



Questionnaire to BSHC Member States on their implementation status of the transition to a Harmonised Vertical Reference, Baltic Sea Chart Datum 2000 (BSCD2000), S-104 Water Level and S-111 Surface Currents)

Please return to Thomas Hammarklint by email (thomas.hammarklint@sjofartsverket.se) at the latest by **15 March 2024**.

Member state	Finland
Date of reply	2023-03-15
Point of Contact	Jyrki Mononen, Finnish Transport and Communications Agency (Traficom), jyrki.mononen@traficom.fi Anni Jokiniemi, Finnish Meteorological Institute, anni.jokiniemi@fmi.fi

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?

Done

1.2. What are the national decisive organizations?

- Finnish Transport and Communications Agency (TRAFICOM)
- Finnish Meteorological Institute (FMI)
- Finnish Transport and Infrastructure Agency (Väylä)
- Finnish Environment Institute (SYKE)
- National Land Survey of Finland (NLS)

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

2.1. What actions have already been done?

FMI provides almost all sea level data in both systems.

Traficom

MSL to BSCD2000 -transformation parameters have been defined for all sea areas and parameters have been implemented in the bathymetric data management system.



Bathymetric and fairway data has been transformed to BSCD2000 in the Bay of Bothnia, in the Quark and in the Bothnian Sea and western part of the Gulf of Finland.

2.2. What actions have been planned to be executed and what is the schedule?

Traficom:

- Couple of charts have been published. See Annex for production plan and schedule for the rest of the charts.

FMI:

- Some local products are waiting that the charts of that area are published in BSCD2000.

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).

- Approach charts from Tornio to Pori have been published. See Annex for the schedule of the rest of the charts.
- We don't have a chart where MSL-N2000 differences for each chart has been shown.
- Differences between BSCD2000 and MSL are as a table en.ilmatieteenlaitos.fi/sea-level-conversions

2.4 If you implemented the attribute VERDAT in S-57 (ENC), are You using VERDAT=3 (Mean Sea Level)?

Yes

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?

Finnish Meteorological Institute.

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?

BSCD2000 and MSL.



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?

Sea level data is mostly provided in both systems.

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?

- Shared service could be an option for water level information, but the practical issues are e.g. who will be responsible of organizing the service and how to get the needed funding and recourses.
- IHO S-100 products includes standard for water level information, S-104 Water Level Information for Surface Navigation (<http://s100.iho.int/S100/product%20specification/division-search/s-104-water-level-information-for-surface-navigation>), which includes real-time water level observations and predictions/forecasts.
- When S-100 based ENC and compatible ECDIS are in use those should be the primary way of providing the navigational/nautical data to mariners.
- The organizations responsible for water level information are essential stakeholders when discussing what kind of information is needed for mariners.

3.5 Do we need to work together with the development of the IHO S-104 standard?

That will be important. IHO Tides Water level and Currents Working Group (TWCWG) is responsible of developing S-104. More information in TWCWG web-page (<https://iho.int/en/twcwg>).

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?

Traficom, Finnish Meteorological Institute, Finnish Transport Infrastructure Agency, National Land Survey, Mariners, Shipping Companies, Pilots, Ports, Maritime education institutes, Communities, Fairway owners, Traffic Management Finland, Boatmen, Construction companies.

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



Yes

- 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?

FMI:

Yes, by meeting stakeholders, news on our web-pages and via webpage (e.g. en.ilmatietaenlaitos.fi/sea-level-height-systems).

Traficom:

- There are different information campaigns and materials for different stakeholder groups (e.g., ports, fairway operators, pilots...)
- General information is presented on the Finnish Transport and Communications Agency (Traficom) webpages.

FIN: <https://www.traficom.fi/fi/n2000-vayla-ja-merikarttaudistus>

SWE: <https://www.traficom.fi/sv/transport/sjofart/farleds-och-sjokortsreformen-n2000>

ENG: <https://www.traficom.fi/en/transport/maritime/n2000-fairway-and-nautical-chart-reform-improved>

- Information will be given also e.g., in the International Boat Fare in Helsinki.

