Executive Summary

The present report outlines and summarizes the activities carried out since the 22\textsuperscript{nd} BSHC Conference by the Federal Maritime and Hydrographic Agency (BSH). The report concentrates on the Baltic Sea.

Issues of special interest have been:

- Replacing the survey, wreck search and research vessel ATAIR. The new vessel will be equipped with a hybrid engine using mainly LNG (Liquid Natural Gas);
- Investigation of the regular use of communication satellites to broadcast the GNSS corrections to the survey vessels in a higher precision and in real-time;
- Automatic derived contour lines and soundings from a nautical high resolution DTM.

1. Hydrographic Office

The Bundesamt für Seeschifffahrt und Hydrographie (BSH, Federal Maritime and Hydrographic Agency of Germany) is an agency within the remit of the Federal Ministry of Transport, Building and Urban Development and has headquarters in Hamburg and Rostock. It encompasses responsibilities in hydrography, oceanography and shipping. The department “Nautical Hydrography” covers the obligations as the national Hydrographic Office and is mainly situated in Rostock. Alongside the BSH the national Waterways and Shipping Administration (WSV) belonging to the same Ministry manages and maintains the federal maritime waterways.
2. Surveys

Coverage of new surveys

The BSH conducts hydrographic surveys on a general schedule, which is being updated on a yearly basis and amended if necessary. The survey area is subdivided into different slices of similar quality demands. The quality aspects include the re-survey rate as well as survey standards.

<general survey scheme for the German part of the Baltic Sea>

The hydrographic surveys are being executed by vessels from the Hydrographic Office. Due to the relatively high mobility of the seafloor and high morphological energy in combination with dense traffic and many obstructions and wrecks, the area is being resurveyed quite often. The resurvey rate ranges from 5 to 25 years. In 2018 Germany continues to resurvey the main routes according to the latest S 44 Standard for the second time using multi beam.

The detailed survey plan for 2018 is provided in a graphical format on the next page. For further details reference is made to the HELCOM Resurvey Site: http://helcomresurvey.sjofartsverket.se/HELCOMRESURVEYSITE/
Surveys in 2018:
105  Ansteuerung Kiel 1    planned
110  Kadetrinne            in process
321  vor Usedom            finished
313  Jasmunder Bodden     finished
401  Darsser Ort          finished
209  Oderbank             in process

Wreck search

BSH investigated 10 wrecks in 2017 in the Baltic Sea, six of them were new found obstructions or wrecks, the others were reinvestigated on a regular schedule. The reinvestigation is necessary due to possible changes caused by currents or other effects. The frequency of the reinvestigation is depending besides other aspects mainly on the likeliness and the impact of changes.

New technologies and/or equipment

The regular use of communication satellites to broadcast the GNSS corrections to the survey vessels in a higher precision and in real-time were investigated in 2017 and 2018. In collaboration with the BKG (Federal Agency of Cartography and Geodesy) a VSAT-communication-system is installed on the survey, wreck search and research vessel DENEK. The investigations were very successful. The BSH is planning to equip all vessels with a VSAT-communication system.

The use of up to date ortho photos for the survey planning in the vicinity of the coastline and in the Wadden Sea is currently under investigation. The ortho photo will be generated by aerial photos from a camera on an unmanned aerial vehicle (UAV).
New ships

The survey, wreck search and research vessel ATAIR is going to be replaced by a new one in 2020. This new vessel will be equipped with modern hydrographic equipment and a hybrid engine using mainly LNG (Liquid Natural Gas).

Problems encountered

No new problems were encountered since the last report.
3. New charts & updates

Charts (paper as well as ENCs) covering the German waters are produced and updated by BSH.

ENCs
The German waters have been covered with 174 ENCs in various navigational bands. All the ENCs are updated on a weekly basis.

ENC Distribution method
All the German produced ENCs and updates (ERs) are distributed through a network of IC-ENC authorized distributors.

INT charts
48 German published INT charts (for the North Sea, the Baltic Sea and Antarctic Waters) have been updated. For the Baltic Sea, BSH is the producer of 28 INT charts.

National paper charts for domestic waters
For national shipping BSH has developed a scheme of DIN A1 sized papercharts and published the first DIN A1 chart for the Baltic Sea (2018/6, chartnumber 2610). The new chart series takes into account the IHO S4 Standard und uses the INT1 symbologie. Additionally 4 SOLAS complient Small Craft Charts Series and a general planning chart are issued for the German part of the Baltic Sea.

National paper charts for foreign waters
Germany is the producer of INT 120 (DE 98) covering the whole Baltic and 3 INT charts for Antarctic waters.

Withdrawal of paper charts for foreign waters
None for the Baltic Sea.

Other charts, e.g. for pleasure craft
Routeing guide for the Baltic Sea INT 1200 (DE 2911) and for German Bight INT 1410 (DE 2910).
For Polish waters, 3 Small Craft Charts Series are produced in co-operation with the Polish Hydrographic Office (HOPN).
Updates for small craft charts via internet.

Problems encountered
None

4. New publications & updates:

New Publications
BSH developed a new online chart catalogue and chart server. This catalogue informs about the range of nautical products available and their properties. The data of the catalogue are available for download as xml-files from the web page.

