

27th BSHC Conference National Report of Germany

September 2022

Executive Summary

The present report outlines and summarizes the activities carried out since the 26th 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. Process of replacing the vessels DENEK and WEGA has started.
- Financial difficulties to operate the five BSH vessels.
- Project SIOOPORT (S-100 Port of Rostock Trial)
- Using German Sailing Directions and German List of Radio Signals data, S-123 (Marine Radio Service), S-127 (Marine Traffic Management) and S-131 (Marine Harbour Infrastructure) datasets are under development for the Port of Rostock area.

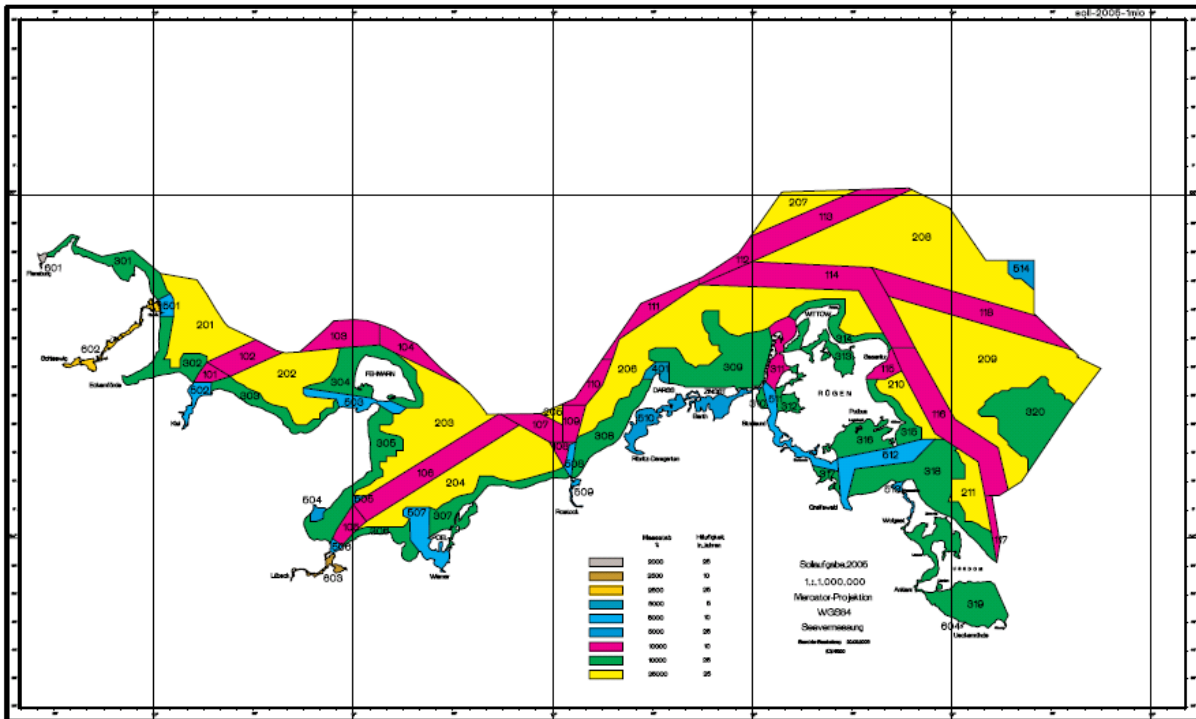
1. Hydrographic Office

The Bundesamt für Seeschifffahrt und Hydrographie (BSH, Federal Maritime and Hydrographic Agency of Germany) is an agency within the remit of the Federal Ministry for Digital and Transport 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.

