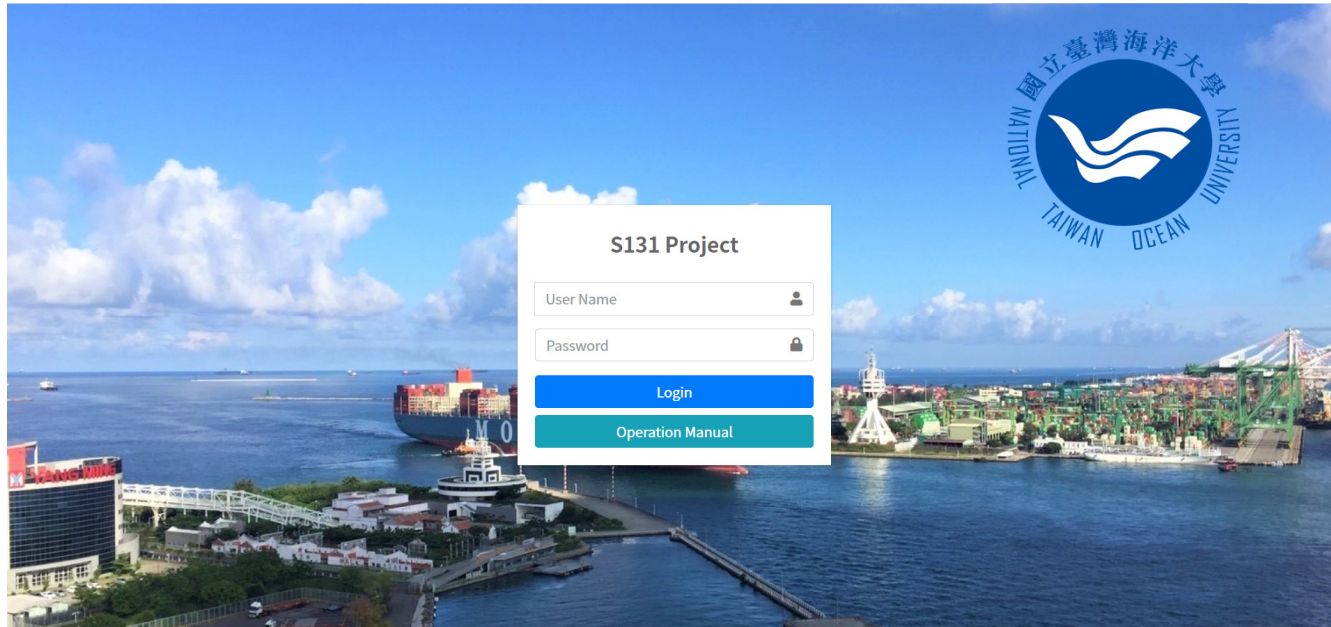


## *Feedbacks from the System Design and Implementation for S-131 Database Project*

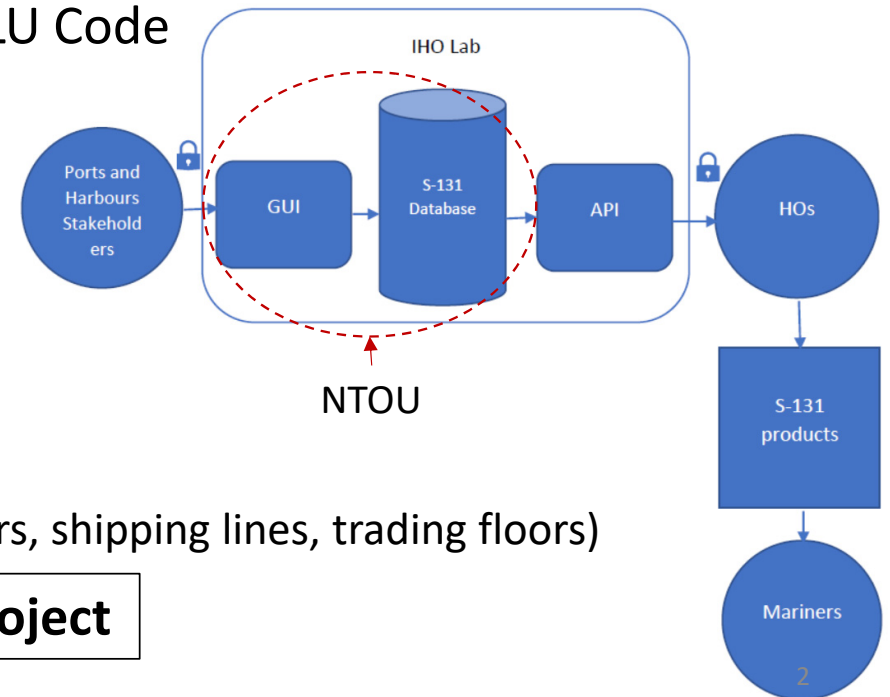
Agenda Item HSSC15-PS9

Shwu-Jing Chang, National Taiwan Ocean University (NTOU)