The catalogue is available at: http://linchart60.bsh.de/chartserver/index.html
<table>
<thead>
<tr>
<th>Art. Nr.</th>
<th>Titel</th>
<th>Format</th>
<th>Abmessung (für Küstenkarten)</th>
<th>Material</th>
<th>Preis</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT 1</td>
<td>Nordsee - Die Küstenkarte</td>
<td>1:44,000</td>
<td>32 x 76 cm</td>
<td>Karte</td>
<td>11.50 €</td>
</tr>
<tr>
<td>INT 1050</td>
<td>Die Küstenkarte Nordsee bis Bremen</td>
<td>1:100,000</td>
<td>64 x 35 cm</td>
<td>Karte</td>
<td>59.00 €</td>
</tr>
<tr>
<td>INT 1060</td>
<td>Die Küstenkarte Bremen bis Stade</td>
<td>1:100,000</td>
<td>64 x 35 cm</td>
<td>Karte</td>
<td>59.00 €</td>
</tr>
<tr>
<td>INT 1090</td>
<td>Die Küstenkarte Stade bis St. Peter-Ording</td>
<td>1:100,000</td>
<td>64 x 35 cm</td>
<td>Karte</td>
<td>59.00 €</td>
</tr>
<tr>
<td>INT 1120</td>
<td>Die Küstenkarte St. Peter-Ording bis Cuxhaven</td>
<td>1:100,000</td>
<td>64 x 35 cm</td>
<td>Karte</td>
<td>59.00 €</td>
</tr>
<tr>
<td>INT 1140</td>
<td>Die Küstenkarte Cuxhaven bis Wilhelmshaven</td>
<td>1:100,000</td>
<td>64 x 35 cm</td>
<td>Karte</td>
<td>59.00 €</td>
</tr>
<tr>
<td>INT 1160</td>
<td>Die Küstenkarte Wilhelmshaven bis Brunsbüttel</td>
<td>1:100,000</td>
<td>64 x 35 cm</td>
<td>Karte</td>
<td>59.00 €</td>
</tr>
<tr>
<td>INT 1180</td>
<td>Die Küstenkarte Brunsbüttel bis Lübeck</td>
<td>1:100,000</td>
<td>64 x 35 cm</td>
<td>Karte</td>
<td>59.00 €</td>
</tr>
<tr>
<td>INT 1200</td>
<td>Die Küstenkarte Lübeck bis Kiel</td>
<td>1:100,000</td>
<td>64 x 35 cm</td>
<td>Karte</td>
<td>59.00 €</td>
</tr>
<tr>
<td>INT 1210</td>
<td>Die Küstenkarte Kiel bis Flensburg</td>
<td>1:100,000</td>
<td>64 x 35 cm</td>
<td>Karte</td>
<td>59.00 €</td>
</tr>
</tbody>
</table>

Der Verlag dankt der Deutschen Bundespost für die freundliche Erlaubnis der Kartenkopien."
The catalogue includes a map service to search for the relevant publications at a specific coordinate.
Updated Publications (July 2018)

20001  Handbuch für Brücke und Kartenhaus  2018
20005  Seeschifffahrtsstraßen-Ordnung  mit den Bekanntmachungen der Generaldirektion Wasserstraßen und Schifffahrt  2017
20031  Ostsee-Handbuch, südwestlicher Teil  Flensburg bis Kolobrzeg und Flensburg bis Sandhammaren  2017
20032  Naturverhältnisse Ostsee  Teil B zu den Handbüchern für die Ostsee und das Kattegat  2008
5001   Handbuch Revierfunkdienst  Teil D zum Ostsee-Handbuch, südöstliche Teil (Nr. 20031)  2017
4001   Leuchtfarverzeichnis, südwestliche Ostsee  2018
2010   Winterbetonnung der deutschen Küstengewässer  2017
2011   VTS Guide Germany  2016
2115   Gezeitentafeln Europäische Gewässer  Europäische Gewässer  2018
2119   Nachrichten für Seefahrer  Einzelbezug (analog/digital)  2018
2119.1 Nachrichten für Seefahrer  Monatsbezug (analog/digital)  2018
2119.2 Jahrgangs CD Digitale Nachrichten für Seefahrer  2016 oder 2017
2175   Nautisches Jahrbuch  Ephemeriden und Tafeln  2018
IMD Verkaufsnummer II962E
2155   Funkdienst für die Klein- und Sportschifffahrt  2018
2165   Suche und Rettung  2017
2452   Seekarten und Bücher Katalog  2018

Superseded and updated publication
None

Supplements
None

Means of delivery, e.g. paper, digital
Nautical Publications will be delivered as paper copies. Selected Publications are digital and are only available on the Internet.
Charts will be delivered as paper copies and ENC. GeoTiffs are available for all charts. Alternative digital formats and products such as pdf or shape files will be produced on request.

Problems encountered
None
5. MSI

Existing infrastructure for transmission
Incoming hydrographic data is immediately assessed for vital information. Urgent updates are issued as chart-updating Notices to Mariners (NtMs) or Navigational Warnings (Radio Navigational Warnings - NAUTISCHE WARNNACHRICHTEN, NWN).

