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## **BSHC Chart Datum Working Group (CDWG)**

### **CDWG Report to the BSHC 23<sup>rd</sup> Conference**

The CDWG TORs requests the CDWG to report annually to the BSHC.

#### **1. Status of Work of CDWG since BSHC 22<sup>st</sup> Conference**

Since the BSHC 22<sup>nd</sup> Conference, *Mr Thomas Hammarklint* has acted as a Chair. There is no permanent secretary for the CDWG. *Mr Jyrki Mononen* was elected as the secretary of the CDWG 10<sup>th</sup> meeting.

CDWG has supported the implementation of the Baltic Sea Chart Datum 2000, reviewed the progress of implementation, promoted development of a common geoid model for the Baltic Sea, and cooperated with relevant international bodies. The work has been presented at several international conferences (at least six) and as well at national conferences.

In addition transition period road map and time line have been updated [[CDWG Roadmap](#)], BSHC CDWG – web pages [[CDWG Website](#)] were updated and maintained and a sketch of implementation process and relevant connections has been drafted [[CDWG10 Chairmans Report](#)].

The communication within the CDWG has been done by e-mail correspondence and the CDWG10 meeting. The meeting was held on 7-8 April 2018 in Arkö, Sweden.

All the BSHC countries have nominated members to the working group, however not all have been active or participated to the meetings. BOOS has nominated Point of Contact. Observers are nominated from Swedish National Land Survey, Swedish Meteorological and Hydrological Institute, Finnish Geodetic Institute, Finnish Meteorological Institute, Federal Agency for Cartography and Geodesy (Germany), and Norwegian Mapping Authority.

Members of CDWG:

Denmark	PhD Joanna Gerlings
Denmark	Mr Philip Sigaard Christiansen
Estonia	Mrs Gabriela Kotsulim
Finland	Mr Jyrki Mononen
Germany	Dr Patrik Westfeld
Latvia	Mr Armands Murans
Lithuania	Mr Mindaugas Zakarauskas
Poland	Cdr Sławomir Lipiński
Poland	Lt Cdr Marcin Banaszak



Russia Capt S. Travin  
Russia Dr Sergey V. Reshetniak  
Russia Mr Leonid Shalnov  
Sweden Mr Thomas Hammarklint  
Sweden Mr Lars Jakobsson  
Sweden Mr Henrik Tengbert

Representative of BOOS: Sweden Mr Thomas Hammarklint

Observers: Finland Mrs Mirjam Bilker-Koivula  
Finland Katri Leinonen  
Sweden Dr Jonas Ågren  
Sweden Dr Per-Anders Olsson  
Sweden Mr Mikael Stenström  
Norway Mr Aksel Voldsund  
Germany Dr Gunter Liebsch

An updated member list and other documents can always be found at the [CDWG website](#).

## 2. CDWG 10<sup>th</sup> meeting 7-8 February 2018, Arkö, Sweden

[Minutes](#) from the meeting.

The Chairman, Mr Thomas Hammarklint presented the [Chairman's report](#) and concluded that progress has been made over the last year of the implementation of the Baltic Sea Chart Datum 2000. A good example of implementation was shown from Estonia.

One of the most important items in the meeting was to review national plans and status of implementation of the Baltic Sea Chart Datum 2000. The national implementation plans were reviewed by participants. A questionnaire of national plans and status was done before the meeting to gather information from all the member states regardless participation in the meeting. However, answers were given by Denmark, Estonia, Finland, Germany, Latvia, Russian Federation and Sweden. The coverage of answers was deemed not to be sufficient for monitoring and coordinating the implementation of the Baltic Sea Chart Datum 2000. It was stressed out that all BSHC member states should contribute by answering the CDWG questionnaires and if possible participate at the meetings. It can be concluded that most member states have made actions to implement the common vertical datum.

A good geoid model for the whole Baltic Sea was deemed to be an essential component for the Baltic Sea Chart Datum 2000. Gravity surveys are needed to cover the Baltic Sea area with sufficient data for the geoid model. To get all the needed work done, financing for the gravity surveys and geoid calculations should be ensured. It was proposed that member states could



e.g. commit to continuation of EU co-financed FAMOS-project (Finalising Surveys for the Baltic Motorways of the Sea), which includes gravity surveys and improvement of the geoid model for the Baltic Sea.

