NIWC Test Bed Report

NIWC LANT

for

S-101PT5

Test Bed Updates / Deliveries

Changes to applications and data

Available Now On Basecamp
NIWC Test Bed 1.0.0.0

NIWC S-101 Portrayal Catalogue 1.1.1

S-100 Viewer 1.9.0.0

Lua Scripting Reference 1.0.1

Shore Based ECDIS 1.0.1.0

- SENC Editor 1.0.0.0 (SENC Installer)

S-101 Portrayal Catalogue 1.1.1

- Request PT endorsement and update to registry
- Updates related to S-100WG5:
  - Added Alerts and Indications catalogue
  - Added "order" attribute to display planes
  - Added symbol dependencies
    - Text / INFORM / CHDATD
  - Added hover instructions
    - INFORM / CHDATD / Lights / Beacons / Buoys / Landmarks
- Use *displayName* attribute to control display of feature name (per DCEG)
- *QualityOfBathymetricData* reverted to testPCB area fill
- Other minor corrections / bug fixes

S-100 Viewer 1.9.0.0

- Use updated portrayal schemas approved at S-100WG5
  - Supports latest NIWC S-101 portrayal catalogue
- Fixes for regional number formats
  - Digit grouping and decimal symbols
- Fix issue with display of portrayal text
  - commas, ampersand, colon, and semicolon punctuation
- Other minor updates and bug fixes

Lua Scripting Reference 1.0.1

- Minor change to address reported compilation issue
  - affects certain installs of Visual Studio

Shore Based ECDIS – Goals

- Verify (using S100Viewer) and validate (using ShoreECDIS) requirements. Shows requirements:
  - Can be implemented (using S-100 / S-101)
  - Are not conflicting
  - Are demonstrably complete
- Serves as a reference implementation
  - Demonstrate agreed upon interpretation of requirements
  - Accelerate acceptance and development by OEMs by demonstrating maturity of relevant specifications
- Provide a visualization tool for the community
  - Accelerate time to usable fielded data

SENC Installer

- Installer for ShoreECDIS
- Will be removed once exchange sets are available

NIWC ShoreECDIS

- Initial release

- Demonstrates portrayal schema changes approved at S-100WG5
  - Alerts and Indications
  - Symbol Dependencies
  - Support for date dependent portrayal
  - Display plane ordering
  - Pick report via hover

- Multiple datasets (now)

- Multiple products / Interoperability (later)

ShoreECDIS: Alerts and Indications
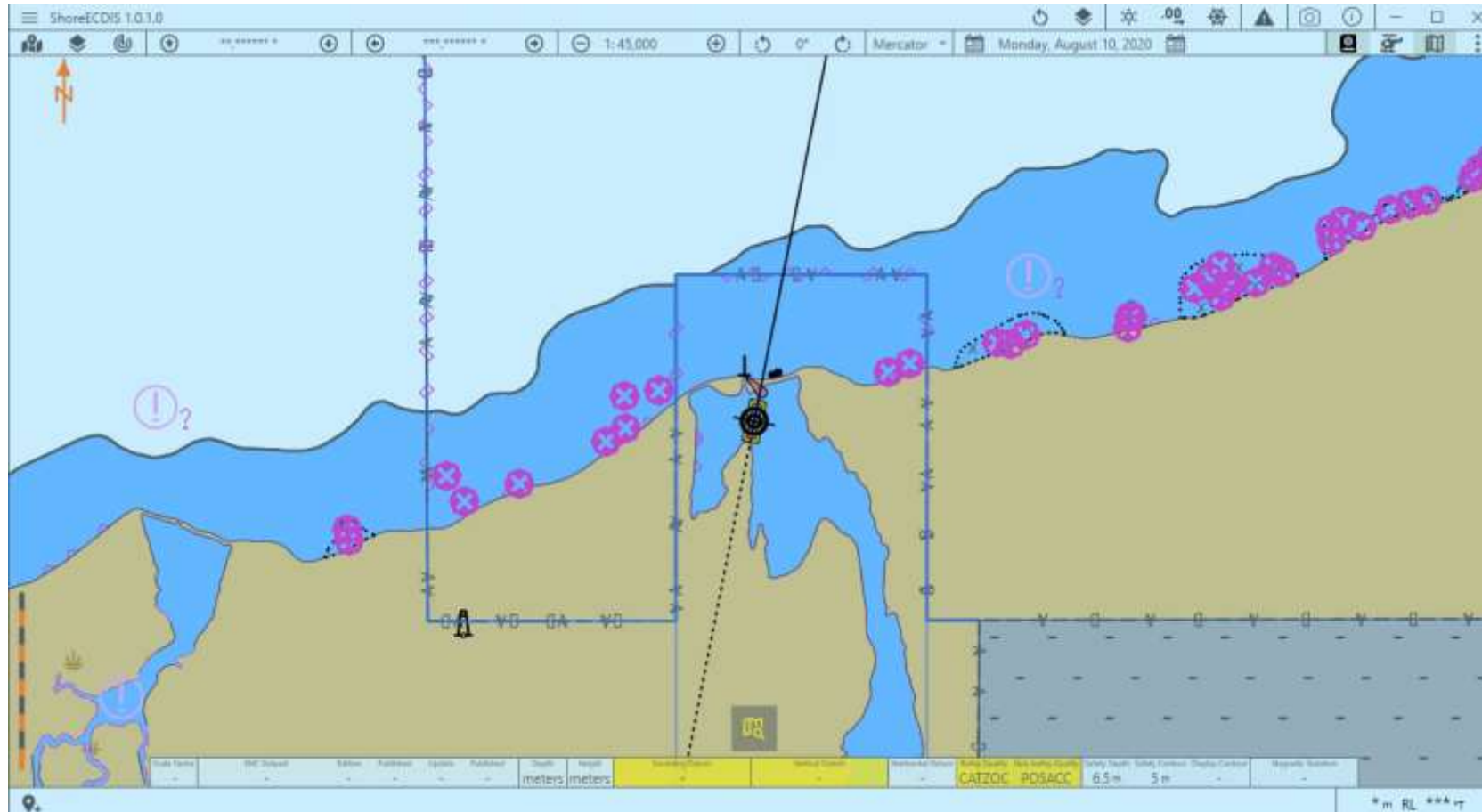
ShoreECDIS: Date Dependent / Hover
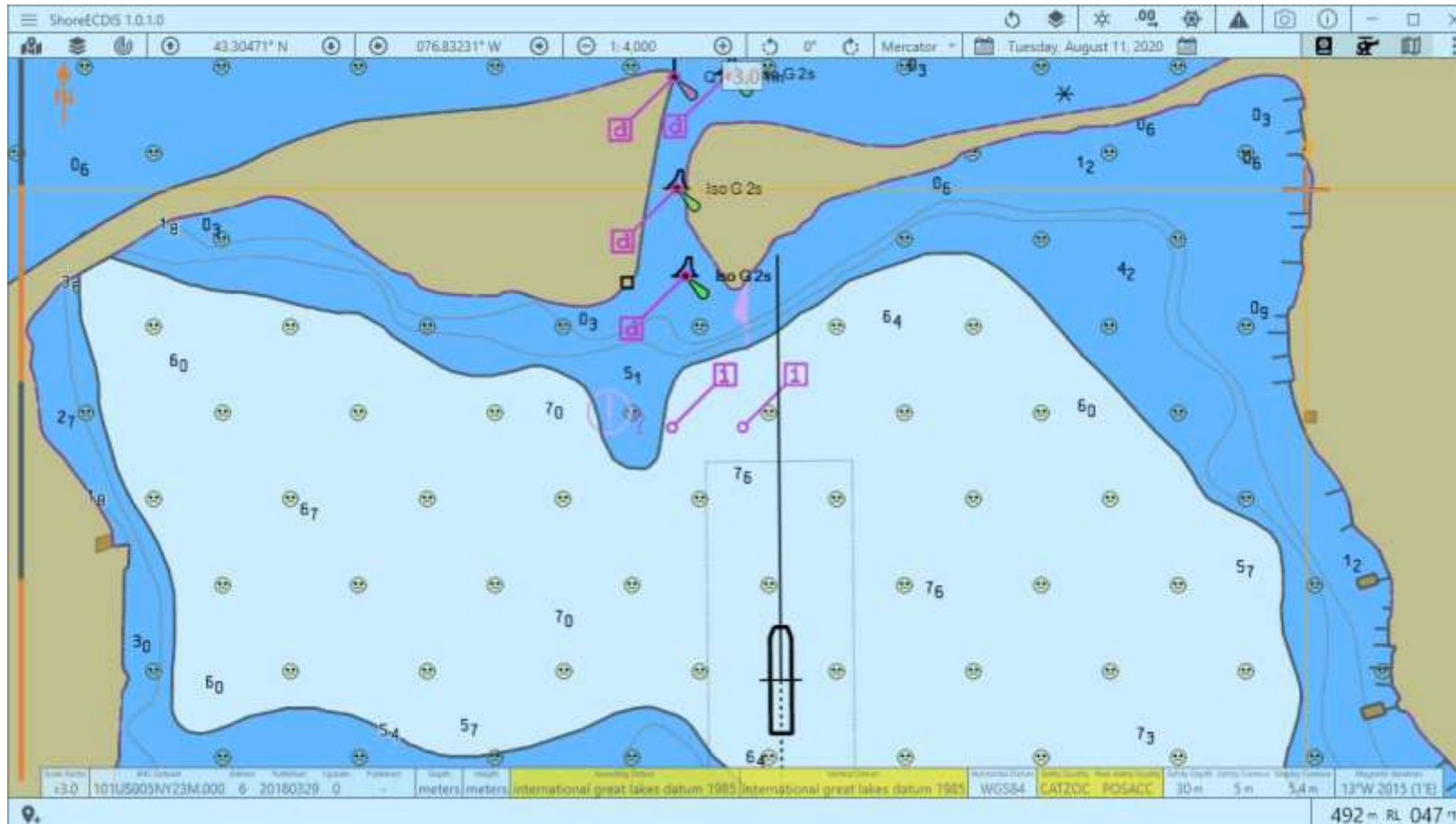
QualityOfBathymetricData

