S-164

IHO Test Datasets for ECDIS

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Instruction Manual for the Use of IHO Test Datasets in ECDIS

IHO

International Hydrographic Organization

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Table of Contents

Pages

1 Introduction 1
1.1 Acknowledgements 1
1.2 Acronyms and Terms 1
1.3 References 2
1.4 Normative References: 2
1.5 Preface to Edition 2.0.0 2
1.6 Key Documents Organizations and Relationships 2
1.7 Structure of the Instruction Manual 3
1.8 Screenshots 4
1.9 Organization and Coverage of the TDS 5
1.10 Required Test Items and Use of the TDS 6
1.11 Testing of SECOM requirements 6
2 Catalogue and Dataset Loading and Updating 8
2.1 Catalogue Loading and System Initialisation 8
2.1.1 Initial Catalogues 8
2.1.2 Out of Catalogue Sequence Dataset 9
2.1.3 Valid Catalogue Update and Data 9
2.1.4 Multiple Revision Portrayal 9
2.2 Dataset Loading 11
2.2.1 Preparation and Initial Power Up 11
2.2.2 Number and date in System Database 14
2.2.3 Load additional dataset and check System Database 15
2.2.4 Remove dataset and check the System Database 15
2.3 Automatic updates of Unencrypted ENCs 15
2.3.1 Loading sequential updates 15
2.3.2 Loading update in an invalid sequence 20
2.3.3 Loading update of newer edition 20
2.3.4 Update Information 24
2.3.5 Importing update of older edition 25
2.3.6 Importing a re-issue and an update of a dataset 25
2.3.7 Rejection of automatic update 27
2.4 Manual Updates 30
2.4.1 Creation of a Manual Update 30
2.4.2 Manual Update - Dates 31
2.4.3 Manual Update - retrieval 32
2.4.4 Manual Update - Alerts and indications 33
2.5 Loading, Updating and Authentication of datasets 34
2.5.1 Organization of encrypted datasets 34
2.5.2 ENC Licensing – Permit Management 36
2.6 Dataset Authentication 44
2.6.1 Missing Catalogue Signature 44
2.6.2 Invalid Catalogue Signature 45
2.6.3 Authentication against a non-SA certificate 45
2.6.4 Authentication via a domain coordinator 46
2.6.5 ENC signature validation 46
2.6.6 Check authentication is continuous and complete 47
2.6.7 Single exchange set with datasets signed by multiple data servers 48
2.6.8 Missing Certificate 49
2.6.9 ENC Decryption 50
2.7 Dataset Management 54
2.7.1 Encrypted ENCs supplied by different Data Servers 54
2.7.2 Loading additional dataset permits and cells from a different data provider 55

2.7.3 Test that the system operates correctly in a multiple data provider environment....56
2.8 ECDIS management of data services....58
2.8.1 ECDIS management of cancelled cells....58
2.8.2 ECDIS management of ENC re-issued datasets....61
2.8.3 ECDIS management of Exchange Sets....62
2.8.4 Update of Supplementary Files....63
2.8.5 Fileless Cancellation....64
2.9 ECDIS Update Status Report....64
2.9.1 ENC Update Status Report....64
2.9.2 ENP Update Status Report....65
2.9.3 Missing Revision information....65
2.9.4 Multiple Revision Information....66
2.9.5 Product Independence....66
2.9.6 Adequate and Complete Tests....67
2.10 Loading and update of non-ENC S-100 datasets....68
2.10.1 Bathymetric Surface Datasets (S-102)....68
2.10.2 Water Levels (S-104)....71
2.10.3 Tidal Streams (S-111)....73
2.10.4 Marine Protected Areas (S-122)....75
2.10.5 Navigational Warnings (S-124)....78
2.10.6 Marine traffic Management (S-127)....83
2.10.7 Under Keel Clearance Management Areas (S-129)....85
2.10.8 Marine Harbour Infrastructure (S-131)....87
3 Chart Display....90
3.1 Dataset Selection and Loading....90
3.1.1 Dataset Selection....90
3.1.2 Dataset Rendering....90
3.2 Display of ENC data....90
3.2.1 Display Base category....90
3.2.2 Display Standard category....92
3.2.3 Display Other category....97
3.2.4 ECDIS Viewing groups names. Standard Display....101
3.2.5 ECDIS Viewing Layers. Other Display....111
3.2.6 Text Grouping....121
3.3 Invalid Features....128
3.3.1 Display of Invalid Features....128
3.3.2 Invalid Features Pick Report Display....131
3.4 Independent Mariner Selections....133
3.4.1 Portrayal of simplified point symbols....133
3.4.2 Symbolized and plain boundaries....135
3.5 Date Dependent Display and Functionality....141
3.5.1 Fixed Date Range....141
3.5.2 Periodic Date Range....145
3.5.3 Safety contour....147
3.6 148
3.7 Display of User Selected Safety contour....155
3.7.1 Setting User Selected Safety contour....155
3.7.2 Safety depth....157
3.7.3 Shallow pattern....162
3.7.4 Contour labels....164
3.7.5 Colour Palettes....166
3.7.6 Display of Additional Chart Information Symbol....169
3.7.7 Scale minimum....172
3.7.8 Full light lines....175
3.7.9 Display of Text in other languages....178
3.7.10 Use of language packs....180
3.8 Display priority....181

3.8.1 Different priority 181
3.9 Display Priorities 183
3.9.1 Same priority 183
3.9.2 Line Suppression 185
3.9.3 Manual Updates 187
3.9.4 Text Display 189
3.9.5 Display of area borders 192
3.9.6 Display of unknown symbols 194
3.9.7 Boundary display for unofficial data 196
3.9.8 Overscale Pattern 201
3.9.9 Display of features affected by Complex Portrayal Procedures 203
3.9.10 Display of Centred Symbols 205
3.10 Overscale 210
3.10.1 Display of overscale indication 210
3.10.2 Indication of larger scale data 211
3.10.3 Boundaries between optimum display scales 213
3.10.4 Display of data from another scale 215
3.10.5 Display of graphical index 220
3.10.6 Change of display scale 221
3.10.7 Impact of Scale Minimum on display 222
3.11 Display and Operation of Water Level Adjustment. 226
3.11.1 Enabling Water Level Adjustment 226
3.11.2 Adjustment of Other Depth Values 228
3.11.3 Feature information - Water Level Adjustment. 230
3.11.4 Water Level Adjustment Uncertainty 231
3.11.5 Water Level Adjustment across a time period 232
3.11.6 WLA with non matching vertical datums 232
3.11.7 Route planning with Water Level Adjustment 233
3.12 Display of ENC covering Polar Regions 234
3.12.1 Display of ENC Data up to 85 degrees 234
3.12.2 Scale Bar at high latitudes 240
3.12.3 Display of data at extreme high latitudes 241
4. Chart related functions 245
3.12.4 Mode and orientation 245
3.13 Scale bar 246
3.13.1 Display of scale bar 246
3.13.2 Display of scale bar 247
3.14 Feature information 247
3.15 Radar and Plotting Information 260
3.16 Accuracy 267
3.16.1 Distance and azimuth between geographical positions 267
3.16.2 Geographical position from a known position and distance/azimuth 268
3.16.3 Rhumb line distance and azimuth between geographical positions 269
3.16.4 Geodesics 270
3.16.5 Rhumb Lines 271
3.16.6 Positions for use in Accuracy Tests - Geodesics 273
3.16.7 Positions for use in Accuracy Tests – Rhumb Lines 279
3.17 Symbols 283
3.17.1 Symbol Size 283
3.17.2 Display of ECDIS chart 1 symbols of correct size 283
3.17.3 Size in pixels of the check symbol CHKSYM01 283
3.17.4 Display of text at the correct size 284
3.17.5 ECDIS Chart 1 284
3.17.6 Display redraw 284
3.18 Units and Legend 285
3.18.1 Legend – Multiple Product Specifications. 286
3.19 Other ECDIS and Chart Related Functionality 287

3.19.1 ECDIS Chart 1 287
3.19.2 Use of the Colour Differentiation Diagram 289
3.19.3 Data Quality Indicators and Portrayal 291
3.19.4 Miscellaneous encoding 291
5 Detection and Notification of Navigational Hazards 292
5.1 Detection and Notification of Navigational Hazards - Basic test 292
5.1.1 User selection of prohibited areas 324
5.2 Detection and Notification of Navigational Hazards – Use of largest scale available 325
5.3 Detection and Notification of Navigational Hazards – Basic test Monitoring Mode 328
5.4 Detection and Notification of Navigational Hazards – Use of largest scale available – Monitoring Mode 330
5.5 Use of Data Quality Information. 333
6 Detection of Areas for which Special Conditions Exist 334
6.1 Detection of Areas for which Special Conditions Exist - Basic test 334
6.1.1 User selection of Areas with Special Conditions 337
6.2 Detection of Areas for which Special Conditions Exist - Use of largest scale available 338
6.3 Detection of Areas for which Special Conditions Exist - Monitoring Mode 340
6.4 Detection of Areas for which Special Conditions Exist - Use of largest scale available – Monitoring Mode 342
7 Detection and Notification of the Safety contour 343
7.1 Detection and Notification of the Safety contour - Basic test 343
7.2 Detection and Notification of the Safety contour – Use of largest scale available 346
7.3 Detection and Notification of Safety contour Next Leg - Planning Mode 349
7.4 Detection and Notification of Safety contour – Water Level Adjustment. 350
7.5 Detection and Notification of the Safety contour - Basic test – Monitoring Mode 351
7.6 Detection and Notification of the Safety contour – Use of largest scale available – Monitoring Mode 353
8 S-57 Testing 355
8.1 Introduction 355
8.2 Notes on specific tests. 355
9 Dual Fuel Mode testing 356
9.1 Introduction 356
9.2 Data Scheming for Dual Fuel testing 356
9.3 Chart Loading and Update 356
9.3.1 Initial Loading of charts in Dual fuel mode. 356
9.3.2 Update(s) of combined exchange set. 357
9.4 Functions associated with chart display 358
9.4.1 Dual Fuel feature information 358
9.5 Detection and Notification of Navigational Hazards 358
9.5.1 Detection and Notification of Navigational Hazards – basic test 358
9.5.2 Dual Fuel Detection and Notification of Navigational Hazards – Use of largest scale available. 361
9.5.3 Detection and Notification of Navigational Hazards – monitoring mode 362
9.5.4 Detection and Notification of Navigational Hazards – use of largest scale available – monitoring mode 364
9.6 Detection of Areas for which Special Conditions Exist 367
9.6.1 Detection and Notification of Areas for which special conditions exist – basic test 367
9.7 367
9.7.1 Detection and Notification of Areas for which special conditions exist – use of largest scale available 368
9.7.2 Detection and Notification of Areas for which special conditions exist – monitoring mode 369
9.7.3 Detection and Notification of Areas for which special conditions exist – use of largest scale available – monitoring mode 370
9.8 Detection and Notification of the Safety contour 371
9.8.1 Detection and Notification of the safety contour – Basic test 371
9.8.2 Detection and Notification of the safety contour – use of largest scale available. 372
9.8.3 Detection and Notification of the safety contour – use of largest scale available – monitoring mode ... 373

9.8.4 Detection and Notification of the safety contour – monitoring mode 374

Document History

Changes to this Specification are coordinated by the S-98/S-164 Sub-Group, a Project Team under the IHO S-100 Working Group. New editions will be made available via the IHO website. Maintenance of the Specification shall conform to IHO Resolution 2/2007 (as amended).

Version Number	Date of Issue	Author(s)	Brief Description of Change(s)
1.0.0	01/03/2023	S100WG	Initial Draft
1.1.0	31/03/2023	S100WGTSM9	Updated following feedback from TSM9 meeting.
1.2.0	31/12/2023	J. Pritchard	Updated following new datasets and S-100WG meetings.
1.3.0	14/06/2024	J. Pritchard	Updated with v1.2.0 dataset content, and new form.
1.4.0	04/10/2024	J. Pritchard	Updates following S-98 review and implementation of new settings form.
1.9.0	31/01/2025	J. Pritchard	Updates following latest S-98 revision and reorganisation. Version for HSSC submission and finalisation with test dataset construction.
1.9.1	30/09/2025	J. Pritchard	Updates including global revision of the screenshots and integration of new tests for non-S-101 products.
1.9.2	16/02/2026	J. Pritchard	Updates including addition tests for non ENC products, revision of existing tests and general review (but non exhaustive) of the document content.
2.0.0	12/11/2026	K. Dickens	Formatting, Date, and Footer updates

1 Introduction

The International Hydrographic Organization (IHO) Test Datasets (TDS) for Electronic Chart and Display Information System (ECDIS) have been produced to fulfil the requirement for data necessary to accomplish all ECDIS testing requirements as outlined in the IEC 61174 standard. The TDS has been published as IHO Publication Number 164 and consists of numerous data sets required for testing as well as this guide, the TDS Instruction Manual. This Instruction Manual provides supporting documentation about the organization, understanding, and use of the ENC TDS and is intended to be used along with the data sets included in the TDS. It aims to provide appropriate comments about each test including the information about the most suitable data elements, their location and the expected test results.

1.1 Acknowledgements

Edition 2.0.0 and its subsequent clarifications have been produced with assistance from many expert contributors and members of the IHO S-100 WG, the ENC Working Group (ENCWG), testbed developers, early S-100 OEM adopters, and associated expert contributors; their input during the drafting and revision process has been invaluable.

1.2 Acronyms and Terms

This publication makes extensive use of terms and acronyms described in the IHO S-32 Standard. Additionally, the following acronyms are frequently used:

EUT – Equipment Under Test
HMI – Human Machine Interface
TDS – Test Datasets

1.3 References

This publication provides tests based on the requirements documented in IHO standards. References to the source for a specific test are provided within this document. As specified in the IEC 61174 standard the tests provided are used to ensure conformance to the ECDIS requirements laid out in the IMO performance standard for ECDIS.

1.4 Normative References:

- S-100 *Universal Hydrographic Data Model*, IHO Publication S-100, Edition 5.2.
- S-98 *S-100 ECDIS and Interoperability Specification, Edition 3.0 .*
- IEC 61174 *Maritime navigation and radiocommunication equipment and systems - Electronic chart display and information system (ECDIS) - Operational and performance requirements, methods of testing and required test results, 2015.*
- IEC 63173-2 *Maritime navigation and radiocommunication equipment and systems - Data interfaces - Part 2: Secure communication between ship and shore (SECOM),* 2022.

1.5 Preface to Edition 2.0.0

IHO S-164 is dependent for some of its content on the existence of comprehensive TDS (which it documents) and systems which have implemented correctly the requirements of IHO S-100 (and allied) standards.

As 2.0 is the initial operational version of S-164 there are few fully developed S-100 systems in place, and some datasets are still under development. Therefore, some of the tests documented may not contain reference screenshots from S-100 implementations – where this is the case screenshots have been noted with "**[TBD]**" ("to be determined").

As version 2.0 is refined, and implementation of S-100 matures these gaps will be filled in this manual. Additional tests reflecting the complete functionality specified as mandatory in the operational edition of S-98 may need to be added as refinements and clarifications to this operational edition of S-164. Such refinements will be noted in the clarification number of this document. Tests may be marked with a "To do" planned enhancement where this is the case.

This version of the manual is accompanied by named exchange sets available from the IHO for use in type approval testing. Additions to such exchange sets will also be added as tests are refined as required.

References to both IEC61174 and IHO S-98 are definitive in this operational version of S-164. The scope of S-164 is fully constrained by the requirements set out in S-98. For all test cases, S-98 contains the expected and definitive behaviour.

As portrayal and feature catalogue contents are updated for the relevant product specifications screenshots will be updated with the latest portrayal images and, if necessary, tests for complex portrayal will be enhanced.

With the advent of updated feature and portrayal catalogues, and the finalisation of the ECDIS performance standard for ECDIS, it is finally possible to state the complete "scope" of IHO S-164 as that which implements the requirements laid out in S-98. Where such requirements are optional in S-98, they will be similarly noted in this operational edition of S-164. The complete text of many of the newly introduced tests introduced in this edition will be finalised as the TDS are completed, and as implementations of ECDIS make available the complex functionality contained in the S-100 standards.

1.6 Key Documents Organizations and Relationships

The development and application of the TDS involves several organizations and related specifications (see Figure 1). The TDS was produced by the IHO to allow for the complete testing of ECDIS equipment (hardware and software) in respect of the ECDIS Performance Standard. The ECDIS Performance Standard

is specified by the International Maritime Organization (IMO) in MSC.530(106), and methods for testing this standard are the responsibility of the International Electrotechnical Commission (IEC) which publishes these requirements in document IEC 61174.

All standards are subject to revision. Therefore, users of these standards must use the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid international standards.

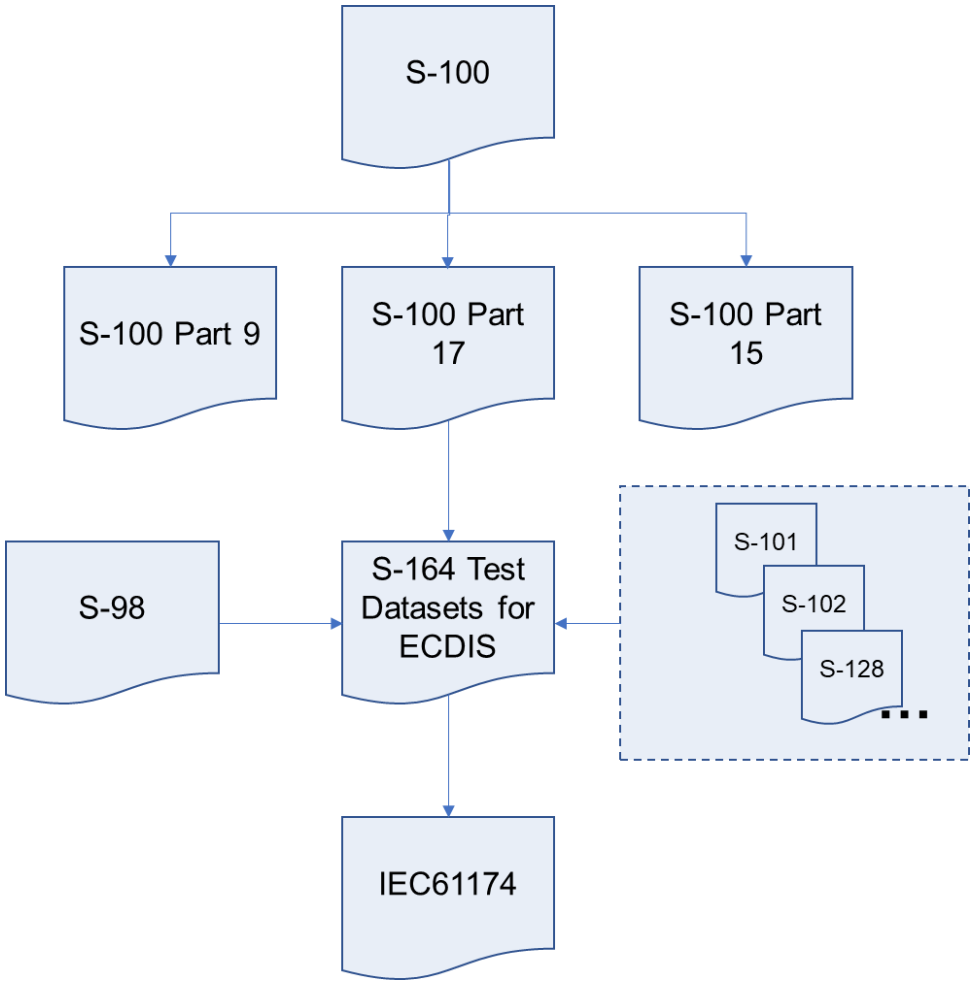


Figure 1 - The TDS and its relationship to other standards.

The S-164 TDS contain both encrypted and unencrypted data. The inclusion of an encrypted dataset, conforming to S-100 Part 15, is so that ECDIS data loading and management operations can be tested under IEC 61174. There are also unencrypted datasets which test visualisation and operational aspects of the ECDIS in respect of its compatibility with S-100 data in various forms. S-164 also now contains datasets which test the dual fuel mode of ECDIS, mixing S-57 and S-101 electronic navigational charts.

1.7 **Structure of the Instruction Manual**

This document consists of an introduction followed by tests grouped into major sections in a task-based layout. All tests are listed in a common format which is shown in the test template below:

Test Reference	S-164 Test Name	**IHO Reference** **IEC Reference**	IHO Standard reference IEC Standard reference
Test Description			
A short description of what the test covers.			
Setup			

The configuration required before performing the test. Generally, starts with reference to another test: "*As per end (or possibly "start") of test xxxxxx (test name)*" and mentions exchange sets to be loaded, specific settings to be applied and any other information required.

Display Mode		**Independent Mariner's Selections (Default = On)**	
Displaybase, **Standard** or **Other**		Accuracy	
Context Parameters (Default = On)		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown objects	
Radar overlay		Update review	
Plain boundaries		**Chart text**	
Simplified symbols		Important text	
Full light lines		**Other Text**	
Ignore scale minimum		Names	
Shallow water dangers		Light description	
Palette		All other chart text	
Day, **Dusk** or **Night**			

Viewing Date (or Date Range)		**Display**	
Start viewing date		Centre	The position at which the display must be centred.
End viewing date		Scale	Dataset viewing scale.

Viewing Groups (Default = On)			
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Action
The action which the test executor must perform after the setup is in place and before checking the expected results.
Results
The result which the test executor must observe to complete the test.

1.8 Screenshots

Screenshots are widely used in this manual to show the expected results of the test on the EUT graphics window. The window of the EUT must have the minimal characteristics as described in S-98 and the applicable ECDIS testing standards – these are not documented here.

1.9 Organization and Coverage of the TDS

The TDS contains a named directory for each section of the Instruction Manual which requires test data. Depending on the test requirement, the named folder contains an S100_ROOT directory containing the files of the exchange set (e.g., CATALOG.XML), plus any required catalogues, updates or other optional/related files, e.g., .TIF, .TXT necessary.

The TDS data for encrypted data, located in section 2.6, contains multiple named exchange sets, each with their own S100_ROOT directory and full test scripts describing how to use the data.

The location (or path) of the exchange sets will be indicated using bold italic notation, e.g., ***Powerup***. Tests are structured so that data is imported from standard S-100 (and S-57 for dual fuel tests) exchange sets only, with no individual datasets requiring import. Datasets themselves are sometimes named individually in the tests for reference where necessary. Exchange sets do not contain all necessary catalogues. These should be pre-loaded from the **Catalogues** exchange set with the exception of tests in Section 2.1 which test the loading of catalogues themselves. Once installed, catalogues should not require re-installation but testers may find it helpful to delete the system database contents between tests.

TDS are arranged in a number of spatially disjoint schemes, with S-57 and S-100 datasets located in close proximity (to facilitate dual fuel testing). Examples of the schemes, and individual dataset names are illustrated in the following diagrams. These show the extent of the S-101 charts comprising the TDS. Other S-100 products are layered on top of these datasets and are integrated with the named exchange sets referenced in each individual test.

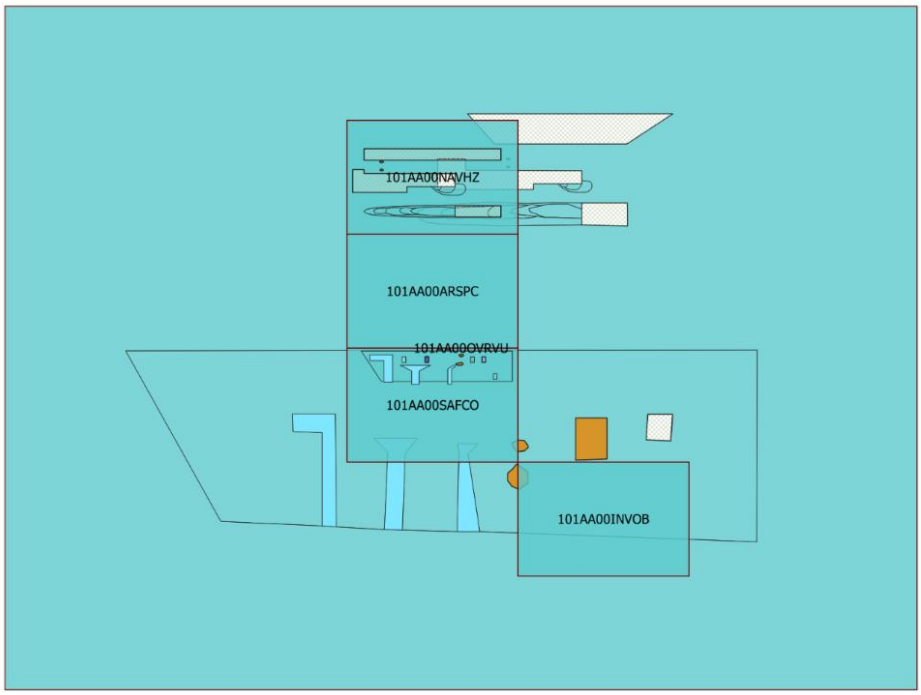


Figure 2 - Data Scheming for Alert and Indication Tests

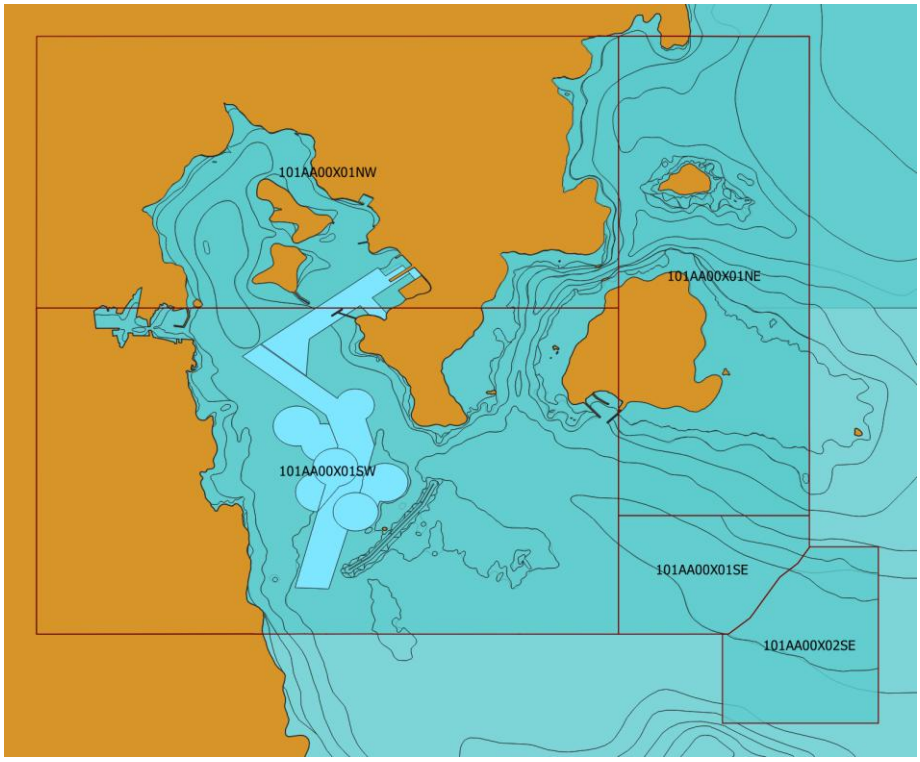


Figure 3 - Cartographic cell overview

1.10 Required Test Items and Use of the TDS

This section lists the items required for the execution of Tests specified in this document and how the TDS should be used. The following items are required:

1. *IHO S-98*

2. *IHO S-164 test datasets for ECDIS which includes both encrypted and unencrypted datasets, and updates, together with the associated instruction manual.*

ECDIS Chart 1 and colour differentiation diagrams must also be acquired and installed on the EUT by the manufacturer, prior to the beginning of the tests.

The second item, the IHO TDS, is provided as part of S-164, including the encrypted data and its test scripts. This document is to be considered the “Instruction Manual”. The IHO TDS may be upgraded from time to time to correct residual anomalies and ensure that the results of the tests conform to the description in this Manual.

It is important to ensure that the tests are conducted with the latest version posted on the IHO web site at **http://www.iho.int > (ENCs & ECDIS).** The version number will remain the same as long as the corrections do not impact this document.

[All tests using data assume the system has preloaded the correct catalogues. Aside from Section 1 of this manual, all systems should pre-install the necessary catalogues, contained in exchange set “PowerUpCatalogues” as a pre-requisite. This will ensure the correct portrayal. Section 1 of this manual is concerned with correct behaviour of catalogue installation.]

1.11 Testing of SECOM requirements

S-164 contains tests to satisfy the requirement for unidirectional data transfer using the SECOM standard

(IEC63173-2). This requirement is contained in S-98 and is optional in the current edition of S-98 2.0.0.

Unlike the other tests specified in this manual, the SECOM interfaces are not tested exclusively with test data but are performed by connecting the ECDIS to a conformant SECOM network service and executing the documented test scripts.

The infrastructure for executing SECOM tests is hosted by the IHO and instructions for its use are available from the S-100 ECDIS IHO web page. This manual contains instructions for test procedures and confirmation of correct receipt of the SECOM test data.

For testing of SECOM requirements, refer to Annex A of this document.

2 Catalogue and Dataset Loading and Updating

2.1 Catalogue Loading and System Initialisation

2.1.1 Initial Catalogues

Test Reference	InitialCatalogues	**IHO Reference** **IEC Reference**	S-98: 20.1

Test description

This test ensures the EUT supports the import of initial Feature and Portrayal Catalogues and checks they are persistent in the EUT.

Setup

Clear all EUT Catalogue and data contents.

Action

*Import the catalogues contained in the exchange set **InitialCatalogues**.* [*Note: the method by which catalogues are installed is not prescribed by S-164 and may be by any method developed by the OEM*]

Results

Verify the versions of the S-100 Feature Catalogues and Portrayal Catalogues is correct. The correct information is shown in the following table:

Catalogue	***Product***	***Version***
Feature Catalogue	*S-101*	*1.9.0*
Portrayal Catalogue	*S-101*	*1.9.0*
Feature Catalogue	*S-102*	*3.0.0*
Portrayal Catalogue	*S-102*	*3.0.0*
Feature Catalogue	*S-104*	*2.0.0*
Feature Catalogue	*S-111*	*1.9.0*
Portrayal Catalogue	*S-111*	*1.9.0*
Feature Catalogue	*S-122*	*2.0.0*
Portrayal Catalogue	*S-122*	*2.0.0*
Feature Catalogue	*S-124*	*1.9.0*
Portrayal Catalogue	*S-124*	*1.9.0*
Feature Catalogue	*S-127*	*2.0.0*
Portrayal Catalogue	*S-127*	*2.0.0*
Feature Catalogue	*S-128*	*2.0.0*
Portrayal Catalogue	*S-128*	*2.0.0*
Feature Catalogue	*S-129*	*2.0.0*
Portrayal Catalogue	*S-129*	*2.0.0*
Feature Catalogue	*S-131*	*2.0.0*
Portrayal Catalogue	*S-131*	*2.0.0*
Feature Catalogue	*S-411*	*2.0.0*
Portrayal Catalogue	*S-411*	*2.0.0*

2.1.2 **Out of Catalogue Sequence Dataset**

Test Reference	OutOfCatalogueSequence Dataset	**IHO Reference** **IEC Reference**	S-98: 20.1 and B-1
Test description			
This test ensures the EUT will detect mismatches between PS versions of installed Catalogues and imported dataset.			
Setup			
As per test **Initial Catalogues** *(exchange set* ***InitialCatalogues*** *loaded).*			
Action			
Import the exchange set ***OutOfCatalogueSequenceDataset.***			
Results			
The Dataset installation process shall stop, issuing the user with the error message SSE133 "Version mismatch between 10100AA_X01NE and S-101 Feature Catalogue 1.9.0. Only version 2.0.0 is supported for data of this type (S-101 ENC)".			

2.1.3 **Valid Catalogue Update and Data**

Test Reference	UpdateCatalogues	**IHO Reference** **IEC Reference**	S-98: 20.1 and B-1
Test description			
This test ensures EUT supports the management and update of Feature and Portrayal Catalogues.			
Setup			
As per test **Initial Catalogues** *(exchange set* ***InitialCatalogues*** *loaded).*			
Action			
1. Import the following exchange sets: • ***PowerUpCatalogues*** • ***UpdatedCatalogueData*** *2. Verify the versions of all catalogues installed.*			
Results			
1. The exchange sets shall install without any warning messages. *2. The EUT shall allow at least the following catalogue versions to be listed:*			

Catalogue	***Product***	***Version***
Feature Catalogue	***S-101***	***2.0.0***
Portrayal Catalogue	***S-101***	***2.0.0***
Feature Catalogue	***S-101***	***2.5.0***
Portrayal Catalogue	***S-101***	***2.5.0***
Feature Catalogue	***S-101***	***2.6.0***
Portrayal Catalogue	***S-101***	***2.6.0***
Feature Catalogue	***S-101***	***2.7.0***
Portrayal Catalogue	***S-101***	***2.7.0***
Feature Catalogue	***S-101***	***2.8.0***
Portrayal Catalogue	***S-101***	***2.8.0***
Feature Catalogue	***S-111***	***2.0.0***
Portrayal Catalogue	***S-111***	***2.0.0***
Feature Catalogue	***S-124***	***2.0.0***
Portrayal Catalogue	***S-124***	***2.0.0***

2.1.4 **Multiple Revision Portrayal**

Test Reference	MultipleRevisions	**IHO Reference**	S-98: 20.1 and B-1

		IEC Reference	

Test Description

This test ensures EUT supports the correct display of datasets based on different versions of a Product Specification (S-101).

Loaded Data

Exchange Set Name

MultipleRevisions

Display Mode		Independent Mariner's Selections	
Other		Accuracy	**On**
Context Parameters		Contour label	Off
Safety contour	**10**	Highlight date dependent	**On**
Safety depth	**8**	Highlight document	Off
Deep contour	**30**	Highlight info	**On**
Shallow contour	**2**	Shallow pattern	Off
Four shades	Off	Unknown objects	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart text	**On**
Full light lines	Off	Important text	**On**
Ignore scale minimum	Off	**Other Text**	
Shallow water dangers	Off	Names	**On**
Palette		Light description	**On**
Day		All other chart text	**On**

Date Dependent Objects		Display	
Start Date	N/A	Centre	42°30.00'S 61°45.00''E
End Date	N/A	Scale	1:24 000

Viewing Groups

Standard Display		Other	
Drying lines	**On**	Spot soundings	**On**
Buoys. Beacons, aids to navigation	**On**	Submarine cables and pipelines	**On**
Buoys, beacons, structures	**On**	All isolated dangers	**On**
Lights	**On**	Magnetic variation	**On**
Boundaries and limits	**On**	Depth contours	**On**
Prohibited and restricted areas	**On**	Seabed	**On**
Chart scale boundaries	**On**	Tidal	**On**
Cautionary notes	**On**	Miscellaneous (Other)	**On**
Ships' routeing systems and ferry routes	**On**		
Archipelagic sea lanes	**On**		
Miscellaneous (Standard)	**On**		
Chart (Standard)	**On**		
Alert Highlights (Standard)	**On**		

Setup

*As per **UpdateCatalogue***

Action

1. *Import exchange set **MultipleRevisions**;*
2. *Verify installation of the datasets 10100AASPLIT01, 10100AASPLIT02, 10100AASPLIT03 and 10100AASPLIT04 and the versions of the Feature Catalogues and Portrayal Catalogues for each of the datasets;*
3. *Navigate to the position indicated at viewing scale 1: 24 000 and verify the symbols used for each of the shown landmarks. These are specific to the different revisions of the portrayal catalogues;*
4. Verify the existence of the "***Alternative Landmarks***" context parameter (defined in portrayal catalogue 2.7.0).

Results

1. *The exchange set shall install without any warning messages.*
2. *The information in the System Database shall show the presence of the datasets and their associated Catalogue versions as follows:*

Dataset	***Feature Catalogue***	***Associated Portrayal Catalogue***
10100AASPLIT01	*2.5.0*	*2.5.0*
10100AASPLIT02	*2.6.0*	*2.6.0*
10100AASPLIT03	*2.7.0*	*2.7.0*
10100AASPLIT04	*2.8.0*	*2.8.0*

3. *At the defined position the following image shall be observed:*



4. The EUT shall show context parameter (defined in portrayal catalogue 2.7.0) – "***Alternative Landmarks***".

2.2 Dataset Loading

2.2.1 Preparation and Initial Power Up

Test Reference	**InitialPowerUp**	**IHO Reference** **IEC Reference**	S-98: 6.1.1 61174: 4.4.1

Test Description
This test ensures EUT supports the import of initial datasets and indication of own ship stationary position.
Loaded Data
Exchange Set Name
InitialPowerUp

Display Mode		**Independent Mariner's Selections**	
Other		Accuracy	**On**
Context Parameters		Contour label	Off
Safety contour	**10**	Highlight date dependent	**On**
Safety depth	**8**	Highlight document	Off
Deep Contour	**30**	Highlight info	**On**
Shallow contour	**2**	Shallow pattern	Off

Four shades	Off	Unknown objects	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart text	**On**
Full light lines	Off	Important text	**On**
Ignore scale minimum	Off	**Other Text**	**On**
Shallow water dangers	Off	Names	**On**
Palette		Light description	**On**
Day		All other chart text	**On**

Date Dependent Objects		**Display**	
Start Date	N/A	Centre	32°29.66’S 60°55.86’E
End Date	N/A	Scale	1:60 000
		Orientation	

Viewing Groups

Standard Display		**Other**	
Drying lines	**On**	Spot soundings	**On**
Buoys. Beacons, aids to navigation	**On**	Submarine cables and pipelines	**On**
Buoys, beacons, structures	**On**	All isolated dangers	**On**
Lights	**On**	Magnetic variation	**On**
Boundaries and limits	**On**	Depth contours	**On**
Prohibited and restricted areas	**On**	Seabed	**On**
Chart scale boundaries	**On**	Tidal	**On**
Cautionary notes	**On**	Miscellaneous (Other)	**On**
Ships’ routeing systems and ferry routes	**On**		
Archipelagic sea lanes	**On**		
Miscellaneous (Standard)	**On**		
Chart (Standard)	**On**		
Alert Highlights (Standard)	**On**		

Setup

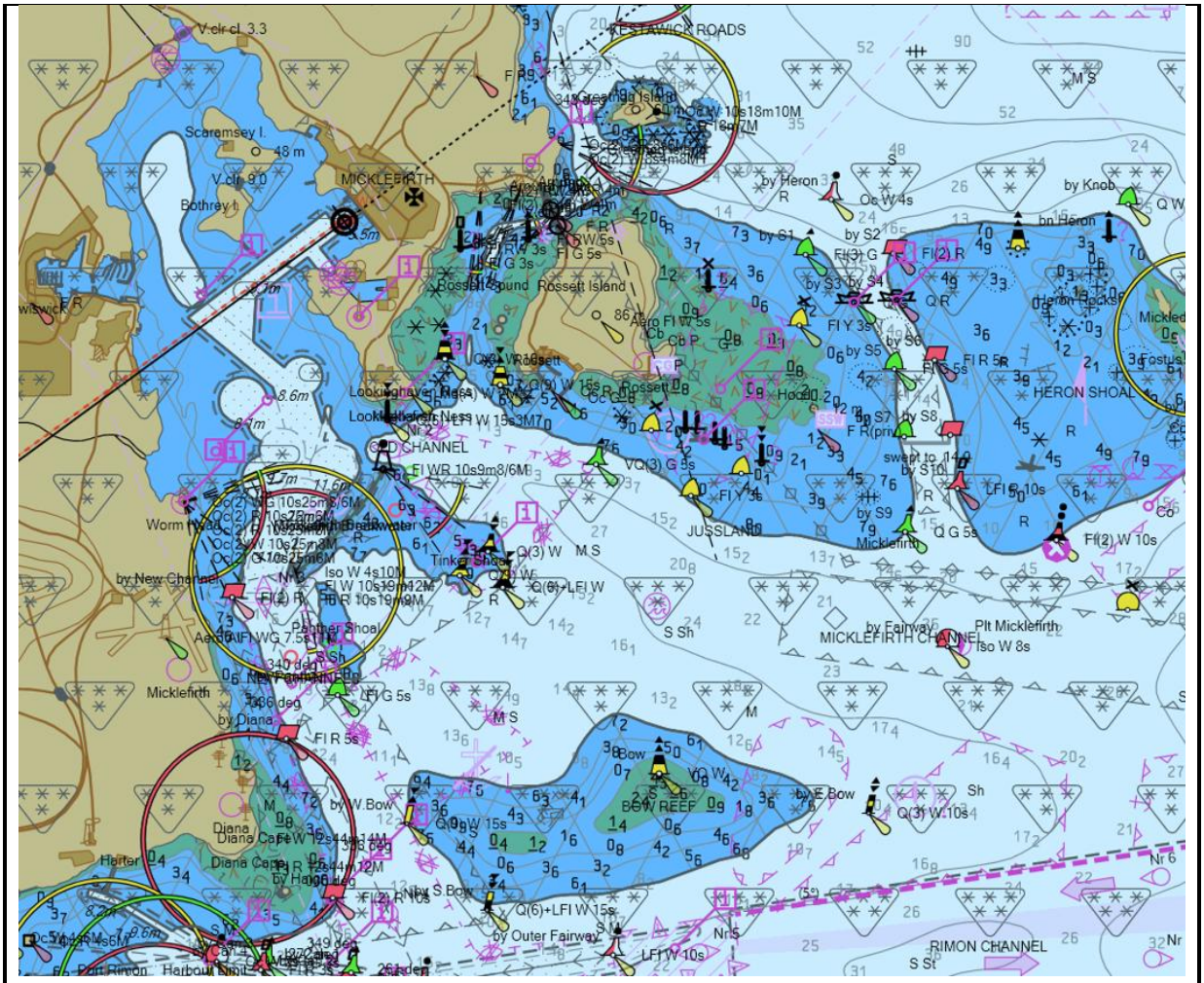
As per InitialCatalogues.

Action

1. *Import the exchange set **InitialPowerUp.***
2. *Set ship position at 32°29.66’S, 060°55.86’E with heading=234.00;*
   Set the viewing scale to 1:60 000;
   Centre the display on position 32°32.00’S, 060°59.50’E.

