

Research into integration of nautical publication layers (S-123, S-124, S-125 & S-127) into ECDIS by Canadian Coast Guard

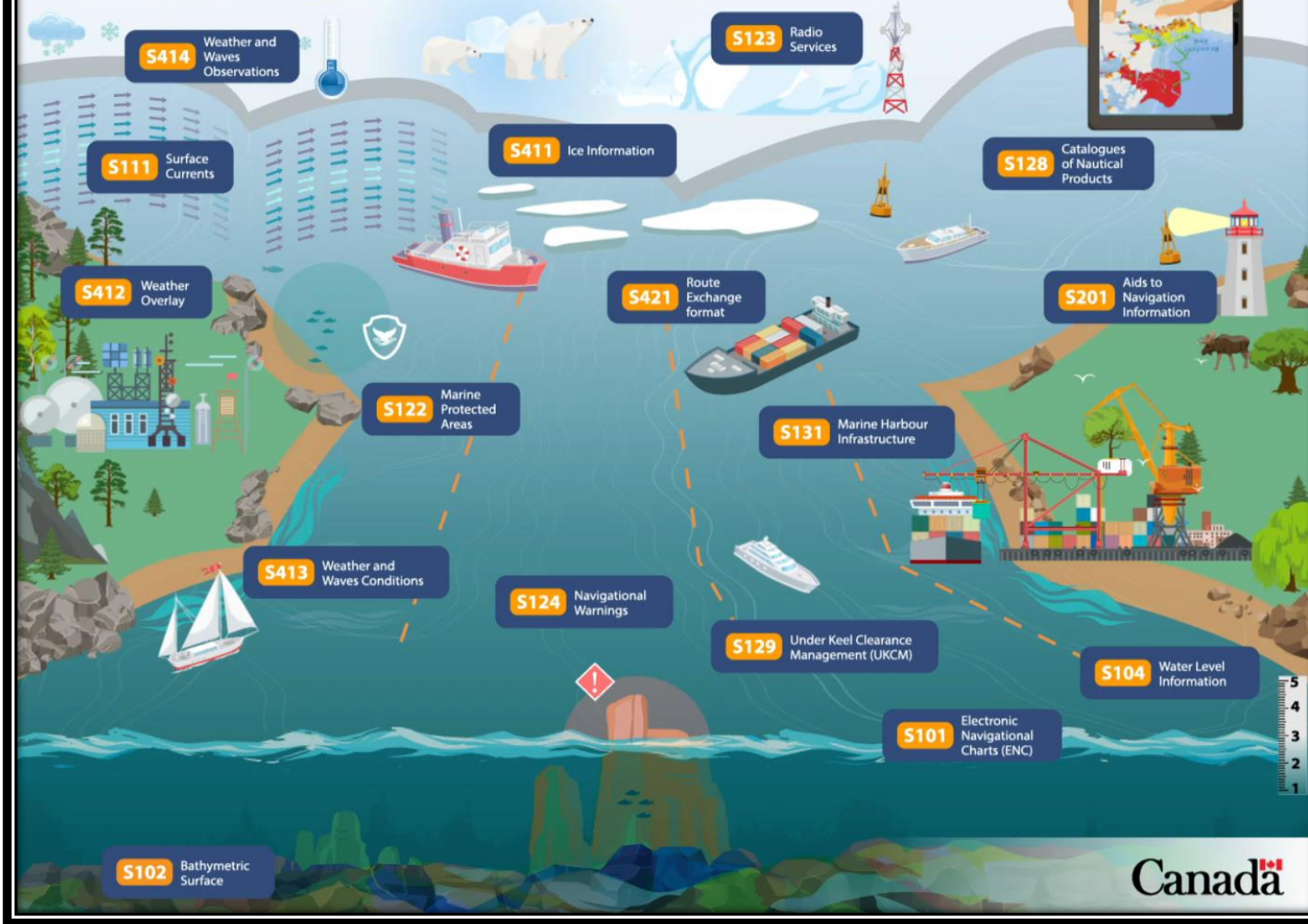
HSSC ECDIS Stakeholders Forum

Helsinki, Finland

June, 2023



Navigating the S100 World



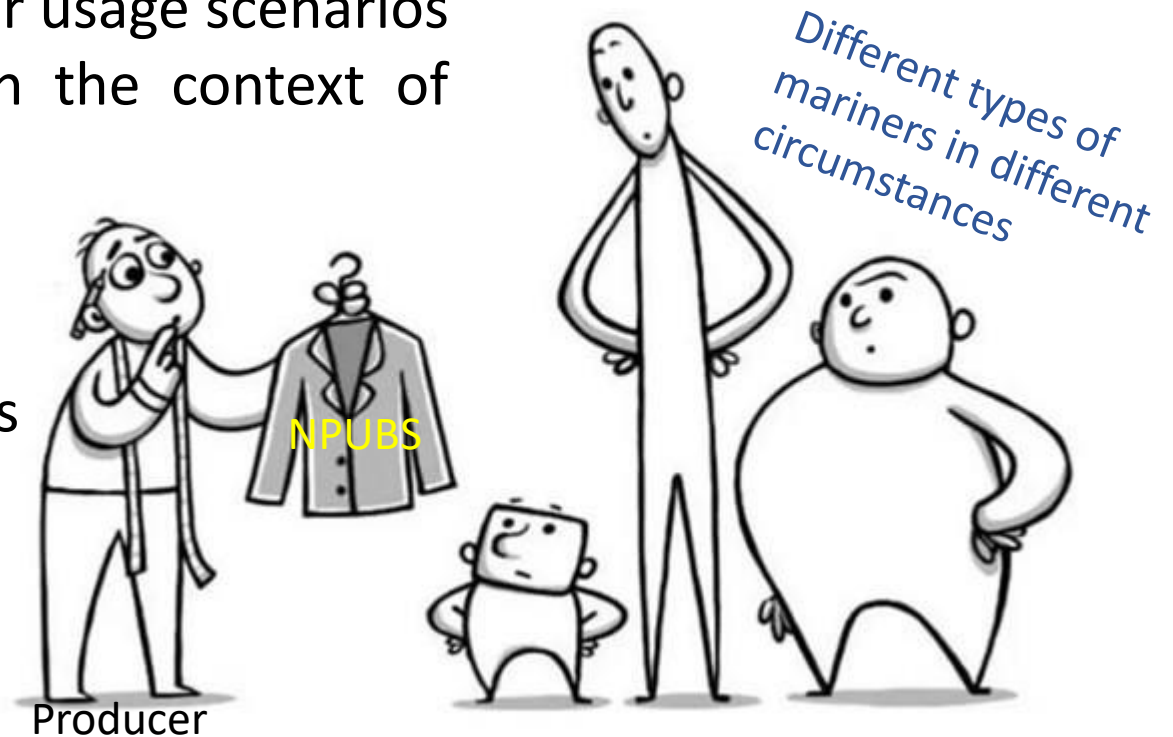
Canada

Challenge faced

The next generation of ECDIS/ECS will enable end users to visualize and interact with a variety of S-100-based data products. The new Electronic Navigational Chart (S-101), has been the focus for several years, along with chart complements such as bathymetric surface (S-102), water level information (S-104) and surface currents (S-111).

Upcoming data products such as Digital Nautical Publications have been largely unexplored in terms of their usage scenarios and potential benefits for the end users in the context of navigation (planning and monitoring).

The aim of the breakout sessions has been to demonstrate and discuss the possible utility and interaction of Digital Nautical Publications in the future navigational environments to improve data integration and reduce the overall burden on the navigator.



Description of consultation sessions

CCG as a national authority has the mandate to implement electronic exchange of information using S-100. Services that are the responsibility of Canadian Coast Guard and currently at various stages of development includes:

- **Marine Radio Services (S-123)**
 - **Navigational Warnings (S-124)**
 - **Marine Aids to Navigation (S-125)**
 - **Vessel Traffic Management (S-127)**
 - **Under Keel Clearance Management (S-129)**
- Marine Radio Services (S-123) and Vessel Traffic Management (S-127) constitute the two sides of digitalizing the Radio Aids to Marine Navigation (RAMN) document. These are the main focus of this interactive breakout session today, along with how Navigational Warning (S-124) and Marine Aids to Navigation (S-125) services can be visualized.

The breakout sessions were aided by visual mock-ups created by IIC Technologies, based on real navigation scenarios, created to simulate the use of Digital Nautical Publications in route planning operations and route monitoring. The narrative will be mostly from a vessel perspective.

The goals of the demonstration and subsequent discussion were:

- **Collect input on current use of the Nautical Publications;**
- **Gather feedback on the proposed use of these new Digital Nautical Publications;**
- **Gather feedback on the proposed portrayal;**
- **Collect additional stories and scenarios to help refine and complete the narrative;**
- **Adjust the planned input to IHO in the ongoing development of these standards and products.**

2 types of scenarios were created

- Planning (P)

- Can be done directly on the ECDIS or using an external Voyage Planning tool
