6TH MEETING OF THE HYDROGRAPHIC SERVICES AND STANDARDS COMMITTEE
Hotel Marina Del Rey, Viña del Mar, Chile, 11-14 November 2014

Paper for Consideration by HSSC

Report of the Data Quality Working Group

Submitted by:	Chairman, Data Quality Working Group
Related Documents:	Any relevant documents and references to the extent that they are known to the originator.
Related Projects:	Any related projects that may impact upon considerations

Chair:	Chris Howlett, UK
Vice-Chair:	Antti Castren, Finland
Secretary:	Eivind Mong, Jeppesen
Member States:	Australia, Brazil, Canada, Denmark, Ecuador, Finland, France, Indonesia, Italy, Japan, Korea (Rep of), Netherlands, Norway, Slovenia, Turkey, UK, USA
Expert Contributor Organisations:	CARIS, Fugro-Pelagos, Jeppesen, University of Southern Mississippi, Warsash Maritime College
	see Annex A for full details

Meetings Held During Reporting Period
DQWG-8, Wollongong, NSW, Australia; 25-27 March, 2014.
DQWG-9, Poole, UK; 3-7 November, 2014.

Work Program
Since HSSC5 the principle activities have been:

DQWG-8
The 8th meeting of the DQWG took place in the offices of the Australian Hydrographic Service, Wollongong, between 25 and 27 March, 2014. This meeting was held in the same location and at the same time as the Tides and Water Level Working Group so our joint group could discuss matters relating to uncertainty and quality within tidal predictions. Of particular note here was a presentation to our joint groups by OMC International, a company who offer a real time under keel clearance (UKC) service to vessels entering/exiting ports where depths are marginal. This was related to the instruction to DQWG by HSSC 5 to work towards developing an UKC model that can be built in to S-101 ECDIS.

The creation of a true UKC model was discussed at length by the DQWG and it was concluded that this went further than an IHO generated model should go. It was accepted that such a model is the natural end point of data quality and tidal prediction matters (mariners essentially want to know where they can or can not go) but not all parts are in the gift of the IHO – vessel draft (both static and dynamic) will have a significant affect on the model and the modelling of how the dynamic draft varies with vessel loading, speed, water

depth and weather are very complex. This aspect was re-enforced by the OMC presentation where such aspects formed a major part of their modelling process.

Because of the inability of the IHO WGs to tackle the draft issue related to the UKC study the DQWG concluded that our work should be limited to actual data quality issues and how these are combined with dynamic tides, draft etc is best left to companies who could develop their own solutions. For Hydrographic Offices to perform this task would entail accepting liability and risk in areas where the core skills are not well developed.

Regarding the provision of data quality indicators on tidal predictions a discussion was held with the TWLWG. The DQWG members felt that the uncertainty value was only needed in the vertical sense (i.e. what is the probable error in height of a tidal prediction) such that this could be added into any UKC. The TWLWG members felt that uncertainty should be added to both vertical and time (to cater for those predictions which are correct in height but are out of phase). Further discussions will be needed on this to finalise how such uncertainties could be used.

A discussion also took place around how the individual data quality indicators should be combined to form a single, composite indicator that would drive the quality portrayal. A decision tree was drafted that would illustrate the effect each indicator would have on the final display. This work was not completed and has been carried forward to DQWG-9 which is being held in Poole November 3-7, 2014.

One conclusion from this work was that the long held view that the final data quality display should be a red, amber or green colour wash overlay was abandoned. It is still thought that a three colour wash overlay is the portrayal but the red, amber and green should be reserved for the final UKC display (no go, go with caution and can go) not for the data quality element.

Discussions continued on the theme of educating the mariner. The responses to IHO CL 51/2013 were available but had not been collated into the IHO standard text. The initial work on this was held over until DQWG-9 with the text to be completed by correspondence after this meeting. On a related topic, Leendert Dorst presented the work that he has done on collating a list of marine incidents related to data quality. This list is now available via the DQWG page on the IHO web site and will be maintained by the DQWG Vice Chair as new incidents happen or come to light.

The final day of DQWG-8 was a joint meeting between DQWG and DCEG. Progress with Data Quality elements were discussed and proposals made to move the work of DCEG forward. These will be discussed at DQWG-9.

