Alerts and Indications Model for S-100 (proposed)

Presented by NIWC

for TSM7

Sept 2019

References

IEC

- 61174:2015 – ECDIS performance requirements
- 62288:2014 – Presentation of navigation information on shipborne navigational displays
- 62616:2010 – Bridge navigational watch alarm system (BNWAS)

IMO

- Assembly
  - A.1021(26) – Code on alerts and indicators, 2009
- Maritime Safety Committee
  - MSC.302(87) – Adoption of Performance Standards for Bridge Alert Management
  - MSC.252(83) – Revised performance standards for INS
  - MSC.232(82) – Revised performance standards for ECDIS

Definitions

Alert: Announces abnormal situations requiring attention

- Priority
  - Alarm: Highest priority of alert. Condition requiring immediate attention and action by the bridge team, to maintain the safe navigation of the ship.
  - Warning: Condition requiring no-immediate attention or action by the bridge team. Warnings are presented for precautionary reasons to make the bridge team aware of changed conditions which are not immediately hazardous, but may become so, if no action is taken.
  - Caution: Lowest priority of alert. Awareness of a condition which does not warrant a alarm or warning condition, but still requires attention out of the ordinary consideration of the situation or of given information.
- Category
  - A: Graphical information at the task station directly assigned to the function generating the alert is necessary, as decision support for the evaluation [of] the alert related condition.
  - B: No additional information for decision support is necessary besides the information which can be presented at the central alert management HMI.

Indication: Display of regular information and conditions, not part of alert management

- Permanent Indication: Indication not to be removed from the display
- Other informal terms are used: e.g. “clear indication”

Background

2014 - TSMAD28 12.4A

- What is needed for full machine readability

2015 - TSM3 5.3

- Need for an Alerts and Indications Model for S-100

2016 - S-100WG1 10.12A

- Proposed Alerts and Indications Model for S-100 (XSLT, new Part X)