- Portrayal reverted to testPCB
  - As shown on previous slide
  - PT needs to finalize a portrayal
- #PR1: Provide portrayal requirements for QoBD
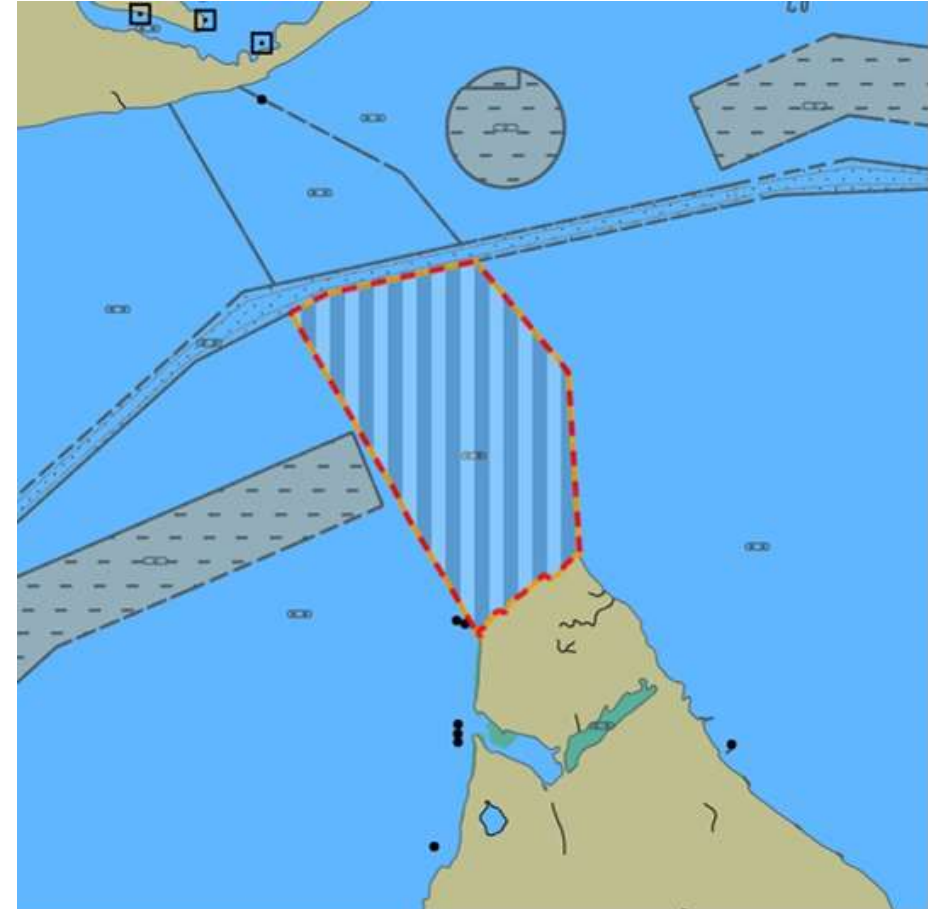
NCWG symbols for new S-101 features