Action #22 from BSHC22:

To summarize the decisions made in BSHC Conferences regarding the vertical reference level Baltic Sea Chart Datum 2000:

- how the chart datum name should be shown in paper charts
- how the chart datum should be shown in S-57 ENCs, attribute VERDAT
- the abbreviation used for Baltic Sea Chart Datum 2000.

A proposal to an answer to the BSHC 23<sup>rd</sup> Conference was presented by the Chairman and formalized at the CDWG10 meeting:

S-57 ENCs: VERDAT = 3

Paper charts: Mean Sea Level (Baltic Sea Chart Datum 2000<sup>national realization name</sup>) or Mean Sea Level (Baltic Sea Chart Datum 2000)

When sufficient, the following abbreviation of Baltic Sea Chart Datum 2000 should be used: BSCD2000

S-100: BSCD2000 Proposal should be sent to IHO Registry by SMA

Description and justification for the proposal needs to be determined:

“The Baltic Sea is an international shallow, non-tidal area in the northern part of Europe with dense traffic. IHO BSHC has approved the name and the adoption of the Baltic Sea Chart Datum 2000. The datum refers to each Baltic country’s realization of the European Vertical Reference System (EVRS) with land-uplift epoch 2000, which is connected to the Normaal Amsterdams Peil (NAP).”

The submitting organization needs to be registered as Submitting Organization.

The specification for the Baltic Sea Chart Datum 2000 was reviewed and few amendments were proposed and agreed to be included in the specification. It was agreed that specification will be presented to BSHC after the final geoid model is ready. The specification is an essential document for applying and realizing the Baltic Sea Chart Datum 2000 in all BSHC member states.

Other items were to plan the cooperation with BOOS in future, to review and update the [TORs](#) and the [Work Programme](#) for the years 2018-2019 and plan the future work until 2021 of the CDWG [[RoadMap](#)].



### 3. Future Work of the CDWG

CDWG will continue to guide and follow up the progress of the implementation of the harmonised vertical reference. The updated [list of actions from CDWG10](#).

Further develop the latest version of "the specification for Baltic Sea Chart Datum 2000". Continue cooperation with FAMOS concerning improving geoid model for the whole Baltic Sea, promoting studies and further development of dynamic topography of sea surface and promote improving precise real-time GNSS navigation. However, it should be noted that it is not sure that FAMOS-project continues after the end of 2018.

Continue cooperation with BOOS concerning water level information. Cooperation is important for the implementation and usage of the harmonised vertical reference.

Continue communication with relevant organisations and inform users by giving presentations and participating in relevant conferences.

To activate all the member states to send representatives to CDWG meetings.

The CDWG plans to have its next meeting (CDWG11), 5-6 February 2019 in Ålborg, Denmark.

### 4. The results of the CDWG during 2017-2018

CDWG has promoted studies and development of a common geoid model for the Baltic Sea by supporting FAMOS-project. Within FAMOS-project several gravity-surveying campaigns were executed in the Baltic Sea during 2015-2017 and interim geoid models have been calculated during 2017.

In cooperation with BOOS partners, the CDWG have compiled a list of the mean sea level in the Baltic Sea Chart Datum 2000 at sea level stations located in the Baltic Sea (including Norway). The list can be downloaded from [here](#). The values are also presented in the [Chairman's Report](#), which was presented by the Chairman at CDWG10.

