TSMAD 25-4.6.1A

Paper for Consideration by TSMAD and DIPWG

Attributes to Simplify Portrayal in S-101

Submitted by:	S-101 Work Item Leader and UKHO
Executive Summary:	This paper identifies cases where the addition of attributes currently calculated as part of S-52 portrayal could be added to the S-101 Feature Catalogue in order to simplify portrayal for S-101.
Related Documents:	1. S-101 DCEG
Related Projects:	1. S-101

Introduction / Background

1. The Data Classification and Encoding Guide (DCEG) sub group has been developing an improved data model for S-101, addressing limitations of S-57 and expanding it using the new constructs defined in S-100. Although some of the changes should simplify portrayal there are some specific cases where adding attribution to S-101 features could reduce the complexity of portrayal. This paper discusses the justification and practicality of this. It goes on to suggest a number of new attributes to address this in S-101.

2. One of the actions from the joint TSMAD24/DIPWG4 meeting was for DIPWG members to undertake a review of the existing conditional symbology procedures (CSP) in S-52 and see if they can be reduced. One of the review tasks was as follows:

- Any new S-101 feature objects, attributes or attribute values that could enable eliminating or simplifying the CSP.

3. In addition, an ECDIS workshop and S-100 portrayal meeting was held in October 2012 and one of the clear messages from OEMs was that CSPs must be reduced and that there were some relatively easy solutions to reduce a few of the more complex CSPs with the introduction of a new feature or a new attribute. This paper will propose the following:

Item	Feature/Attribute	Affected CSP	Included in Aug 12 DCEG
Least_Depth or Safe Clearance Depth	Attribute	DEPVAL02	
Surrounding Minimum Depth	Attribute	UDWHAZ04	
Light Description	Attribute	LITDSN01	
Sector Extension	Attribute	LIGHTS05	
Flare Rotation	Attribute	LIGHTS05	

The following features have already been added to the S-101 DCEG and should be taken into consideration by DIPWG when putting the portrayal catalogue together.

Item	Feature/Attribute	Affected CSP	Included in Aug 12 DCEG
Topmark	Complex Attribute	TOPMAR01	Y
Major Light	Attribute	Currently based on range (DA ??)	Y
Multisectored	Feature	LIGHTS05	Y

Light			
All Round/Single Sectored Light	Feature	LIGHTS05	Y
Directional Light	Feature	LIGHTS05	Y
Fog Light	Feature	LIGHTS05	Y
Air Obstruction Light	Feature	LIGHTS05	Y

4. At TSMAD24/DIPWG4, the UKHO submitted a paper (10.8A) that identified cases where the addition of attributes will help simplify portrayal. At that meeting, the group noted the paper and agreed that there were instances that would help simplify portrayal. However, TSMAD did not agree to the addition of these new attributes as DIPWG was also about to undertake a full CSP review. Now that this review is completed, TSMAD is at the appropriate point to reconsider these new items.

Analysis/Discussion

5. In the S-52 Presentation Library the conditional symbology procedures enable ECDIS to process the more complex display rules. In many cases these rules are required to process mariner provided input (such as safety contour depth) that is used to determine the portrayal of certain objects. However, some of the complexity of conditional symbology procedures simply determines values, which could be defined within the ENC dataset. For example, wrecks, obstructions and rocks without the VALSOU defined will require the DEPVAL02 CSP to query its underlying depth area to obtain a least depth, in addition, to calling several other CSPs. The following table shows two CSPs: WRECKS04 and OBSTRN06 and the embedded CSPs that are called from within, and the reasoning behind the CSP.