- Ongoing from S-101PT3-4.5
- NCWG to develop symbol concepts
- Produce S-100 compliant SVG files from symbol concepts
- Update S-101 Portrayal Catalogue with new symbols and corresponding portrayal rules
- Testing requires production of test data containing new features
- #PR2: Needs completion

S-100 Issues / Findings

S-100 Issues to be resolved

DSID record issues

- S-100 Part 10a DSID record
  - No entry for update number
  - Example 10a-3.4 shows UPDN field
  - DSED shown as A() [ASCII]
  - 10a-3.4 correctly shows as integer
- #1: Update S-100 10a
  a) Include UPDN in 10a-5.1.2.1?
  b) Change DSED to integer

10a-5.1.2.1 Data Set Identification field structure

Field Tag: DSID			Field Name: Data Set Identification

| Subfield name	Label	Format	Subfield content and specification
Record name	RCNM	b11	{10} - Data Set Identification
Record identification number	RCID	b14	Range: 1 to 2^{32}-2
Encoding specification	ENSP	A()	Encoding specification that defines the encoding
Encoding specification edition	ENED	A()	Edition of the encoding specification
Product identifier	PRSP	A()	Unique identifier for the data product as specified in the product specification
Product edition	PRED	A()	Edition of the product specification
Application profile	PROF	A()	Identifier that specifies a profile within the data product
Dataset file identifier	DSNM	A()	The file identifier of the dataset
Dataset title	DSTL	A()	The title of the dataset
Dataset reference date	DSRD	A(8)	The reference date of the dataset Format: YYYYMMDD according to ISO 8601
Dataset language	DSLG	A()	The (primary) language used in this dataset
Dataset abstract	DSAB	A()	The abstract of the dataset
Dataset edition	DSED	A()	The edition of the dataset
Dataset topic category	*DSTC	b11	A set of topic categories

Portrayal of Shared Edges

- Solid grey line should be dashed

- Shared edges are drawn twice, once for each surface
  - Direction is reversed
  - Starting offset may change

- Issue has presumably been overcome in S-52

- #2: Recommend consult with OEMs and ENCWG to determine how to address in S-100 / S-101
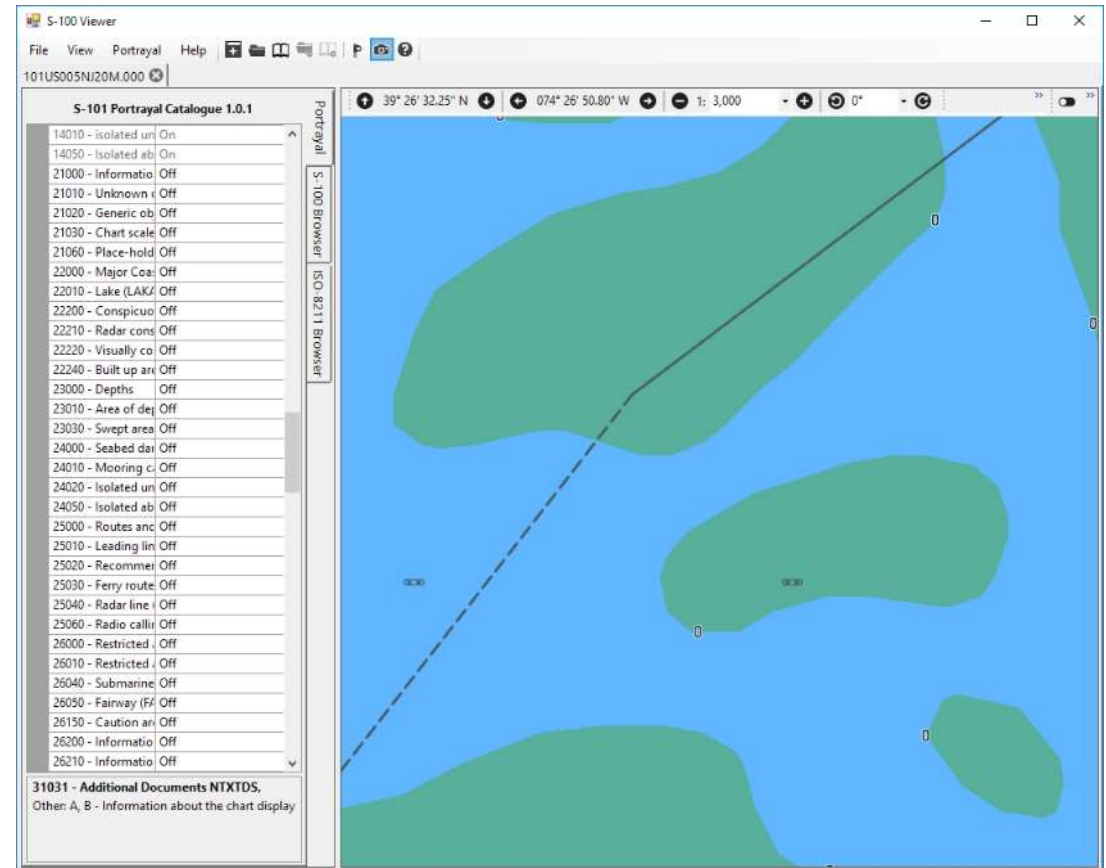
id values in Portrayal Catalogues

- S-101 *displayMode id*="1"
  - Base

- S-102 *displayMode id*="1"
  - Other

- How to synchronize settings between PCs?

- #3: Change id's to meaningful value which can be synchronized: "Base", etc.

```xml
<displayModes>
    <displayMode id="1">
        <description>
            <name>Base</name>
            <description>Always on display</d
            <language>eng</language>
        </description>
        <viewingGroupLayer>1</viewingGroupLa
</displayMode>
<displayMode id="2">
        <description>
            <name>Standard</name>
            <description>ECDIS default displ
            <language>eng</language>
        </description>
```

S-101 Issues / Findings

Issues to be resolved

Ambiguities to be addressed

Dataset Loading / Unloading Algorithm

- Multiple datasets not always presented correctly due to multiple issues:
  - Dataset converter limitations
  - Data loading algorithm problems
  - No topology between features and *DataCoverage*
  - Removal of S-57 ENC metadata
    - navigational purpose
    - compilation scale

- Addressed in a separate paper

S-101 DCEG vs FC associations / bindings

- DCEG describes associations in a manner which cannot be expressed by FC
  - E.g. a bridge consists of one or more span fixed, span opening, or pylons
- FC requires description of each component of the relationship separately
  - E.g. a bridge has an association to zero or more span openings
- Current FC incorrectly describes multiplicity of bindings
  - *BridgeAggregation* consists of 1..* *SpanOpening*
- #4: Update FC
  - Supports validation
  - Use checks to ensure at least one of associated features is present