Results

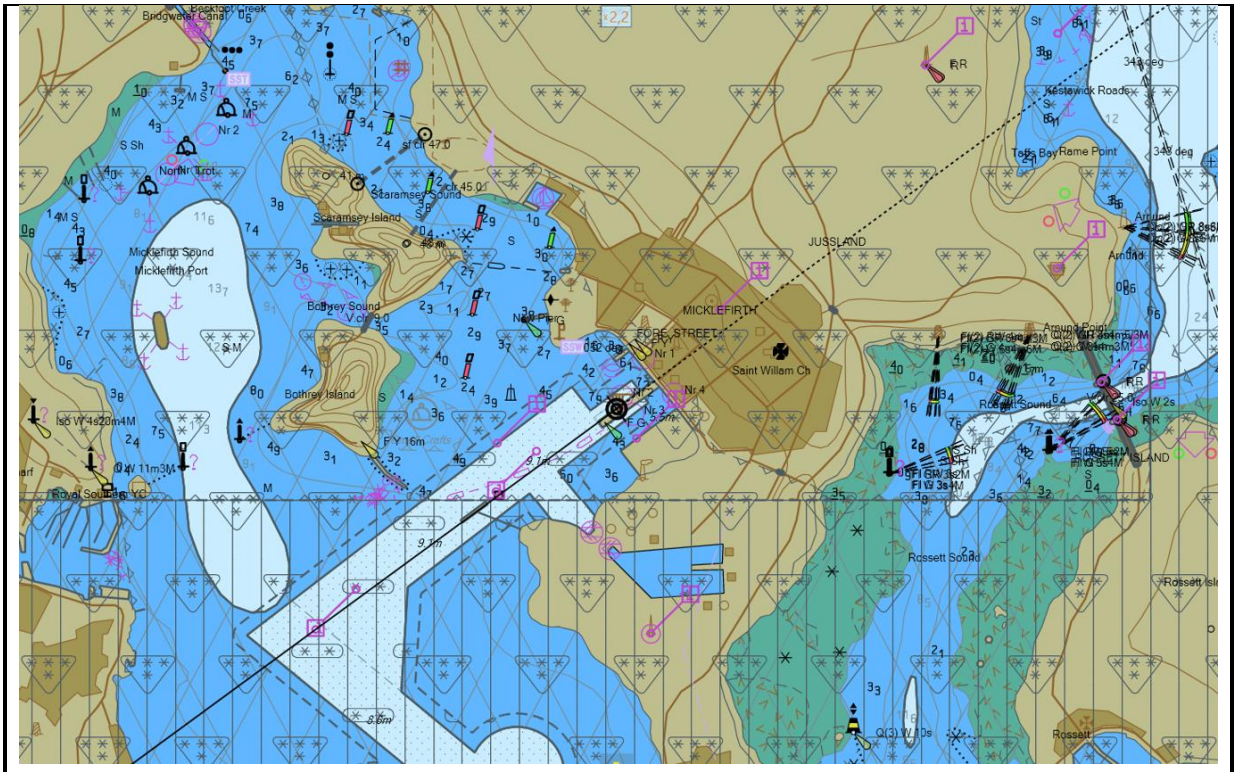
1. *The exchange sets shall install without any warning messages.*
2. *At the defined position the following image shall be observed:*



With chart 10100AA_X0000 displayed, the own ship shall be placed at the jetty in Micklefirth.

Note: Within this test dataset there are two omni directional lights co-located at 32°34.688'S, 060°54.955'E, this case is not a real-world example, as such the ECDIS may show a red-light sector.

Action
- *Set the viewing scale to 1:20 000.* - *Centre the display on own ship.*
Results
At the defined position the following image shall be observed:



The prison bars shall be displayed out of 10100AA_X01NW.000 coverage.

2.2.2 **Number and date in System Database**

Test Reference	PowerUp	**IHO Reference** **IEC Reference**	S-98: 6.1.1 61174: 4.4.1
Test description			
This test ensures EUT supports the import of initial datasets and confirmation of information in System Database.			
Setup			
*As per **InitialPowerUp**.*			
Action			
1. *Import the exchange set **PowerUp.*** 2. *Check information about the datasets in the System Database.*			
Results			
1. The exchange sets shall install without any warning messages. *2. The information in the System Database shall be identical to the below table:*			

ENC	Edition (EDTN)	Update number (UPDN)	Update Application Date (UADT)	Issue Date (ISDT)
10100AA_X0000.000	7	0	N/A	22 Apr 2018
10100AA_X01NE.000	5	0	N/A	22 Apr 2018
10100AA_X01NW.000	3	0	N/A	22 Apr 2018
101AA00_X01SE.000	3	0	N/A	22 Apr 2018
101AA00_X01SW.000	3	0	N/A	22 Apr 2018
101AA00_X02SE.000	4	0	N/A	22 Apr 2018

2.2.3 Load additional dataset and check System Database

Test Reference	AdditionalCell	**IHO Reference** **IEC Reference**	61174: 4.4.1
Test description			
This test ensures EUT supports import of additional cell and confirmation of its addition to the System Database.			
Setup			
*As for test **PowerUp**.*			
Action			
1. *Import the exchange set **Settings.*** 2. *Check that in the System Database the details of the dataset have been added.*			
Results			
1. *The exchange sets shall install without any warning messages.* 2. *The information in the System Database shall reflect the cell loaded and the coverage shall have changed accordingly;*			

ENC	Edition (EDTN)	Update number (UPDN)	Update Application Date (UADT)	Issue Date (ISDT)
10100AA_X0001.000	4	0	N/A	22 Apr 2022

2.2.4 Remove dataset and check the System Database

Test Reference	RemoveCell	**IHO Reference** **IEC Reference**	S-98: 6.1.1 61174: 4.4.1
Test description			
This test ensures EUT supports removing a cell and confirmation of its removal from the System Database.			
Setup			
*As on completion of test **AdditionalCell.***			
Action			
Remove the following cell: 10100AA_X0001.000 and check that in the System Database the details of the cell have been removed.			
Results			
The information in the System Database shall reflect the cell removed and the chart coverage shall have changed accordingly.			

2.3 Automatic updates of Unencrypted ENCs

2.3.1 Loading sequential updates

Test Reference	SequentialUpdates	**IHO Reference** **IEC Reference**	S-98: 20.4.3 61174: 4.4.2
Test Description			
This test will ensure the EUT supports the import of sequential updates and their review.			
Loaded Data			
Exchange Set Name			
PowerUp			
SequentialUpdate1 to 5 (contains datasets for Updates 1 to 5)			

Display Mode		**Independent Mariner's Selections**	
Displaybase		Accuracy	**On**
Context Parameters		Contour label	Off
Safety contour	**8**	Highlight date dependent	**On**

Safety depth	**8**	Highlight document	**On**
Deep Contour	N/A	Highlight info	**On**
Shallow contour	N/A	Shallow pattern	Off
Four shades	Off	Unknown objects	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart text	**On**
Full light lines	Off	Important text	**On**
Ignore scale minimum	Off	**Other Text**	**On**
Shallow water dangers	Off	Names	**On**
Palette		Light description	**On**
Day		All other chart text	**On**

Date Dependent Objects		**Display**	
Start Date	N/A	Centre	32°31.80’S, 60°57.50’E
End Date	N/A	Scale	1:20 000
		Orientation	

Viewing Groups

Standard Display		**Other**	
Drying lines	**On**	Spot soundings	**On**
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	**On**
Buoys, beacons, structures	**On**	All isolated dangers	**On**
Lights	**On**	Magnetic variation	**On**
Boundaries and limits	**On**	Depth contours	**On**
Prohibited and restricted areas	**On**	Seabed	**On**
Chart scale boundaries	**On**	Tidal	**On**
Cautionary notes	**On**	Miscellaneous (Other)	**On**
Ships’ routeing systems and ferry routes	**On**		
Archipelagic sea lanes	**On**		
Miscellaneous (Standard)			
Chart (Standard)	**On**		
Alert Highlights (Standard)	Off		

Setup

*As per PowerUp (exchange set **PowerUp** loaded).*

Action

1. *Import exchange sets **SequentialUpdate1 to 5.***
2. *Apply the following 5 updates one by one and check the plots after each successfully applied update to create the same results as the S-164 plots.*
   - *Apply Update .001*

Update review date range: 1st May 2011 – 21st May 2011

   - *Apply Update .002*

Update review date range: 1st Dec 2014 – 1st Mar 2015

   - *Apply Update .003*

Update review date range: 1st Sep 2015 – 14th Sep 2015

   - *Apply Update .004*

Update review date range: 15th Sep 2015 – 30th Sep 2015

   - *Apply Update .005*

Update review date range: 1st Oct 2015 – 14th Oct 2015

3. *Review of updates shall be performed after the update process is completed and the updates have been applied. Review the updates by selecting the given date range and confirm that display is as available in the corresponding screen plot.*

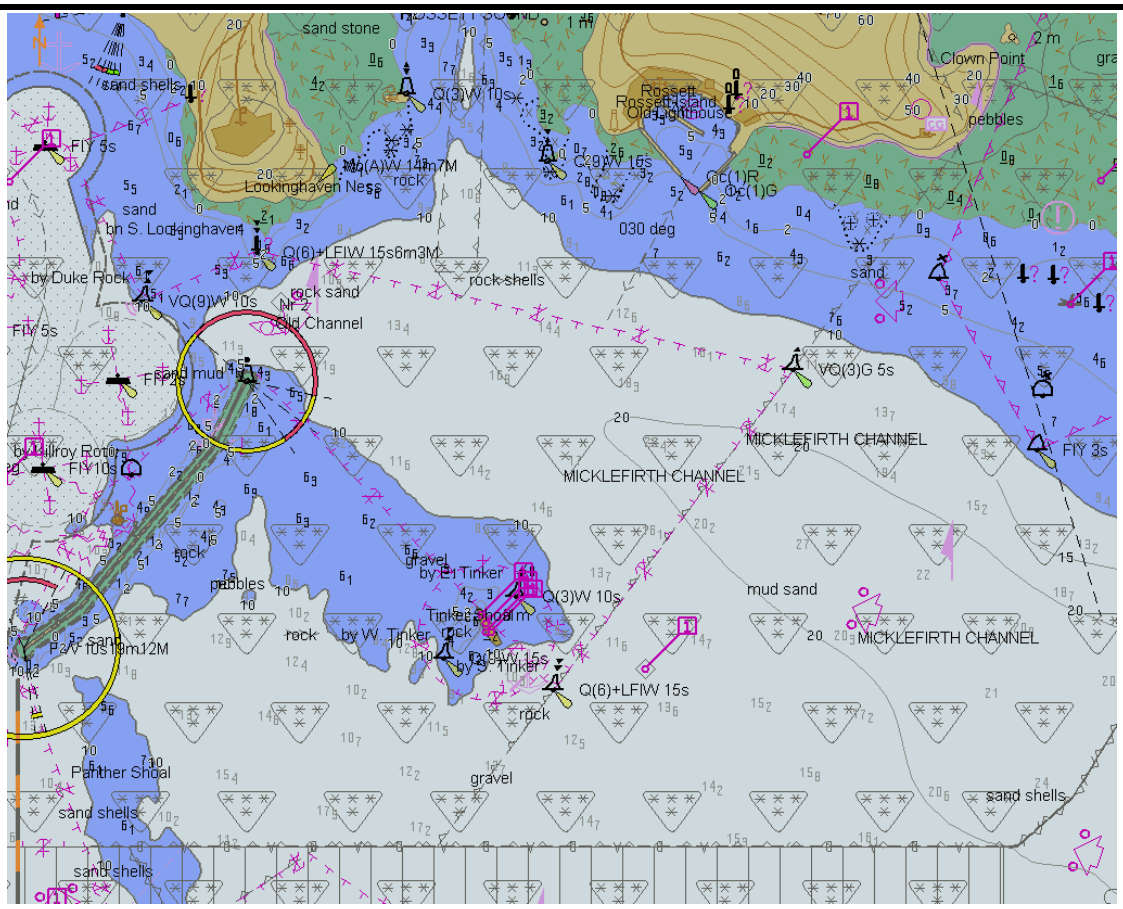
Results

1. *The exchange sets shall install without any warning messages.*
2. *The update process shall install all updates (up to update no. 005) and indicate it in an*

appropriate summary report which shall contain the following information:

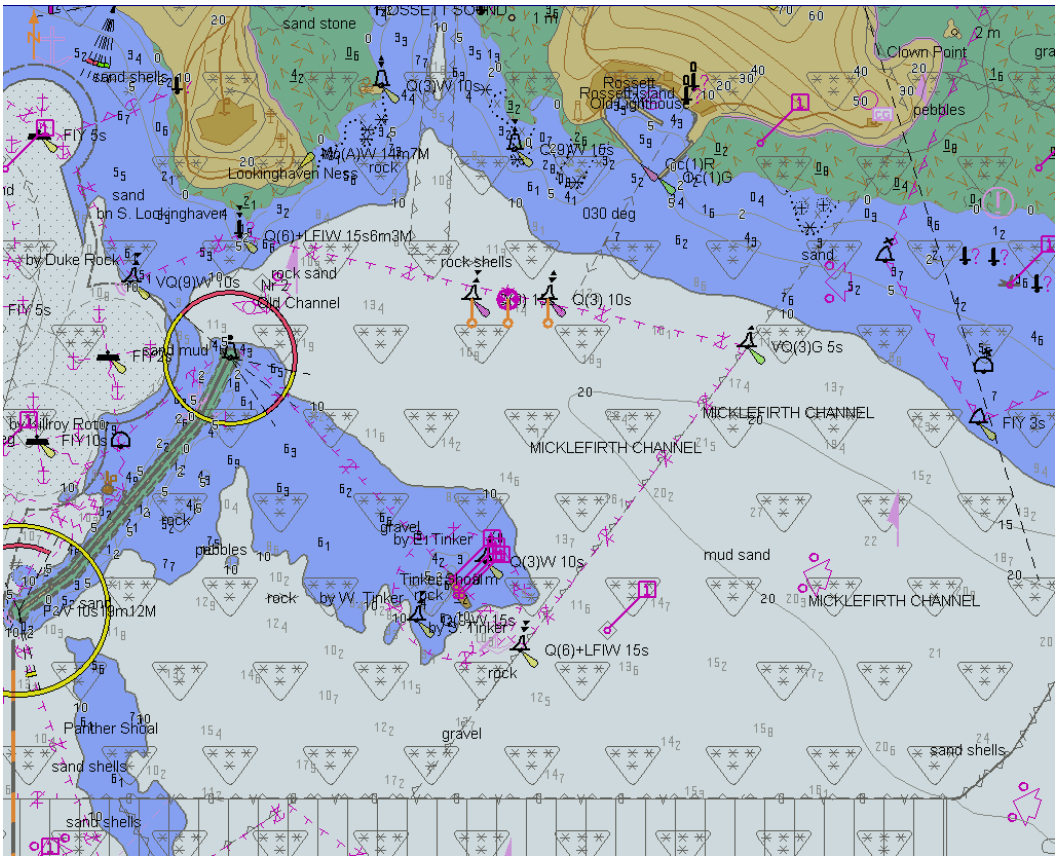
- *identification of issuing authority;*
- *update numbers of the update files;*
- *identifiers of datasets affected;*
- *edition number and reference date of involved datasets;*
- *number of updates in the affected datasets.*

Note: Manufacturers can use their own algorithms for calculating the position of centred symbols.



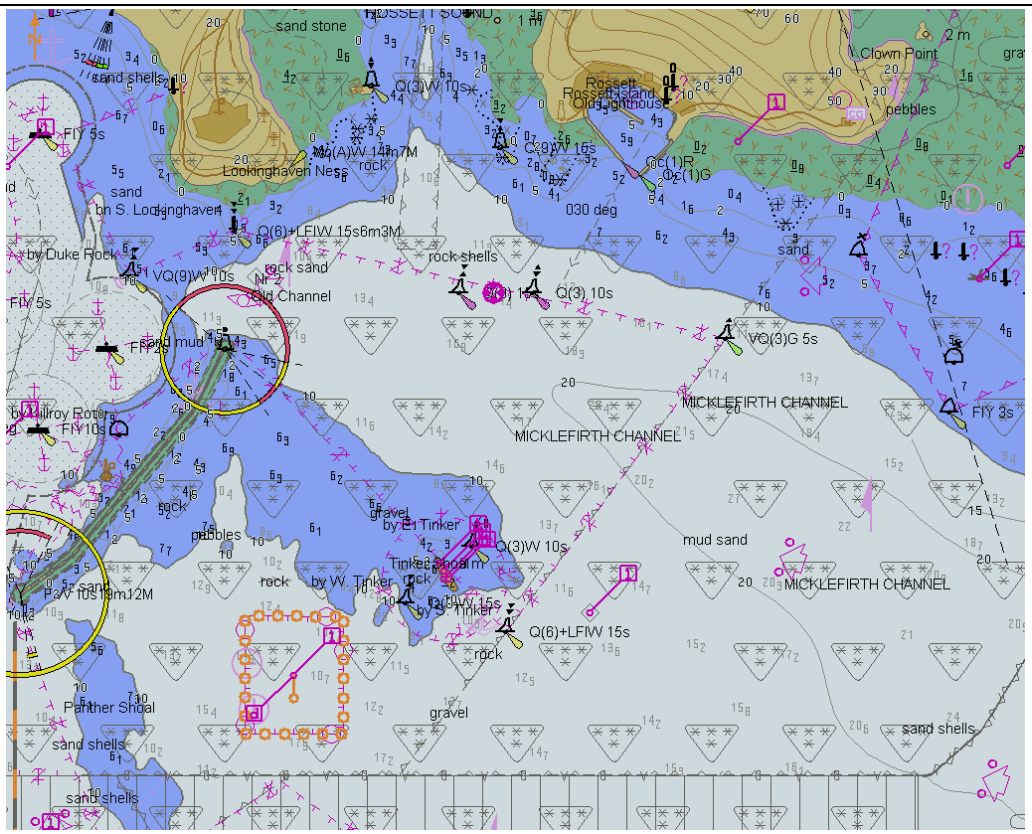
TBD

Before loading of updates, displayed scale 1:20 000



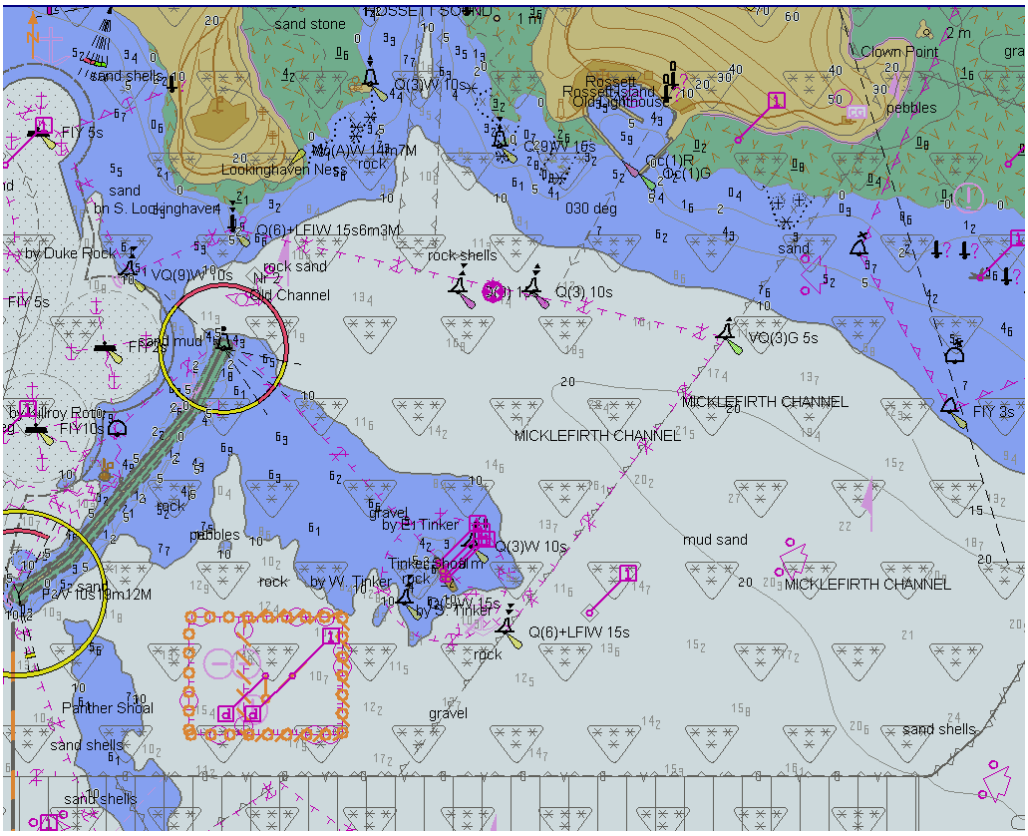
TBD

After loading of 101AA00X01SW.001, displayed scale 1:20 000, date range include 9th May 2011



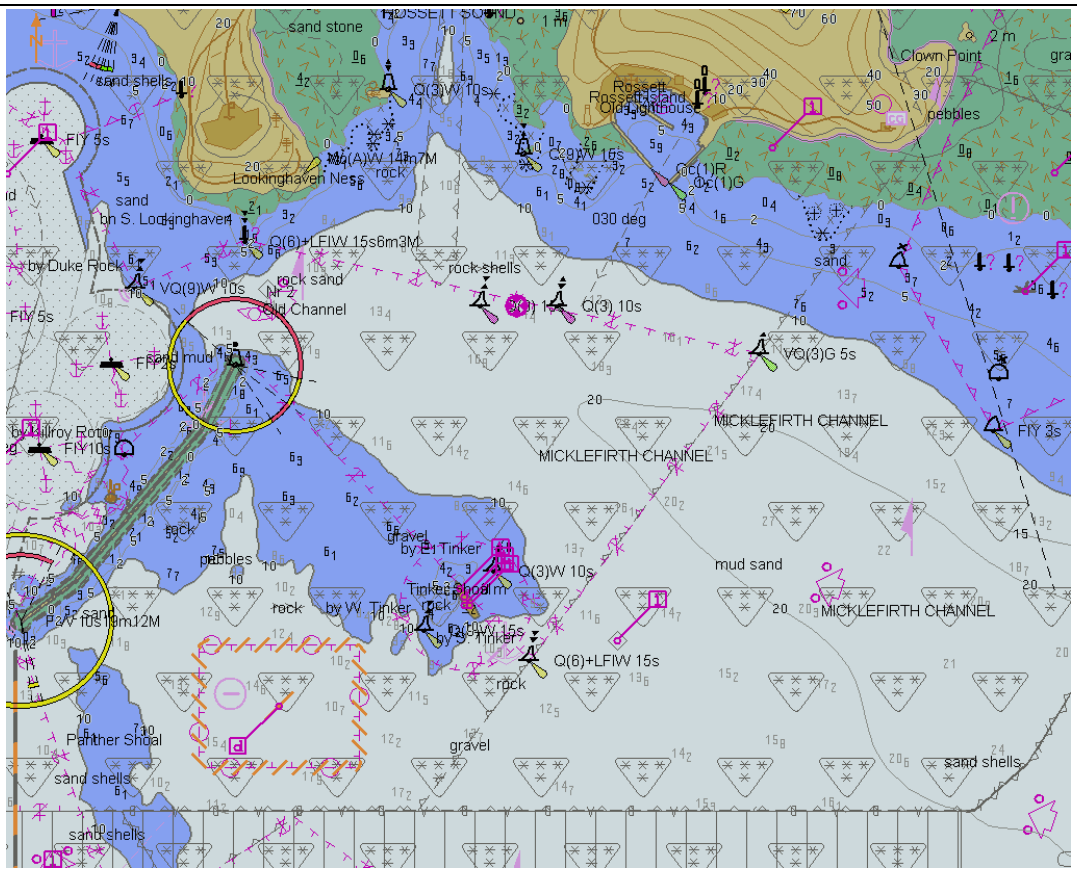
TBD

After loading of 101AA00X01SW.002, displayed scale 1:20 000, date range 1st Jan 2015-21st Feb 2015



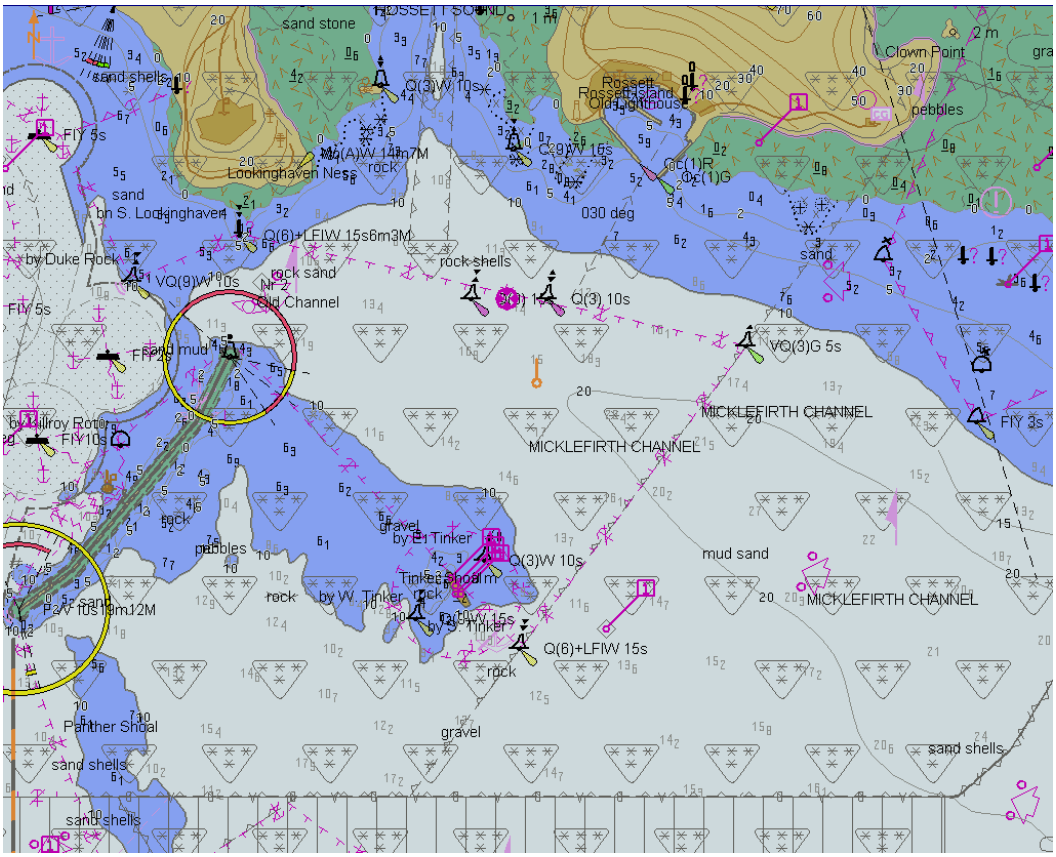
TBD

After loading of 101AA00X01SW.003, displayed scale 1:20 000, date range include 8th Sep 2015



TBD

After loading of 101AA00X01SW.004, displayed scale 1:20 000, date range include 22nd Sep 2015



TBD

After loading of 101AA00X01SW.005, displayed scale 1:20 000, date range include 6th Oct 2015

2.3.2 **Loading update in an invalid sequence**

Test Reference	InvalidSequence	**IHO Reference** **IEC Reference**	S-98: 20.4.3 61174: 4.4.2
Test description			
This test will ensure the EUT will reject the import of an update file which is not in the expected sequence.			
Setup			
*As per **PowerUp. (PowerUp exchange set loaded, but all previously loaded Update datasets must be removed from the System Database.***			
Action			
Import the following five update exchange sets: ***InvalidSequence00x** with x=1,2,3*			
Results			
The update process shall install the updates up to update no. 2 and reject the installation of updates no. 4 with a permanent indication, “Non sequential update, previous update(s) missing try reloading from the base media. If the problem persists contact your data supplier (message SSE123)”			

2.3.3 **Loading update of newer edition**

Test Reference	NewerEditionUpdate	**IHO Reference** **IEC Reference**	61174: 6.8.16.1
Test Description			
This test will ensure the EUT supports the import, display and update review process of an update file of a newer edition than base dataset installed			
Loaded Data			
Exchange Set Name			

NewUpdate

GoodBaseCell

Display Mode		**Independent Mariner's Selections**	
Other		Accuracy	**On**
Context Parameters		Contour label	Off
Safety contour	**8**	Highlight date dependent	**On**
Safety depth	**8**	Highlight document	Off
Deep Contour	N/A	Highlight info	**On**
Shallow contour	N/A	Shallow pattern	Off
Four shades	Off	Unknown objects	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	**On**
Simplified symbols	Off	Chart text	**On**
Full light lines	Off	Important text	**On**
Ignore scale minimum	Off	**Other Text**	**On**
Shallow water dangers	Off	Names	**On**
Palette		Light description	**On**
Day		All other chart text	**On**

Date Dependent Objects		**Display**	
Start Date	N/A	Centre	32°31.80'S, 60°57.50'E
End Date	N/A	Scale	1:20 000
		Orientation	

Viewing Groups (Default = On)

Standard Display		**Other**	
Drying lines	**On**	Spot soundings	**On**
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	**On**
Buoys, beacons, structures	**On**	All isolated dangers	**On**
Lights	**On**	Magnetic variation	**On**
Boundaries and limits	**On**	Depth contours	**On**
Prohibited and restricted areas	**On**	Seabed	**On**
Chart scale boundaries	**On**	Tidal	**On**
Cautionary notes	**On**	Miscellaneous (Other)	**On**
Ships' routeing systems and ferry routes	**On**		
Archipelagic sea lanes	**On**		
Miscellaneous (Standard)	**On**		
Chart (Standard)			
Alert Highlights (Standard)			

Setup

As per PowerUp (dataset 101AA00X01SW.000 (edition 3) loaded.

Action

1. Import the following update exchange set:

***NewUpdate**, contains 101AA00X01SW.001 (update 1 of edition 4)*

2. Display installed chart.

3. Import exchange sets:

***GoodBaseCells** 101AA00X01SW.000 (edition 4)*

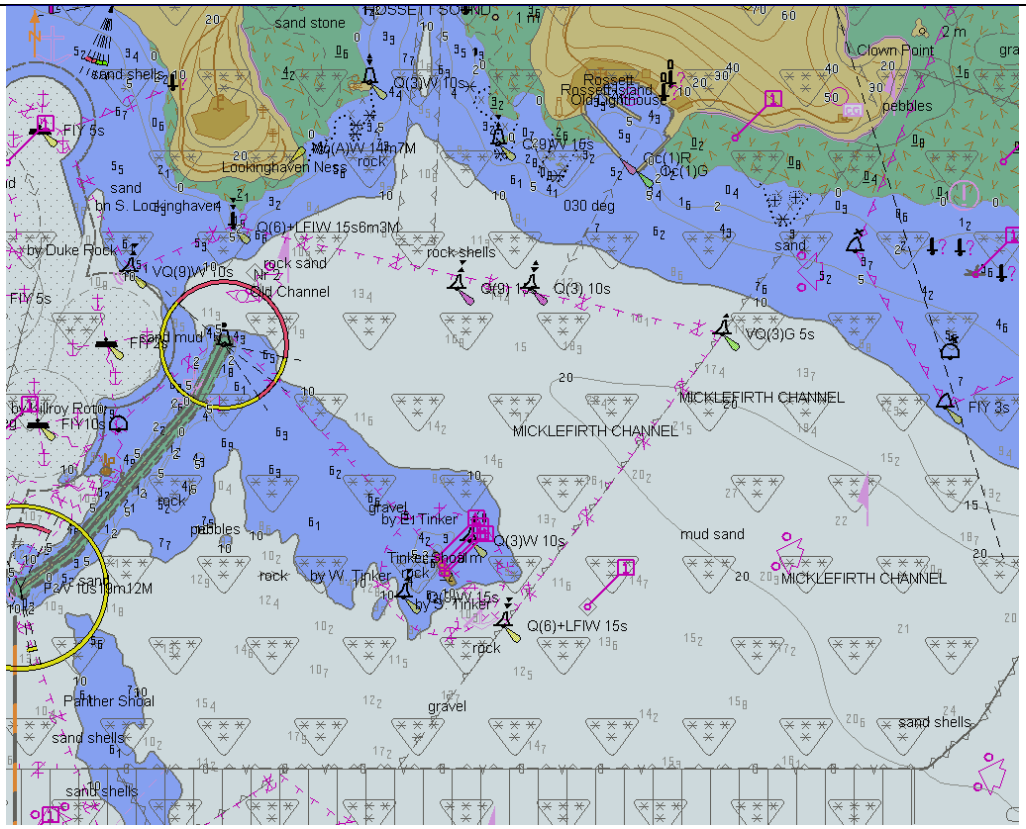
***NewUpdate** 101AA00X01SW.001 (edition 4)*

4. Display installed chart.

Results

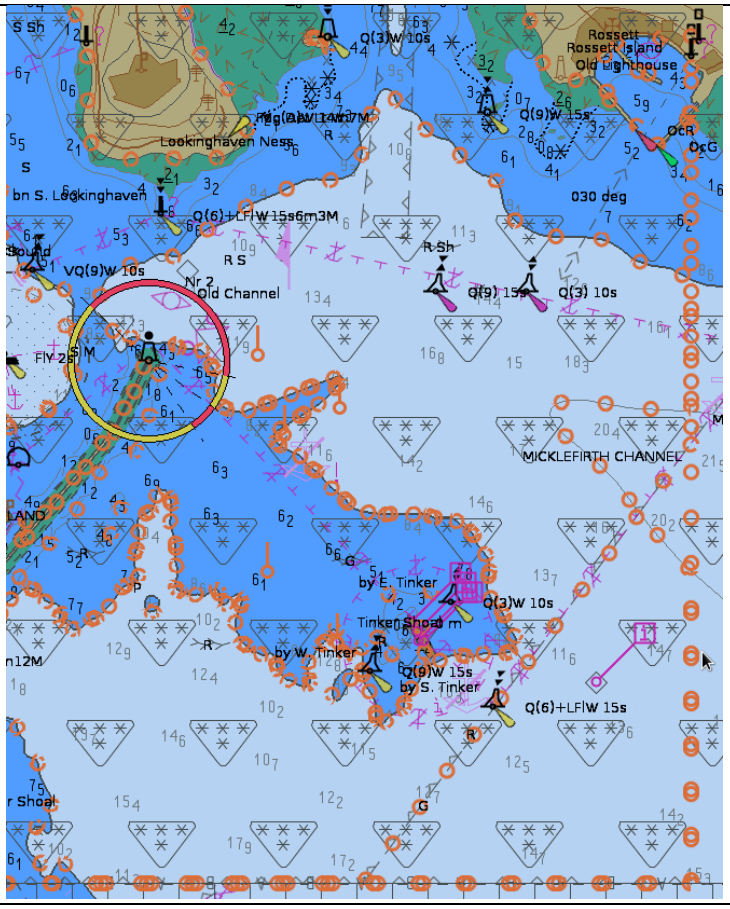
1. *The update process shall refuse to install the update and inform the user that chart data of a newer edition are available.*
2. *A permanent indication "Chart information not up to date" shall be available in the chart display area when such a chart is in use (either displayed on chart area or used as largest scale available for chart related alerts and indications).*

3. *The EUT shall install Base Cell and Update without any warning or error.*
4. *The "Chart information not up to date" message no longer displayed.*



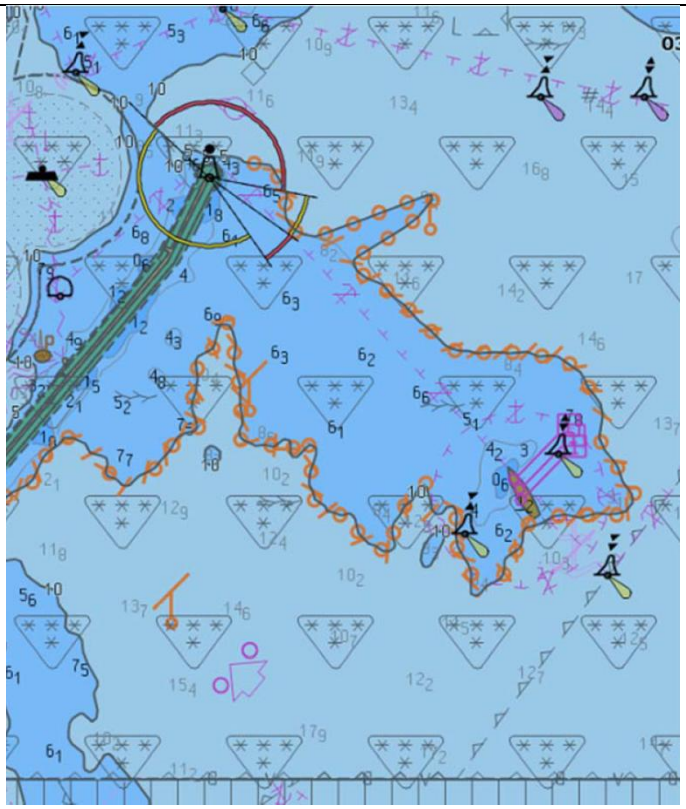
TBD

After loading of 101AA00X01SW.000 4th edition, displayed scale 1:20 000



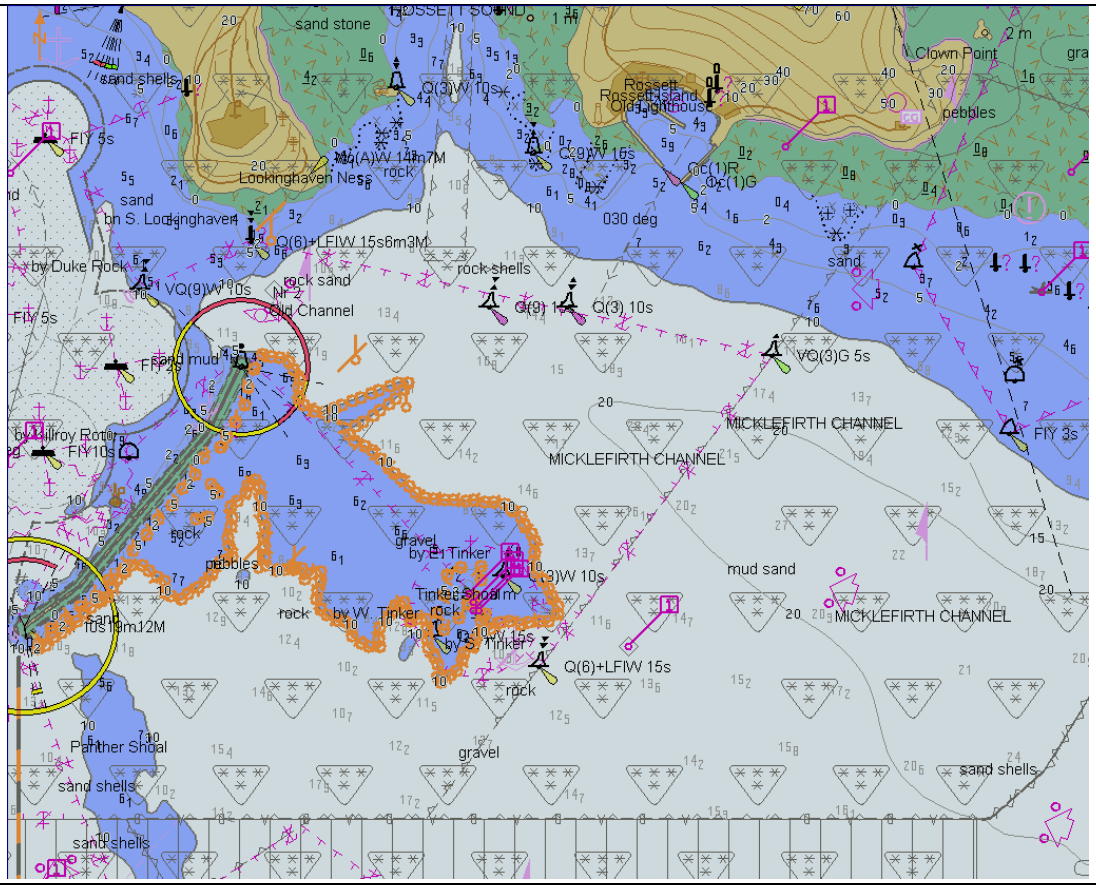
TBD

After loading of 101AA00X01SW.001 4th edition, displayed scale 1:20 000, all features and their geometries being subject to this update review are highlighted.



TBD

After loading of 101AA00X01SW.001 4th edition, displayed scale 1:20 000, update review highlight filtered for real changes (example 1).



TBD

After loading of 101AA00X01SW.001 4th edition, displayed scale 1:20 000, update review highlight filtered for real changes (example 2).

2.3.4 **Update Information**

Test Reference	UpdateInformation	**IHO Reference** **IEC Reference**	S-98 20.4.3 IEC 61174/ 4.4.2

Test Description

This test ensures EUT supports the import and display of S-101 metadata feature Update Information.

