IHO MASS PT S100 Gap Analysis

Member State/Organization	United Kingdom – UK Hydrographic Office
S100 Standard Reviewed	S101
Maturity of Standard	Currently at V1.0 but moving to V1.1.0 at end of year, still in test and development phase
S100 Standard Chair	Tom Richardson

Issue/Requirement (take from Spreadsheet)	**Issue addressed?**	**More cnontent?**	**Gap in standard?**	**Potential Solution/s**	**Ease to implement?**
MASS will require fairways to be captured as polygons and features in their own right.	✓	✓	☐		Choose an item.
Mass will require canal locks to be captured with relevant attribution, such as width of lock.	✓	✓	☐		Choose an item.
MASS will require port areas/limits to be captured as polygons with relevant attribution.	✓	☐	☐		Choose an item.
MASS will require VTS areas to be captured as polygons with relevant attribution.	✓	☐	☐		Choose an item.
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	☐	☐	✓	Analysis of S-101 has identified that 22 text attributes remain. This is a reduction from S-57 due to improve modelling, but analysis of these attributes should be	Choose an item.

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.				done to understand which would affect MASS. A list of these has been added at the end of this document. Some text attributes are used across many features and as S-101 data emerges it would be useful to conduct analysis of these "generic" attributes to identify changes that could be made to S-101. See Annex A below	
MASS will require more frequent or real-time updates of the data contained in the S100 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.	✓	☐	☐		Choose an item.
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.	✓	☐	☐		Choose an item.

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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 Harbour 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 S101, 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.	Easy
Cross referencing of features contained in multiple standards e.g restriction area where S101 will have the feature and speed restriction but S127 will also have the feature but additional attribution maybe included in the S127 feature	☐	☐	✓	Recommendation is that features should have some form of link, whether this is Marine Resource Name (unique ID) or some form of foreign key that links the features to allow systems to link features and get the additional attribution.	Moderately
MASS will require areas defined by buoys such as the edge of a channel captured as polygons. Humans can make the relationship between the buoys and a channel, machines can not. This will allow MASS to plan paths and obey the rules.	✓	☐			Choose an item.

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MASS will require unique identifiers for features which could be another means of position fixing. As an example charts may show an area of 'mooring posts' but not define how many or where, this information would overload a human readable chart. If, however they were identified with unique ID numbers and positions in a machine-readable format they would be a highly accurate method of the MASS in verifying its position, progress against goals and navigational status.	☐	☐	✓	Consider Marine Resource Names attribute for certain features such as conspicuous features.	Easy
MASS will need to know when restricted water space is active or inactive for example military exercise areas or firing ranges. When inactive it is perfectly safe to traverse these but not when active. Another example could be Fish farms and understanding when they need to be given a wider berth if it is breeding season etc.	✓	☐	☐	However, the cross-referencing issue above needs to come into play.	Choose an item.
MASS need to be aware of and go through Traffic Separation Schemes, but today there is no way for a Degree 4 MASS to know that a TSS exists. A method of identifying TSS and then transitioning towards it and through it safely will be crucial.	☐	☐	✓	Recommendation is to add augmented geometry to the TSS features which acts as a virtual buffer that MASS can use when it intercepts the buffer and route to and through appropriately.	Moderately

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MASS will need to know where reporting points or areas are geographically. As an example knowing at what point to contact Falmouth Coastguard to say whether you were passing between UK mainland and the Isles of Scilly or not.	☐	☐	✓	Although not explicitly an S101 issue, it is another case for cross referencing as S101 will have reporting points as features, but S123 will have more detail.	Moderately
MASS requires more land based topographical data such as contours for visual reference.	✓	✓	☐		Choose an item.
Light sectors can sometimes be blocked by land mass or other features. MASS will need some method of determining line of sight, maybe having attribution that determines visibility in degrees.	✓	☐	☐		Choose an item.
MASS will need to understand the drift of Buoys, the length of chain and tidal range can mean Buoys could be several metres 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.	☐	☐	✓	Recommend adding a tolerance value on buoy's position to cater for drift, length of chain etc	Easy
MASS will need the accurate fully resolution detail of wrecks. Today we generalise wreck features at certain scales, but MASS needs the rich detail, particularly in shallower waters. One	✓	✓	☐		Choose an item.

of the main reasons given is that wrecks are often fishing locations and discarded nets are a hazard to smaller MASS. This raises the scaleless data question, scale is for human readers of data, machines don't care about scale or generalisation.					
MASS need to have richer detail on offshore infrastructure, for example is the feature still in use, is it being decommissioned, how high off the seabed is it etc. This requirement also exists for Wind Farms.	✓	☐	☐		Choose an item.

Annex A

S-101 Text Fields (Edition 1.0.2) Feature Catalogue 20220413

Attribute	**Potential Solution**
callSign	It is appropriate for this to remain natural language.
communicationChannel	This is Ok as long as the formatting suggested in the standard is used. Confirm validation rules confirm this formatting is used.
destination	It is appropriate for this to remain natural language. MRN will link this to S-127 and other S-100 standards.
ReferenceLocation	It is appropriate for this to remain natural language. Could consider use of UNLOCODE either to replace

	ReferenceLocation or as an additional attribute.
mMSICode	It is appropriate for this to remain natural language. Validation checks should ensure this is 9 digits as per standard.
nationality	It is appropriate for this to remain natural language. Validation checks should ensure this valid ISO 3166 code.
pictorialRepresentation	No concern at this point, we need to understand the scale of usage and some examples and test how MASS will use this data.
radarBand	Consider changing to enumeration value to be either X or S.
regulationCitation	It is appropriate for this to remain natural language.
SignalGroup	It is appropriate for this to remain natural language. Validation checks should ensure it meets format structure as outlined in the standard.
sectorCharacteristics	It is appropriate for this to remain natural language (probably an edge case).
shapeInformation	It is appropriate for this to remain natural language (probably an edge case).
Source	It is appropriate for this to remain natural language.
stationName	It is appropriate for this to remain natural language.
surveyAuthority	It is appropriate for this to remain natural language.
updateDescription	Not relevant for MASS. It is appropriate for this to remain natural language.

vesselClass	It is appropriate for this to remain natural language. MRN will link this to S-127 and other S-100 standards.
information	We need to analyse how many of these will exist in the real data once used. It may become a redundant feature or used very little and have no application for MASS.
featureName	It is appropriate for this to remain natural language. Could consider use of UNLOCODE either to replace featureName or as an additional attribute.