The NtMs are issued weekly by the BSH. The NtMs provide information on important navigational measures, incidents, and changes concerning the German navigable waterways and the German EEZ.

NWN are issued by the VTS centres for their areas of responsibility, and by the 24-h maritime warning service in Emden for the entire German warning area, and are broadcasted as radio messages. In special cases, the maritime warning service also informs on dangers outside its area of responsibility (e.g. dangerous wrecks in the main shipping lanes).

Navigational warnings in English language relating to the area of responsibility of the Federal Republic of Germany are broadcasted on 518 kHz (international NAVTEX service) by the Swedish coastal radio station Gislovshammar Radio, identification character J, for the Baltic Sea, and by the Pinneberg radio station of the German Meteorological Service (DWD), identification character S, for the North Sea.

A national NAVTEX service in German language is broadcast on 490 kHz by the Pinneberg radio station (identification character L) for the entire navigational warnings area of the North and Baltic Seas.

New infrastructure in accordance with GMDSS Master Plan
None

Problems encountered
None
6. C-55

### Status of surveys

<table>
<thead>
<tr>
<th>A1</th>
<th>A2</th>
<th>B1</th>
<th>B2</th>
<th>C1</th>
<th>C2</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>A regular re-survey scheme is in place, taking into account the rapid changes of the sea floor topography. For more details for the Baltic Sea see <a href="http://helcomresurvey.sjofartsverket.se/HELCOMRESURVEYSITE/">http://helcomresurvey.sjofartsverket.se/HELCOMRESURVEYSITE/</a></td>
</tr>
</tbody>
</table>

### Status of nautical charting

<table>
<thead>
<tr>
<th>Offshore passage/Small</th>
<th>Landfall Coastal passage/Medium</th>
<th>Approaches Ports/Large</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>100</td>
<td>0</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

7. Capacity Building
BSH is providing the chair of the Capacity Building Subcommittee since 2011 and the CB-Coordinator for the BSHC. A Cat A course in Hydrography is offered in english language at the Harbour City University (HCU) in Hamburg.

8. Oceanographic activities
The BSH operates several services such as daily water level forecasts, storm surge warnings, ice reports, ice charts and charts of the sea-surface-temperature. It surveys and evaluates the physical and chemical conditions of the North and Baltic Sea.

9. Other activities
The BSH is responsible for spatial planning and is the building permit authority within the German EEZ. It has several administrative tasks in the shipping sector and is certified for type testing and approval. It is as well certifying body for the construction and operation of offshore wind energy farms in the German EEZ.

9.1 Participation in IHO Working Groups
BSH is actively involved in the work done by
- HSSC,
- IRCC,
- CBSC,
- NCWG - NAUTICAL CARTOGRAPHY WORKING GROUP,
- NIPWG - NAUTICAL INFORMATION PROVISION WORKING GROUP,
- MSDIWG,
- S-100 WORKING GROUP,
- TWCWG - TIDES, WATER LEVEL AND CURRENTS WORKING GROUP
- HSPT – HSSC Project Team on Standards for Hydrographic Surveys.
9.2 Other international activities

BSH is also participating in IMO Committees, namely NCSR as well as IOC.

BSH contributes to the HPD User Group Meetings.

Germany (BSH and BKG, Federal Agency for Cartography and Geodesy) is taking part in the FAMOS project, especially in relation to the vertical reference. In this framework, Germany conducts gravity measurement to improve the quality of the quasi geoid.

9.3 Automatic derived contour lines and soundings from a nautical high resolution DTM

The BSH work on the automatisation for a database-supported nautical surface of the German North- and Baltic Sea as well as for the German estuaries. This nautical surface is the essential condition for the upcoming BSH Service to provides bathymetric ENC (Additional Bathymetric Layer ABL) for the German Pilots and VTS.

The requirement to produce contour lines and selected soundings in a short time, BSH asked the German Companies "Smile Consult" and "7Cs" to create a software witch corresponding to our need.

The ENC Bathymetry Plotter is the result. This Plotter can be used to create contour lines and selected soundings for incorporation into ENCs or other digital hydrographic chart products. Point Cloud or Gridded bathymetry data that serve as input is processed and transformed into a so called Nautical Elevation Model. A Nautical Elevation Model is shoal-biased smoothed-out underwater terrain model.

The result of the Nautical Elevation Model creation process can be imagined as draping a sheet over a rough and bumpy surface to make it appear much smoother. The degree of generalization can be defined by the user to suit the targeted scale of the final chart product. To see more, visit: https://www.sevencs.com/enc-production-tools/enc-bathymetry-plotter/

Parallel to the BSH work, other HO´s change there workflows to optimise the production of contour lines and soundings. They are also involved in the development of new software tools to try finding new solutions. To harmonise the knowledge and to chair the ideas, Germany will arrange a workshop on this issue. Members of BSHC are invited to attend this workshop. The envisaged date of the workshop is the second half of April 2019. More details will be provided in due course by e-Mail.

10. Conclusions

None