# S-131: Goals or Targets

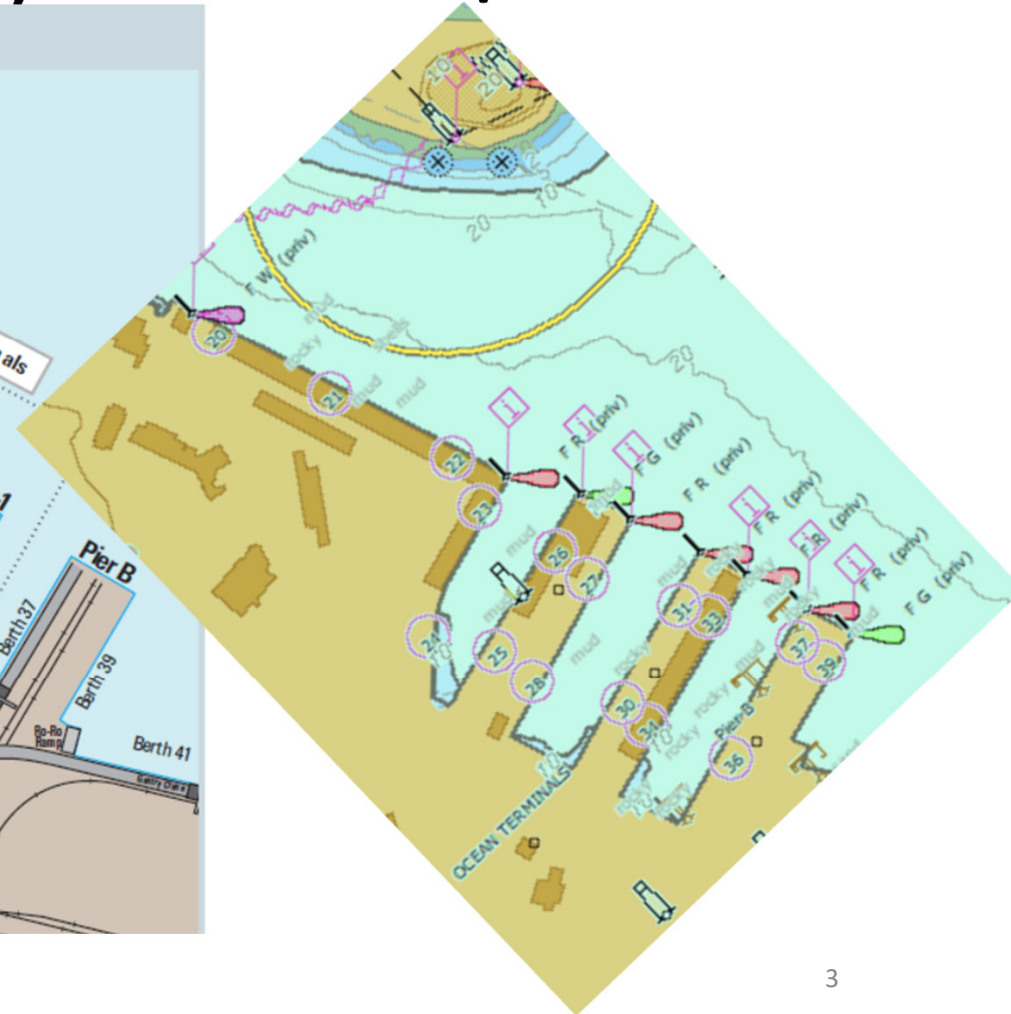
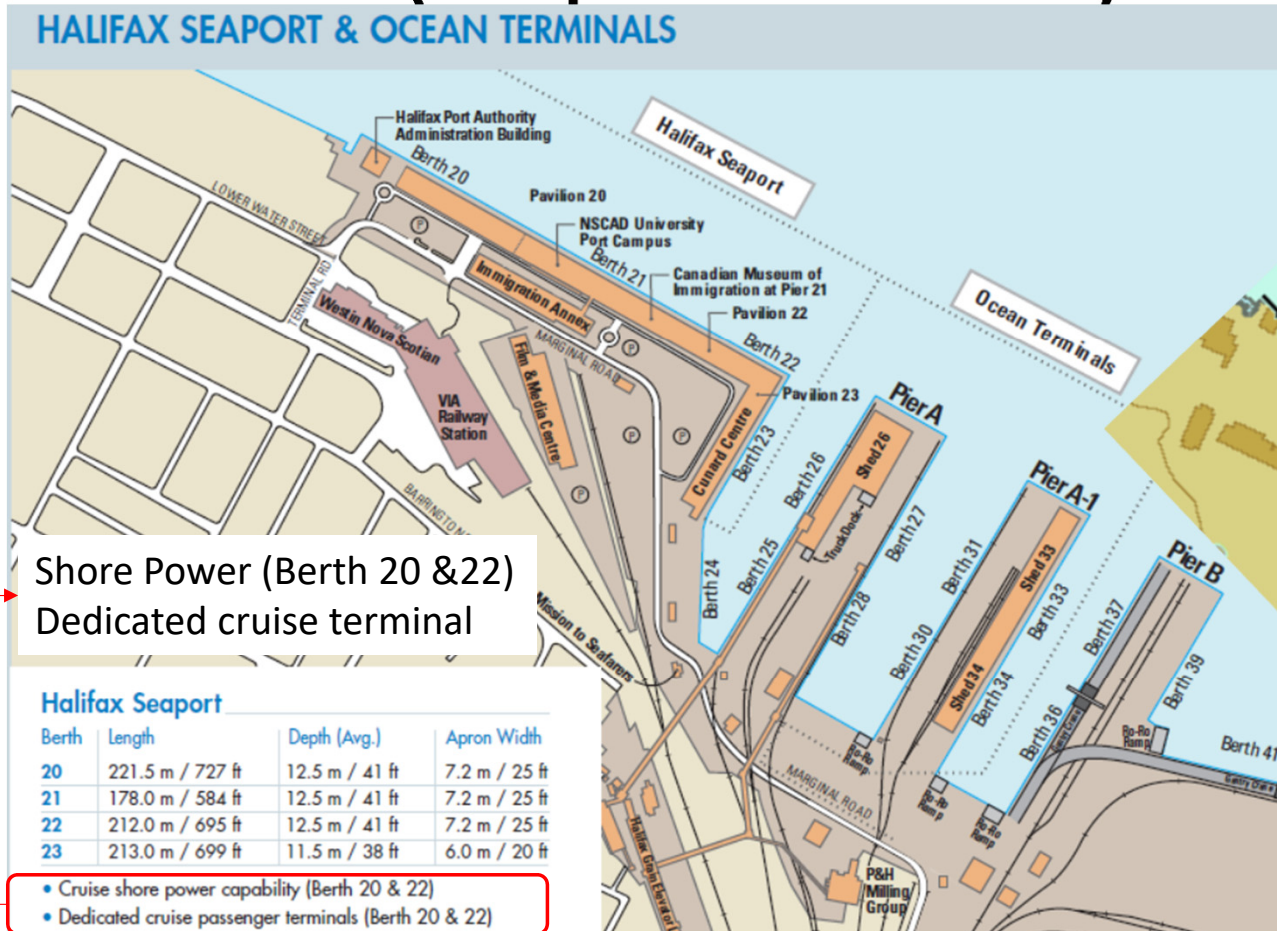
- S-131 Marine Harbour Infrastructure (MHI) Product Specification
  - Voyage planning [IMO A.893(21)] : berth-to-berth
    - including those areas necessitating the presence of a pilot
  - Port Information Books [IMO A.862(20)]: BLU Code
- The IHO-SG Lab S-131 Database Project
  - Improve the information exchange
    - between harbours and HOs
  - Support the creation of S-131 products
  - Facilitate the exchange of information
    - compliant with S-101 and S-131
    - between harbours, HOs and port users (mariners, shipping lines, trading floors)



