

26th BSHC Conference National Report of Germany

August 2021

Executive Summary

The present report outlines and summarizes the activities carried out since the 25th BSHC Conference by the Federal Maritime and Hydrographic Agency (BSH). The report concentrates on the Baltic Sea.

Issues of special interest have been:

- New survey, wreck search and research vessel ATAIR in service. Allocation of replacing buildings DENEK and WEGA planned in 2021.
- Investigation of combined PPP-RTK techniques to derive accurate and reliable GNSS correction data on open sea
- Development of automatic procedures for processing bathymetric data for navigational data products.

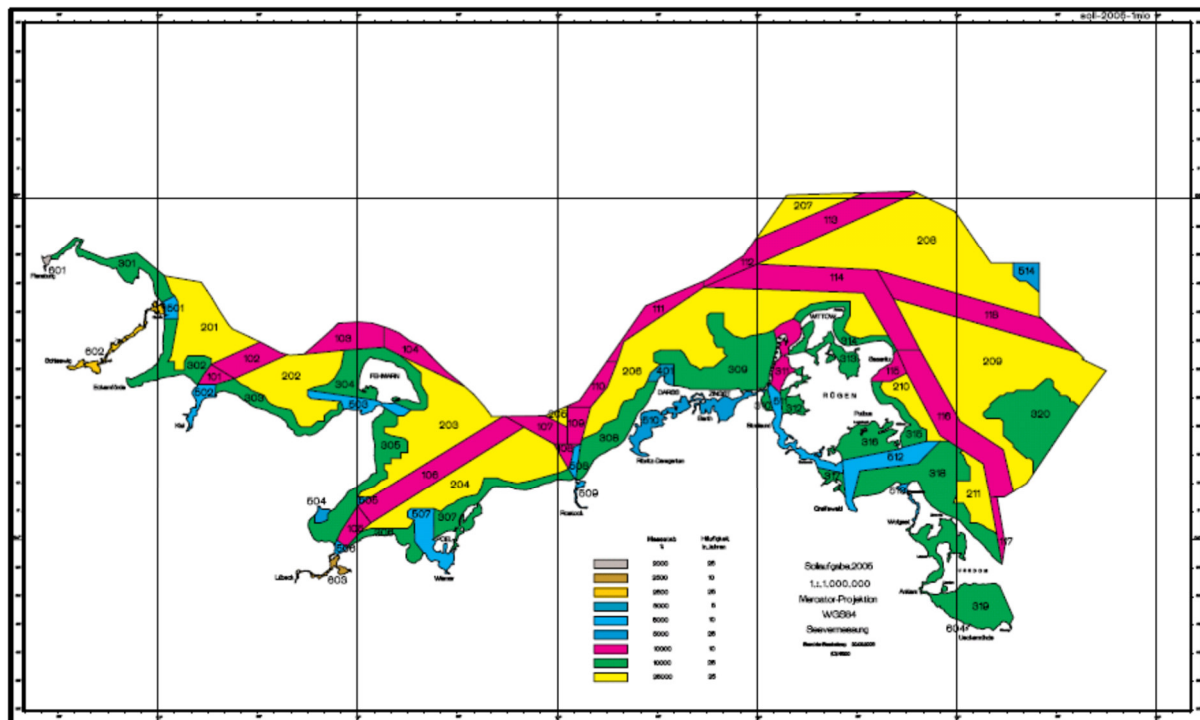
1. Hydrographic Office

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 located in Rostock. Alongside the BSH, the national Waterways and Shipping Administration (GDWS) 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 2021 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 2021 is provided in a graphical format on the next page. For further details reference is made to the HELCOM Resurvey Site:

<https://helcomresurvey.sjofartsverket.se>



Surveys in 2020:

104	Weg T	in process
112	Route Schweden 1	finished
205	Mecklenburger Bucht O	in process
303	Howachter Bucht bis Kiel	in process
308	Rostock bis Darss	planned
209	Oderbank	in process
503	Route Fehmarnsund	finished
201	Kieler Bucht Nord	planned

Wreck search

BSH investigated 20 wrecks in 2020 in the Baltic Sea, five 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 realization of BSH' concept for 3D positioning in sea surveying applications is finalized. Solely the problem of reliable and precises GNSS correction terms for the German EEZ in the North Sea is part of a currently ongoing R&D study.

BSH is investigating and evaluating how new measurement techniques like airborne laserbathymetry, UAV imagery, satellite-derived bathymetry etc. can serve as complementary data sources besides hydroacoustic measurements, and how data from heterogeneous sources can be processed jointly to exploit the full information potential.

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With the aim to derive consistent 3D underwater terrain model from multibeam sonar data, BSH is currently working on the development of improved techniques to determine spatio-temporal resolved water sound velocity profiles using dense in situ measurements and distribution model data.

BSH is working intensively on automatic data analysis techniques like stone detection and classification in geometric and radiometric multibeam echosound data or coast line extraction from multi-spectral aerial imagery, partly using deep machine learning techniques like artificial neural network.

BSH is addressing virtual reality (VR) technologies in the context of operator-based data evaluation and augmented reality (AR) technologies for public relations.

BSH investigates the potential of crowdsourced bathymetry strategies, in particular the accuracy and reliability of bathymetric measurements collected by non-survey vessels, as basis for decision-making in resource scheduling.

New ships

The survey, wreck search and research vessel ATAIR is replaced and now in service. After 15 years of chartering the "BSH North Sea Summer Survey" was carried out by an own vessel.

In 2021 the allocation of the replacing buildings DENE and WEGA ist planned.



Problems encountered

No new problems were encountered since the last report.