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?

- Informing and education of users.
 - o Changes in fairway information and how users will understand how to utilize water level information (plus- and minus-water).
 - o Changes in the presentation of fairway information on nautical charts.
 - o Difficulties to find the chart datum information used on a chart product, especially on ECDIS and chart plotters (leisure craft).
 - o Two styles to present sea level data confuses users.

5.2. What measures has been planned to avoid them?

- Customer feedback
- Web-page reactions



- Meetings with the pilots, maritime academies, VTS, yachting clubs, boat fairs etc.

6. Connections to neighbouring countries

6.1. Which are the relevant countries to cooperate?

Estonia, Sweden.

6.2. Are the needed points of contacts already known?

Sweden and Estonia yes.

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

Not any specific agreements have done with neighbouring countries. Finland will follow the time schedules agreed within BSHC/CDWCWG as far as feasible.

Bilateral meetings have been kept with Sweden and Estonia. We see it important to continue the bilateral meetings.

7. Are there any needs for support from BSHC?

Everything to help member states to communicate and execute the transition in synchronized manner are valuable.

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

- Common information and promotion of the Baltic Sea Chart Datum 2000.
- All member states to commit to adoption of the Baltic Sea Chart Datum 2000 and inform the implementation status.

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.)

- Not for shipborne surveys in vertical referencing at this moment, GNSS is used in bathymetric LiDAR-surveys for vertical referencing.
- In horizontal positioning contractors uses commercial services (E.g

Fugro Marinestar, Trimnet (Geotrim Oy), @Fokus (Indagon Oy)) or data from FinnRef GNSS network.

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.)



ITRS, EUREF-FIN (ETRS89 realization in Finland) -> coordinate system ETRS-TMn (n is the central meridian).

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?

No

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)?

No

9.5 Has your HO assessed the need for dynamic geodetic reference systems (time-dependent transformation relationship) between primarily national and global reference frames?

Yes, we have co-operation with the experts of NLS (National Land Survey of Finland)

10. What is the national status of the implementation of IHO S-104 Water Level and S-111 Surface Currents?

10.1 What actions have already been done?

Traficom coordinates in cooperation with the Finnish Meteorological Institute. Regulatory cooperation meetings in preparation for the production of S-104 and S-111.

The first test products of S-104 and S-111 will be created by FMI in the Baltic Sea e-Nav -project. The project has 10 partners around the Baltic Sea, FMI and Traficom, for example.

10.2 What actions have been planned to be executed and what is the schedule?

Preparing to begin production of the S-104 and S-111 in 2026 (2025).

The Baltic Sea e-Nav -project started 2023 and ends 2026.

10.3 Are all the decisions done to implement S-104 and S-111?

The responsibilities of the organization have been agreed upon. The Finnish Meteorological Institute is responsible for the production of S-104 and S-111 in Finland.

Technical capabilities are being prepared and expected for adoption of the standard.

10.4 When the decisions have been done or planned to be done?

Probably during 2024-2025.



10.5 Which organization/-s is responsible for observed and modelled/forecasted water level (Refer to 3.1) and currents in Your country?