- Use the various digital datasets and services to plan a safe and efficient route
- Features can be filtered according to vessel type, size, cargo, etc
- Elements can be added to the route to trigger specific actions at different times and locations, reducing the burden on the navigator







P1

- Monitoring (M)

- S-100 products have been integrated directly on the ECDIS
- Digital Nautical Publications are used automatically by the ECDIS to determine:
 - What is out there
 - Is it applicable to my route / ship
 - What do I need to do / When
 - For an action of type Report, How do I report, and Where
 - Reports can even be pre-filled and ready to send with one-click

M1

What do I want to do?

-  P1 Simplify my planning – Add in automatic waypoints for reporting points with the correct notice period to my route.
-  M1 When I get to the waypoint, offer me the option to semi-automatically fulfil my reporting obligations
-  M2 What is here? Show me only certain types of information
Qu'est-ce qu'il y a ici? Affiche seulement certains types d'information
-  M3 Something happened. Show me reference information, which applies to me, telling me what to do.
-  M4 Show Navigational Warnings and the features they relate to.
-  M5 Show richer information on planned changes to navigational aids.

A red circle with a thin blue outline, containing the text 'P1' in white.

P1

Simplify my planning – Add in automatic waypoints for reporting points with the correct notice period to my route.

Planning: Extract relevant information to create route plan

In “this area”, “these vessels” are “required” to “do this”

Applicability
Does it apply to “me”

Ship Report
What do I need to do?
When do I need to do it?

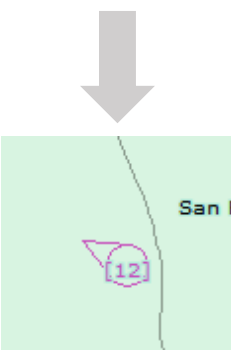
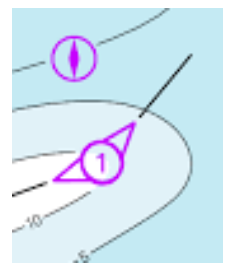
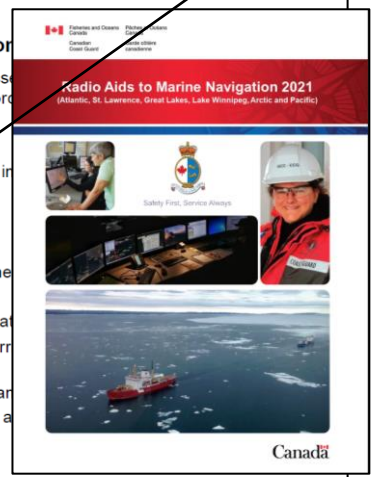
3.5 Local Vessel Traffic Services (VTS) Zones
With respect to the VTS zones specified in the Vessel Traffic Services Zones Regulations, these regulations apply in respect of:
a) every ship 20 metres or more in length;
b) every ship engaged in towing or pushing any vessel or object, other than fishing gear, where:
i. the combined length of the ship and any vessel or object towed or pushed by the ship is 45 metres or more in length, or
ii. the length of the vessel or object being towed or pushed by the ship is 20 metres or more in length.
With respect to the VTS zones specified in the Vessel Traffic Services Zones Regulations, these regulations do not apply in respect of:
a) a ship engaged in towing or pushing any vessel or object within a log booming ground;
b) a pleasure yacht that is less than 30 metres in length; and
c) a fishing vessel that is less than 24 metres in length and not more than 150 tons gross tonnage.
Participation is mandatory.

