

## Minutes of 14<sup>th</sup> DQWG Meeting

IHO Secretariat, Monaco (5-8 February 2019)

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### FINAL MINUTES

#### 1. OPENING AND ADMINISTRATIVE ARRANGEMENTS

The Chair opened the meeting and welcomed everyone to the 14<sup>th</sup> meeting of the Data Quality Working Group (DQWG) at the IHO Secretariat in Monaco. Apologies were received from Australia. This meeting is attended by Brazil, Canada, Denmark, Finland, France, Italy, Japan, Netherlands, Norway, UK, USA-NOAA, US-NGA, IHO Assistant Director for HSSC (*Guillam*), IHO Technical Standards Support Officer (*Wootton*). The IHO-Secretary General, IHO Director for HSSC and Assistant-Director for IRCC attended some parts of this meeting.

All members made a short introduction to the group. The IHO Director (*Kampfer*) reported the increasing need for marine data and marine knowledge. Another important item is the development of autonomous shipping. These goals require good Data Quality descriptions. IHO Assistant Director for IRCC (*Costa Nevez*) attended parts of this meeting for the interest of Data Quality in relation to Crowd Sourced Bathymetry and the usage of CATZOC in C-55. *Guillam* reported the requirement for Data Quality in relation to upcoming geo-spatial portals, MSDI and the developments within UN-GGIM.

The existing Terms of Reference were verified and the suggestion was made to request a small change to item 3.b.iii: Monitor periodically developments of ISO and other international standards regarding quality information, and advise ~~the S-100WG~~ accordingly; All members agreed to the suggested change. This will allow the DQWG to provide advice related to Data Quality as needed beyond the Product Specifications managed by the S-100WG. (ACTION **14/01**).

*Wootton* informed that S-101 Edition 2.0.0 is scheduled to be released by the end of 2020 and is intended to be used for sea-trials. Edition 3.0.0 is scheduled to be released by the end of 2022 for full operational implementation.

Chair gave a presentation of the program outline, describing the interaction between the DQWG and other HSSC WGs/PTs.

#### 2. MATTERS RELATING TO UPPER IHO BODIES

Chair presented the report made by the DQWG at HSSC-10 and the decisions and tasks assigned to the DQWG. There were no further comments from the members.

### 3. PREVIOUS DQWG MEETING AND STATUS OF ACTIONS

The minutes of the previous meeting were accepted without any change.

Status of actions:

12/06 -> overtaken by events. New action item: all members are invited to share test data for stacked Quality of Bathymetric Data. (ACTION 14/02)

12/12 -> FR will deliver this action item directly to the S-101PT, action can be closed.

13/04 -> completed.

13/13 -> completed.

13/06 -> no input received but discussed during the meeting, action completed.

13/07 -> rejected by the ENCWG, implemented in the S-101 DCEG, action completed.

13/08 -> all submitted national methodologies uploaded to website, action completed.

13/09 -> received and used during meeting, action completed.

13/10 -> will be included into Guidance to HOs, action overtaken by events.

13/11 -> completed.

13/12 -> work in progress. (ACTION 14/03)

13/14 -> Minimum Standard for Data Validation will be delivered in 2020, work in progress. (ACTION 14/04)

13/15 -> new portrayal concept will be developed, action overtaken by events.

13/16 -> not required, can be closed.

13/17 -> not required, can be closed.

13/18 -> work in progress. (ACTION 14/05)

13/19 -> Guidance to HOs will be drafted, action item overtaken by events, can be closed.

13/20 -> done during meeting, item can be closed. Is regular work item for DQWG.

13/21 -> completed.

13/22 -> completed.

13/23 -> none received, action item can be closed.