CSP	Reason for CSP	Features Affected	Sub CSP called	Reason for sub CSP call
WRECKS04	Wrecks of depths less than the safety contour which lie within the safe waters defined by the safety contour to be displayed as isolated danger	Wrecks	DEPVAL02	Determines the “least_depth” and “seabed_ depth” of the feature if there is no VALSOU
			UDWHAZ04	Helps determine if a feature is an isolated danger or not by calculating if the minimum depth value is less than or equal to the safety contour set by the mariner. It also determines then if an isolated danger symbol is required
			QUAPNT02	Checks whether the mariner has requested that the Low Accuracy symbol is to be shown, retrieves any QUOAPOS attributes and returns the appropriate symbols
OBSTRN06	Obstructions or isolated dangers of depths less than the safety contour which lie within the safe waters defined by the safety contour to be displayed as isolated danger	OBSTRN UWTROC	DEPVAL02	Determines the “least_depth” of the feature if there is no VALSOU
			UDWHAZ04	Helps determine if a feature is an isolated danger or not by calculating if the minimum depth value is less than or equal to the safety contour set by the mariner. It also determines then if an isolated danger symbol is required
			QUAPNT02	Checks whether the mariner has requested that the Low Accuracy symbol is to be shown, retrieves any QUOAPOS attributes and returns the appropriate symbols

6. From the table above there are several areas where the CSP can be simplified or eliminated by adding new attributes on the data. One area where conditional symbology could be simplified is where the underlying depth of underwater hazard features needs to be calculated. As the DEPVAL02 procedure is not dependant on user input contextual information, a least depth or safe clearance depth could instead be provided as an attribute in the ENC data. This could be achieved by adding a simple attribute to the appropriate features. This approach could also be used to replace the Exposition of sounding on these features. For example, where VALSOU is not known but a least depth can be estimated a value could be entered by the producer overriding the default value. This approach would require the new attribute to be conditionally mandatory if VALSOU is not populated and be enforced through validation checks.

7. This new attribute, could be automated using the logic that is in the DEPVAL02 CSP where the "least_depth" and put in place by the production systems, or it could have a user override and the hydrographic office could put in place its own logic for populating this attribute.

Proposal 1:

- Add a new attribute least depth or safe clearance depth to Obstruction, Underwater rock and Wrecks features.
- The attribute must be conditionally mandatory based on the population of VALSOU.
- TSMAD needs to determine if the production software should automatically populate it based on the CSP logic or allow for a manual override.
- S-58 checks must ensure the attribute is populated.
- As a consequence the DEPVAL02 CSP can be deleted for S-101 Portrayal and the following CSPs can be simplified by DIPWG:
    - OBSTRN06
    - WRECKS04
    - UWHAZ04

NOTE1: The S-57 to S-101 convertor must also make this calculation

8. If TSMAD agrees in principal to this inclusion, then a small subgroup must be formed to develop the specific details of the proposal. Including the name of the feature, the logic that needs to be implemented, where in S-101 should it be placed and the S-58 check.

Proposal 2:

9. Another area where a CSP can either be eliminated or reduced is by adding in a new attribute "maximum surrounding depth". This calculation is performed as part of the UWHAZ04 CSP. The reason this is value is needed is so that portrayal knows if the water surrounding the ship is navigable per the ships parameters. For example, the mariner only wants to know if there are Isolated Dangers in the area of water that their ship can navigate in, they don't really care about the isolated dangers in water that is non-navigable. By automatically populating a new attribute maximum surrounding depth – this would enable to portrayal to be simplified in that it does not have to make that calculation.

- Add a new attribute "maximum surrounding depth" to Obstructions and Underwater Rocks features.
- The attribute must be mandatory and calculated by the production software
- S-58 Checks must ensure that the attribute is populated.

- The existing logic should be examined to see if it should be used for the automatic calculation. Currently it looks to see if DRVAL1 is greater than or equal to the value of the safety contour. However, it has been pointed out that perhaps the logic should be looking at DRVAL2. For example, given a vessel with a 12M draft, the vessel could be in a depth area that ranges from 10-15 as long as it is in the deeper portion of the area.
- As a consequence, the UWHAZ04 CSP can be simplified by DIPWG.

10. If TSMAD agrees in principal to this inclusion, then a small subgroup must be formed to develop the specific details of the proposal. Including the name of the feature, the logic that needs to be implemented, where in S-101 should it be placed and the S-58 check.

Proposal 3:

11. Another area where conditional symbology could be simplified is if the production systems could automatically populate a new attribute for Light Descriptions within the ENC. The string would be formed using the same procedure as in the CSP and utilizes the following attributes: CATLIT, COLOUR, HEIGHT, LITCHR, SIGGRP, SIGPER, STATUS, VLNMR.

