



19th Meeting of the Data Quality Working Group

MASS and DQ

Agenda Item 8.1A

DQWG-19, VTC Event, 25- 26 March 2024



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MASSPT has met once since DQWG18.

MASSPT6 has held at February 27-28, 2024, and has decided to request HSSC's approval to transform the project team into a working group.

It is noted that several MASS requirements has been identified In MASSPT4 during the gap analysis.

Some of these MASS requirements are as follow:



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- MASS will require the natural language data in publications, charts (pick reports) and MSI to be made machine readable and interpretable. Natural language is difficult for machines to read and interpret, we need to move to a feature and attribute model for all aspects of data for MASS. This will also need to cover meta data for the actual data.
- MASS will require more frequent or real-time updates of the data contained in the S-100 products, which should be pushed from official sources that the vessels can ‘listen’ out for and update their navigational database and products automatically irrespective of where they are in the world. Event driven data updates and near real time updates will be required for MASS as MASS will always need to be up to date.



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- The communication infrastructure necessary to sustain data exchange is not reliable and affordable today. Thought needs to be given to data packets sizes for data and updates for MASS.
- MASS will require full bathymetric coverage datasets/DTM, gaps in data will pose a problem for MASS.
- To avoid large volumes of bathymetric data (i.e. S-102 gridded data), there is a need for conspicuous seabed features to be highlighted (such as sea mounts, obstacle or trenches) for use with Inertial Navigation Systems in GNSS denied environments. Similar to land based visually conspicuous objects captured in ENC's today.



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- MASS will require certainty of seabed and associated features. High resolution data is great, but if it changes regularly, then that needs to be made clear and articulated in some way (example Humber estuary). Understanding when highly mobile seabed was last surveyed will also be important.
- MASS will require certainty of tidal heights and surface currents at a given point and time, particularly in congested water space and shallower waters. Bramble bank in UK was used as an example, being shoalier by 0.5m could lead to a grounding. Predicted and forecast tidal height and surface currents are essential but certainty factors surrounding the predictive nature is important for decision making and risk profiling a route for MASS.
- MASS will require real time tidal data which is crucial in shallower waters.



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- MASS will require more geographical polygons to describe areas (such as speed restriction and constraints), with suitable attribution for MASS to interrogate and act appropriately. This information is often captured in text boxes, Sailing Directions or Pick Reports in natural language with very little geographic descriptors, making it impossible for MASS to interrogate, read and act upon. These could be created as instructional layers which are geographically location based containing attribution such as name of feature, type of feature, unique number, reason for speed restriction or constraint etc. in a machine readable format.



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- MASS will require more visually and radar conspicuous items required for alternate means of position fixing using computer vision techniques. Also a measure of certainty of the features position would be required. Features to include could be (but not limited to) Coastal terrain, Navigation marks, Harbor Approaches, Dock/quay walls, Major buildings or landmarks, Bridges and other man made structures, extending out over the water.

Whilst these features are modelled in S-101, work needs to be done to model the uncertainty of positions. Recommendation is that attribution is added to these features to model the certainty/uncertainty of the features position.



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- MASS will need to understand the drift of Buoys, the length of chain and tidal range can mean Buoys could be several meters out of position, humans can understand this MASS will need to know that a Buoy may have a tolerance of position if they are using them for navigation purposes.



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Application of DQ evaluation in MASS Domain

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- like manned ships, MASS is a kind of the users of S-100 data sets. It is necessary to use data quality elements to evaluate the usability of a S-100 data set based on the requirements of MASS before making a decision to use it on MASS.
- Evaluation of data set conformance to MASS requirements: Data Quality evaluation procedures may be used to establish if a data set meets the conformance quality levels specified in MASS requirements. Indirect as well as direct methods may be used in analyses of data set conformance to user requirements.



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- The process flow which may be used to evaluate the usability of a S-100 data set on MASS are as follows:
 - Specify the MASS requirements related to DQ;
 - Specify data quality measures;
 - Specify data quality evaluation procedures;
 - Conduct the evaluation;
 - Report the results of evaluation to help decision-making.



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- Some of content of evaluation are as follows:
- Evaluate whether the update frequency of a S-100 dataset can meet the requirements of MASS, for example, S-104 dataset;
- Evaluate whether important information in an S-100 product is machine readable;
- Evaluate whether the size of an exchange set or update file is within an acceptable range ;
- Evaluate whether a significant element of a S-100 dataset is missing;



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- Evaluate whether full bathymetric coverage of important water areas has been achieved;
- Evaluate whether the QoBD (Quality of Bathymetric Data) of important water areas meets the requirements of MASS;
- Evaluate whether falls within the time interval required by MASS;
- Evaluate whether there are precise geographical coordinates of important features.



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ACTIONS

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The DQWG is requested to:

a.Note the information provided;

b.Establish a subWG to discuss this issues with MASSWG and draft a guideline document to explain how to implement this kind of DQ evaluation from a MASS user's perspective.