I Research on symbols for S-100 product Service in Korea

**1. Studying hydrographic information for Korean e-nav service**

➢ Studying Symbols of PS related to Korean e-nav service
- S-102 Bathymetric Surface
- S-104 Water Level Information for Surface Navigation
- S-111 Surface Currents
- S-122 Marine Protected Areas
- S-123 Radio Services
- S-124 Navigational Warnings
- S-127 Traffic Managements
- (S-129 UKCM)

2. Surveying symbols being used in INT1, S-12x and commercial products

➢ Surveying symbols being used in INT1 and S-12x including commercial products such as GPS plotters to find out things to be introduced

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3. Finding issues to display symbols from two or more PSs simultaneously

➢ Assuming no issues to display symbols of individual product specifications separately

➢ Making scenarios to combine two or more product specifications, such as combining S-102 and S-104, combining S-104, S-124 and S-127 and so on

➢ Finding out possible issues to disturb to display symbols clearly
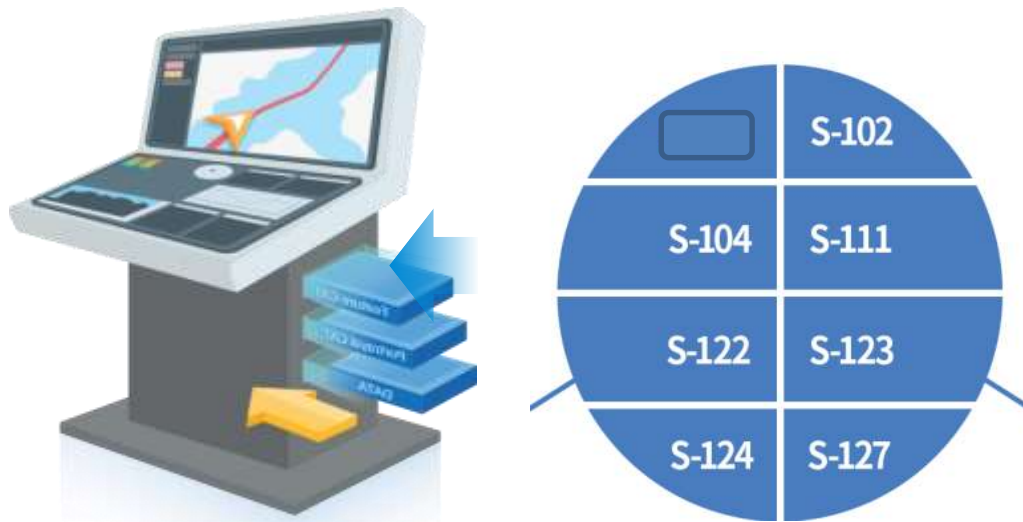
Ⅱ

Outputs
(for now)

INT1, S-12x and Commercial product

➢ Aims:
- Any symbols to use similar names for different contexts
- Any symbols to use similar names with same meanings

➢ Regarding on commercial symbols:
- Any symbols which is not used in ENC but used in commercial chart?
- If the symbols are useful to users and/or the symbols are better-looking than ENC symbols?

INT1 categories

- Chart Number – Title – Marginal Notes
- Positions – Distances – Directions – Compass
- Natural Features
- Cultural Features
- Landmarks
- Ports
- Tides – Currents
- Depths
- Nature of the Seabed
- Rocks – Wrecks – Obstructions – Aquaculture
- Offshore Installations
- Tracks – Routes
- Areas – Limits
- Lights
- Buoys – Beacons
- Fog Signals
- Radar, Radio – Satellite Navigation Systems
- Services
- Small Craft(Leisure Facilities)

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Commercial products

➢ 70 manufacturers use C-map symbols including compatible symbols

➢ 600 and more devices of PDA and GPS plotter

Example of
commercial product categories

- POSITIONS, DIRECTIONS, COMPAS
- NATURAL FEATURES
- RIVERS, LAKES
- CULTURAL FEATURES
- PORT, SERVICES
- LANDMARKS
- SEABED TYPE
- DEPTHS, SOUNDING
- WRECKS, OBSTRUCTIONS
- TRACKS, ROUTES
- ATTENTION AREA
- NAV-AIDS