### 4. HARMONIZATION OF DATA QUALITY

Paper DQWG14-04A describes the cross relation between S-44 and S-101 bathymetric data quality. Many members provided input on their national policies as to how the quality of a single hydrographic survey is assigned the appropriate S-57 CATZOC value. Common items and exceptions between members were discussed. The following observations were made:

- Crowded Source Bathymetry Data is typically assigned CATZOC = D, sometimes CATZOC = C.<sup>1</sup>
- Satellite Derived Bathymetry is typically assigned CATZOC = C.
- LIDAR data is typically assigned CATZOC = B, one member sometimes assigns CATZOC = A2.
- Surveys from ports are usually assigned CATZOC = B, some port authorities provide CATZOC = A1, to be evaluated by the HO on a port-by-port basis.
- Some members do not downgrade CATZOC over time to account for temporal variation but instead provide M\_SREL data.

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<sup>1</sup> This subject was discussed at CSBWG7 where several HO's indicated to use CATZOC = C.

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When receiving a survey to be charted, each HO makes an assessment to convert the quality of the survey (labelled with an S-44 standard) to a meaningful CATZOC value. It was noted that in various standards (S-44, S-52, C-55 and S-4) different depth ranges are used:

- S-44: Cubic features > 2m in depths up to 40 m, 10% of depth beyond 40m.
- S-44: Areas shallower and deeper than 100m.
- S-52: Default safety depth is set at 30m, default safety contour is set at 30m.
- C-55: 200m
- S-4: According to S-4, the standard series of depth contour lines to be charted is: 0 (where tides are appreciable), 2, 5, 10, 20, 30, 50, 100, 200, 300, 400, 500, 1000, 2000m etc. The 2 and 5 m contours may be omitted where they serve no useful purpose. Supplementary contours at: 3, 8, 15, 25, 40 and 75m and multiples of 10 or 100m may be shown, if the available data permit, to delineate particular bathymetric features where soundings would otherwise be the only depth information over a large area, or for the benefit of particular categories of shipping.

Generalization (aggregation) of adjacent CATZOC areas from a large-scale chart to a small-scale chart was discussed. One member noted that in paper charts the source data diagram is usually 1/10<sup>th</sup> of the scale of the complete chart. Mariners tend to over zoom when using the ENC. In an ENC, the size of a CATZOC area can be a lot smaller than used in a source data diagram. Its current symbol is 17 mm wide, being too large to visualize small important areas with a higher CATZOC value, for example the final approach to a port. It was agreed that in general, CATZOC values should be assigned to the chart at the largest scale and smaller scale charts should inherit these values. When two CATZOC areas become too small, the lesser value of the two should be used when the areas merge. The minimum size of a CATZOC area should be the same minimal size of any DEPART that can be visualized in a chart on screen at the compilation scale. This will allow the visualization of CATZOC to, for example, a narrow approach channel to a port at the compilation scale. (Example: approach Houston port is 122m wide, compilation scale 1:25.000, symbol size 4.88 mm).

The discussion and findings were very useful input for the Guidance to HOs documentation.

## 5. DATA QUALITY CHECKLIST

S-97 - Part C, data quality was discussed and the comments from the S100WG were noted. Relative or internal accuracy seems to be missing. (ACTION **14/06**). There is a clear demand for graphical examples of the various Data Quality measures, mainly the Topological Consistency checks. The S-127 Product Specification (PS) has some good examples. (ACTION **14/07**).

In the introduction paragraph the sentence “anything specifically required for the specified product.” should be removed. The footnote on page 10 should be removed.

The outcome of the discussion will be provided to the S100WG. (ACTION **14/08**)

## 6. GUIDANCE ON DATA QUALITY ASPECTS

HSSC requests the DQWG to provide guidance on data quality aspects, in particular to ensure harmonized implementation (ToR objective). The provided papers were discussed and the following conclusions were drawn:

- A guidance document How to provide meaningful Quality of Bathymetric Data information in S-101 ENC's, is to be created;
- The decision tree should be described in text and associated graphical overview;
- This document should include a chapter describing the best practice to make an assessment from a survey to a Quality of Bathymetric Data value;
- This document should include a chapter on the aggregation of Quality of Bathymetric Data in relation to the compilation scale of the chart (small scale charts inherit their values from large scale charts);
- A separate document is to be created describing the convertor from S-57 (M\_QUAL/CATZOC) to S-101 (Quality of Bathymetric Data).

