SWEDISH MARITIME ADMINISTRATION

BSHC Chart Datum Working Group (CDWG)

CDWG Report to the BSHC 27th Conference

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

1. Status of Work of CDWG since BSHC 26th Conference

Since the BSHC 22nd Conference, *Mr Thomas Hammarklint* has acted as a Chair.

CDWG has supported the implementation of the Baltic Sea Chart Datum 2000 (BSCD2000), 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. A sketch of implementation process and connections has been drafted [CDWG13 Chairmans Report].

The communication within the CDWG has been done by e-mail correspondence. An online meeting has been organized; CDWG13 7 September 2021. A hybrid meeting (CDWG14) was planned to be held in March 2022, but it was canceled due to the suspension of work decided by the BSHC after the Russian invasion of Ukraine.

All the BSHC countries have nominated members to the working group, however not all have been active or participated at the meetings. BOOS has nominated a 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	Mrs Gitte Hauerberg Iversen
	Estonia	Mrs Gabriela Kotsulim
	Finland	Mr Jarmo Mäkinen
	Germany	Dr Patrik Westfeld
	Latvia	Mr Bruno Špēls
	Lithuania	Mr Mindaugas Zakarauskas
	Poland	Mr Witold Stasiak
	Russia	Mr Leonid Shalnov
	Russia	Dr Sergey V. Reshetniak
	Sweden	Mr Thomas Hammarklint (Chair)
	Sweden	Mr Lars Jakobsson
	Sweden	Mr Henrik Tengbert

Observers and Experts:	Estonia	Prof. Artu Ellmann
	Estonia	Mr Sander varbla
	Finland	Mrs Mirjam Bilker-Koivula
	Finland	Mrs Anni Montonen
	Germany	Dr Gunter Liebsch
	Germany	Dr Joachim Schwabe
	Norway	Mr Aksel Voldsund
	Poland	Mr Krzysztof Pyrchla
	Poland	Mrs Małgorzata Pająk
	Poland	Dr Monika Wilde-Piórko
	Poland	Dr Malgorzata Szelachowska
	Sweden	Dr Jonas Ågren
	Sweden	Dr Per-Anders Olsson
	Sweden	Mr Mikael Stenström
Representative of BOOS:	Sweden	Mr Thomas Hammarklint

An updated List of Members and other documents can be found at the CDWG website.

2. CDWG 13th meeting 7 September 2021

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. 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. A questionnaire of national plans and status was done in 2021. It can be concluded that most member states have made actions to implement the common vertical datum, see the Summary of the Implementation Status 2022 (mostly based upon the survey done in 2021).

A good geoid model for the whole Baltic Sea is an essential component for the Baltic Sea Chart Datum 2000. The member states were committed to continue the EU co-financed FAMOS-projects (Finalising Surveys for the Baltic Motorways of the Sea), which includes gravity surveys and improvement of the geoid model for the Baltic Sea. However, the continuation project did not receive any funding and needs to be finalized without any finance. At the meeting, it was discussed how the work will be concluded until the end of 2022. Several actions have been listed in the CDWG13 Action list.

3. Status August 2022

Due to the Russian invasion of Ukraine 24th February 2022, all work in the Chart Datum Working Group has been set on hold, after a decision taken by the member states of BSHC. The CDWG14-meeting was scheduled in March 2022, but it was cancelled the very last minute. The CDWG14-meeting is now planned to be held 28-29 March 2023 in Göteborg (physical meeting only).

One of the most important items in the working group is to review national plans and status of implementation of the Baltic Sea Chart Datum 2000. Due to the pause in the work, not all countries have been able to contribute to the implementation status of 2022. However, it can be concluded that most member states after all have made actions to implement the common vertical datum, see the Summary of the Implementation Status 2022.

A good geoid model for the whole Baltic Sea is an essential component for the Baltic Sea Chart Datum 2000. The member states are committed to continue the EU co-financed FAMOS-projects (Finalising Surveys for the Baltic Motorways of the Sea), which includes gravity surveys and improvement of the geoid model for the Baltic Sea. The action is planned to be concluded until the end of 2022. Several ongoing actions have been listed in the CDWG13 Action list.

4. Future Work of the CDWG

CDWG will continue to guide and follow up the progress of the implementation of the harmonised vertical reference, following the TORs and the Work Programme (Annex 1 and 2) for the years 2021 and onwards. The future work until 2025 of the CDWG [RoadMap] have been updated.

Further develop the "the specification for Baltic Sea Chart Datum 2000". Finalize the FAMOS Geoid model for the whole Baltic Sea, in cooperation with the FAMOS Data Owners. 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 (CDWG14) in Göteborg, Sweden 28-29 March 2023 (physical meeting only).

5. The results of the CDWG during 2021-2022

CDWG has promoted studies and development of a common geoid model for the Baltic Sea by supporting the FAMOS-projects. 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 and further computations have been executed since 2020 within the FAMOS Finalization project. An updated version of the FAMOS Geoid model will be released late 2022.

The specification for the Baltic Sea Chart Datum 2000 have been finalized. The specification is an essential document for applying and realizing the Baltic Sea Chart Datum 2000 in all BSHC member states. Baltic Sea Chart Datum 2000 has been registered in IHO Geospatial Information Registry as chart datum number 44.

An article about the CDWG work and the implementation of the Baltic Sea Chart Datum 2000 has been published in the International Hydrographic Review (IHR) in May 2020.

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 (see map).

Presentations were given by CDWG members as planned in the communication plan in the following conferences in 2021 and 2022:
- BSHC CDWG13, 7 September 2021, VTC
- BSHC26, 21-23 September 2021, VTC [presentation]
- BOOS, 24-26 November 2021, VTC [presentation]
- TWCWG6, 4-7 April 2022, VTC
- BSHC27, 20-22 September 2022, Stockholm, Sweden [presentation]

The following decisions have been taken by the BSHC Conferences concerning the usage, naming and abbreviation of the Baltic Sea Chart Datum 2000:

- The following chart datum name should be shown in paper charts:
  Mean Sea Level (Baltic Sea Chart Datum 2000$^{\text{national realization name}}$) or
  Mean Sea Level (Baltic Sea Chart Datum 2000)
- The attribute to specify the datum to which both vertical datum and sounding datum are referred in S-57 ENCs [link], should be the following: VERDAT = 3 (Mean sea level)
- When sufficient, the abbreviation of Baltic Sea Chart Datum 2000 should be used: BSCD2000
- BSCD2000 have been registered as chart datum 44 in IHO Geospatial Information (GI) Registry [link].

6. Actions for the BSHC 27th Conference

The BSHC 27th Conference is requested to:

1. note this report
2. give further guidance to CDWG, as seen appropriate