

Busy days in Warnemünde

A conference report by IAN HOLDEN and HOLGER KLINDT

The hydrographic world gathered in Rostock-Warnemünde for the HYDRO 2016 event from 8 to 10 November. The German Hydrographic Society (DHYG) hosted this conference and exhibition for the second time at this location right next to the Baltic Sea. More than 450 delegates from 38 countries came together. They enjoyed the high-carat lecture programme, the trade exhibition, the workshops and the live boat demos.

Six years after the successful HYDRO 2010 the international hydrographic community returned back to Rostock-Warnemünde for the latest in the international HYDRO conference series.

Since 1976, the International Federation of Hydrographic Societies (IFHS) and its predecessor organisation is holding its annual science and technology conference on latest advances in hydrographic methods, tools, research and education. Each year one national IFHS member society is taking the honour to host the HYDRO conference.

Under the motto »never change a winning team« the German Hydrographic Society (DHYG) one more time opted to invite the international hydrographic community back again to the Baltic shores at the Warnemünde Yachthafen Residenz.

And although the 2010 event already saw record breaking numbers of exhibitors and participants HYDRO 2016 became much more than just a straight copy of its predecessor. One week before the conference took off an all-time high of 350 participants and nearly 50 exhibiting industry partners from over 20 countries had registered for the conference. By the end of the day, when HYDRO 2016 closed its doors, a total of 450 visitors from 38 nations, ranging from students and day visitors to full paying attendees, had come to join, what had turned out to be a fantastic event for all and everyone who had undertaken the effort to become part of the »hydrographic family«.

Icebreaker

The three-day event was kicked off on Monday evening with the traditional, informal icebreaker reception. QPS, the dutch specialist in hydrographic data processing and visualisation, generously sponsored the event. Part of the tradition is the special atmosphere, where first participants start to enjoy the gathering, while other still rush to finish off their exhibition stands. Exhibitors, clients and delegates were able to renew contacts or make new contacts during this lively event.

Opening ceremony

Tuesday morning then saw the more formal HYDRO 2016 opening. Rob van Ree, president of IFHS, and Holger Klindt, chair of the hosting DHYG, extended their warm welcome to all who had come to attend the show from near and far. Special thanks were given to all members and helping

hands of the organising team. And they reminded everyone, how hard it is to organise such an event, and that almost all of the hard work had just been carried out by volunteers in their little spare time.

However, as both concluded, the result fully justified all the efforts spent. Looking at the conference series as a whole, both underpinned the ever growing need and demand for a truly international gathering of the hydrographic community, as »in a world with

- an exponentially growing global trade and economy,
- a breath-taking increase in demands for energy, food and commodities,
- as well as fast growing maritime tourism and leisure activities

the world oceans, coastal regions and inland waters are more and more coming into focus as the basis for the nation's future development and well-being. A multitude of different businesses and users are today asking for the continuous provision of precise, reliable and just-in-time provision of hydrographic data – not just for the sake of safe maritime traffic.

And it's therefore, that the HYDRO series – although by many just been looked at as an »insider meeting« for a highly specialised maritime branch – has indeed become a unique platform for a wide range of discussions between surveyors, manufacturers and end-users of hydrographic products and services.«

Following the welcome addresses by Mathias Jonas, Vice President of Germany's Federal Maritime and Hydrographic Agency (BSH), and Robert Ward, former President of the IHB in his then brand new role as Secretary General of the International Hydrographic Organisation (IHO), the conference than kick-started with two inspiring keynote speeches:

Peter Ehlers, former President of the BSH, embarked on a course towards a strategic analysis of »Ocean governance and the current and future role of hydrography«. Stating the undeniable fact, that the hydrographic profession, together with its products and services still hasn't gained public recognition and appreciation equivalent to the value and quality of all of its contributions to maritime affairs, he invited all hydrographers to further increase their efforts to promote the need for high-quality hydrography and hydrographic services for all maritime undertakings. Hydrography shouldn't

just be considered when ultimate maritime disasters flush our media channels. Implementing the Blue Ocean and Blue Growth strategy truly needs hydrography as a central ingredient for a sustainable maritime future.

In the second keynote well-known John Hughes Clarke then went deeply technical. John recently moved to the University of New Hampshire and now serves as a Professor at the Center for Coastal & Ocean Mapping/Joint Hydrographic Center. Being the renowned expert on multibeam technology John invited the audience on a tour-de-force about »Future perspectives on multibeam backscatter and seabed classification«. Particular emphasis was given to new methods for the identification of seafloor parameters beyond »simple bathymetry«. Correlations between properly chosen measurement geometries and the quality of results particularly in seafloor texture analysis were discussed in details.