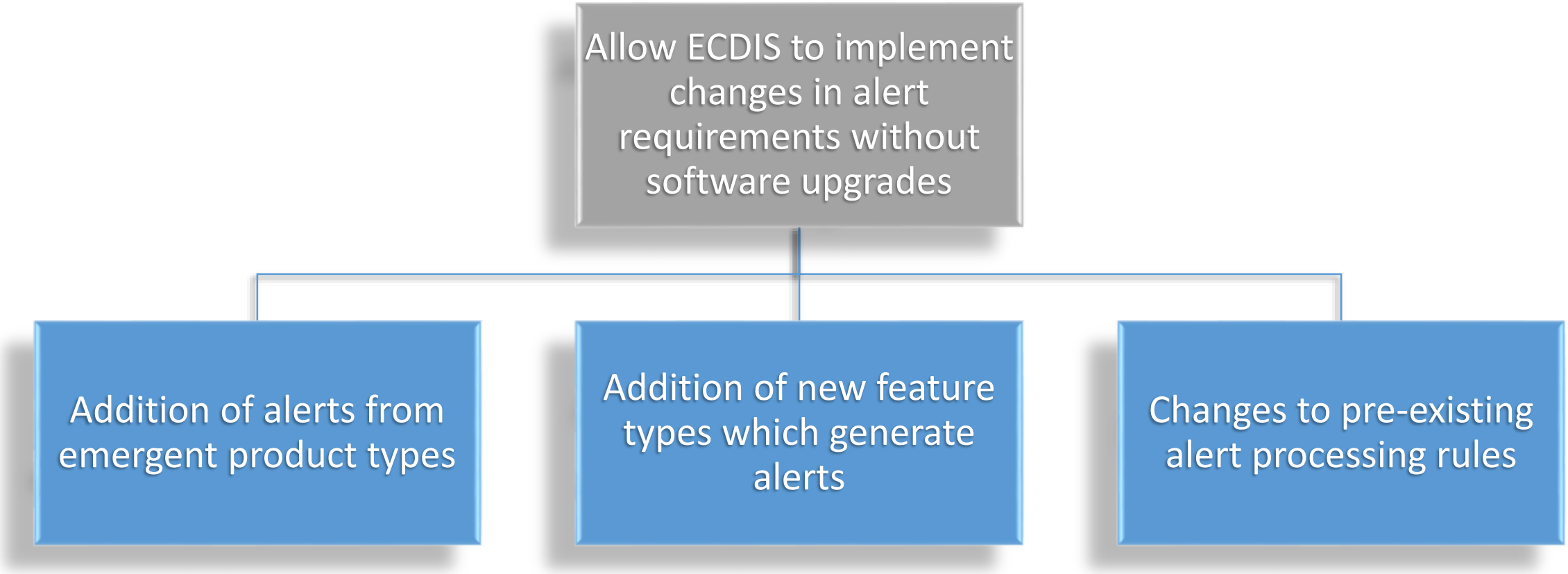
2018 - TSM6 4.4

- Proposed Alerts and Indications Model for S-100 (XML, extends Part 9)

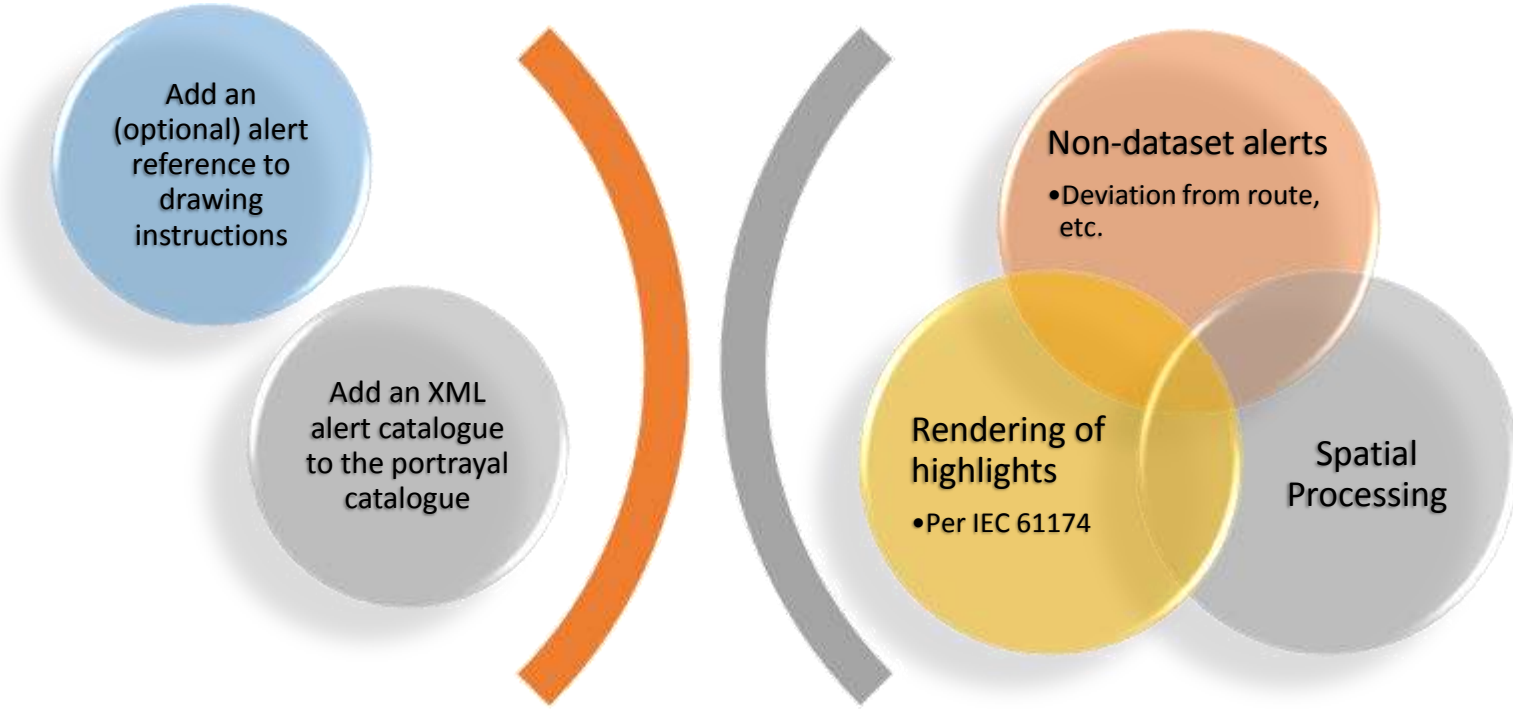
2019 – TSM7 5.2

- Proposed Alerts and Indications Model for S-100 (Simplified)

