

## **Report of the 20<sup>th</sup> and 21<sup>st</sup> meeting of the NSHC-TWG to the 32<sup>nd</sup> NSHC Conference**

### **1. Meetings and attendance**

The 20<sup>th</sup> NSHC-TWG meeting was held at the Netherlands Hydrographic Office in The Hague 27 – 28 January 2015. The 21<sup>st</sup> NSHC-TWG was held at the Marine Survey Office of the Irish Maritime Administration in Dublin 7-9 March 2016. On both meetings representatives of Belgium, Denmark, Germany, Netherlands, Norway, Sweden and United Kingdom attended the meeting. France did not attend both meetings.

### **2. Current actions**

The TWG has continued to work on the path to combine existing national models in order to develop a common reference surface for tidal reduction to Chart Datum in the North Sea. Adjacent are ongoing actions to share new developments on tidal gauges, GNSS tidal reduction and developments on publishing tidal information.

Several countries have their own reference surface related to the ellipsoid. There are discontinuities at adjacent maritime boundaries. During meeting 21 in Dublin these differences were visualized along the national maritime boundaries. The differences were then calculated as percentage of depth along these boundaries. The present TWG members unanimously agreed that a bilateral difference of 1% or less is acceptable. All nations have at least one maritime boundary that exceeds the 1% mark at some point. TWG suggests that this should be further investigated and efforts made to reduce these values.

All TWG members agreed that in future for exchange of data, the GRS80 ellipsoid should be used as common reference frame. This also allows connection to land based systems.

### **3. List of deliverables and timing**

- Make an overview of existing models, including metadata. Each member sends the information to UK.
- Create an overview of connection between EVRS and Chart Datum. Input expected in December 2016
- Investigate all LAT differences at the boundary of more than 1 % (LAT difference/depth). Input expected December 2016
- Publish information of NSHC-TWG on [www.nshc.pro](http://www.nshc.pro). All to deliver input to UK who will forward to webmaster Bernd Vahrenkamp (DE).

### **4. Recommendations to the 32<sup>nd</sup> NSHC Conference**

The 32<sup>nd</sup> NSHC Conference is invited to approve and amend, if necessary:

- This report
- Approve publication of minutes on [www.nshc.pro](http://www.nshc.pro).
- The work plan for NSHC-TWG, Annex A
- The action items, Annex B

### **5. Next meeting of the group**

Under rotating chairmanship the 22<sup>nd</sup> NSHC TWG is to be held in Belgium.

**ANNEX A: WORK PLAN NSHC-TWG to be approved by NSHC**

<b>Workplan NSHC Tidal Working Group: ([Mar 2016] - to be confirmed by NSHC)</b>				
<b>Item number (TWG/item)</b>	<b>objective (WHY/priority)</b>	<b>task description (WHAT/HOW)</b>	<b>HO involved</b>	<b>Status</b>
WP 16 / 04	Enable GNSS-based tidal reduction and the connection with the vertical datum on land	Follow developments on geoid, MSL and LAT computations for the North Sea area	All	Permanent, see also WP18/01
WP18/01	Improve North Sea wide realization of reference surfaces	Explain and reduce differences in reference surfaces at the international boundaries	All	Permanent
WP 18/02	Improve methodologies for GNSS surveys	Exchange between HO's on operational methodologies for GNSS based surveys	All	Permanent

## ANNEX B: Action for internal coordination within TWG

Item number (TWG/item)	objective (WHY/priority)	task description (WHAT/HOW)	HO involved	status	corresponding work plan item
A18/01	Explain differences in realizations of LAT	Exchange on bilateral basis between involved HO's to investigate further the origin of observed differences at the boundaries between national reference surfaces	All	Permanent	WP 18/01
Action 19/03	Make an overview over existing separation and hydrodynamic models, including metadata	Each member state sends the information to UKHO	All, UK	July 2015	WP 18/01
Action 20/01	Improve North Sea wide realization of reference surfaces	Redo the work done in 2010 using the latest references from the Member States	NL, All	Closed	WP 18/01
Action 20/02	Show insight in the status at all bilateral boundaries	Create a matrix showing the status at all boundaries wrt Chart Datum, LAT, MSL and ellipsoidal boundaries	NL, All	Closed	WP 18/01
Action 20/03	Better capitalize the work done by the NSHC TWG	Use the webportal for NSHC TWG on the IHO website	UK, All	Closed	None
Action 20/04	Gain insight the connection between EVRS and chart datum	Create overview of connection between EVRS and Chart Datum	NL, All	Dec 2016	WP 16/04
Action 21/01	Investigate the differences at the BE-FR border between national LAT reference surfaces	Investigate all LAT differences at the border of more than 1 percent (LAT difference/depth)	BE, FR	Dec 2016	WP 18/01
Action 21/02	Investigate the differences at the BE-NL border between national LAT reference surfaces	Investigate all LAT differences at the border of more than 1 percent (LAT difference/depth)	BE, NL	Dec 2016	WP 18/01
Action 21/03	Investigate the differences at the DK-DE border between national LAT reference surfaces	Investigate all LAT differences at the border of more than 1 percent (LAT difference/depth)	DK, DE	Dec 2016	WP 18/01
Action 21/04	Investigate the differences at the DK, NO border between national LAT reference surfaces	Investigate all LAT differences at the border of more than 1 percent (LAT difference/depth)	DK, NO	Dec 2016	WP 18/01

Action 21/05	Investigate the differences at the FR-UK border between national LAT reference surfaces	Investigate all LAT differences at the border of more than 1 percent (LAT difference/depth)	FR, UK	Dec 2016	WP 18/01
Action 21/06	Investigate the differences at the DE-NL border between national LAT reference surfaces	Investigate all LAT differences at the border of more than 1 percent (LAT difference/depth)	DE, NL	Dec 2016	WP 18/01
Action 21/07	Investigate the differences at the NO-UK border between national LAT reference surfaces	Investigate all LAT differences at the border of more than 1 percent (LAT difference/depth)	NO, UK	Dec 2016	WP 18/01
Action 21/08	Investigate the differences at the NO-SWE border between national LAT reference surfaces	Investigate all LAT differences at the border of more than 1 percent (LAT difference/depth)	NO, SE	Dec 2016	WP 18/01