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
Comp	Structure/Equipment	Bridge	Supported by	1,1	Daymark, Fog Signal, Light Air Obstruction, Light All Around, Light Fog Detector, Light Sectored, Physical AIS Aid to Navigation, Radar Transponder Beacon, Retroreflector, Signal Station Traffic, Signal Station Warning	Supports	1,*
Aggr	Bridge Aggregation	Bridge	Component of	1,1	Span Fixed, Span Opening, Pylon/Bridge Support	Consists of	1,*

```xml
<S100FC:featureBinding roleType="aggregation">
  <S100FC:multiplicity>
    <S100Base:lower>1</S100Base:lower>
    <S100Base:upper xsi:nil="true" infinite="true"/>
  </S100FC:multiplicity>
  <S100FC:association ref="BridgeAggregation"/>
  <S100FC:role ref="consistsOf"/>
  <S100FC:featureType ref="SpanOpening"/>
</S100FC:featureBinding>
```

ISO-8211 / S-101 encoding of Boolean attributes

- Based on correspondence with Teledyne, ISO-8211 / S-101 encoding of Boolean attributes is ambiguous
  - S-101 4.3.5.1
    - 0 / "False" / "false"?
    - non-zero / 1 / "True" / "true"?
- #5: SevenCs to submit proposal to S-100WG

| Type	Definition
Boolean	the value is a logical value either 'True' or 'False'
Integer	the value is an integer number
Real	the value is a floating point number
Enumeration	the value is one of a list of predefined values
Codelist	the value is an open enumeration, or the identifier of a vocabulary (mapping between codes, labels and definitions) [Not currently used in S-101]
Text	the value is general text. This is also defined as CharacterString
Date and Time	the value marks a point in time, consisting of a date in the Gregorian calendar and a 24 hour time. The time may contain a time zone [Not currently used in S-101]
Truncated Date	the value is a date according to the Gregorian calendar, and allows for partial dates to be provided
Time	the value is a 24 hour time, it may contain a time zone

Light Descriptions with unknown *lightCharacteristic*

- Current PC does not output light description when *lightCharacteristic* (LITCHR) is unknown

- No guidance in DCEG or S-52

- #6: What is the desired portrayal output?
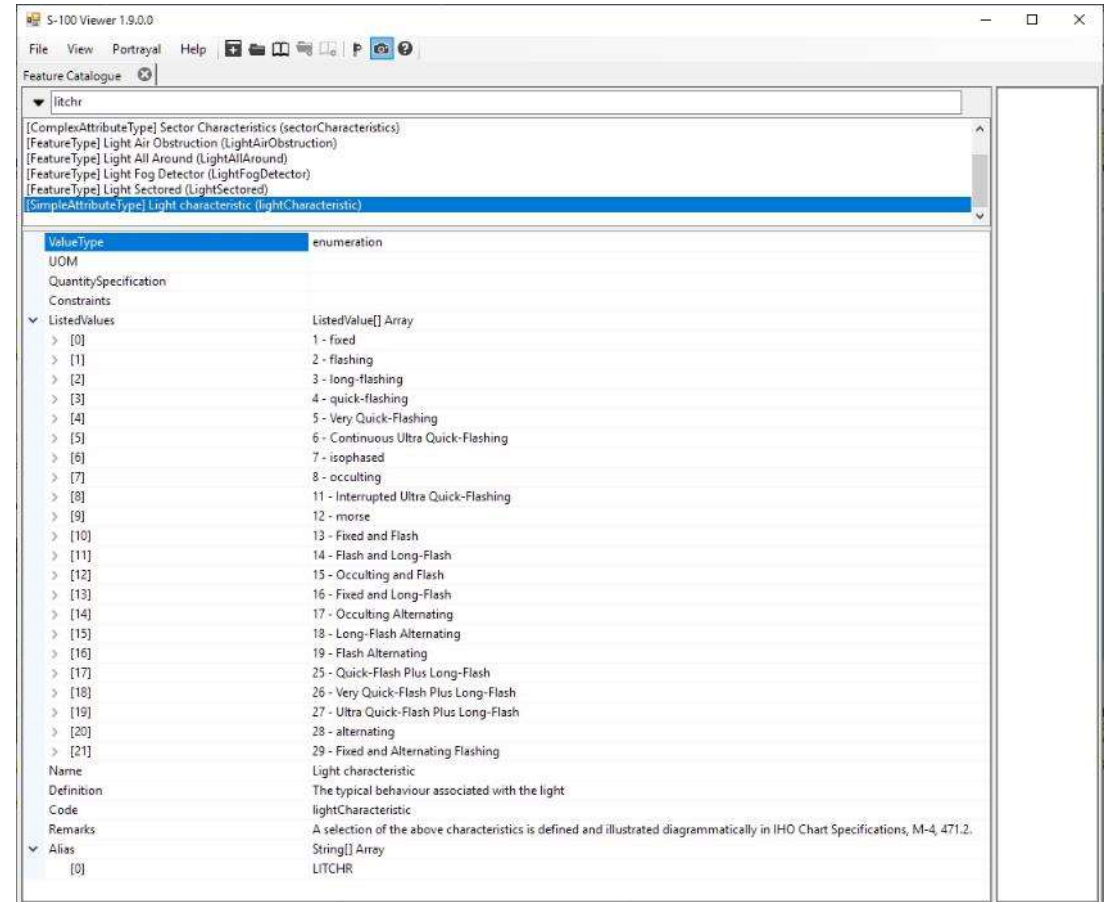
Portrayal Catalogue Translations

- Enables test bed reporting on national language support

- #7: Populate language independent text in portrayal catalogue?