Vice Chair volunteered to draft the required documents. (ACTION **14/03**)

PRIMAR provided a paper showing an investigation of CATZOC compared in TSS involving more than one producing authority. DQWG noted this paper and it was suggested this paper to be discussed at the WENDWG-9. (ACTION **14/09**)

DQWG discussed the usage of a Source Data Diagram or CATZOC (ZOC) diagram in paper charts. No issues or recommendations were concluded at this time.

## 7. DATA VALIDATION IN S-1XX

DQWG received a request to review S-101, S-102 and S-127 for Data Quality aspects. These Product Specifications were checked against S-97 Part C - Data Quality. S-127 PS has a very clear relation of the data quality measures that are applied according to which part of the PS or the type of data quality measure according to S-97. There is also a very good example of the Validation Checks to be performed on this Product Specification.

S-101 has a good introduction paragraph. The Validation Checks will be developed by the Vice-Chair of the ENCWG. Advice has been given and the development will be continued in liaison with the ENCWG.

S-102 is unclear about horizontal and vertical uncertainty. These paragraphs are under discussion within the S-102PT. It is noted that the DQ measures for uncertainty are not in line with the 95% confidence interval used in S-44 and in S-101.

Feedback on these PS to be delivered to the appropriate WG. (ACTION **14/10**)

## 8. METHODOLOGY FOR THE DISPLAY OF QUALITY INFORMATION

The IHO-SG joined the meeting for this agenda item. Autonomous shipping is on the IMO agenda and navigation products have to be supportive to this development. There is a strong need to know the quality of the underlying information when decision making is done. The Chair introduced paper DQWG14-08C and the associated paper NCWG3-08.4A and the written response from the Australian Hydrographic Office. The papers were further discussed in depth on the next day during an interactive workshop. The following observations were made:

- A Data Quality Indicator is needed for Risk Management by the Mariner;
- A screen wide overview is needed for spatial awareness;
- Current CATZOC system and symbology are in use > 20 years, it is proven technology;
- Current CATZOC is (almost always) turned off during execution of the voyage;
- Current CATZOC symbols were developed when “simple” VGA monitors were the standard with low screen resolution, today's monitors can show more detail;
- The NCWG3-08.4A proposal symbology is not intuitive, it is not clear what the symbols mean when shown in isolation;
- The NCWG3-08.4A proposal is still cluttering the screen and likely to be turned off during voyage;
- The NCWG3-08.4A proposal to use a “safety corridor” as a check route functionally is welcomed;
- The DQWG14-08A proposal is usable for monitoring but lacks spatial awareness for planning;
- The DQWG14-08A proposal requires interaction of Quality of Bathymetric Data with other data elements of an ENC (e.g. isolated features hazardous to navigation);
- In current ECDIS systems, the Mariner has the option to set a Safety Depth (needed for under keel clearance) and XTD (needed to avoid isolated dangers hazardous to navigation);
- A new setting should be added: level of confidence;
- The Mariner can enter his required level of confidence, the combination of safety depth and level of confidence will compute a SAFETY ZONE around and under the vessel;
- Alarms (audible/visible) should be developed when the SAFETY ZONE is breached, both in planning and monitoring mode;
- It was recommended that in planning mode, a message that a planned route will not be saved where the SAFETY ZONE for the intended route contains any dangers to the vessel, unless over-ridden by the navigator, is displayed.
- In planning mode, a “show detail” option is to be developed, providing detailed information along the route where the SAFETY ZONE is breached;
- DQWG welcomes the recommendation from the Australian Hydrographic Office that HO's are encouraged the use of QUAPOS=3 or 4 in DEPCNTs within ZOC D (any depth) or ZOC C areas (depth =<30m).