Design Goals



Design Approach



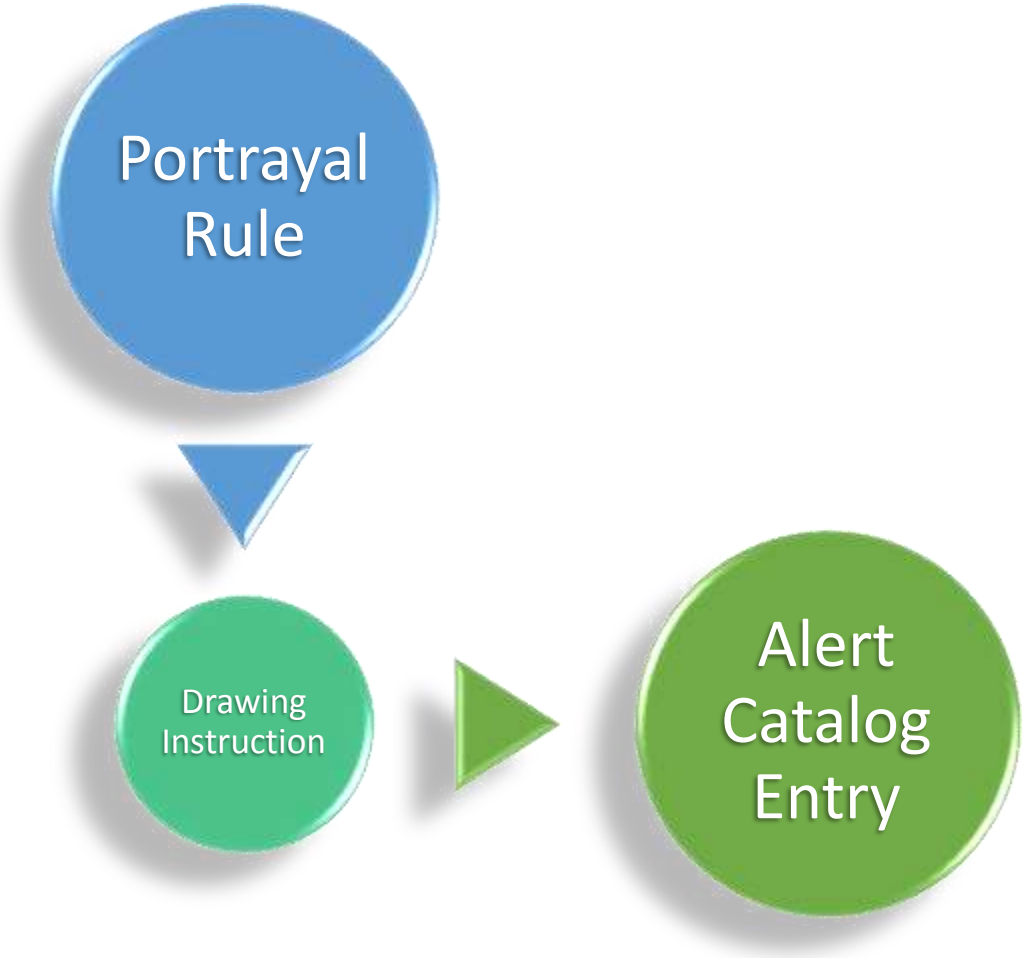
Extend the portrayal model (Part 9/9a)

Manufacturer Responsibilities

Model Overview

An alert catalogue is provided as a component of the portrayal catalogue, it provides alerts and supporting components

Portrayal rules generate drawing instructions which optionally associate feature, component, or augmented geometries with alert catalogue entries