- #8: Identify resources to deliver desired translations
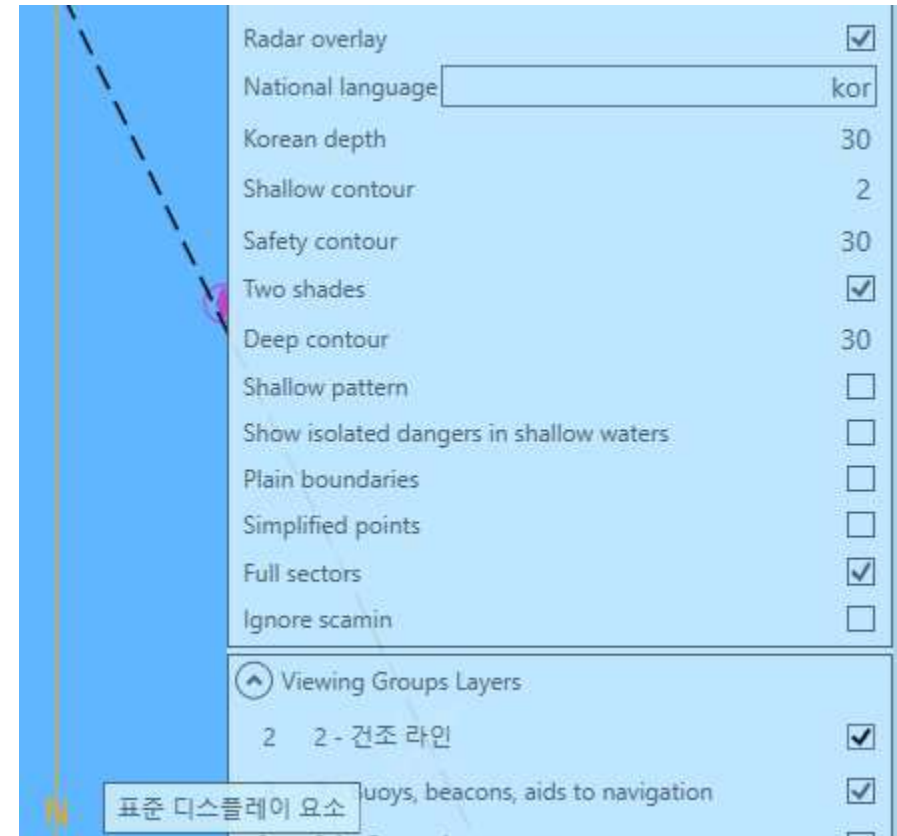
S-101 Overscale Pattern

- May be OBE via paper on navigational purpose
- S-52
  - different navigational purpose, two or more times the compilation scale
- S-101
  - No navigational purpose
  - No compilation scale
  - "*maximumDisplayScale*"
- #9: Recommend "more than *maximumDisplayScale*" rather than "more than 2x compilation scale"
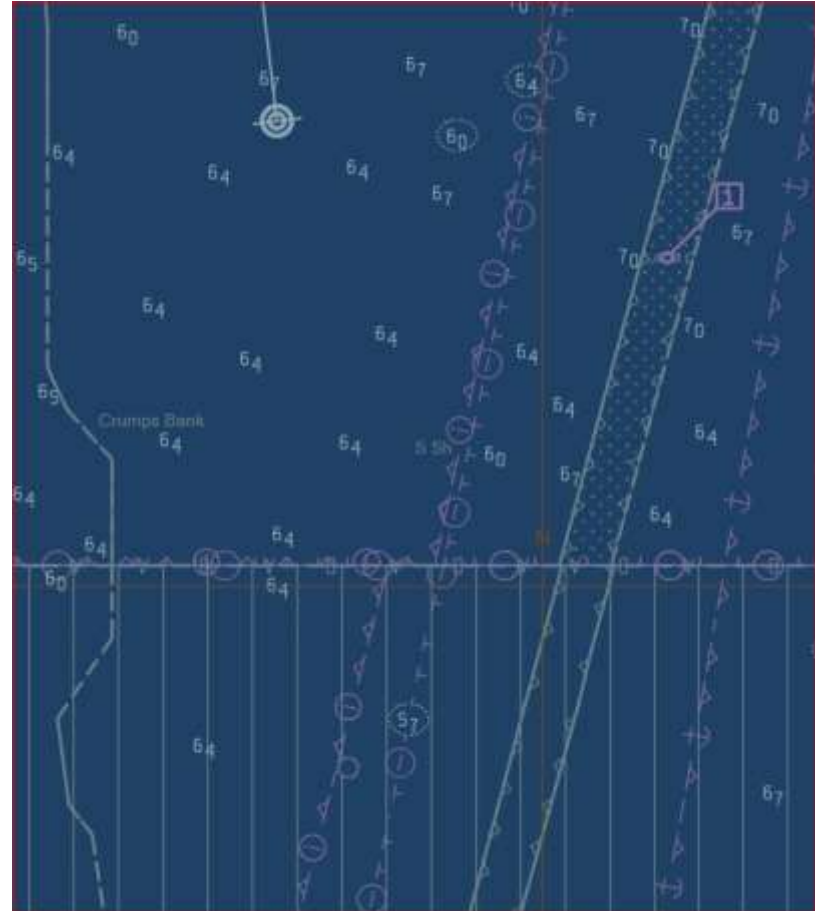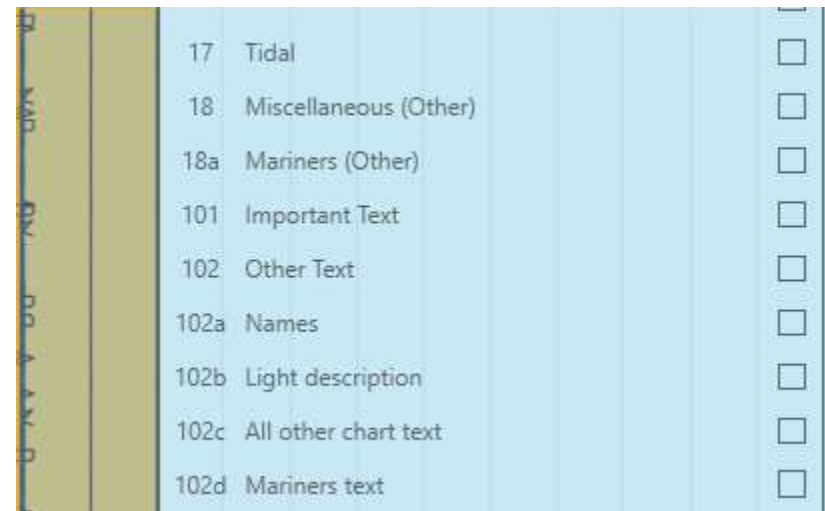
Guidance needed for implementation of "temporary" overlays

- S-52 6.1.1 3.2.2 (22): *"The [INFORM symbol] may cause clutter, and should only be displayed temporarily"*

- "temporarily" is not defined

- Display mode is OTHER
  - Viewing group 31030 and 31031
  - Viewing group layer 18 Miscellaneous

