



Hydrographic Services and Standards Committee

Report of the Tides, Water Level and Current Working Group

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(1) Secretary, International Hydrographic Bureau, (2) Chair, Shom, (3) Vice-Chair, Canadian Hydrographic Service, (4) SCPT, USA, NOAA (5) Australian Hydrographic Service

TWCWG activities for HSSC-9

WG objectives


- ✦ To monitor developments related to tidal, water level and current observation, analysis, prediction, vertical and horizontal datums;
- ✦ To develop and maintain the relevant IHO standards, specifications and publications for which it is responsible in liaison with the relevant IHO bodies and non-IHO entities;
- ✦ To develop standards for the delivery and presentation of navigationally relevant surface current/water level information;
- ✦ To provide technical advice and coordination on matters related to tides, water levels, currents and vertical datums.



Principal activities and achievements

- ✦ **2017: Second TWCWG meeting (Canada, Victoria)**
- ✦ **S-1xx product specification segmented in work-packages** (grid, forecast, obs, prediction, uncertainty, quality flag, size of the product, etc.) Workpackages are :
 - S-104 – Water Level Information for Surface Navigation
 - S-111 – Surface Currents
- ✦ **TWCWG action from HSSC8 : Answer on Netcdf point**

- Status : Done



5.8 Tides, Water Level and Currents (TWCWG)					
	NetCDF format	HSSC8/42	TWCWG to investigate the use of the NetCDF format within the IHO and provide recommendations to the S-100WG as appropriate, for further considerations.	TWCWG2, May 2017	<u>Done</u>

- Context : Many ocean model provide outputs in Netcdf format. Point was raised to take into account of this specificity and then opening on the possibility for future products to harvest these models outputs. Knowing well that HDF5 is a «cousin» of Netcdf, same family format.
- Result : HDF5 on single format choosed : Agreed with the WG.



Principal activities and achievements

✦ **Surface current product specification (S-111)**

- File structure is stable, almost final.
- S-111 validator tool should be soon available from Canada (2018).
- Korean S-100 viewer able to read S-111 test datasets
- Data test sets is increasing on IHO web site and ready for uploading to the website (a S-100 based Product Specification) : Ready for new step: additional data sets. (6 stakeholders are volunteers to share, test their surface current files for a S-111 encoding following IHO guidance).

✦ **Water level product specification (S-104)**

- S-104 Product Specification document : draft version delivered in 2017, May: Process in progress. (TWCWG S-104 IHO web page)



Principal activities and achievements

✦ **Water level product specification (S-104)**

- S-104 Product Specification document : draft version: Process in progress.
(TWCWG S-104 IHO web page)
- Able to review almost all the document. Reviewed sections : 6, 7, 8, 9,10.
- There is a coherence with S-111.
- Symbol for a single point was chosen in accordance with IHO registry. We defined a criteria for water level trend and index (cf; AIS frame (4 flag, rising, falling, steady, not available))



Principal activities and achievements

- ✦ **Water level product specification (S-104)**
- ✦ **Ongoing actions :**
 - Prototype S-104 data sets for the end of this year.
 - S-104 liability issue 100_VerticalAndSoundingDatum

Addition of Ellipsoidal height (Sestion 12-2-6 of S-104 PS TWCWG)

Role Name	Name	Description	Mult	Type	Remarks
Value	Ellipsoidal Height	Not in S100			31



Principal activities and achievements

✦ **2/ Capacity building (Liaise with SAN)**

- Sept 2017. Course with the basics for a first learning on hydrography and tides has been provided.

✦ Ongoing actions:

- (1) Provide comments, amendments and feedback on the existing documents available on IHB web site (TWCWG). Send it to the leader of this task (SAN) and to the TWCWG.
(https://www.iho.int/mtg_docs/com_wg/IHOTC/IHOTC_Misc/Tides_and_Water_Level_Workshop_Course_Material)
- Other level of courses will be delivered by S.A.N (2017, 2018) in English.
- (2) Translation in Spanish and French before submission to the review committee TWCWG and IHB.
- Status : Beginning process for translation of workshop material into Spanish and into French.
Input for this task : The different levels of courses deliveries. Expected agenda : 2018.