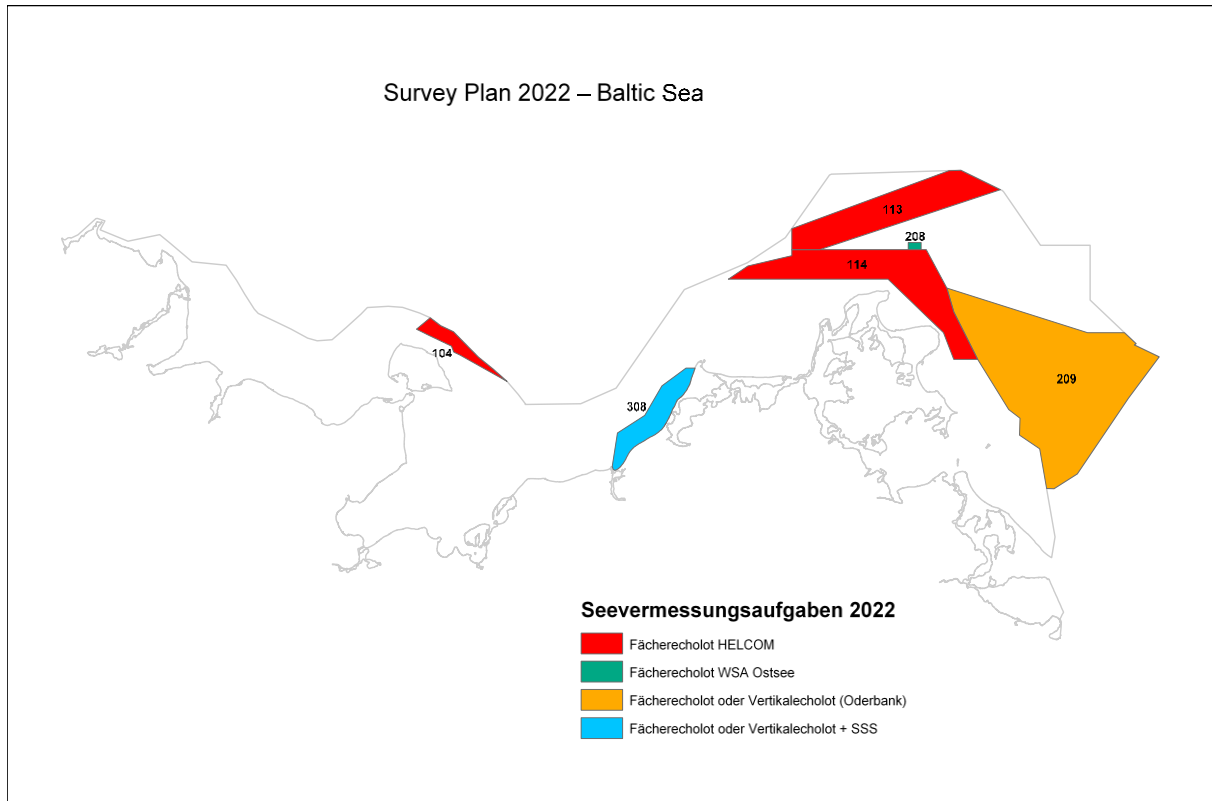


<general survey scheme for the German part of the Baltic Sea>

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 2020 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 2022 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 2022:

104	Weg T	finished
209	Oderbank	in process
308	Rostock bis Darss	planned
113	Route Schweden 2	in process
114	Route Sassnitz 2	planned
208	zw. Rügen u. Bornholm S	planned

Wreck search

BSH investigated 59 wrecks in 2022 in the Baltic Sea, twelve 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. The development of a real-time high-precision positioning SSR-RTK service, a further development of the standard PPP approach, was prototypically realized.

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 (SVP) using dense in situ measurements and distribution model data. In this context, strategies will also be developed to predict water body characteristics in real time during hydrographic surveys in order to adjust SVP measurements accordingly.

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

In 2023 the allocation of the replacing buildings DENE and WEGA is planned. Both vessels will be operated with environmentally friendly and climate neutral fuels.



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 288 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 and 7 Baltic Sea INT charts in DIN A0 format are produced in co-operation with UKHO and are distributed through UKHO chart agents. For the Baltic Sea, BSH is the producer of 24 INT charts. Two small scale INT charts are scheduled to be transferred 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 17 Baltic Sea charts have been converted.

National paper charts for domestic waters

BSH has published and updated 63 North Sea and 28 Baltic Sea paper charts in DIN A1 format during the reporting period. To provide chart coverage of new wind farms some New Charts are still planned. The remaining 7 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

None

Problems encountered

None

4. New publications & updates:

New Publications

None

Updated Publications (August 2022)

20001	Handbuch für Brücke und Kartenhaus	Scheduled for 2022 In progress
20005	Seeschiffahrtsstraßen-Ordnung mit den Bekanntmachungen der Generaldirektion Wasserstraßen und Schifffahrt	2021
20031	Ostsee-Handbuch, südwestlicher Teil Flensburg bis Kolobrzeg und Flensburg bis Sandhammaren	2021
20061	Nordsee-Handbuch, südöstlicher Teil Lister Tief bis Ems	Scheduled for 2022 In progress
4001	Leuchtfeuerverzeichnis, südwestliche Ostsee	2022
4003	Leuchtfeuerverzeichnis südöstliche Nordsee	2022
2011	VTS Guide Germany	2022
2115	Gezeitentafeln Europäische Gewässer Europäische Gewässer	2022
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	2022
2155	Funkdienst für die Klein- und Sportschifffahrt	2022

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

New S-100 compliant data sets for S-12x Products under development

Work on all S-12x products commenced. It is attempted to produce the S-12x data set by the HPD. The requested HPD capability to handle such data and to generate S-100 compliant data sets is expected in the next years to come.

Project SIOOPORT (S-100 Port of Rostock Trial) Status Report

Using German Sailing Directions and German List of Radio Signals data, S-123 (Marine Radio Service), S-127 (Marine Traffic Management) and S-131 (Marine Harbour Infrastructure) datasets are under development for the Port of Rostock area.

Following information provided in the said publications has been converted into S-100 compliant data model elements:

Geometry: approach and port area

Fairways: description, regulations, recommendations, restrictions, rules for navigation

Natural conditions: surface current

Anchorage: location, regulations, holding ground condition

Port: regulations, restrictions, recommendations, harbour services

Berths: list of berths with relevant berth details

Administrations: telecommunication, contact details

The S-123, S-127 and S-131 data models offer much more elements and content, which are not provided in German nautical publications. BSH will initiate NIPWG discussions to seek feedback on necessity for route planning, route monitoring and navigation in port areas.