- #10: Provide implementation guidance or remove requirement from S-101
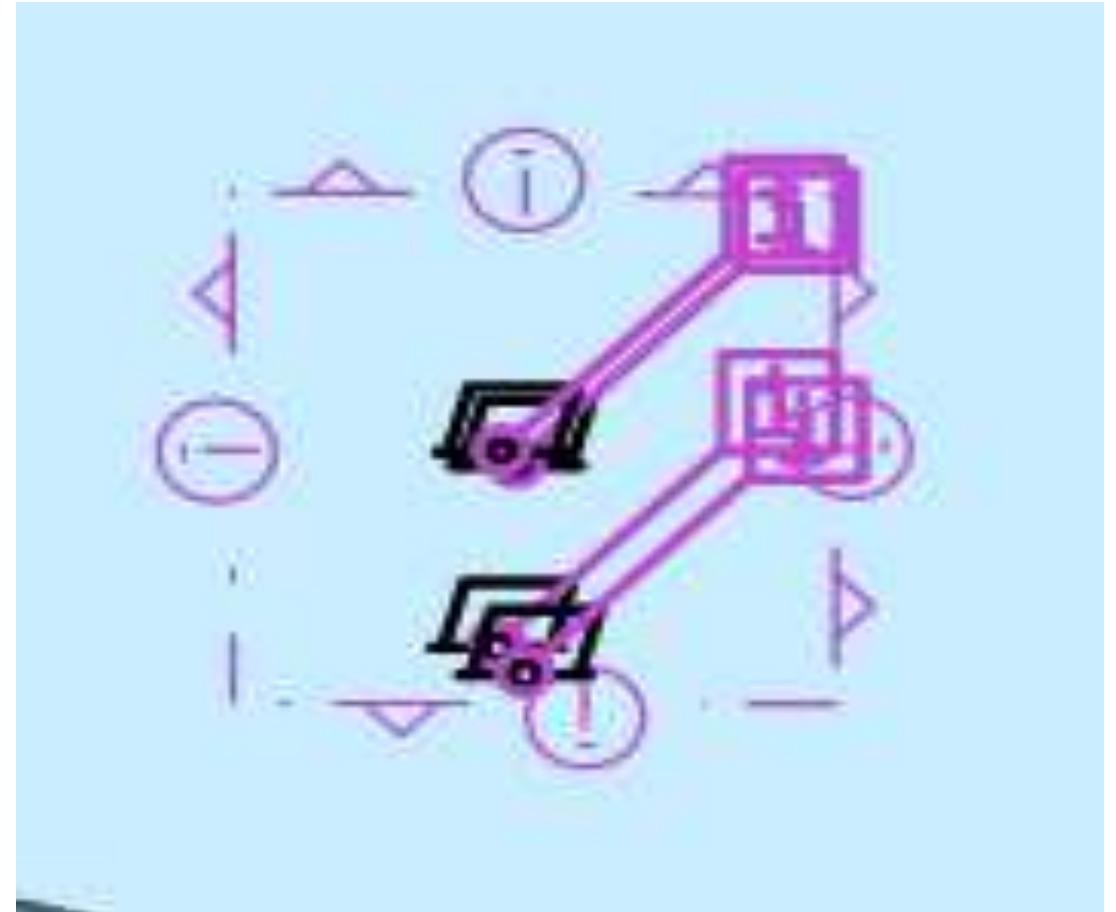
S-101 PC and Mariners Viewing Groups

- Viewing groups intended for mariners' information are currently included in the S-101 PC

- OEM's may prefer to merge their own mariner layer implementations

- #11: Remove mariners' viewing groups / viewing group layers from S-101 PC?

Guidance needed for detection of invalid geometries

- How to handle invalid geometries on data import?

- S-52 / IEC-61174 only address data integrity on the application of updates

- Validation checks in S-58 only apply to data producers

- Conversion of NOAA ENC catalogue (~1500 datasets) results in 11 datasets with invalid geometries (less than 1%)
  - Self-intersecting geometries

- #12: Disallow install of datasets with invalid geometries?

SY(CHDATD01) symbol has no portrayal parameters

- Correspondence with ENCWG confirmed S-52 symbol SY(CHDATD01) has no portrayal attributes
  - Display plane
  - Display priority
  - Viewing group
  - etc.
- #13: Endorse use of INFORM01 attributes or provide other guidance
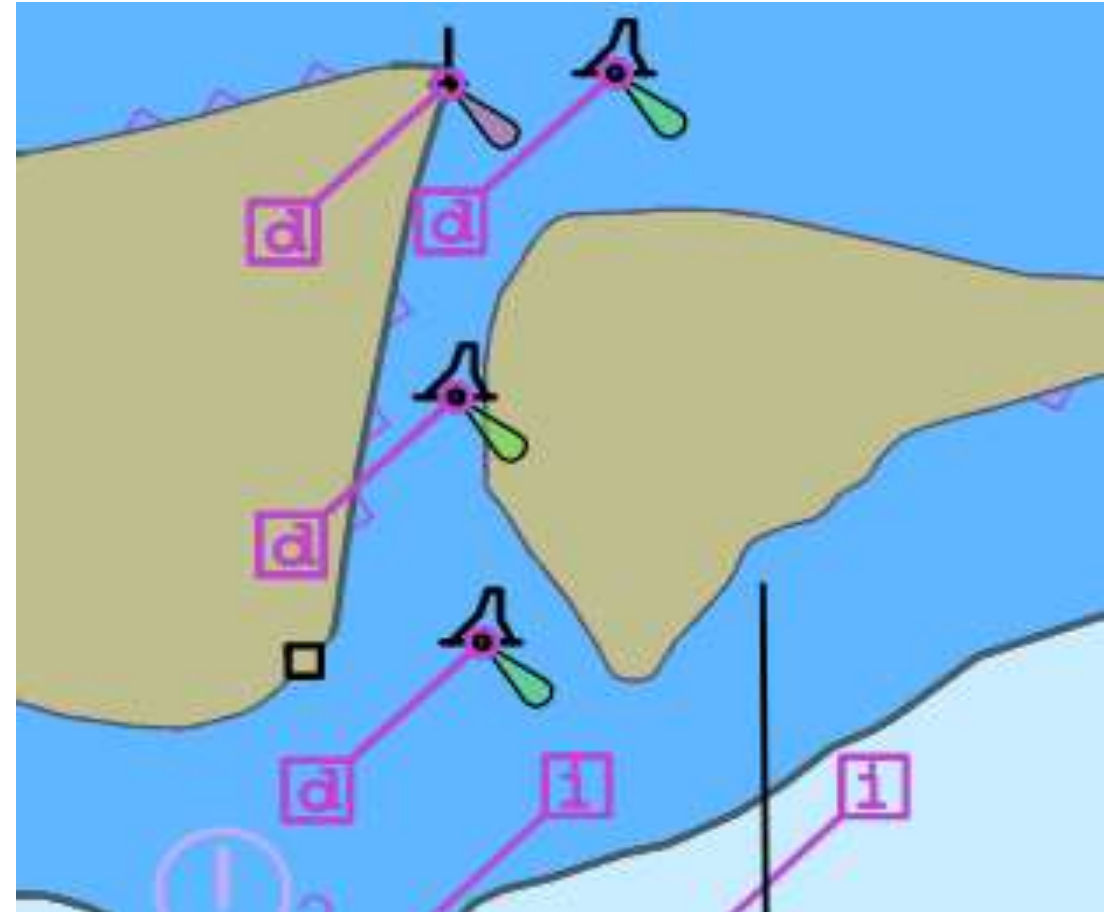
Pick Report: Units of Measure

- To support machine readability, FC should define complex attribute defining value and units as single attribute

- #14: Update FC to support machine readable implementation of S-52 10.8 #4

10.8   Cursor Pick and Interface Panel Display

There are a number of rules that must be applied to all ECDIS cursor pick reports.