3.5.1 Local Vessel Traffic Services (VTS) Zones
With respect to local VTS zones as prescribed in the Vessel Traffic Services Regulations, the master of the ship shall report to an MCTS officer in accordance with the regulations.

3.5.2 Information Required
Dependent upon the reporting requirement, the following information shall be provided:
a) the name of the ship;
b) the radio call sign of the ship;
c) the position of the ship;
d) the estimated time that the ship will enter the VTS zone;
e) the destination of the ship;
f) the estimated time that the ship will arrive at its destination;
g) whether any pollutant or dangerous goods cargo is carried on board, and if so, the quantity and nature of the pollutant or dangerous goods cargo;
h) the estimated time that the ship will depart the berth; and
i) the estimated time at which the ship will next arrive at a berth.

3.5.3 Entering a Zone
At least 15 minutes before a ship intends to enter a VTS zone, a report shall be made specifying the information listed in a), b), c), d), e), f) and g).
Exception: Ships already in possession of a valid Traffic Clearance issued by ECAREG, NORDREG or VTS Offshore are not required to provide this report.

3.5.3.1 Arrival at a Calling-In-Point (CIP)
When a ship arrives at a CIP, a report shall be made specifying the information listed in a), c) and i).



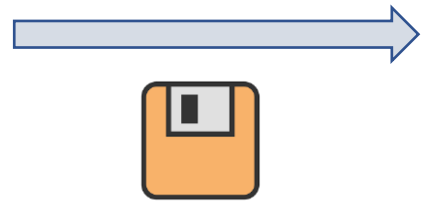
Radio Calling in point

- Designator or communication Channel
- Vessel type

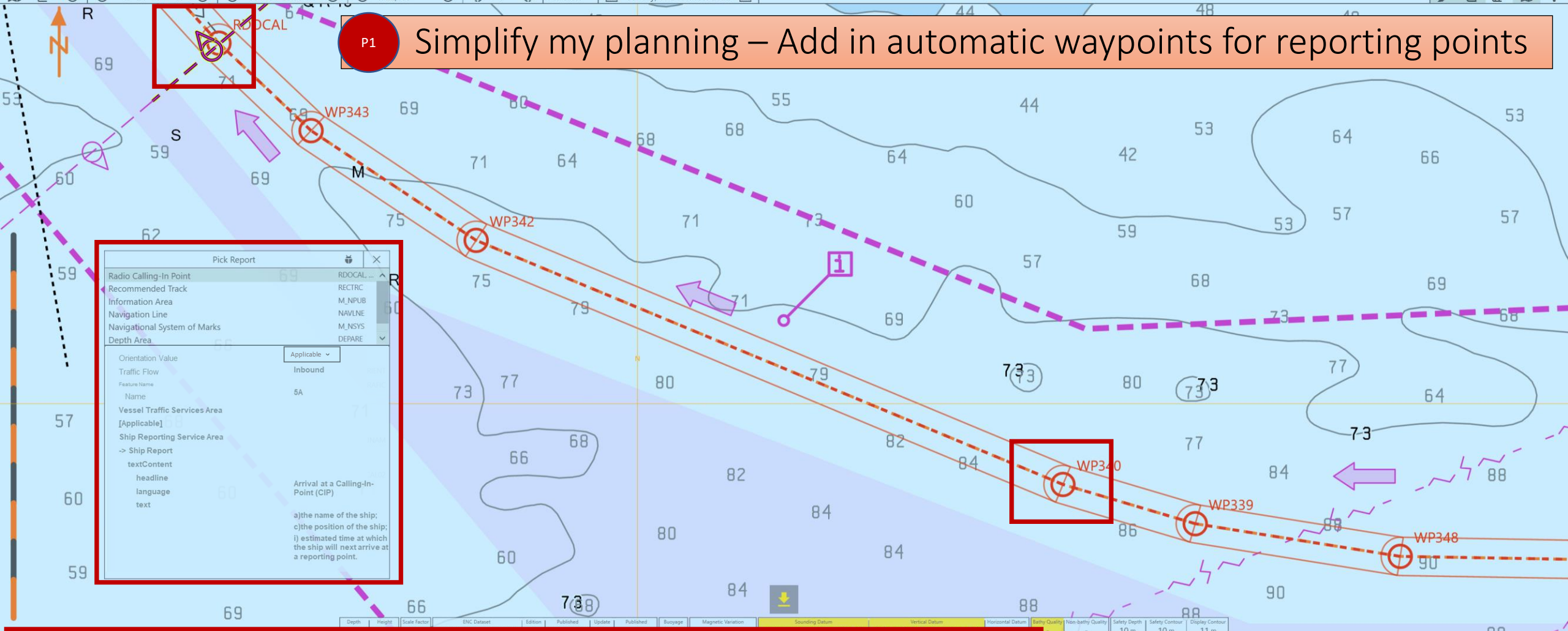


RDOCAL
OBJNAM: G4
ORIENT: 300 deg
Traffic Flow: outbound
COMCHA: 12

Save with
your S-421 Route



P1 Simplify my planning – Add in automatic waypoints for reporting points



Pick Report

- Radio Calling-In Point
- Recommended Track
- Information Area
- Navigation Line
- Navigational System of Marks
- Depth Area

Orientation Value: Applicable

Traffic Flow: Inbound

Feature Name: 5A

Vessel Traffic Services Area: [Applicable]

Ship Reporting Service Area: -> Ship Report

textContent: Arrival at a Calling-In-Point (CIP)

headline: a) the name of the ship;

language: c) the position of the ship;

text: j) estimated time at which the ship will next arrive at a reporting point.