Required Changes to Part 9

Add *AlertCatalog* to *FileType*

- Font
- AreaFill
- LineStyle
- Symbol
- ColorProfile
- Pixmap
- Rule
- AlertCatalog

Add *AlertCatalog* reference to *PortrayalCatalog*

- Adds an external file reference to PortrayalCatalog.xml

Add class *AlertReference*

- *reference*
  reference to an *alert* in the alert catalog
- *plan*
  a viewing group for highlighting in route planning
- *monitor*
  a viewing group for highlighting in route monitoring

Add *alertReference* to *DrawingInstruction* class

- Multiplicity: *0..1*
- Type: *AlertReference*
- Adds optional alert reference to all drawing instructions

Required Changes to Part 9a

Add Alert state commands

- AlertReference

Functionality

- Associates an alert with geometries
- Supports feature, augmented (soundings) and component (safety contour) geometries
- Supports coverages

AlertReference parameters

- *alertReference* reference to an *alert* in the alert catalog
- *plan* viewing group for highlighting
- *monitor* viewing group for highlighting

Sample Drawing Instruction

Part 9

```
<lineInstruction>
  <featureReference>4</featureReference>
  <spatialReference>2</spatialReference>
  <alertReference plan="123"
monitor="321">MyAlert</alertReference>
  …
</lineInstruction>
```

Part 9a

```
SpatialReference:2
AlertReference:MyAlert,123,321
…
LineInstruction:lineStyle
```

Contents of the Alert Catalog

Messages

- Referenced by other catalog contents
- Language independent text
- Optional icon
  - Reference to PC symbol