Additional information, such as for administrative divisions, is not available in German nautical publications. BSH is using the current „Port Guide of Rostock“ edition as additional source.

BSH approached Port of Rostock to provide following details, preferably in GML format:

BerthPosition

 Berth/Berth layout

 ISPS Level

 Cargo handling facilities

 Available Berth length

 Number of bollards and bollard capacity

 Bollards layout (number, dimensions, etc.)

 Supply options

 Electric power, land connection

 Bunker/fuel

 Potable water

 Maximum vessel's dimension

 length

 draught

available port services

 wasteDisposalService

 berthing assistance

- mooring gang
- tugs
- Fire Fighting capabilities
- Medical services
- Repair servicesturservice
- Compass adjustment
- Diving service
- Mechanic harbour service

Following data model elements are under assessment:

S-123	S-127	S-131
NavtexStationArea GMDSSArea NavigationalMeteorologic alArea WeatherForecastWarning Area Landmark CoastguardStation InmarsatOceanRegionAr ea	SignalStationWarning RadarRange OrganisationContactArea SupervisedArea ConcentratioOfShippingHa zardArea SignalStationTraffic IspsCodeSecurityLevel MilitaryPracticeArea RestrictedAreaRegulatory PiracyRiskArea UnderkeelClearanceMana gementArea PlaceOfRefuge	MooringWarpingFacility OrganisationContactArea SupervisedArea HarbourAreaSection

Some of the mentions data model elements are not present in the test area, e.g. S-127: MilitaryPracticeArea or S-127: PiracyRiskArea. Other elements might be provided by third parties (commercial/ administrative).

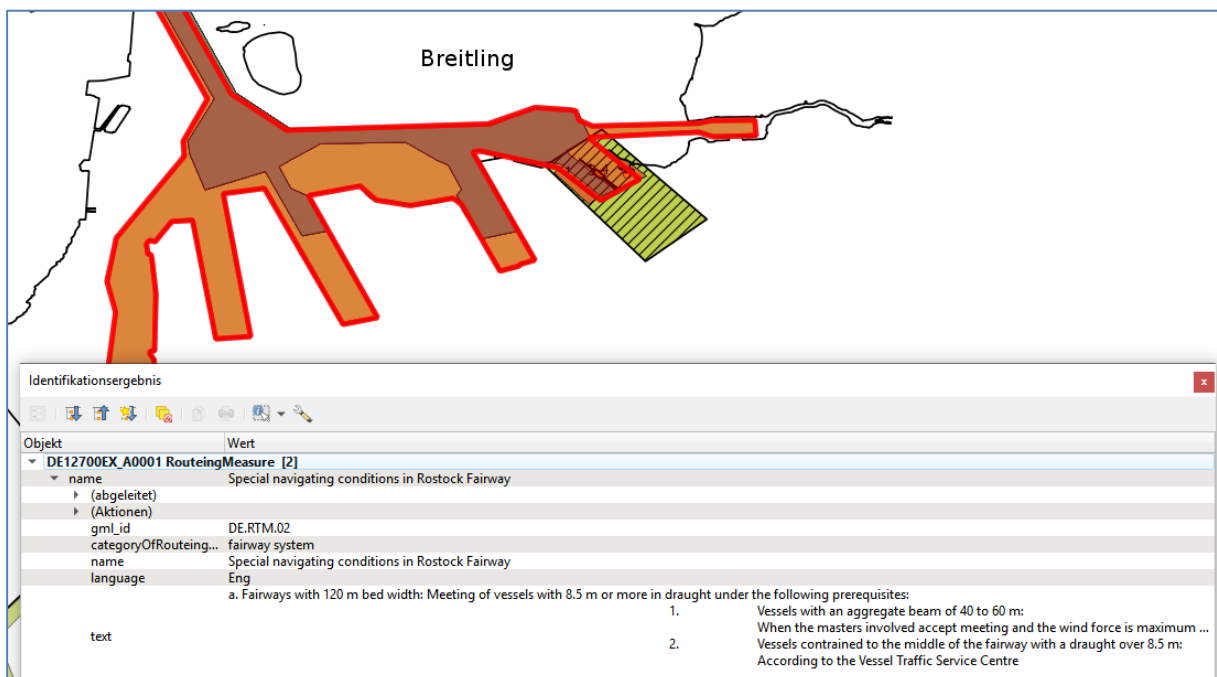


Image: Visualisation of S-127 data in QGIS

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 passage/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,
- TSM – Test Strategy Meeting (S100WG sub-group)
- DQWG – Data Quality Working Group
- IHR – International Hydrographic Review

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),
Baltic Sea Maritime Safety Information Working Group (BSMSIWG)
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 finalization of the BSCD2000 height reference surface after the FAMOS project is no longer funded.

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