Leg	Priority	Alert Geometry	Alert Message	Feature	Feature Geometry	Name	Dataset	Edition	Update	Latitude	Longitude	Notice Time (Hours)
1	Indication	Surface	Crossing prohibited or special conditions area	Restricted Area Navigational	Surface	101CA00376044.000		4	0	43° 11' 17.12" N	064° 57' 40.14" W	
2	Info	Curve	Ship Report	Radio Calling In Point	Curve	127CA00EC35.GML		2	3	45° 25' 30.95" N	061° 06' 30.14" W	0.25 <input type="button" value="Add"/>
3	Indication	Surface	Crossing prohibited or special conditions area	Restricted Area Navigational	Surface	101CA00376044.000		4	0	43° 04' 01.02" N	065° 15' 41.68" W	

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A red circle with a thin blue outline, containing the white text 'M1' in the center.

M1

When I get to the waypoint, offer me the option to automatically fulfil my reporting obligations

M1

Offer me the option to automatically fulfil my reporting obligations

Ack	Show	Priority	Message	Time	Ack Time
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Indication	Safety contour defaulted to next deeper contour	Sat 12:23:44	Sun 10:22:50
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Report	Ship Report Notice Time (Hours) 0.25	Sat 12:23:44	Sun 10:22:50



Pick Report

Radio Calling-In Point Feature|94 RDOCAL...

Recommended Track Feature|1837 RECTRC

Information Area Feature|8526 M_NPUB

Navigation Line Feature|1538 NAVLNE

Navigational System of Marks Feature|8524 M_NSYS

Depth Area Feature|1083 DEPART

Attributes

Orientation Value 320°

Traffic Flow Inbound

Feature Name 5A

Name

Vessel Traffic Services Area [Applicable]

Ship Reporting Service Area

-> Ship Report

textContent

headline

language

text

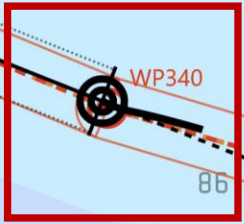
Arrival at a Calling-In-Point (CIP)

a) the name of the ship;

c) the position of the ship;

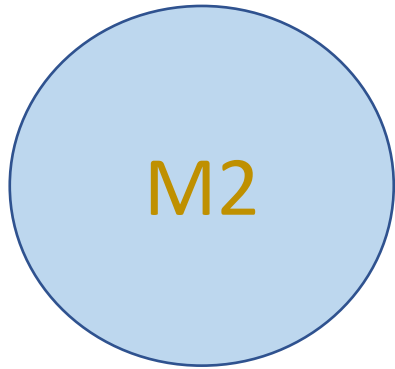
i) estimated time at which the ship will next arrive at a reporting point.

Send >



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What is here? Show me only certain types of information

M2 What is here? Show me only certain types of information

Entering a Radio Service Area

Content	Communication Details
Meteorological	Frequencies
Navigational	Times
Warnings	



Pick Report

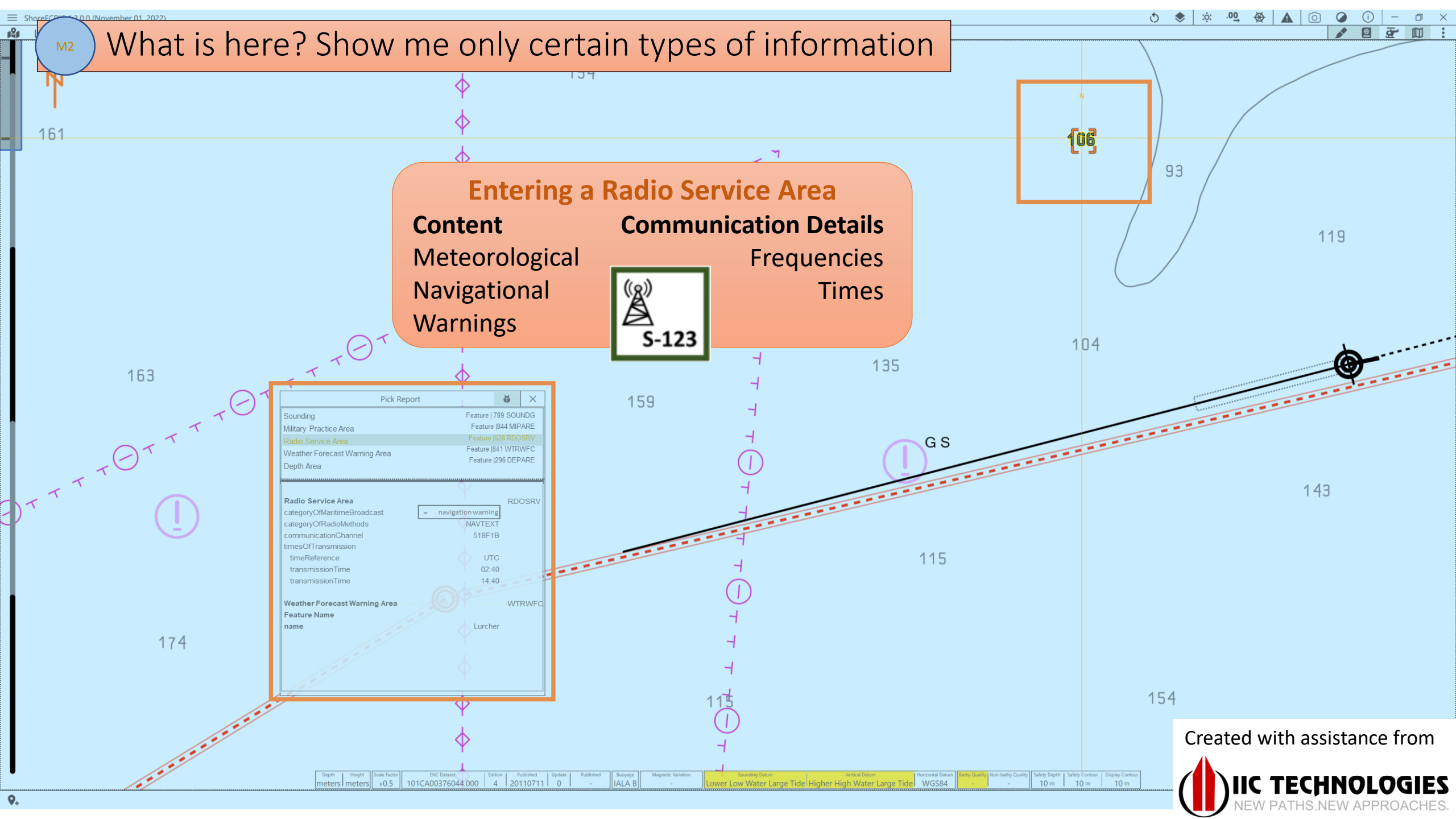
Sounding	Feature 789 SOUNDG
Military Practice Area	Feature 844 MIPARE
Radio Service Area	Feature 628 RDOSRV
Weather Forecast Warning Area	Feature 841 WTRWFC
Depth Area	Feature 296 DEPARE

