

Current Hydrographic Projects at BSH

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Current Hydrographic Projects at BSH

Thomas Dehling



Presentation at 7th Workshop „Seabed Acoustics“ November 2015



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- Introduction
- FAMOS
- Airborne laser bathymetry
- Sea floor mapping
- Dissemination of geodata
- Bathymetric ENC
- Nautical charts
- New survey vessel



Current hydrographic projects at BSH

FAMOS



FAMOS – Finalizing Surveys for the Baltic Motorways of the Sea

- EU co-funded project in the frame of CEF - Connecting Europe Facility to support EU infrastructures
- Time frame 2014 to 2020
- The FAMOS project is split into three phases
- First phase, FAMOS Freja, 2014-2016.
- consortium includes the Hydrographic Offices of all BSHC countries except Poland and Russia
- Overall budget around 34 M€



Current hydrographic projects at BSH

FAMOS



Project activities

1. Hydrographic surveying (90.000 km²)
2. **Harmonizing vertical datum**
3. Surveying infrastructure
4. Data workflow from sounding to chart
5. Coordination and communication



Current hydrographic projects at BSH

FAMOS



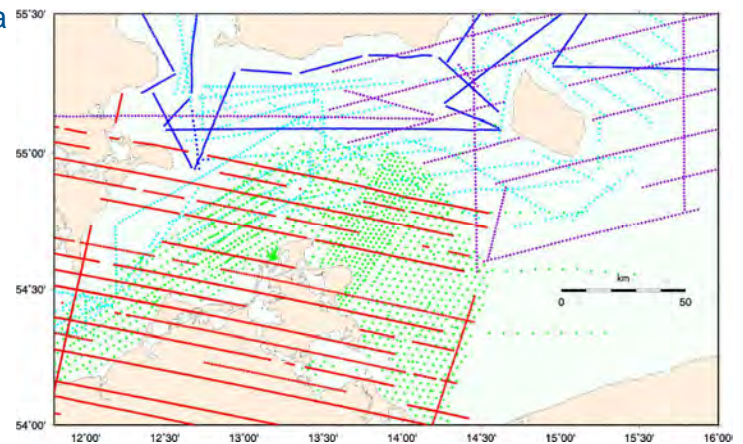
Activity 2: Harmonizing vertical datum

Precise definition of the (Quasi) Geoid is necessary to provide an accurate vertical datum.

Some areas lack of sufficient gravity data

Gravity measurements to:

- Improve data coverage
- Improve accuracy (1mGal)



Distribution of gravity data between Rügen and Bornholm

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Gravity measurements 2015 on board DENE B



Gravity meter (Chekan) installed on board DENE B

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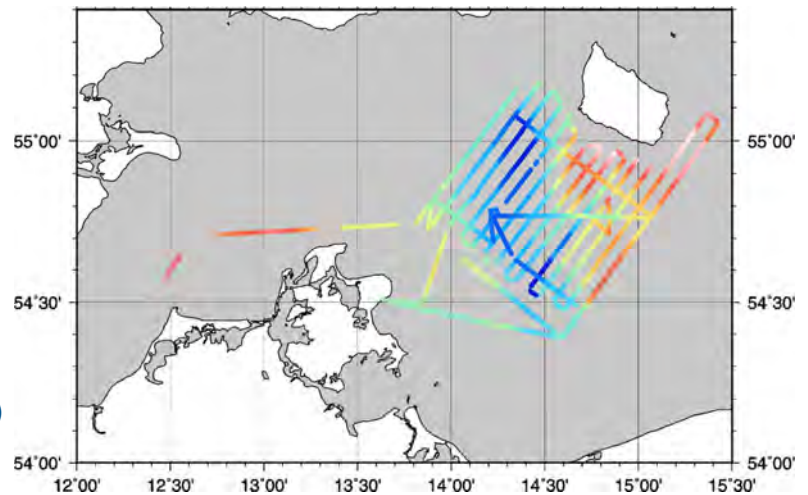
Activity 2: Harmonizing vertical datum

The gravity measurements contribute to a common geoid model of the Baltic Sea

- leading to better survey results
- better navigation.

It will contribute to

- a common European geoid model of high accuracy.
- an improved German Combined Quasi Geoid (currently GCG2011)



Tracks of the 2015 survey

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Airborne laser bathymetry



Airborne laser bathymetry (ALB) is in use in shallow waters with low turbidity.