Loaded Data

Exchange Set Name

UpdateInformation

Display Mode	
Other	
Context Parameters	
Safety contour	**10 m**
Safety depth	**8 m**
Deep Contour	**30 m**
Shallow contour	**2 m**
Four shades	Off
Radar overlay	Off
Plain boundaries	Off
Simplified symbols	**On**
Full light lines	Off
Ignore scale minimum	**On**
Shallow water dangers	**On**
Palette	
Day	

Independent Mariner's Selections	
Accuracy	Off
Contour label	Off
Highlight date dependent	Off
Highlight document	Off
Highlight info	**On**
Shallow pattern	Off
Unknown objects	Off
Update review	**On**
Text Groups	
Chart Text	**On**
Important text	**On**
Other Text	
Names	**On**
Light description	**On**
All other chart text	**On**

Date Dependent Objects	
Start Date	
End Date	

Display	
Centre	32°31.61'S, 60°54.24'E
Scale	**1: 12 000**

Viewing Groups (On / Off)

Standard Display	
Drying lines	**On**
Buoys. Beacons, aids to navigation	**On**
Buoys, beacons, structures	**On**
Lights	**On**
Boundaries and limits	**On**
Prohibited and restricted areas	**On**
Chart scale boundaries	**On**
Cautionary notes	**On**
Ships' routeing systems and ferry routes	**On**
Archipelagic sea lanes	**On**
Miscellaneous (Standard)	**On**
Chart (Standard)	**On**
Alert Highlights (Standard)	Off

Other	
Spot soundings	**On**
Submarine cables and pipelines	**On**
All isolated dangers	**On**
Magnetic variation	**On**
Depth contours	**On**
Seabed	**On**
Tidal	**On**
Miscellaneous (Other)	**On**

Setup

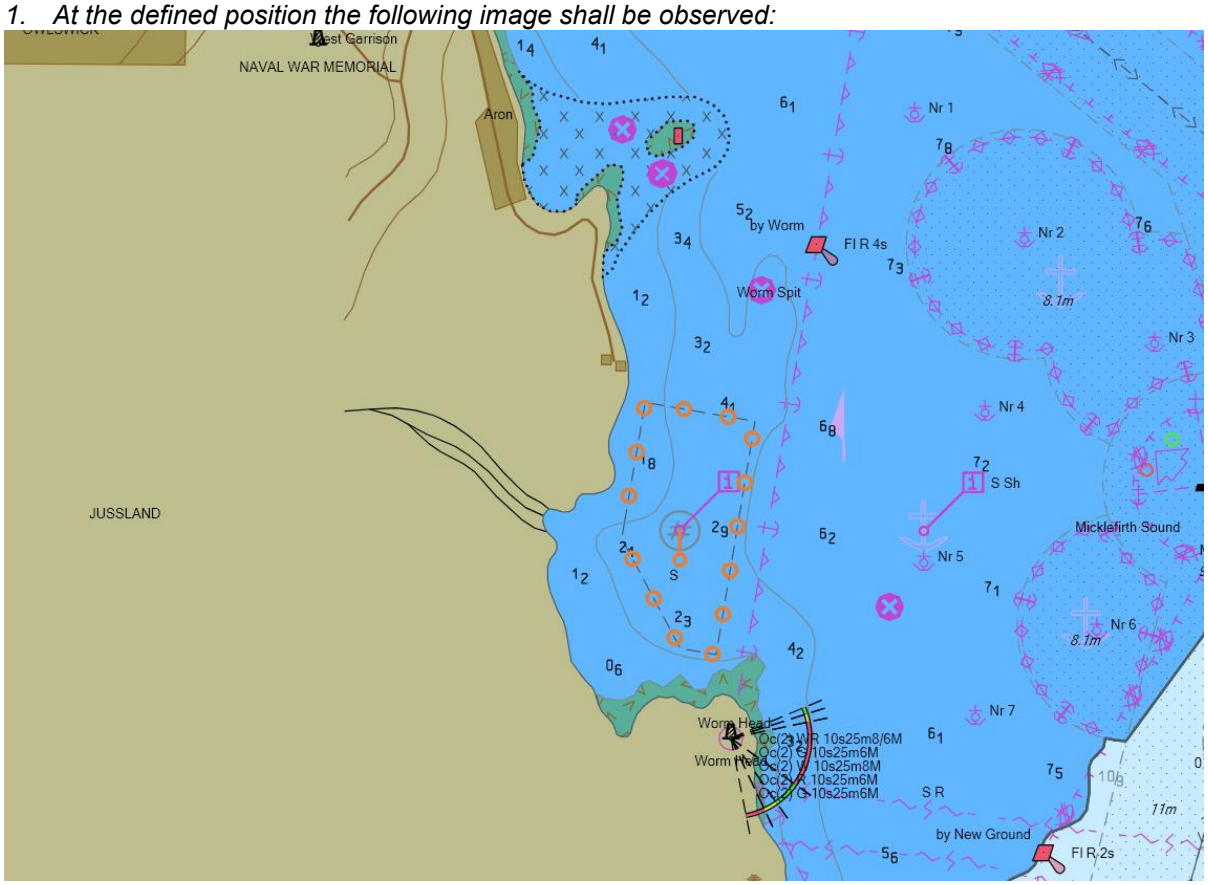
*As per **PowerUp***

Action

1. *Observe dataset 10100AA_X01SW.000 at indicted position and scale and verify Foul Ground feature is highlighted;*
2. *Cursor pick highlighted Foul Ground area feature and verify information contained in the Update Information feature.*

Results

1. *At the defined position the following image shall be observed:*



2. *Cursor pick shall show the following information:*
   - Update Type = Insert
   - Update Number = 0
   - Information Text = “Foul Ground is new for this edition of the ENC”

2.3.5 **Importing update of older edition**

Test Reference	OlderEditionUpdate	**IHO Reference** **IEC Reference**	S-98: 20.4.3 61174: 4.4.2
Test description			
This test ensures EUT will reject the import of an update file of an older edition than base dataset installed.			
Setup			
*As per **Updated Catalogue Data** (all datasets must be removed from the System Database; only catalogue files must be present).*			
Action			
1. *Import the following exchange set: **GoodBaseCell** (dataset 10100AA_X01SW.000 (edition 4));* 2. *Import the following exchange set:**OldUpdate**(dataset 10100AA_X01SW.001 (edition 3))*			
Results			
1. *The exchange set **GoodbaseCell** shall install without any warning message.* 2. *The update shall not be applied successfully and the system shall provide an indication (either on screen or in an error log) the reason the update was not applied, for example “Incorrect Edition Number 1 [of update]: expecting 2”.*			

2.3.6 **Importing a re-issue and an update of a dataset**

Test Reference	ReIssueAndUpdate	**IHO Reference** **IEC Reference**	S-98: 20.5 61174: 4.4.2
Test Description			

This test ensures EUT supports import and display of a re-issue of an unencrypted ENC dataset and a subsequent update.

Loaded Data

Exchange Set Name

Reissue
ReissueUpdate

Display Mode		**Independent Mariner's Selections**	
Other		Accuracy	**On**
Context Parameters		Contour label	Off
Safety contour	**10**	Highlight date dependent	**On**
Safety depth	**8**	Highlight document	Off
Deep Contour	**30**	Highlight info	**On**
Shallow contour	**2**	Shallow pattern	Off
Four shades	Off	Unknown objects	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart text	**On**
Full light lines	Off	Important text	**On**
Ignore scale minimum	Off	**Other Text**	
Shallow water dangers	Off	Names	**On**
Palette		Light description	**On**
Day		All other chart text	**On**

Date Dependent Objects		**Display**	
Start Date	N/A	Centre	32°31.80'S, 60°57.50'E
End Date	N/A	Scale	1:20 000
		Orientation	

Viewing Groups

Standard Display		**Other**	
Drying lines	**On**	Spot soundings	**On**
Buoys. Beacons, aids to navigation	**On**	Submarine cables and pipelines	**On**
Buoys, beacons, structures	**On**	All isolated dangers	**On**
Lights	**On**	Magnetic variation	**On**
Boundaries and limits	**On**	Depth contours	**On**
Prohibited and restricted areas	**On**	Seabed	**On**
Chart scale boundaries	**On**	Tidal	**On**
Cautionary notes	**On**	Miscellaneous (Other)	**On**
Ships' routeing systems and ferry routes	**On**		
Archipelagic sea lanes	**On**		
Miscellaneous (Standard)	**On**		
Chart (Standard)	**On**		
Alert Highlights (Standard)	**On**		

Setup

As per UpdateCatalogues

Action

Display dataset 10100AA_X01SW.000 (Edition 3);

1. *Import exchange set **Reissue**;*
2. *Display dataset 10100AA_X01SW.000 (Reissue of Edition 3, update 5);*
3. *Import exchange set **ReissueUpdate**;*
4. *Display dataset 10100AA_X01SW.000 with update 6 applied).*

Results

1. *After loading of 101AA00X01SW.000 3rd edition, displayed scale 1:20 000*

Screenshot TBD

2. *The exchange set Reissue shall install without any warning messages.*

Screenshot TBD

3. *After loading of 101AA00X01SW.000 (Reissue of Edition 3, update 5) displayed scale 1:20 000.*
4. *The exchange set ReissueUpdate shall install without any warning messages.*
5. *After loading of 101AA00X01SW.000 (Reissue of Edition 3, update 6) displayed scale 1:20 000.*

Screenshot TBD

2.3.7 **Rejection of automatic update**

Test Reference	UpdateRejection	**IHO Reference** **IEC Reference**	S-98: 20.4.3 61174: 4.4.2

Test Description

This test ensures EUT supports the manual rejection of an automatic update.

Loaded Data

Exchange Set Name

PreReissue
SequentialUpdate1

Display Mode		**Independent Mariner's Selections**	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown objects	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		**Display**	
Start Date		Centre	
End Date		Scale	1:60 000
		Orientation	

Viewing Groups

Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Setup

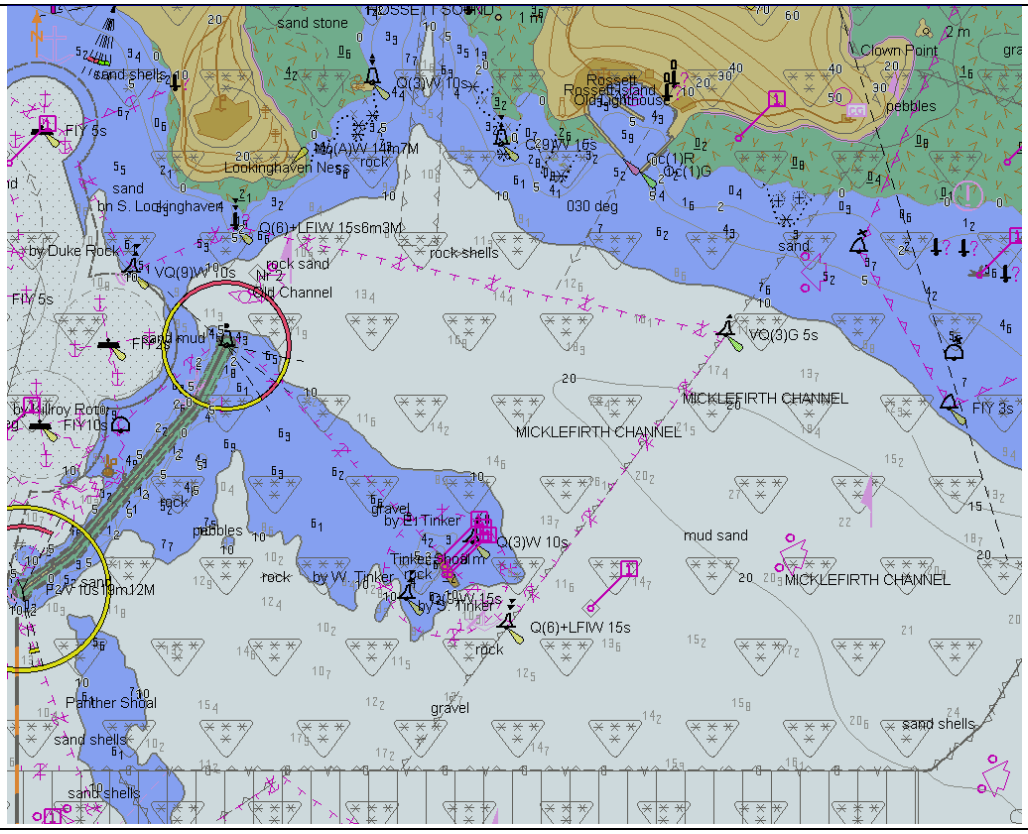
*As per **Update Catalogues***

Action

1. *Import Exchange Set **PreReissue** and display the dataset at indicated centered position and scale;*
2. *Import Exchange Set **SequentialUpdate1**;*
3. *Manually annotate the features of the update as rejected using the deletion available in the manual update method.*

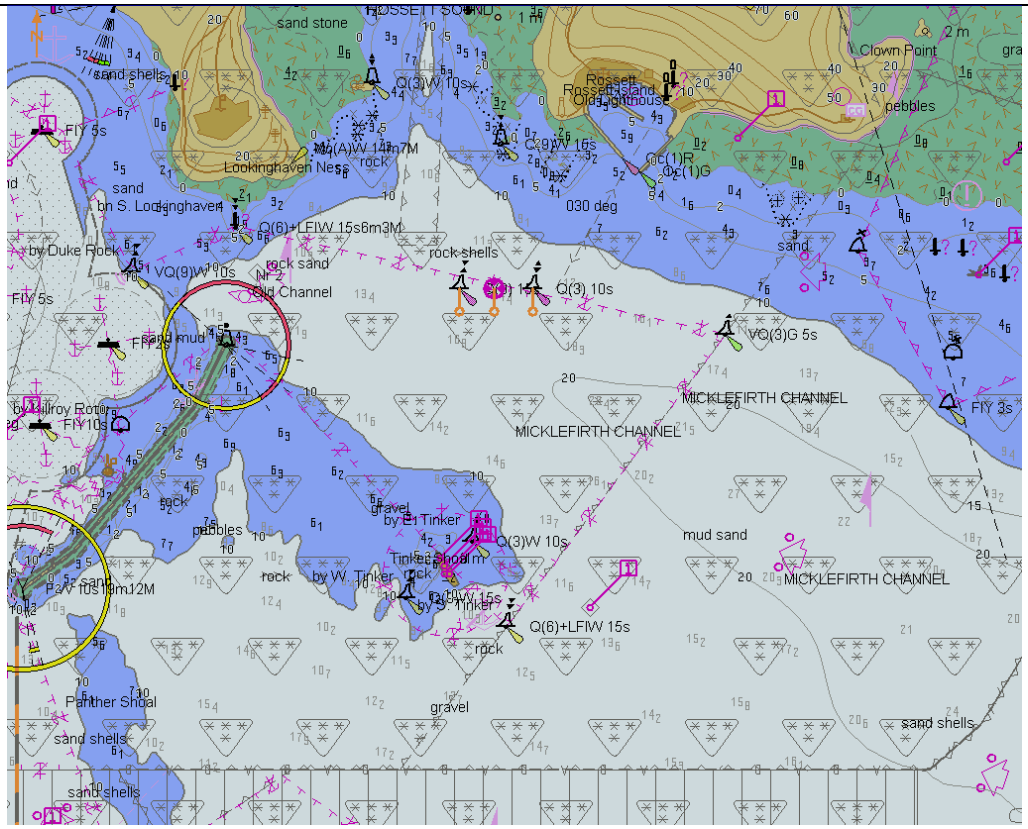
Results

The features from the update shall remain in display as annotated by the deletion mark of the manual update method.



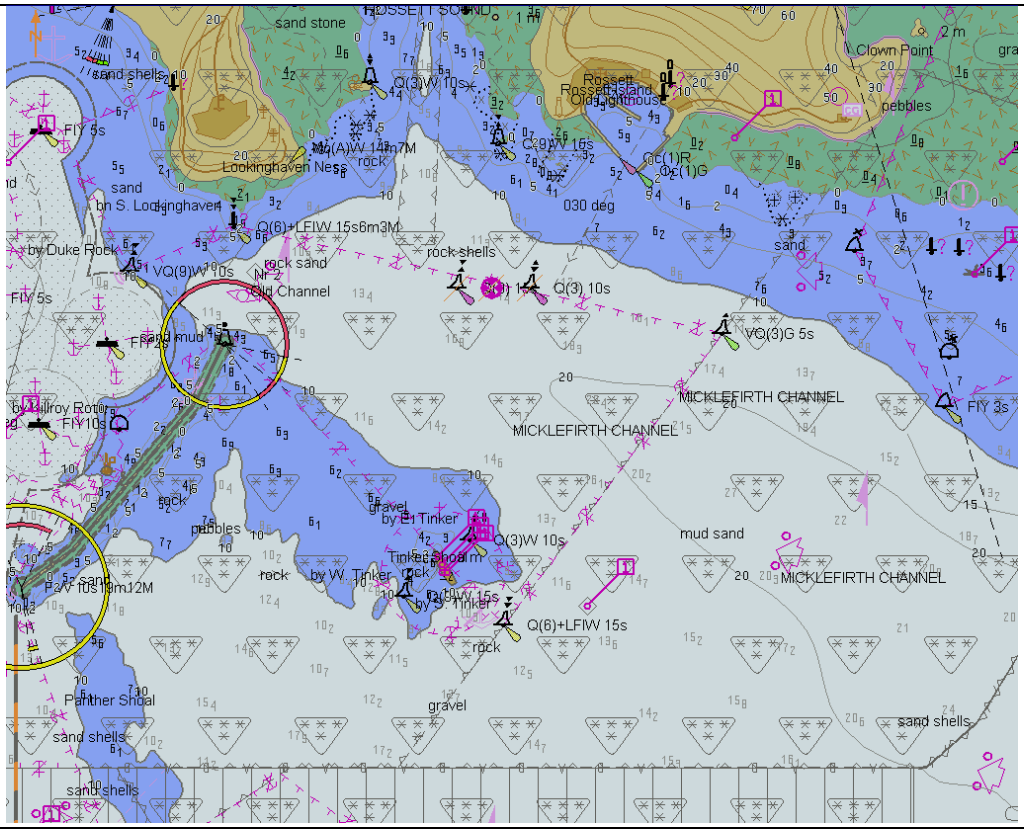
TBD

Before loading of update, displayed scale 1:20 000



TBD

After loading of 101AA00X01SW.001, displayed scale 1:20 000



TBD

After update 1 has been manually annotated as rejected by the Mariner, displayed scale 1:20 000

2.4 Manual Updates

2.4.1 Creation of a Manual Update

Test Reference	ManualUpdateCreation	**IHO Reference** **IEC Reference**	S-98: 20.4.4 IEC: 61174/ 6.8.17

Test Description
Manual updates.

Loaded Data	
Exchange Set Name	

Display Mode		**Independent Mariner's Selections**	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown objects	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		**Display**	
Start Date	N/A	Centre	
End Date	N/A	Scale	1:60 000
		Orientation	

Viewing Groups			
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Setup
*Load the exchange set **PowerUp***
- *Select Display Category Standard*
- *Set the Safety contour value to 8 m*
- *Set the Safety depth value to 8 m*
- *Select Symbolized Boundaries*
- *Select Simplified symbols = false*

- *Select Highlight date dependent*
- *Select Spot soundings*

Action

These descriptions potentially need editing as they are the original updates. They will need to be updated to the feature model included in S-98.

1. *Using the editing tools available with the EUT, make the following changes and include a short textual description of the action to a-g:*
   a. Insert a dangerous wreck near: 32 31.5S, 60 57.3E;
   b. Insert East Cardinal buoys including topmarks near: 32 31.5S, 60 57.46E;
   c. Insert West Cardinal buoy including topmark near: 32 31.5S, 60 57.16E;
   d. Insert a prohibited entry area between Panther and Tinker Shoals timed to come into force at 20220220;
   e. Insert a cautionary area in the same location being in force from date of issue to 20220220;
   f. Insert 15 metre sounding at 32 31.7S, 60 57.4E;
   g. Delete fog signal of cardinal buoy at 32 31.444S, 60 55.842E.
2. *Set viewing date before 20220220. Display chart cell with manual updates.*
3. *Set viewing date after 20220220. Display chart cell with manual updates.*
4. *Using the editing tools available with the EUT, make the following changes and include a short textual description of the action to h-j:*
   h. Extend western limits of the prohibited entry area;
   i. Delete cautionary area;
   j. *Move cardinal buoy at 32 31.444S, 60 55.842E, including top mark and light, to 32 31.500S, 60 55.700E.*
5. *Set viewing date before 20220220. Display chart cell with manual updates.*
6. *Set viewing date after 20220220. Display chart cell with manual updates.*
7. *Review manual updates.*
8. *Retrieve textual description from record.*
9. *Remove all manual updates from display and review them (system time and date may need to be adjusted for verification).*

Results

[The table from previous editions has been deleted (it will be referred to when creating the screenshots for the operational S-164 TDS Manual. The portrayal of manual updates has changed completely and so these screenshots will need to be completely revised]

2.4.2 **Manual Update - Dates**

Test Reference	ManualUpdatesDates	**IHO Reference** **IEC Reference**	S-98 20.4.4 61174: 6.8.17

Test Description

Test Manual Updates work with the date settings on the ECDIS.

- *Identified by S-98 stakeholders.*
- *Behaviour should be as specified in S-98 and allow users to create appropriate manual updates which behave correctly as the target date on the ECDIS is configured.*
- *There are tests in the previous test but they should be re-located here and made exhaustive.*

Loaded Data	
Exchange Set Name	

Display Mode		**Independent Mariner's Selections**	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	

Shallow contour		Shallow pattern	
Four shades		Unknown objects	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		**Display**	
Start Date		Centre	
End Date		Scale	1:60 000
		Orientation	

Viewing Groups			
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Setup
Action
Results

2.4.3 **Manual Update - retrieval**

Test Reference	ManualUpdatesRetrieval	**IHO Reference** **IEC reference**	S-98: 20.4.4 61174: 6.8.17
Test Description			
Test retrieval of manual updates.			
Loaded Data			
Exchange Set Name			

Display Mode		**Independent Mariner's Selections**	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	

Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown objects	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		**Display**	
Start Date	N/A	Centre	
End Date	N/A	Scale	1:60 000
		Orientation	

Viewing Groups			
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Setup
Action
Results

2.4.4 **Manual Update - Alerts and indications**

Test Reference	ManualUpdatesAlerts	**IHO Reference** **IEC Reference**	S-98: 20.4.4 61174: 6.8.17

Test Description

- *Test that manual updates are able to interact with alerts and indications.*
- *This should exhaustively test that manual updates which are required for creation of alerts/indications work correctly. This should be done by locating them in order, creating them according to the instructions and then running a route over the manual updates to observe the alerts/indications.*
- *Suggest using the area where the existing navhaz test are located for this test.*

Loaded Data

Exchange Set Name	

Display Mode		Independent Mariner's Selections	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown objects	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date	N/A	Centre	
End Date	N/A	Scale	1:60 000
		Orientation	

Viewing Groups			
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Setup

Action

Results

2.5 Loading, Updating and Authentication of datasets

2.5.1 Organization of encrypted datasets

The tests for loading encrypted data are stored in the folder "Part15". The test exchange sets are named and

referred to in the tests by the exchange set name. Where permits, certificates or other elements are needed they are provided in the root folder of the exchange set.

This section also includes tests of how the ECDIS performs data management functions for update, cancel/replace and reissued datasets and supplementary files.

[**notes for finalization of encrypted data tests: the S-101 test datasets are planned for use with these tests. These are AA / IHO datasets which will be given their own data producer certificates. The test descriptions will therefore change all the dataset names, but the details of the tests will remain the same. Additionally, depending on S-98 reviews and updates some of the SSE codes and messages may change]**

Default test data parameters

The S-100 Part 15 data permits that accompany any encrypted TDS have been generated for the User Permit specified below. To carry out the tests described in this document manufacturers will have to create systems compatible with the following manufacturer information and hardware ID (HW_ID) – these are taken from S-100 Edition 5.2.1 Part 15.

Manufacturer ID: (M_ID) = **859868**

Manufacturer Key: (M_KEY) = **4D5A79677065774A7343705272664F72**

Hardware ID: (HW_ID) = **40384B45B54596201114FE9904220101**

USERPERMIT = **AD1DAD797C966EC9F6A55B66ED98281599B3C7B1859868**

This is the official manufacturer information issued for and by the Scheme Administrator (IHO secretariat) and is provided expressly for the purpose of producing encrypted ENC test data. This data is provided specifically for the following purposes:

- OEM Type approval against the S-164 Test Data for Encrypted ENCs (this document).
- OEM and Data Server self-certification of their systems against S-100 Part 15.
- OEM Type approval against the S-64 Test Data for Encrypted ENCs (this document).
- OEM and Data Server self-certification of their systems against the S-63 Data Protection Scheme.

Test Certificate and Public Key

The TDS IHO Scheme Administrator Certificate (IHO.CRT) should be used in the test data unless a different certificate or public key file is specified in the test description.

2.5.2 **ENC Licensing – Permit Management**

2.5.2.a. Check permit string availability

Test Reference	InvalidPermit	**IHO Reference** **IEC reference**	S-98: B-3
Test description			
Test how the system performs when loading a non-compliant permit file. Verify that the ECDIS returns the correct error message.			
Setup			
No pre-installed permits. *Test data used:* *1) PERMIT.XML file (empty file)* *2) TEXT.XML file (wrong name)* *Test data location:* ***InvalidPermitFile***			
Action			
1) Attempt to load a PERMIT.XML file with no cell permits listed. *2) Attempt to load a non-compliant text file.*			
Results			
Security Scheme Error (SSE 111) and accompanying description is displayed in the system at permit installation. *i.e.,* ***SSE 111 – Cell permit not found***			

2.5.2.b. ENC cell permit string incorrect format

Test Reference	IncorrectPermitFormat	**IHO Reference** **IEC Reference**	S-98: B-3
Test description			
ENC Licensing – Permit Management. *ENC cell permit string incorrect format.* *Test how the system performs when loading a PERMIT.XML file with an incorrectly formatted permit string. Verify that the ECDIS returns the correct error message.*			
Setup			
No pre-installed permits or ENCs in the System Database. *Test data used:* *1) PERMIT.XML* *2) b) S100_ROOT (Exchange Set – 101AA0027M5, 101AA002GTBT plus updates)* *Test data location:*			
Action			
Load the permit file (PERMIT.XML) and then the exchange set (S100_ROOT) from the location above.			
Results			
Security Scheme Error (SSE 112) and accompanying description is displayed in the system at permit installation. That is, ***101AA0027M5****, "****SSE 112 – Cell permit format is incorrect****" 101AA002GTBT, valid to 31st Dec 2018 installed OK.* *(This message is only intended as indication of what should be displayed when a valid permit is installed.) Only 101AA002GTBT (edition #13 update # 5) and updates should be loaded into the System Database. The permit string for 101AA0027M5 is the wrong length [The cell name has the permit string for 101AA002GTBT is the correct length and is valid.*			

2.5.2.c. Validate permit checksum

Test Reference	InvalidPermitChecksum	**IHO Reference** **IEC Reference**	S-98: B-3
Test description			
ENC Licensing – Permit Management Validate permit CRC: *Test how the system performs when installing an ENC permit with an invalid checksum. Verify the system checks for a valid permit checksum and reports the appropriate message.*			
Setup			
No pre-installed permits. *Test data used:* *PERMIT.XML* *Test data location:* - ***ENCLicencingC1*** - ***ENCLicencingC2***			
Action			
Attempt to load the PERMIT.XML file from locations (a) and (b) above into the ECDIS.			
Results			
The system reports a CRC failure on 101AA0027M5 accompanied by the appropriate error message as follows: *"**SSE 113 – Cell Permit is invalid (checksum is incorrect)**"* *In both cases the permit for 101AA002GTBT imports without any error or warning.* *1) Cell 101AA0027M5 has had its permit CRC changed from* 760CD6BA8AAEF1A0 to 760CD6BA8AAEE1A0. *2) Cell 101AA0027M5 has had the encrypted cell keys 1 & 2 altered slightly.* *3) Cell 101AA002GTBT has a valid permit (CRC value for both tests).*			

2.5.2.d. **Missing** PERMIT.XML signature

Test Reference	MissingPermitSignature	**IHO Reference** **IEC Reference**	S-98: B-3
Test description			
This test checks that permits cannot be loaded from a PERMIT.XML without a valid PERMIT.SIG permit signature file also present.			
Setup			
No pre-installed permits. *Test data used:* *PERMIT.XML* *Test data location:* - ***ENCLicencingH***			
Action			
Import PERMIT.XML.			
Results			
Verify the EUT fails to import the permits contained in PERMIT.XML and a suitable error message is issued.			

2.5.2.e. Multiple Permits

Test Reference	MultiplePermits	**IHO Reference** **IEC Reference**	S-98: B-3
Test description			
This test checks that multiple permits contained in a single permit file can be correctly managed by the ECDIS.			
Setup			
Load the PERMIT.XML from the location **MultiplePermits**			
Action			
Import PERMIT.XML.			
Results			
Verify the ECDIS selects the correct permit from the available permits contained in PERMIT.XML			

2.5.2.f. Invalid PERMIT.XML signature (contained in PERMIT.SIG)

Test Reference	InvalidPermitSignature	**IHO Reference** **IEC Reference**	S-98: B-3
Test description			
This test checks that permits cannot be loaded from a PERMIT.XML with an invalid PERMIT.SIG permit signature.			
Setup			
No pre-installed permits. *Test data used:* *PERMIT.XML* *Test data location:* - ***ENCLicencingI***			
Action			
Load PERMIT.XML.			
Results			
Verify the ECDIS fails to load the permits contained in PERMIT.XML and a suitable error message is issued.			

2.5.2.g. Check remaining permit expiry period

Test Reference	ExpiringPermit	**IHO Reference** **IEC Reference**	S-98: B-3
Test description			
Test how the system performs when loading permits that expire within the next 30 days. Verify that the ECDIS returns the correct warning message.			
Setup			
No pre-installed permits. *Test data used:* *PERMIT.XML* *The expiry date set in this test permit is 20251231 (31st December 2025).* *Test data location:* - *ENCLicencingD*			
Action			
Set the computer Date/Time properties to 3rd Dec 2025 *Install the PERMIT.XML file:*			
Results			
The system must return an SSE 120 warning message as follows: *"**SSE 120 – Subscription service will expire in less than 30 days. Please contact your data supplier to renew the subscription licence**."*			

2.5.2.h. Incorrect User Permit in PERMIT.XML

Test Reference	InvalidPermitSignature	**IHO Reference** **IEC Reference**	S-98: B-3
Test description			
This test checks that permits cannot be loaded from a PERMIT.XML with the wrong user permit contained.			
Setup			
No pre-installed permits. *Test data used:* *PERMIT.XML* *Test data location:* - ***ENCLicencingJ***			
Action			
Load PERMIT.XML.			
Results			
Verify the ECDIS fails to load the permits contained in PERMIT.XML with the following message: *"**SSE 121 – Permits may be for another system or new permits may be required, please contact your data supplier to obtain a new licence**."*			

2.5.2.i. Check for expired permits

Test Reference	ExpiredPermits	**IHO Reference** **IEC Reference**	S-98: B-3
Test description			
Test how the system performs when installing permits which have expired. Verify that the ECDIS returns the correct warning message.			
Setup			
No pre-installed permits. *Test data used:* *PERMIT.XML* *The expiry date set in this test permit is 20251231 (31st December 2025).* *Test data location:* - ***ENCLicencingE***			
Action			
Load the PERMIT.XML file. [Note The expiry dates for these permits are set to 31st Dec 2025. ***Set the computer Date/Time to 1st Jan 2026*** *and install the PERMIT.XML file]*			
Results			
The system must report the correct SSE 115 warning message as follows: *"**SSE 115 – Subscription service has expired. Please contact your data supplier to renew the subscription licence**."* *It should be possible to install expired permits but the system must display a permanent warning message to the use as documented in S-98 Appendix B.*			

2.5.2.j. Permit installation and reporting

Test Reference	PermitInstallation	**IHO Reference** **IEC reference**	S-98: 15-7.4
Test description			
Test how the system performs when a valid set of ENC permits, with more than 30 days until expiry, is loaded. Confirm that the ECDIS installs valid permits and offers the user a meaningful report at the end of the process.			
Setup			
No pre-installed permits. *Test data used:* *PERMIT.XML* *Test data location:* - ***ENCLicencingF*** *The expiry dates for these permits are set to 31st Dec 2028.* ***Set the computer Date/Time prior to 1st Dec 2028*** *and install the PERMIT.XML file.*			
Action			
Load the file PERMIT.XML in the location stated above.			
Results			
The permit file must import without any errors or warnings. A report dialog should be available to the user so that they can confirm the successful import. *(10 ENC Cell permits are provided for this test created using the IHO manufacturer hardware ID and M_KEY.)*			

2.5.2.k. Management of permits from multiple data servers.

Test Reference	MultipleDataServers	**IHO Reference** **IEC reference**	S-98: B-3
Test description			
Test how the system performs when loading permit files from two different data servers. Confirm that the ECDIS manages permits supplied from different data servers correctly and stores them independently of one another.			
Setup			
No pre-installed permits. *Test data used:* *PERMIT.XML* *Test data location:* - ***ENCLicencingG1*** - ***ENCLicencingG2*** *There are two ENC cells common to both PERMIT.XML files. These common permits have been created using different encryption keys.*			
Action			
Load the PERMIT.XML file at the test data location (a) above. *Load the PERMIT.XML file at the test data location (b) above.*			
Results			
The two independently supplied permits should be stored in a Data Server specific location within the ECDIS. These permits must be available to view the contents at the user's request. (There are two ENC cells common to both PERMIT.XML files. These common permits have been created using different encryption keys.)			

2.5.2.l. Management of installed permits

Test Reference	PermitManagement	**IHO Reference** **IEC Reference**	S-98: 15-7.4
Test description			
Test whether the system enables user to manage their permit holdings. Confirm that users have the ability to selectively remove permits from the system.			
Setup			
Use the pre-installed permits from the previous test MultipleDataServers (*2.5.2g).* *Test data used:* *PERMIT.XML files loaded in the previous test.* *Two permit files have been supplied with this test from two different Data Servers (DS). These have been designated GB and PM.*			
Action			
Attempt to remove one of the installed sets of permits from the system leaving the other one intact.			
Results			
The user must be able to delete permits from the system. Suitable warnings/confirmations must be given.			

2.5.2.m. Change and update installed certificate

Test Reference	InstallSACertificate	**IHO Reference** **IEC Reference**	S-98: B-3
Test description			
Confirm that the system can import a new certificate/public key and return a report informing the user of the fact. Validate the supplied exchange set against the SA certificate.			
Setup			
Use the pre-installed information and data from the previous test. *Test data used:* *1) IHO.CRT* *2) PERMIT.XML* *3) S100_ROOT (Exchange Set)* *Test data location:* - ***Authentication1B***			
Action			
1. *Install the new IHO.CRT file as the new SA certificate* *Install the exchange set from the location above.*			
Results			
1) The new certificate or public key file should load without error or warning, i.e., no SSE 126 message. A message should be displayed informing the user that the new file has been installed successfully. *2) The exchange set loads without any authentication failures.* *ENC cell 101AA003555D (Edition #7, Update #1) installed without error or warning;* *ENC cell 101AA003LRFD (Edition #3, Update #2) installed without error or warning.*			

2.5.2.n. No pre-installed certificate/public key on the system

Test Reference	MissingSACertificate	**IHO Reference** **IEC reference**	S-98: B-3
Test description			
Test how the system performs when there is no pre-installed certificate. Confirm that the correct SSE 105 error message is displayed and that the system does not progress to the decompress/decrypt stage.			
Setup			
No pre-installed certificate, permits or ENC data. *Test data used:* *1) PERMIT.XML* *2) S100_ROOT (Exchange Set)* *Test data location:* - ***Authentication1C***			

Action
Install the exchange set stored in the location above.
Results
The system must report an SSE 105 error message similar to the one below. *"**SSE 105 – SA Digital Certificate file is not available. A valid certificate can be obtained from the IHO website or your data supplier**."* *The system must abort at this point and not continue to install ENCs.* *ENC cell 101AA0027M5 (Edition #3, Update #6) not installed. "SSE 105" Error Message;* *ENC cell 101AA002GTBT (Edition #13, Update #5) not installed. "SSE 105" Error Message.*

2.5.2.o. Check SA Certificate Expiry Date

Test Reference	CertificateExpiry	**IHO Reference** **IEC Reference**	S-98: B-3
Test description			
Test how the system performs if the SA certificate (IHO.CRT) has expired. To confirm that the correct SSE 122 error message is displayed and that the system does not progress to the decompress/decrypt stage.			
Setup			
No pre-installed certificate, permits or ENC data. *Test data used:* *IHO.CRT PERMIT.XML PERMIT.SIG* *S100_ROOT (Exchange Set)* *Test data location:* ***Authentication1DExpired*** ***Authentication1DCurrent*** *The IHO.CRT (Expired) certificate expired on 31st December 2014* *The IHO.CRT (Current) certificate expires on 29th August 2033*			
Action			
There are two folders one contains an expired certificate and an exchange set, the other a current certificate and an exchange set. *The system date should be set to a date between the expiry dates for (a) and (b) above.* *1) Install the SA certificate at location (a) above then attempt to load the exchange set.* *2) Then install the SA certificate at location (b) above then attempt to load the exchange set (this test should result in the certificate & ExSet loading correctly).*			

Results
1) When installing the expired certificate, the system must report an SSE 122 error message similar to the one below. *"**SSE 122 – SA Digital Certificate file has expired. A new SA Public Key (certificate) can be obtained from the IHO website or your data supplier**." When attempting to install the exchange set the system must report the required SSE 105 message stating that no valid certificate is installed in the ECDIS.* *2) When installing the current certificate this should install OK and load the ExSet without error or warning.* ***Current*** *ENC cell 101AA0027M5 (Edition #3, Update #6) installed without errors and warnings.* *ENC cell 101AA002GTBT (Edition #13, Update #5) installed without errors and warnings.* ***Expired*** *ENC cell 101AA0027M5 (Edition #3, Update #1) not installed. "SSE 122 & 105" Error Messages.* *ENC cell 101AA002GTBT (Edition #12, Update #7) not installed. "SSE 122 & 105" Error Messages*.

2.6 Dataset Authentication

2.6.1 Missing Catalogue Signature

Test Reference	MissingCatalogueSignature	**IHO Reference** **IEC Reference**	S-98: B-3
Test description			
This test checks that exchange sets with an invalid catalogue signature file cannot be loaded.			
Setup			
No pre-installed permits. *Test data used:* *CATALOG.XML* *Test data location:* - ***Authentication3A*** *The exchange set is missing the CATALOG.SIGN catalogue signature file.*			
Action			
*Load exchange set **MissingCatalogueSignature.***			
Results			
Verify the EUT fails to install the exchange set contents and outputs a suitable error message.			

2.6.2 **Invalid Catalogue Signature**

Test Reference	InvalidCatalogueSignature	**IHO Reference** **IEC Reference**	S-98: B-3
Test description			
This test checks that exchange sets with an invalid catalogue signature file cannot be loaded.			
Setup			
No pre-installed permits. *Test data used:* *CATALOG.XML CAT.SIG* *Test data location:* - ***Authentication3B*** *The signature contained in CATALOG.SIGN is invalid.*			
Action			
*Load exchange set **InvalidCatalogueSignature.***			
Results			
Verify the ECDIS fails to install the exchange set contents and outputs a suitable error message.			

2.6.3 **Authentication against a non-SA certificate**

Test Reference	NonSASignedData	**IHO Reference** **IEC reference**	S-98: B-3
Test description			
Test that the system will correctly reject data which is authenticated against a certificate which is not the Scheme Administrator.			
Setup			
No pre-installed certificate/public key, permits or ENC data. *Test data used:* *1) S100_ROOT (Exchange Set – 101AA_TBD_52, 101AA_TBD_53, 101AA_TBD_54)* *Test data location:* - ***Authentication2B*** *This test uses an exchange set where the data server certificate is self-signed (not by the SA).*			
Action			
Install certificate and exchange set stored in the location above.			
Results			
The system must authenticate the exchange set against the certificate and/or public key stored on the system. The system must identify that the data has been authenticated against a public key not issued by the IHO acting as the SA. *An error message must be displayed as follows:* *"**SSE 126 – ENC is not authenticated by the IHO acting as the SA**"* ***This test should prevent the exchange set from being loaded.***			

2.6.4 **Authentication via a domain coordinator**

Test Reference	AuthenticationDomainCoordinator	**IHO Reference** **IEC Reference**	S-98: B-3
Test description			
S-100 Part 15 allows for domain coordinators and a chain of certification between the data server certificate and the SA. This test verifies the ECDIS is able to correctly import data which is authenticated by the SA via one or more domain coordinators.			
Setup			
No pre-installed certificate, permits or ENC data. *Test data used:* *1) PERMIT.XML* *3) S100_ROOT (Exchange Set – 101AA_TBD_52, 101AA_TBD_53, 101AA_TBD_54)* *Test data location:* - ***AuthenticationDomainControllers***			
Action			
Install the IHO.CRT file, PERMIT.XML and ENC exchange set from the location described.			
Results			
Verify the ECDIS correctly installs all cells.			

2.6.5 **ENC signature validation**

Test Reference	InvalidDatasetSignature	**IHO Reference** **IEC Reference**	
Test description			
Test how the system responds when validating an incorrectly signed dataset. Confirm that the correct SSE 109 message is displayed.			
Setup			
No pre-installed certificate/public key, permits or ENC data. *Test data used:* *1) IHO.CRT* *2) S100_ROOT (Exchange Set)* *Test data location:* - ***Authentication2C*** *The digital signature for 101AA00EJ8PM.000 is in the correct format but the signature is invalid. The digital signature for 101AA00EP00S.000 is in the correct format and is valid.*			
Action			
Install the SA IHO.CRT file, PERMIT.XML and ENC exchange set from the location described below.			

2.6.6 **Check authentication is continuous and complete**

Test Reference	ContinuousAuthentication	**IHO Reference** **IEC Reference**	
Test description			
Tests that the system authenticates all signature files individually and continuously without hanging at an error. Check that the SSE 109 and SSE 124 messages are reported correctly.			
Setup			
Use data installed from the previous test (with 101AA00EJ8PM & 101AA00FD2Z already installed). *Test data used:* *1) S100_ROOT (Exchange Set)* *Test data location:* - *Authentication2E* *101AA00HAOUR.000 (invalid signature) 101AA00I9FJ3.001 (Incorrect signature format)*			
Action			
Load the exchange set from the location above.			
Results			
The system must authenticate each ENC signature continuously in turn. It must report the following errors at the end of the process: *"101AA00HAOUR.000 – SSE 109 – ENC Signature is invalid."* *"101AA00I9FJ3.001 – SSE 124 – ENC Signature format is incorrect."* *The system must load all ENC data files with authenticated digital signatures but not those that do not. Some systems may report an SSE 109 (ENC Signature is invalid) error for both 101AA00HAOUR.000 & 101AA00I9FJ3.001. This is acceptable as the expected outcome is the same, i.e. the data file is rejected.* *Note: 101AA00I9FJ3.002 should also return a sequential update error as it was not possible to install 101AA00I9FJ3.001.* *e.g* *ENC cell 101AA00EJ8PM (Edition #3, Update #0) installed without error or warning* *ENC cell 101AA00EP00S (Edition #4, Update #0) installed without error or warning* *ENC cell 101AA00FD2Z (Edition #5, Update #0) installed without error or warning* *ENC cell 101AA00HAOUR (Edition #3, Update #0) is not installed. Error message SSE109* *ENC cell 101AA00HC6FD (Edition #8, Update #1) installed without error or warning* *ENC cell 101AA00I9FJ3 (Edition #3, Update #2) Base cell is installed without error or warning. Update #1 is not installed. Error message SSE 124*			

2.6.7 **Single exchange set with datasets signed by multiple data servers**

Test Reference	MultipleDataServers	**IHO Reference** **IEC Reference**	S-98: B-3

Test description

To test how the system performs when an exchange set contains digital signatures from multiple data servers. That is, datasets signed with different data server private keys and containing different SA signed data server certificates.

Setup

No pre-installed certificates, permits or ENCs.

