Swedish Maritime Administration
Hydrographic Office

Questionnaire to BSHC Member States on their implementation status of the transition to a Harmonised Vertical Reference, Baltic Sea Chart Datum 2000 (BSCD2000).

*Please return to Thomas Hammarklint by email (thomas.hammarklint@sjofartsverket.se) at the latest by **17 March 2023**.*

Member state	Denmark
Date of reply	2023-03-dd
Point of Contact	Nikolaj Møller, GST, nikmn@gst.dk

1. Are all the decisions done to implement the Baltic Sea Chart Datum 2000?

1.1. When the decisions has been done or planned to be done?

1.1.1. In Denmark BSCD2000 is implemented in ENC and will be implemented in paper charts In the order of reprinting. In Denmark BSCD2000 is implemented by the use of DVR90 which is equal to BSCD 2000. MSL data in charts is referring to DVR90.

1.1.2. Before year 2000 depth data has been referenced to the old Danish datum DNN and the difference between DNN and DVR90 is in worst case 12 cm. It was decided not to correct old depth data to DVR 90, since measuring precision before 2000 was less than 12 cm and most depths was given with decimetre resolution. This led Denmark to the conclusion that there has not been a need for conversion in the charts between DNN and DVR90.

1.2. What are the national decisive organizations? N/A

2. What is the national status of implementation of chart datum?

2.1. What actions have already been done? See 1.1

2.2. What actions have been planned to be executed and what is the schedule? If Denmark is publishing a new chart we will print 'BSHC2000-DVR90' on the chart.

2.3 Which ENC Approach have been updated with the new reference datum? If possible, attach a chart datum overview covering Your countries nautical charts, designed graphically or as a table, updated around January, 2021. Also, if possible, include an attribute to each named chart describing the CD difference to BSCD2000 in cm (CD minus BSCD2000). Example attached at the end of the Questionnaire (Annex). All charts and ENC's are reference to the same datum and see 1.1.

2.4 If you implemented the attribute VERDAT in S-57 (ENC), are You using VERDAT=3 (Mean Sea Level)? Denmark is using MSL or LAT and it is stated in the ENC.

3. Has Your country established the national realization of EVRS and are the water level stations connected to this new height system (BSCD2000)?

3.1 Which organization/-s is responsible for the water level stations/data in Your country?
- Danish Coastal Authority (DCA)
- Danish Meteorological Institute (DMI)
- Danish Environmental Protection Agency (Danish EPA)

3.2 Which reference are used today to present water level information? Does Your country planning to present water level information referring to BSCD2000? Doing it already today? Date decided for change the reference to BSCD2000?
DVR90, LAT and MLWS, see https://ocean.dmi.dk/tides/tides.uk.php
DVR90 is viewed as the Danish implementation of BSCD2000, therefore the Danish water level information is referenced to BSCD2000

3.3 Are there any plans for digital service/-s intended for the users to have the option to choose MSL or BSCD2000 as the reference level for water level information?
S-104 is in a very early planning and development phase at GST. However Danish water level information is already referenced to DVR90.

3.4 GNSS supported UKC control/confirmation is probably the reality in a few years. We also need reliable water level predictions for carrying out optimal loading and real time water level data to check the GNSS data. Do we need a shared service in the Baltic Sea for water level information (predictions/real-time), which fulfils nautical needs and demands?
It is too early for GST to assess the need for a shared S-104 service within the Baltic Sea.

3.5 Do we need to work together with the development of the IHO S-104 standard?
GST welcomes collaboration within the Baltic Sea to share test data, progress and development.

4. Are the relevant national contacts and interest groups defined for the change of chart datum and water level reference?

4.1. What are the essential national interest groups in Your country?

4.2. Are the relevant point of contacts known and contacts been made to them?

4.3 Are You planning any information campaign about the change of chart datum and water level reference? If, yes have you published information about this somewhere?

5. Have You identified any obstacles or major issues concerning transition to the harmonized vertical reference?

5.1. What are the major obstacles or issues?

5.2. What measures has been planned to avoid them?

6. Connections to neighbouring countries

6.1. Which are the relevant countries to cooperate?

6.2. Are the needed points of contacts already known?

6.3. What actions have been agreed with the relevant countries (e.g. synchronising plans and schedules)?

7. Are there any needs for support from BSHC?

8. Do you have any other proposals or guidance to the CDWG to help and foster the transition process?

9. Are you using GNSS and GNSS augmentation services for referring to your (bathymetric) surveys to the chart datum?

9.1 What GNSS augmentation service is used for hydrographic surveys? (If there are several augmentation services, list all of them VRS from GPSNET and, if needed, base stations related to EUREF89/DVR90 (DKGEIOD12A)

9.2 To which coordinate system, and vertical reference level/frame the GNSS augmentation service is referred to? (If there are several systems in use, list all of them.) DVR90 and ETRS89

9.3 Does your HO require, in-house or procured, that Hydrographic survey system shall be prepared to be able to measuring the GNSS-height and refer the depth to the geoid? Yes, if possible

9.4 Do you discuss within your HO the need of an altimetric measured Mean Sea Surface (MSS)? (For example, in order to support hydrodynamic models, shipping and / or adjust existing depth data)? It is not a discussion in HO but SDFI and DTU space is working on developing a model.

9.5 Has your HO assessed the need for dynamic geodetic reference systems (time-dependent transformation relationship) between primarily national and global reference frames? Not assessed