

Paper for Consideration by DQWG

Data quality indicators in S-102

Submitted by:	S102 PT
Executive Summary:	S-102 testbed has revealed the importance of offering informative and understandable quality indicators to the end user. This is an absolute requirement for the end user to have full confidence in the product. DQWG is asked to help specify such indicators and consider how they are to be accessible and displayed.
Related Documents:	S-102 Draft Product Specification 2.0.0
Related Projects:	

Introduction / Background

HSSC9 approved the new DQWG TORs. In accordance with the DQWG TOR objective (1.) and revised procedures (3a, 3b ii, 3b vi) S102 PT seek DQWGs assistance.

During the groups work on next edition of the S-102 product specification questions related to data quality has arisen.

PRIMAR, one of the PTs contributors, is running a S-102 testbed with different actors present like producers, software developers and end users. An important feedback from the end users is the importance of including quality indicators in the product. Being able to access and display quality information is regarded crucial for the credibility of the product.

Analysis/Discussion

S-57 uses the M_QUAL object CATZOC for encoding of data quality.

S-52 in turn uses the CATZOC information to portray the defined level of quality in ECDIS when this information is accessed by the end user.

S-44 defines different uncertainty variations, like total vertical uncertainty (TVU), total horizontal uncertainty (THU) and total propagated uncertainty (TPU). S-44 also defines orders (Special Order, Order 1a, Order 1b and Order 2) to classify surveys acceptable for different needs.

CATZOC, uncertainty and order are examples of quality indicators.

S-102 has uncertainty defined as one of its features. The S-102 product specification also list different codes (values) defining how to determine uncertainty (table 5):

Value	Definition
Unknown	"Unknown" - The uncertainty layer is an unknown type
Raw_Std_Dev	"Raw Standard Deviation" - Raw standard deviation of soundings that contributed to the node.
CUBE_Std_Dev	Dev "CUBE Standard Deviation" - Standard deviation of soundings captured by a CUBE hypothesis (i.e., CUBE's standard output of uncertainty)
Product_Uncert	"Product Uncertainty" - NOAA standard product uncertainty V1.0 (a blend of CUBE uncertainty and other measures).
Historical_Std_Dev	"Historical Standard Deviation" – Estimated standard deviation based on historical/archive data.

According to S-44, uncertainty is defined as: “a statistical assessment of the likely magnitude of an error”. However, how could this be used as a quality indicator made understandable for the end user? An uncertainty grid displayed as a surface may not be neither especially intuitive nor informative.

Loss of quality can be found several places in a data production and display process. For starters, loss of quality can be defined already during survey due to conditions in survey equipment and survey surrounding

circumstances. As for S-102 production, a further impact on quality happens when calculations are done defining a grid square elevation value based on several depths from source data covering this square. For this operation several different algorithms can be used.

Loss of quality when data are displayed must also be considered. During display in ECDIS, are factors like screen resolutions, colours or display priorities crucial for quality?

Also, if S-102 data are used as basis for terrain models and 3D applications there need to be a standardized way to encode loss of quality due to such model calculations. It is important to consider the products primary and secondary purpose when searching for quality indicators. For instance, when a product is for navigation, other quality indicators may be necessary than if the product is meant for non-navigation purposes.

Taken into consideration interoperability between S-100 products, display settings and priorities must be considered. In that sense, a consideration may also be necessary with regards to whether the proposed action HSSC9/35 (Proposal for portrayal of Bathymetry Quality in S-101) needs to be considered or not when trying to define quality indicators for S-102.

Conclusions

For end users to have confidence in S-102 there needs to be defined quality indicators. It is important to consider the full process from surveying – via production – to end use and display of data when searching for quality indicators and display solutions. The data purpose – primary or secondary – must also be taken into consideration.

Action Required of DQWG

The DQWG is invited to:

Note this paper and provide advice on the discussed data quality aspects to S-102 PT accordingly.