Test data used:

1) IHO.CRT
2) S100_ROOT (Exchange Set)

Test data location:

- ***Authentication2F***

ENC Signatures Signed by Data Server 1 (DS1) DS1"s SA signed certificate	***ENC Signatures Signed by Data Server 2 (DS2) DS2"s SA signed certificate***
101AA00EJ8PM.000, 101AA00EP00S.000, 101AA00FD2Z.000, 101AA00HAOUR.000, 101AA00HC6FD.000	*101AA00HC6FD.001 101AA00I9FJ3.000,001 & 002 101AA00J9D5.000 & 001*

Action

Install the certificate, permits and exchange set from the location above.

Results

The seven cells and accompanying updates must authenticate, decrypt and import to the ECDIS without any error or warning messages.

ENC cell 101AA00EJ8PM (Edition #3, Update #0) installed without error or warning
ENC cell 101AA00EP00S (Edition #4, Update #0) installed without error or warning
ENC cell 101AA00FD2Z (Edition #5, Update #0) installed without error or warning
ENC cell 101AA00HAOUR (Edition #3, Update #0) installed without error or warning
ENC cell 101AA00HC6FD (Edition #8, Update #1) installed without error or warning
ENC cell 101AA00I9FJ3 (Edition #3, Update #2) installed without error or warning
ENC cell 101AA00J9D5 (Edition #4, Update #1) installed without error or warning

2.6.8 **Missing Certificate**

Test Reference	MissingCertificate	**IHO Reference** **IEC Reference**	S-98: B-3
Test description			
This test checks that exchange sets containing signatures but missing a data server certificate may not be loaded.			
Setup			
No pre-installed permits. *Test data used:* *CATALOG.XML CATALOG.SIGN* *Test data location:* - ***Authentication3C*** *This exchange set contains data signed by two data servers (as in MultipleDataServers) but DS2's SA signed data server certificate is missing.*			
Action			
Install the certificate, permits and exchange set from the location above.			
Results			
The four cells signed by DS1 must authenticate, decrypt and import to the ECDIS without any error or warning messages. The cells and updates from DS2 must not be loaded and a suitable error message given. *ENC cell 101AA00EJ8PM (Edition #3, Update #0) installed without error or warning* *ENC cell 101AA00EP00S (Edition #4, Update #0) installed without error or warning* *ENC cell 101AA00FD2Z (Edition #5, Update #0) installed without error or warning* *ENC cell 101AA00HAOUR (Edition #3, Update #0) installed without error or warning* *ENC cell 101AA00HC6FD (Edition #8, Update #1) not installed* *ENC cell 101AA00I9FJ3 (Edition #3, Update #2) not installed* *ENC cell 101AA00J9D5 (Edition #4, Update #1) not installed*			

2.6.9 **ENC Decryption**

2.6.9.a. Install ENCs when pre-installed permits have expired

Test Reference	ExpiredPermits	**IHO Reference** **IEC Reference**	S-98: B-3
Test description			
To test how the system performs when importing new ENCs where the previously installed permits have expired.			
Setup			
Only the PERMIT.XML and IHO.CRT files installed from the location below. *Test data used:* *1) IHO.CRT* *2) PERMIT.XML* *3) S100_ROOT (Exchange Set - 101AA_TBD_52 & 101AA_TBD_53)* *Test data location:* - ***DecryptionA***			
Action			
Install the exchange set from the location above. *Note: The computer clock must be to 1st Jan 2023.*			
Results			
The system must display the SSE 115 warning when importing the exchange set as follows: *"**SSE 115 – Subscription service has expired. Please contact your data supplier to renew the subscription licence**", (list affected cells)* *The system must display the following SSE 125 warning when viewing cells with expired permits:* *"**SSE 125 – The ENC permit for this cell has expired. This cell may be out of date and MUST NOT be used for NAVIGATION**".* *(Permits for this test are set to expire on 31st Dec 2022.)* *101AA_TBD_52 (edition # 1 update # 1) should be installed.* *101AA_TBD_53 (edition # 1 update # 1) should be installed.*			

2.6.9.b. Permit expiry within 30 days

Test Reference	ExpiringPermits	**IHO Reference** **IEC Reference**	S-98: B-3
Test description			
To test how the system performs when importing new ENCs where the installed permits expire within 30 days.			
Setup			
No ENC data installed but with PERMIT.XML and IHO.CRT installed for previous test (2.5.6a). *Test data used:* *1) IHO.CRT (already installed)* *2) PERMIT.XML (already installed)* *3) S100_ROOT (Exchange Set - 101AA_TBD_52 & 101AA_TBD_53)* *Test data location:* - ***EncryptionB***			
Action			
Set the computer clock between 1st Dec 2022 and 31st Dec 2022. *Install the exchange set from the location above.*			
Results			
The system must import the exchange set but display the appropriate SSE 120 warning message as follows (Permits in this test are set to expire on 31st Dec 2022): *"**SSE 120 – Subscription service will expire in less than 30 days. Please contact your data supplier to renew the subscription licence**."* *101AA_TBD_52 (edition # 1 update # 1) should be installed (with "SSE 120").* *101AA_TBD_53 (edition # 1 update # 1) should be installed (with "SSE 120").*			

2.6.9.c. Incorrect cell keys encrypted in the ENC permits

Test Reference	IncorrectCellKeys	**IHO Reference** **IEC Reference**	S-63: 10.7.3
Test description			
1) Test how the system responds when loading ENCs encrypted with cell keys that are different to those used to generate the permits. Confirm that the correct SSE 121 error message is displayed. *2) Test that the system does not permanently halt for a single/multiple failures.* *3) Test that the system reports the number of successful/unsuccessful imports.*			
Setup			
No pre-installed permits or ENCs. Certificate from previous tests, 2.5.6a and 2.5.6b. *Test data used:* *1) IHO.CRT (Pre-installed)* *2) PERMIT.XML* *3) S100_ROOT (Exchange Set - 101AA00XGEH, 101AA00XHTX, 101AA00XPE6, 101AA00XUIH, 101AA00YY4T, 101AA00Z85F & 101AA_TBD_51)* *Test data location:* - ***EncryptionC***			
Action			
Install the permits and load the exchange set from the location above.			
Results			
The system must check each installed permit in turn to see if there is a valid decryption key. If no valid key is available the system must report the appropriate SSE 121 error message as follows: *"SSE 21 – Decryption failed no valid cell permit found. Permits may be for another system or new permits may be required, please contact your data supplier to obtain a new licence."* *(Permits created from a different set of cell keys from those used to encrypt the test ENCs are as follows: - 101AA00XPE6 & 101AA00XUIH.)* *The system must not halt at an error but continue on to the next ENC.* *The system must report on successful/unsuccessful imports.* *101AA00XGEH (edition # 1 update # 0) should be installed (without error or warning).* *101AA00XHTX (edition # 2 update # 1) should be installed (without error or warning).* *101AA00XPE6 (edition # 1 update # 1) should not be installed (with "SSE 121").* *101AA00XUIH (edition # 1 update # 0) should not be installed (with "SSE 121").* *101AA00YY4T (edition # 1 update # 0) should be installed (without error or warning).* *101AA00Z85F (edition # 1 update # 0) should be installed (without error or warning).* *101AA_TBD_51 (edition # 1 update # 0) should be installed (without error or warning).*			

2.6.9.d. Validate ENC data integrity

Test Reference	DataIntegrity	**IHO Reference** **IEC Reference**	S-98: B-3
Test description			
Confirm that the system correctly validates decrypted ENCs and checks the integrity of each ENC data file. Confirm that the system reports the correct SSE 116 error message when the digital signature is incorrect or does not agree with the value contained in the corresponding CATALOG.XML record for the dataset. Also determine whether the system correctly reports the SSE 123 (sequential update error).			
Setup			
IHO.CRT from previous test (2.5.6c) but no pre-installed permits or ENCs. *Test data used:* *1) IHO.CRT (Pre-installed)* *3) S100_ROOT (Exchange Set – 101AA00P860, 101AA00PTU4K, 101AA00QYVK & 101AA00R5ZR)* *Test data location:* - ***EncryptionD***			
Action			
Install the ENC cell permits and exchange set from the location above.			
Results			
*1) The system must validate the digital signature of each dataset in the exchange set. The system must report the appropriate error message for all ENC files (see additional comments below) which fail to validate as follows: "**SSE 116 – Dataset <Dataset Name> Signature is incorrect. Contact your data supplier as ENC(s) may be corrupt or missing data**".* *2) The system must also report an error message for any validated ENC files that cannot be imported resulting from (1) as follows: "**SSE 123 – Non sequential update, previous update(s) missing try reloading from the base media. If the problem persists contact your data supplier".*** *(101AA00PTU4K.000 – digital signature altered manually in CATALOG.XML file* *101AA00R5ZR.003 – ENC data intentionally corrupted.)* *101AA00P860 (edition # 9 update # 3) should be installed (without error or warning).* *101AA00PTU4K (edition # 2 update # 1) should not be installed (with "SSE 116" followed by "SSE 123").* *101AA00QYVK (edition # 1 update # 1) should be installed (without error or warning).* *101AA00R5ZR (edition # 1 update # 5) should be installed with only two updates (edition # 1 update # 2) (with "SSE 116" followed by "SSE 123").*			

2.7 Dataset Management

2.7.1 Encrypted ENCs supplied by different Data Servers

Test Reference	DataManagement	**IHO Reference** **IEC Reference**	S-98: B-3
Test description			
To test how the system performs when loading datasets from two different data servers who have their own unique SA signed certificates and encrypt using their own unique encryption keys.			
Setup			
IHO.CRT from previous test but no pre-installed permits or ENCs. ***a) Data Server 1 (DS1)*** *Test data used:* *1) IHO.CRT [Pre-installed]* *2) PERMIT.XML* *3) S100_ROOT (Exchange Set - 101AA008GJO, 101AA008M4D, 101AA008RXF0 & 101AA009SKHX)* *Test data location:* - ***DataManagementA1*** ***b) Data Server 2 (DS2)*** *Test data used:* *4) IHO.CRT [Pre-installed]* *5) PERMIT.XML* *6) S100_ROOT (Exchange Set - 101AA009SKHX, 101AA00B5MV, 101AA00D1AZO & 101AA00E356)* *Test data location:* - ***DataManagementA2***			
Action			
Install the permits and exchange set for Data Server 1 (DS1), then install the permits and exchange set for DS2 from locations above.			
Results			
Both exchange sets authenticate against the same installed SA certificate and contain the correct data server certificate. The DSs' permits must be stored independently and decrypt the relevant exchange sets when loaded. *(In this test both Data Servers (DS) have ENC cell 101AA009SKHX common to both. DS1 has 101AA009SKHX.000 – 002 and DS2 has 101AA009SKHX.000 – 004.* *This test scenario considers how the ECDIS performs when a user obtains ENCs from two independent data providers.)* *The system should be up to date as follows:* *after installation of cells from DS1 (a):* *101AA008GJO (edition # 1 update # 1)* *101AA008M4D (edition # 1 update # 0)* *101AA008RXF0 (edition # 1 update # 0)* *101AA009SKHX (edition # 1 update # 2)* *after installation of cells from DS2 (b):* *101AA008GJO (edition # 1 update # 1)* *101AA008M4D (edition # 1 update # 0)* *101AA008RXF0 (edition # 1 update # 0)* *101AA009SKHX (edition # 1 update # 4)* *101AA00B5MV (edition # 1 update # 3)* *101AA00D1AZO (edition # 1 update # 0)* *101AA00E356 (edition # 1 update # 0)*			

2.7.2 **Loading additional dataset permits and cells from a different data provider**

Test Reference	AdditionalPermits	**IHO Reference** **IEC Reference**	S-98: B-3

Test description

Check that a pre-existing licence subscription is not overwritten by the ECDIS for any subsequent additions. Confirm that any data already stored on the system is unaffected by any newly imported permits.

Setup

Use the data installed for test 2.5.7a for DS1 & 2 (assuming that the data loaded as per the expected results)
Test data used:
1) IHO.CRT [Pre-installed]
2) PERMIT.XML
3) S100_ROOT (Exchange Set - 101AA006EC2, 101AA006TF9N, 101AA008GJO, 101AA008M4D, 101AA008RXF0 & 101AA009SKHX)
Test data location:

- ***DataManagementB***

Action

Install the permit file from the location above followed by the exchange set at the same location.

Results

The permit file must be merged with the previously installed one for the correct data server [DS1 - GB]. The exchange set must install all new cells as well as the updates for the previously installed ones [101AA008GJO & 101AA008M4D]. The expected Status within the ECDIS is listed below.

The ENC cells loaded during test 2.5.7a for data server 2 [DS2] must still be viewable in the ECDIS to their expected state of correctness. The expected SYSTEM DATABASE status listed below shows the expected results against 2.5.7a [DS2].
*The permit file **only** contains new permits for cells 101AA006EC2 & 101AA006TF9N. The exchange set contains the new cells and the cells from the previous test, **DataManagementA**] plus additional updates. This test scenario considers how the ECDIS performs when presented with a subset of new additional ENC permits from a specific data provider.*
The system should be up to date as follows:

after installation of cells from DS1:
101AA006EC2 (edition # 3 update # 3) new cell should be installed.
101AA006TF9N (edition # 1 update # 1) new cell should be installed.
101AA008GJO (edition # 1 update # 2) updated.
101AA008M4D (edition # 1 update # 1) updated.
101AA008RXF0 (edition # 1 update # 0)
101AA009SKHX (edition # 1 update # 4)

installation of cells from DS2 unchanged from 2.5.7a:
101AA008GJO (edition # 1 update # 2)
101AA008M4D (edition # 1 update # 1)
101AA008RXF0 (edition # 1 update # 0)
101AA009SKHX (edition # 1 update # 4)
101AA00B5MV (edition # 1 update # 3)
101AA00D1AZO (edition # 1 update # 0)
101AA00E356 (edition # 1 update # 0)

2.7.3 **Test that the system operates correctly in a multiple data provider environment**

Test Reference	ProviderChange	**IHO Reference** **IEC Reference**	S-98: B-3
Test description			
Check that ENCs existing within both subscriptions do not cause corruption across service providers. Confirm that both providers information is managed independently without conflict.			
Setup			
IHO certificat installed from previous tests 2.5.7a & 2.5.7b. No pre-installed permits or ENCs. ***a) Data Server 1 (DS1)*** *Test data used:* *IHO.CRT [Pre-installed] PERMIT.XML* *S100_ROOT (Exchange Set - 101AA008GJO, 101AA008M4D, 101AA008RXF0 & 101AA009SKHX)* *Test data location:* - ***DataManagementC1*** ***b) Data Server 2 (DS2)*** *Test data used:* *IHO.CRT [Pre-installed] PERMIT.XML* *S100_ROOT (Exchange Set - 101AA008GJO, 101AA008M4D, 101AA008RXF0, 101AA009SKHX, 101AA00B5MV & 101AA00D1AZO)* *Test data location:* - ***DataManagementC2*** *2*			
Action			
1) Install the PERMIT.XML from location (a) above. *2) Load the Exchange Set (S100_ROOT) from (a).* *3) Load the Exchange Set (S100_ROOT) from (b).* *4) Install the PERMIT.XML from location (b).* *5) Load the Exchange Set (S100_ROOT) from (b). This exchange set contains new base datasets and updates to previously installed cells. One cell is already installed with no updates. This test scenario considers how the ECDIS performs when the user changes from one data provider to another.*			
Results			

1. *Permits at (a) shall install without error or warning.*
2. *Exchange Set (S100_ROOT) at (a) shall load without error or warning.*
3. *Exchange Set (S100_ROOT) at (b) must **not** load as there are no valid permits for data server 2 [DS2] installed in the ECDIS. A SSE 110 warning must be displayed stating "**SSE 110 – Permits not available for this data provider**".*
4. *Permits at (b) shall install without error or warning.*
5. *Exchange Set (S100_ROOT) at (b) shall install the new bases and updates. Warning messages relating to "cells/updates already installed" may be displayed.*

The content of the ECDIS SYSTEM DATABASE must be the same as that described below.

The system should be up to date as follows:
after installation of cells from DS1:
101AA008GJO (edition # 1 update # 1)
101AA008M4D (edition # 1 update # 0)
101AA008RXF0 (edition # 1 update # 0)
101AA009SKHX (edition # 1 update # 2)

After installation of cells from DS2:
101AA008GJO (edition # 1 update # 2)
101AA008M4D (edition # 1 update # 1)
101AA008RXF0 (edition # 1 update # 0)
101AA009SKHX (edition # 1 update # 4)
101AA00B5MV (edition # 1 update # 3)
101AA00D1AZO (edition # 1 update # 0)

2.8 ECDIS management of data services.

2.8.1 ECDIS management of cancelled cells

Test Reference	CancelledDatasets	**IHO Reference** **IEC Reference**	
Test description			
This test ensures EUT responds correctly when a dataset is cancelled.			
Setup			
IHO certificate/public key installed from previous test ProviderChange. No pre-installed permits or ENCs. *Test data used:* *1) IHO.CRT [Pre-installed]* *2) PERMIT.XML* *3) S100_ROOT (2 Exchange Sets - 101AA00572C 101AA006EC2, 101AA007I3I, 101AA00EJ8PM)* *Test data location:* - ***DataManagementCancelBase*** - ***DataManagementCancelUpdate***			
Action			
1. Install the ENC permits. *2. Load the exchange set **DataManagementCancelBase*** *3. Update using the exchange set **DataManagementCancelUpdate*** *4. Attempt to view all imported cells in the ECDIS and determine their status.*			
Results			
The system shall report any cell(s) that have been identified as cancelled at load time. *(Cell 101GB00280200 is cancelled.)* *A message shall be displayed informing the user of the cell name.* *Depending on the method adopted by the OEM for managing cancelled cells one of the following conditions shall be observed:* *1. The cancelled cell cannot be viewed in the ECDIS* *2. The cancelled cell can be viewed in the ECDIS with the warning message defined in S-63 and specified below:* *“Cell <name> has been cancelled and may not be up to date. Under no circumstances should it be used for primary navigation”.* *Clarification: Systems that remove cells without consulting the user do not have to provide a warning message at load time.* *The system should be up to date as follows: after installation of cells from 2.5.7d [Base]:* *101AA00572C (edition # 1 update # 4)* *101AA006EC2 (edition # 2 update # 2)* *101AA007I3I (edition # 2 update # 0)* *101AA00EJ8PM (edition # 2 update # 1)* *After installation of cells from 2.5.7d [Update]:* *101AA00572C (edition # 1 update # 8)* *101AA006EC2 (edition # 3 update # 0)* *101AA007I3I cancelled cell (101AA007I3I) should be reported by the system and either removed from the system database or displayed with the appropriate warning.* *101AA00EJ8PM (edition # 2 update # 4)*			

ECDIS Display of Replacement ENC Cells**Test Reference**	CancelReplace	**IHO Reference** **IEC Reference**	

Test description

To test how the system responds when a cell is cancelled and replaced in a service.

101AA00MTG2 is cancelled and replaced by 101AA00NYPC & 101AA00NYWT ***[Fileless Cancel]***
101AA00NF2KE is cancelled and replaced by 101AA00P46I ***[by Cancellation Update]***

Setup

Status as per successful completion of test 2.5.7 d)
Test data used:
1) *IHO.CRT [Pre-installed]*
2) *PERMIT.XML*
3) *S100_ROOT (2 Exchange Sets - 101AA00MTG2, 101AA00NF2KE, 101AA00P860, 101AA00PTU4K & 101AA00RACV)*

Test data location:
- ***DataManagementCancelReplaceBase***
- ***DataManagementCancelReplaceUpdate***

Action

Install the ENC permits. Load the exchange set ***DataManagementCancelReplaceBase*** *then update using the exchange set* ***DataManagementCancelReplaceUpdate.***

Attempt to view all imported cells in the ECDIS and determine their status.

Results

The system must report any cell(s) that have been identified as cancelled at load time. A message must be displayed as specified in test 2.5.7 d). Replacement cells must be presented to the user as follows: "Cell <name> has been cancelled and has been replaced by cell(s), <name1>; <name2>."

.

Test	Cell Name	Exchange Set Content		Expected SYSTEM DATABASE Content		Notes
		Edition N°	Update N°	Edition N°	Update N°	
Base	101AA00MTG2	2	0	2	0	All ENC cells installed without error or warning
	101AA00NF2KE	2	0	2	0	
	101AA00P860	8	3	8	3	
	101AA00PTU4K	1	1	1	1	
	101AA00RACV	1	4	1	4	
Update	101AA00572C	1	8	1	8	Cells from the previous test (same status)
	101AA006EC2	3	0	3	0	
	101AA007I3I	2	1	2	1	
	101AA00EJ8PM	2	4	2	4	
	101AA00MTG2	2	1	cancelled		Messages should be displayed as for previous test
	101AA00NF2KE	2	1	cancelled		
	101AA00P860	9	0	9	0	
	101AA00PTU4K	2	1	2	1	

		101AA00RACV	1	5	1	5	plus message relating to replaced cells: 101AA00MTG2 is cancelled and replaced by 101AA00NYPC & 101AA00NYWT 101AA00NF2KE is cancelled and replaced by 101AA00P46I	

2.8.2 ECDIS management of ENC re-issued datasets

Test Reference	Reissues	IHO Reference IEC Reference	

Test description

To test how the system responds when a cell is published as a re-issue. Confirm that the system operates correctly as defined in the S-63 standard. (The PRODUCTS.TXT file has "Base cell update number" field in each cell record that identifies and flags the update that carries any re-issued cell)

Setup

IHO certificate/public key installed from previous test
No pre-installed permits or ENCs.
Test data used:
1) IHO.CRT [Pre-installed]
2) PERMIT.XML
3) Base [Exchange Set – 101AA00L75N]
4) Update [Exchange Set – 101AA00L75N & 101AA00WOV3]
Test data location:

- ***DataManagementF1***
- ***DataManagementF2***

Action

*Install the ENC permits. Load the exchange set **DataManagementF1** then update using the exchange set **DataManagementF2.***

Results

The system must load the base exchange set and then the re-issued cells. (101AA00L75N & 101AA00WOV3) on the update as though they were a new data set or a new edition of a data set. The system must also install the subsequent updates 101AA00L75N [Ed 11 Up10] and 101AA00WOV3 [Ed 6 Up 6].

101AA00WOV3 is a re-issue with no previous history, i.e., new cell. 101AA00L75N is a re-issued cell with history, i.e., base cell already installed in the ECDIS. Both re-issued cells have subsequent updates to test the loading sequence is continuous.

Test	Cell Name	Exchange Set Content		Expected SYSTEM DATABASE Content		Comments
		Edition N°	Update N°	Edition N°	Update N°	
2.5.7f [Base]	101AA00L75N	11	9	11	9	Edition 11 of 101AA00L75N installed with updates 1-9
2.5.7f [Update]	101AA00L75N	11	10	11	10	101AA00WOV3 is straight re-issue with no previous history, i.e. new cell. 101AA00L75N is a re-issued cell with history, i.e. base cell already installed in the ECDIS.
	101AA00WOV3	6	6	6	6	

2.8.3 ECDIS management of Exchange Sets

Test Reference	ECDISManagement	IHO Reference IEC Reference	

Test description

To confirm the user is informed when there is incompatibility between installed ENCs and an applied update exchange set.

Setup

No permits or ENCs installed
Test data used:
1) IHO.CRT [Pre-installed from previous tests]
2) PERMIT.XML
3) Exchange Sets DataManagementG1, DataManagementG2, DataManagementG3
*4) Update exchange set **DataManagementG4***
Test data location:

- ***DataManagementG1, DataManagementG2, DataManagementG3, DataManagementG4***

7g

Action

Install permits and load the exchange sets listed.

Results

***DataManagementG1, DataManagementG2 and DataManagementG3** should load without error. However, when loading **DataManagementG4** the system should install some ENC updates without error but the system must return an appropriate error message that the exchange set is incompatible with existing installed data.*
Note: Systems must appropriately manage the import of data from different Data Servers and store information of installed data. When loading new data systems should check that the S-128 revision information is compatible with that which is already installed and report any inconsistencies.
Users should only be prompted to install licenced datasets
[The system will also display continuity errors as a result of non sequential loading when attempting to load and install the updates for 101AA00P860, 101AA00RY93F, 101AA00S8YN & 101AA00101AA00SA35K.]

DataManagementG4** used in this test is dated 20 July 2016 and pre dates **DataManagementG3

Test	Cell Name	Exchange Set Content		Expected ECDIS Content		Comments
		Edition N°	Update N°	Edition N°	Update N°	
DataManagementG1	101AA00JQS3A	22	16	22	16	
	101AA00LR0Z	4	6	4	6	
	101AA00LXFQ0	3	9	3	9	
	101AA00LXJSN	11	0	11	0	
DataManagementG2	101AA00P860	9	0	9	0	Cells installed for this exchange set but with the incompatibility warning
	101AA00RY93F	2	3	2	3	
	101AA00S8YN	1	1	1	1	
	101AA00SA35K	4	0	4	0	
DataManagementG3	101AA00SH6I7	10	7	10	7	
	101AA00TJHYR	9	5	9	5	
	101AA00WOV3	5	2	5	2	
	101AA00X8SFR	2	1	2	1	
DataManagementG4	101AA00JQS3A	23	4	23	4	NE installed from WK37/07 ***DataManagementG4***
	101AA00LR0Z	4	7	4	7	
	101AA00LXFQ0	3	12	3	12	
	101AA00LXJSN	11	1	11	1	

	101AA00P860	9	5	9	0	Cells not updated due to incompatible S-128
	101AA00RY93F	3	5	2	3	
	101AA00S8YN	1	7	1	1	Cell not updated due to non-sequential update
	101AA00SA35K	5	2	4	0	Cell not updated due to incompatible S-128
	101AA00SH6I7	11	0	11	0	NE installed from ***DataManagementG4***
	101AA00TJHYR					No updates for this cell
	101AA00WOV3					No updates for this cell
	101AA00X8SFR	2	2	2	2	

2.8.4 **Update of Supplementary Files**

Test Reference	SupplementaryFiles	**IHO Reference** **IEC Reference**	S-98: Appendix C
Test description			
This test ensures the EUT supports the update of dataset support files.			
Setup			
No pre-installed permits or ENCs. *Test data used:* *1) IHO.CRT [Pre-installed]* *2) PERMIT.XML* *3) Base **DataManagementSF1*** *4) Update**DataManagementSF2*** *Test data location:* - ***DataManagementSF1*** - ***DataManagementSF2***			
Action			
Install permits and load the exchange sets listed.			
Results			
1. Select the note encoded using TXTDSC (text description) (Caution area at 32°34.74'S - 061°08.92'E); *2. The content of the note should be as follows:* ***[Updated note content]*** *This note content is updated via a direct replacement in the Update exchange set, without an explicit update to the ENC dataset.*			

2.8.5 Fileless Cancellation

Test Reference	Fileless Cancellation	**IHO Reference** **IEC Reference**	S-98: 21.2
Test description			
Test that the ECDIS correctly processes fileless cancellation.			
Setup			
No pre-installed permits or ENCs. *Test data used:* *1) IHO.CRT [Pre-installed]* *2) Base **DataManagement1*** *3) Update **FilelessCancellation1***			
Action			
1. *Install Exchange Set DataManagement1* 2. *Inspect the system to ensure installation of* 102AA00WOV3 and 102AA00X8SFR 3. *Install **FilelessCancellation1***			
Results			
1. *Ensure that* 102AA00WOV3 is cancelled (successful processing of a fileless cancellation) 2. *Ensure* 102AA00X8SFR is **not** cancelled due to incorrect formatting of the dataset discovery metadata			

2.9 ECDIS Update Status Report

2.9.1 ENC Update Status Report

Test Reference	UpdateStatusReportENC	**IHO Reference** **IEC Reference**	S-98: Appendix C
Test description			
Confirm that the ECDIS is capable of executing the ENC Update status report as documented in S-98, Appendix C.			
Setup			
*Load the exchange set **PowerUp.*** *Set system time to 10th February 2019.*			
Action			
Ensure ECDIS has data installed. Locate and execute the Update Status Report and inspect output. If ECDIS also supports route filtering of the Status Report then construct a route intersecting with the cells loaded and run the Status Report with the route filtered option.			
Results			
Verify that the update Status Report can be filtered to display only Electronic Navigational Charts (S-101). *The ECDIS should report the status of all ENCs loaded in accordance with S-98 XXX-XXX. It should use the issue date of the latest delivered S-128 dataset as the reference date and should display its reference date as* 9th February *2019.* *The datasets should show in the report as "up to date". Then reset the system time to a* 1st April 2019 *– rerun the report, all the datasets should show as "not up to date".*			

2.9.2 **ENP Update Status Report**

Test Reference	UpdateStatusReportENP	**IHO Reference** **IEC Reference**	S-98: Appendix C
Test description			
Confirm that the ECDIS is capable of executing the ENP Update status report as documented in S-98, Appendix C.			
Setup			
As for UpdateStatusReportENC.			
Action			
Ensure ECDIS has data installed. Locate and execute the Update Status Report and inspect output. Select ENP Update Status report. *If ECDIS also supports route filtering of the Status Report then construct a route intersecting with the cells loaded and run the Status Report with the route filtered option.*			
Results			
Verify that the update Status Report can be filtered to display only Electronic Navigational Publications with the following products shown - *S-124* - *S-129* *The ECDIS should report the status of the ENP datasets loaded in accordance with S-98, Appendix C. It should use the issue date of the latest delivered S-128 dataset as the reference date and should display its reference date as* 9th February *2019.* *The datasets should show in the report as "up to date". Then reset the system time to a* 1st April 2019 *– rerun the report, all the datasets should show as "not up to date".*			

2.9.3 **Missing Revision information.**

Test Reference	MissingRevisionInformation	**IHO Reference**	S-98, Appendix C
Test description			
This test checks that the ECDIS correctly marks datasets as unknown when no revision information is available).			
Setup			
Load the exchange set ***MissingRevisionInformation.*** *This exchange set contains no revision information.*			
Action			
Ensure ECDIS has data installed. Locate and execute the Update Status Report and inspect output.			
Results			
Verify that all cells are marked as "Unknown" in accordance with S-98 Appendix C.			

2.9.4 **Multiple Revision Information**

Test Reference	MultipleRevisionInformation	**IHO Reference**	S-98, Appendix C
Test description			
This test checks that the ECDIS is able to merge multiple sources of revision information (encoded in the S-128 datasets) together.			
Setup			
Load the following exchange sets: - ***MultipleRevisionInformation1*** - ***MultipleRevisionInformation2*** *These exchange sets contain multiple S-128 revision information. The ECDIS must merge the revision information together to give the user a harmonised view of their data holdings. A single S-124 dataset is common to both services and the revision information shows it has been updated but is not contained in the delivered exchange set.* ***Data server is the producer code of the S-128, multiple data servers = multiple reports.***			
Action			
Ensure ECDIS has data installed. Locate and execute the Update Status Report and inspect output.			
Results			
Verify that all S-101 datasets are marked as "up to date" in the ENC up to date status report. The ENP Up to date Status report should show S-124 dataset 124AA00X01NE.GML marked as "not up to date".			

2.9.5 **Product Independence**

Test Reference	RevisionInformation	**IHO Reference**	S-98, Appendix C
Test description			
***TODO**:* *Latest updates in S-98 will place new test requirements for update status report.* • *Product independence. Delivery of one product only should not invalidate other products. The reference to use is S-104 / S-101, so a delivery of S-104 only should not invalidate S-101* • *Also, check data producer is valid. Under S-98 the data producer is the producer code of the S-128 dataset.* • *Scenario is S-104 revision independent of S-101.* •			
Setup			
Action			
Results			

Test Reference	RevisionUpdate	**IHO Reference**	S-98, Appendix C
Test description			
• *Check it is possible to update revision information using GML updates as stated in S-98* • *Simple S-128 update, new/modified objects added.* • *This should also check for filenames of GML update files (to be added to S-98)*			
Setup			
Action			
Results			

2.9.6 **Adequate and Complete Tests**

Test Reference	RevisionCompleteness	**IHO Reference**	S-98, Appendix C
Test description			
TODO: • *Check that S-124 in-force bulletins can be replicated by inspecting an S-124 only S-128 dataset and identifying gaps (in S-128, not on ECDIS, on ECDIS cancelled/not present in S-128)*			
Setup			
Action			
Results			

2.10 Loading and update of non-ENC S-100 datasets.

2.10.1 Bathymetric Surface Datasets (S-102)

Test Reference	S-102	IHO Reference	S-98 6.1 S-98 13

Test description

Tests of S-101 ENC and S-102 loading and portrayal:

TODO: Add tests for correctly disallowing interoperability based on producer codes [S-98 8.1.1/Appendix D-1]
TODO: S-102 should only be displayed according to scale values in CATALOG.XML [S-98]

Setup

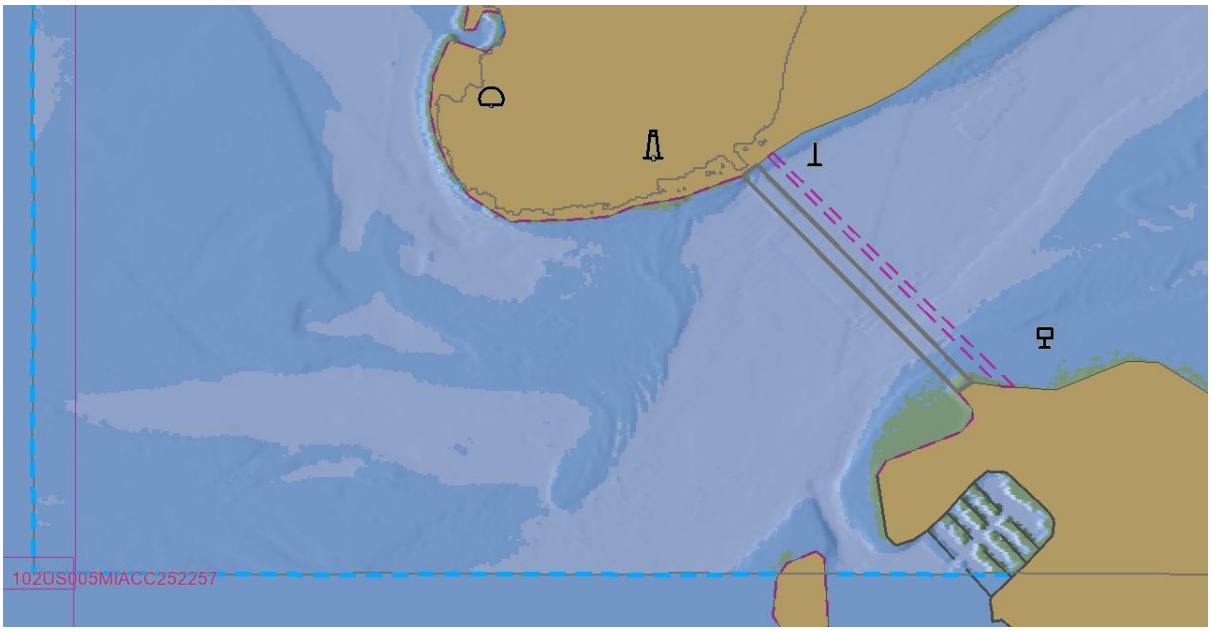
As per test **Initial Catalogues** *(exchange set* ***InitialCatalogues*** *loaded).*

Action

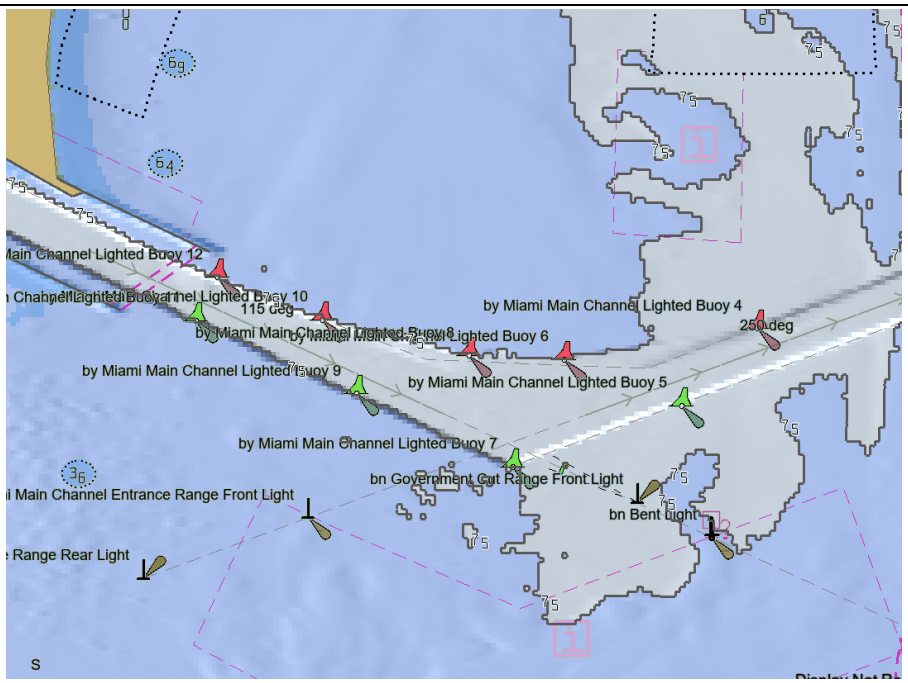
Ensure enhanced Safety Contour is enabled and Water Level Adjustment is disabled.