Leendert Dorst (Vice Chair) resigned as vice chair due to his taking up a new role in the Netherlands HO. His role as Vice Chair was taken on by Antti Castren of the Finnish Maritime Agency.

Progress on HSSC Action Items

Good progress has been made in devising the decision tree and algorithm to be used to combine the individual data quality indicators into a single composite indicator that will drive the colour.

Also, the conclusion that the DQWG should restrict its activities to data quality maters and not expand this to the under keel clearance problem marks a major mile stone.

Problems Encountered

None.

Any Other Items of Note
None.

Conclusions and Recommended Actions
DQWG not to expand work to cover under keel clearance issues
The major conclusion from this years work has been that the DQWG should not expand its work to look at the under keel clearance problem. Indeed it is a recommendation of the group that the IHO does not do this either.

The standards devised by the IHO deal with the matters that are within the expertise of Hydrographic Offices namely charting, tides, surveying. Although all of these are critical to the under keel clearance issue the HOs do not generally possess expertise in the third, and equally important, aspect that is vessel draft. This is especially so when dynamic draft under different loading conditions and sea states can be significant.

With this deficit the DQWG concludes that to tackle the under keel clearance problem in its entirety would place additional liability on HOs and consequently the under keel solution should be left to private companies, using charting and surveying data quality matters provided n the ENCs by the HOs.

Data Quality Portrayal not to use Red Amber Green as the colour wash.
The portrayal of data quality should be achieved by a three colour wash overlay to the ENC. The actual colours used to depict data quality are yet to be determined but the long held view of red, amber, green has been abandoned as these three colours should be reserved for the Under Keel Clearance issue which DQWG is no longer intending to pursue.

Justification and Impacts
The DQWG needs to finish its work on developing the method of combining data quality indicators to a single composite indicator is required to allow the portrayal of this to be added into S-100 ENCs.

Action Required of HSSC
The HSSC is invited to:

a. endorse the DQWG report;
b. agree to the continuation of the DQWG work until the data quality portrayal is concluded.

Annex A to Appendix 2

Membership of Data Quality Working Group		
Member State	**Name**	**E-mail**
Australia	Mike PRINCE	mike.prince@defence.gov.au
Brazil	Adriano VIEIRA DE SOUZA Julierme GONÇALVES PINHEIRO	adriano.vieira@chm.mar.mil.br pinheiro@chm.mar.mil.br
Canada	Jon GRIFFIN	Jonathan.Griffin@dfo-mpo.gc.ca
Denmark	Berit HOLSE (Mrs)	bes@kms.dk
Ecuador	Carlos ZAPATA Cortes	sec-hidrografia@inocar.mil.ec carlosklever@hotmail.com
Finland	Antti CASTREN (Vice Chair)	antti.castren@fta.fi
France	Gaël MORVAN	gael.morvan@shom.fr
Indonesia	Capt SAMIYONO	infohid@dishidros.go.id samiyono@dishidros.go.id samiyono@yahoo.com
Italy	Carlo MARCHI	carlo.marchi@marina.difesa.it
Japan	Tetsuichiro YABUKI	chart@jodc.go.jp
Korea (Rep of)	Bong Seok PARK	bong1510@korea.kr
Netherlands	Rogier BROEKMAN	R.Broekman.01@mindef.nl
Norway	Kjetil WIRAK	kjetil.wirak@statkart.no
Slovenia	Igor KARNICNIK	igor.karnicnik@gis.si
Sweden	Kennet SWAHN (GUSTAFSSON) Ulf OLSSON	kennet.swahn@sjofartsverket.se ulf.olsson@sjofartsverket.se
Turkey	Eşref GÜNSAY	egunsay@shodb.gov.tr
United Kingdom	Chris HOWLETT (**Chair**) Sam HARPER	Chris.Howlett@ukho.gov.uk samuel.harper@ukho.gov.uk
USA	Sean LEGEER Brian HEAP	sean.legeer@noaa.gov brian.r.heap@nga.mil
IHB	Yves GUILLAM	adcs@iho.int