Outstanding issues : Current

S-111 tool to produce HDF5 data files

- ✦ Generate more S-111 compatible datasets using an S-104 updated; (CA, USA, agreed to generate compatible datasets from existing data using CARIS software,).
- ✦ DEU, FRA, JPN, NLD intended to install the S-111 tool available from CAN and produce HDF5.2 data (water level HDF5 as well as current datasets but in a second time).
- ✦ KHOA will continue testing of datasets against S-104 and S-111 PSs as they are developed. Other TWCWG members were encouraged to contribute and build up their national and organizational knowledge base.
- ✦ AUS agreed to finalize the next draft version of S-104 and circulate for comment; no expertise available to commence encoding in HDF5 format. NOR to commence liaise with Norwegian Meteorological Institute and to commence work on encoding water level data into HDF5 format. FIN will contact the Finnish Meteorological Centre to check their output files format.



Outstanding issues : Current

- ✦ S-111: Finalise the dynamics information to include in the future e-navigation products:

- Milestone 2017: dataset for tests:

A first set of data have been uploaded. Reference : S-111 TWCWG IHB web page.

- ✦ Progress:

- Portrayal setup (2018) : On going action.

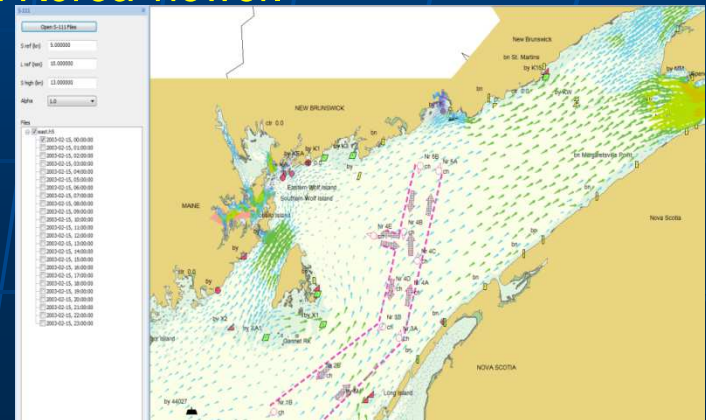
- Milestone 2018-T1 : Increasing interactions between stakeholders to share tool(s) to encode surface current information into HDF5 following S-111 specification.



Outstanding issues : Current

Progress in Surface Currents

- ✦ Sample S-111 compliant HDF5 surface current data files have been posted on the TWCWG website for (L.Maltais , K. Hess et al., Sewoong OH)
 - Fixed current meter stations
 - Regularly gridded fields of currents
 - Irregularly gridded fields of currents
 - Drifting current meter stations
 - S-111 product specification viewed with South Korea viewer.



Outstanding issues : Sea level

✦ **S-104: Product specification writing (draft version)**

- Milestone 2017 : Product specification draft writing (draft version written)

https://www.iho.int/mtg_docs/com_wg/IHOTC/S-100_PS/S-104_Tidal_Information_for_Surface_Navigation_Product_Specification_Documents/S-104_Tidal_Information_for_Surface_Navigation_Product_Specification_Documents.htm

✦ **Progress**

- Under progress.
- Milestone 2018: dataset for tests
- Milestone 2019 - 2020 : Portrayal setup



Outstanding issues

✦ **Vertical Reference Frame**

- Increase information on IHB TWCWG web page. 2nd term of 2017.
- Required interaction with NSHC (IHO framework) and other programs

✦ **IHO representative at the IOC/GLOSS meeting**

- TWCWG attended GLOSS 2017-07 (USA and Brazil stakeholders)

✦ **NSHC meeting 2017-10-25**

- Participation of TWCWG (Fr stakeholder)