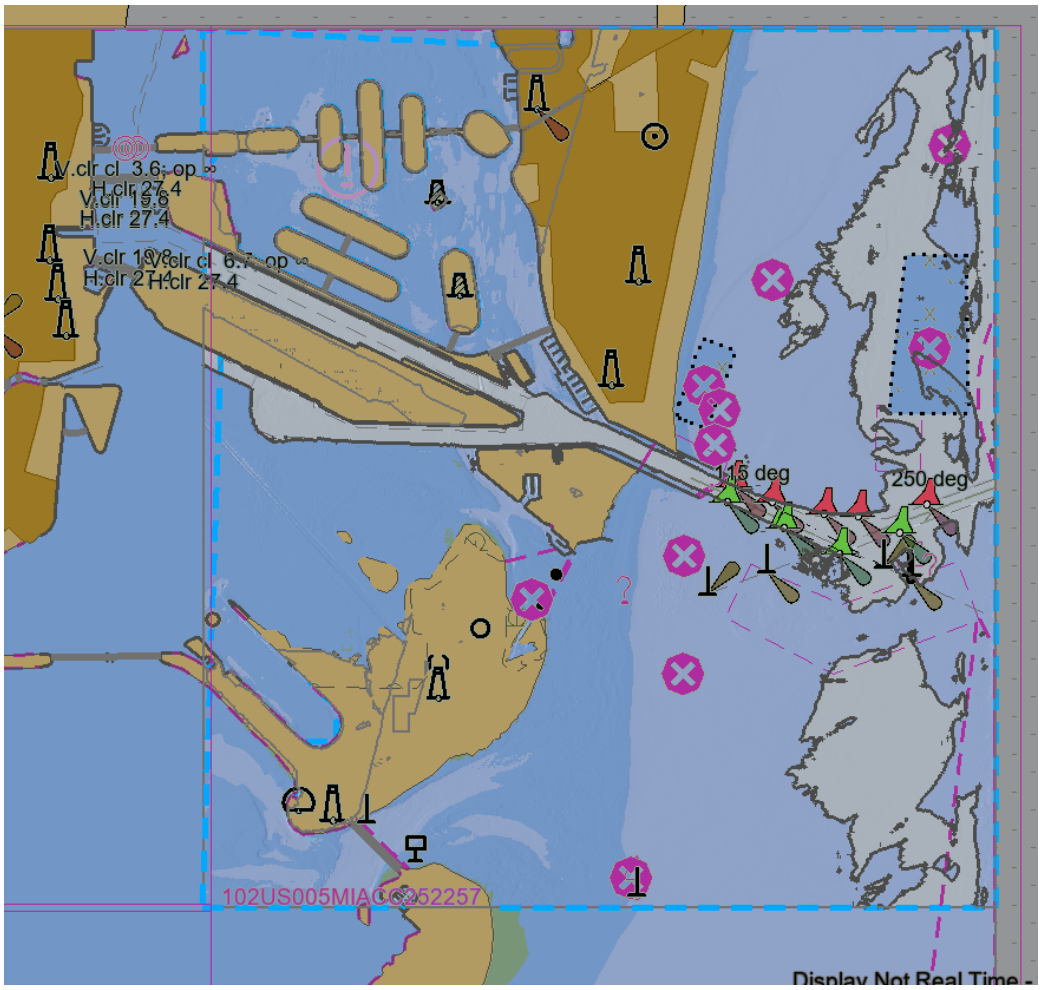
Results

1. *Navigate to the specified position*
2. *Turn on Enhanced Safety Contour*
3. *Ensure the blue border appears as shown in the following image denoting the limit of the area for which enhanced safety contour is available.*



1. ***[Show new safety contour]*** *Set safety contour value to 7.5m*
2. *Ensure display shows the enhanced safety contour constructed from the S-102 data, at position XXX.XXX, YYY.XXX*


by Miami Main Channel Lighted Buoy 4
250 deg
by Miami Main Channel Lighted Buoy 6
by Miami Main Channel Lighted Buoy 9
by Miami Main Channel Lighted Buoy 5
by Miami Main Channel Lighted Buoy 7
bn Government Cut Range Front Light
bn Bent light
Main Channel Entrance Range Front Light
Range Rear Light


V.clr cl 3.6; op ∞
H.clr 27.4
V.clr 19.8
H.clr 27.4
V.clr 19.8 clr cl 6.7 op ∞
H.clr 27.4 H.clr 27.4
115 deg
250 deg
102US005MIA0052257
Display Not Real Time -

2.10.2 **Water Levels (S-104)**

Test Reference	Water Level Adjustment S-104	**IHO Reference**	S-98 Appendix D-2

Test Description

TODO: Water Level permission for producer codes [S-98 8.1.1 / Appendix D1]
TODO: More detailed tests for vertical clearance adjustment

Loaded Data	
Exchange Set Name	

Display Mode		**Independent Mariner's Selections (default=On)**	
Other		Accuracy	
Context Parameters		Contour label	On
Safety Contour	10	Highlight date dependent	
Safety Depth	8	Highlight document	
Deep Contour	30	Highlight info	
Shallow Contour	5	Shallow Pattern	
Four Shades	On	Unknown	On
Radar Overlay		Update Review	
Plain Boundaries	Off	**Text Groups**	On
Simplified Symbols	Off	Chart Text	
Full Light Lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow Water Dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		**Display**	
Start Date		Centre	
End Date		Scale	1:8000
		Orientation	

Viewing Groups (Default = On)

Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional			

Setup

1. *As per test* **Initial Catalogues** *(exchange set* ***InitialCatalogues*** *loaded).*
2. *Ensure enhanced Safety Contour and Water Level Adjustment is disabled.*
3. *Load exchange set EnhancedSafetyContour*
4. *Load exchangbe set WaterLevelAdjustment*

Source Dataset 10100AA164US4FL2, 102US004FL2A125227

Action

1. *Switch on Enhanced Safety Contour and Water Level Adjustment*
2. *Ensure the blue border is displayed showing the limit where water level adjustment is applied.*
3. *Navigate to the position XXX.XXX YYY.YYY*
4. *Query* ***0.6m*** *sounding at position XXX.XXX YYY.YYY*
5. *Ensure an adjusted value of sounding is available =* ***0.9m***
6. *Ensure an unadjusted value is also available =* ***0.6m***
7. *Switch off Enhanced Safety Contour and WLA*
8. *Ensure the Sounding value available in the pick report is* ***0.6m***

Results



Action

1. *Turn on Enhanced Safety Contour and Water Level Adjustment*
2. *Turn on Uncertainty – if the ECDIS supports separate horizontal and vertical uncertainty, switch on Vertical Uncertainty*

3. *Query the 0.6m sounding at position XXX.XXX YYY.YYY*
4. *Ensure the vertical uncertainty value of 0.1m is taken into account giving an adjusted value of 0.8m*

Results

tbd

Action

1. *Switch off Enhanced Safety contour, Water Level Adjustment and Uncertainty*
2. *Load exchange set WLAOverlap*
3. *Switch on Water Level Adjustment*
4. *Navigate to position XXX.XXX YYY.YYY*
5. *Ensure an indication of "Overlap" is shown on the display and the user is prompted to choose which datasets to use as the source for Water Level Adjustment*

Results

2.10.3 **Tidal Streams (S-111)**

Test Reference	S-111	**IHO Reference**	S-98 6.1 S-98 13
Test Description			

Loaded Data	
Exchange Set Name	

Display Mode		**Independent Mariner's Selections (default=On)**	
Other		Accuracy	
Context Parameters		Contour label	On
Safety Contour	10	Highlight date dependent	
Safety Depth	8	Highlight document	
Deep Contour	30	Highlight info	
Shallow Contour	5	Shallow Pattern	
Four Shades	On	Unknown	On
Radar Overlay		Update Review	
Plain Boundaries	Off	**Text Groups**	On
Simplified Symbols	Off	Chart Text	
Full Light Lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow Water Dangers		Names	

Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:8 000
		Orientation	

Viewing Groups (Default = On)			
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

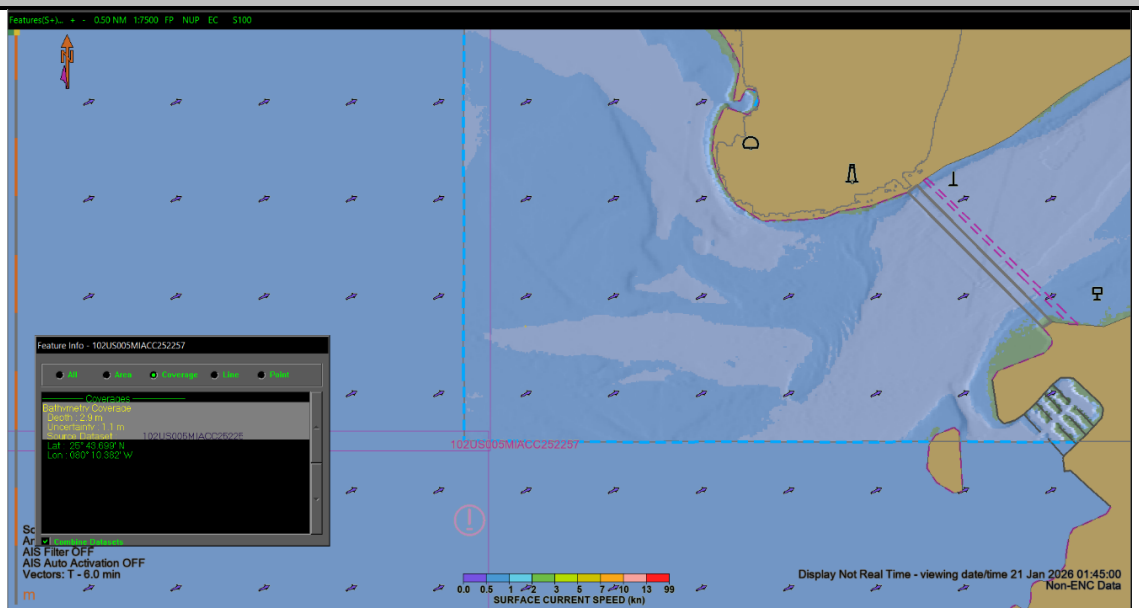
Additional			

Setup

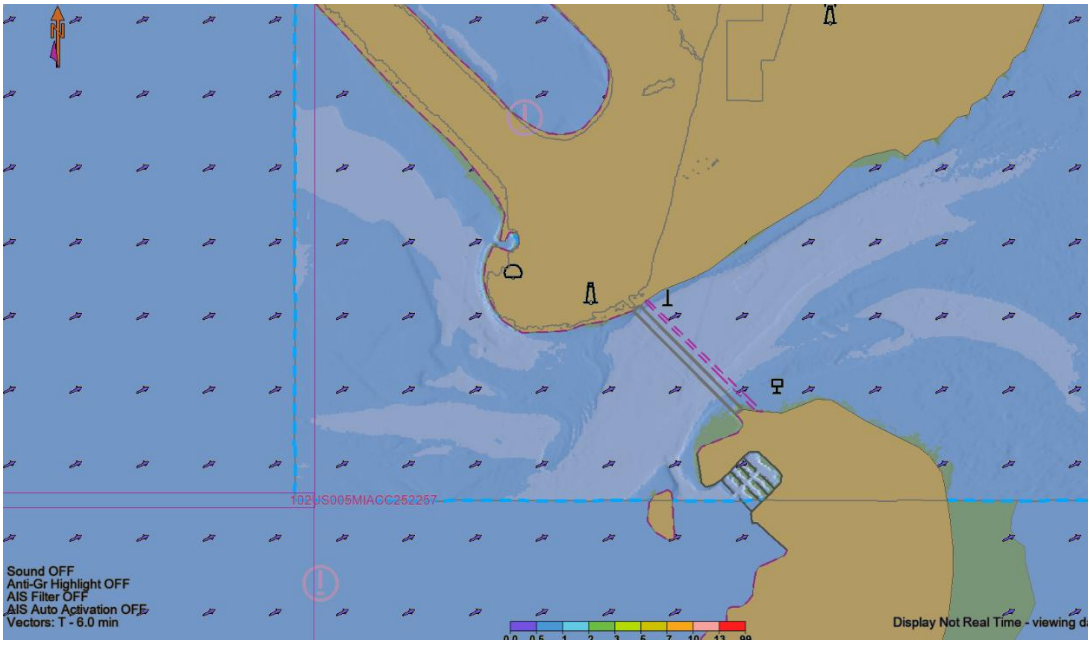
1. *As per test* **Initial Catalogues** *(exchange set* ***InitialCatalogues*** *loaded).*
2. *Zoom to display scale of 1:8 000*
3. Switch on portrayal of S-111 Tidal Streams
4. Ensure the display shows the S-111 arrows, as shown

Action

Results



Action
1. Zoom to Display Scale 1: 20 000 or smaller
Results
2. Ensure the S-111 portrayal remains at a constant density, showing that the portrayal of the S-111 data has been "thinned" to reduce clutter on screen.



2.10.4 Marine Protected Areas (S-122)

Test Reference	Marine Protected Areas.	IHO Reference	S-98 6.1.1
Test Description			
Ensure the ECDIS is capable of displaying the mandatory overlays of S-122 **TODO: S-122 (and others) should only display within scale range of MSVS**			

Loaded Data	
Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	On
Safety Contour	10	Highlight date dependent	
Safety Depth	8	Highlight document	
Deep Contour	30	Highlight info	
Shallow Contour	5	Shallow Pattern	Off

Four Shades	On	Unknown	
Radar Overlay		Update Review	
Plain Boundaries	Off	**Text Groups**	On
Simplified Symbols	Off	Chart Text	
Full Light Lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow Water Dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		**Display**	
Start Date		Centre	32.5465S,60.9387E
End Date		Scale	1:45,000
		Orientation	

Viewing Groups (Default = On)

Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional

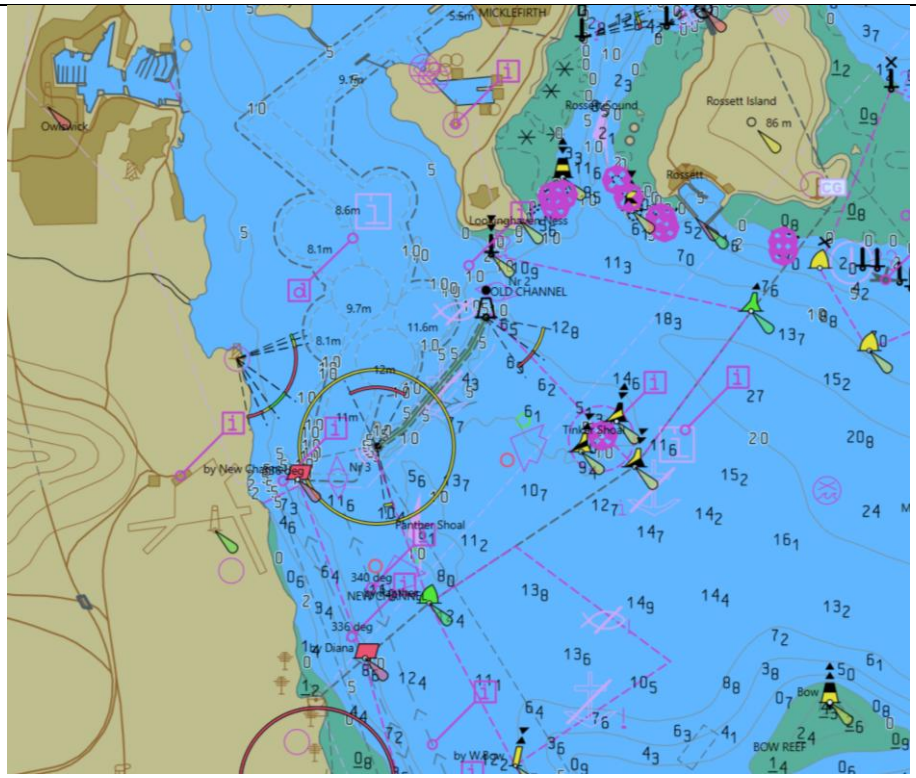
Setup

1. Load the Exchange set PowerUp
2. Load the Exchange set Overlays
3. Switch off all overlays
4. Navigate to the documented position and MSVS

Action

5. Observe the Display

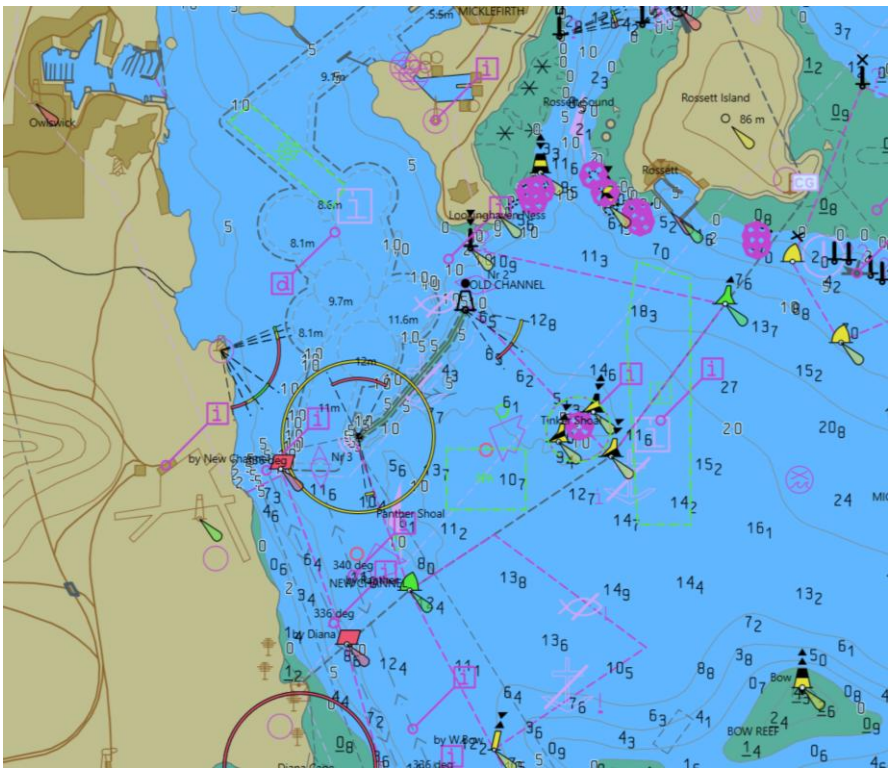
Results



Action

6. Switch on S-129 Under Keel Management Areas

Results



Action

7. Query the display at position 32.5465S,60.9387E

Results

8. Verify that the S-122 feature “Marine Protected Area” has details as follows:

- *Category Of Marine Protected Area* = **IUCN IV**

2.10.5 Navigational Warnings (S-124)

Test Reference	Navigational Warnings	IHO Reference IEC Reference	S-98 11.12.1 S-98 11.2.2

Test Description

This test ensures the EUT is capable of displaying the mandatory overlays of S-124.

Loaded Data

Exchange Set Name

Display Mode		Independent Mariner's Selections	
Other		Accuracy	
Context Parameters		Contour label	On
Safety Contour	10	Highlight date dependent	
Safety Depth	8	Highlight document	
Deep Contour	30	Highlight info	
Shallow Contour	5	Shallow Pattern	Off
Four Shades	On	Unknown	
Radar Overlay		Update Review	
Plain Boundaries	Off	**Text Groups**	On
Simplified Symbols	Off	Chart Text	
Full Light Lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow Water Dangers		Names	
Palette		Light description	
Day		All other chart text	

Viewing Date or Range		Display	
Start viewing date		Centre	32.5059S,60.9557E
End viewing date		Scale	1:8,000

Viewing Groups

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

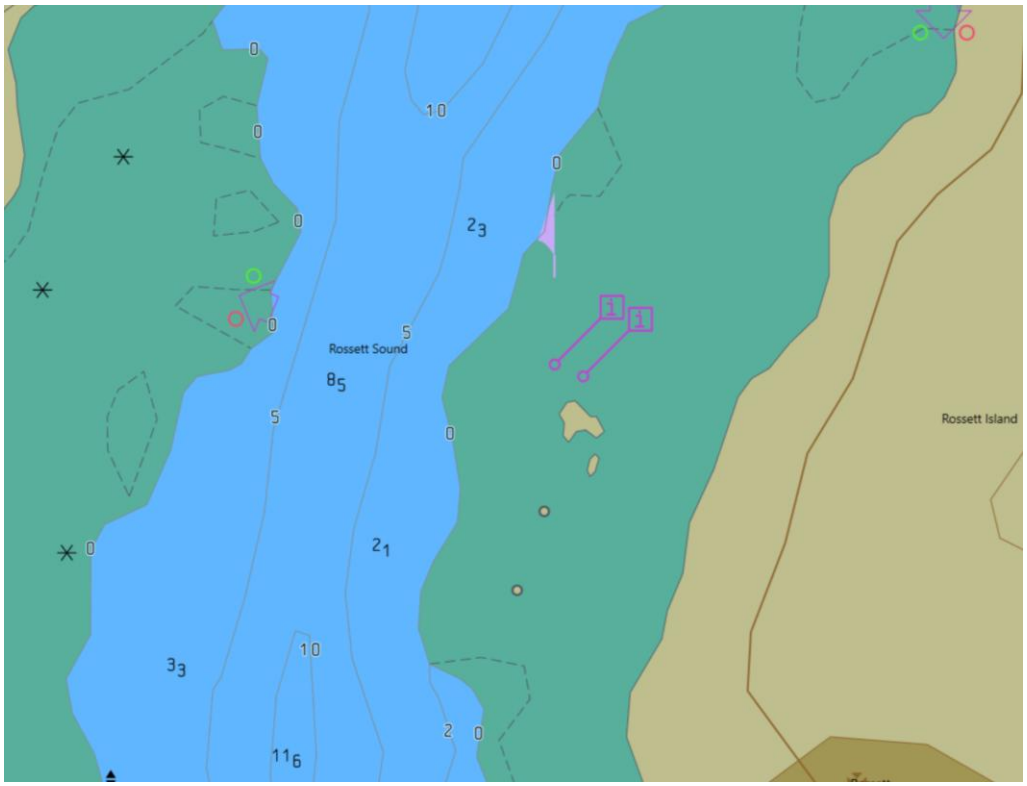
Setup

1. Load the Exchange set PowerUp
2. Load the Exchange set Overlays
3. Switch off all overlays
4. Navigate to the documented position and MSVS

Action

5. Observe the Display

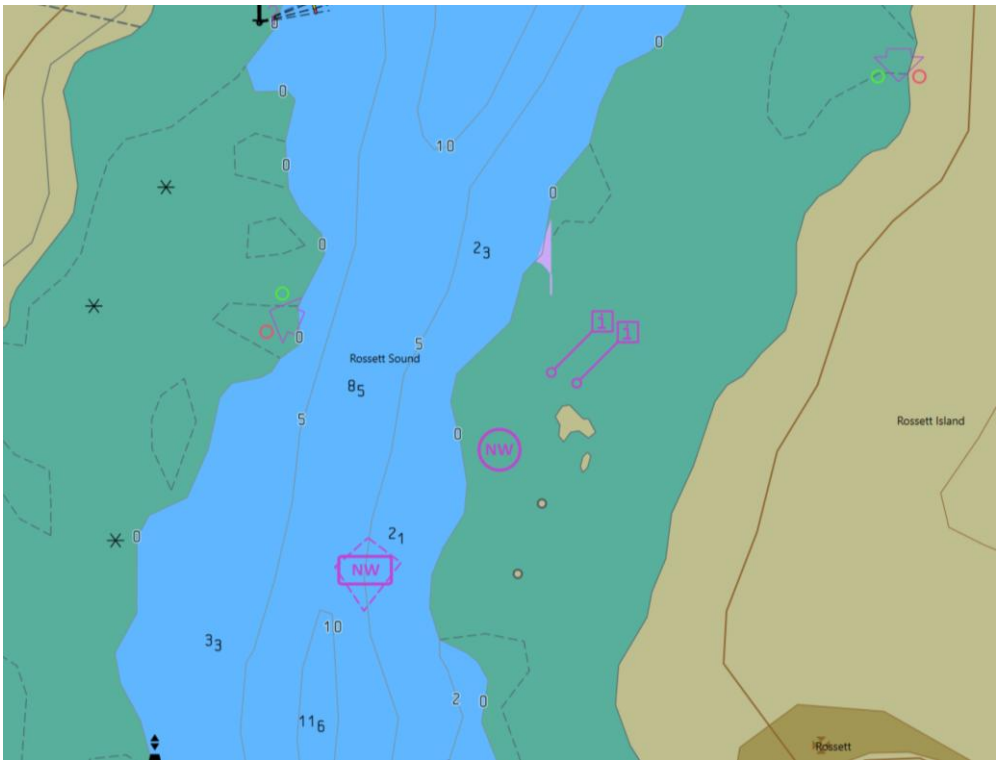
Results



Action

6. Switch on S-124 Navigational Warnings

Results



Action

1. Query the display at position 32.5069S,60.9551E

Results
2. Verify that the Navigational Warning selected has details as follows: • *Name of Series:* ***NAVAREA 43*** • *Warning Number* ***2025/36*** • *Warning Type:* ***Local Navigational Warning*** • *Navwarning Type General:* ***Special Operations***
Action
Provision of dedicated S-124 user interface Load exchange set S124NAVARNSelection
Results
Check that a dedicated user interface is provided to allow users to interact with NAVWARN messages: 1. Confirm that classification of individual messages is possible 2. Confirm that classification ensures an uncluttered screen 3. Confirm that the classification functionality enables manual filtering of the display of NAVWARN messages 4. Confirm that the manual filtering of the display of NAVWARN messages includes the following criteria: a. Warning type b. Producer c. Series d. Navigation warning topic (*navwarnTypeGeneral*) e. Date range f. Valid time

Test Reference	S-124 Detail 2	IHO Reference	S-98 11.12.1

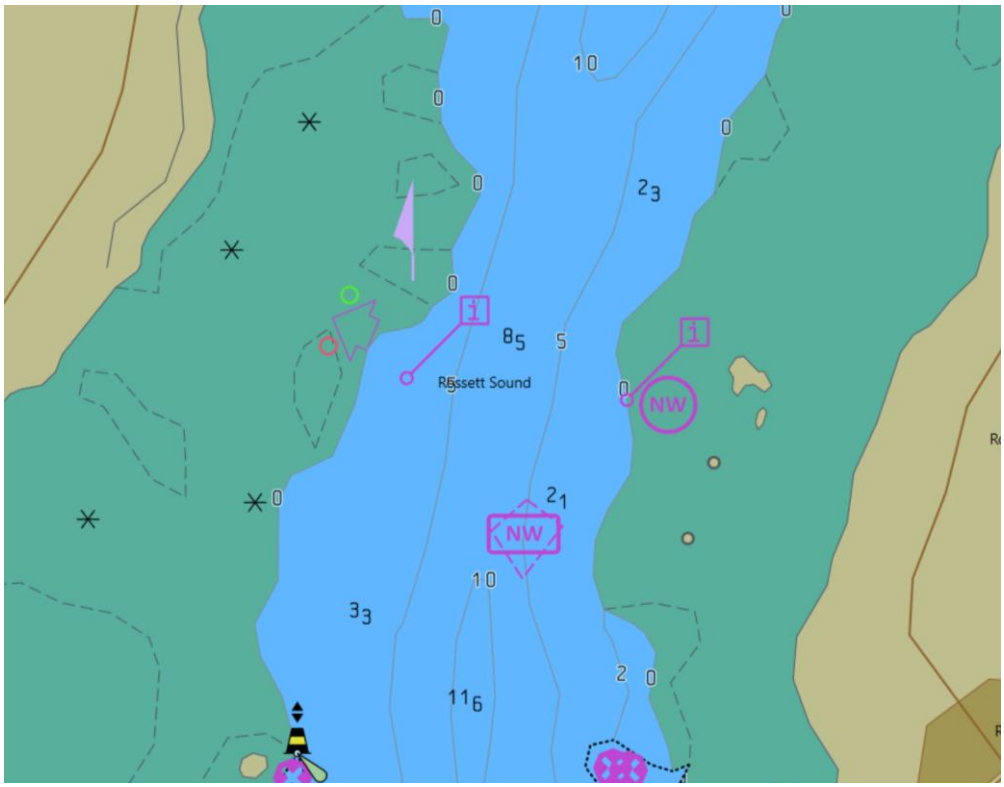
Test description

Lat -32.507020 Lon = 60.950072
Scale = 12k

(Other)

Pick the circular NW as shown and observe in the pick report the following details:

Name of Series: NAVAREA 43
Warning Number 2025/36
Warning Type: Local Navigational Warning
Navwarning Type General: Special Operations



Action

Results

On-demand listing of S-124 NavWARN messages:

1. Confirm that an on-demand listing of all S-124 NAVWARN messages is provided. Confirm the on-demand listing allows sorting according to:
    a. Installed date and time
    b. Issue date and time (*publicationTime*)
    c. Warning type
    d. Producer, series and message classification
2. Confirm the on-demand listing includes means for viewing an abbreviated view of any NAVWARNPart *warningInformation* attributes consisting of a minimum of the Issue Date (*publicationTime*), warning type (*navwarnTypeGeneral*) and the first 64 characters of the *warningInformation* attributes.
3. Confirm it is possible to view the most recent message and the full list of past messages

Action

Message cancellation.

Load exchange set *S124MessageManagement*

Results

Confirm that the two messages [*2025/36*] and [*2025/37*] are no longer displayed, but are still listed, and marked as “cancelled” in the on-demand listing

Action

New NAVWARN indications

Load exchange set S124NewNAVWARN (containing *NewNAVWARN1* and *NewNAVWARN2*)

Results

1. Confirm an indication is provided to show the new NAVWARN message has been loaded.
2. Confirm the indication disappears when NAVWARN *NewNAVWARN1* is displayed
3. Set the system clock to +24 hours from current time
4. Confirm the indication disappears for *NewNAVWARN2*

2.10.6 **Marine traffic Management (S-127)**

Test Reference	Marine Traffic Management.	**IHO Reference**	S-98 6.1.1

Test Description
Ensure the ECDIS is capable of displaying the mandatory overlays of S-127

Loaded Data	
Exchange Set Name	

Display Mode		**Independent Mariner's Selections (default=On)**	
Other		Accuracy	
Context Parameters		Contour label	On
Safety Contour	10	Highlight date dependent	
Safety Depth	8	Highlight document	
Deep Contour	30	Highlight info	
Shallow Contour	5	Shallow Pattern	Off
Four Shades	On	Unknown	
Radar Overlay		Update Review	
Plain Boundaries	Off	**Text Groups**	On
Simplified Symbols	Off	Chart Text	
Full Light Lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow Water Dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		**Display**	
Start Date		Centre	32.5521S,61.0432E
End Date		Scale	1:45,000
		Orientation	

Viewing Groups (Default = On)			
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			

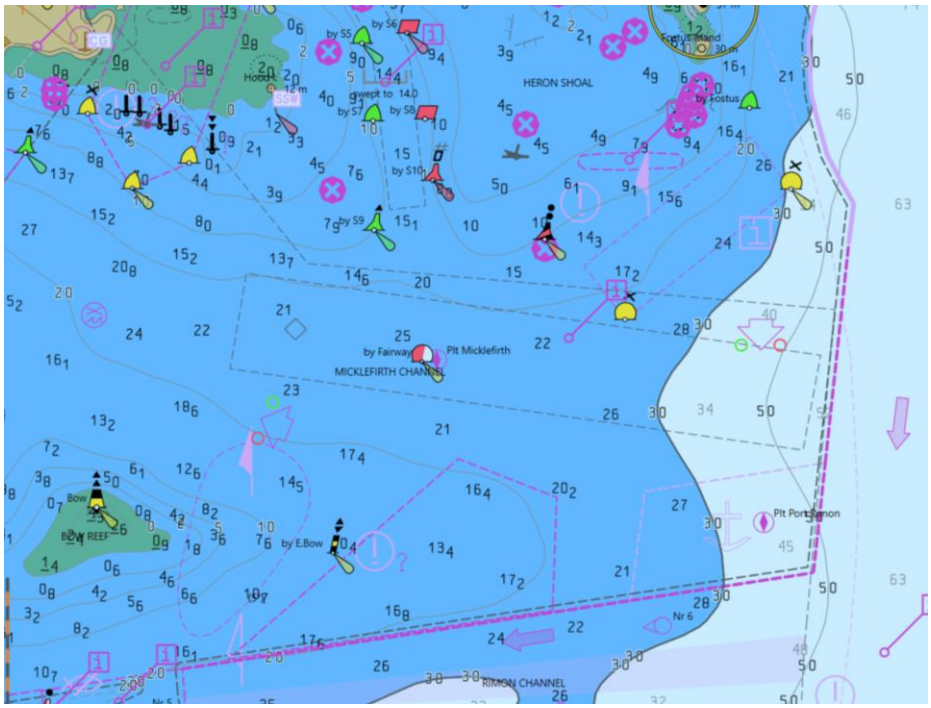
Alert Highlights (Standard)			
Additional			
Setup			

1. Load the Exchange set PowerUp
2. Load the Exchange set Overlays
3. Switch off all overlays
4. Navigate to the documented position and MSVS

Action

5. Observe the Display

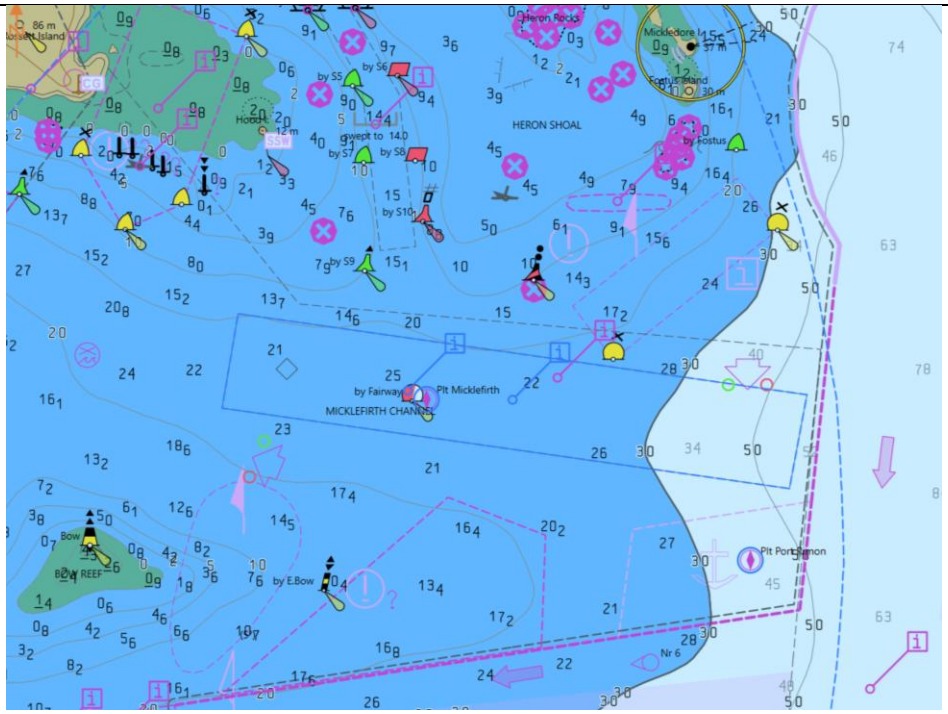
Results



Action

6. Switch on S-129 Under Keel Management Areas

Results



Action
1. Query the display at position 32.5521S,61.0432E
Results
2. Verify that the S-127 feature “Routing Measure” has details as follows: • *Category Of Routing Measure* = **Fairway system**

2.10.7 Under Keel Clearance Management Areas (S-129)

Test Reference	UnderKeelClearance	**IHO Reference** **IEC Reference**	S-98 6.1.1

Test Description
This test ensures the EUT is capable of displaying the mandatory overlays of S-129.
Loaded Data
Exchange Set Name

Display Mode		**Independent Mariner’s Selections**	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour	**10 m**	Highlight date dependent	
Safety depth	**8 m**	Highlight document	
Deep contour	**30 m**	Highlight info	
Shallow contour	**5 m**	Shallow Pattern	
Four shades	Off	Unknown	
Radar overlay	Off	Update Review	
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:30000

Viewing Groups			
Standard Display		**Other**	
Drying lines	**On**	Spot soundings	**On**
Buoys. Beacons, aids to navigation	**On**	Submarine cables and pipelines	**On**
Buoys, beacons, structures	**On**	All isolated dangers	**On**
Lights	**On**	Magnetic variation	**On**
Boundaries and limits	**On**	Depth contours	**On**
Prohibited and restricted areas	**On**	Seabed	**On**
Chart scale boundaries	**On**	Tidal	**On**
Cautionary notes	**On**	Miscellaneous (Other)	Off
Ships' routeing systems and ferry routes	**On**		
Archipelagic sea lanes	**On**		
Miscellaneous (Standard)	Off		
Chart (Standard)	Off		
Alert Highlights (Standard)	Off		

Setup

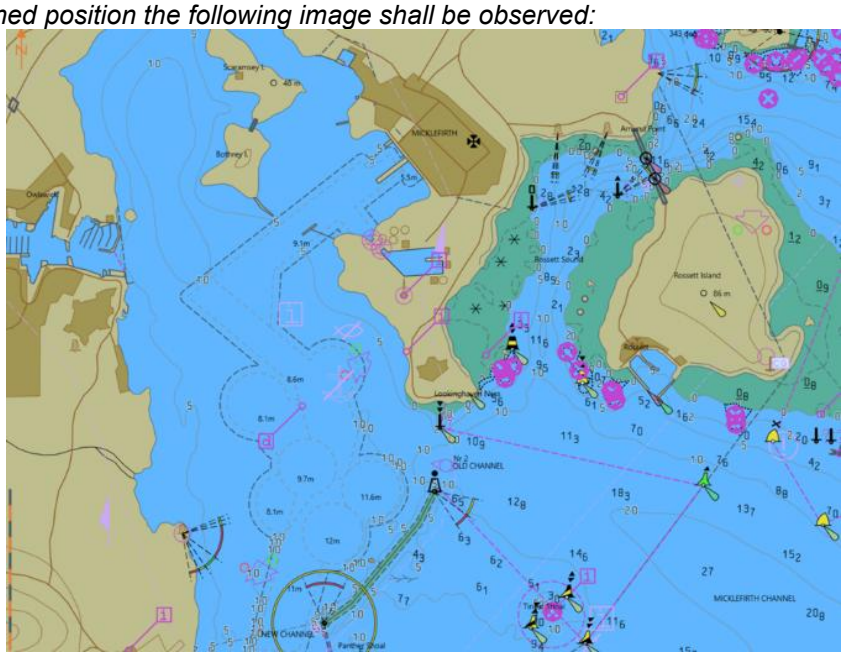
*As per **PowerUp**.*

Action

1. *Import exchange set Overlay-S129;*
2. *Switch off all overlays and observe the display at indicated scale and position.*

Results

1. *The exchange set shall install without any warning message;*
2. *At the defined position the following image shall be observed:*

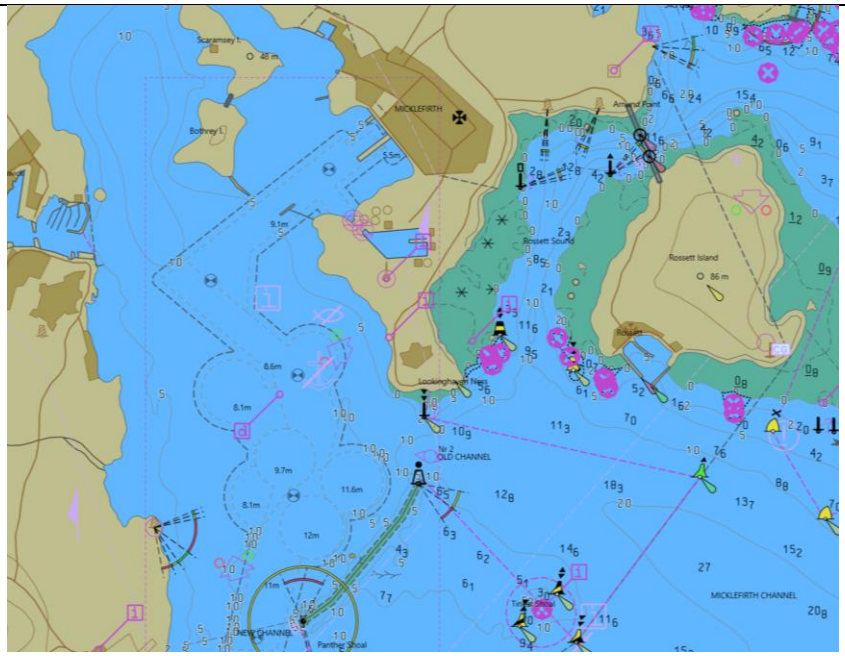


Action

Switch on S-129 Under Keel Management Areas

Results

At the defined position the following image shall be observed:



Action
Query the display at position 32.5078S,60.9123E
Results
The Under Keel Clearance Control Point must have details as follows: • *Name: CP02* • *Expected Passing Time: 2025-10-30T01:30:00Z* • *Expected Passing Speed: 10* • *Distance Above UKC Limit: 1.0*

2.10.8 Marine Harbour Infrastructure (S-131)

Test Reference	Marine Harbour Infrastructure.	**IHO Reference**	S-98 6.1.1
Test Description			
Ensure the ECDIS is capable of displaying the mandatory overlays of S-131 **TODO: Portrayal of S-131 has been updated for 2.0.0**			

Loaded Data	
Exchange Set Name	

Display Mode		**Independent Mariner's Selections (default=On)**	
Other		Accuracy	
Context Parameters		Contour label	On
Safety Contour	10	Highlight date dependent	
Safety Depth	8	Highlight document	
Deep Contour	30	Highlight info	
Shallow Contour	5	Shallow Pattern	Off
Four Shades	On	Unknown	
Radar Overlay		Update Review	
Plain Boundaries	Off	**Text Groups**	On
Simplified Symbols	Off	Chart Text	

Full Light Lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow Water Dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		**Display**	
Start Date		Centre	32.494S,60.9314E
End Date		Scale	1:45,000
		Orientation	

Viewing Groups (Default = On)

Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			
Additional			

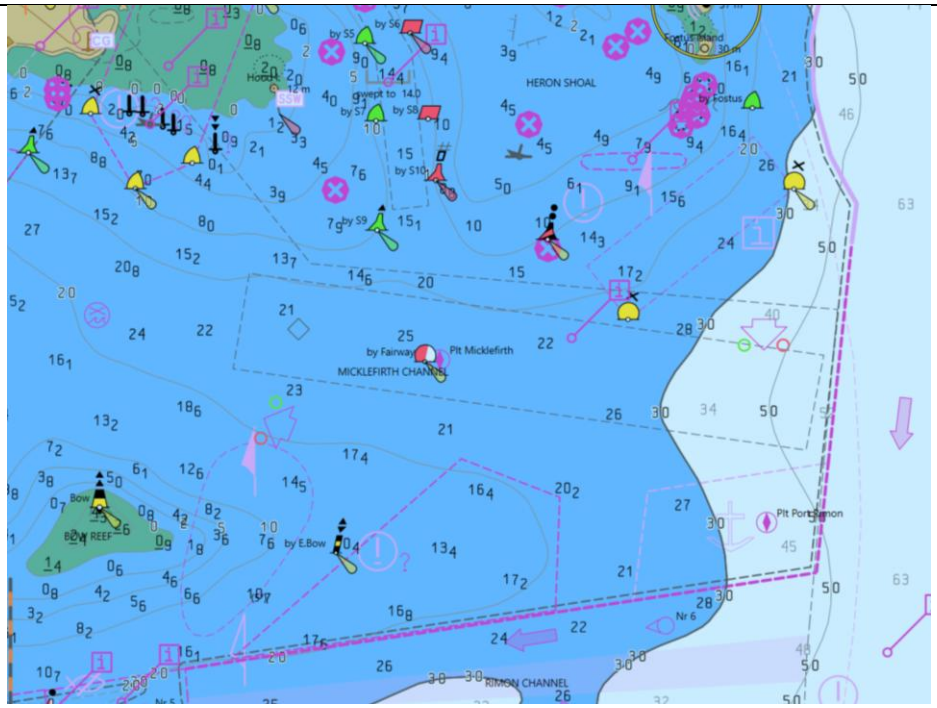
Setup

1. Load the Exchange set PowerUp
2. Load the Exchange set Overlays
3. Switch off all overlays
4. Navigate to the documented position and MSVS

Action

5. Observe the Display

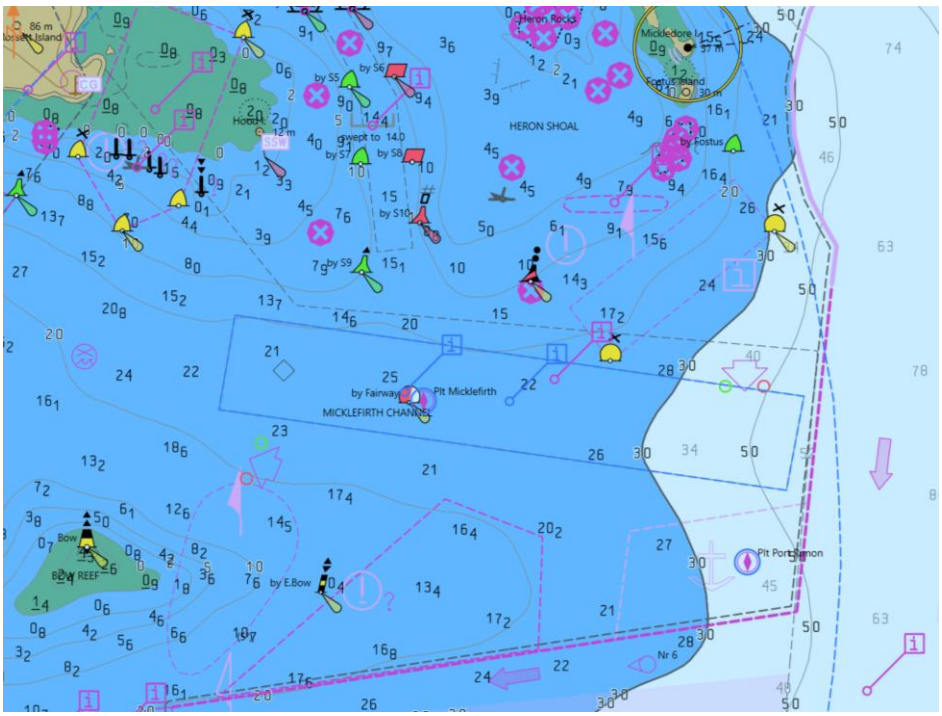
Results



Action

6. Switch on S-129 Under Keel Management Areas

Results



Action

3. Query the display at position 32.494S,60.9314E

Results

4. Verify that the S-131 feature “Berth” has details as follows:

- *Available Berthing Length* = **56.3m**

3 Chart Display

3.1 Dataset Selection and Loading

3.1.1 Dataset Selection

Test Reference	Dataset Selection	**IHO Reference**	S-98 Appendix E
Test description			

TODO:

- *Algorithm tests. Should test for correct selection of datasets from a group at given scales.*
- *Test what happens when an overlap exists (between min/opt according to S-98)*
- *Scale band boundary test(s) to check that optimum is selected instead of minimum as per MONG when MSVS is at minimum/optimum of overlapping cells.*
- *If there are user prompts in the event of overlaps inspection of these should be added here.*

- *This test should also test that non ENC datasets are only displayed between the optimum/maximum values set in the catalogue (new requirement in S-98). This should also include the overlapping cases. This is further checked in the non-ENC tests.*

3.1.2 Dataset Rendering

Test Reference	DatasetRendering	**IHO Reference**	S-98 Appendix E
Test description			

TODO: Test for correct rendering according to the MONG algorithm,

- *Test for correct rendering*
- *Features which extend beyond the dataset boundary in datasets. Test for truncation of text and features on the boundaries of cells.*
- *Text across boundaries.*
-

3.2 Display of ENC data

3.2.1 Display Base category

Test Reference	DisplayBase	**IHO Reference** **IEC Reference**	S-98 6.1.1; S-100 Part 9; S-101 Portrayal.