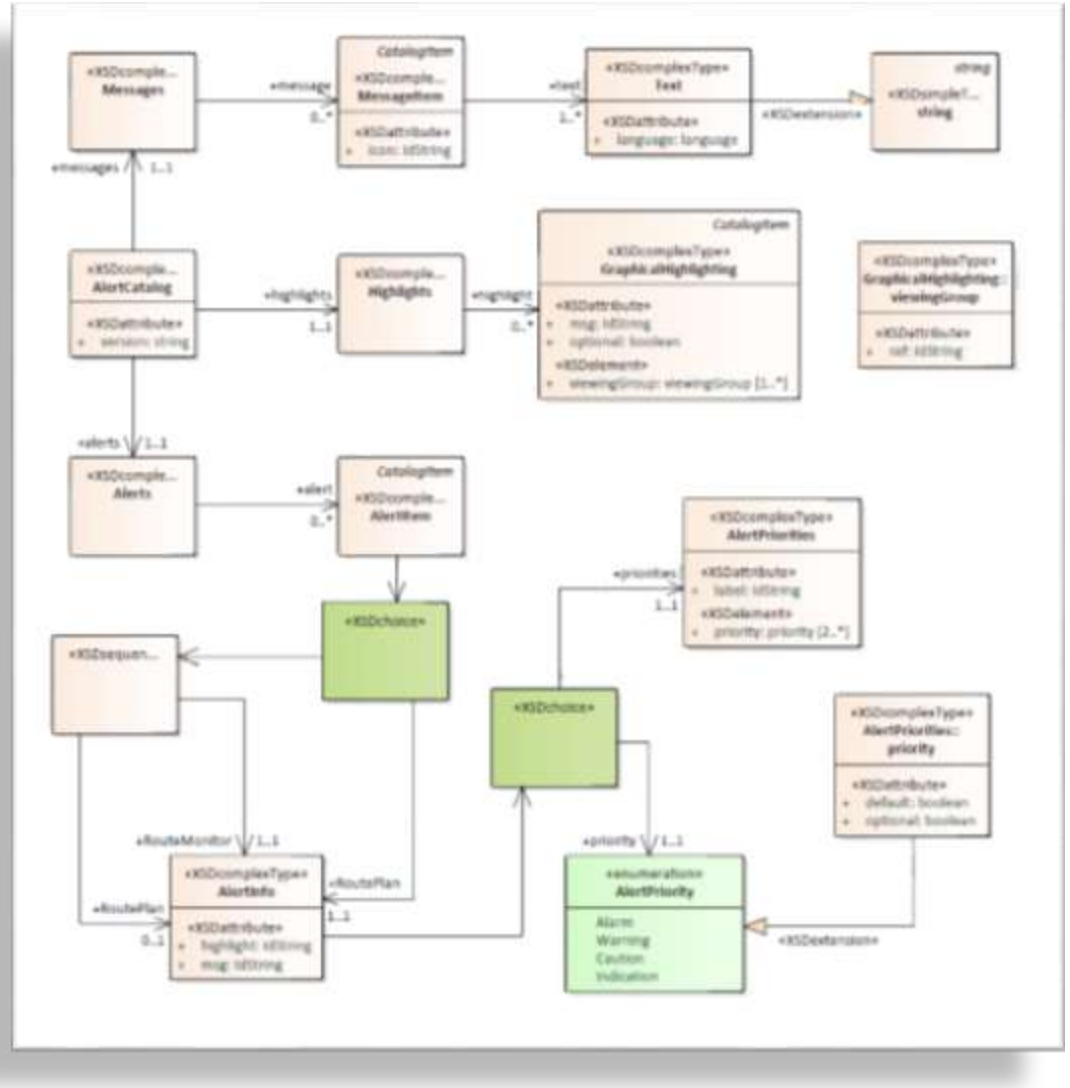
Highlights

- Supports turning graphical highlights on / off
- Reference to viewing group(s)
- Optional
  - Reference to message for display when highlight is off

Alerts

- Describes behavior
  - Route Monitoring
  - Route Planning
- Alert priority
- Message to display when the alert is active
- Optional
  - Highlight reference
  - Alternate priorities

Alert Catalog UML



Contents of the Alert Catalog

Name	Description		Type
AlertCatalog	A container of catalogue items	-	-
version	The version of the catalogue	1	string
messages	Container of messages used within the alert catalogue	1	Messages
highlights	An indication to display when the selector is disabled. Only used with *Boolean* selectors.	1	Highlights
alerts	Indicates whether active alerts should be cleared. Only used with *Boolean* selectors.	1	Alerts

Messages

Name	Description		Type
Messages	A container of MessageItems	-	-
message	Definition of a message	0..*	MessageItem

Name	Description		Type
MessageItem	Language independent message with optional icon	-	Subtype of CatalogItem
icon	Reference to a symbol in the portrayal catalogue	0..1	string
text	Language specific text	1..*	Text

Name	Description		Type
Text	Language specific string	-	Subtype of string
language	Identifies a language, default is eng. ISO 639-2/T alpha-3 code (eng – English, deu – German).	0..1	string

Highlights

Name	Description		Type
Highlights	A container of GraphicalHighlighting items	-	-
highlight	Definition of a highlight	0..*	GraphicalHighlighting

Name	Description		Type
GraphicalHighlighting	Associates viewing groups with alert information	-	Subtype of CatalogItem
optional	Allowing the highlight to be turned off is not required. Default is false.	0..1	boolean
msg	A reference to a message to be displayed while any of the viewing groups are disabled.	0..1	string
viewingGroup::*ref*	References viewing groups used to control graphical highlighting.	1..*	string

Alerts

Name	Description		Type
Alerts	A container of AlertItem items	-	-
alert	Definition of an alert	0..*	AlertItem

Name	Description		Type
AlertItem	Describes a single alert	-	Subtype of CatalogItem
routeMonitor	The alert behavior in route monitoring	0..1	AlertInfo
routePlan	The alert behavior in route planning	0..1	AlertInfo