Based on these findings, a new portrayal concept will be developed, reviewed by correspondence and forwarded to other HSSC WGs according to task HSSC10/47. (ACTION 14/11)

All DQWG members are invited to provide test data for this concept. (ACTION 14/12)

## **9. DATA QUALITY EDUCATIONAL MATERIAL FOR THE USE OF MARINERS**

S-67 draft v0.8 was discussed. Many comments have been received on the review by correspondence action. DQWG members agreed that the need for this official Standard is high, but in its current form has too many items included. It is a mixture of guidance to the Mariner on the CATZOC symbol, guidance to the HO and Under Keel Clearance Management. The decision was made to first draft the guidance to HOs document (ref agenda item 6), and then continue the writing on S-67 and confirming it is in line with definitions used in S-4. (ACTION 14/05)

The document for Standards for Watchkeepers from IMO was also mentioned. This will be verified against S-67. (ACTION 14/13)

## **10. RELATIONS WITH OTHER WORKING GROUPS**

*Costa Neves* introduced the paper from the MSDI WG Chair: Data integrity, marine boundaries from a MSDI perspective. DQWG is recommended to be aware about data integrity and using marine boundaries from a MSDI perspective is a good use case to illustrate the issues. The potential impacts and the need to provide means and mechanisms to protect the data integrity and assure the end user of the provenance of the data they are receiving should be considered further.

Data integrity was discussed at the DQWG14 meeting. On this occasion, the DQWG recommends that the process of SENC distribution that entered into force for certified\* (Norske Veritas procedure) value-added resellers for S-57 data should be considered (or re-considered) within the S-100 framework for S-100 based products.

Inform MSDIWG. (ACTION 14/14)

## **11. INTERNATIONAL STANDARDS FOR DATA QUALITY**

No international standards needed to be discussed at this time. Information was exchanged about EMODNET and INSPIRE. If the ToR amendment is accepted by HSSC, more subjects will be on the agenda for the next meeting.

## **12. HSSC-11**

It was agreed that S-67 should not be delivered to HSSC at this time. (DECISION 14/15)

### **Date and venue of the next meeting**

The Australian Hydrographic Office volunteered to host the next meeting. This proposal was discussed and all members agreed that having the meeting at the IHO Secretariat is very beneficial due to the transverse character of this WG and ability for various Secretariat staff and Professional staff to join (parts of) the meeting. DQWG-15 meeting is scheduled for the first week of February 2020 in Monaco.

## ANNEX A – Terms of Reference

Terms of Reference are available at:

[https://www.iho.int/mtg\\_docs/com\\_wg/TOR/DQWG\\_TOR\\_E\\_13Nov2017.pdf](https://www.iho.int/mtg_docs/com_wg/TOR/DQWG_TOR_E_13Nov2017.pdf)

## ANNEX B – List of Decision and Actions

### LIST OF DECISIONS & ACTIONS ARISING FROM DQWG14

Agenda item	Subject	Actions (in bold, action by)	Target Date/Event	Status (after DQWG-14)
1	Terms or Reference	Propose HSSC to amend the ToR to allow DQWG to monitor international standards and advice accordingly. <b>(14/01, Chair)</b>	HSSC-11	Planned
5	Data Quality Checklist	Check S-100 for the recommendation to use internal or relative accuracy. <b>(14/06, Chair)</b>	01 April	Planned
5	Data Quality Checklist	Provide graphical examples of the various Data Quality measures, mainly the Topological Consistency checks. <b>(14/07, Chair)</b>	15 December	Planned
5	Data Quality Checklist	Deliver the results of the review of S-97 Part C – Data Quality to the S100WG. <b>(14/08, Chair)</b>	01 April	Completed
6	Guidance to HOs	All members are invited to share test data for stacked Quality of Bathymetric Data. <b>(14/02, All)</b>	01 May	Planned
6	Guidance to HOs	Continue the draft guidance on data quality aspects, in particular to ensure harmonized implementation. Update the DQ model on the website accordingly. <b>(14/03, Vice-Chair)</b>	01 May	Work in Progress
6	Guidance to HOs	PRIMAR paper to be discussed at the WENDWG-9. <b>(14/09, Guillam)</b>	26 Feb	Completed
7	Data Validation in S-1xx	Continue the development of a Minimum Standard for Data Validation. <b>(14/04, Chair)</b>	2020	Work in Progress
7	Data Validation in S-1xx	Feedback on reviewed PS to be delivered to the appropriate WG. <b>(14/10, Chair)</b>	01 April	Completed
8	Methodology for the display of quality information	Continue the development of a portrayal concept, to be reviewed by all DQWG members by correspondence. <b>(14/11, Chair/All)</b>	15 March	Planned