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Symbols in S-12x

> Categorizing the S-12x features aligning to INT1 catagories to find out differences and overlaps
> - Landmarks
> - Radio / Station / Communication
> - Pilot
> - Vessel Traffic
> - Tracks / Routes
> - Attentions
> - **Under Keel Clearance Management**
> - **Safety Service**

S-122	MarineProtectedArea	RestrictedAreaNavigational	RestrictedAreRegulatory	Vess...
S-123	Radio Station	Navtex StationArea	WeatherForecastWarningArea	S-123 App...
S-124	S124_TextPlacement	S124_NavigationalWarningFeaturePart		
S-127(1)	RadioCallingInPoint	SignalStationWarning	RadarRange	ConcentrationOf...
S-127(2)	MillitaryPracticeArea	RestrictedAreaRegulatory	RestrictedAreaNavigational	WaterwayAr...
S-129	UnderKeelClearanceNonNavigableArea	UnderKeelClearanceAlmostNonNavigableArea	UnderKeelClearanceControlPoint	

	Landarks	
S-123	Landmark	
S-123	Building	

	Radio / Station / Commu	
S-123	Radio Station	
S-127	ShipReportingServiceArea	
S-127	RadioServiceArea	
S-127	RadioCallingInPoint	
S-123	Navtex StationArea	
S-123	CoastguardStation	
S-123	InmarsatOceanRegionArea	

	Pilot	
S-127	PilotService	
S-127	PilotBoardingPlace	
S-127	PilotageDistrict	

	UKCM	
S-129	UnderKeelClearanceControlPoint	
S-129	UnderKeelClearanceNonNavigable	
S-129	UnderKeelClearanceAlmostNonNa	
S-127	UnderKeelClearanceAllowanceArea	
S-127	UnderkeelClearanceManagementA	

	Safety Service	
S-127	GMDSSArea	
S-127	IspsCodeSecurityLevel	
S-127	PlaceOfRefuge	
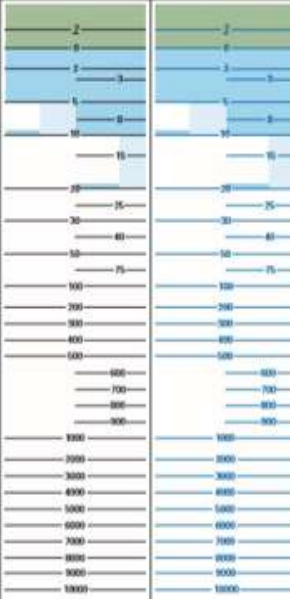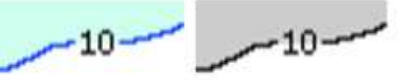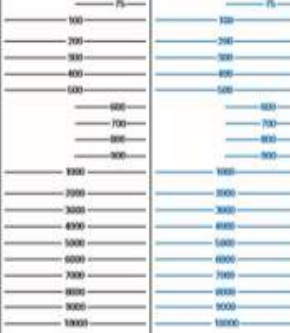
	Traffic	
S-122	VesselTrafficServiceArea	
S-127	VesselTrafficServiceArea	
S-127	SignalStationTraffic	

	Attentions	
S-122	MarineProtectedArea	
S-127	MillitaryPracticeArea	
S-123	WeatherForecastWarningArea	
S-127	PiracyRiskArea	
S-127	CautionArea	
S-127	ConcentrationOfShippingHazardArea	
S-122	RestrictedAreaNavigational	
S-122	RestrictedAreRegulatory	
S-122	SignalStationWarning	
S-127	RestrictedAreaNavigational	
S-127	SignalStationWarning	
S-127	RestrictedAreaRegulatory	

	Etc	
S-124	S124_TextPlacement	
S-124	S124_NavigationalWarningFeaturePart	
S-123	S-123 ApproximateAreas	
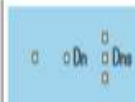
Example of Depths and Soundings

Example of Port Services symbols

Port,Services			
	Fishing harbor		Port de pêche *Fishing harbour*
	Dolphin		Duc d'Albe, dauphin Dolphin
	Signal station, Coas	S-123 CoastguardStation S-127 SignalStationWarning,Traffic	