Observer Organisation	**Name**	**E-mail**
CARIS	Karen COVE	karen.cove@caris.com
Fugro-Pelagos	Don VENTURA	DVentura@fugro.com
Jeppesen	Eivind MONG (Secretary)	Eivind.Mong@jeppesen.com
University of S. Mississippi	David WELLS	David.Wells@usm.edu
Warsash Maritime College	Gordon MEADOW	Gordon.Meadow@solent.ac.uk

Contact	**Name**	**E-mail**
Australia	Jeff WOOTON	jeff.wootton@defence.gov.au
Netherlands	Jan APPLEMAN	jcp.appelman@gmail.com
USA	Shepard SMITH	shep.smith@noaa.gov

Annex B to Appendix 2

DQWG Proposed Work Plan - 2014 to 2015

1. Any remarks relevant to the understanding of the plan to be inserted in here.

A. Review ISO 19113, Geographic Information-Quality Principles, ISO 19114, Geographic Information-Quality Evaluation Procedures, and ISO 19115, Geographic Information - Metadata and propose relevant enhancements and amendments for incorporation in S-100 "IHO Universal Hydrographic Data Model" (IHO Task 2.5.2)

B. Monitor and further develop quality indicators for hydrographic data (IHO Task 2.5.2)

C. Maintain and extend as needed existing quality indicators in S-57 "IHO Transfer Standard for Digital Hydrographic Data", including the education of both the mariner and the cartographer, and the development of documentation (IHO Task 2.5.2)

D. Maintain and extend as needed the presentation of data quality, as provided in S-52 "Specifications for Chart Content and Display Aspects of ECDIS" and its Presentation Library (IHO Task 2.5.2)

E. Investigate ways of ensuring that ECDIS displays provide a clear warning or indication to the mariner on the quality of the underlying survey data, through appropriate use of the attribute CATZOC and/or improvement of the existing display capabilities (IHO Task 2.5.2)

F. Propose new data quality topics and other applications for consideration by HSSC (IHO Task 2.5.2)

G. Maintain and extend data quality related elements of S-100 "IHO Universal Hydrographic Data Model" (IHO Task 2.5.2)

H. Maintain and extend data quality related elements of S-101 "ENC Product Specification" and other S-100-based Product Specifications (IHO Task 2.5.2)

I. Conduct the annual meetings of DQWG (IHO Task 2.5.1)

Task	Work Item	Priority H-high M-medium L-low	Milestones	Start Date	End Date	Status P-planned O-ongoing C-Completed	Contact Person	Affected Pubs/Standard	Remarks
A1	Review ISO 19113, 19114, 19115 and 19157 and make recommendations for inclusion in S-100	M		2010	Permanent	O	DQWG	S-100	Ongoing task to keep S-100 data quality in line with ISO standards.
B.4	Develop the hierarchy approach by formalizing the hierarchy and the algorithm that drive the display	H	TSMAD28	2013	2014	O	Mike Prince	S-101	To be completed for submission to TSMAD28.

C.4	Investigate possible methods for how to educate practicing mariners on data quality issues.	H	DQWG9	2010	2015	O	DQWG		Investigate in liaison with training institutions the adequacy of existing HO's documentation on the quality aspects of the practical use of ENCs. IHO CL 51/2013 issued on this topic. To include recommendations of HSSC5-INF4, interface with IMO/HTW (Action HSSC5/45 refers).
E.1	Develop logic for indicators in current and proposed approaches.	H	DQWG9	2010	2014	O	Mike Prince		To be completed for submission to TSMAD28.
E.2	Demonstrate methods to mariners.	H	Follows S-100 demonstrator	2012	2014	O	DQWG	S-101	Build possible methods into ENC and ECDIS to demonstrate effectiveness.
E.3	Demonstrate methods to mariners	H	Follows E.1	2014	2015	P	C Howlett		Consider using Singapore Strait Marine Electronic Highways (MEH) project as a test case (Action HSSC5/47 refers)
F.1	Investigate areas of quality concern (other than survey/ bathymetry)	M	DQWG9	2010	Permanent	O	E Mong		SNPWG has responded, liaison on going.
H.1	Establish contact with other working groups to investigate scope of data quality items for the S-10x standards (e.g. TSMAD for S-102)	M		-	-	P			To specifically seek contact and collaboration with the TWLWG to include data quality elements into dynamic tide / water levels (Action HSSC5/46 refers)