Radio Service Area RDOSRV

categoryOfMaritimeBroadcast	navigation warning
categoryOfRadioMethods	NAVTEXT
communicationChannel	518F1B
timesOfTransmission	
timeReference	UTC
transmissionTime	02:40
transmissionTime	14:40

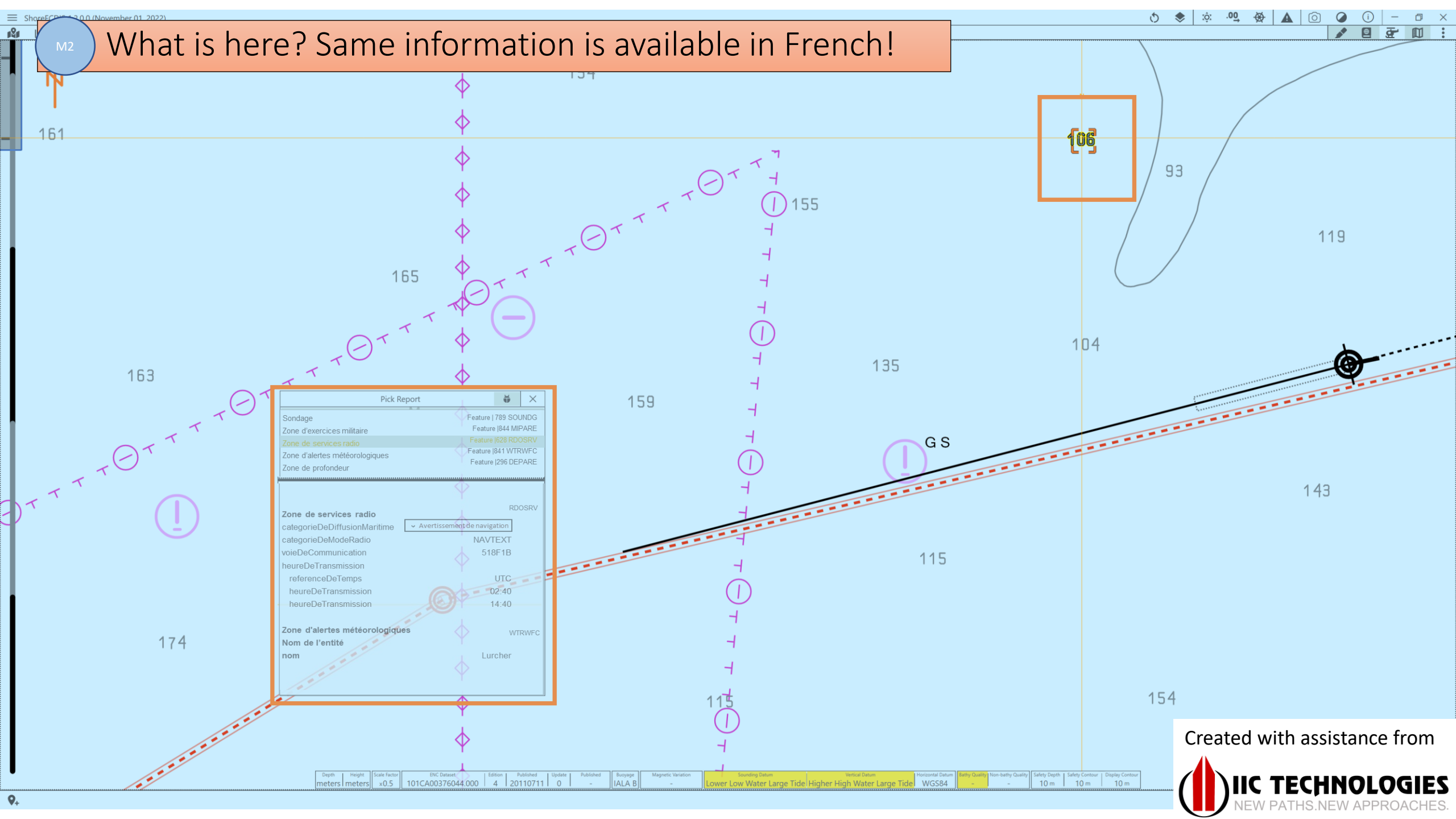
Weather Forecast Warning Area WTRWFC

Feature Name	Lurcher
name	



M2

What is here? Same information is available in French!



Pick Report

Sondage	Feature 789 SOUNDG
Zone d'exercices militaire	Feature 844 MIPARE
Zone de services radio	Feature 628 RDOSRV
Zone d'alertes météorologiques	Feature 841 WTRWFC
Zone de profondeur	Feature 296 DEPARE

Zone de services radio RDOSRV

categorieDeDiffusionMaritime

categorieDeModeRadio NAVTEXT

voieDeCommunication 518F1B

heureDeTransmission

referenceDeTemps UTC

heureDeTransmission 02:40

heureDeTransmission 14:40

Zone d'alertes météorologiques WTRWFC

Nom de l'entité

nom Lurcher

Depth	Height	Scale factor	ENC Dataset	Edition	Published	Update	Published	Buoyage	Magnetic Variation	Sounding Datum	Vertical Datum	Horizontal Datum	Bathy Quality	Non-bathy Quality	Safety Depth	Safety Contour	Display Contour
meters	meters	x0.5	101CA00376044.000	4	20110711	0	-	IALA B	-	Lower Low Water Large Tide	Higher High Water Large Tide	WGS84	-	-	10 m	10 m	10 m

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M3

Something happened.

Show me reference information, which applies to me,
telling me what to do.

Something happened. Show me reference information, which applies to me, telling me what to do.