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Airborne laser bathymetry

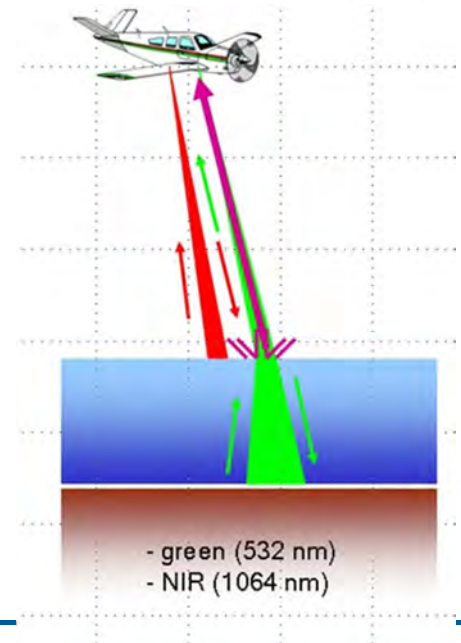


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Airborne laser bathymetry (ALB) or bathymetric LIDAR is in use for hydrographic surveying in shallow waters with low turbidity.

Project 2012 to 2015 with Leibniz University Hannover

- Applicability of ALB in the southern Baltic
- three flight campaigns
- Test area close to the island of Poel
- Two different sensors
 - Riegl VQ-820-G
 - Chiroptera (Airborne Hydrography AB)



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Airborne laser bathymetry



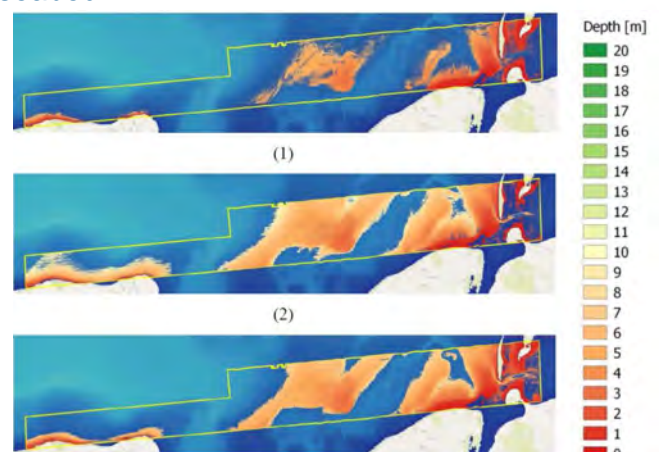
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Examination of the 3D points classified as seabed:

- point distribution and density,
- area coverage in several depth levels.
- Comparison with echo sounding data
- Comparison of the 3 campaigns

Results:

- Only small differences in elevation
- Object detection is very limited
- Usability in areas up to 5 or even 8 meters of depth
- The ALB results satisfy the requirements of IHO S-44 Order 1b for several depth intervals.



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Airborne laser bathymetry



Probable next steps:

1. Use of ALB in certain shallow areas along the Baltic coast, where the visibility is good enough, depending on the season and the topography.
2. This technique will be a supplement to the ship-based surveys in areas where the vessels have disadvantages in maneuvering.
3. The areas in question shall have a low priority in terms of safety of navigation because of the deficits of ALB in object detection.
4. A further study could be to investigate whether it is possible to use images to verify objects on the seafloor?

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Airborne laser bathymetry



Practical execution:

- Necessary to define larger areas with sufficient amount of work for contractors to reduce the overall costs.
- Establish a joint task for these surveys with other agencies (i.e. coastal protection) to share the costs and workload on one hand and the output on the other hand.
- Chance to join forces on an international level with neighboring countries.



In the German North Sea ALB is currently limited to very special projects due to the high turbidity.

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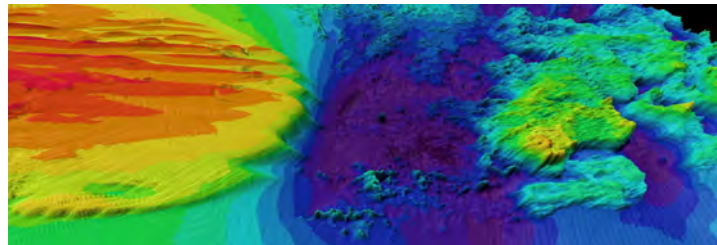
Airborne laser bathymetry



Data processing:

Very limited experience worldwide in data processing to derive really good results in the waters in question. How to assure making the most use of these surveys?

