Paper for Consideration by TMS5

S-100 open issues based on experience from prototype S-10x viewer

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Executive Summary:	This paper is about experience gained with feasibility study prototype developed by Furuno Finland Target of this paper is to list still open issue of the S-100/S-101/S-124 for development of an ECDIS based on S-101 ENC charts and being capable to overlay other S-10X products
Related Documents:	
Related Projects:	S-100, S-101

Introduction / Background

1. This is the first time we report hands on experience from our internal S-101 viewer prototype. Target of our internal prototype has been to gain own experience about implementation of S-100, S-101 and S-124.

2. Our company is an ECDIS manufacturer so our focus is in viewer part and not in production of data sets. Therefore we have waited that others provide "ready to test machine readable material" instead of us trying to "cook" such material ourselves (for example using S-57 to S-101 converters + manual editing, etc.). As test material we have used IHO S-101 test data posted by Tony Pharaoh on 26th Jun 2015, S-101 test material created by DMA (Denmark) for EfficienSea2 project (same charts available both in S-57 and S-101) and S-124 test material created by DMA (Denmark) & SMA (Sweden) for STM validation project.

3. The base of our prototype has been our S-57/S-52/S-63 based ECDIS which we have extended to handle machine readable material from S-100, S-101 and S-124. Some features, for example HMI selectors and alerts & indications, missing from the machine readable parts of S-100 has been as hardcoded for S-57/S-52 purposes.

4. The encoding of S-101 test material was based on ISO 8211 and the encoding of S-124 test material was based on GML.

5. For portrayal of S-101 we implemented the XSLT based method specified in Ed 2.0.0 of S-100. For portrayal of S-124 we could not use S-100 based methods (because of no available portrayal material). For S-124 we used printed symbol instructions from IEC 62288 Ed2 for MSI (Maritime Safety Information) which we manually encoded into the traditional S-52 DAI-file format.

Observations

6. We have seen similar S-101 portrayal mistakes as reported by SPAWAR and KHOA from their testbeds in 2016 and 2017 meetings of S-100WG. The nature of mistakes has been such as wrong colour token, missing specification of a colour token, wrong symbol shape reference, etc. in the portrayal catalogue will be fixed. Annex A include a few examples.

7. Main observations reported in this paper focus on the still open issue of the S-10x concept itself. Figure 1 shows our generic understanding of an S-100 based ECDIS which would be capable to implement all features required to pass type approval as an IMO carriage requirement compliant ECDIS. The figure can serve as basis of getting mutual understanding by IMO member states, manufacturers and data providers what is actually inside an fully IMO compliant ECDIS. The figure indicates which parts should be available machine readable based on the S-100 or S-10x standards, which parts are implemented by the manufacturer as part of their ECDIS design process and .which parts are controlled or observed by the end users.