No	Cursor Pick Rules
1	Full S-57 Object and Attribute names must be displayed.
2	Enumerate value names must be displayed.
3	There must not be any padding of attribute values, for example a height of 10 metres must not be padded to 10.000000 metres as this could potentially confuse or mislead the Mariner.
4	Units of measure must be included after all attribute values which are weights or measures.
5	S-57 category "C" feature attributes must not be displayed unless

requested by the user. Attributes in this subset provide administrative information about an object and the data describing it. In most cases it is of no practical use to the Mariner. This information is only relevant to S-57 data transferred between Hydrographic Offices.

An exception to show the value of SORDAT if it is for the following objects:
- WRECKS, OBSTRN, UWTROC, and SOUNDG with value QUASOU= 9 and geometry attribute QUAPOS=8
- DRGARE with QUASOU=11
- SWPARE
- Any object class with attribute CONDTN=1or 3 or 5

Pick Report: Sorting by significance

S-52 10.8.4 Sorting by Significance

A general cursor enquiry must be sorted by the drawing priority of the object as defined in the look-up table for symbolizing. When the drawing priority of objects is equal the geometric primitive will be used to order the information, points followed by lines and finally areas.

- #15: Provide rules for aggregates

Pick Report: Category "C" attributes

- No machine readable mechanism to implement requirement

- #16: Update FC to provide machine readable support for requirement

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Provide Guidance on Date Dependent and Safety Check

- S-52 PresLib 4.0.2 Part 1, 10.4.1

  *To provide the Mariner with effective route planning capabilities **and for the look-ahead function during route monitoring** ECDIS must **display date dependent chart data based on a Mariner selected date or date range** (start viewing date and end viewing date)*

- NIWC test bed implements as written

- #17: Recommend working with ENCWG to clarify
  - Safety check during route planning: use mariner selected value(s)
  - Safety check during route monitoring: use current date

61174 4.18 default selector requirement

- S-100 implements text groups as ordinary viewing groups
- S-101 places Important Text in display mode "Other"
  - Viewing group layer 101
- 61174 default selection requires "Standard" with Important Text On
  - Results in default display mode set to "Custom"
- #18: Provide guidance

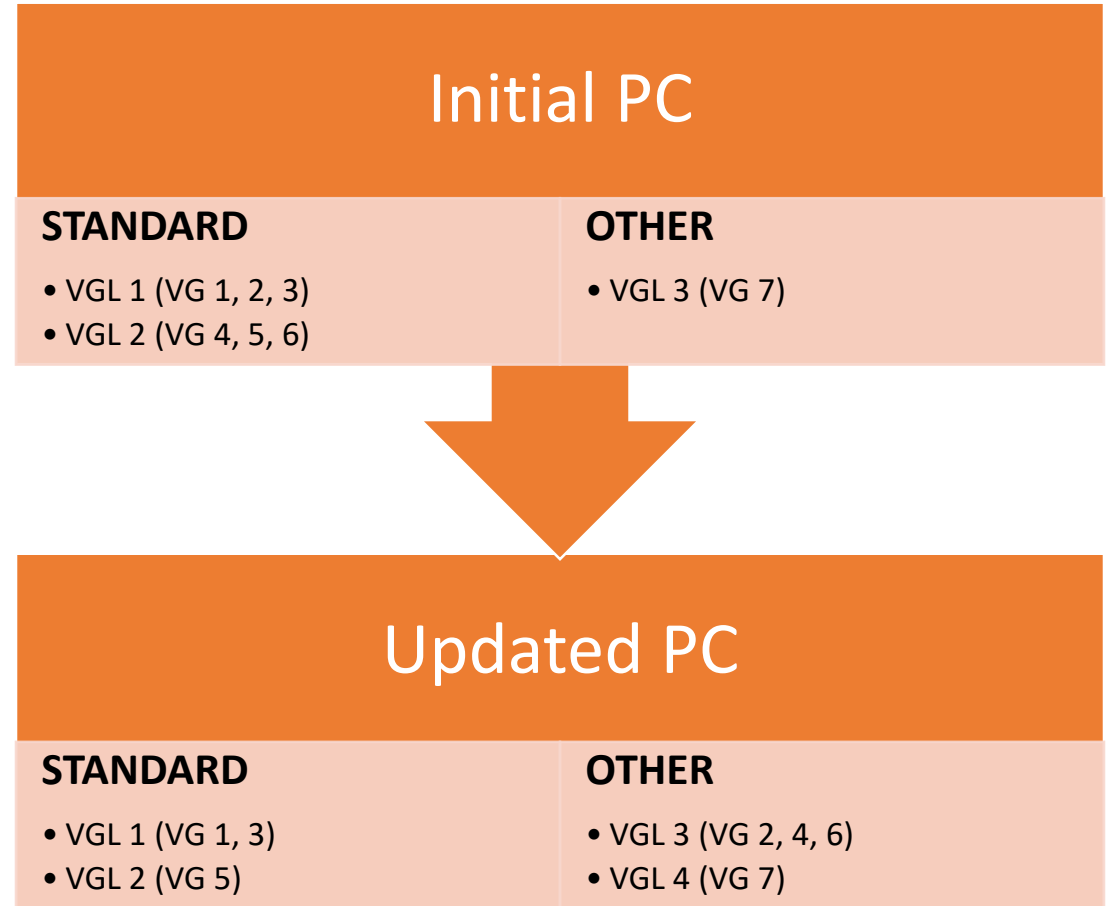Table 3 – Control settings configured in response to 'Default' selection

(Appendix 6 of IMO resolution MSC.252(83))