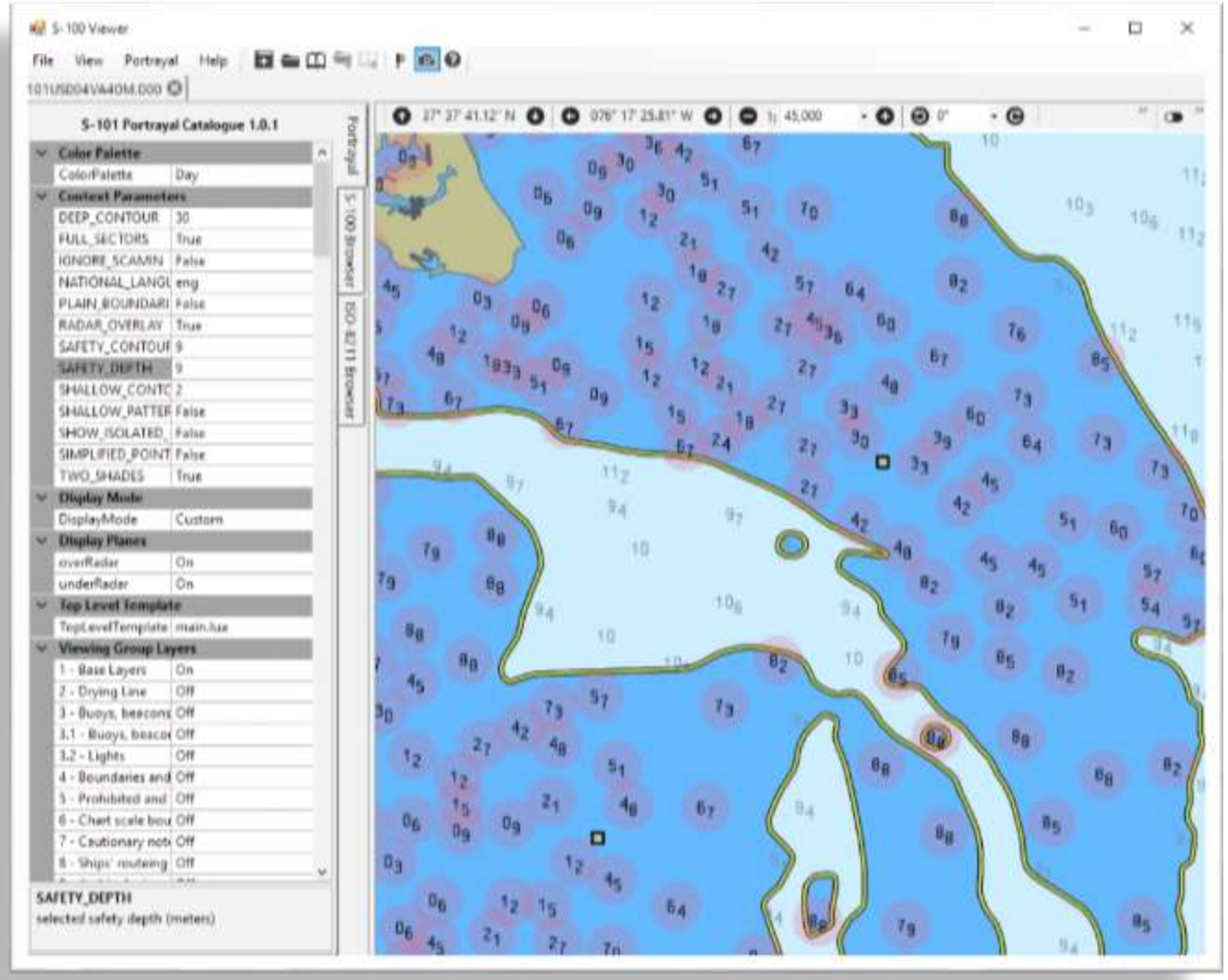
Name	Description		Type
AlertInfo	The behavior of an alert	-	-
msg	Reference to a message to be displayed when the alert is active. E.g. “Crossing safety contour”	1	string
highlight	Reference to a highlight	0..1	string
priority	A single alert priority	1	AlertPriority
priorities	A set of alert priorities		AlertPriorities

Alerts::Priority

Name	Description		Type
AlertPriority	Enumerates the possible priorities of an alert.	-	-
Alarm	MSC.252(83) 19.1.2	-	-
Warning	MSC.252(83) 19.1.3	-	-
Caution	MSC.252(83) 19.1.4	-	-
Indication	Display of regular information and conditions	-	-

Name	Description		Type
AlertPriorities	A set of alert priorities	-	-
label	Reference to a message used to label the UI component which allows selection of the alert priority	1	string
priority	An alert priority	2..*	AlertPriority
priority::*default*	Identifies the default priority. Default value is false.	0..1	boolean
priority::*optional*	Indicates allowing the user to choose this priority is optional. Default value is false.	0..1	boolean