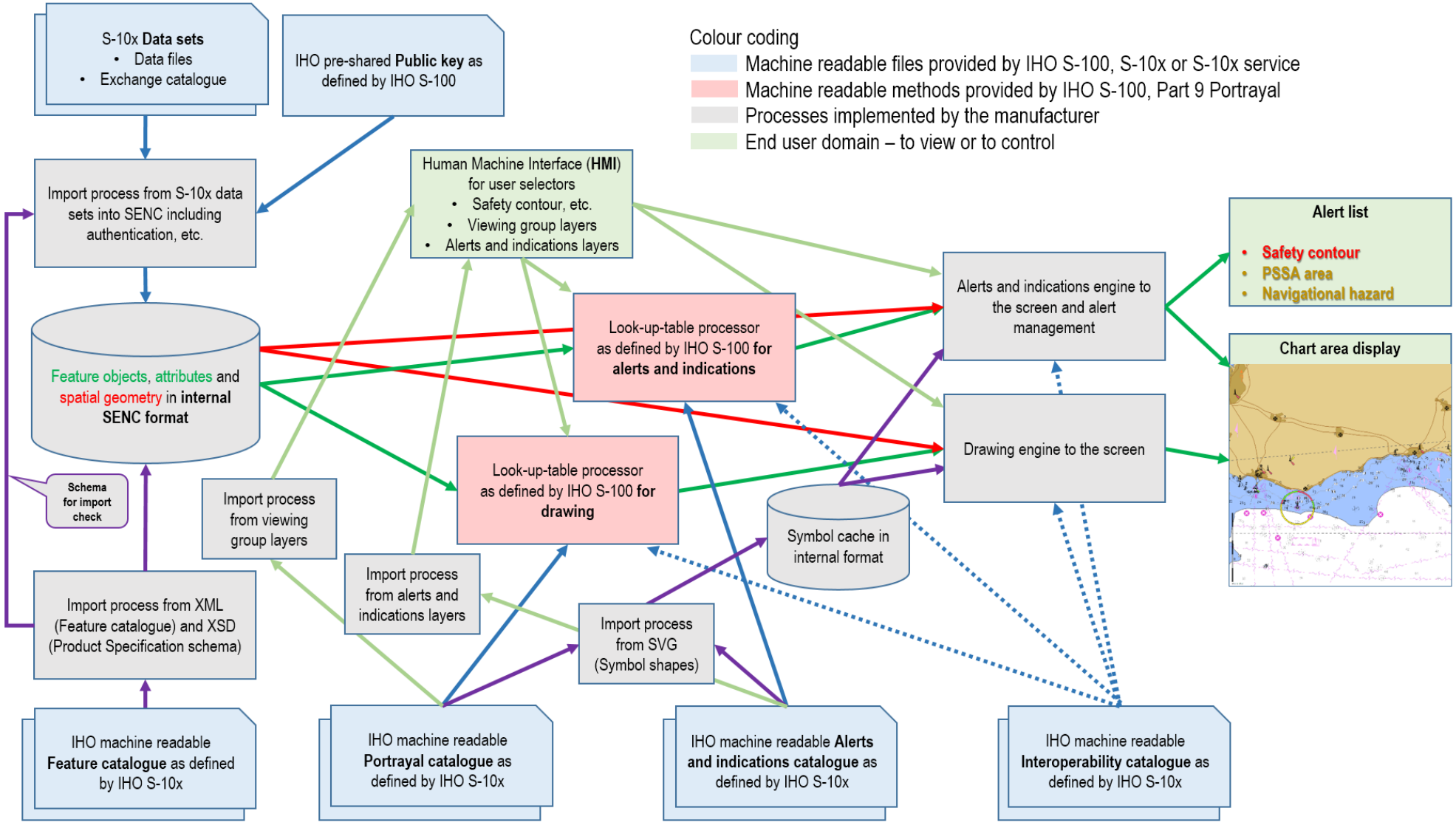


Figure 1 - High level model of an IMO carriage requirement compliant ECDIS

8. Table 1 lists high level items which are open because of missing specification or because of missing test material.

Function	S-100	S-101	S-124	Notes
Cyber security	Missing	Missing	Missing	S-100WG and old DPSWG has had S-63 based discussions, but nothing yet included into the published S-100
Feature catalogue	Specified	Available	Available	
Scale dependent and scale independent dataset Data loading	Specified	Missing	Missing	
Updates	Specified	Missing	Missing	
Portrayal - Look-up-table rules	Specified as XSLT	Available, but not complete	Missing	
Portrayal - Symbols shapes	Specified as SVG	Available, but not complete	Missing	
Portrayal - Palettes	Specified	Missing	Missing	
Portrayal - HMI selectors	Missing	Missing	Missing	
Alerts and indications - Look-up-table rules	Missing	Missing	Missing	Old TSMAD discussion, when Barrie Greenslade was chair, has been that machine readable "alerts and indications" could be based on same model as the machine readable portrayal. Since the old TSMAD discussion no real progress on this issue
Alerts and indications - Symbols shapes	Missing	Missing	Missing	
Alerts and indications - HMI selectors	Missing	Missing	Missing	
Interoperability catalogue	Specification under progress	Missing	Missing	This issue is progressing well within S-100WG

Table 1 - High level model of an IMO carriage requirement compliant ECDIS

9. GML encoding alternative is problematic. The GML itself is very wide and subject to multiple interpretation, see referenced article "*webpage 17aug2017 - GML madness*". Our opinion is that in order to make GML as suitable for S-100 concept the IHO S-100WG should define a subset of GML applicable for S-100 purposes. Then manufacturers of viewer could implement this subset and producers of GML encoded S-10X Products could also know how to encode their features for the intended end result.

Conclusions

10. Target of this paper is to highlight missing items which need work by S-100WG or by other S-100 related IHO workgroups, subgroups, etc. We believe that focusing on the completion of the issues of this paper is the best and fastest way to introduce the S-100 into the maritime market.