Function	Setting
Display category	ECDIS Standard display
Chart related selector: Accuracy	Off
Chart related selector: Date dependent objects	current date
Chart related selector: Highlight date dependent	Off
Chart related selector: Full light lines	Off
Chart related selector: Highlight info	Off
Chart related selector: Highlight document	Off
Chart related selector: Unknown	On
Chart related selector: Scale min	Off
Chart related selector: Shallow pattern	Off
Chart related selector: Shallow water dangers	On
Chart related selector: Contour labels, if provided	Off
Chart related selector: Four shades, if provided	Off
Chart related selector: National language, if provided	Remain unchanged
Chart related selector: Paper chart / Simplified symbols	Paper chart
Chart related selector: Plain / Symbolized boundaries	Plain
Chart related selector: Text group layer	Important text
Selected sea area	Around own ship with appropriate off-set
Range	3 NM
Orientation	True motion, north-up

6	Chart scale boundaries	☑
7	Cautionary notes	☑
8	Ships' routeing systems and ferry routes	☑
9	Archipelagic sea lanes	☑
10	Miscellaneous (Standard)	☑
10a	Chart (Standard)	☑
10b	Mariners (Standard)	☑
10c	Alert Highlights (Standard)	☑
11	Spot soundings	☐
12	Submarine cables and pipelines	☐
13	All isolated dangers	☐
14	Magnetic variation	☐
15	Depth contours	☐
16	Seabed	☐
17	Tidal	☐
18	Miscellaneous (Other)	☐
18a	Mariners (Other)	☐
101	Important Text	☐
102	Other Text	☐
102a	Names	☐
102b	Light description	☐
102c	All other chart text	☐
103d	Mariners text	☐

OEM guidance on application of changes to viewing groups

- How should ECDIS application render datasets when set to STANDARD?

- Older datasets use older catalog?
  - May require user to configure multiple PCs
  - Can result in features being off in one group of datasets and on in another

- #19: Recommend apply VG / VGL / Display Mode settings from most recent catalog to all datasets
  - Update S-101 PS

Initial PC

STANDARD	OTHER
• VGL 1 (VG 1, 2, 3) • VGL 2 (VG 4, 5, 6)	• VGL 3 (VG 7)

Updated PC

STANDARD	OTHER
• VGL 1 (VG 1, 3) • VGL 2 (VG 5)	• VGL 3 (VG 2, 4, 6) • VGL 4 (VG 7)

S-101 Feature Dependency Issues

- Buoy and Light are separate features
- Symbol dependency approved at WG5 applies to symbolization of a single feature
- May be possible to use feature association(s) to turn off dependent feature
  - Bindings do not provide machine readable information needed to determine which side is the parent
- #20: Continue testing and report findings / provide recommendations at TSM

Buoy and Light on	Light off	Buoy off
With label	Label turns off due to symbol dependency	Light and label visible
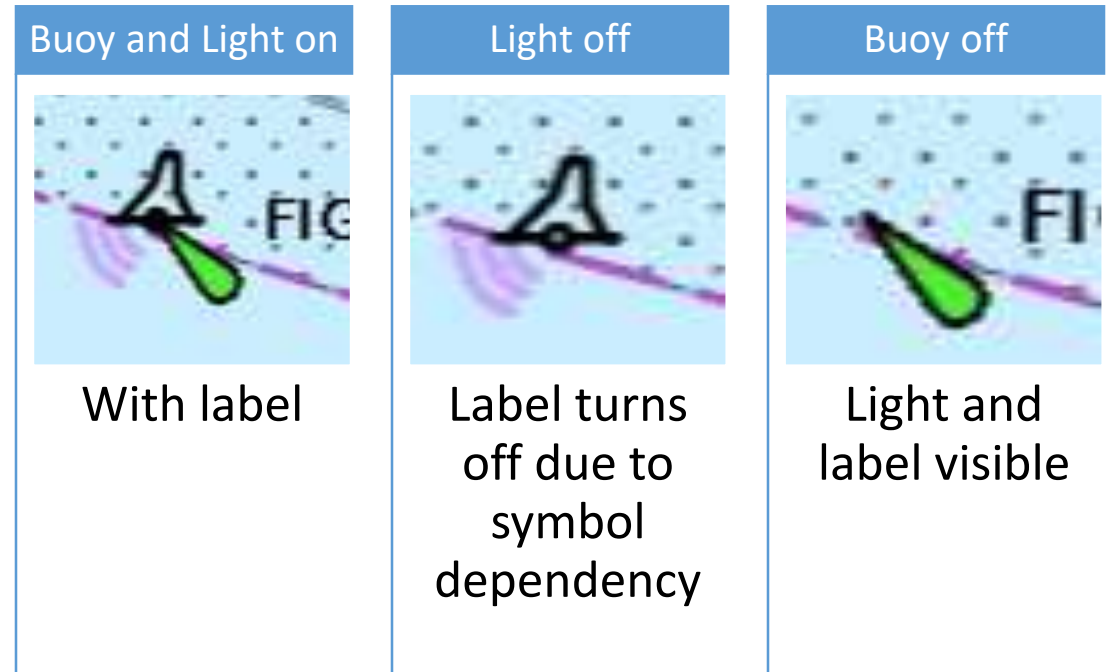
Null or missing attribute values

- S-100 / S-101 provides no guidance on handling of null / missing attribute values
    - Validation
    - Portrayal
    - Safety check
    - etc.
- #21: Provide guidance in S-101 PS

S-52 PresLib 10.3.4.4
Independent Mariner Selections

- Display only if selection is enabled
- Three types of implementation
  1. Context Parameter
  2. Viewing Group
     - Manufacturer implements selector
  3. Manufacturer responsibility
- Avoid use of context parameters
  - Performance
  - Minimize user input
  - Recommended changes:
    - Ignore SCAMIN -> None
    - Shallow pattern -> 23010
    - Shallow water dangers -> 24020 / 24050
- #22: Provide guidance
  a) Update S-101 PS with OEM requirements
  b) Update PC with recommended changes to context parameters?

Selection	S-101 Implementation
Accuracy	Viewing group 31010
Date dependent	None
Full light lines	Context parameter: "Full sectors"
Highlight date dependent	Viewing group 31030
Highlight info	Viewing group 31030
Highlight document	Viewing group 31031
Paper chart / simplified symbols	Context parameter: "Simplified points"
Plain / Symbolized boundaries	Context parameter: "Line symbol style"
Scale min (Turn SCAMIN off)	Context parameter: "Ignore scamin"
Shallow pattern	Context parameter: "Shallow pattern"
Shallow water dangers	Context parameter: "Show isolated dangers in shallow waters"
Unknown (toggle "?" symbol)	Viewing group 21010
Update review	None