**Update S-131 with observations from the project**

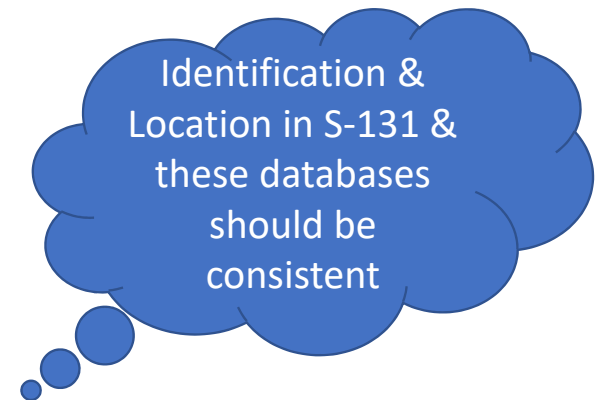
# Port Info.(Map on Website)

# ENC/ECDIS



# 1<sup>st</sup> Step: Identification & Location

- Reference databases (as resources to all users)
  - UN/LOCODE
    - <https://unece.org/trade/uncefact/unlocode>
  - SMDG (Container) Terminal Code
    - ~ monthly update on <http://smdg.org/smdg-code-lists>
  - IMO Port Facility Number (GISIS ISPS Code database)
    - <https://gisis.imo.org/Public/ISPS/Download.aspx>
  - [IMO GISIS Port Reception Facility Database] → Information (no geometry)
    - MEPC.1/Circ.834/Rev.1 ..Guidance for port reception facility providers and users
- Add port database, features → Locate & identify the features → edit



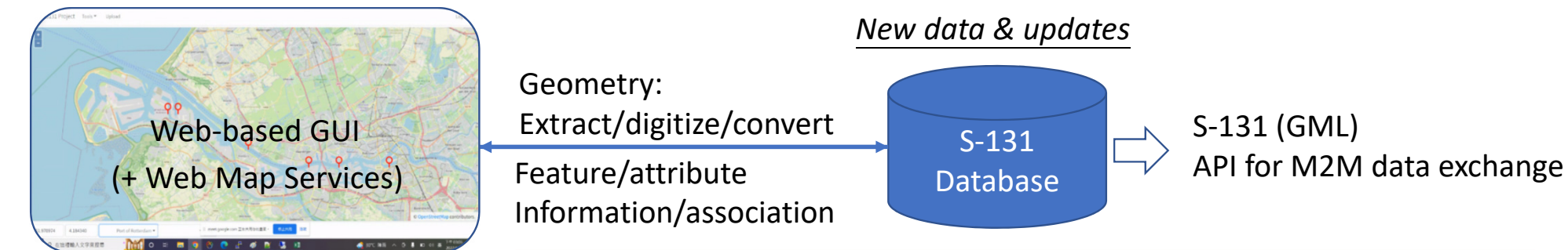


# Common Resources : IMO GISIS, SMDG,...

The screenshot displays the S131 Project GIS interface. The main map shows East Asia with various port locations marked by colored circles: blue for UN/LOCODE, red for SMDG Terminal Code, and green for IMO approved port facility numbers. A legend in the top right explains these symbols. Three property windows are overlaid on the map:

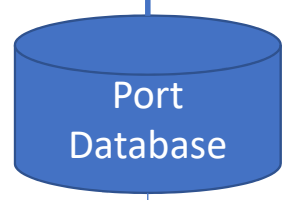
- SINGAPORE ANCHORAGES** (green border):
  - country\_name : Singapore
  - port\_name : Singapore
  - facility\_name : SINGAPORE ANCHORAGES
  - imo\_port\_facility\_number : SGSIN-0089
  - description : As directed by the Port Master
- Kaohsiung** (blue border):
  - un\_locode : TWKHH
  - mainportname : Kaohsiung
- TWKHH | LIEN HAI TERMINAL (W42-W43)** (red border):
  - name : TWKHH | LIEN HAI TERMINAL (W42-W43)
  - unlocode : TWKHH
  - terminal\_code : KHHPT
  - terminal\_company\_name : LIEN HAI TERMINAL CORP.
  - terminal\_facility\_name : LIEN HAI TERMINAL (W42-W43)
  - terminal\_website : <https://www.gccports.com/index.php?/directory-details/lien-hai-terminal-stevedoring-co-ltd>

The interface also includes a sidebar with categories like HarbourAreaAdministrative, Terminal, and Berth, and a search bar at the bottom.