- Training of our own personnel is probably not productive due to the sporadic task.
- Sound selection of contractors if possible and feasible.
- Join forces with other offices who have experience (like France).
- ...



Current hydrographic projects at BSH

Seafloor mapping in the German EEZ



Coordination



Scientific partners



SENCKENBERG
world of biodiversity



Main objectives:

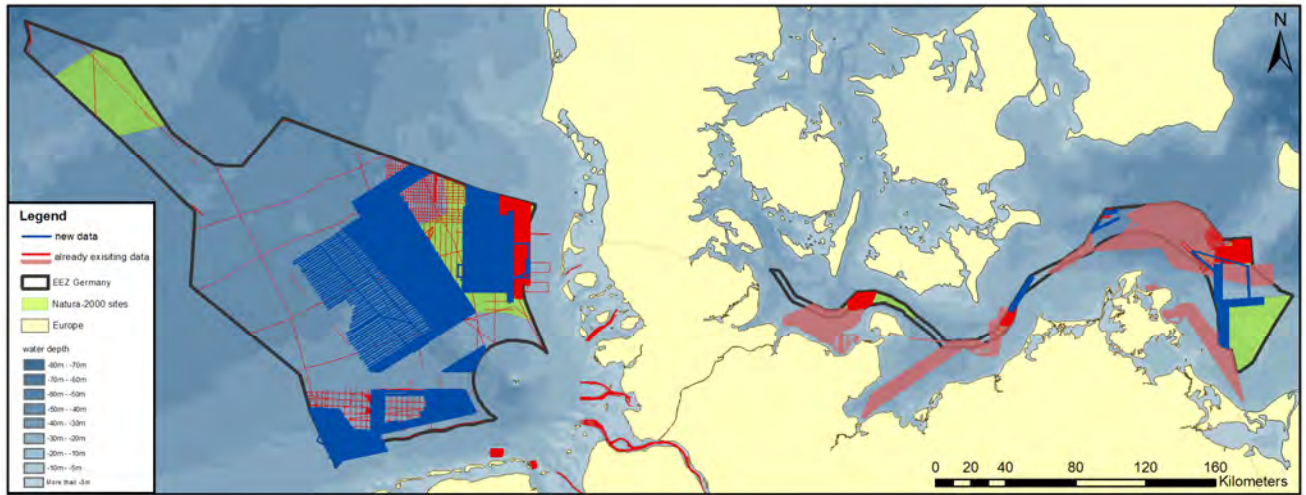
- **High-resolution sediment mapping**
(side scan sonar, grab sampler, underwater video)
- **Development of a standardized mapping procedure**
(1st draft in November 2014)
- **Creation of sediment distribution maps**