Test Description
This test ensures the EUT correctly displays all S-101 ENC features included in the IMO Display Base category. The test ENC dataset 10100AA_DBASE.000 contains all ENC features belonging to Display Base according to the S-101 Portrayal Catalogue.

Loaded Data	
Exchange Set Name	
DisplayBase	

Display Mode		**Independent Mariner's Selections**	
Displaybase		Accuracy	Off
Context Parameters		Contour label	Off
Safety contour	**10**	Highlight date dependent	Off

Safety depth	**10**	Highlight document	Off
Deep contour	**30**	Highlight info	Off
Shallow contour	**2**	Shallow pattern	Off
Four shades	Off	Unknown objects	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart text	**On**
Full light lines	Off	Important text	Off
Ignore scale minimum	Off	**Other Text**	
Shallow water dangers	Off	Names	Off
Palette		Light description	Off
Day		All other chart text	Off

Date Dependent Objects		**Display**	
Start date		Centre	10°05.00'N, 9°55.00'E
End date		Scale	1:80 000
		Orientation	

Viewing Groups

Standard Display		**Other**	
Drying lines	Off	Spot soundings	Off
Buoys. Beacons, aids to navigation	Off	Submarine cables and pipelines	Off
Buoys, beacons, structures	Off	All isolated dangers	Off
Lights	Off	Magnetic variation	Off
Boundaries and limits	Off	Depth contours	Off
Prohibited and restricted areas	Off	Seabed	Off
Chart scale boundaries	Off	Tidal	Off
Cautionary notes	Off	Miscellaneous (Other)	Off
Ships' routeing systems and ferry routes	Off		
Archipelagic sea lanes	Off		
Miscellaneous (Standard)	Off		
Chart (Standard)	Off		
Alert highlights (Standard)	Off		

Setup

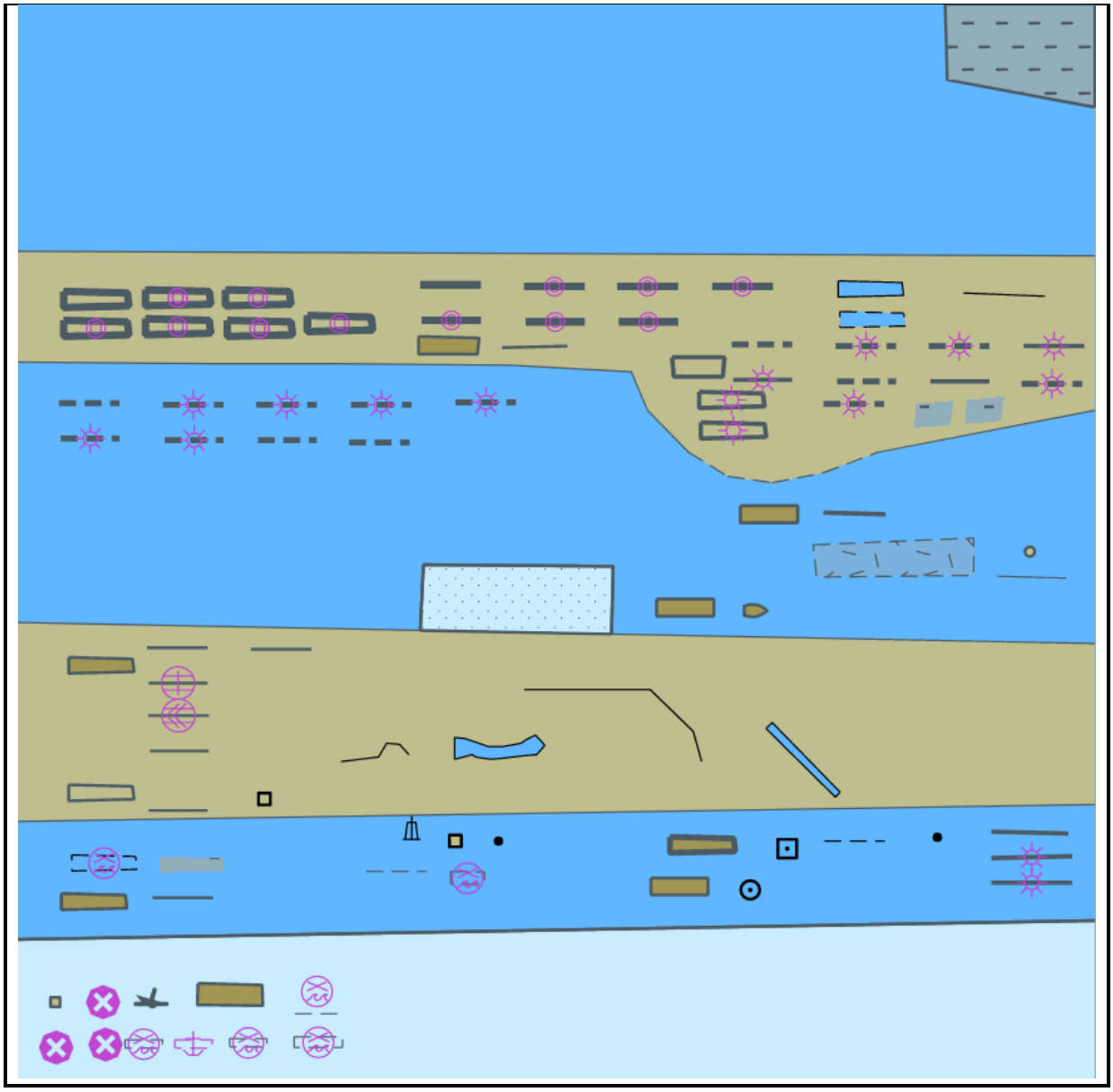
As per UpdateCatalogues (S-101 Feature and Portrayal Catalogues loaded, but all datasets removed from the System Database)

Action

1. *Import exchange set **DisplayBase** (Dataset 10100AA_DBASE.000).*
2. *Check the symbols shown in the EUT against the graphical plot.*

Results

1. *The exchange set shall install without any warning messages.*
2. *At the defined position the following image shall be observed*



3.2.2 **Display Standard category**

Test Reference	DisplayStandard	**IHO Reference** **IEC Reference**	S-98 6.1.1 S-100 Part 9 S-101 Portrayal

Test Description
This test ensures the EUT correctly displays all S-101 ENC features included in the IMO Standard Display category. The test ENC dataset 10100AA_STNDR.000 contains depth and land areas from Display Base plus all S-101 ENC features belonging to Standard Display according to the S-101 Portrayal Catalogue. The features belonging to Standard Display are to be shown if Standard Display is selected in EUT HMI and should disappear in the Display Base mode.

Loaded Data
Exchange Set Name
DisplayStandard

Display Mode		**Independent Mariner's Selections**	
Standard		Accuracy	Off
Context Parameters		Contour label	Off
Safety contour	**10 m**	Highlight date dependent	Off
Safety depth	**10 m**	Highlight document	Off

Deep contour	**30 m**	Highlight info	Off
Shallow contour	**2 m**	Shallow pattern	Off
Four shades	Off	Unknown objects	Off
Radar overlay	Off	Update review	
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart text	Off
Full light lines	Off	Important text	Off
Ignore scale minimum	Off	**Other Text**	
Shallow water dangers	Off	Names	Off
Palette		Light description	Off
Day		All other chart text	Off

Date Dependent Objects		**Display**	
Start Date		Centre	10°05.00'N, 9°55.00'E
End Date		Scale	1:70 000
		Orientation	

Viewing Groups			
Standard Display		**Other**	
Drying lines	**On**	Spot soundings	Off
Buoys. Beacons, aids to navigation	**On**	Submarine cables and pipelines	Off
Buoys, beacons, structures	**On**	All isolated dangers	Off
Lights	**On**	Magnetic variation	Off
Boundaries and limits	**On**	Depth contours	Off
Prohibited and restricted areas	**On**	Seabed	Off
Chart scale boundaries	**On**	Tidal	Off
Cautionary notes	**On**	Miscellaneous (Other)	Off
Ships' routeing systems and ferry routes	**On**		
Archipelagic sea lanes	**On**		
Miscellaneous (Standard)	**On**		
Chart (Standard)	**On**		
Alert Highlights (Standard)	**On**		

Setup

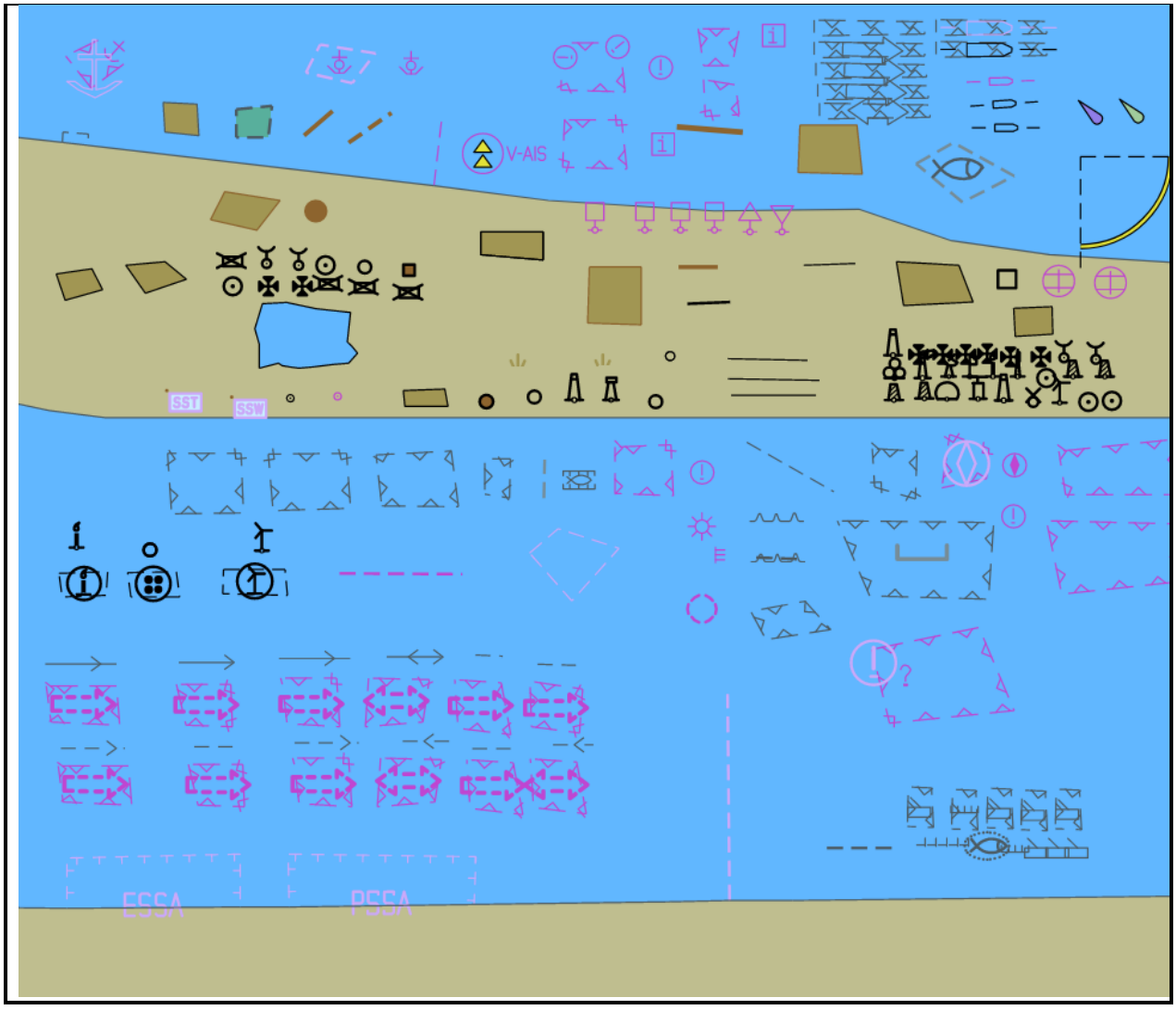
As per UpdateCatalogues (S-101 Feature and Portrayal Catalogues loaded, but all datasets removed from the System Database).

Action

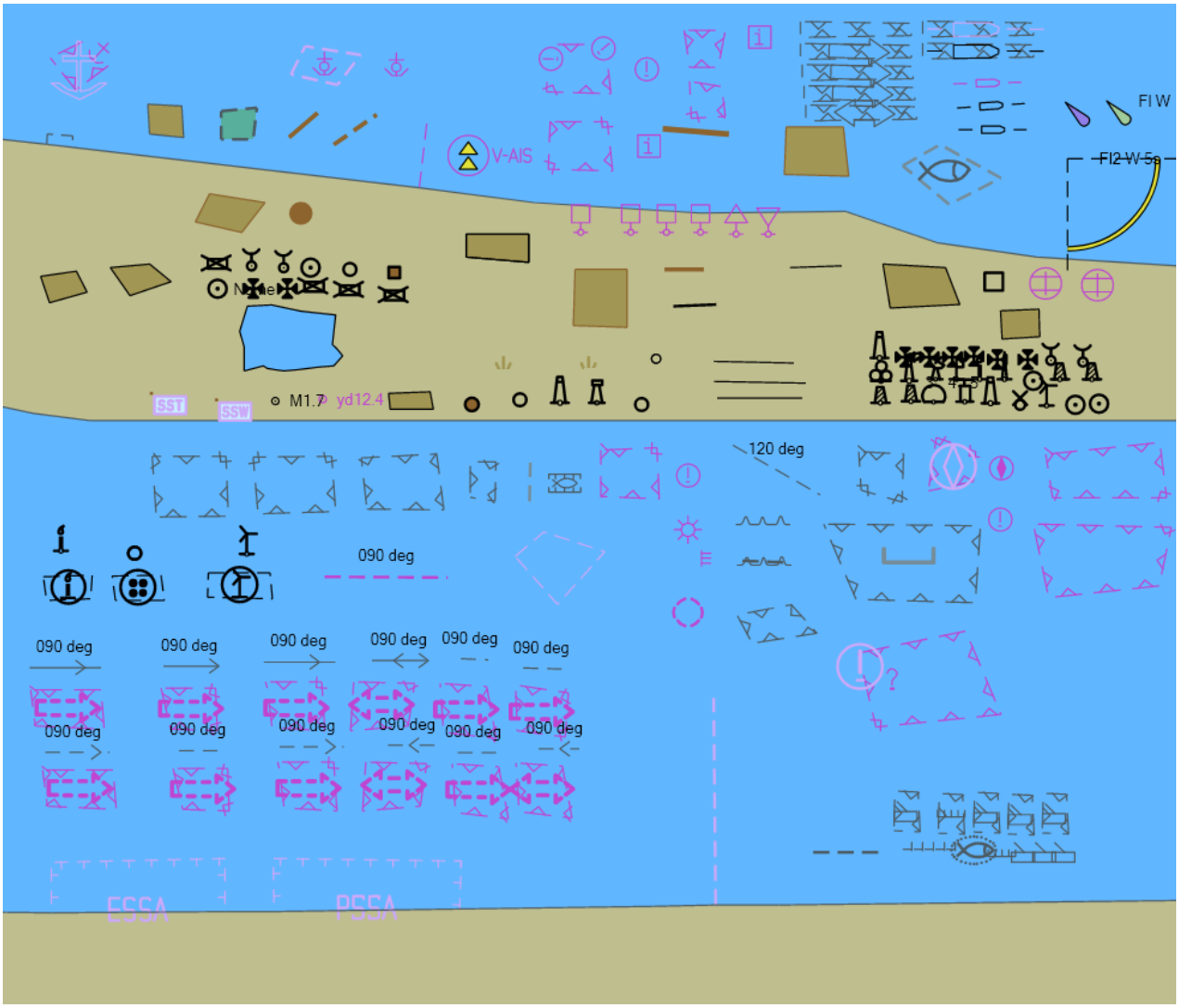
1. *Import the exchange set **DisplayStandard** (Dataset 10100AA_STNDR.000).*
2. *Check the symbols shown in the EUT against the graphical plot.*

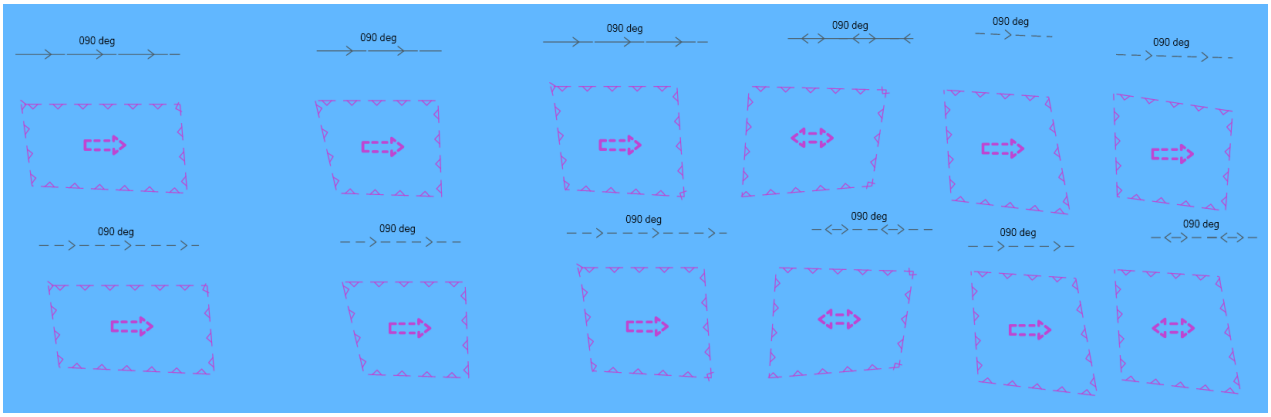
Results

1. *The exchange set shall install without any warning messages.*
2. *At the defined position the following image shall be observed. Confirm that depth and land areas from Display Base are shown.*

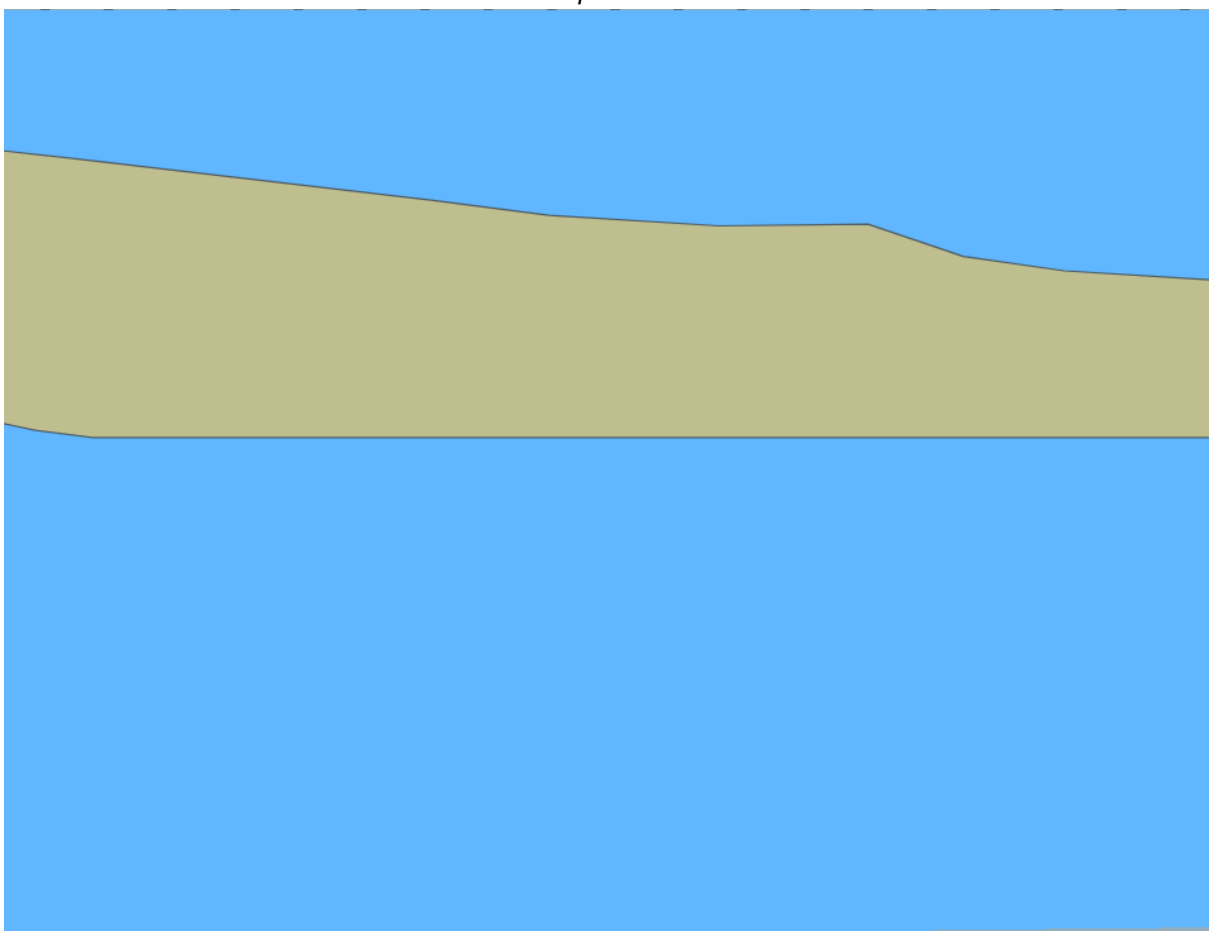

V-AIS
SST
SSW
ESSA
PSSA

Action
Select all text groups. *Check the symbols shown in the EUT against the graphical plot.*
Results
The ENC in the EUT should be shown as in the picture below.





South-West part of above chart at scale 1:20 000

Action
Switch on Display Base and display the dataset at scale 1:70 000. Check ENC symbols shown in ECDIS against graphical plot.
Results
The ENC in the ECDIS should be shown as in the picture below 

3.2.3 Display Other category

Test Reference	DisplayOther	IHO Reference IEC Reference	S-98 6.1.1 S-100 Part 9 S-101 Portrayal

Test Description

This test ensures the EUT correctly displays all S-101 ENC features included in the IMO Other Display category. The test ENC dataset 10100AA_OTHER.000 contains depth and land areas from Display Base plus all ENC features belonging to Other Display according to the S-101 portrayal catalogue.
The features belonging to Other Display are to be shown if Other (or All) display is selected in EUT HMI and should disappear in the Display Base or Standard Display Categories.

Loaded Data

Exchange Set Name

DisplayOther

Display Mode		Independent Mariner's Selections	
Other		Accuracy	Off
Context Parameters		Contour label	Off
Safety contour	**10 m**	Highlight date dependent	Off
Safety depth	**10 m**	Highlight document	Off
Deep Contour	**30 m**	Highlight info	Off
Shallow contour	**2 m**	Shallow pattern	Off
Four shades	Off	Unknown	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	Off
Full light lines	Off	Important text	Off
Ignore scale minimum	Off	**Other Text**	
Shallow water dangers	Off	Names	Off
Palette		Light description	Off
Day		All other chart text	Off

Date Dependent Objects		Display	
Start Date	N/A	Centre	10°05.00'N, 9°55.00'E
End Date	N/A	Scale	1:60 000
		Orientation	

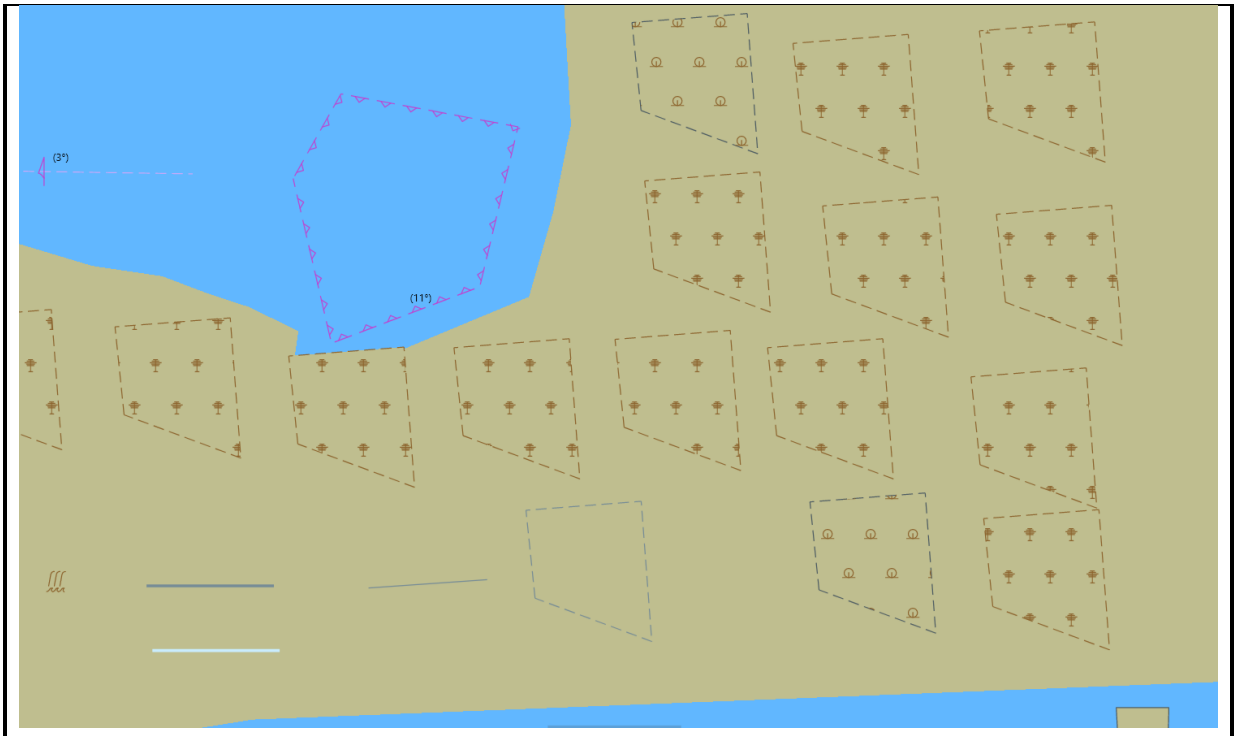
Viewing Groups

Standard Display		Other	
Drying lines	**On**	Spot soundings	Off
Buoys. Beacons, aids to navigation	**On**	Submarine cables and pipelines	Off
Buoys, beacons, structures	**On**	All isolated dangers	Off
Lights	**On**	Magnetic variation	Off
Boundaries and limits	**On**	Depth contours	Off
Prohibited and restricted areas	**On**	Seabed	Off
Chart scale boundaries	**On**	Tidal	Off
Cautionary notes	**On**	Miscellaneous (Other)	Off
Ships' routeing systems and ferry routes	**On**		
Archipelagic sea lanes	**On**		
Miscellaneous (Standard)	**On**		
Chart (Standard)	**On**		
Alert Highlights (Standard)	**On**		

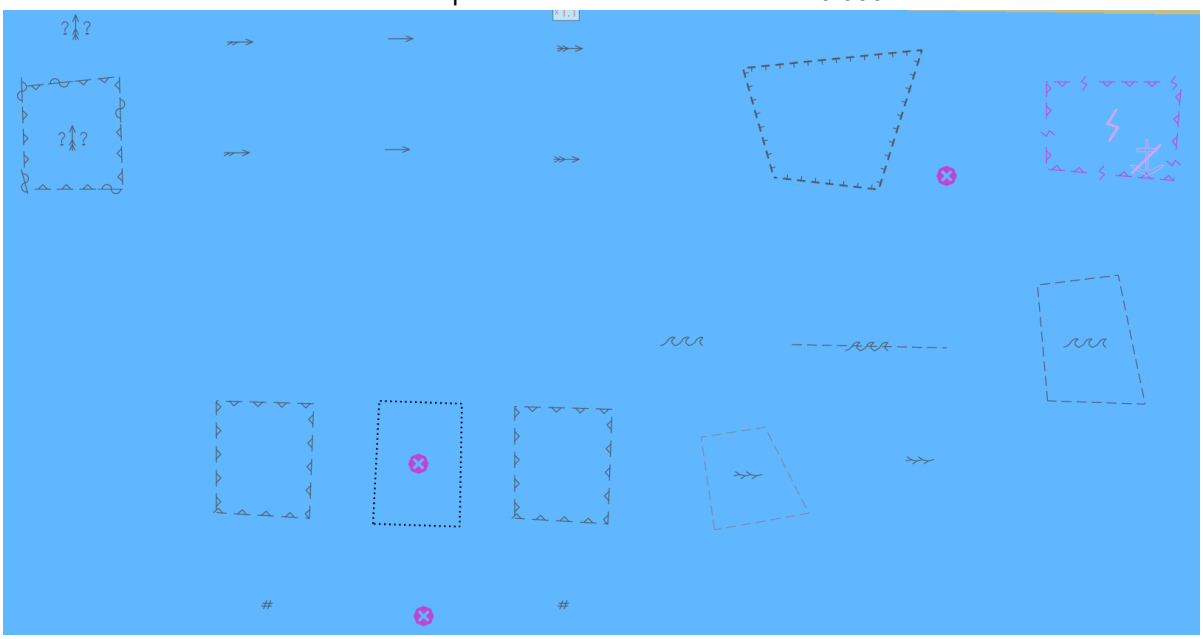
Setup

As per UpdateCatalogues (S-101 Feature and Portrayal Catalogues loaded, but all datasets removed from the System Database)..

Action
1. *Import the exchange set **DisplayOther** (dataset 10100AA_OTHER.000).* 2. *Check every ENC symbol shown in ECDIS against graphical plot.*
Results
The features are shown as presented in the screen plot below (Scale 1:70 000) 



North-East part of above chart at scale 1:20 000



South-East part of above chart at scale 1:20 000, with Shallow water dangers **On**.

Action
Switch on Display Base. Check ENC display in ECDIS against graphical plot
Results
The ENC in the ECDIS should be shown as in the picture below.



3.2.4 ECDIS Viewing groups names. Standard Display

Test Reference	ViewingGroupsStandard	IHO Reference	S-98 6.1.1 S-100 Part 9 S-101 Portrayal

Test Description

The purpose of the test is to verify that ECDIS is able to change S-101 display settings using standardized controls.
Names of the controls, located under the Standard Display section of ECDIS should switch On and Off certain viewing layers and should comply with the content of the S-101 Portrayal Catalogue.

Loaded Data

Exchange Set Name

DisplayStandard

Display Mode		Independent Mariner's Selections	
Standard		Accuracy	Off
Context Parameters		Contour label	Off
Safety contour	**10 m**	Highlight date dependent	Off
Safety depth	**10 m**	Highlight document	Off
Deep Contour	**30 m**	Highlight info	Off
Shallow contour	**2 m**	Shallow pattern	Off
Four shades	Off	Unknown	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	Off
Full light lines	Off	Important text	Off
Ignore scale minimum	Off	**Other Text**	
Shallow water dangers	Off	Names	Off
Palette		Light description	Off
Day		All other chart text	Off

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:70 000
		Orientation	

Viewing Groups

Standard Display		Other	
Drying lines	On	Spot soundings	Off
Buoys. Beacons, aids to navigation	On	Submarine cables and pipelines	Off
Buoys, beacons, structures	On	All isolated dangers	Off
Lights	On	Magnetic variation	Off
Boundaries and limits	On	Depth contours	Off
Prohibited and restricted areas	On	Seabed	Off
Chart scale boundaries		Tidal	Off
Cautionary notes	On	Miscellaneous (Other)	Off
Ships' routeing systems and ferry routes	On		
Archipelagic sea lanes	On		
Miscellaneous (Standard)	On		
Chart (Standard)			
Alert Highlights (Standard)			

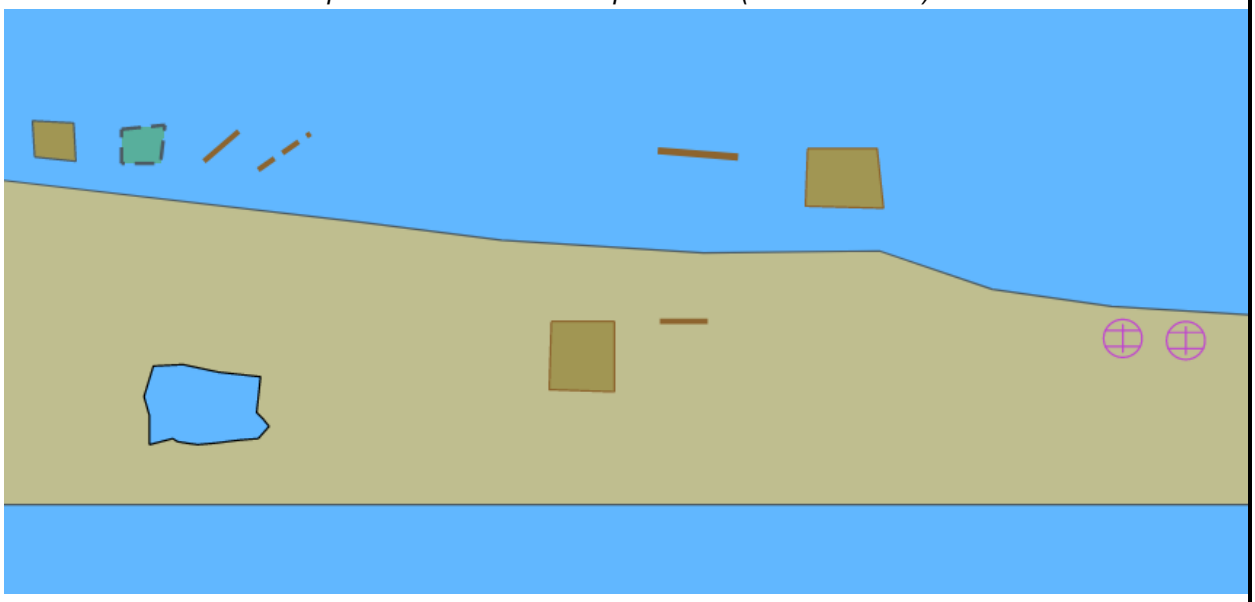
Setup

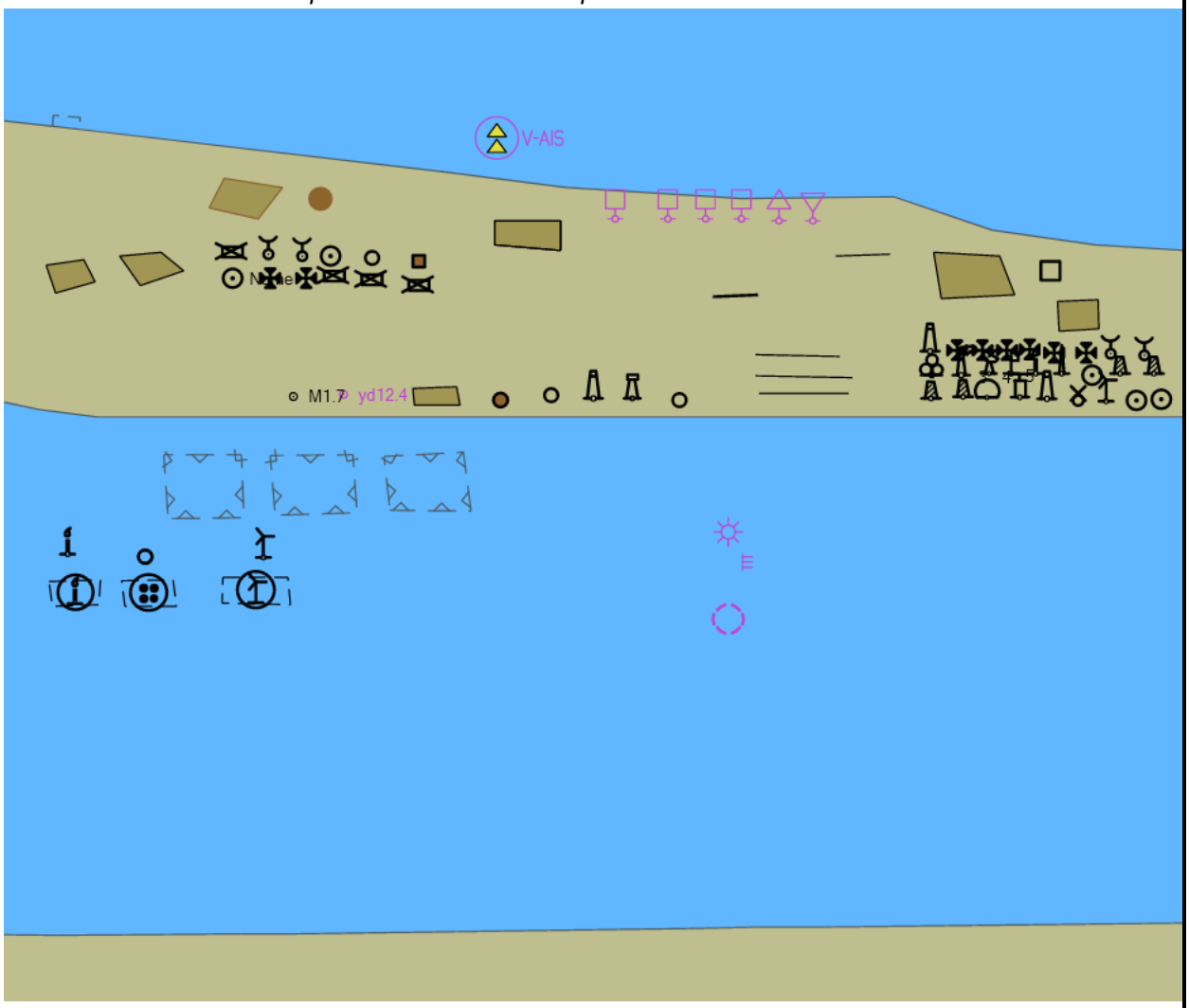
As per UpdateCatalogues (S-101 Feature and Portrayal Catalogues loaded, but all datasets removed from the System Database).