Action Required of TMS5

The TMS5 is invited to:

a) note the issues presented in this paper

b) consider what is the best way forward and act based on that decision

Annex A, Some examples of differences between S-101 and S-57

An example of Landmark

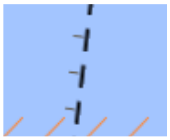
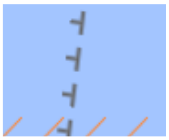
S-101	S-57
	
Info query CHART_DK2SUNDT___844429705478254!0;P;() Landmark Feature name: Display name = 0 Language = eng Name = Gladsaxe TV-mast Scale minimum = 1499999 Visually conspicuous = 2 In the water = 0 Category of landmark = tower Function = television Symbol explanation = A prominent object at a fixed location which can be used in determining a location or a direction.	**Info query** CHART_DK2SUNDT_844429705478254!0;P;(74) Landmark (35) Category of landmark = mast (83) Conspicuous, visually = not visually conspicuous (94) Function = television, radio, light support (116) Object name = Gladsaxe TV-mast (133) Scale minimum = 1: 1,499,999 Symbol explanation = mast
Reason for difference Probably the instruction rule is incorrect Corresponding symbol is MSTCON04 which requires categoryOfLandmark=7 Note also that in S-101_FC_0.8.9.xml attribute “visuallyConspicuous” has valueType = boolean (probably should be enumeration)	

An example of Light

S-101	S-57
	
Info query CHART_DK2SUNDT___8444296946648l4!0;P;() Light air obstruction Scale minimum = 1499999 Status = permanent Colour = white Value of nominal range = 10 Height = 250 Exhibition condition of light = light shown without change of character Rhythm of light: Signal group = (1) Light characteristic = flashing Signal period = 3 Flare angle = 135 Multiplicity of features: Multiplicity known = 1 Number of features = 2	**Info query** CHART_DK2SUNDT_8444296946648l4!0;P; (75) Light (37) Category of light = aero light, vertically disposed (75) Color = white (92) Exhibition condition of light = light shown without change of character (95) Height = 250 m (107) Light characteristic = flashing (110) Multiplicity of lights = 2 (133) Scale minimum = 1: 1,499,999 (141) Signal group = (1) (142) Signal period = 2 s (178) Value of nominal range = 10 NM Symbol explanation = light flare, white or yellow

Reason for difference Probably the instruction rule is incorrect since it does not refer to flare angle

An example of Administrative area

S-101	S-57
	
Info query CHART_DE110000___15282480193289584820!0; A;() Administration Area (Named) Feature name: Display name = 0 Language = eng Name = Germany Feature name: Display name = 0 Name = Deutschland Jurisdiction = national Nationality = DE Symbol explanation = A defined (and possibly named) administrative area.	**Info query** CHART_DE110000_15282480193289584820!0; A;(1) Administration Area (Named) (103) Jurisdiction = national (111) Nationality = DE (116) Object name = Germany (301) Object name in national character set = Deutschland Symbol explanation = jurisdiction boundary Extra: (147) Source date = 24 Mar 2016 Extra: (148) Source indication = DE,DE,graph,chart98
Reason for difference colorProfile.xml does not have CHGRD specified. Instead CHBLK is twice and the other should probably be CHGRD.	

An example of Buoy special

S-101	S-57
	
Info query CHART_DK4SUNDT___8444275423970 38!0; P;() Buoy, special purpose/general Scale minimum = 179999 Category of special purpose mark = mooring mark Colour = yellow Status = periodic/intermittent Buoy shape = barrel (tun) Symbol explanation = A special purpose buoy is primarily used to indicate an area or feature, the nature of which is apparent from reference to a chart, Sailing Directions or Notices to Mariners (UKHO NP 735, 5th Edition). Buoy in general: A buoy whose appearance or purpose is not adequately known.	**Info query** CHART_DK4SUNDT_8444275423970 38!0; P;(19) Buoy, special purpose/general (4) Buoy shape = barrel (tun) (66) Category of special purpose mark = mooring mark (75) Color = yellow (118) Periodic date end = 15 Nov (119) Periodic date start = 1 Apr (133) Scale minimum = 1: 179,999 (149) Status = periodic/intermittent Symbol explanation = special purpose buoy, spherical or barrel shaped, or default symbol for special purpose buoy, simplified
Reason for difference There are two template matches for the buoy and the latter has symbol reference="DAYSQR01"	