Seafloor mapping in the German EEZ



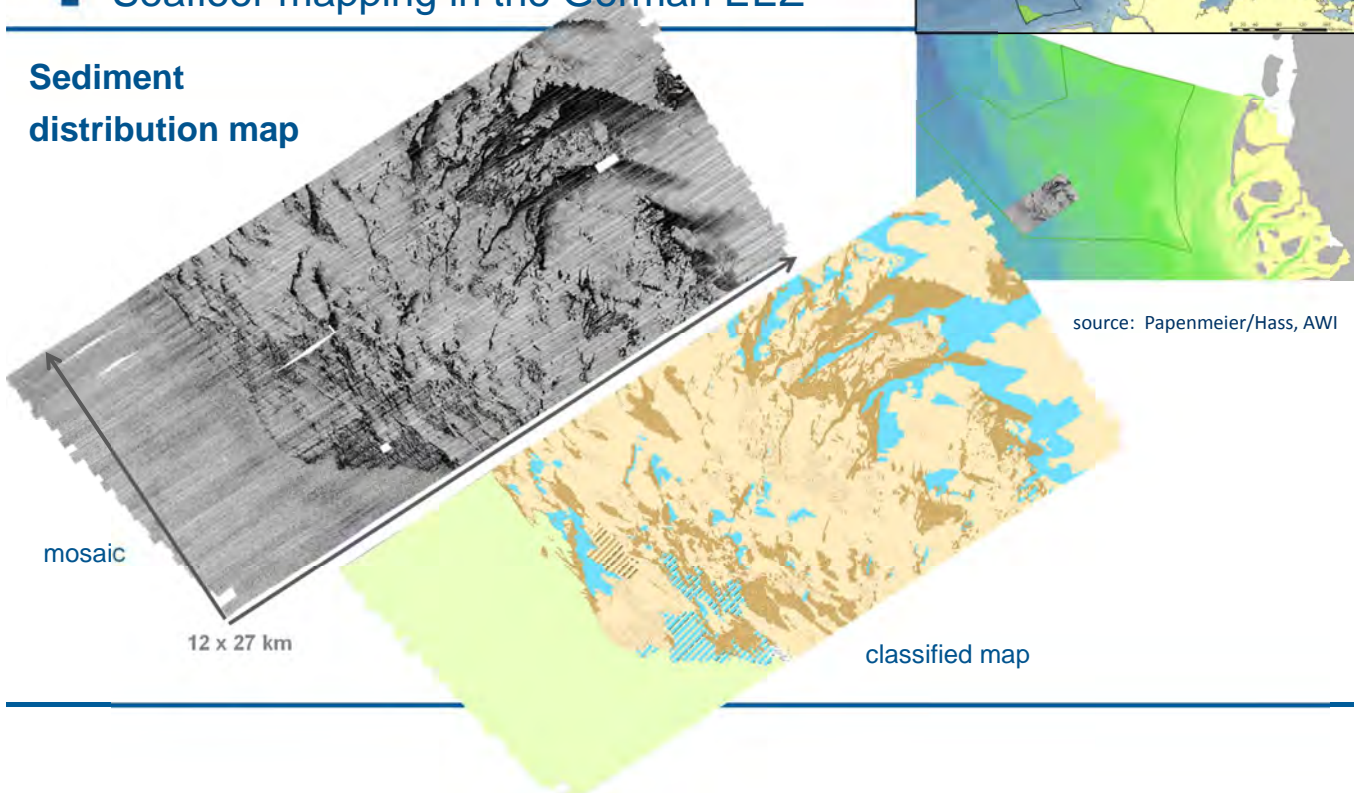
Compilation of hydroacoustic data (side scan sonar):

- new data – since project start June 2012
- already existing data – e.g. research projects, BSH survey