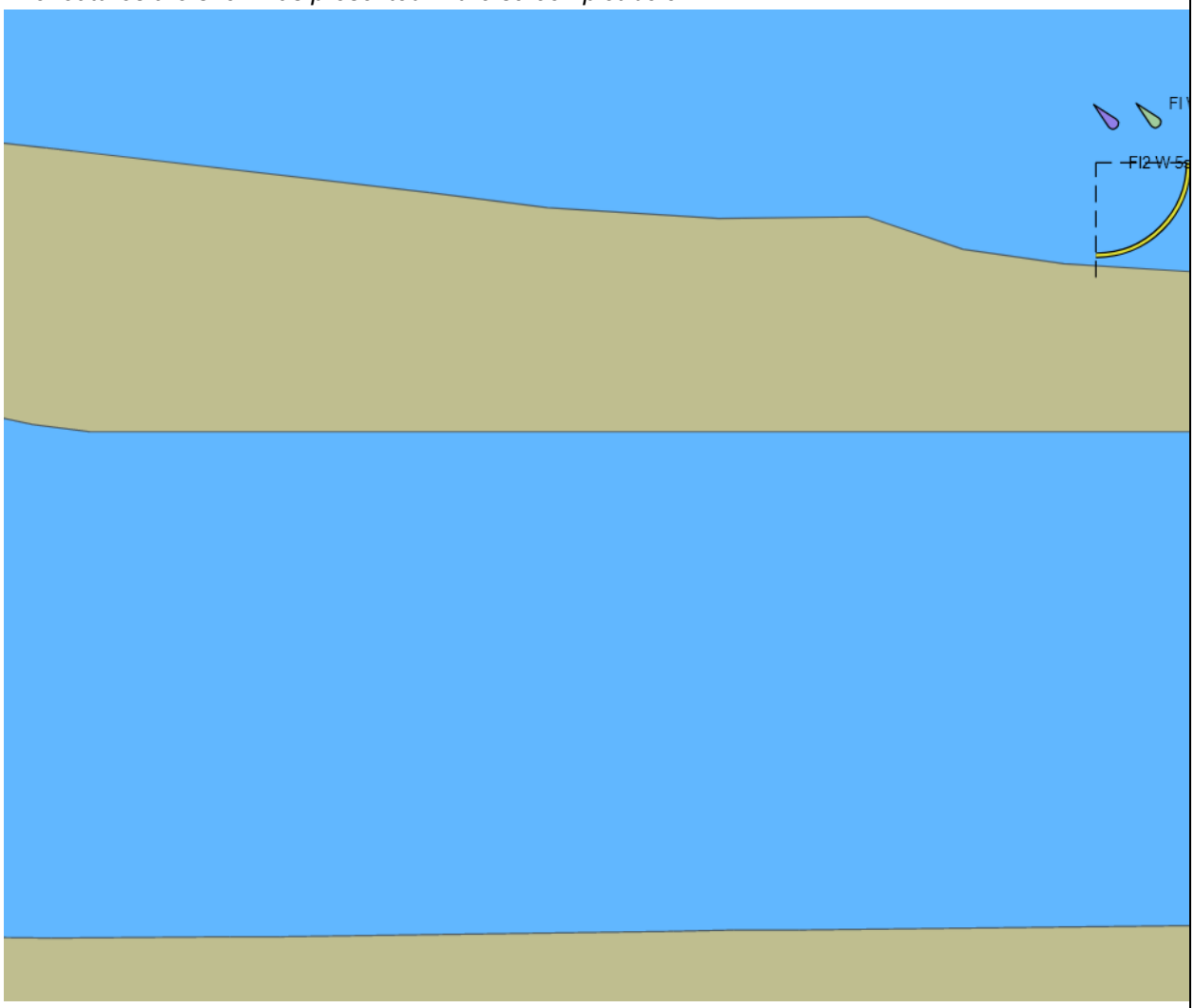
Action

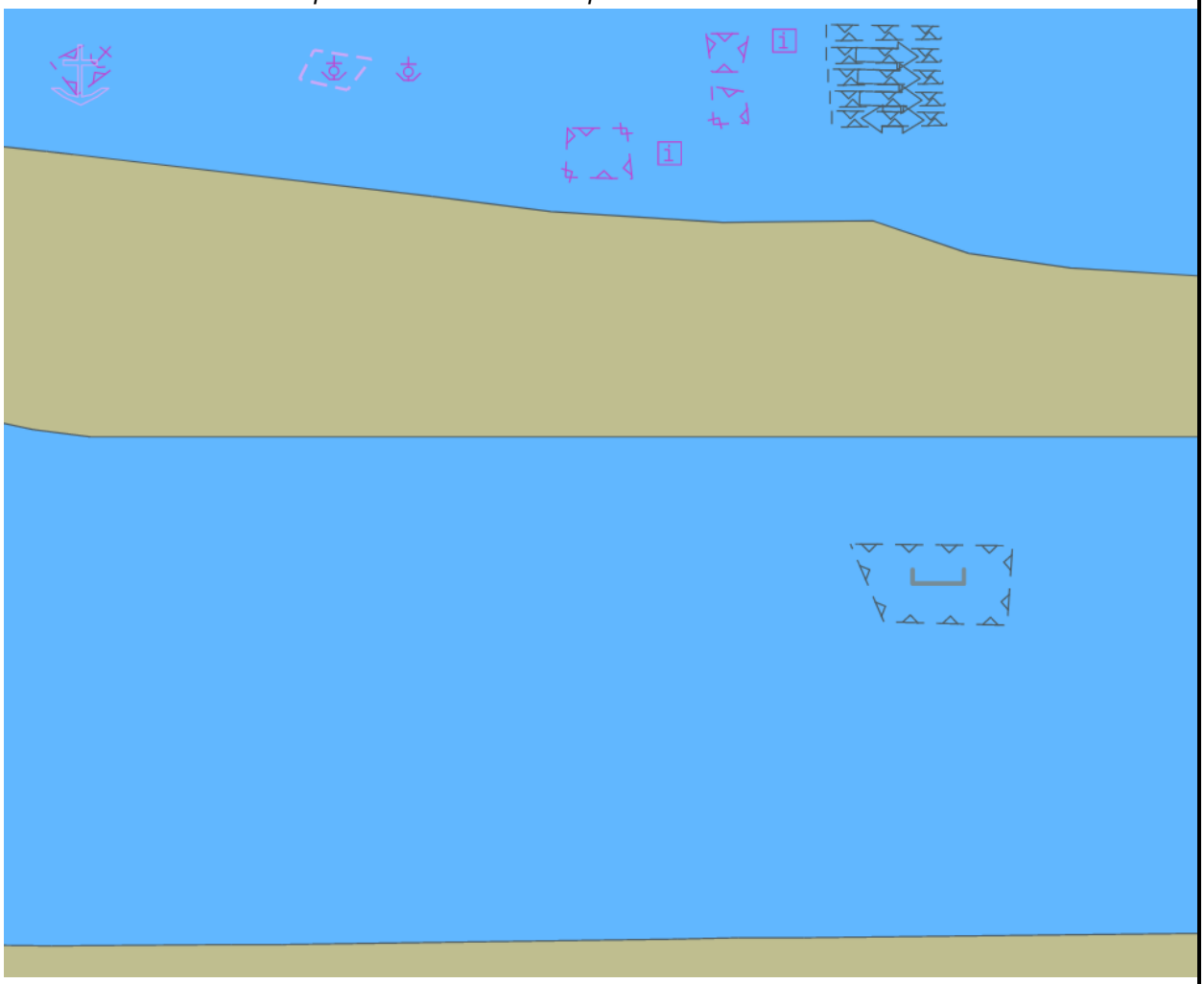
1. *Import the exchange set **DisplayStandard***
2. *Check that EUT HMI contains standardized controls that can switch On and Off certain features*

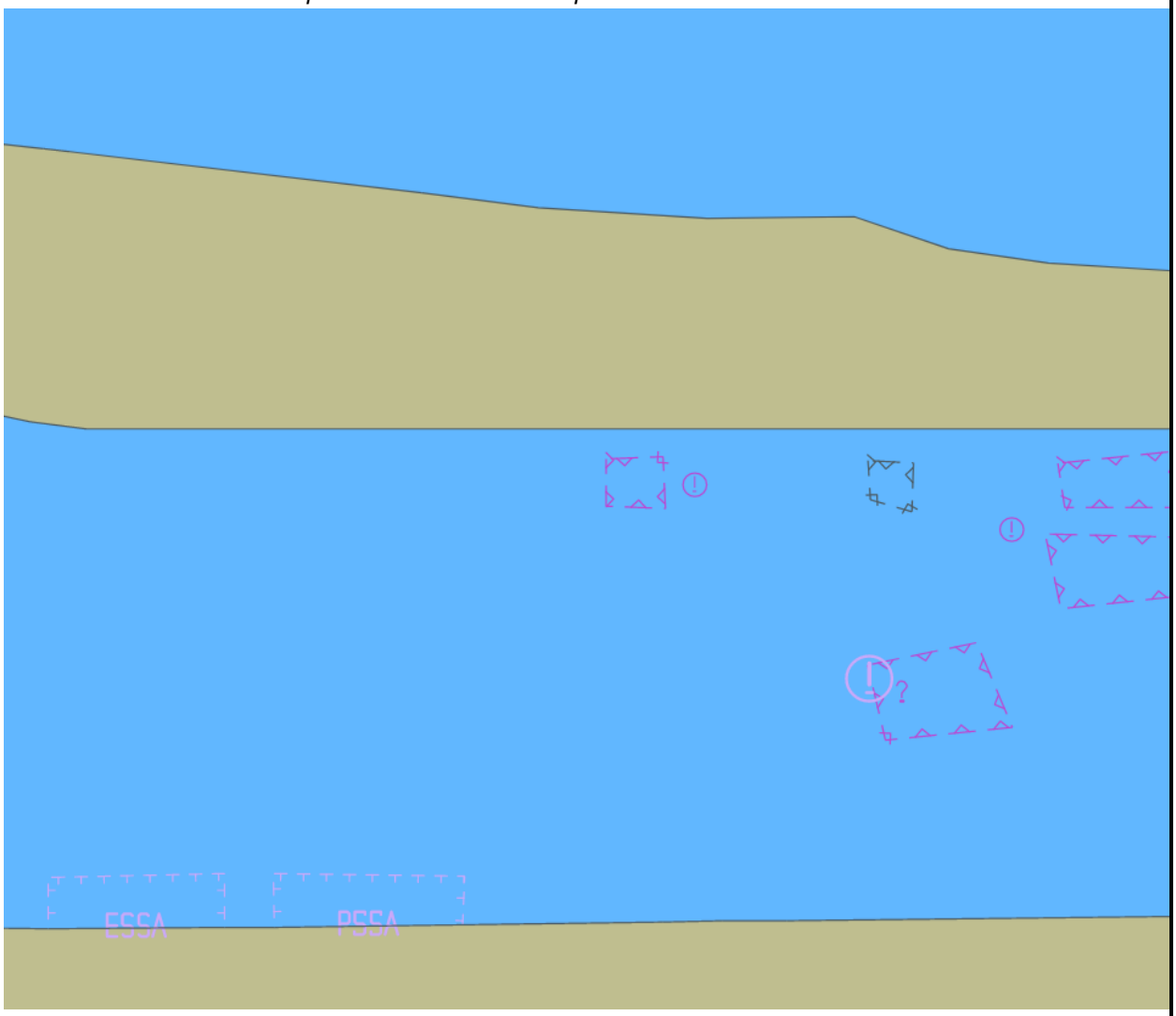
from the chart.
Results
Confirm that the following controls are available at ECDIS HMI *Drying line* *Buoys, beacons, aids to navigation* *Buoys, beacons, structures* *Lights* *Boundaries and limits* *Prohibited and restricted areas* *Chart scale boundaries* *Cautionary notes* *Ships' routeing systems and ferry routes* *Archipelagic sea lanes* *Miscellaneous*

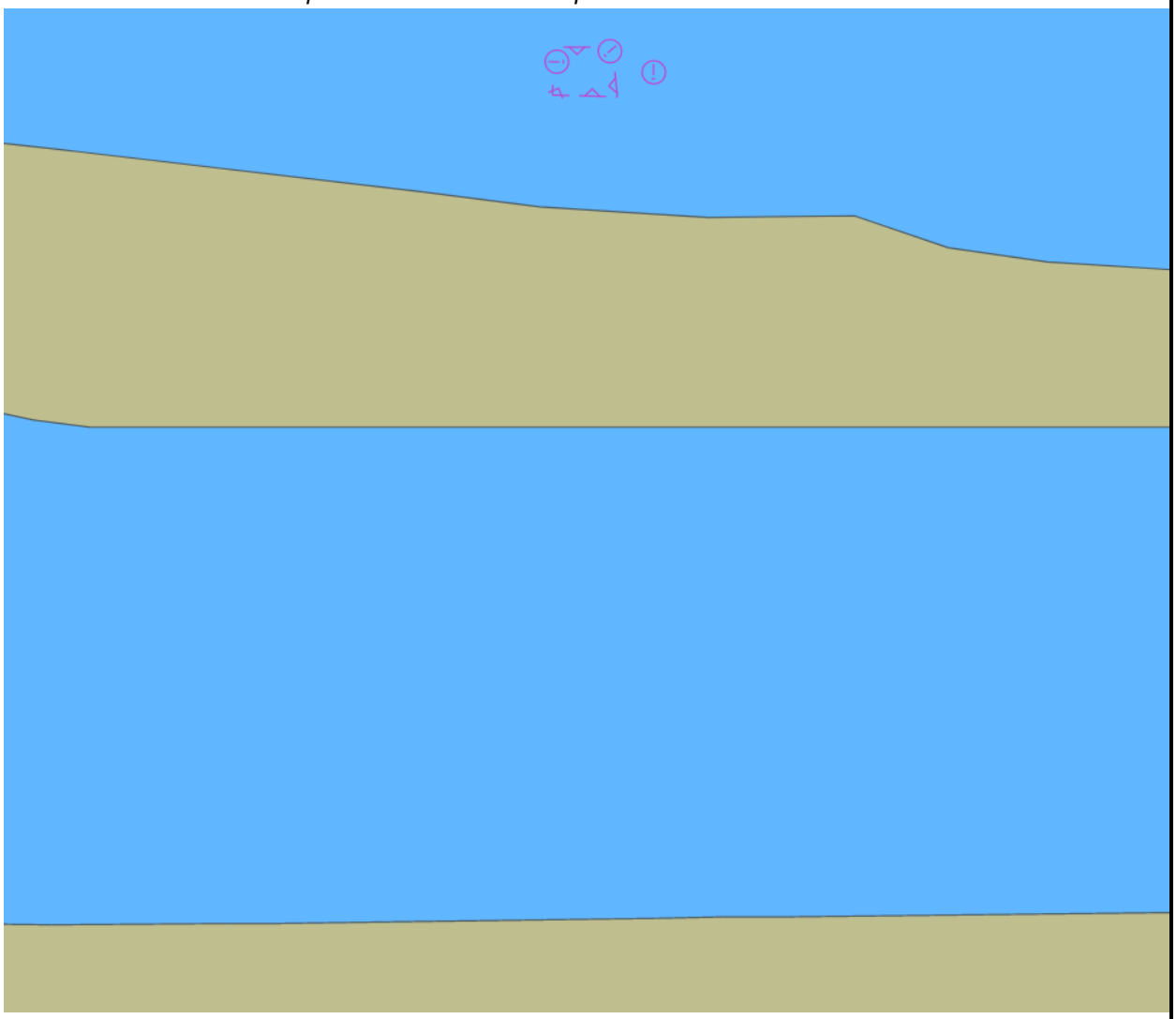
Action
*Switch off all controls and switch "**On"** only the "**Drying line**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below (scale 1:70 000) 

Action
*Switch off all controls and switch on only the "**Buoys, beacons, aids to navigation**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below 

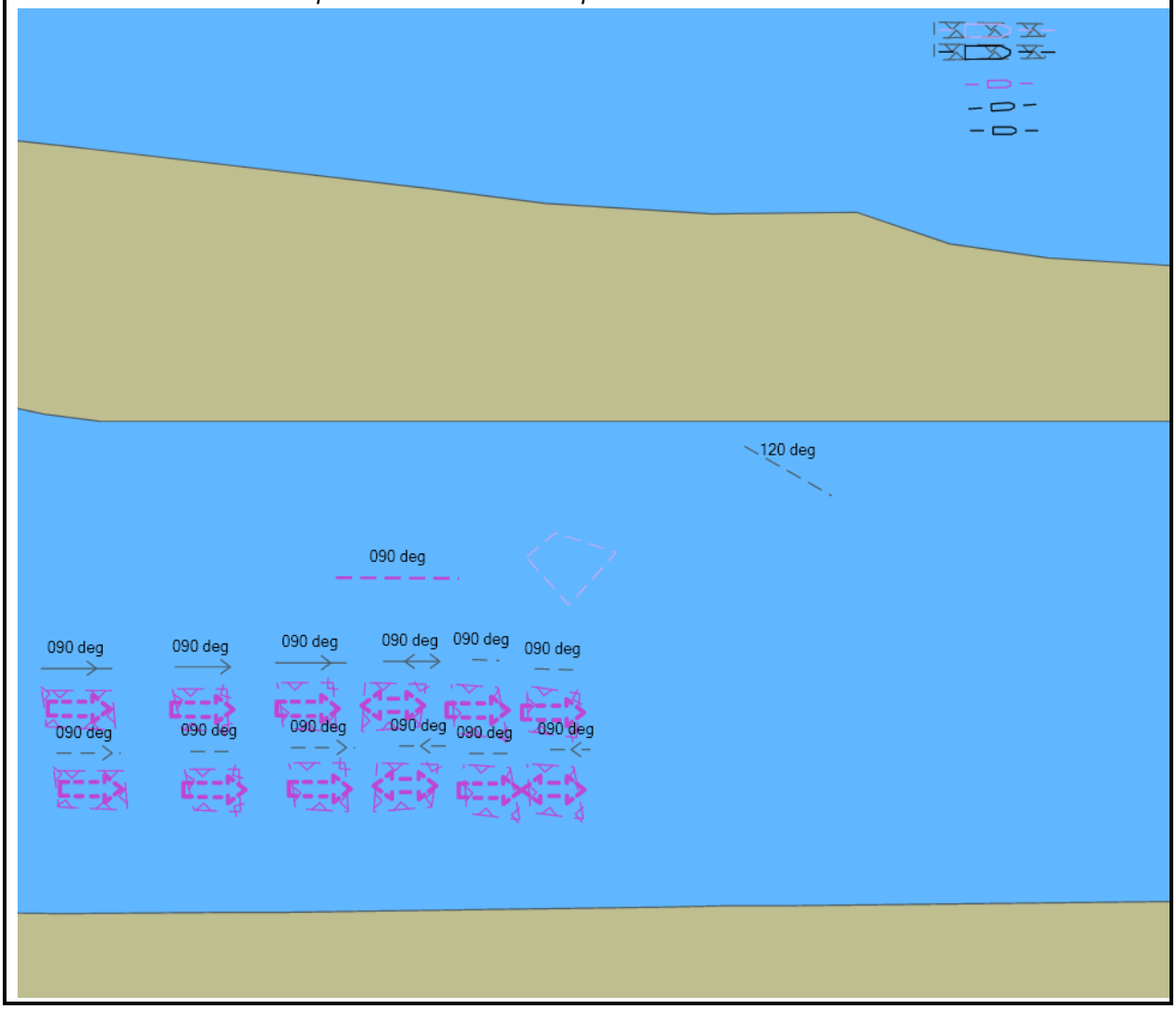
Action
*Switch off all controls and switch on only the "**Lights**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below 

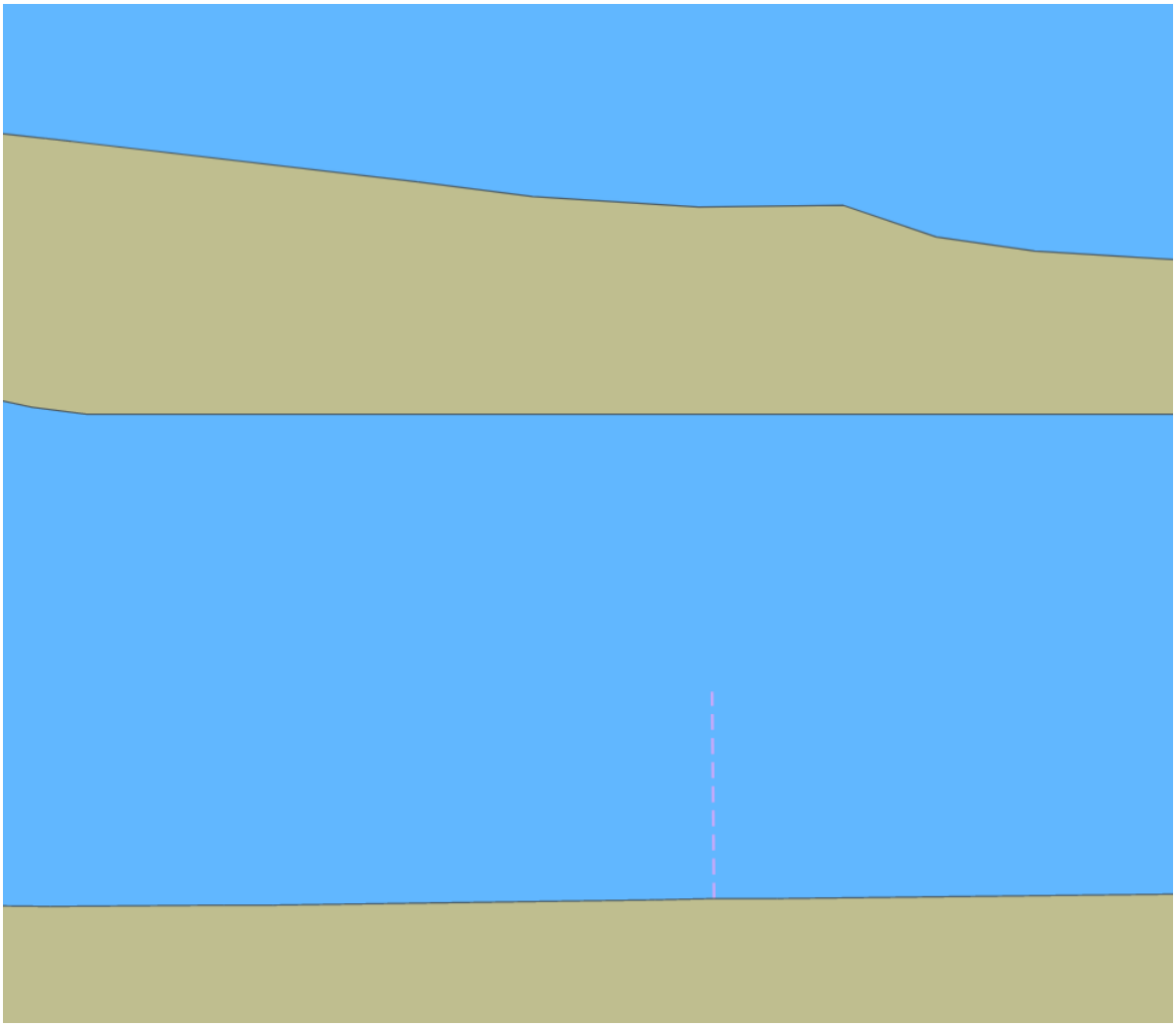
Action
*Switch off all controls and switch on only the "**Boundaries and limits**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below 

Action
*Switch off all controls and switch on only the "**Prohibited and restricted areas**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below 

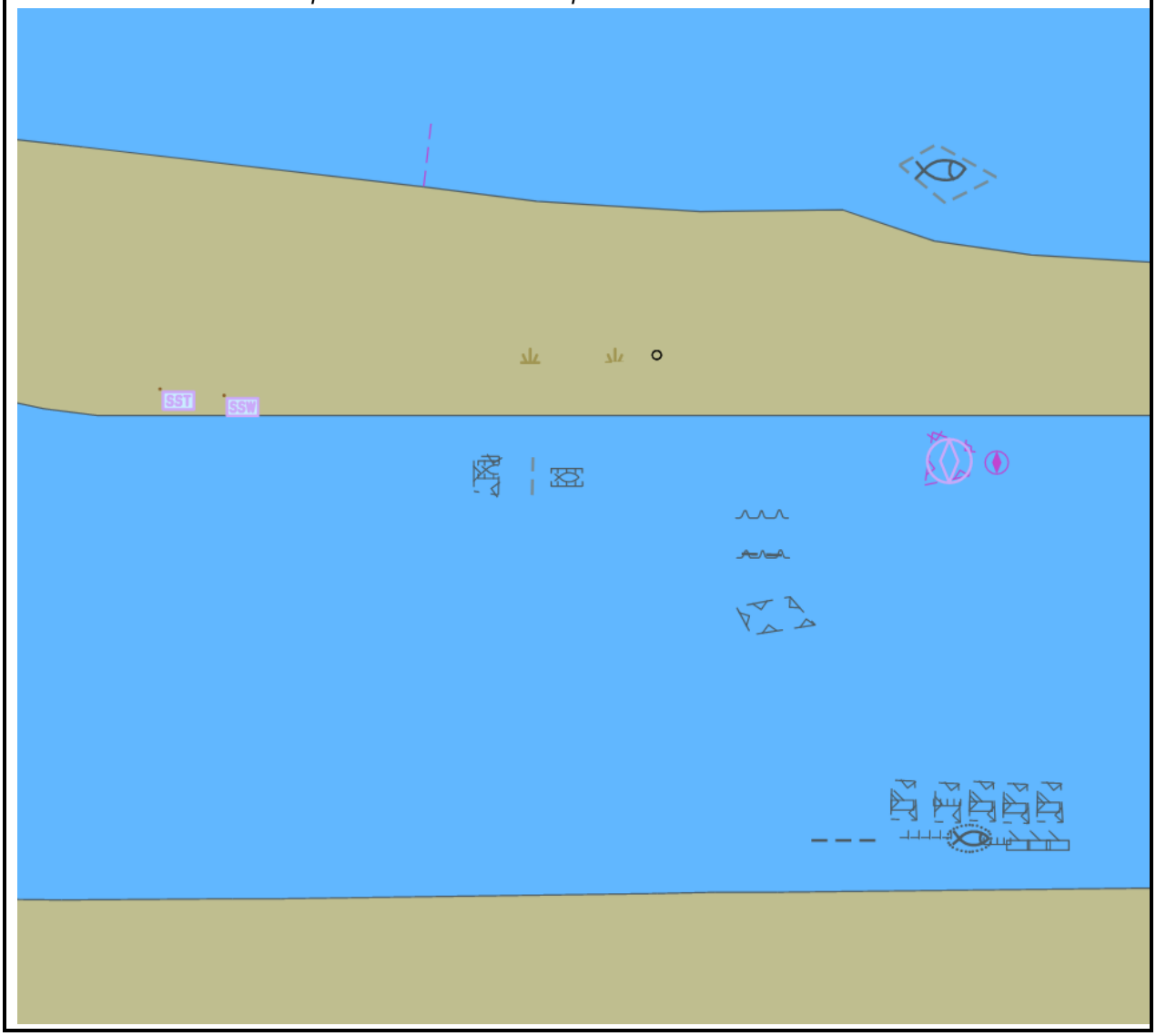
Action
*Switch off all controls and switch on only the "**Cautionary notes**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below 

Action
*Switch off all controls and switch on only the "**Ships' routeing systems and ferry routes**" control. Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below



Action
*Switch off all controls and switch on only the "**Archipelagic sea lanes**" control. Verify that the features are displayed correctly as presented in the plot.*
Results
The Features are shown as presented in the screen plot below 

Action
*Switch off all controls and switch on only the "**Miscellaneous** control. Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below



3.2.5 ECDIS Viewing Layers. Other Display

Test Reference	ViewingGroupsOther	**IHO Reference**	S-98 6.1.1 S-100 Part 9 S-101 Portrayal

Test Description
The purpose of the test is to verify that EUT is able to change ENC display settings using standardized controls. Names of the controls, located under the Other Display section of ECDIS should switch On and Off certain viewing layers and should comply with the S-101 Portrayal Catalogue.
Loaded Data
Exchange Set Name
DisplayOther

Display Mode		**Independent Mariner's Selections**	
Other		Accuracy	Off
Context Parameters		Contour label	Off
Safety contour	**10 m**	Highlight date dependent	Off

Safety depth	**10 m**	Highlight document	Off
Deep Contour	**30 m**	Highlight info	Off
Shallow contour	**2 m**	Shallow pattern	Off
Four shades	Off	Unknown	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	Off
Full light lines	Off	Important text	Off
Ignore scale minimum	Off	**Other Text**	
Shallow water dangers	Off	Names	Off
Palette		Light description	Off
Day		All other chart text	Off

Date Dependent Objects		**Display**	
Start Date		Centre	
End Date		Scale	1:70 000
		Orientation	

Viewing Groups

Standard Display		**Other**	
Drying lines		Spot soundings	**On**
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	**On**
Buoys, beacons, structures		All isolated dangers	**On**
Lights		Magnetic variation	**On**
Boundaries and limits		Depth contours	**On**
Prohibited and restricted areas		Seabed	**On**
Chart scale boundaries		Tidal	**On**
Cautionary notes		Miscellaneous (Other)	**On**
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Setup

As per UpdateCatalogues (S-101 Feature and Portrayal Catalogues loaded, but all datasets removed from the System Database).

Action

*Import the exchange set **DisplayOther** (dataset 10100AA_OTHER.000) with the following settings provided.*
Switch on Other Display Check that ECDIS HMI contains standardized controls that can switch on and off certain features from the chart.

Results

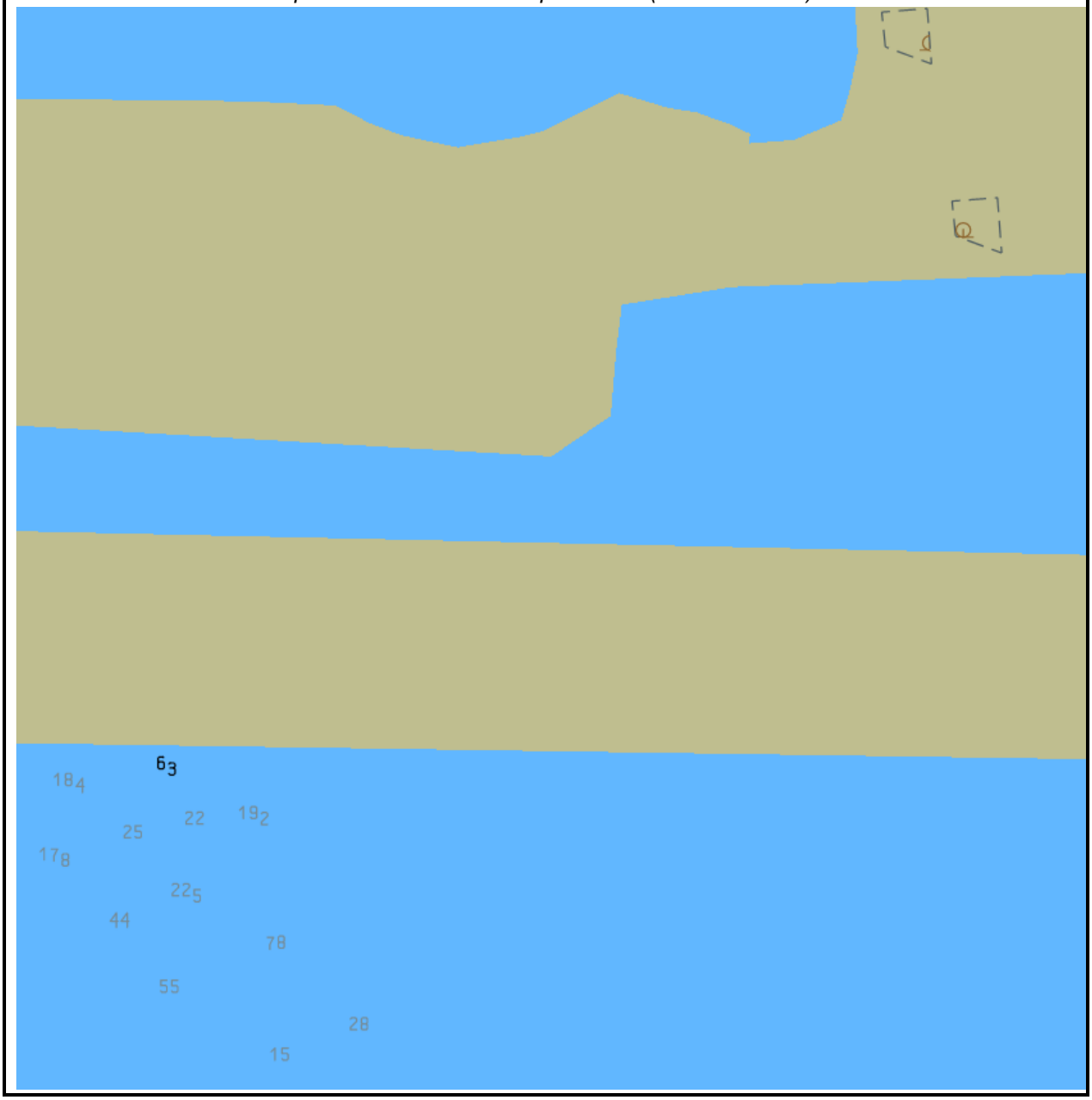
Confirm that the following controls are available at ECDIS HMI under the Other Display section
Spot soundings
Submarine cables and pipelines
All isolated dangers
Magnetic variation
Depth contours
Seabed
Tidal
Miscellaneous (Other)

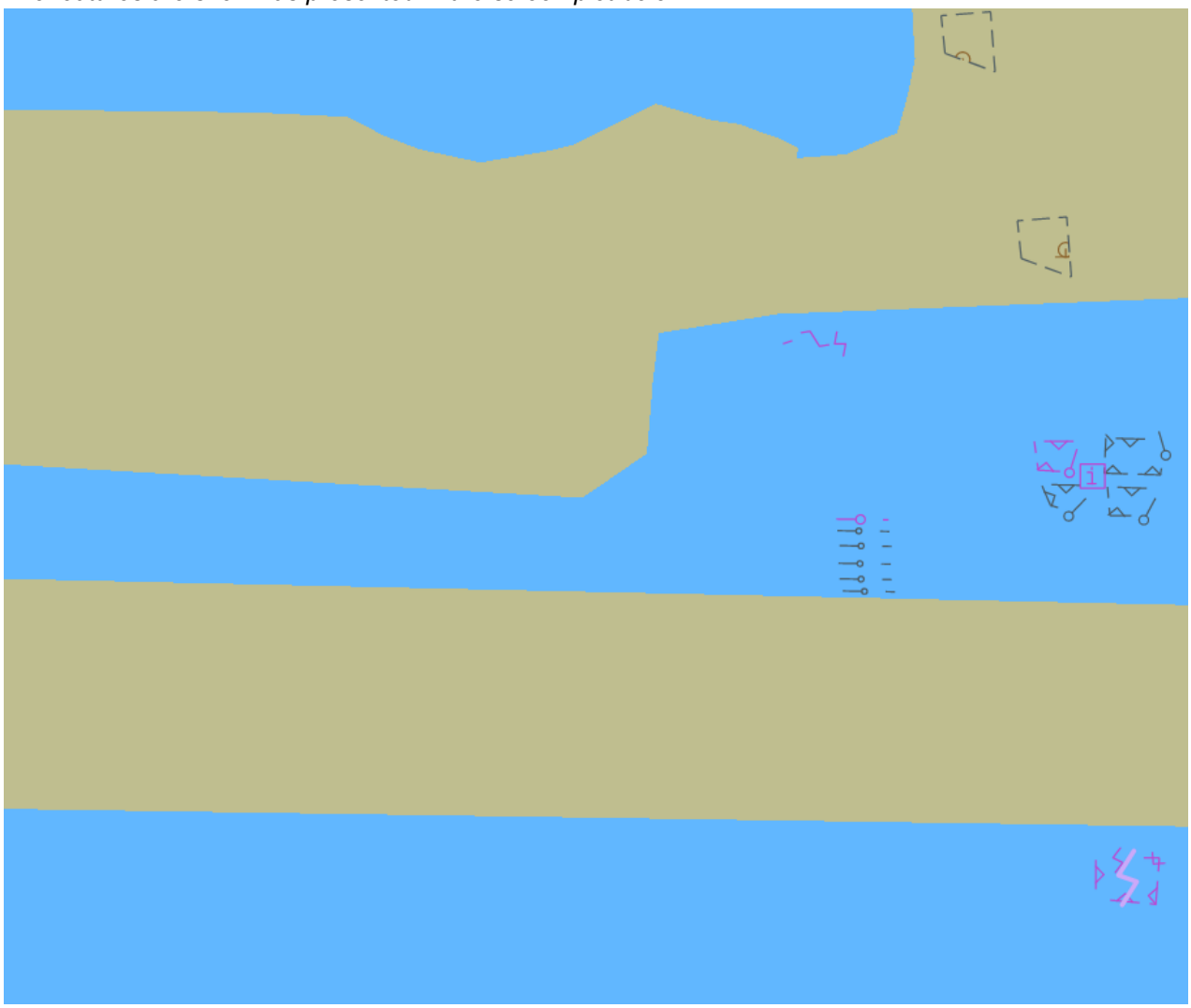
Action

*Switch off all controls and switch on only the "**Spot soundings**" control.*
Verify that the features are displayed correctly as presented in the plot.

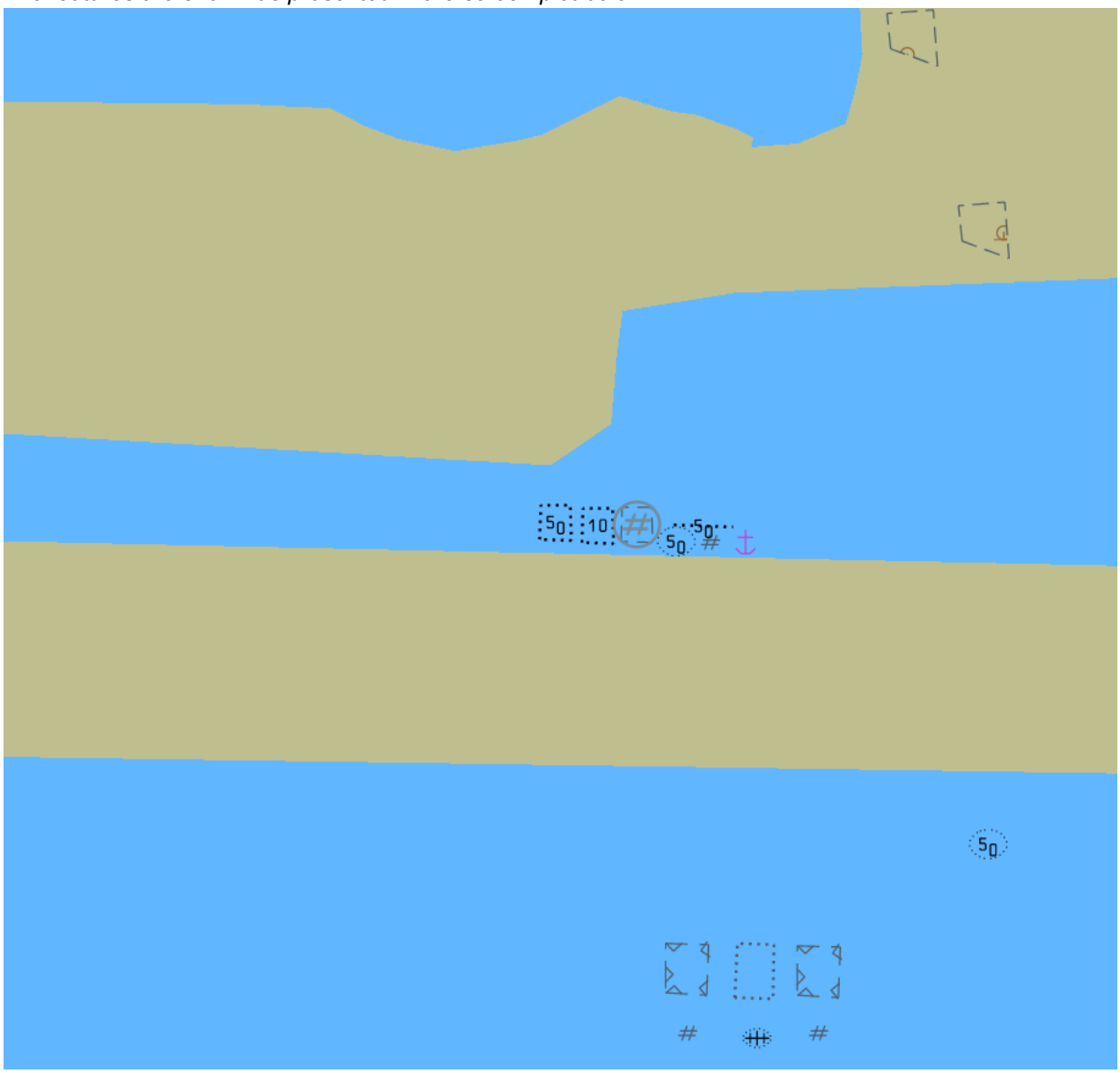
Results

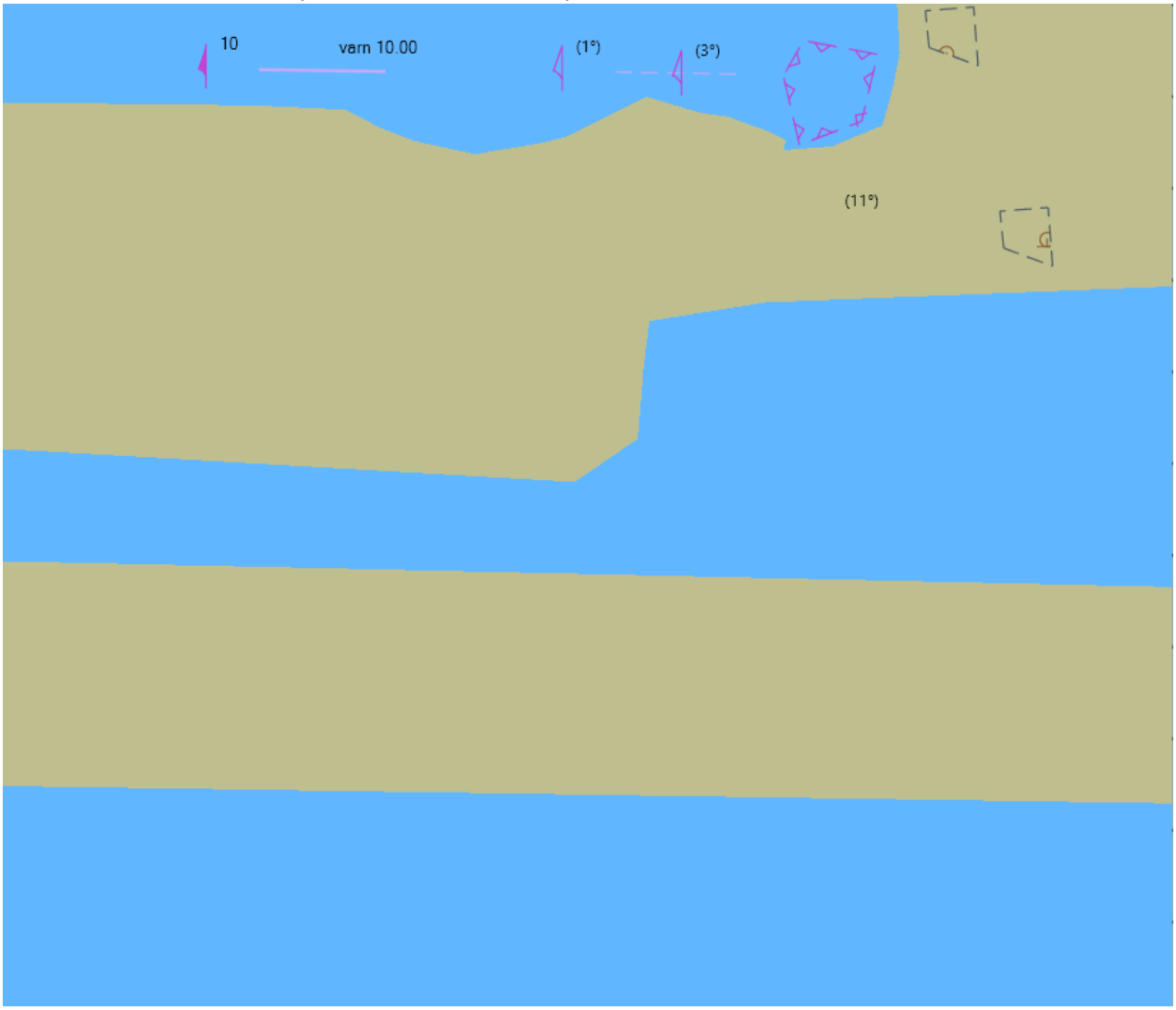
The features are shown as presented in the screen plot below (scale 1:60 000)

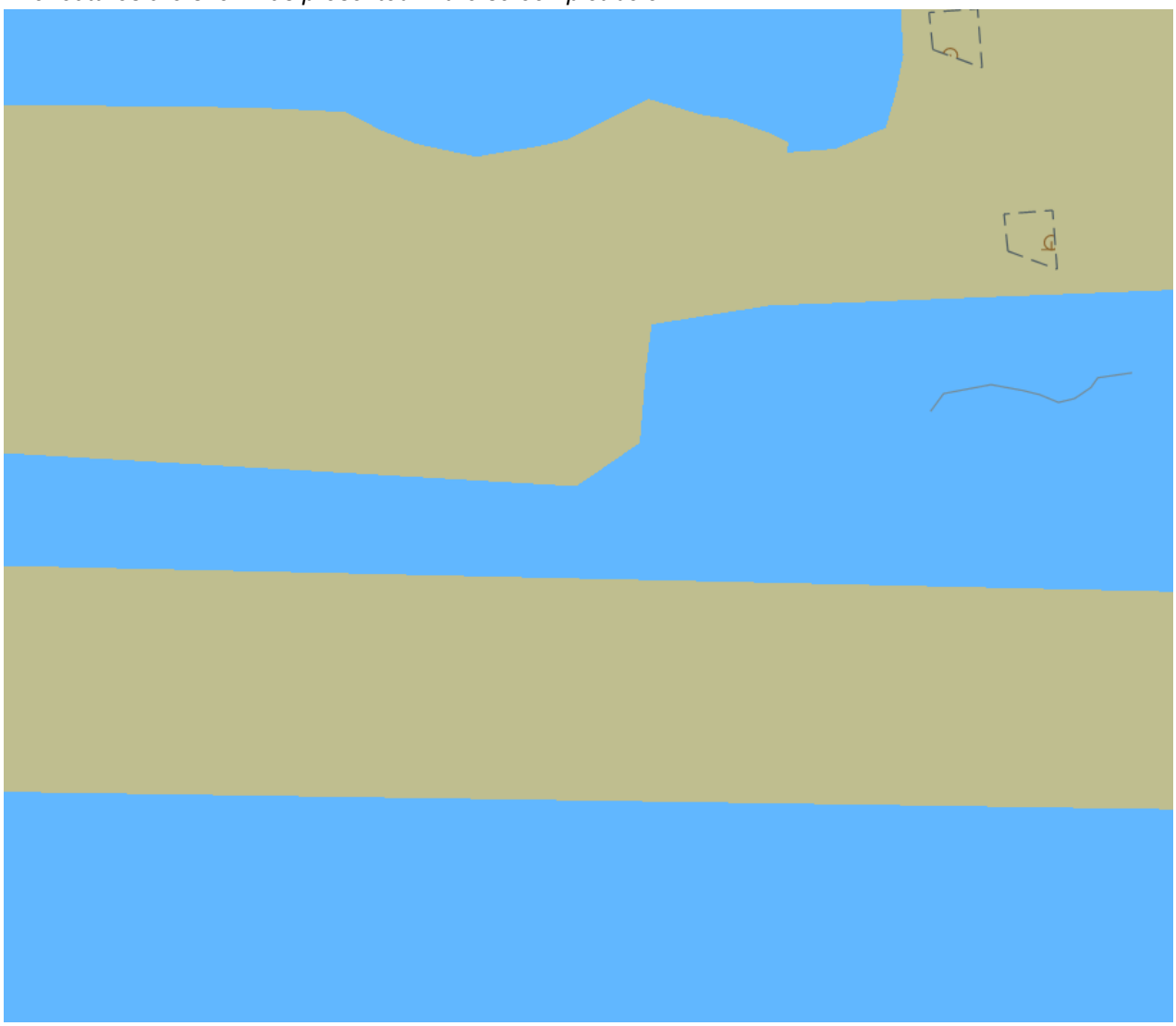


Action
*Switch off all controls and switch on only the "**Submarine cables and pipelines**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below 

Action
*Switch off all controls and switch on only the "**All isolated danger**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below



Action
*Switch off all controls and switch on only the "**Magnetic variation**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below 

Action
*Switch off all controls and switch on only the "**Depth Contours**" control.* *If provided, select optional Contour label.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below 

Action
*Switch off all controls and switch on only the "**Seabed**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below



Action
*Switch off all controls and switch on only the "**Tidal**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below 

Action
*Switch off all controls and switch on only the "**Miscellaneous**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below



3.2.6 **Text Grouping**

Test Reference	TextGrouping	**IHO Reference** **IEC Reference**	S-98 6.1.1 S-100 Part 9 S-101 Portrayal

Test Description

The purpose of the test is to verify that EUT is able to change text display settings and display text in accordance with the S-101 Portrayal Catalogue. Minimum two text display categories should be available in the EUT HMI.