1.1.2 Marine Mammal Protection

Working in collaboration with other government departments/agencies (CCG) Marine Communications and Traffic Services (MCTS) to ensure compliance with new measures toward the protection of marine mammals.

Note: Roseway Basin Seasonal Area is to be avoided. In order to significantly reduce the risk of strikes of the highly endangered North Atlantic Right Whale, it is recommended that ships of 300 gross tonnage and upwards in transit during the period of June 1st through December 31st avoid this area. Any sightings are to be reported to Halifax MCTS.

Note: Grand Manan Basin is to be avoided. In order to significantly reduce the risk of strikes of the highly endangered North Atlantic Right Whale, it is recommended that ships of 300 gross tonnage and upwards in transit during the period of June 1st through December 31st avoid this area. Any sightings are to be reported to Halifax MCTS.

Note: There are mandatory seasonal (April 28th – November 15th) measures in the western Gulf of St. Lawrence for vessels greater than 13 m in length overall to help reduce the risk of vessel collisions with the endangered North Atlantic Right Whale. These measures are described in Canadian Coast Guard's Notice to Mariners (NOTMAR) and in Transport Canada's Ship Safety Bulletin (SSB). Navigational warnings are issued and broadcast, advising vessels of areas subject to speed restrictions. Mariners are requested to report all whale sightings, and observations of entangled, dead, or injured whales to the nearest MCTS Centre.



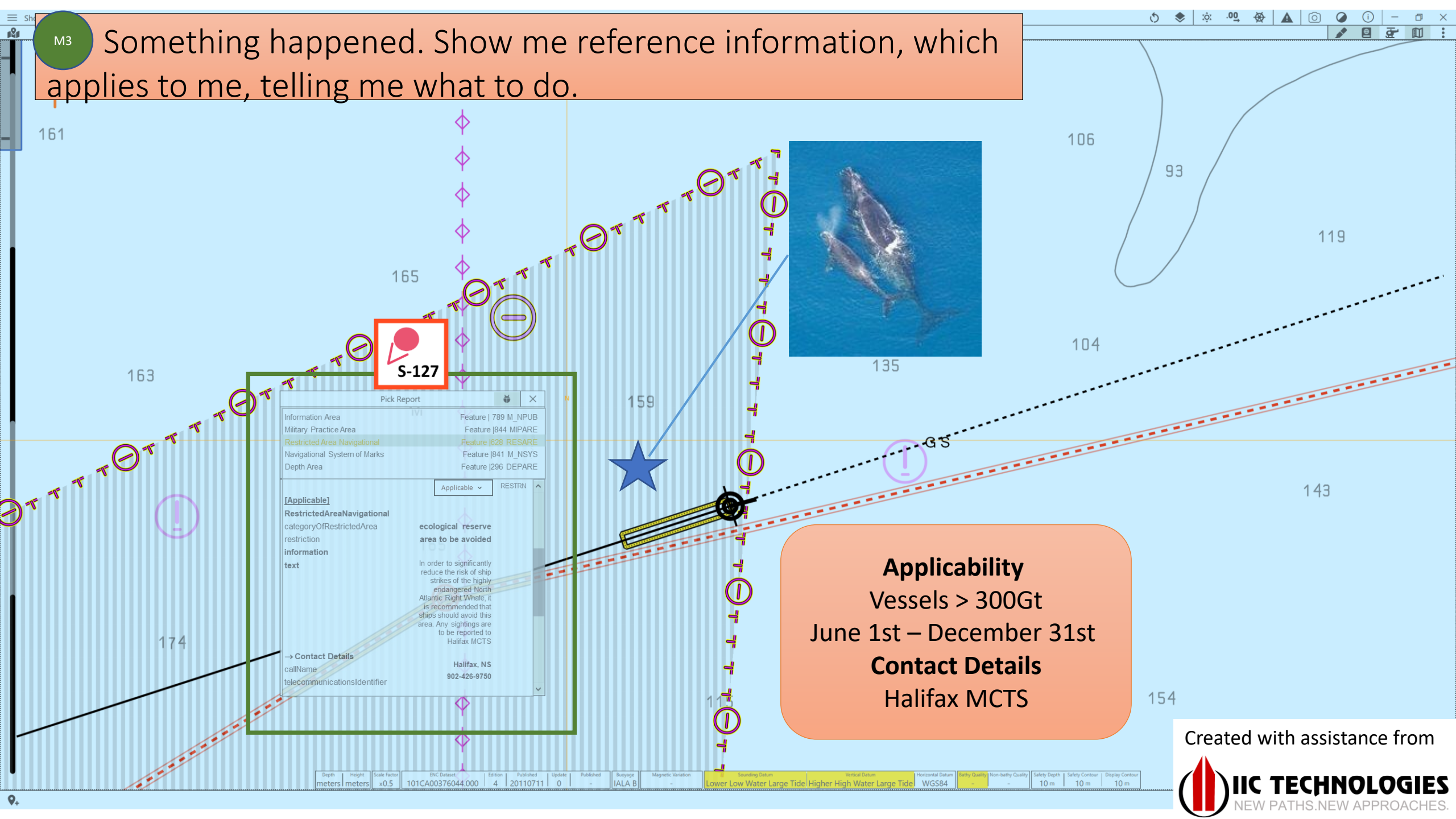
IF you are >300 gross tons
AND in Roseway Basin Seasonal Area
AND the date is between June 1st and December 31st
AND you see a North Atlantic Right Whale

THEN Report it to Halifax MCTS

Note: Roseway Basin Seasonal Area is to be avoided. In order to significantly reduce the risk of ship strikes of the highly endangered North Atlantic Right Whale, it is recommended that ships of 300 tons gross tonnage and upwards in transit during the period of June 1st through December 31st should avoid this area. Any sightings are to be reported to Halifax MCTS.

M3

Something happened. Show me reference information, which applies to me, telling me what to do.