Seafloor mapping in the German EEZ

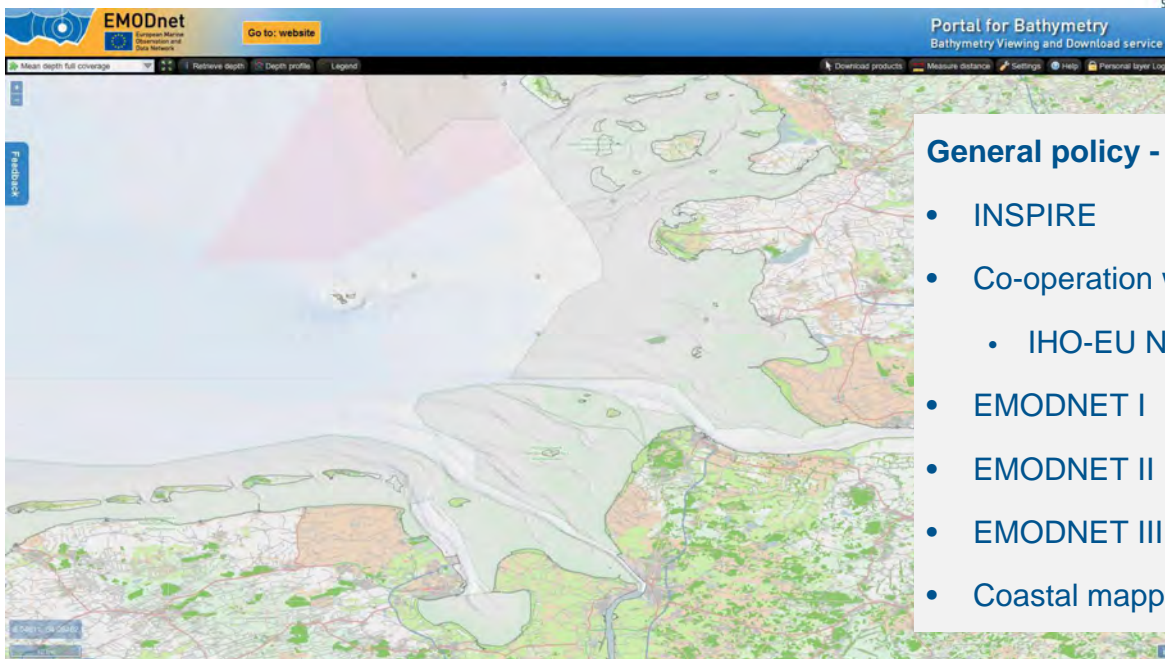
Sediment distribution map



Dissemination of Geodata



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General policy - EU

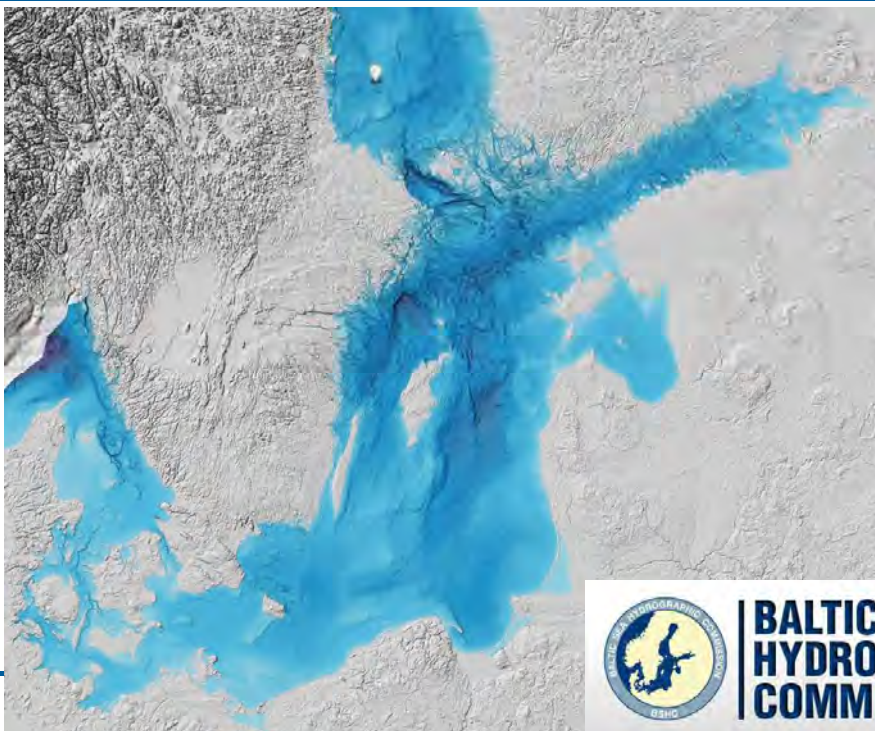
- INSPIRE
- Co-operation with EU
 - IHO-EU Network
- EMODNET I
- EMODNET II
- EMODNET III
- Coastal mapping

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Dissemination of Geodata



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General policy - HOs

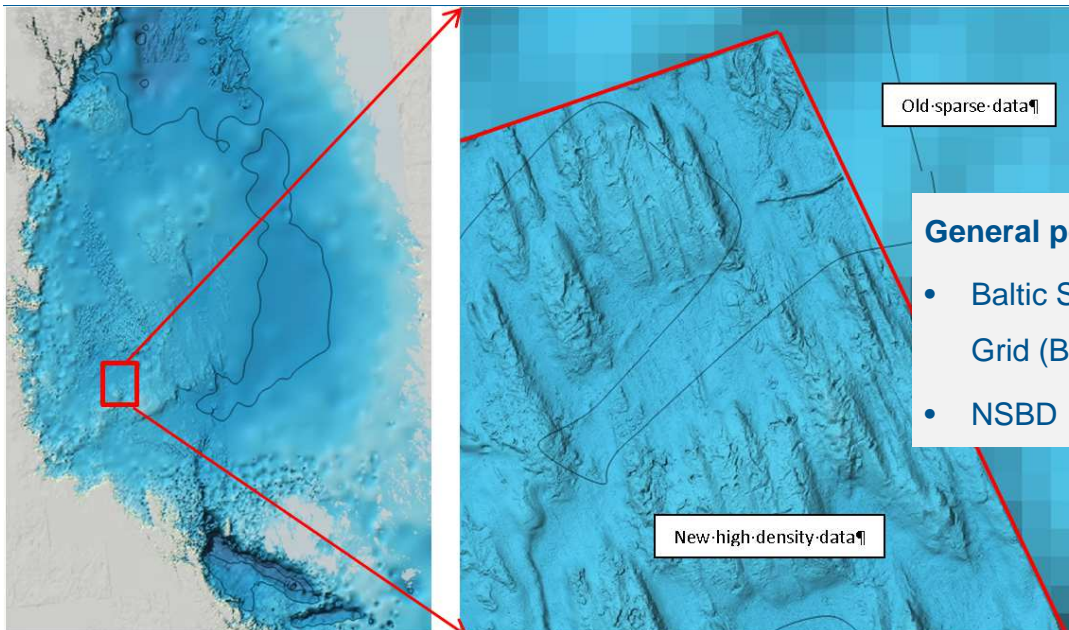
- Baltic Sea Bathymetric Grid (BSBD)
- NSBD