Presentations were given by CDWG members as planned in the communication plan in following conferences:

- Skagerrak-meeting DK-NO-SE, 6 February 2018, Norrköping, Sweden
- SONEL/TGTT, 29-30 January 2018, Brussels, Belgium
- GLOSS Expert meeting GEXV, 8-9 July 2017, New York, United States
- FIG Working Week, 29 May-2 June 2017, Helsinki, Finland
- BOOS Annual Meeting, 22-24 May 2017, Copenhagen, Denmark
- TWCWG2, 8-12 May 2017, Victoria, Canada



- FAMOS Odin meeting, 8-10 March 2017, Malmö, Sweden

## 5. Actions for the BSHC 23<sup>rd</sup> Conference

The BSHC 23<sup>rd</sup> Conference is requested to

1. note this Report
2. support gravity measurements and geoid computation independent of future EU co-financing
3. endorse CDWG TORs 2018-2019 (*Annex 1*)
4. endorse CDWG Work Programme 2018-2019 (*Annex 2*)
5. approve the CDWG answer to BSHC22 Action #22 concerning the Baltic Sea Chart Datum 2000 (*Annex 3*)
6. give further guidance to CDWG, as seen appropriate

### Annexes:

1. CDWG TORs 2018-2019
2. CDWG Work Programme 2018-2019
3. CDWG answer to BSHC23rd Conference concerning the Baltic Sea Chart Datum 2000 (BSHC22 Action #22)



## Annex 1: CDWG TORs 2018-2019

### **BSHC Chart Datum Working Group Terms of Reference 2018-2019 8 February 2018**

To be approved by the BSHC 23<sup>rd</sup> Conference, August 2018

The BSHC18 (September 2013) decided to continue CDWG work and wished the harmonized Baltic Sea vertical reference to be implemented.

#### **The Working Group should**

1. To continue implementation of the **Baltic Sea Chart Datum 2000 (EVRS with land-uplift epoch 2000)**.
2. To prepare the road map for transition, including e.g:
  - to establish a network of relevant bodies involved into the transition and efficiently communicate and give guidance within this network
  - to invite relevant bodies to inform the users
  - to review of progress of national plans and actions
  - to propose harmonization actions.
3. To cooperate with relevant bodies on water level related issues e.g:
  - to promote studies on the validation, status and distribution of water level information, and to promote studies on interpolation and prediction of water levels
  - to promote studies on displaying schemes for joint Baltic Sea water level information
  - to promote studies on recommendations to IHO **bodies** how the sea level and its variations should be shown on nautical paper and ENC charts and publications, and conveying water level information to mariners [ref. IHO Technical Resolutions].
4. To further development of a common harmonized height reference, including further development of a common geoid model for the whole Baltic Sea area and supporting geoid and oceanographic studies relevant to these purposes.



5. To cooperate with relevant international bodies, for example organizations responsible for delivering water level information (e.g. BOOS and NOOS) and geodetic infrastructure (e.g. EUREF and NKG).
6. To liaise with relevant IHO bodies and study relevant IHO resolutions and specifications.

The Working Group should report to the BSHC Conferences.

## Annex 2: CDWG Work Programme 2018-2019

### **Proposed BSHC Chart Datum Working Group Work Programme 2018-2019 8 February 2018**

To be approved by the BSHC 23<sup>rd</sup> Conference, August 2018

Note: This Work Programme includes those Tasks which were identified as the priority issues and which are expected to be fostered during 2018 - 2019 bearing in mind the resources the BSHC members have.

#### Tasks:

1. Guide the implementation process of vertical reference within the Baltic Sea region.
  - a. To monitor and follow up the status of the relevant actions identified.
  - b. To ensure efficient communication with relevant bodies.
  - c. To propagate and explain the idea of harmonized chart datum.
  - d. To foster national efforts for realization of S-104 in the Baltic Sea.
2. Review of progress of national plans and actions.
3. Propose harmonization actions.
4. Promote studies and further development of a common geoid model and dynamic topography for the whole Baltic Sea, mainly by supporting and collaborating with relevant projects, e.g. organizing ship time for gravity measurements.
5. Promote improvement of precise real-time GNSS navigation for the future.
6. Cooperate with BOOS and other relevant institutes and organizations.



7. Support other IHO working groups and European projects in issues concerning vertical references.

**Annex 3: CDWG answer to BSHC23rd Conference concerning the Baltic Sea Chart Datum 2000 (BSHC22 Action #22)**

Action #22 from BSHC22:

To summarize the decisions made in BSHC Conferences regarding the vertical reference level Baltic Sea Chart Datum 2000:

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