Industry exhibition

Following the opening session Holger Klindt and Thomas Dehling, vice-chairman of DHyG, then invited all participants for the grand opening of the industry exhibition. Forty-eight companies from all over the world had undertaken great efforts to join as exhibitors. Products and services ranging from hydrographic and oceanographic instruments to processing tools, from chart producers to survey services. Special thanks were extended to those industry players, who had not only brought their products and displays but had volunteered as conference sponsors – with six of them as main sponsors and twelve more companies as enabling supporters with individual, event-related contributions.

As Thomas Dehling from the HYDRO planning team pointed out, filling up the available spaces in the exhibition area had become a no-brainer very early in the planning phase. Despite various early concerns about the current decline in offshore hydrography the organisers did receive strong and broad interests from industry to take part in the HYDRO 2016 exhibition. In addition, many exhibiting companies were also seeking opportunities for further in-depth product presentations and life demonstrations of their products and capabilities.

In the end fourteen companies had taken the

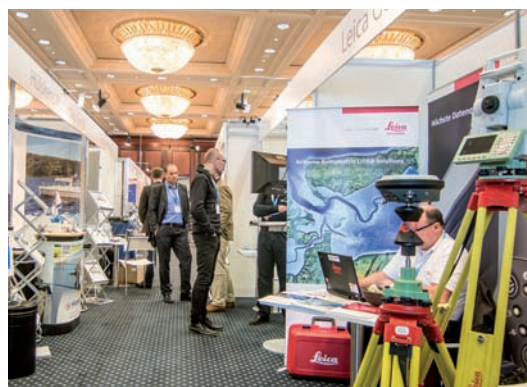
available time slots for industry workshops in separate conference rooms. Participating industry partners enjoyed the opportunity to conduct invited user group meetings, special application seminars and product workshops.

Within easy reach of the conference centre the marina of the Yachthafen Residenz offered the perfect setting for interested companies to demonstrate their systems life in Baltic waters. Fifteen companies made use of this exclusive capability of the venue. Product demonstrations ranged from multibeam sonars, laser scanners, sub-bottom profilers, positioning devices to autonomous underwater vehicles. The 590 GRT offshore support vessel »NOORTRUCK« made its port-call during the conference and offered an open-ship to all participants.

Lecture programme

After all of the official opening activities the conference then entered into its lively and inspiring three-days lecture programme with ample opportunities to learn about brand new research results, innovation initiatives as well as about a multitude of new developments in hydrographic methods and instruments. Two parallel session lines allowed the attendees to pick different topics from carefully arranged, non-overlapping topics.

A full in-depth report about the overwhelming amount of high calibre presentations would surely exceed the available print space. However, just to deliver a bit of taste here, a few glimpses are included from the author's conference diary. May those presenters, not been mentioned, accept our apologies, that we couldn't possibly include each and every presentation. The conference pro-



gramme comprised of fourteen different session topics with a total of fifty lectures.

Excerpt from the conference diary

Session 1A: »Perspectives of hydrography«

Robert Ward opened the session with his presentation about the »General future perspectives of the IHO«. In his introduction he presented a new IHO produced video about »A world without hydrography« (available under: www.iho.int/iho_pubs/misc/video_clips/). He then followed up on the keynote given by Peter Ehlers and underpinned the ever growing need for a stronger strategic promotion of hydrography and hydrographic products. He pointed out, that according to a recent IHO survey still fifty percent of all coastal zones of the world are still unsurveyed.

On another token he pointed out, that the existing IHO surveying standards will in future need to reflect on the latest advances in modern technologies and methods and therefore another update round is high on the IHO agenda. All hydrographic stakeholders from administrations, industry and academia are therefore invited to take part in this dialogue. Robert concluded with a direct invitation towards IFHS to become a primary contributor and coordinate a consolidated industry position from all of its members.

Next Mathias Jonas presented his views on »The provision of hydrographic services as core element of e-navigation«. In a very ostensive presentation he discussed the question: »Why, if S-57 was so successful, do we need to evolve the existing IHO standard towards S-100?« But he then easily made clear, how the new S-100 framework is structured and how in future not only hydrographers and mariners will enjoy the flexibility of digital chart



data. With S-100 a door into a complete new world of maritime applications is about to open (e.g. IALA VTS, oceanography, etc.).

Don Ventura closed the session with his thoughts about »Intelligent exploitation of the blue economy – a hydrographic perspective«. He reminded everyone, that the existing gap between the role and importance of hydrography on the one side and the public perception of hydrography on the other side can only be narrowed, if hydrographers truly start to think »user-driven«. Fortunately, this challenge is eased by the current focus on the importance and opportunities of the blue economy.