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HYDROGRAPHIC
COMMISSION**



Dissemination of Geodata



Old-sparse-data

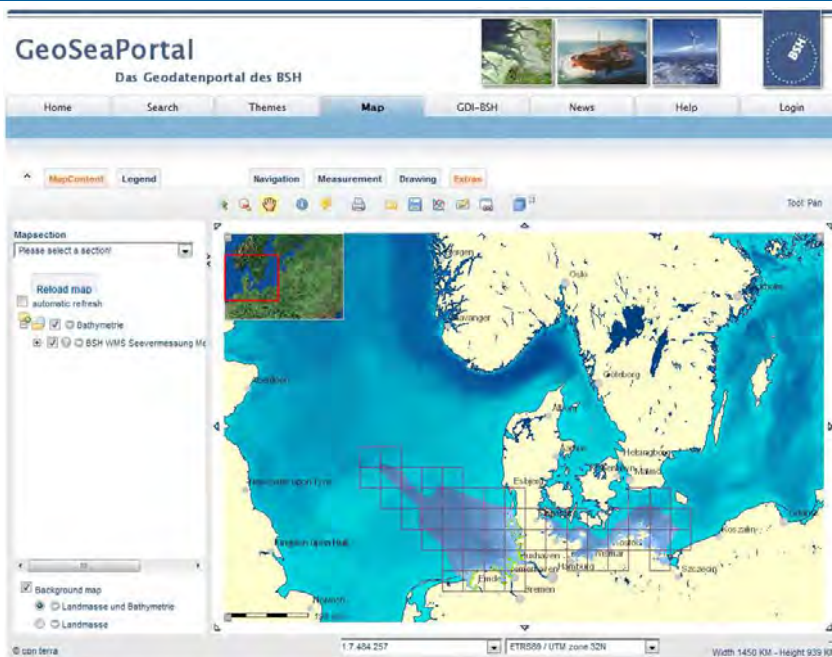
New-high-density-data

General policy - HOs

- Baltic Sea Bathymetric Grid (BSBD)
- NSBD

Examples of Baltic Sea Depth Model on Bothnian Sea with varying density of survey data. The resolution in general is 500 - 200 m, but on re-surveyed areas it could be 25 m or more dense. The rectangle area right demonstrates how detailed sea floor features (e.g. drumlins) can be seen with a 4 m grid.