3. New charts & updates

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

ENCs

The German waters are covered by 273 ENC cells in various navigational bands. All ENCs are updated on a weekly basis. The rescheming of the North Sea is complete. Now the gridded scheme will be implemented step by step for the main harbour and the approach cells of the Baltic Sea.

ENC Distribution method

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

INT charts

49 German published INT charts (for the North Sea, the Baltic Sea and Antarctic Waters) have been updated. 15 North Sea INT charts in DIN A0 format are produced in co-operation with UKHO and are distributed through UKHO chart agents now. For the Baltic Sea, BSH is the producer of 24 INT charts. Two small scale INT charts are scheduled to be handed-in to Denmark and Sweden for further processing.

BSH started to change the paper size of all INT charts to DIN A0. The conversion of the North Sea charts is complete and 11 Baltic Sea charts have been converted.

National paper charts for domestic waters

BSH has published and updated 56 North Sea and 22 Baltic Sea paper charts in DIN A1 format during the reporting period. To provide chart coverage of new wind farms some New Charts are planned. The remaining 9 larger size national charts for the Baltic Sea will be replaced by DIN A1 paper charts step by step.

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.

Other charts, e.g. for pleasure craft

For Polish waters, 3 Small Craft Charts Series are issued in co-operation with the Polish Hydrographic Office (HOPN).

Problems encountered

None

4. New publications & updates:

New Publications

None

Updated Publications (August 2021)

20001	Handbuch für Brücke und Kartenhaus	2020
20005	Seeschiffahrtsstraßen-Ordnung mit den Bekanntmachungen der Generaldirektion Wasserstraßen und Schifffahrt	Scheduled for 2021 In progress
20031	Ostsee-Handbuch, südwestlicher Teil Flensburg bis Kolobrzeg und Flensburg bis Sandhammaren	Scheduled for 2021 In progress
20061	Nordsee-Handbuch, südöstlicher Teil Lister Tief bis Ems	2020
4001	Leuchtfeuerverzeichnis, südwestliche Ostsee	2021
4003	Leuchtfeuerverzeichnis südöstliche Nordsee	2021
2011	VTS Guide Germany	2020
2115	Gezeitentafeln Europäische Gewässer Europäische Gewässer	2021
2119	Nachrichten für Seefahrer Einzelbezug (analog/digital)	
2119.1	Nachrichten für Seefahrer Monatsbezug (analog/digital)	
2119.2	Jahrgangs CD Digitale Nachrichten für Seefahrer 2019 oder 2020	
2119.3	Jährliche Beilage zu den Nachrichten für Seefahrer Amtliche Veröffentlichungen für die Seeschifffahrt	2021
2155	Funkdienst für die Klein- und Sportschifffahrt	2021
5000	Handbuch Nautischer Funkdienst	2021

Superseded and updated publication

None

It is intended to incorporate the publications 20032 (Environmental Conditions Baltic Sea) as Part B in the next editions of the Sailing Directions (20031).

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.

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Problems encountered

None

New S-100 compliant data sets for S-123 (Radio Services) under development

Work on S-123 commenced. It is attempted to produce the S-123 data set by the HPD. The requested HPD capability to handle such data and to generate such a S-100 compliant data set is expected soon.

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 Gislövshammar 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 German navigational warnings area of the North and Baltic Seas.

New infrastructure in accordance with GMDSS Master Plan

None

Problems encountered

None

New IHO Standard S-124 (Navigational Warnings) for providing navigational warnings

BSH is engaged in the development of S-124. S-124 intends to provide navigational warnings in digital format which could be potentially projected on electronic charts. Several sea trials (such as under the STM umbrella) show that this projection could improve the mariner's situation awareness.

6. C-55

Excerpt of C-55 for Germany in INT Region E updated July2019.

Status of surveys

A1	A2	B1	B2	C1	C2	Comment
100	0	0	0	0	0	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 http://helcomresurvey.sjofartsverket.se/HELCOMRESURVEYSITE/

Status of nautical charting

Offshore pas- sage/Small			Landfall Coastal passage/Medium			Approaches Ports/Large			Comment
A	B	C	A	B	C	A	B	C	
100	0	100	100	0	100	100	0	100	

7. Capacity Building

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,
- NIPWG - Nautical Information Provision Working Group,
- MSDIWG - Marine Spatial Data Infrastructures Working Group,
- WENDWG - Worldwide ENC Database Working Group
- S-100 Working Group, S-101PT, S-102PT, S-57 to S-101 Conversion Sub-Group
- TWCWG - Tides, Water Level and Currents Working Group
- HSWG – Hydrographic Surveys Working Group,
- CSBWG – Crowdsourced Bathymetry Working Group.

Within BSHC:

Baltic Sea Bathymetric Database Working Group (BSBDWG),
Baltic Sea International Charting Coordination Working Group (BSICCWG),
Baltic Sea Marine Spatial Data Infrastructure Working Group (BSMSDIWG),
Chart Datum Working Group (CDWG),
Resurvey Monitoring Working Group (MWG).

9.2 Other international activities

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

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. Unfortunately, the last phase of the FAMOS project (2019-2020) could not be realized, so that the finalization of the BSCD2000 height reference surface is now coordinated by the CDWG and planned for the end of 2022.

The BSH participates in a yearly held technical conference to improve the general ENC workflow and the cooperation between Hydrographic Offices and the ICENC.

9.3 Development of automatic procedures for processing bathymetric data for navigational data products

The BSH develops automatic procedures for the compilation, intersection and harmonisation of bathymetric data. The aim is to provide a high-resolution Digital Terrain Model (DTM) of the German North and Baltic Sea as well as for the German estuaries, which will serve as a basis for the derivation of bathymetric ENCs (Additional Bathymetric Layer ABL) and for the future production of S-102 datasets. The activities also generate concrete change requests of the current Product Specification S-102.

10. Conclusions

None