



Nautical Cartography Working Group 5th meeting

S-100 Portrayal Harmonization Project

Korea Hydrographic and Oceanographic Agency (KHAOA)

Background

- S-100 ECDIS will display various additional information on top of ENC's which are S-102, S-104, S-111, S-122, S-124....
- And also non-hydrographic information such as weather information
- S-100WG has developing S-98 for representing S-1xx products harmonized with display priority
- And decided to develop a guideline of colour for navigational data
- KHOA has a S-100 symbol harmonization project to support SMART e-Navigation and share it with IHO



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KHOA Portrayal Harmonization Project

- **Objectives**

1. Conduct **a literature review** of current practices, guidelines, and regulations related to the combined portrayal of safety-of-navigation and nautical chart data.
2. Identify **successful examples/demonstrations** of harmonizing the portrayal of safety-of-navigation and nautical chart data.
3. Develop **proposed guidelines** for harmonizing the portrayal of safety-of-navigation and nautical chart data based on the results of the *SMART e-Navigation Project*.
4. **Propose guidelines** for harmonizing the portrayal of safety-of-navigation and S-101 ENC data for consideration and subsequent adoption or incorporation in the relevant items in **the IHO working group**.



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- Portrayal harmonization guidelines should address, at least the following:
 - a. Simplicity of presentation
 - b. Be as intuitive as possible
 - c. Be acceptable to the mariner
 - d. Enable the type or source (and hence user confidence level) of underlying data to be easily distinguished
 - e. Provide flexibility in what the mariner can display according to the task and the situation
 - f. Distinguish between static and dynamic chart and safety-of-navigation information (including radar overlay, ARPA, AIS, AtoNs, tides, STM, etc.)



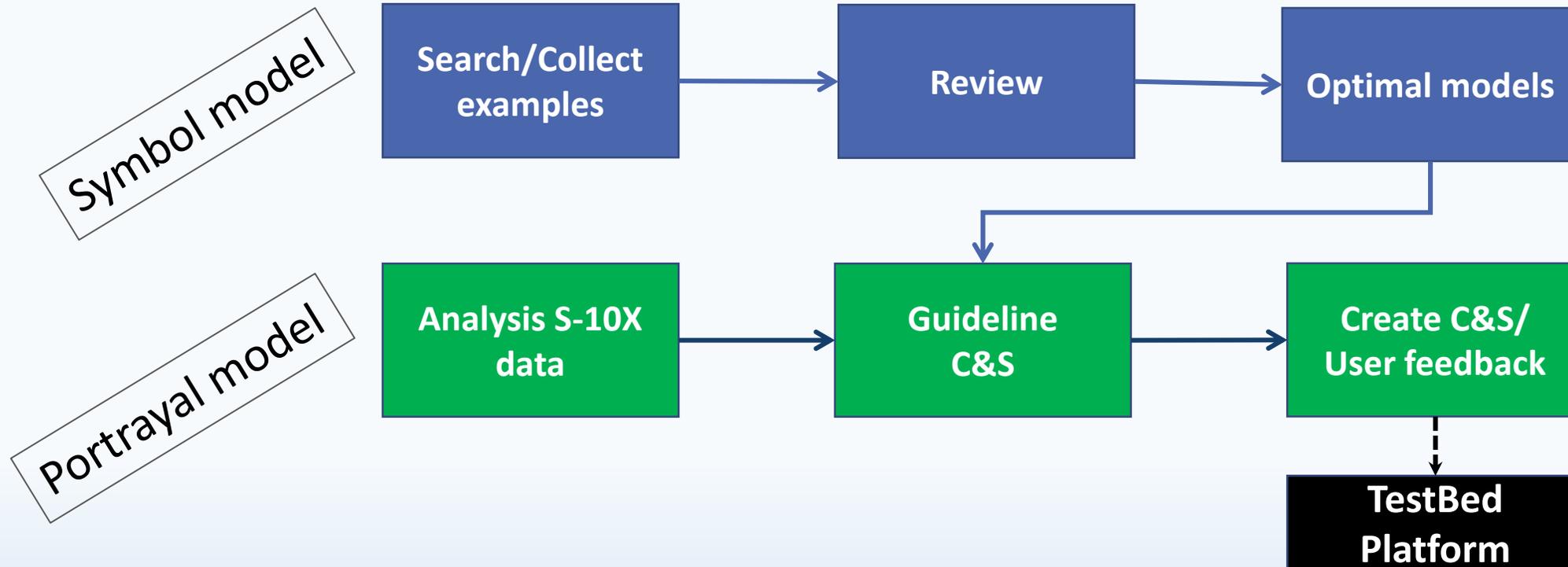
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KHOA Portrayal Harmonization Project