Dissemination of Geodata

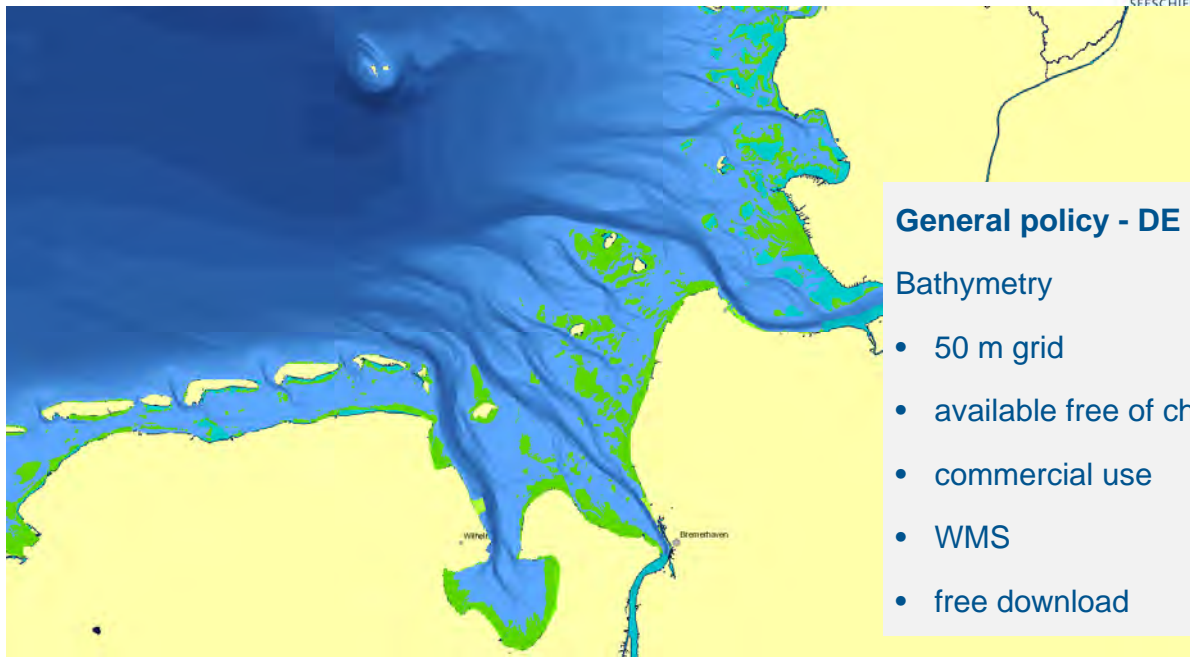


General policy - DE

- Geodatenzugangsgesetz (GeoZG)
- Geoportal.de
- GeoSeaPortal BSH
- Bathymetry

Current hydrographic projects at BSH

Dissemination of Geodata



General policy - DE

Bathymetry

- 50 m grid
- available free of charge
- commercial use
- WMS
- free download

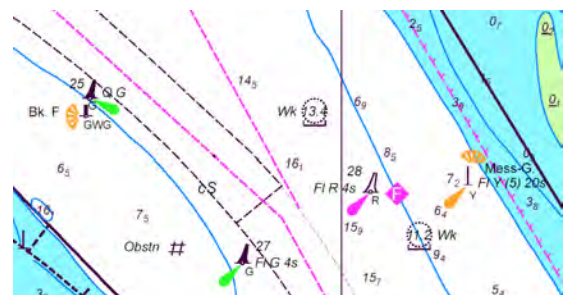
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Bathymetric ENC



Depth information in nautical charts

- Use of ECDIS is more and more common on board
- ENCs provide generalized depth information
- Some users need more details, especially:
 - Vessel Traffic Services (VTS)
 - Pilots