- Add a new attribute to the lights features called light description.
- As a consequence the LITDSN01 CSP can be deleted for S-101 Portrayal.

NOTE: This attribute will be in the feature catalogue, but not in the DCEG. This attribute must be populated by the production software based on the rules in the CSP. This guidance must be added to the S-101 Implementation Annex.

NOTE2: The S-57 to S-101 convertor must also make this calculation

Proposal 4:

- Add a new simple attribute to selected Lights features in S-101 named sector extension as an integer value. In S-101 portrayal the value would be used to extend by the default distance where sectors overlap. The integer value would reflect the screen distance in mm's. The resolution would be to 1mm.
- The relevant part of the LIGHTS05 conditional symbology procedure can be omitted within S-101 Portrayal.

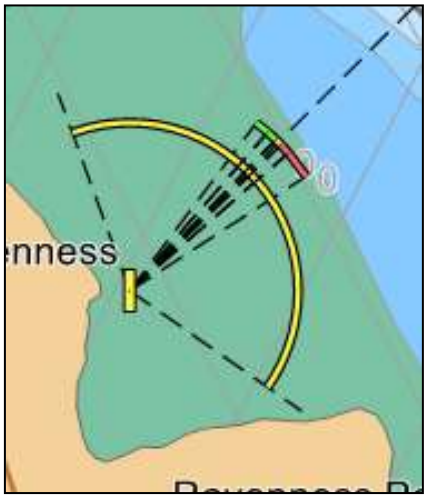

Figure 1 – Example of light sectors being extended based on the CSP LIGHTS05

8. The example shown in figure 1 results from the Lights05 CSP within S-52, the relevant CSP extract is shown in figure 2

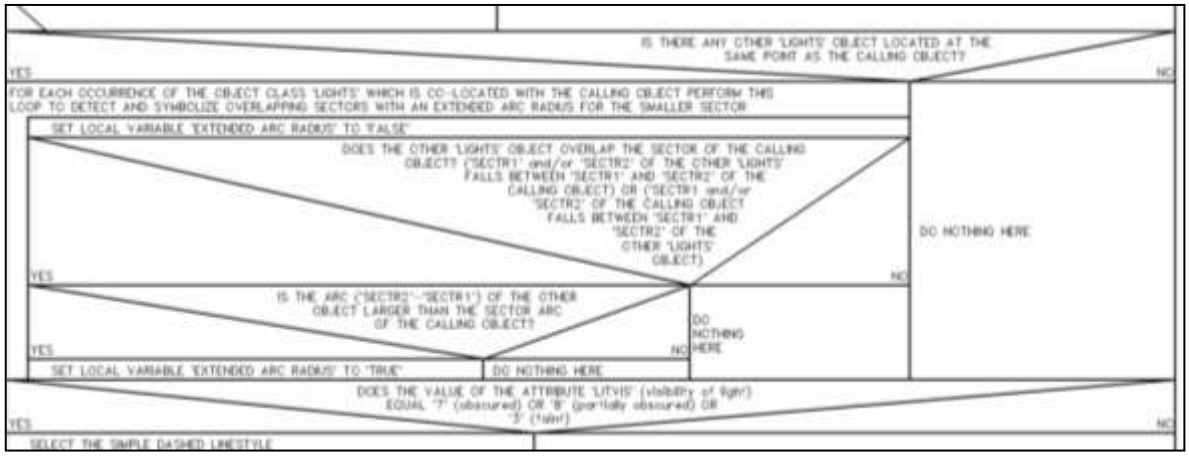

Figure 2 – Excerpt of LIGHTS05 CSP showing logic for extending sector arcs where overlaps exist.

Proposal 5:

- Add an integer attribute value for flare rotation. This value avoids the need to determine coincident lights and amend flare rotation within portrayal logic.
- The relevant part of the LIGHTS05 conditional symbology procedure can be omitted within S-101 Portrayal.