Naming confused amongst S-12x

Radio / Station / Communication	
S-123	Radio Station
S-127	ShipReportingServiceArea
S-127	RadioServiceArea
S-127	RadioCallingInPoint
S-123	Navtex StationArea
S-123	CoastguardStation
S-123	InmarsatOceanRegionArea

UKCM	
S-129	UnderKeelClearanceControlPoint
S-129	UnderKeelClearanceNonNavigableArea
S-129	UnderKeelClearanceAlmostNonNavigableArea
S-127	UnderKeelClearanceAllowanceArea
S-127	UnderkeelClearanceManagementArea

Traffic	
S-122	VesselTrafficServiceArea
S-127	VesselTrafficServiceArea
S-127	SignalStationTraffic

Attentions	
S-122	MarineProtectedArea
S-127	MillitaryPracticeArea
S-123	WeatherForecastWarningArea
S-127	PiracyRiskArea
S-127	CautionArea
S-127	ConcentrationOfShippingHazardArea
S-122	RestrictedAreaNavigational
S-122	RestrictedAreaRegulatory
S-122	SignalStationWarning
S-127	RestrictedAreaNavigational
S-127	SignalStationWarning
S-127	RestrictedAreaRegulatory

Screen Clutter issue

Issuable occasions as displaying two or more PSs at once

➢ Symbols are not clearly distinguishable
- If areas are overlapped

➢ Confusing or misunderstanding
- If areas are almost same but the different colors are used for displaying boundaries
- If areas are overlapped but different colors and/or lines inside the areas are used

Two more values for one symbol

Example: 'WeatherForcastWarningAreas' feature of S-123

➢ Several attributes are assigned to one feature - the attribute 'categoryOfFrcstAndWarningArea' has seven different enumerate values.

|			
	Text and Area (with patten)	TAI	
	Text and Area (without patten)	TAO	
Attributes (속성)	featureName (complexAttribute)		
	textContent (complexAttribute)		
	categoryOfFrcstAndWarningArea (enumeration)	1	The forecast a... ...y WMO
		2	The forecast and warning area defined by national authorities covering High Seas
		3	The forecast and warning area defined by national authorities covering offshore waters
		4	The forecast and warning area defined by national authorities covering coastal waters
		5	The forecast and warning area defined by national authorities covering inshore waters
		6	The forecast and warning area defined by national authorities covering local waters
		7	The ice forecast area defined by international or national authorities
	nationality (text)		

7 different shapes are needed?

Two or more status for one symbol

Candidate solutions

➤ Different symbols with different color
  - Shape is same
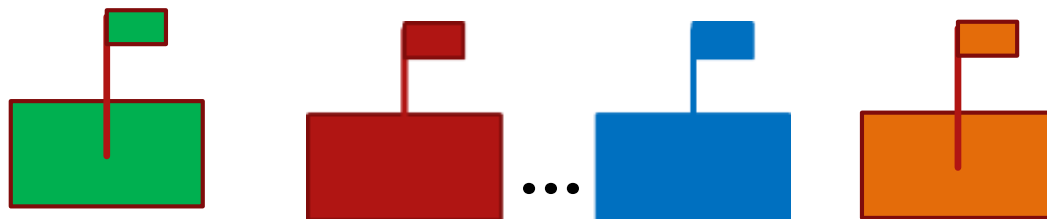
➤ Same symbol with text-based code

C1   C1S2
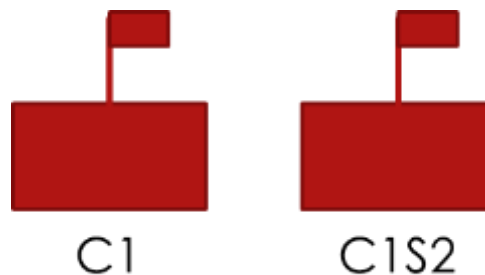
ongoing works and challenges

Factors contemplated

➢ Harmonizing colors, contexts of symbols

➢ Operational modes including day, night and dust etc

Challenges

➢ Time schedule is limited

➢ the target PSs are still going on

Thank you!