Upload or Overlay

Geodata (Resource):  
GIS files (.shp)  
Text and Graphics  
GML ?



Port Information Guide  
Port Website

### SOUTH END CONTAINER TERMINAL

**Operator:** PSA Halifax  
**Terminal Size:** 76.5 acres / 31 hectares  
**Reefer Outlets:** 714 in-ground outlets X 480V 3PH 60Hz 32Amps  
**Throughput Capacity:** 500,000 TEU  
**Cargo Capacity:** Container, Ro/Ro, Breakbulk & Heavy-lift  
**Equipment:**

- 5 Super Post Panamax (SPPX) Cranes:
  - 10 high X 24 wide (1)
  - 8 high X 23 wide (2)
  - 7 High X 21 wide (2)
- 2 Ro/Ro ramps
- 8,000 ft of on-dock, double-stack rail services (320 TEU)
- No navigational/height restrictions

Pier B			
Berth	Length	Depth (Avg.)	Apron Width
36	190.5 m / 625 ft	13.9 m / 45 ft	Unrestricted
37	190.5 m / 625 ft	14.1 m / 46 ft	Unrestricted
39	190.0 m / 623 ft	14.1 m / 46 ft	Unrestricted

Pier C			
Berth	Length	Depth (Min.)	Apron Width
41/42	800 m / 2,625 ft	16 m / 52.5 ft	Unrestricted

**PSA Halifax**  
 577 Marginal Road  
 Halifax, Nova Scotia  
 Canada B3H 4P6

Phone: (902) 421-1778  
 Website: www.psalhalifax.com

# GUI: Key Feature Types (+ Feature) (+ Info)

The image shows a software interface for managing feature types. On the left, a tree view displays a hierarchy of feature types under 'S131 Project Database Resources'. The 'HarbourAreaAdministrative' folder is expanded, showing sub-features like 'featureName', 'uNLocationCode', 'categoryOfHarbourFacility', 'generalHarbourInformation', and 'geometry'. A red box highlights this tree view with the text '(with multiplicity)'. Below the tree, there are two buttons: '+Feature' and '+Info'. A red arrow points from the '+Info' button to an 'Add Information' dialog box. The dialog box is open, showing a list of information types. 'Service Hours' is selected and highlighted in blue. A tooltip for 'Service Hours' is visible, stating: 'The time when a service is available and known exceptions.' Another red arrow points from the 'Add Information' dialog to a context menu that is open over a feature in the tree view. The context menu includes options: 'Add Attributes', 'Add Relationship', 'Edit Geometry', 'Rename', and 'Remove'. The text 'Contents of GUI, including hover text (tips) : Generated from the S-131 Feature Catalogue (draft)' is positioned above the context menu.

Contents of GUI, including hover text (tips) :  
Generated from the S-131 Feature Catalogue (draft)

(with multiplicity)

+Feature +Info

58.130680 7.976165

The time when a service is available and known exceptions.

# Upload Resource (zipped GIS files)

Add feature from uploaded resource || Batch create features while uploading

The screenshot displays the S131 Project GIS application interface. The top navigation bar includes 'S131 Project', 'Database', 'Resource', and 'Settings'. The left sidebar shows a tree view of the project structure, with 'Berth' selected. A context menu is open over 'Berth', with 'Add From Resource' highlighted. The main area shows a map of the 'CAMTR - Montreal' project, with a red rectangle indicating a specific area. A legend on the right side of the map identifies symbols for 'Port Unlocode' (blue circle), 'SMDG Terminal Code' (red circle), and 'ISPS Port Facility' (green circle). The 'Data View' panel on the right shows the attribute table for the selected feature, with columns for 'Attribute Name' and 'Value'. The 'Value' column contains 'B1, B2'. A table titled 'Uploaded Resource' is also visible, showing a list of resources with columns for '#', 'NO\_POSTE\_Q', and 'M2, M3, M4, M5'. The 'Berth' folder in the tree view is expanded, showing a list of 'Berth' features.

Uploaded Resource

#	NO_POSTE_Q
1	M2, M3, M4, M5

adminTest

Port Unlocode  
SMDG Terminal Code  
ISPS Port Facility

Attribute Name	Value
	B1, B2

8



# Geometry (edit on map and/or coordinates)

**Geometry Point**

DDMMSS

Latitude: 58 08 12.4101

Longitude: 7 59 24.9457

OK

#	Latitude
1	58.1375403
2	58.1367806
3	58.1351959
4	58.1365852
5	58.1375837

**Geometry**

Curve Point Curve Surface

Submit

	Latitude	Longitude	Edit	Delete
1	58.1376142	7.9797444	Edit	Delete
2	58.1370572	7.9835462	Edit	Delete
3	58.1379707	7.9867004	Edit	Delete
4	58.1367772	7.9932880	Edit	Delete

Layer transparency/Hide/Show/Set to top  
Point/Curve/Surface; Coordinate Formats

# Add Attributes : Simple, Complex, (+Inherited)

The screenshot displays a GIS application interface for a project named 'S131 Project'. The main window shows a map of a harbour area with a 'Berth' feature highlighted in red. The 'Add Attribute' dialog box is open, showing a list of attributes. The 'Available Berthing Length' attribute is selected, and a tooltip is visible next to it, stating: 'The length of a berth or dock which is available for use.'