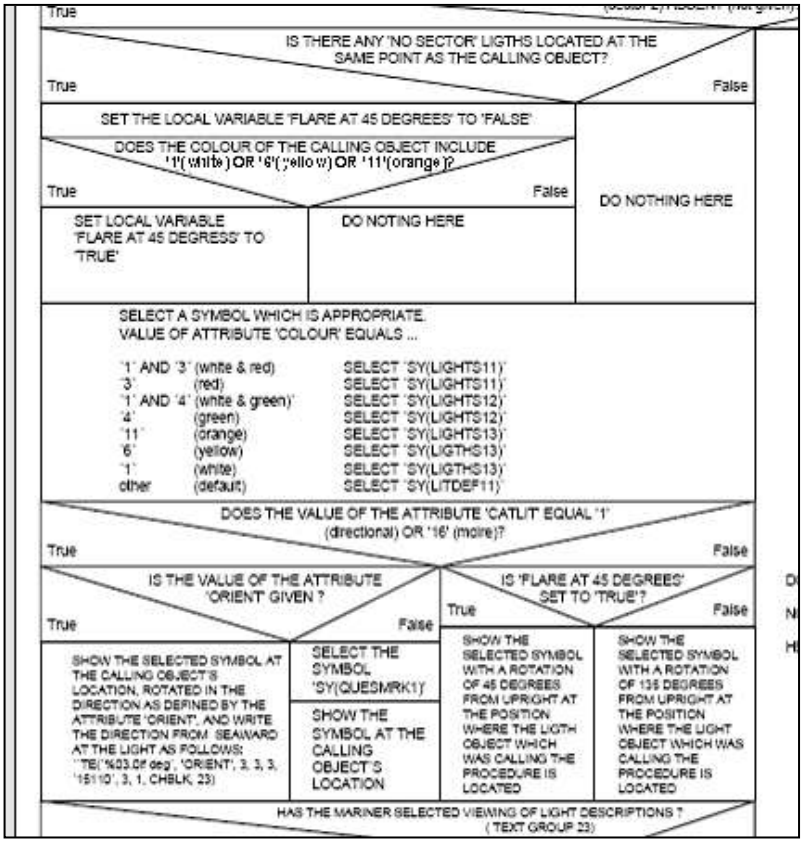

Figure – 3 excerpt of LIGHTS05 CSP showing elements which determine coincident lights and amend flare rotation accordingly.

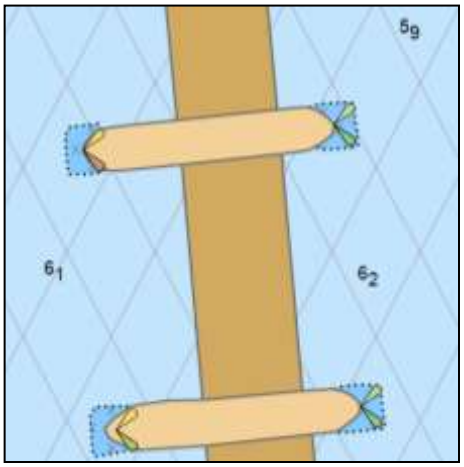

Figure 4 – Example of rotated light flares where coincident lights exist.

Justification and Impacts

9. As the values of the proposed attributes are currently calculated within ECDIS it is more efficient to calculate them within production software. This reduces processing effort for ECDIS and avoids variability. S-101 will provide a machine readable portrayal catalogue. In order to do so, the S-52 CSPs need to be either eliminated through additional attribution within the data or the logic adapted into a defined structure.

10. Due to the nature of some of the CSPs, the more elegant solution is to create additional attributes in the data to handle these same functions that were handled by the ECDIS. The fourattributes that are proposed in this paper will support achieving this goal.

Conclusion

11. These proposals in this paper are in support of the DIPWG CSP review process and will enable attributes that had to be calculated the SENC conversion process to be off-loaded to the production systems it will help reduce the complexity of portrayal by eliminating the need for several CSPs. In addition, as these values are calculated by the system, there would be no additional burden on encoders.

Action Required of TSMAD

- Approve the creation new attribute for Least Depth/Safe Clearance Depth
- Approve the creation attribute for “maximum clearance depth”
- Assign a task group to examine the underlying logic needed for the two above attributes and provide recommendations to TSMAD26/DIPWG4
- Approve the new attribute for Light description
- Approve the new simple attribute for Flare rotation
- Approve the new simple attribute for Sector extension
- Note the need for this to be done during the S-57 to S-101 conversion process
- Note the need for possible S-58 checks