Session 2A: »Student session«

It is only the title of the session that gave the clue that this was a student presentation. All the presenters should be given the highest accolade. The session opened with Jean-Guy Nistad presenting his work about »Backscatter adjustment for multi-sector multi-swath multibeam echo sounders«. The collection of properly calibrated backscatter data still poses major challenges to routine hydrographic work. As he referred to, the »GeoHab guidelines« for backscatter measurements aim to address this issue. The calibration for backscatter is central to improving quality and avoiding modulation effects. This was discussed in detail, with examples for Kongsberg systems.

Next was Mark Gray with »RapidCast: Analysis of spatio-temporal variability in high-resolution speed of sound measurements«. In his paper he analysed and discussed sound velocity data been collected in Plymouth Sound continuously over the full tidal cycle and how he, by means of the RapidCast approach, was able to reduce SVP induced errors in surveys.

Third in the row Arne Lohrberg presented his »Analysis of gas seep activity in Eckernförde Bay and assessment of its linkage to pockmarks and sub-bottom strata« – a very clearly structured scientific work on multi-sensor geophysical assessment work. He was able to show, that the seepage was not just concentrated in the pockmark areas. Although the area in Eckernförde Bay is well known, this was the first time the visualisation of the gas seepage was possible in the area.

Last but not least the 2016 winner of the annual IFHS Student Award Geraud Naankeu Wati presented his work on the »Error budget analysis for hydrographic survey systems«. In his paper he first looked at achievable error budgets with vessel-mounted setups. As this approach becomes impractical in deep water he then, in a second step looked at AUVs as an alternative survey platform. The bias introduced by using non-independent parameters and latency between sub-systems was reviewed, with new equations for the error propagation. The new equations were validated on a campaign in Angola where there were some permanent LBL frames. The AUV and LBL results were compared to give an indication of the sound-

ing accuracy. The paper concluded that the error budget estimation was improved for both underwater and surface systems.

Conference dinner

In the evening the traditional HYDRO conference dinner gave room to relax from an interesting but exhaustive long conference day. In difference to previous years the organising committee had chosen a much lesser formal environment: Karls Erdbeer-Hof, which translates into Karl's Strawberry Farm. And although strawberries are not amongst the local dishes in November, everyone found enough alternatives to go with for an entertaining evening. Together with plenty of food and drinks came the company-own Big Band of ATLAS Elektronik to entertain »the hydrographic family«. Twenty-two musicians including two absolutely fantastic singers – all of them working as active engineers in the company's engineering group – proofed, that they not only know how to generate and control first-class underwater sound.

Traditionally the conference dinner also is the place, where the conference awards are presented to the winners. In his award speech Rob van Ree, acting president of the Federation, presented the award for the best student presentation to Jean-Guy Nistad. All attendees of the student session had the chance to rate the quality of the four presentations been given.

The award for the Federation's international student award was presented to Geraud Naankeu Wati for his Master thesis. In this case the selection follows a two-step approach prior to the HYDRO conference. In step one, each national member society of the Federation selects its national winner. In step two then the board of directors of the Federation pick their favourite »best candidate«. To be eligible a candidate must have been a full-time student on a relevant undergraduate or post-graduate level course at some point during the twelve months preceding the start of the HYDRO conference in question.

Excerpt from the conference diary

Session 4A: »In-situ and remote hydrography« and session 5A: »Space hydrography«

On the second day the two sessions gained lots of attention. It was the organising committee aiming at a »look over the fence« beyond classical survey techniques. And the interest in both sessions was high indeed.

Ingo Hennings opened session 4A with his presentation about »Comparison and characteristics of oceanographic in situ measurements and simulations above submerged sand waves in a tidal inlet«. The motivation for the paper was to prove the theory of upwelling artefacts. 2002 ADCP data were used to look at the concentration of suspended sediment and compare this to the visible ocean colour from space.

In the »Space hydrography« session Stefan Wiehle introduced the audience to »The BASE-platform



project: Deriving the bathymetry from combined satellite data«. The project »BATHymetry Service platform« was set up to address the lack of high resolution bathymetric data in many areas round the world. It uses data from GEBCO and EMODNET, though both are limited by resolution and supplemented by a number of sources including CSB (crowd sourced bathymetry). The BASE platform will offer a single source of data off the shelf, on demand and with metadata.

Next was Knut Hartmann with »Satellite based bathymetry and seafloor mapping for the shallow water zone«. The colour band of a satellite image was stretched to be able to view the green/blue reflectance data containing the seabed, turbidity scatter, vessel traffic, sea state, etc. Images are observed two or three times per day and a database was created. The shallow water is defined where the sun is reflected. The images have the data other than the seabed removed and are then harmonised between images. Accuracies have been seen to be 0.7 m compared to MBES in the Red Sea to 2 m compared to LiDAR in Western Australia and the Caribbean. Uncertainties increase with depth and are affected by the seafloor properties. Habitat mapping validation has shown an 85 % accuracy. The system is now used in hydrodynamic modelling and is efficient, good for conflict areas and there is a reprocess archive and can be used for border boundaries.