The 'Add Attribute' dialog box contains the following attributes:

- Key Attribute
- Key Attribute
- Feature Name
- UN Location Code
- Specific Attribute
- Available Berthing Length** (The length of a berth or dock which is available for use.)
- Bollard Description
- Bollard Pull
- Minimum Berth Depth
- Elevation
- Cathodic Protection System
- Category of Berth Location
- Port Facility Number
- Bollard Number
- GLN Extension
- Metre Mark Number
- Manifold Number
- Ramp Number
- Location by Text
- Method of Securing
- Terminal Identifier

The background map shows a harbour area with a 'Berth' feature highlighted in red. The map includes a scale bar (0 to 5 km) and a 'Source' label. The application interface includes a menu bar (S131 Project, Database, Resource, Settings) and a left sidebar with a tree view of the project structure.

# Observations

- S-131 data model
  - Split information (edited books, designed web pages) into data elements
    - Feature Types, Information Types, Attributes (+ Spatial Geometry + Support Files)
  - Group or link by using “multiple levels” of complex attributes and associations
    - generalHarbourInformation/generalPortDescription/textContent/information/fileReference
    - Feature → Regulations → Applicability (→ Authority → ContactDetails )
- Challenge - Encoding
  - source material → mapping to data model (assisted by GUI/software) → dataset
    - Narrative texts providing explanations and advice; annotated photo; illustrating graphics ?
- Challenge - Viewing
  - dataset → data model → portrayal → user interface for human cognition ( mental map)  
→ machine, for automation ?
  - How to improve the end result /usability ? “Who” is responsible to “which” ? Collaboration
- Challenge - Information Exchange
  - S-131 data model is fundamentally different from that of known GIS system
  - Need additional ‘middle-ware’ for M2M connection with existing GIS system to be useful

# Related general discussions in NIPWG (extract)

NIPWG-VTC03-06.8A : “Gap between French SDs and S-100 based nautical publications” ,December 2022



## Trends

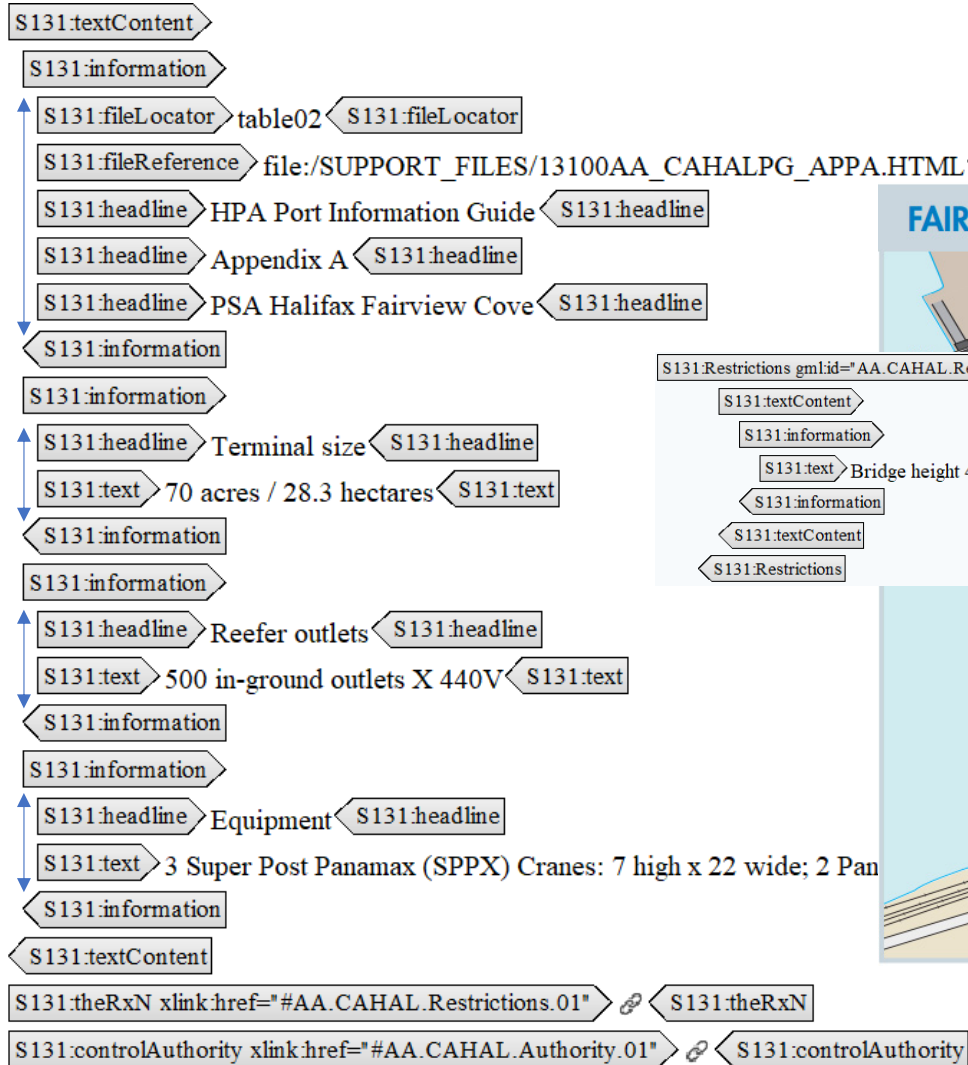
- Simple model for high added value (modeling according to the result on the display)
- Easy to produce data using existing material (current SD)
- Keep textual explanations and advice in the data (better than a complex model involving tricky/impossible production and unlikely ECDIS advanced features).