AlertInstruction example



Limitations

IEC 61174 changes could cause software updates

- Non-dataset alert requirements
- Spatial processing (alert trigger) requirements
- Graphical highlighting styles

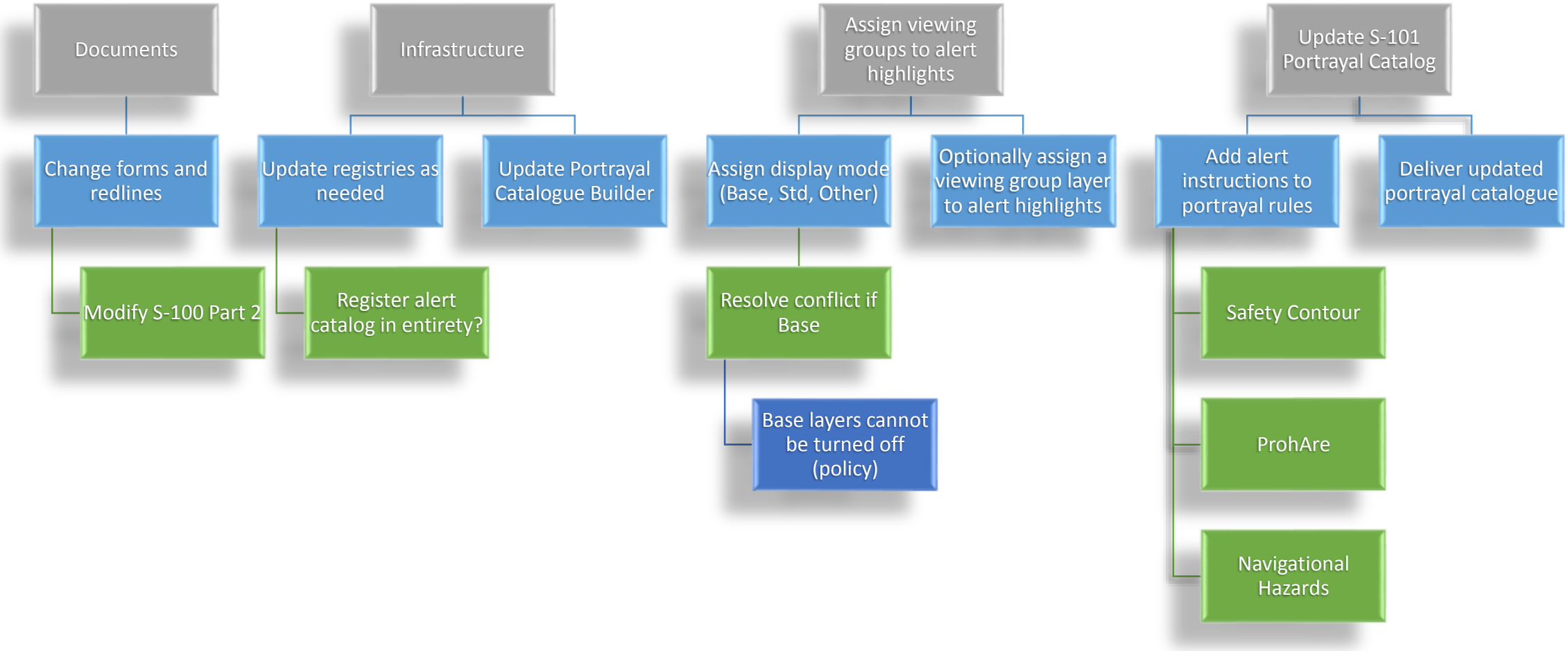
Coverage Requirements

- Spatial processing (alert trigger)
- Highlighting
- Discrete coverages can be treated as points; continuous coverages require implementation guidance

XSLT cannot alert on augmented geometries which are not portrayed

- No equivalent to *NullInstruction* for augmented drawing instructions
- Coverages do not have this limitation
  - Use *LookupEntries* with no portrayal elements

Work Remaining



Deliverables