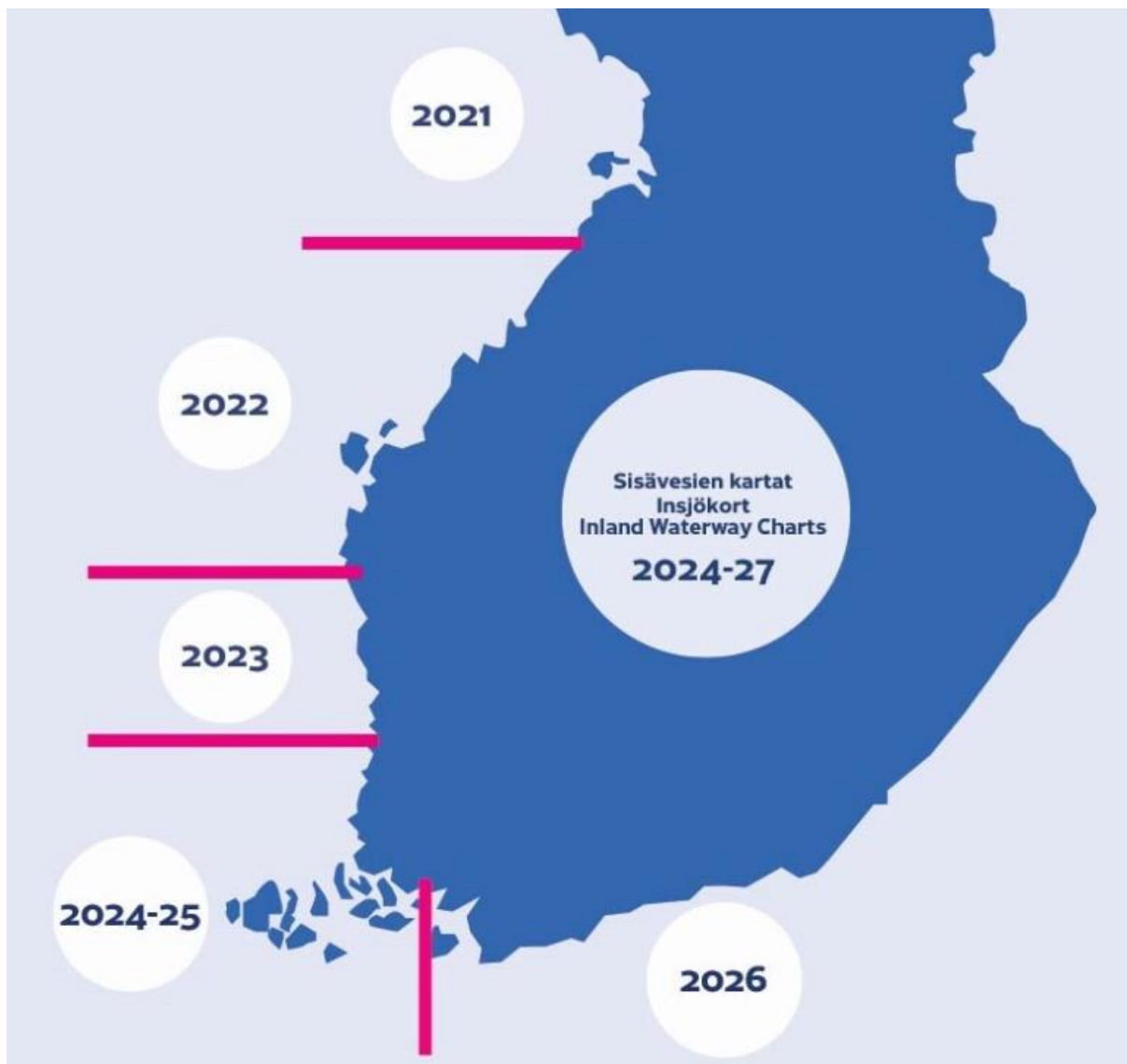
Finnish Meteorological Institute.

10.6 How is Your country represented in the IHO Tides, Water Level and Currents Working Group (TWCWG)?

Both Traficom and Finnish Meteorological Institute have representatives in TWCWG.