- To Develop Colors and Symbols for S-10X data
- Optimal approaches



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Progress of Symbol model

Symbol Design Guide



Symbol Production Process



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Progress of Portrayal Model

- Investigate IHO standards (S-4, INT1 and S-52) and some commercial practices
- Analyze S-100 based product specifications to make Categorization with IHO standards



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Progress of Portrayal Model

- **Identifications of symbol categories**

Step i) Surveying categories of S-4 and INT1

Category 1	Category 2 (sub-category)
General	Position–Distance–Directions–Compass
Topography	Natural Features
	Cultural Features
	Landmark
	Ports
Hydrography	Tides–Currents
	Depths
	Nature of the Seabed
	Rocks – Wrecks – Obstructions – Aquaculture
	Offshore Installations
	Tracks – Routes
	Areas – Limits
Aids to Navigation and Services	Lights
	Buoys–Beacons
	Fog signals
	Radar, Radio–Satellite Navigational Systems
	Services
	Small Craft (Leisure) Facilities



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Step ii) Surveying chart layer information of S-52

Priority layers
1. ECDIS visual alarms/indications
2. HO-data: points/lines and areas + official updates
3. <u>NtMs</u> , manual input and Radio Navigational Warnings
4. HO-caution (ENC cautions)
5. HO-color-fill area data
6. HO's on demand data
7. Radar information
8. Mariner's data: points/lines and areas
9. Manufacturer's data: points/lines and areas
10. Mariner's color-fill area data



Progress of Portrayal Model

Step iii) Matching the features of S-1xx products to the existing categories

Table 3. The matching table of the features, INT1 categories and S-52 layer

Feature name	INT1 category (Category 2 of Table 1)	S-52 layer	Remark
Landmark	Landmark	2. HO-data: points/lines and areas + official updates	
Building	Cultural Features	2. HO-data: points/lines and areas + official updates	
Radio Station	Radar, Radio – Satellite Navigational Systems	3. <u>NtMs</u> , manual input and Radio <u>Navigaional Warnings</u>	
<u>ShipReportingServiceArea</u>	Tracks – Routes	3. <u>NtMs</u> , manual input and Radio <u>Navigaional Warnings</u>	
<u>RadioServiceArea</u>	Radar, Radio – Satellite Navigational Systems	3. <u>NtMs</u> , manual input and Radio <u>Navigaional Warnings</u>	
<u>RadioCallingInPoint</u>	Tracks – Routes	3. <u>NtMs</u> , manual input and Radio <u>Navigaional Warnings</u>	
<u>CoastguardStation</u>	Services	2. HO-data: points/lines and areas + official updates	
		2. HO-data: points/lines and areas	



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- Step iv) Defining new categories for the symbols not matched

Table 4. New categories about non-matched features

Feature name	Category	S-52 layer	Remark
<u>NavtexStationArea</u>	(related to Radar, Radio – Satellite Navigational Systems)	2. HO-data: points/lines and areas + official updates	
<u>InmarsatOceanRegionArea</u>	(related to Radar, Radio – Satellite Navigational Systems)	2. HO-data: points/lines and areas + official updates	
<u>UnderKeelClearance ControlPoint</u>	Under keel clearance management service	2. HO-data: points/lines and areas + official updates	New
<u>UnderKeelClearance NonNavigableArea</u>	Under keel clearance management service	5. HO-color-fill area data	New
<u>UnderKeelClearance AlmostNonNavigableArea</u>	Under keel clearance management service	5. HO-color-fill area data	New
<u>UnderKeelClearance AllowanceArea</u>	Under keel clearance management service	5. HO-color-fill area data	New



