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

### **CDWG Report to the BSHC 24<sup>th</sup> Conference**

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

#### **1. Status of Work of CDWG since BSHC 23<sup>rd</sup> Conference**

Since the BSHC 23<sup>rd</sup> Conference, *Mr Thomas Hammarklint* has acted as a Chair. There is no permanent secretary for the CDWG. Lars Jakobsson was elected as the secretary of the CDWG 11<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 national and international 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 [[CDWG11 Chairmans Report](#)].

The communication within the CDWG has been done by e-mail correspondence and the CDWG11 meeting. The meeting was held on 5-6 February 2019 in Aalborg, Denmark. 15 delegates attended the meeting.

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
	Finland	Mrs Janina Tapia Cotrino
	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



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	Russia	Dr Sergey V. Reshetniak
	Russia	Mr Leonid Shalnov
	Sweden	Mr Thomas Hammarklint
	Sweden	Mr Lars Jakobsson
	Sweden	Mr Henrik Tengbert
Observers:	Finland	Mrs Mirjam Bilker-Koivula
	Finland	Mrs Anni Montonen
	Sweden	Dr Jonas Ågren
	Sweden	Dr Per-Anders Olsson
	Sweden	Mr Mikael Stenström
	Norway	Mr Aksel Voldsund
	Germany	Dr Gunter Liebsch

Representative of BOOS:        Sweden     Mr Thomas Hammarklint

An updated [List of Members](#) and other documents can always be found at the [CDWG website](#).

## 2. CDWG 11<sup>th</sup> meeting 5-6 February 2019, Aalborg, Denmark

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. [Minutes](#) from the meeting.

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, Lithuania Latvia, Poland 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.



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### **Action #21, 22, 23 from BSHC23:**

A proposal to answers to the BSHC 24<sup>th</sup> Conference was presented by the Chairman and formalized at the CDWG11 meeting:

#21: To invite MS to consider gravity measurements and geoid computation

Proposed answer: include this sentence in the [Work Programme](#)

#22: Add task to WP to provide an overview where additional gravity measurements are needed

Proposed answer: include this sentence in the [Work Programme](#)

#23: To write letter to GI-Registry Manager to include BSCD2000 to the IHO GI Registry

Action solved: BSCD2000 was registered in [IHO GI Registry](#) 2018-10-17 and was approved 2018-10-18. BSCD2000 is now listed as chart datum number 44 in IHO GI Registry.

The [draft 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 2019-2020 and plan the future work until 2023 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 CDWG11](#).

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.

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 the CDWG meetings.

The CDWG plans to have its next meeting (CDWG12), 3-4 March 2020 in Gdansk, Poland.



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#### 4. The results of the CDWG during 2018-2019

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 2015-2018 and interim geoid models have been calculated during 2018.

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](#).

Presentations were given by CDWG members as planned in the communication plan in the following conferences in 2018 and 2019:

- CDWG10, Arkö, 7-8 February 2018
- FAMOS, Malmö, 7-9 March 2018
- GLOSS Workshop, Moscow, 12-16 March 2018 “Sea level observations in hostile conditions”
- TWCWG3, Valparaiso, 16-20 April 2018
- BOOS Annual Meeting, Brussels, 21-23 May 2018
- BSHC23, Ålborg, 28-30 August 2018
- FAMOS, Brussels, 11 December 2018
- CDWG11, Aalborg, 5-6 February
- TWCWG4/GLOSSGEXVI, Busan, 8-13 April 2019
- BOOS Annual Meeting, Rostock, 12-13 June 2019
- BSHC24, Gdansk, 10-12 September 2019

#### 5. Actions for the BSHC 24<sup>th</sup> Conference

The BSHC 24<sup>th</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 2019-2020 (*Annex 1*)
4. endorse CDWG Work Programme 2019-2020 (*Annex 2*)
5. approve the CDWG answers to BSHC23 Action #21,22,23
6. give further guidance to CDWG, as seen appropriate



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**Annexes:**

1. CDWG TORs 2019-2020
2. CDWG Work Programme 2019-2020

**Annex 1: CDWG TORs 2019-2020**

**BSHC Chart Datum Working Group**  
**Terms of Reference 2019-2020**  
**6 February 2019**

To be approved by the BSHC 24<sup>th</sup> Conference, 10-12 September 2019

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.**



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The Working Group should report to the BSHC Conferences.

**Annex 2: CDWG Work Programme 2019-2020**

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

To be approved by the BSHC 24<sup>th</sup> Conference, September 2019

Note: This Work Programme includes those Tasks which were identified as the priority issues and which are expected to be fostered during 2019-2020 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. **Invite member states to consider gravity measurements and provide an overview where additional gravity measurements are needed.**
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.