S-127

Pick Report

Information Area	Feature 789 M_NPUB
Military Practice Area	Feature 844 MIPARE
Restricted Area Navigational	Feature 628 RESARE
Navigational System of Marks	Feature 841 M_NSYS
Depth Area	Feature 296 DEPARE

Applicable: RESTRN

[Applicable]
 RestrictedAreaNavigational
 categoryOfRestrictedArea
 restriction
 information
 text

ecological reserve
 area to be avoided

In order to significantly reduce the risk of ship strikes of the highly endangered North Atlantic Right Whale, it is recommended that ships should avoid this area. Any sightings are to be reported to Halifax MCTS

→ Contact Details
 callName: Halifax, NS
 telecommunicationsIdentifier: 902-426-9750

Applicability
 Vessels > 300Gt
 June 1st – December 31st
Contact Details
 Halifax MCTS



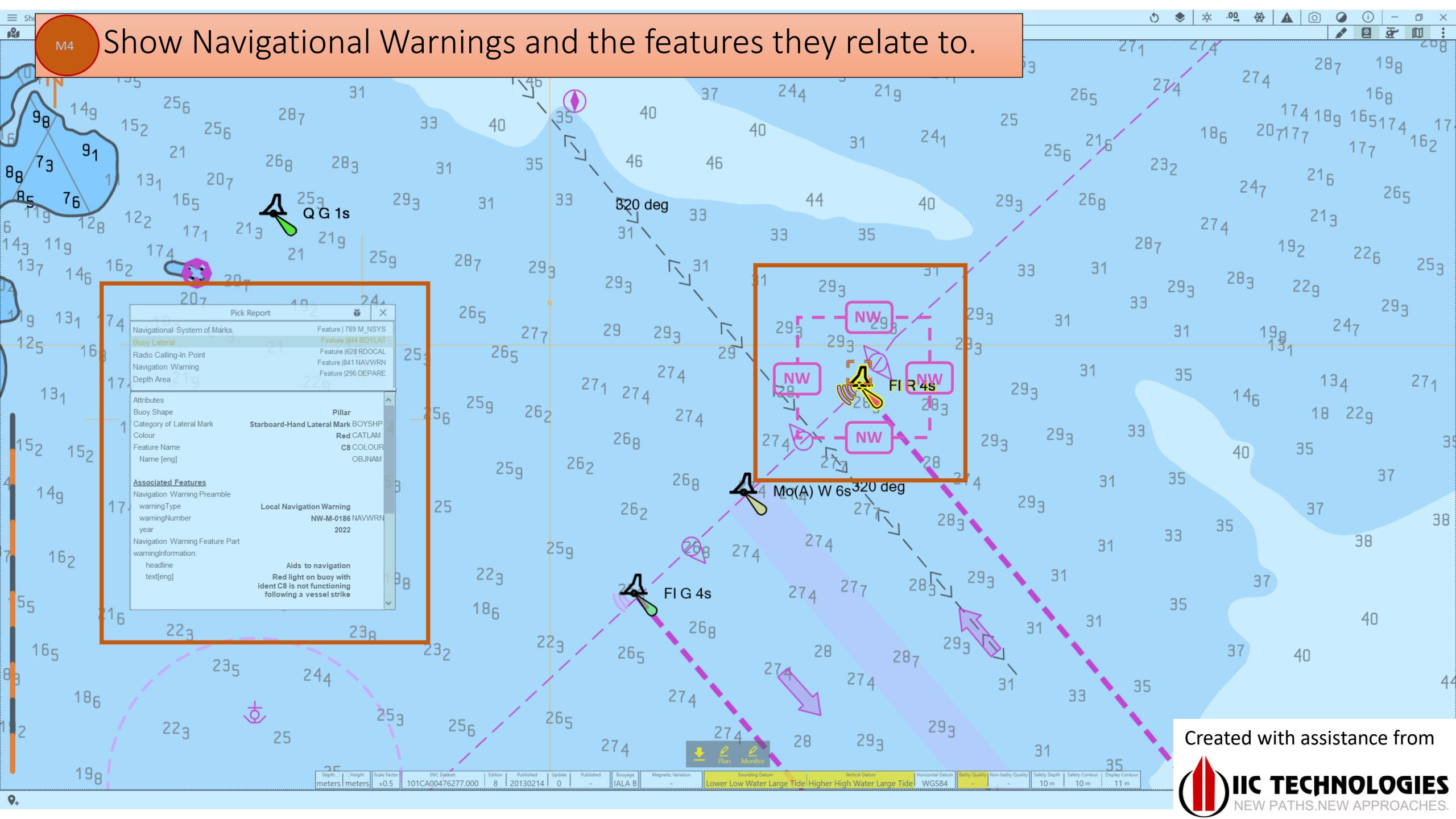
M4

Show Navigational Warnings and the features they relate to

1. Temporary changes : TC
2. Proposed changes : PC
3. Advance notice of change : AC
4. Discrepancy : DC

M4

Show Navigational Warnings and the features they relate to.