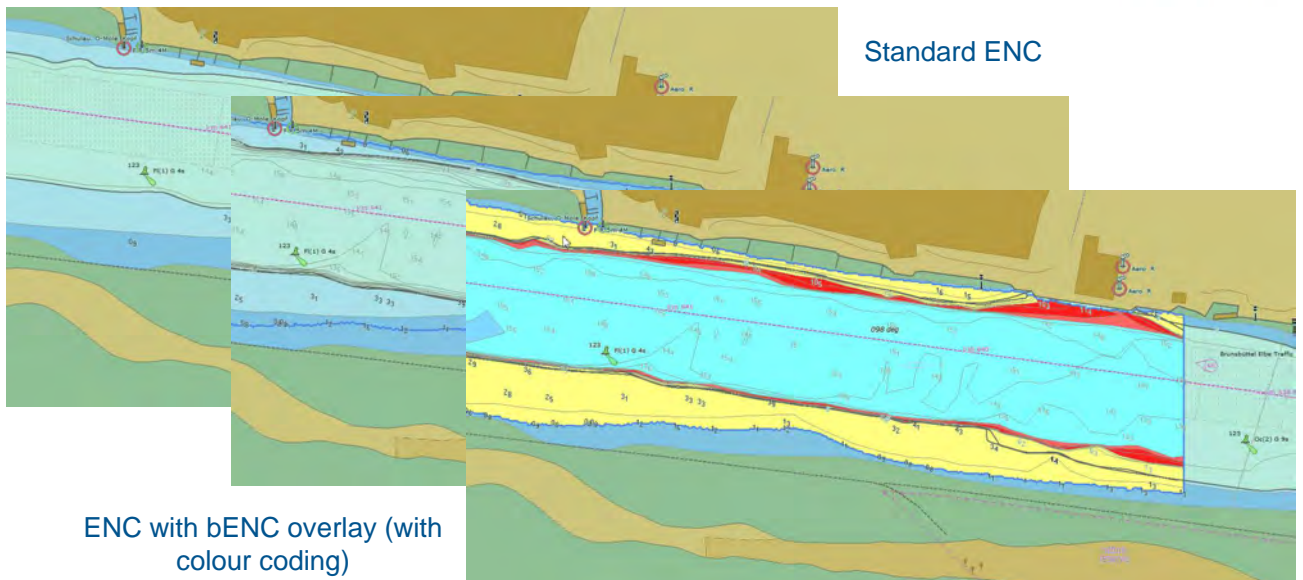


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Bathymetric ENC



Contents of Bathymetric ENC (bENC)



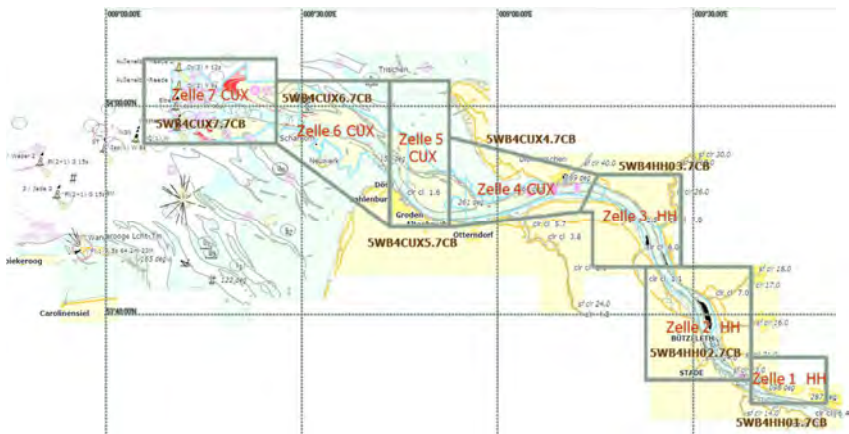
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Bathymetric ENC



Current situation:

- Bathymetric ENC (bENC) in certain designated areas only
- No harmonized approach
- Different participants



Current hydrographic projects at BSH

Bathymetric ENC



New approach:

- centralized service
- Solution for all German areas of interest
- joint agreement of
 - Federal Maritime and Hydrographic Agency (BSH)
 - Water and Shipping Administration (WSV)
 - Federal Chamber of Pilots (Bundeslotsenkammer)
- Two test areas
 - Rostock
 - River Ems

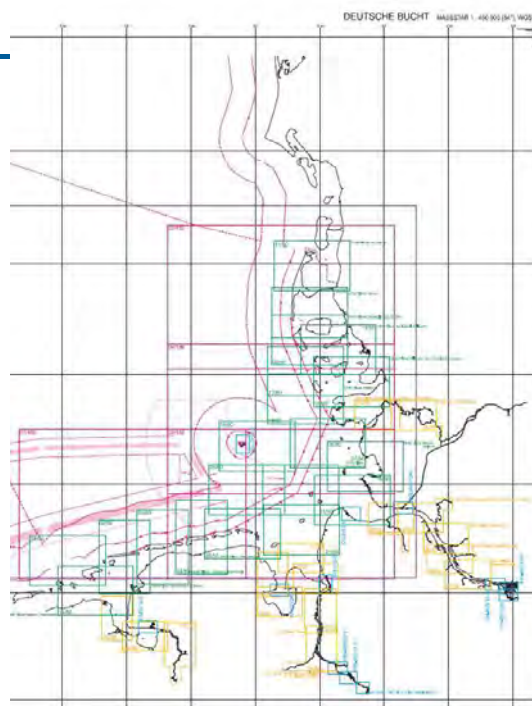


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Nautical Charts

Paper charts

- Paper charts still in use
- Reshaping the charts
 - Size
 - Layout
- Two types of customers



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New Survey Vessel



Replacement of ATAIR

- Surveying
- Wreck search
- Research
- LNG
- Sub-bottom profiler
- LNG
- Time line



Current hydrographic projects at BSH

I wish you a fruitful meeting!



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