NIPWG\_VTC01\_2023\_06.0A: “Concepts for Associations”, March 2023

- **NPUBs use of associations and information types is complex**
  - Pick report-like portrayal is insufficient especially for associations.
  - Producer U/I based purely on data objects is likely to be difficult to use.
  - Other concepts are needed for both production and end-user portrayal interfaces.



# Encoding - in S-131 Sample Dataset : AA.CAHAL.Terminal.05



**FAIRVIEW COVE CONTAINER TERMINAL**

**AA.CAHAL.Restrictions.01**

Restrictions: Bridge height 49 m at high tide with 1.35 m minimum air gap clearance.

Berth	Length	Depth (Min.)	Apron Width
East	370 m / 1,214 ft	16.8 m / 55 ft	Unrestricted
West	330 m / 1,083 ft	16.8 m / 55 ft	Unrestricted

**Ceres Halifax Inc.**  
 6708 Bayne Street  
 P.O. Box 8958  
 Halifax, Nova Scotia  
 Canada B3K 5M6  
 Phone: (902) 453-4590  
 Email: cwhidden@cereshalifax.com

**AA.CAHAL.Authority.02**  
 #AA.CAHAL.ContactDetails.02

<https://www.portofhalifax.ca/wp-content/uploads/2021/03/POH-Harbour-and-Facilities-Map-Feb-2021-Fairview-Cove.pdf>

# Viewing - textContent (fileReference, headline, text) of that Terminal

The screenshot displays the GML WebViewer interface with several key components:

- Related File:** A table showing details for a file named `.htm (filereference + fileLocator)`.
 

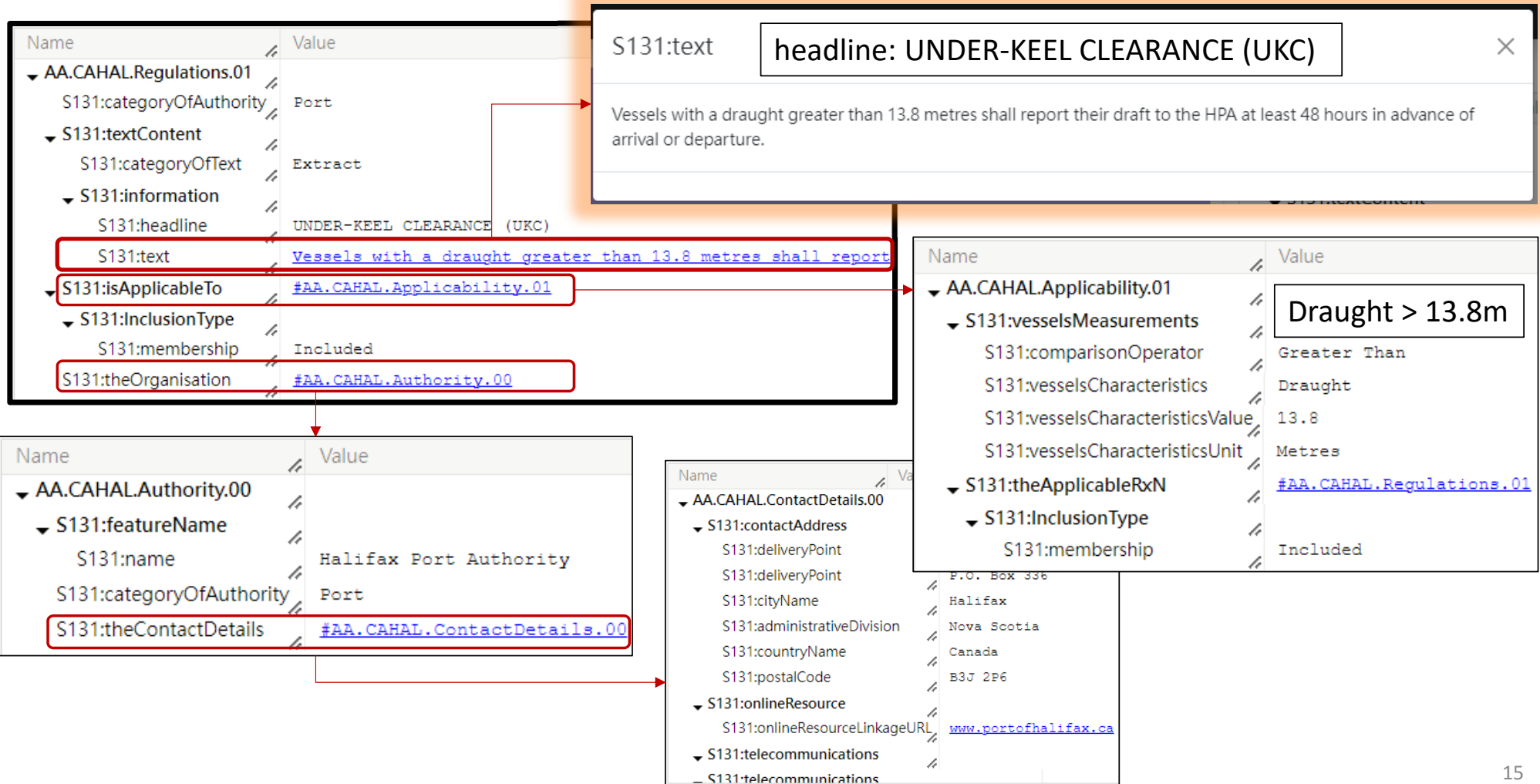
Port	PSA Halifax Fairview Cove
Section	Halifax Harbour- Bedford Basin
Date	April 1, 2022
Position (lat / lon)	44° 40.2'N 063° 37.6'W
Minimum control-led water depth	Control Depth alongside is 16.7m
Chart datum	Geodetic system in use on chart: North American Datum 1983
Range of water densities	1021-1025
Tidal range	Range 2.1m
- Terminal Data (AA.CAHAL.Terminal.05):** A table listing various attributes and their values.
 