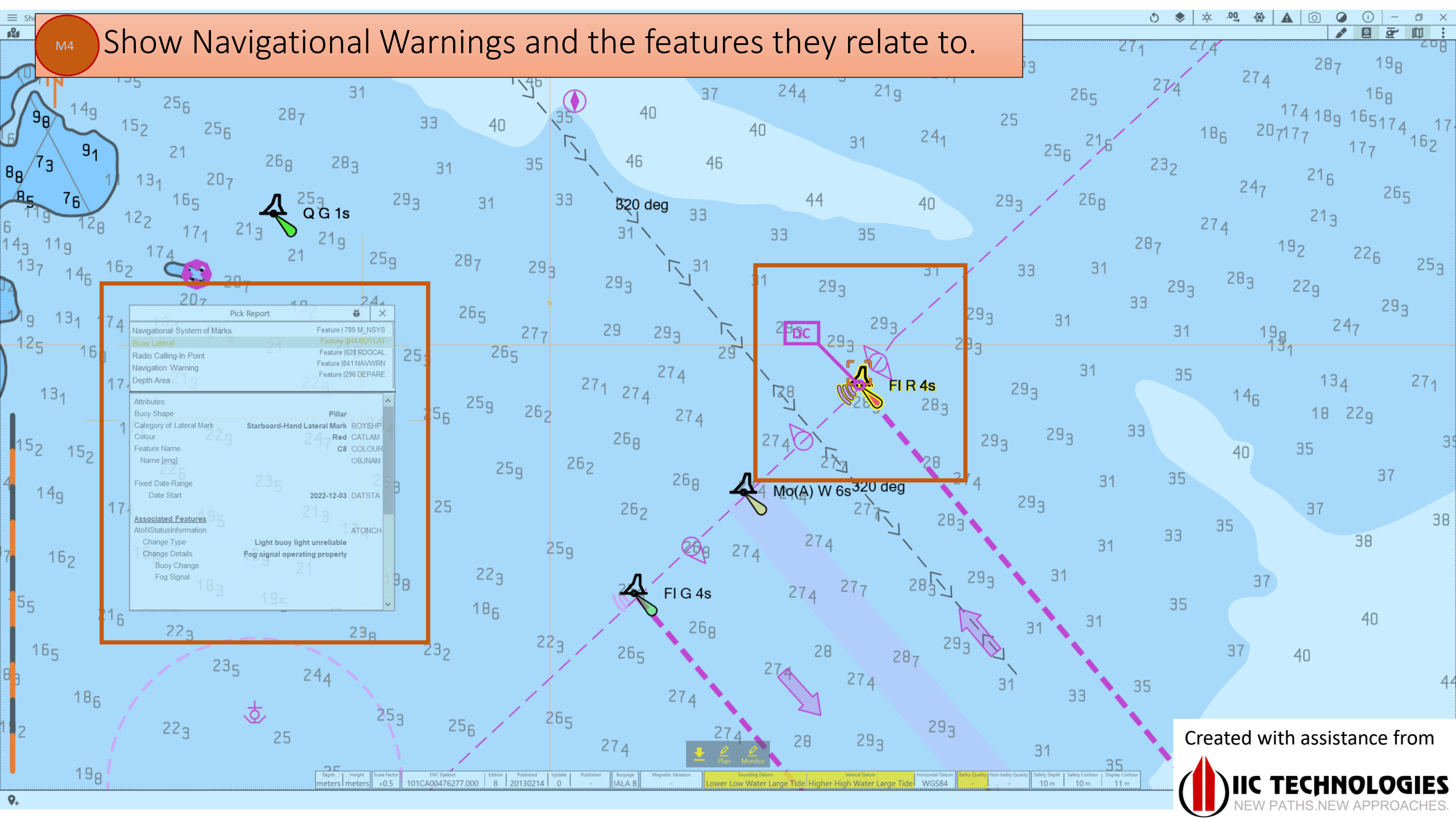
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Depth	Height	Scale factor	ENC Dataset	Edition	Published	Update	Published	Buoyage	Magnetic Variation	Sounding Datum	Vertical Datum	Horizontal Datum	Bathy Quality	Non-bathy Quality	Safety Depth	Safety Contour	Display Contour
meters	meters	x0.5	101CA00476277.000	8	20130214	0	-	IALA B	-	Lower Low Water Large Tide	Higher High Water Large Tide	WGS84	-	-	10 m	10 m	11 m

M4

Show Navigational Warnings and the features they relate to.



Pick Report	
Navigational System of Marks	Feature 789 M_NSYS
Buoy Lateral	Feature 844 BOYLAT
Radio Calling-In Point	Feature 628 RDOCAL
Navigation Warning	Feature 841 NAVWRN
Depth Area	Feature 296 DEPARA
Attributes	
Buoy Shape	Pillar
Category of Lateral Mark	Starboard-Hand Lateral Mark
Colour	Red
Feature Name	C8
Name [eng]	OBJNAM
Fixed Date Range	
Date Start	2022-12-03
Associated Features	
AtoNStatusInformation	Light buoy light unreliable
Change Type	Fog signal operating properly
Change Details	
Buoy Change	
Fog Signal	

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Depth	Height	Scale factor	ENC Dataset	Edition	Published	Update	Published	Buoyage	Magnetic Variation	Sounding Datum	Vertical Datum	Horizontal Datum	Bathy Quality	Non-bathy Quality	Safety Depth	Safety Contour	Display Contour
meters	meters	x0.5	101CA00476277.000	8	20130214	0	-	IALA B	-	Lower Low Water Large Tide	Higher High Water Large Tide	WGS84	-	-	10 m	10 m	11 m



M5

Show richer information on planned changes to navigational aids.

M5

Show richer information on planned changes to navigational aids.

Pick Report

- Light All Around Feature | 789 LIGHTS
- Buoy Safe Water Feature | 844 BOYLAT
- Traffic Separation Scheme Feature | 828 TSSARE
- Aids to Navigation Status Information Feature | 841 ATNSTS
- Navigational System of Marks Feature | 296 M_NSYS

Attributes

- Buoy Shape Pillar BOYSHP
- Colour Red White COLOUR
- Colour Pattern
- Feature Name CF OBJNAM
- Name [eng]

Associated Features

- Aids to Navigation Status Information Advance notice of changes CATCHG
- Change Type
- Change Details
- Buoy Change information Buoy move BOYCHG
- information
- text [eng] Notice is given of a change to TXTDSC

buoy ident CF 500m east from 1st March 2023

AC

Mo(A) W 6s

Depth meters	Height meters	Scale Factor x0.5	ENC Dataset 101CA00476277.000	Edition 8	Published 20130214	Update 0	Published -	Buoyage IALA B	Magnetic Variation	Sounding Datum Lower Low Water Large Tide	Vertical Datum Higher High Water Large Tide	Horizontal Datum WGS84	Bathy Quality	Non-bathy Quality	Safety Depth 10 m	Safety Contour 10 m	Display Contour 11 m
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Route		Name		Latitude	Longitude	Speed	XTE	Bearing	Distance	Time	Sailing Method
#											

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Discussion topics raised at the user consultations:

- Collect input on current use of the Nautical Publications;
- Gather feedback on the proposed use of these new Digital Nautical Publications;
- Gather feedback on the proposed portrayal;
- Collect additional stories and scenarios to help refine and complete the narrative;
- Adjust the planned input to IHO in the ongoing development of these standards and products.

What CCG has learned so far

- Very positive response.
- Further refinements are needed.
- Interactive user systems for demoing concepts have been requested.
- Important to remember to leave mariner in the driver seat and only provide options that mariner may use depending on situation at hand.
- Investigate adding references to specific Npub information to downloadable route plan templates.