Pau Gallés presented the third paper of the session about »Global bathymetry from satellite altimeter sensor«. The approach is open-bathy optimised by local observations with a new SAR mode. Gravity anomalies tilt the surface and thus there is a need to work backwards. Differential ranges

from SAR data are taken along track from Cryosat 2 (N/S) and Jason 1 (E/W) and combined with the gravity spectrum from EGM 2008 and has the sea surface height added. The lack of land data affects the model at >10 km and due to small undulations in the sea surface is good from 2 km; 200 m accuracy is achieved at 5 km.

Session 6A: »Energiewende – Challenges in the wind offshore business«

In this session Jens Wunderlich reported about »Burial depth determination of cables using acoustics«. The cross-track method was discussed with narrow beams for good detection, however, there are many more lines and vessel time and thus along-track is used for most surveys. Approaches were discussed to overcome the limitation of the cable tracking technology including various options for utilising a sub-bottom profiler. Jens also concluded cables should be designed for survey.

David Rose finished the session with his presentation about »Offshore unexploded ordnance recovery and disposal«. 1.6M tons of unused ordnance was deposited in the EEZ, 600,000 mines laid with mine hunting finishing in 1971, etc.

Session 7A: »LiDAR case studies for hydrographic assessments«

Markus Aufleger began with his paper about »High resolution, topo-bathymetric LiDAR coastal zone characterisation in Denmark«. Two case studies were reviewed for the presentation including processing.

Wilfried Ellmer reported about the »Use of laser bathymetry at the German Baltic Sea coast«. This was a three-year project (2012 – 2014) using differing sensors.

Lutz Christiansen then presented »New techniques in capturing and modelling of morphological data«. The Hawkeye III instrument observed down to 8 m in a difficult area with a 3 m Secchi depth. The achieved height accuracy was in the order of 10 to 20 cm compared to existing surveys. The goal was to collect data for coastal protection measures.

Session 8A: »State-of-the-art GNSS techniques« and session 8B »Education«

The third day started with a choice of two parallel sessions. And although at many conferences there can be a drift-off in delegates, this was not the case at HYDRO 2016 and we were treated to a day of further excellent sessions.

In »Education« Jan Appelman discussed the »Changing market requirements for competence and certification for the hydrographic surveyor«. As he reported the Skilltrade format for the Category B course has changed significantly over time due to the increasing time required to complete all aspects. Today e-learning modules, onshore classroom sessions and extensive offshore experience included. 161 students have been on the course over the last nine years; with 55 diplomas been issued.

Derrick Peyton described the Hydrographic certification in Canada. The scheme could take a graduate from an engineering course with a two year development, including ethics, before up for a board for professional status by the Association of Canada Land Surveyors. All need this accreditation for a rig-move. Someone completing an IBSC Cat A course would need two years' experience to gain Level 1 accreditation. For a Cat B course this would be after three years' experience.

There was an open forum discussion following this paper with some concerns that highly experienced people that have evolved with the industry may be seen as »not competent«.

Session 9A: »Hydrography in extreme environments«

With this session the organisers kept their ambition high. Melanie Barth told the sad story about the tragic loss and »The search of MH370«. The search area is concentrated in a remote location some 2,700 km from Perth, Western Australia, covering an area of 172,500 km². The water depth varies from an average of 3,500 m to a maximum depth of 6,000 m. It remains a massive effort and some of the statistics quoted for this project are staggering.

Wilhelm Weinrebe finally presented a highly entertaining paper on »Multibeam mapping in the remote fjords of South-East Greenland«. To do this they went back in time by more than half a century and used a sail schooner built in 1951. The multi-beam sonar mounted over the side, no radar, no equipped lab rooms. And they had to operate in ice-covered confined areas deep into the coastal inlets. The CDT probe had to be lowered down to and recovered from 700 m, by hand! The comfort and convenience of modern systems and vessels were highly appreciated in his talk. However, the photos confirmed, the author and the whole crew truly enjoyed this once-in-a-life-time experience.

Closing ceremony

All good things come to an end, and so did HYDRO 2016. At the end of day three the chairmen of IFHS and DHyG Rob van Ree and Holger Klindt closed the conference. They thanked the hosting society and the organising committee for their enthusiasm and endless efforts to make HYDRO 2016 become a full success for the hydrographic community as a whole. And they thanked the sponsors, the exhibitors, the lecturers and participants and all the other unnamed helping hands who had, all in their individual capacity, helped to make HYDRO 2016 not only become a successful but also a truly memorable and outstanding event in the HYDRO conference series.

And although the final moments of any conference come with mixed emotions Rob van Ree reminded everyone, that there is hope in sight, because HYDRO 2017 will open its doors in Rotterdam from November, the 14th until the 16th. [↕](#)