Name	Value
S131:information	
S131:fileLocator	table02
S131:fileReference	<a href="file:/SUPPORT_FILES/13100AA_CAHALPG_APPA.HTML">file:/SUPPORT_FILES/13100AA_CAHALPG_APPA.HTML</a>
S131:headline	HPA Port Information Guide
S131:headline	Appendix A
S131:headline	PSA Halifax Fairview Cove
S131:information	
S131:headline	Terminal size
S131:text	70 acres / 28.3 hectares
S131:information	
S131:headline	Reefer outlets
S131:text	<a href="#">500 in-ground outlets X 440V</a>
S131:information	
S131:headline	Equipment
S131:text	<a href="#">3 Super Post Panamax (SPPX) Cranes</a>
S131:theRxN	<a href="#">#AA.CAHAL.Restrictions.01</a>
S131:controlAuthority	<a href="#">#AA.CAHAL.Authority.01</a>
S131:sMDGTerminalCo	FCOVE
S131:componentOf	<a href="#">#AA.CAHAL.HarbourAreaSection.101</a>
- Text Content Detail:** A pop-up window titled "S131:text (headline : Equipment) + text" showing the following text:
 

3 Super Post Panamax (SPPX) Cranes: 7 high x 22 wide; 2 Panamax Cranes: 5 high x 13 wide; 30.5 m /100 ft Ro/Ro ramp; 11,000 ft of on-dock double-stack rail service (440 TEU)
- Other Terminal Data:**

ISPS	Marine Facility Security Plan (MFSP) approved by Transport Canada
Loading/unloading requirements	Contact PSA Halifax Fairview Cove <a href="mailto:calvin.whidden@psahalifax.com">calvin.whidden@psahalifax.com</a> Tel:902-453-4590
Free text	PSA Halifax Fairview Cove Container Terminal is located in the Bedford Basin immediately adjacent to CN's main rail yards in Fairview and Rockingham. Operated by PSA Halifax, PSA Halifax Fairview Cove offers full-service 24 hours a day, seven days a week.
Manoeuvre	Arrival

# Regulations + Applicability + Authority + ContactDetails

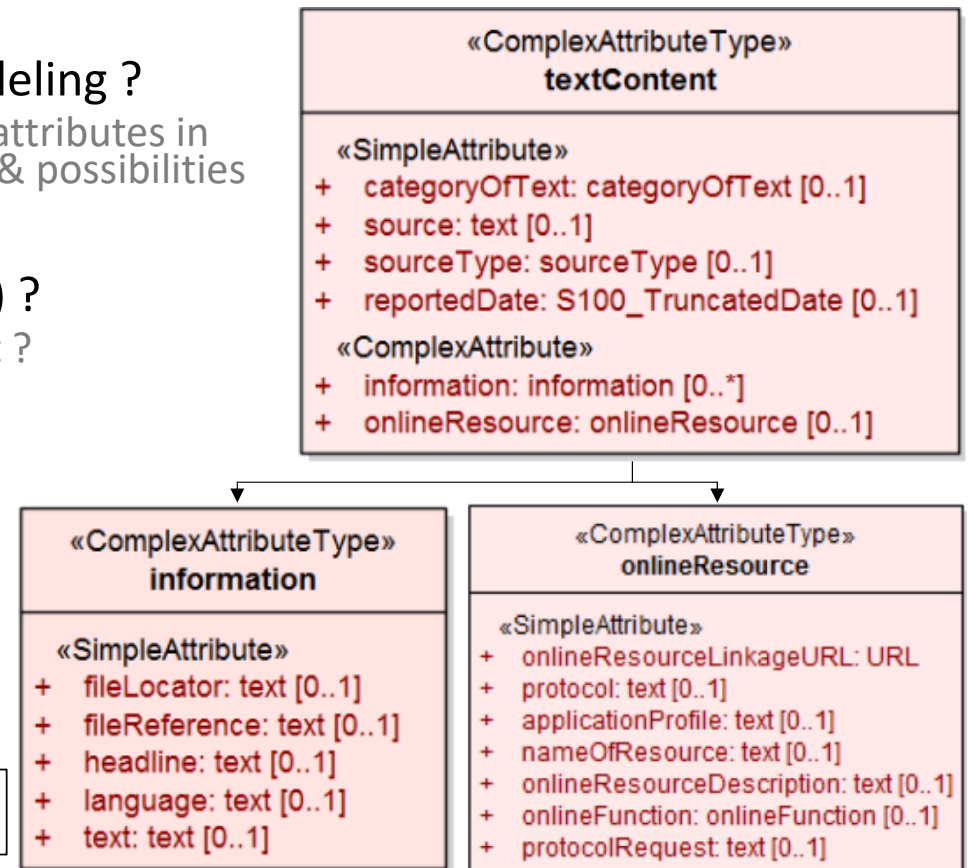


# Questions / Thoughts- from different perspectives

- Data production
  - Is the added value worth such complex modeling ?
    - splitting textual content of a feature into sub-attributes in groups and multiple level – providing options & possibilities
- GUI (Editing support)
  - How to convey the DCEG (use of the Model) ?
    - To which extent could/should the GUI support ?
- End user interface (portrayal)
  - Combine sub-attributes again, into .HTM ?
    - [support file] fileReference + fileLocator
    - headline1, headline2, headline3....
    - headline + text ....
    - [onlineResource]
  - How ? Readability ?