Agenda item	Subject	Actions (in bold, action by)	Target Date/Event	Status (after DQWG-14)
8	Methodology for the display of quality information	All DQWG members are requested to provide test data for this concept. <b>(14/12, All)</b>	15 December	Planned
9	Data Quality Educational Material for the Use of Mariners	Continue the development of S-67, review by correspondence. <b>(14/05, Vice Chair/All)</b>	15 December	Work in Progress
9	Data Quality Educational Material for the Use of Mariners	Verify the document for Standard for Watchkeepers from IMO. <b>(14/13, Guillam / IT)</b>	01 May	Planned
9	Data Quality Educational Material for the Use of Mariners	Decision made not to deliver S-67 draft at HSSC-11. <b>(14/15, All)</b>	NA	Decision
10	Relations with other WGs	Inform MSDIWG on the subject of Data Integrity. <b>(14/14, Chair)</b>	21 February	Completed



## ANNEX C – DQWG Work Plan

### DQWG Tasks:

- A. Develop and maintain a data quality checklist for product specification developers.
- B. Periodically review S-100 based product specifications to ensure the data quality aspects have been taken into consideration and provide input papers for WGs and PTs consideration if deemed necessary.
- C. Monitor periodically developments of ISO and other international standards regarding quality information, and advise the S-100WG accordingly.
- D. Provide guidance on data quality aspects to hydrographic offices, in particular to ensure harmonized implementation.
- E. Provide data quality educational material for the use of mariners.
- F. Review appropriate methodology for the display of quality information to product specification developers.
- G. Propose new data quality topics for consideration by HSSC.

Task	Work Item	Priority H=High M=Medium L=Low	Milestones	Start Date	End Date	Status P=planned O=ongoing C=complete	Contact Person	Affected Pubs/ Standards	Remarks
A.1	Develop checklist on data quality components	H	HSSC11	2019	2019	C	R.Broekman	S-97 part C	None
A.2	Provide graphical examples of DQ measures	M	HSSC12	2019	2020	P	R.Broekman	S-97 part C	None
B.2	Development of a minimum standard for Data Validation in S-1xx based products	H	S-101 Ed.2.0.0	2019	2020	O	R.Broekman	S-1xx	Start with S-101
C.1	Review S-100 Section 4C	L	DQWG15	2017	2020	O	R.Broekman	S-97 part C	None
D.2	Provide guidance documentation how to populate CATZOC values	H	S-101PT4	2018	2019	O	S.Leger	S-101 DCEG	None
D.3	Provide guidance documentation on the transition from S-57 CATZOC to S-101 QoBD	M	S-101 Ed.2.0.0	2019	2020	P	S.Leger	S-101 DCEG	None
D.4	Collect best practice on how to assign ZOC from survey	M	HSSC11	2019	2020	C	S.Leger	S-101DCEG	Ref IHO CL50/2017
E.1	Submit edition 1.0.0 of S-67 for endorsement by HSSC	M	S-101 Ed.2.0.0	2018	2020	O	S.Leger	S-4, S-101	After task D2 and D3.
E.3	Consider a video version of S-67 when approved by MS	L	S-101 Ed.2.0.0	2020	2020	P	R.Broekman	S-4, S-101	After task E.1
F.1	Continue development of Portrayal of bathymetry quality in S-101	H	HSSC11	2017	2019	O	R.Broekman	S-101 DCEG	Autonomous shipping
F.2	Invite industry partners (ECDIS producers) and end users to get their input on methodology for the display of quality information	H	DQWG14	2018	2019	C	R.Broekman	S-101 DCEG	Overtaken by events