Annex 1



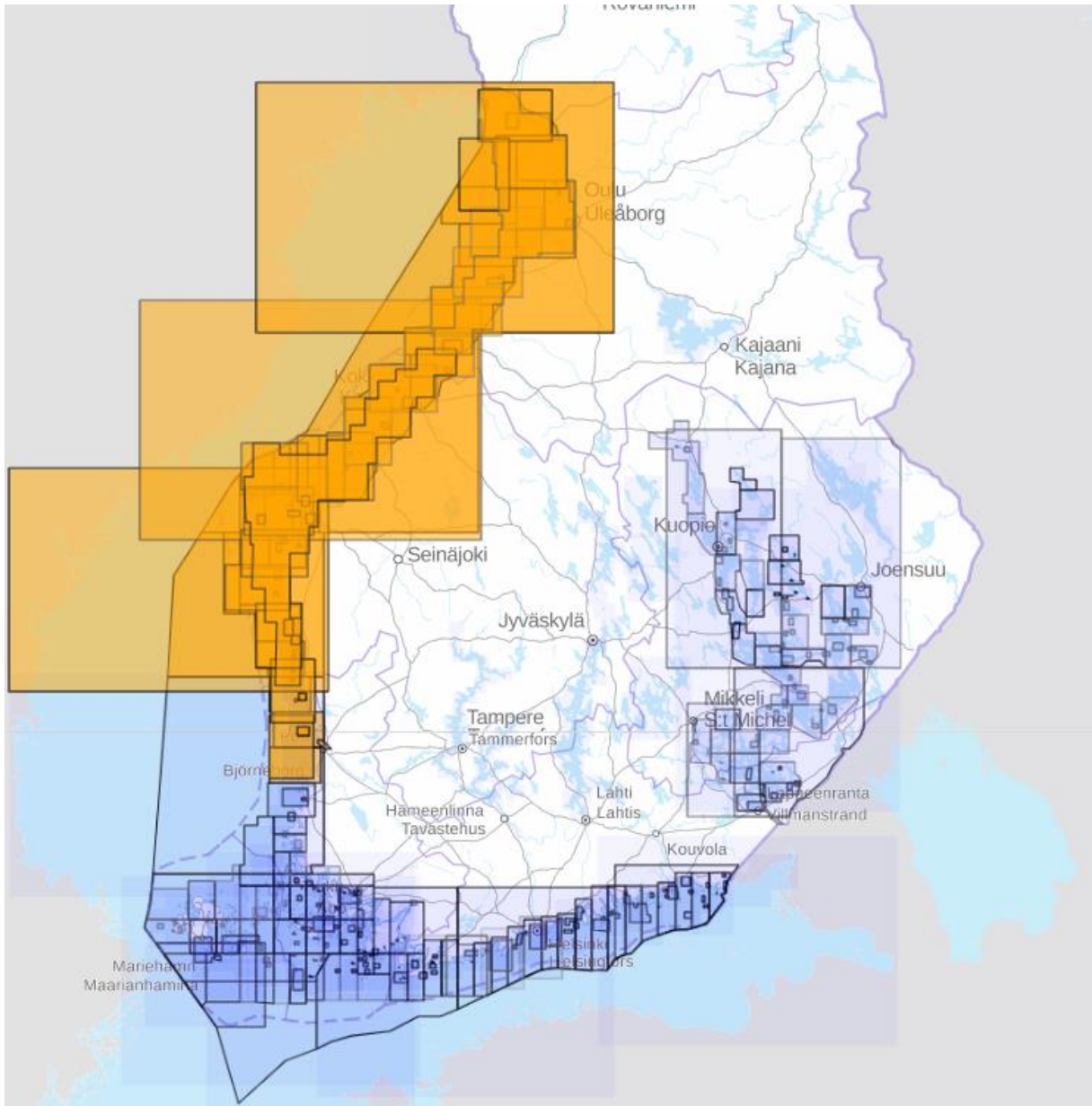
Production schedule of BSCD2000 (N2000) nautical charts.

Link:

<https://www.traficom.fi/en/transport/maritime/publication-status-n2000-charts>



Annex 2



Status of production of BSCD2000 (N2000) nautical charts

Links:

<https://www.traficom.fi/en/finnish-nautical-charts-portfolio>

<https://www.traficom.fi/en/transport/maritime/n2000-fairway-and-nautical-chart-reform-improved>