observation systems, including mini ROV, USV and associated sensors. For more details, contact: sales@subsea-tech.com



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Prize Puzzle

C	I	H	P	A	R	G	O	R	D	Y	H
O	G	R	O	F	G	A	Z	E	T	T	E
R	N	E	R	O	B	R	A	H	F	E	X
E	I	T	E	Y	E	V	R	U	S	N	C
S	N	E	N	C	R	H	I	G	A	I	S
T	O	M	G	H	A	O	P	E	T	E	B
N	I	O	I	A	N	S	C	C	A	S	O
A	T	N	N	M	O	O	R	B	Y	D	T
T	I	O	E	P	S	A	E	S	E	K	T
X	S	R	E	R	S	D	T	P	C	T	O
E	O	H	R	P	B	E	T	E	U	E	M
S	P	C	Q	V	M	H	D	H	E	L	M

ARCTIC
BOTTOM
CHAMP
CHRONOMETER
CORE
DECK
DEPTH
ENGINEER
EX
GAZETTE
GPS
HARBOR
HELM
HUT
HYDROGRAPHIC
OCEAN
PI
POSITIONING
QPS
SEABEDBV
SEXTANT
SONAR
SURVEY
SYSTEM

The object of the puzzle is to find the listed hidden words. The words may be hidden in any direction: horizontally, vertically, diagonally, forwards and backwards. The letters that remain make up the prize word. Solutions have to be submitted before April 30th. The winner will receive a GOPRO HD Hero 4.
Please send your solution to sales@seabed.nl

Colophon

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Seabed has a complete range of rental products available. For rates and availability please contact us at sales@seabed.nl

Orinoco Solo V3

Portable Lightweight Multibeam Set (SPLMS)

SGR6 Receiver

Electric Vibrocoror

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Getting to the bottom of things