Organize/edit on the production side instead?

UML of the Data Model





# 'graphic' in S-131 may also contain textual info.

- All S-131 feature types have graphic and textContent complex attributes
- All S-131 Information types have graphic complex attribute
  - RxN (Regulations, Restrictions, Recommendations, and NauticalInformation) inherit textContent from AbstractRxN, thus provides attributes textContent and graphic for **textual** and **pictorial** material **respectively**

## graphic

Definition: Pictorial information such as a photograph, sketch or other graphic, optionally accompanied by descriptive information about the graphic and the location relative to its subject from which it was made.

Sub-attribute	Type	Mult.
<a href="#">pictorialRepresentation</a> .TIF support file	text	1..*
<a href="#">pictureCaption</a>	text	0..1
<a href="#">sourceDate</a>	date	0..1
<a href="#">pictureInformation</a>	text	0..1
<a href="#">bearingInformation</a>	complex	0..1

Like this ?



3.4.1. — Rade de Lorient (2016).  
1) La rade de Lorient s'étend au Nord de la citadelle et se compose de la rade de Port-Louis au Sud et de la rade de Pen-Mané, au Nord.  
2) Lorient est à la fois un port de commerce, un port de pêche et un port de plaisance établi au confluent des rivières le Ter, le Scorff et le Blavet.

Extracted from: NIPWG-VTC03-06.8A (SHQM)

# S-100 support file may be .HTM or .XML

- Dataset support files as specified in S-101 Ed. 1.1.0:
  - Picture: .TIF
    - Referenced by the attribute **pictorial representation**
  - Text: .TXT, .HTM, .XML
    - **HTML files must only include inline or embedded Cascading Style Sheet (CSS)** information and must not contain embedded Javascript or other dynamic content, for example DHTML, Flash etc.
    - Referenced by the complex attribute **information**, sub-attribute **file reference**
- Dataset support files as specified in the draft S-131 PS:
  - Picture: .TIF
  - Text: .TXT, .HTM, .XML
    - **HTML and XML files must contain only text and markup as defined in the relevant W3C standards.** References in datasets to HTML and XML support files must treat them as text files (i.e., they should not be referenced using attributes intended for picture files). The extension must be HTM for HTML files and XML for general XML files.

Add graphic with HTML <svg> element ? Embed SVG in .HTM support file

# Trial - using embedded CSS + SVG, for illustration

## PORT INFORMATION GUIDE (Port of Halifax)

### 7.19 MAXIMUM ALLOWABLE LOAD LIMITS FOR HPA BOLLARDS

The bollards located on the piers of marine facilities operated and leased by the HPA have been painted different colours to indicate load limits. When conducting mooring operations, it is the responsibility of the Master to ensure that the strain on the mooring lines does not exceed the maximum allowable load limit of the bollard(s) indicated in the table below. It is also recommended, whenever possible, that vessels shall not share bollards or use more than two (2) mooring lines per bollard.

Bollard Colour	Bollard Allowable Load Limit (Max)
BLACK with RED X	OUT OF SERVICE
SAFETY RED	50 Tonnes
SAFETY ORANGE	100 Tonnes
SAFETY YELLOW	150 Tonnes
SAFETY GREEN	200 Tonnes

## S-131 Support File (.htm with internal css and SVG)

### MAXIMUM ALLOWABLE LOAD LIMITS FOR HPA BOLLARDS

The bollards located on the piers of marine facilities operated and leased by the HPA have been painted different colours to indicate load limits. When conducting mooring operations, it is the responsibility of the Master to ensure that the strain on the mooring lines does not exceed the maximum allowable load limit of the bollard(s) indicated in the table below. It is also recommended, whenever possible, that vessels shall not share bollards or use more than two (2) mooring lines per bollard.

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BLACK with RED X	OUT OF SERVICE
SAFETY RED	50 Tonnes
SAFETY ORANGE	100 Tonnes
SAFETY YELLOW	150 Tonnes
SAFETY GREEN	200 Tonnes

## S-131 Support File (.htm with internal css)

### MAXIMUM ALLOWABLE LOAD LIMITS FOR HPA BOLLARDS

The bollards located on the piers of marine facilities operated and leased by the HPA have been painted different colours to indicate load limits. When conducting mooring operations, it is the responsibility of the Master to ensure that the strain on the mooring lines does not exceed the maximum allowable load limit of the bollard(s) indicated in the table below. It is also recommended, whenever possible, that vessels shall not share bollards or use more than two (2) mooring lines per bollard.

Bollard Colour	Bollard Allowable Load Limit (Max)
BLACK with RED X	OUT OF SERVICE
SAFETY RED	50 Tonnes
SAFETY ORANGE	100 Tonnes
SAFETY YELLOW	150 Tonnes
SAFETY GREEN	200 Tonnes

Using HTML <svg> element to add the X



# Summary

- Update GUI/system design & implementation for S-131 DB project
  - Comments ? Suggestions ?
- Feedbacks
  - reconsider the # of levels in complex attributes and associations
    - So that users won't easily get lost during the "navigation" while editing or viewing
    - More feasible and less loss for M2M information exchange with existing GIS system
  - "Simple model for high added value (modeling according to the result on the display)"
  - consider making use of the .htm, .xml introduced in S-100
    - Not just a support file for formatted text
    - Explore the potential in improving the user interface (in a standardized/consistent way)
      - Product specification, Data Production (Editing) , End-User Interface (Portrayal)