Future work programme

A	Maintain the list of standard tidal constituents (IHO Task 2.7.2.3)
B	Compare the tidal predictions generated as a result of analysis of a common data set using different analysis software
C	Develop, maintain and extend a Product Specification for digital tide and tidal current tables (IHO Task 2.7.3)
D	Develop, maintain and extend a Product Specification for the transmission of real-time tidal data (IHO Task 2.7.4)
E	Develop, maintain and extend a Product Specification for the transmission of real-time surface current data (S-111— IHO Task 2.13.3)
F	Develop, maintain and extend a Product Specification for dynamic surface currents in ECDIS (S-111) (IHO Task 2.13.4)
G	Develop, maintain and extend a Product specification for dynamic water level in ECDIS (S-104) (IHO Task 2.7.5)
H	Liaise with S-100WG on water level and current matters relevant to ECDIS applications
I	Liaise with industry experts on the development of product specifications for water level and currents
J	Prepare and maintain an inventory of water level gauges and current meters used by Member States and publish it on the IHO/TWCWG web site (IHO Task 2.7.2.4)
K	Review and maintain the Actual Tides and Currents On-Line links as published on the IHO TWCWG website
L	Maintain and extend the relevant IHO standards, specifications and publications as required (IHO Tasks 2.7.2 and 2.13.2)
M	Conduct the at least annual meetings of TWCWG and its sub-group(s) and project team(s) (IHO Tasks 2.7.1 and 2.13.1)
N	Develop and maintain material for course on Tides, Water Levels and Currents

D: Included in S-104 (Action G)

E: Included in S-111 (Action F)



Future work programme

Work item	Title	Priority H-high M-medium L-low	Next milestone	Start Date	End Date	Status P-planned O-ongoing C-completed S-Superseded	Contact Person(s)	Related Pubs / Standard	Remarks
A.1	Maintain the list of standard tidal constituents	M		-	Permanent	O	Chris Jones*		Review current list of published tidal constituents
B.1	Compare the tidal predictions generated as a result of analysis of a common data set using different analysis software.	M		-	Permanent	O	Hilde Sande Borck * All		Select Common data set Analyze using different software Predict common set of tides Compare results
C.1	Develop, maintain and extend the standard for digital tide and tidal current tables	H	Prepare final draft Standard	2009	2016 2017 2018	O	Peter Stone* Chris Jones Zarina Jayaswal		2009: first contact to identify requirements and define the need and ask for precision.
F.1	Develop and maintain a product specification for dynamic application of surface currents in ECDIS (S-111)	H		2013	2017 2018	O	Louis Maltais* Kurt Hess		Establish joint project teams as required. Liaise with S-100WG (see H.1) Liaise with industry experts (see I.1)



Future work programme

Work item	Title	Priority H-high M-medium L-low	Next milestone	Start Date	End Date	Status P-planned O-ongoing C-completed S-Superseded	Contact Person(s)	Remarks
G.1	Develop and maintain a product specification for dynamic application of water levels in ECDIS	H	Develop draft Product Specifications (S-104) for water level information for surface navigation in S-100.	2009	2017 2018 2019	O	Z. Jayaswal* G.Rowe J.Ko	Establish joint project teams as required. Liaise with S-100WG (see H.1) Liaise with industry experts (see I.1)
H.1	Liaise with S-100WG on water level and current matters relevant to ECDIS applications	H		-	Permanent	O	G. Jan K. Hess	Establish joint project teams as required.
I.1	Liaise with industry experts on the development of product specifications for water levels and currents	H		-	Permanent	O	All	
J.1	Maintain an inventory of water level gauges and current meters used by Member States and publish it on the IHO/TWCWG web site.	H		-	Permanent	O	D Wyatt* All	Initial inventory from TWCWG members available on IHO web site.



Future work programme

Work item	Title	Priority H-high M-medium L-low	Next milestone	Start Date	End Date	Status P-planned O-ongoing C-completed S-Superseded	Contact Person(s)	Remarks	Work item
K.1	Review and maintain the Actual Tides and Currents On-Line links as published on the IHO TWCWG website	L		-	P	O	D.Wyatt* All		
L.1	Maintain and extend the relevant IHO standards, specifications and publications	M		-	P	O	G. Jan	IHO Resolutions in M-3 S-60 User's Handbook on Datum Transformations involving WGS 84	See IHO CL10/2017 dated 1/02/2017
N.1	Develop and maintain material for CB course on Tides and Tide gauges	H	Complete translate of course material into French, Spanish and Portuguese by 2018 in liaison with Regional CB Coordinator requirements	-	P	O	R.Farre* P. Stone Z. Jayaswal G. Jan C. Borba		Adapt currently available course material to create a course suitable for delivery in support of CBSC requests





✦ Thank you