Progress of Portrayal Model

- **Defining Colors for the symbols not matched**

Feature name	Expected color	Remark
VesselTrafficServiceArea	Magenta (S-4) / Blue (S-52)	S-122
*VesselTrafficServiceArea		S-127
RestrictedAreaNavigational	Magenta (S-4) / Red (S-52)	S-122
RestrictedAreaRegulatory		S-122
*RestrictedAreaNavigational		S-127
*RestrictedAreaRegulatory		S-127



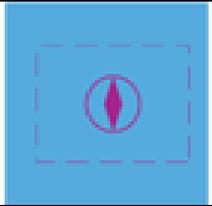
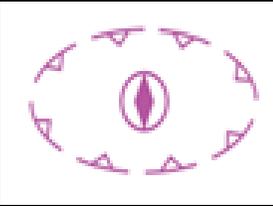
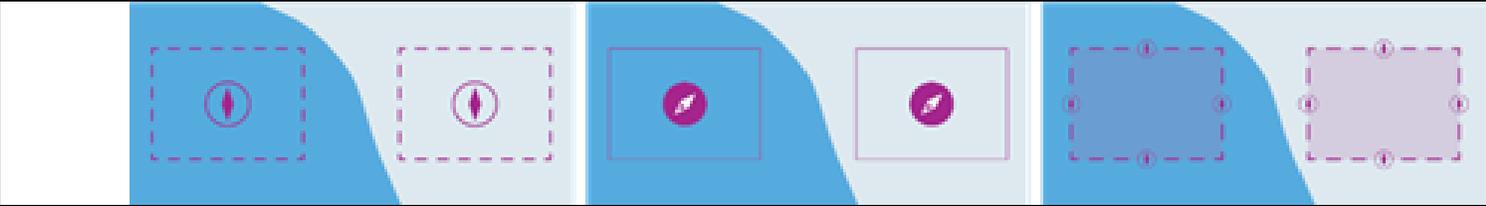
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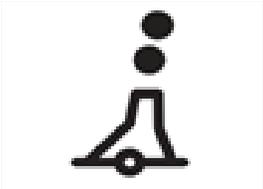
- **Example of symbol modernization (SVG)**

• Area

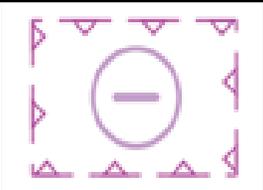
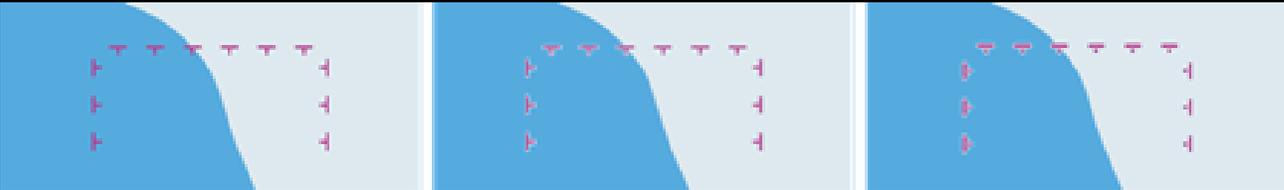
		
Existing symbol (Paper chart)	Existing symbol (ENC)	<ol style="list-style-type: none">1. Re-sized symbol and line2. Changing symbol and line3. Filling the area and line with symbol

Progress of Portrayal Model

• Point

		
Existing symbol (Paper chart)	Existing symbol (ENC)	<ol style="list-style-type: none"> 1. Changing color to blue 2. Filling blue color in the symbol 3. Filling blue color in the symbol and adding yellow middle line

• Line

		
Existing symbol (Paper chart)	Existing symbol (ENC)	<ol style="list-style-type: none"> 1. Re-sized the line 2. Adding white border each line component (┆, ⊥) 3. Line component changed to dot and line

Conclusion and recommendations

- KHOA conducts S-100 symbol harmonization project to modernize existing symbol and to make new symbols for S-100 based products.
- Request to provide feedback and input by NCWG



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Thank you



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