Loaded Data

Exchange Set Name

DisplayOther

Display Mode		**Independent Mariner's Selections**	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour	**10 m**	Highlight date dependent	
Safety depth	**10 m**	Highlight document	
Deep Contour	**30 m**	Highlight info	
Shallow contour	**2 m**	Shallow pattern	
Four shades	Off	Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	On
Ignore scale minimum		**Other Text**	On
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		**Display**	
Start Date	N/A	Centre	
End Date	N/A	Scale	1:60 000
		Orientation	

Viewing Groups

Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

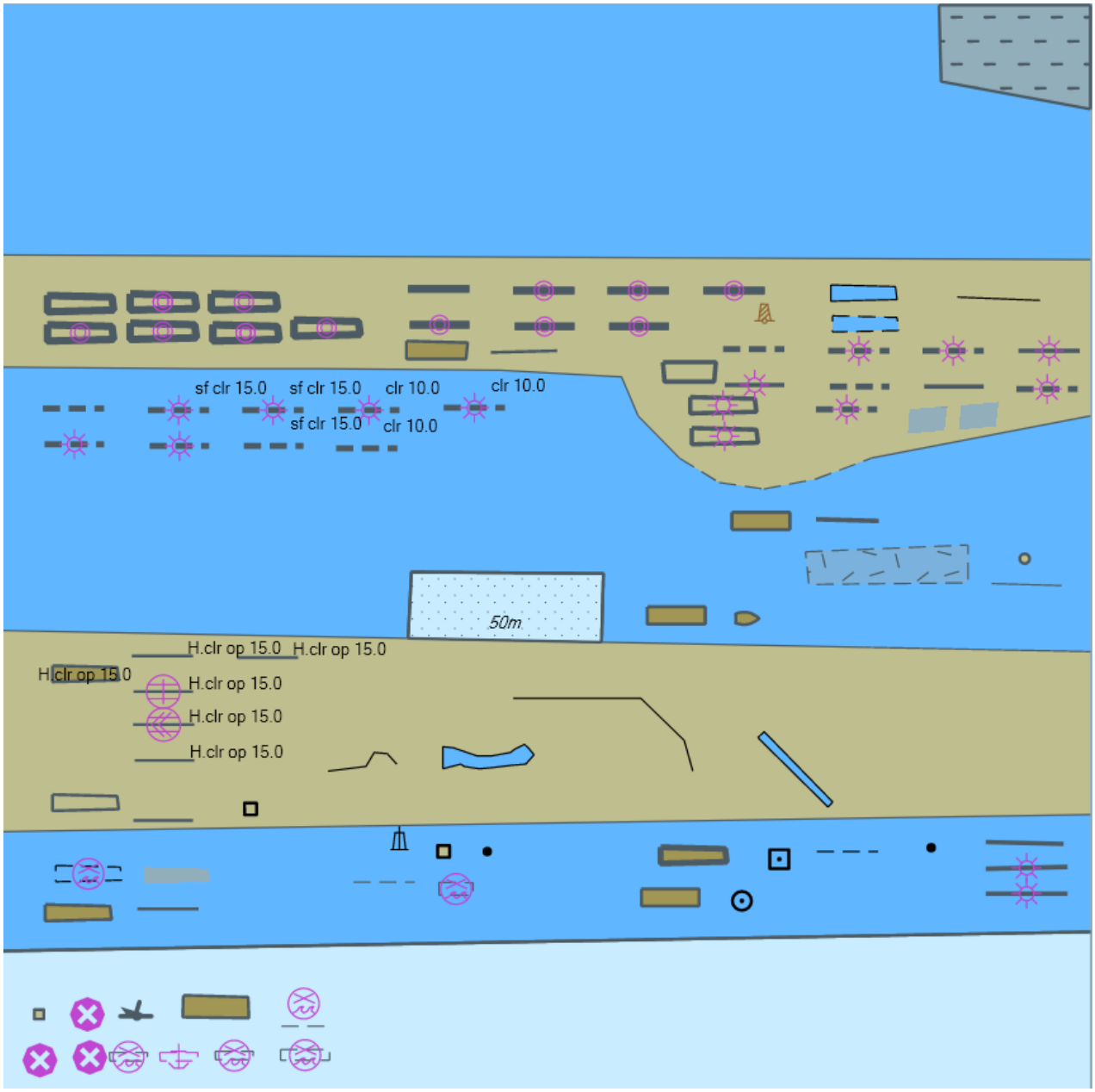
Setup

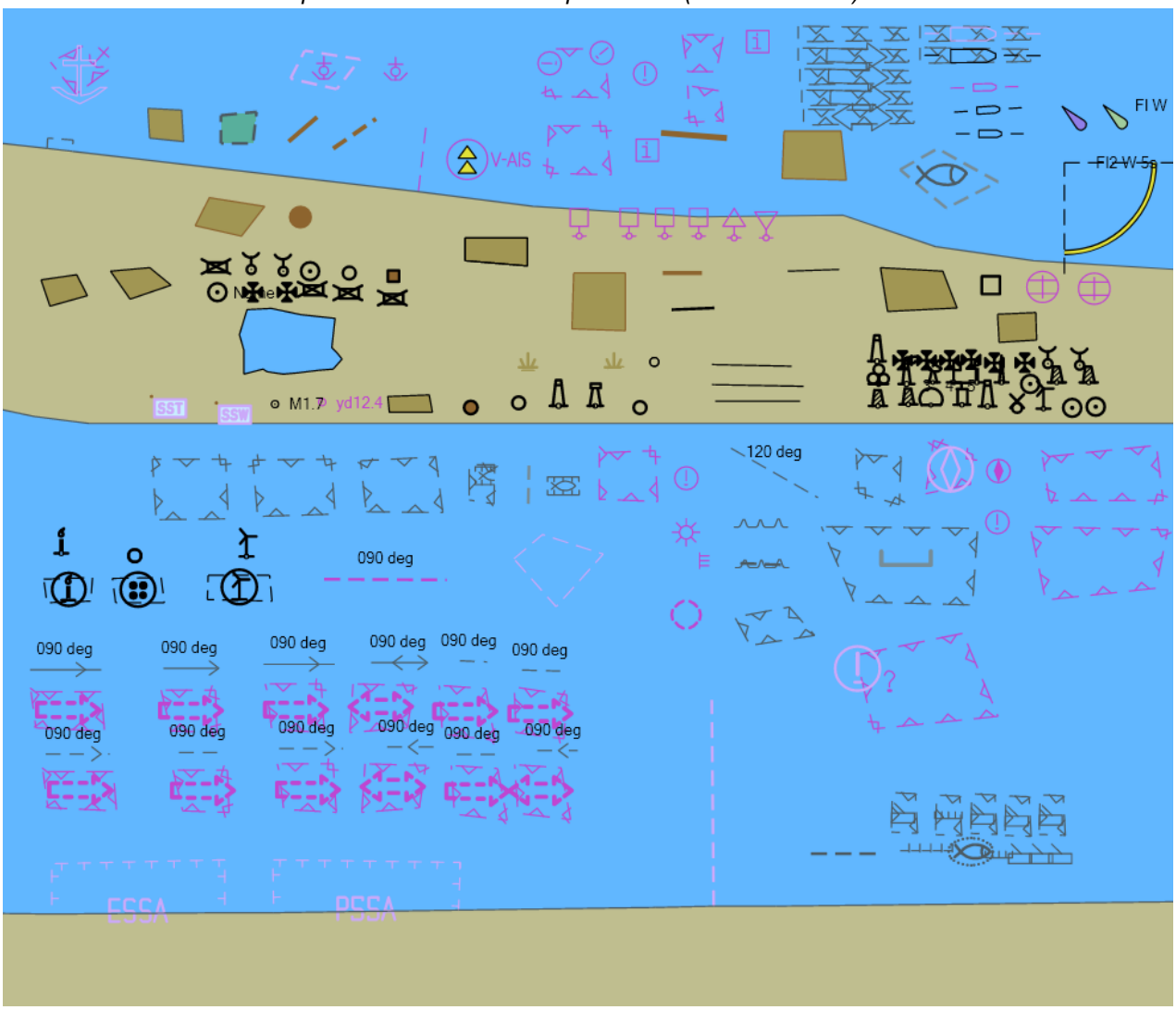
As per UpdateCatalogues (S-101 Feature and Portrayal Catalogues loaded, but all datasets removed from the System Database).

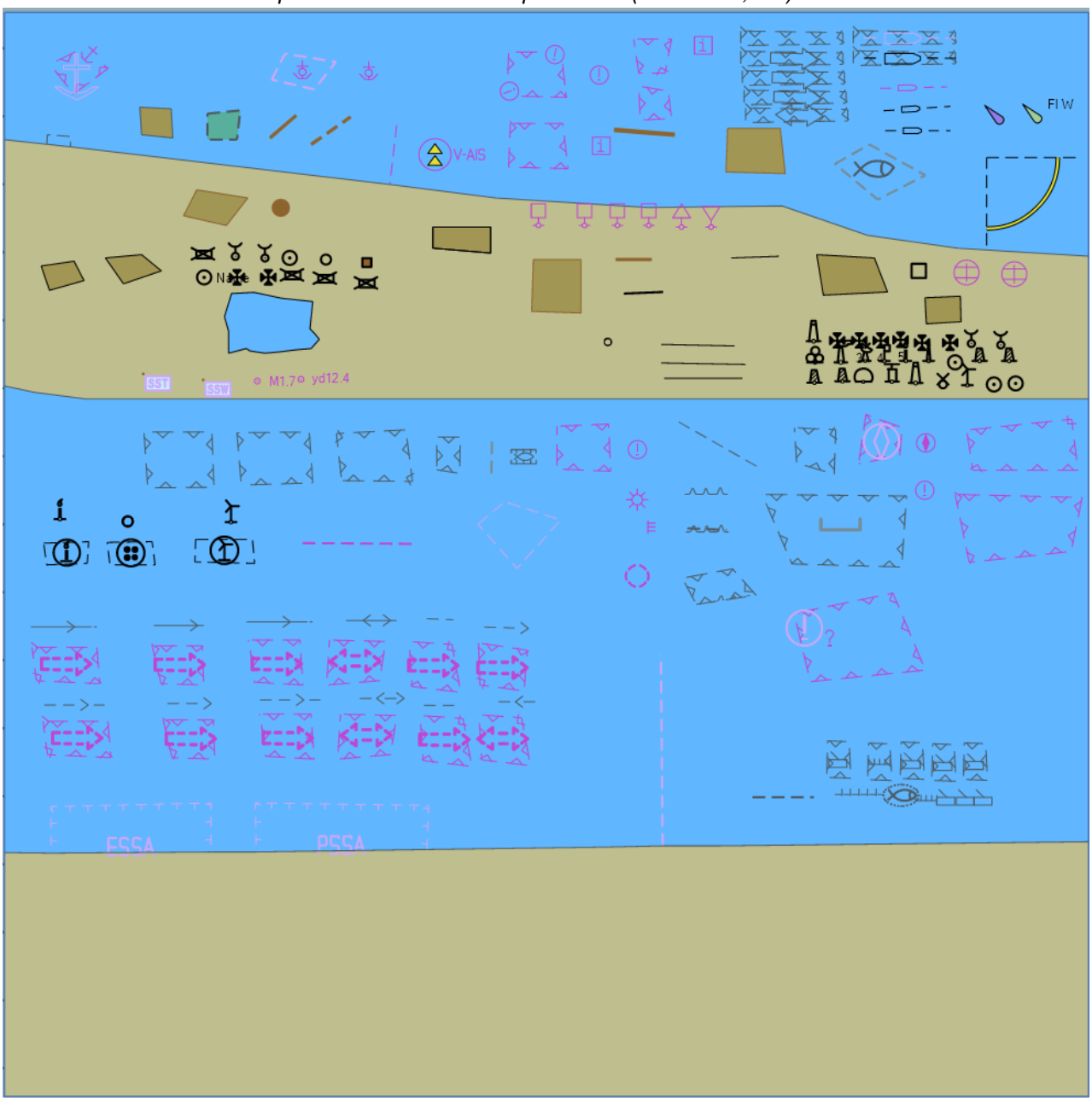
Action

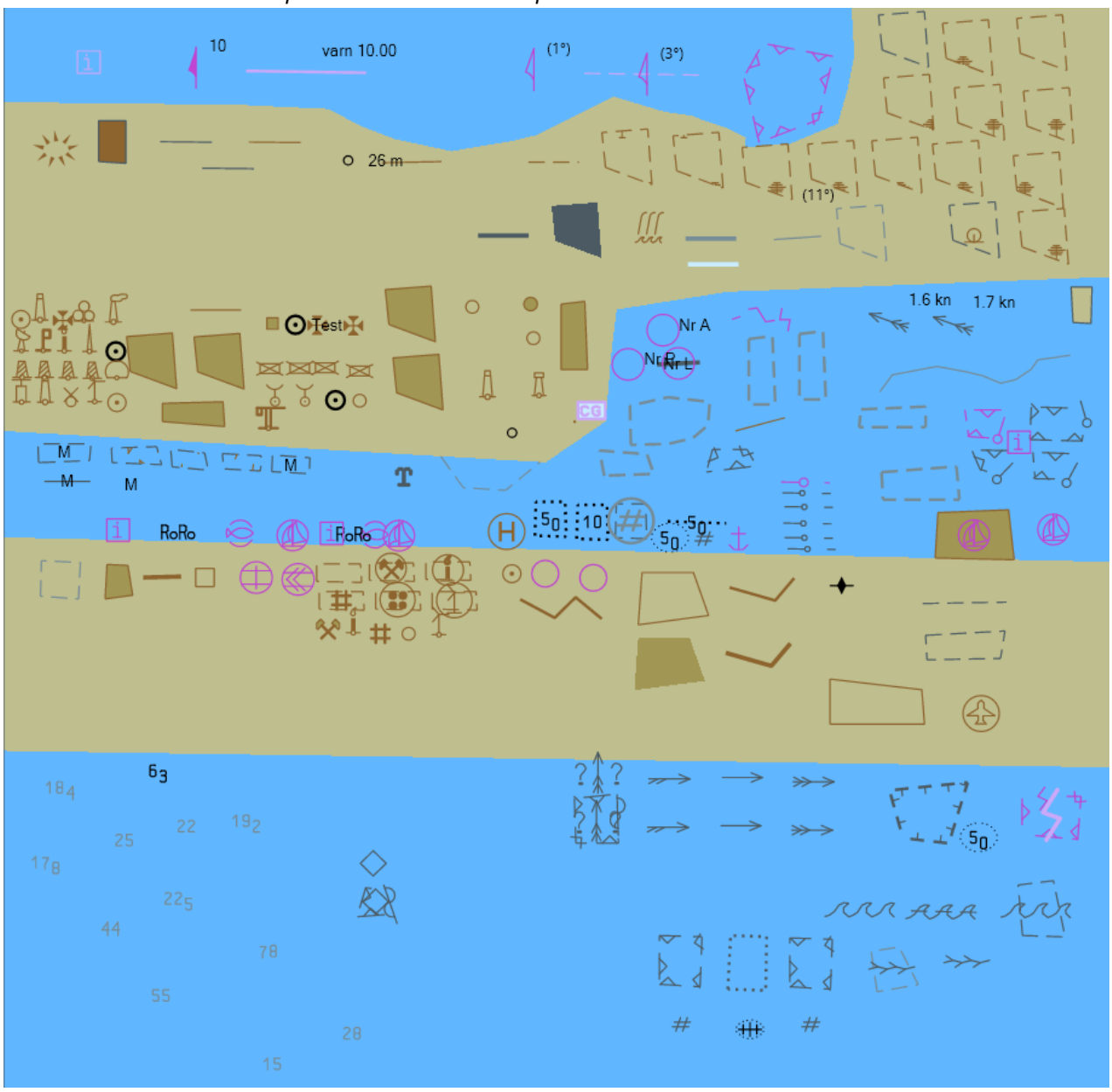
*Import the exchange sets **DisplayBase**, **DisplayStandard** and **DisplayOther;***

Check that EUT HMI contains standardized controls that can switch on and off certain features from the chart.
Results
Confirm that the following controls are available at EUT HMI under the Other Display section: • *Important Text* • *Other Text* *More text display controls may be available; however, all the additional controls should be subdivisions of one of the above controls.*

Action
View dataset 10100AA_DBASE.000 *Select Display Category Display Base* *Switch off all text group controls and switch on only the "**Important Text**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below (scale 1:60 000) 

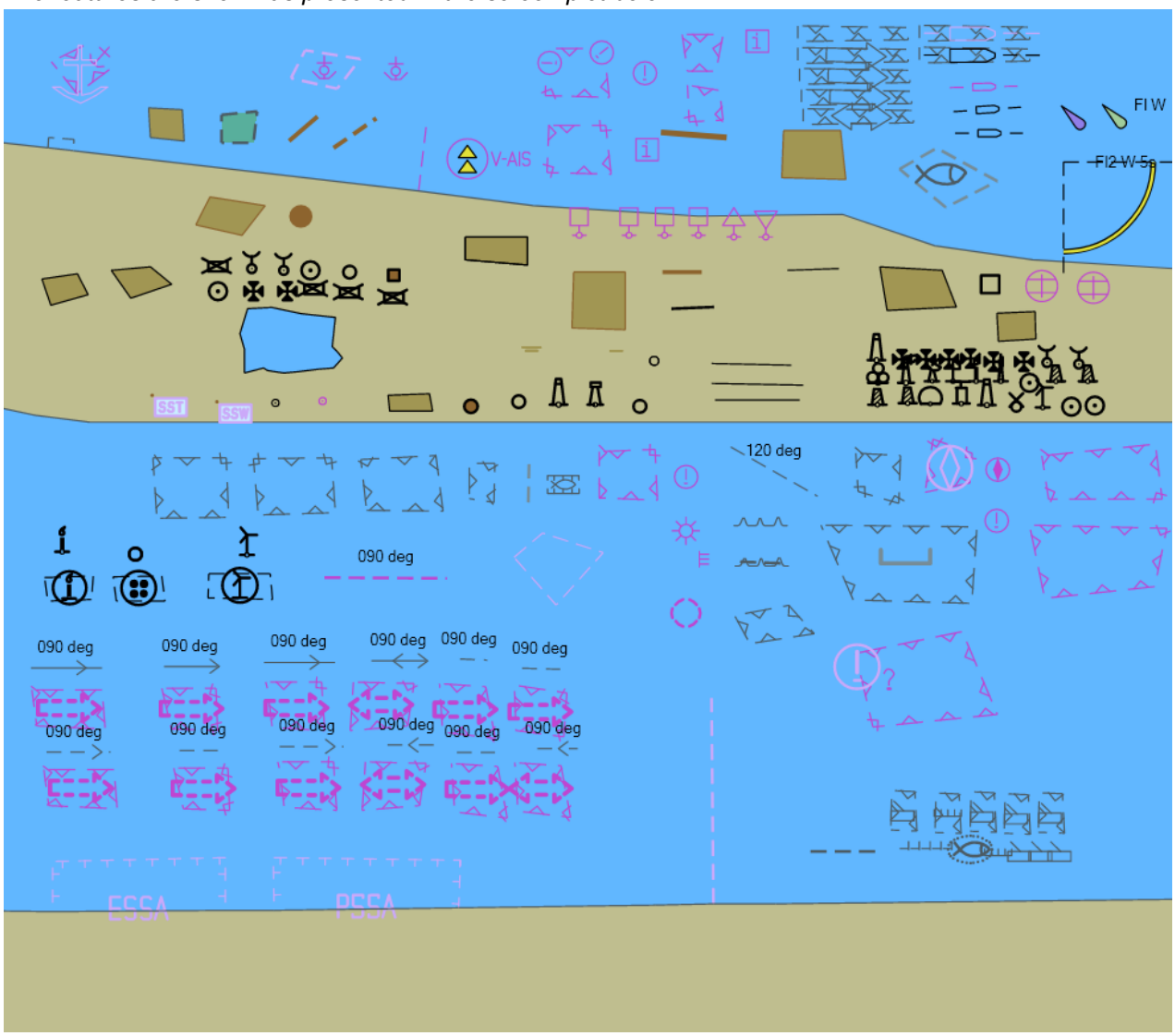
Action
View dataset 10100AA_STNDR.000 *Select Display Category Standard* *Switch off all text group controls and switch on only the "**Important Text**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below (scale 1:70 000) 

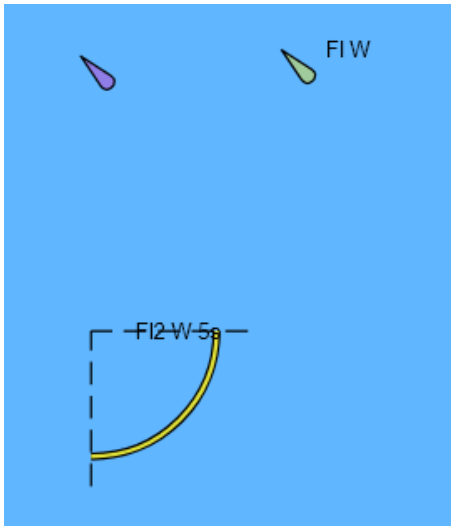
Action
View dataset 10100AA_STNDR.000 *Select Display Category Other* *Switch off all text group controls and switch on only the "**Other Text**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below (scale 1:60,000) 

Action
View dataset 10100AA_OTHER.000 *Select Display Category Other* *Switch off all text group controls and switch on only the "**Other Text**" control.* *Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below 

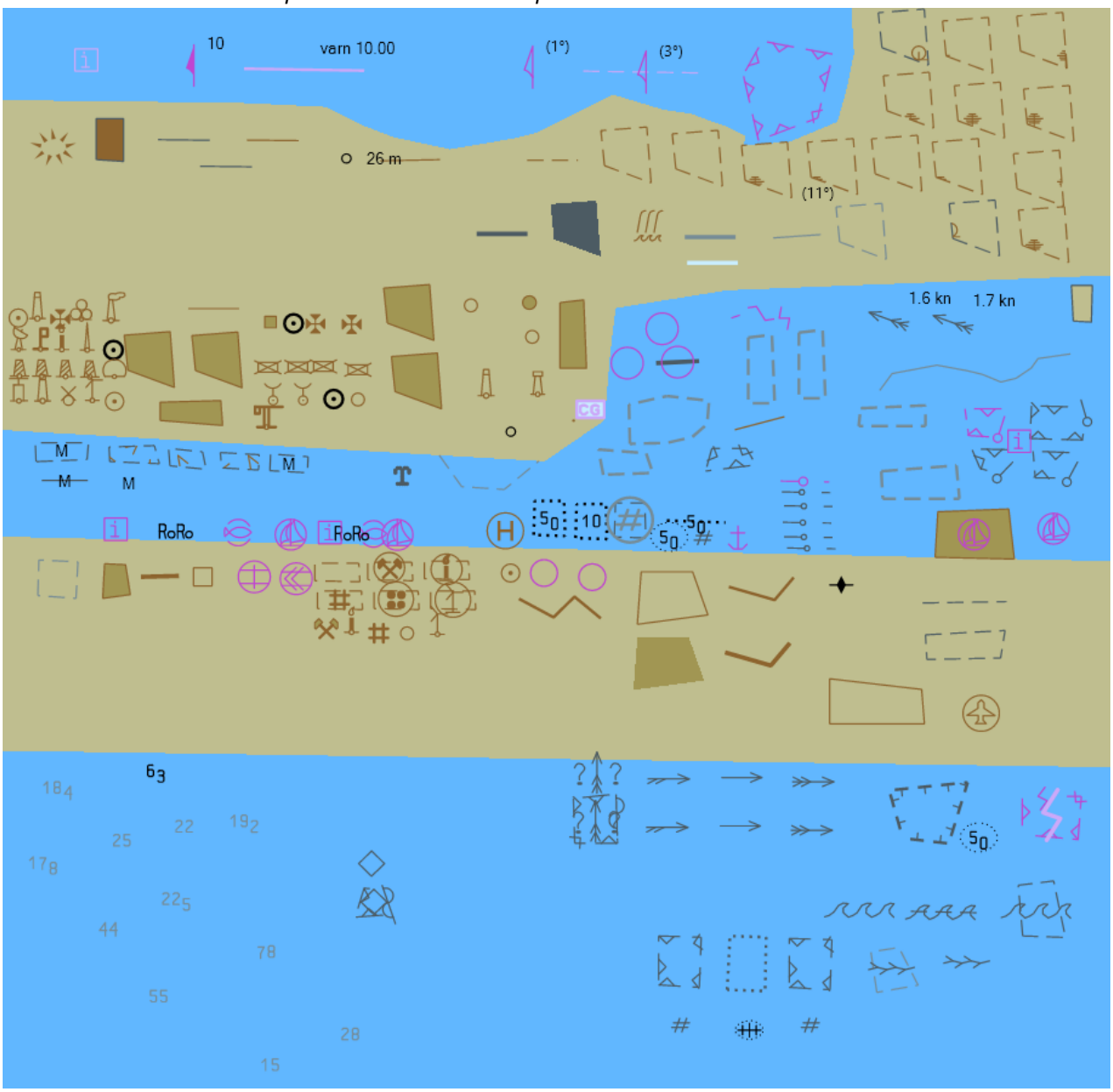
Action
View dataset 10100AA_OTHER.000 *Select Display Category Other* *Switch off all text group controls and switch on only the "**Names**" control located under the "**Other Text**" control. Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below 

Action
View dataset 10100AA_STNDR.000 *Switch off all text group controls and switch on only the "**Light description**" control located under the "**Other Text**" control. Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below





North_East part of above dataset at scale 1:20 000

Action
View dataset 10100AA_OTHER.000 *Switch off all text group controls and switch on only the "**All other**" control located under the "**Other Text**" control. Verify that the features are displayed correctly as presented in the plot.*
Results
The features are shown as presented in the screen plot below 

3.3 Invalid Features

3.3.1 Display of Invalid Features

Test Reference	InvalidFeaturesA	IHO Reference	S-98 6.1.1 S-100 Part 9 S-101 Portrayal
Test Description			
This test ensures EUT supports the display of features with unrecognised feature class or the display of features for which available or not available attribute(s) causes special presentation.			
Loaded Data			
Exchange Set Name			

InvalidFeatures	

Display Mode	
Other	
Context Parameters	
Safety contour	**0 m**
Safety depth	**0 m**
Deep Contour	**30 m**
Shallow contour	**0 m**
Four shades	Off
Radar overlay	Off
Plain boundaries	Off
Simplified symbols	Off
Full light lines	Off
Ignore scale minimum	Off
Shallow water dangers	Off
Palette	
Day	

Independent Mariner's Selections	
Accuracy	Off
Contour label	Off
Highlight date dependent	Off
Highlight document	Off
Highlight info	Off
Shallow pattern	Off
Unknown	Off
Update review	Off
Text Groups	
Chart Text	Off
Important text	Off
Other Text	
Names	Off
Light description	Off
All other chart text	Off

Date Dependent Objects	
Start Date	N/A
End Date	N/A

Display	
Centre	
Scale	1:50000
Orientation	

Viewing Groups

Standard Display	
Drying lines	Off
Buoys. Beacons, aids to navigation	**On**
Buoys, beacons, structures	**On**
Lights	**On**
Boundaries and limits	**On**
Prohibited and restricted areas	**On**
Chart scale boundaries	Off
Cautionary notes	**On**
Ships' routeing systems and ferry routes	Off
Archipelagic sea lanes	Off
Miscellaneous (Standard)	Off
Chart (Standard)	Off
Alert Highlights (Standard)	Off

Other	
Spot soundings	**On**
Submarine cables and pipelines	**On**
All isolated dangers	**On**
Magnetic variation	Off
Depth contours	Off
Seabed	Off
Tidal	Off
Miscellaneous (Other)	Off

Setup

As per UpdateCatalogues (S-101 Feature and Portrayal Catalogues loaded, but all datasets removed from the System Database).

Action

*Import the exchange set **InvalidFeatures** (dataset 10100AA_INVFE.000);*

Results

Confirm that the symbol SY(QUESMRK1) is displayed as below for following cases:
a) unknown feature class, point geometry
b) unknown feature class, line geometry
c) unknown feature class, area geometry
d) known feature class for which missing attribute causes presentation of additional symbol SY(QUESMRK1)

Test Reference	InvalidFeaturesB	**IHO Reference**	S-98 6.1.1 S-100 Part 9 S-101 Portrayal

		IEC Reference	

Test Description

Display of features with unrecognised feature class or display of features for which available or not available attribute(s) causes special presentation.

Loaded Data

Exchange Set Name

InvalidFeatures

Display Mode		Independent Mariner's Selections (Default=On)	
Standard		Accuracy	
Context Parameters		Contour label	
Safety contour	**0 m**	Highlight date dependent	
Safety depth	**0 m**	Highlight document	
Deep Contour	**30 m**	Highlight info	
Shallow contour	**0 m**	Shallow pattern	
Four shades	Off	Unknown	
Radar overlay	Off	Update review	
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	
Full light lines	Off	Important text	
Ignore scale minimum	Off	**Other Text**	
Shallow water dangers	Off	Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:10000
		Orientation	

Viewing Groups

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional

Setup

Load the following exchange sets

- ***InvalidFeatures*** *(10100AA_X01NE.000)*
- ***PowerUp (****10100AA_X0000.000)*

Action
View dataset at scale 1:10 000
Results
Confirm that all features display as shown in the following screenshot

3.3.2 **Invalid Features Pick Report Display**

Test Reference	InvalidFeaturesPickA	**IHO Reference**	S-98 6.1.1 S-100 Part 9 S-101 Portrayal
Test description			
This test ensures the EUT display pick report information for features with unknown feature class.			
Setup			
As for test InvalidFeaturesA			
Action			
1. Select the following features: *a)* 39° 29.000’ N 104° 44.000’ W *b)* 39° 29.000’ N 104° 42.500’ W *c)* 39° 29.000’ N 104° 40.500’ W *2. Remove pick report information from display.*			
Results			
1. Pick report associated with chart feature is displayed only when feature is selected. *1a. First example has 2 attributes (Orientation is 45.0 deg; Information is Wreck).* *1b. Second example has 1 attribute (Information is danger line).* *1c. Third example has 1 attribute (Information is See regulation “Jussland fishing act” paragraph 42).* *2. Pick report associated with chart feature is removed from the display.*			

Test Reference	InvalidFeaturesPickB	**IHO Reference**	S-98 6.1.1 S-100 Part 9 S-101 Portrayal
Test description			
Display of pick report information for features with unknown feature class.			
Setup			
As for InvalidFeaturesB.			
Action			
1. Select the following feature 32°30.924’S, 60°58.719’E *2. Remove pick report information from display.*			
Results			
1a. Pick report associated with chart feature is displayed only when feature is selected. *1b. This example has no attributes. Only unknown feature and its position is available in the pick report.* *2. Pick report associated with chart feature is removed from the display.*			

Test Reference	InvalidFeaturesPickC	IHO Reference	S-98 6.1.1 S-100 Part 9 S-101 Portrayal
Test description			
Display of pick report information for known features which have unknown attribute(s).			
Setup			
As for InvalidFeaturesA.			
Action			
1. Select the following features: - 39° 27.000’ N 104° 44.000’ W - 39° 27.000’ N 104° 42.500’ W - 39° 27.000’ N 104° 40.500’ W *2. Remove pick report information from display.*			
Results			
1a. Pick report associated with chart feature is displayed only when feature is selected. *1b. First example is a wreck and it has 1 unknown attribute and 1 known attributes (Water level effect is Covers and uncovers).* *1c. Second example is an obstruction and it has 1 unknown attribute and 1 known attribute (Value of sounding has no value).* *1d. Third example is a restricted area and it has 1 unknown attribute* *2. Pick report associated with chart feature is removed from the display.*			

Test Reference	InvalidFeaturesPickD 3.2.2 d)	IHO Reference	S-98 6.1.1 S-100 Part 9 S-101 Portrayal
Test description			
Display of pick report information for known features for which available or not available attribute(s) cause special presentation.			
Setup			
As for InvalidFeaturesB.			
Action			
1. Select the following features: *- 32°31.737’S, 60°59.153’E* *- 32°31.379’S, 60°59.084’E* *- 32°31.383’S, 60°59.193’E* *- 32°31.472’S, 60°59.364’E* *- 32°31.511’S, 60°59.452’E* *- 32°31.646’S, 60°59.800’E* *2. Remove pick report information from display.*			
Results			
1a. Pick report associated with chart feature is displayed only when feature is selected. *1b. First example is a buoy and it has 2 known attributes (Category of special purpose mark is target mark; Colour is yellow)* *1c. Second example is a beacon and attribute Beacon shape has no value* *1d. Third example is a beacon and attribute Beacon shape has no value* *1e. Fourth example is a beacon and attribute Beacon shape has no value* *1f. Fifth example is a beacon and attribute Beacon shape has no value* *1g. Sixth example is a beacon and attribute Beacon shape has no value* *2. Pick report associated with chart feature is removed from the display.*			

3.4 Independent Mariner Selections

3.4.1 Portrayal of simplified point symbols

Test Reference	SimplifiedSymbolsFalse	**IHO Reference**	S-98 6.1.1 S-100 Part 9 S-101 Portrayal

Test Description
This test ensures EUT supports the display of features with simplified symbols turned off.

Setup	
Exchange Set Name	
Settings	

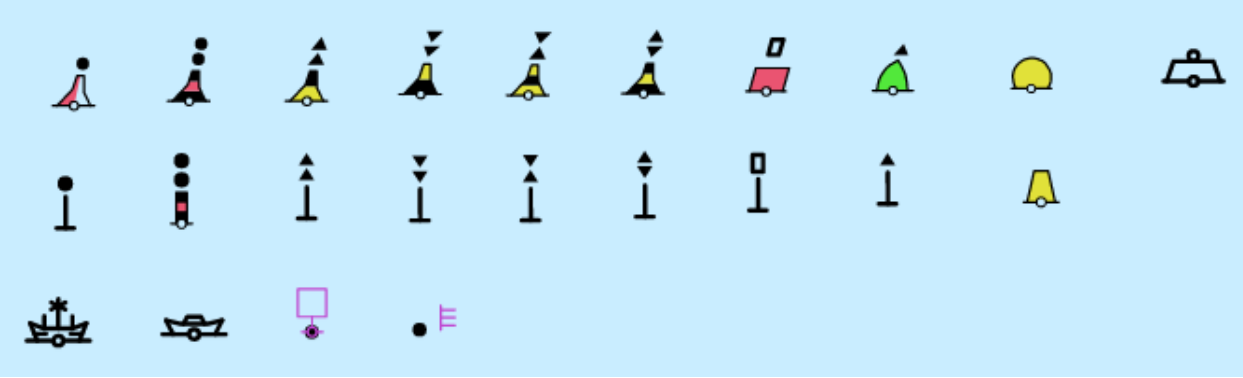
Display Mode		**Independent Mariner's Selections**	
Standard		Accuracy	Off
Context Parameters		Contour label	Off
Safety contour	**10 m**	Highlight date dependent	Off
Safety depth	**10 m**	Highlight document	Off
Deep Contour	**30 m**	Highlight info	Off
Shallow contour	**2 m**	Shallow pattern	Off
Four shades	Off	Unknown	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	Off
Full light lines	Off	Important text	Off
Ignore scale minimum	**On**	**Other Text**	
Shallow water dangers	Off	Names	Off
Palette		Light description	Off
Day		All other chart text	Off

Date Dependent Objects		**Display**	
Start Date		Centre	*32° 37.280' S 61° 21 .000' E*
End Date		Scale	1:10000
		Orientation	

Viewing Groups			
Standard Display		**Other**	
Drying lines	Off	Spot soundings	Off
Buoys. Beacons, aids to navigation	**On**	Submarine cables and pipelines	Off
Buoys, beacons, structures	**On**	All isolated dangers	Off
Lights	**On**	Magnetic variation	Off
Boundaries and limits	Off	Depth contours	Off
Prohibited and restricted areas	Off	Seabed	Off
Chart scale boundaries	Off	Tidal	Off
Cautionary notes	Off	Miscellaneous (Other)	Off
Ships' routeing systems and ferry routes	Off		
Archipelagic sea lanes	Off		
Miscellaneous (Standard)	Off		
Chart (Standard)	Off		
Alert Highlights (Standard)	Off		

Setup
*As per **UpdateCatalogues**.*

Action
*Import the exchange set **Settings.***
View the features at scale and position indicated.
Results
Confirm that the features display as follows:



Test Reference	SimplifiedSymbolsTrue	**IHO Reference**	S-98 6.1.1 S-100 Part 9 S-101 Portrayal

Test Description
This test ensures EUT supports the display of features with simplified symbols.

Setup	
Exchange Set Name	
Settings	

Display Mode		**Independent Mariner's Selections**	
Other		Accuracy	Off
Context Parameters		Contour label	Off
Safety contour	**10 m**	Highlight date dependent	Off
Safety depth	**10 m**	Highlight document	Off
Deep Contour	**30 m**	Highlight info	Off
Shallow contour	**2 m**	Shallow pattern	Off
Four shades	Off	Unknown	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	Off
Full light lines	Off	Important text	Off
Ignore scale minimum	**On**	**Other Text**	
Shallow water dangers	Off	Names	Off
Palette		Light description	Off
Day		All other chart text	Off

Date Dependent Objects		**Display**	
Start Date		Centre	*32° 37.280' S 61° 21 .000' E*
End Date		Scale	1:10000
		Orientation	

Viewing Groups			
Standard Display		**Other**	
Drying lines	Off	Spot soundings	Off
Buoys. Beacons, aids to navigation	**On**	Submarine cables and pipelines	Off

Buoys, beacons, structures	**On**	All isolated dangers	Off
Lights	**On**	Magnetic variation	Off
Boundaries and limits	Off	Depth contours	Off
Prohibited and restricted areas	Off	Seabed	Off
Chart scale boundaries	Off	Tidal	Off
Cautionary notes	Off	Miscellaneous (Other)	Off
Ships' routeing systems and ferry routes	Off		
Archipelagic sea lanes	Off		
Miscellaneous (Standard)	Off		
Chart (Standard)	Off		
Alert Highlights (Standard)	Off		

Setup

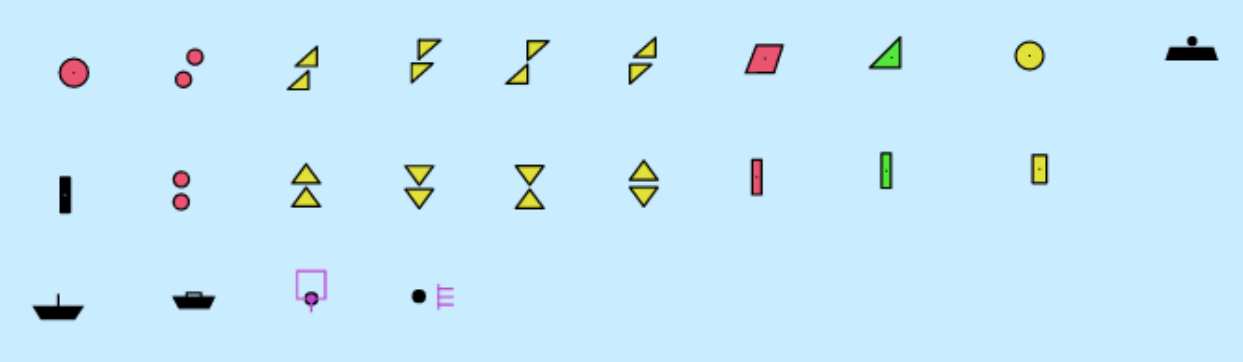
As for test SimplifiedSymbolsFalse.

Action

Select Simplified symbols = true
View the features at scale and position indicated.

Results

Confirm that the features display as follows:



3.4.2 **Symbolized and plain boundaries**

Test Reference	PlainBoundaries	**IHO Reference**	S-98 6.1.1 S-100 Part 9 S-101 Portrayal

Test Description

Display of features with plain boundaries.

Setup

Exchange Set Name	
Settings	

Display Mode		**Independent Mariner's Selections**	
Other		Accuracy	Off
Context Parameters		Contour label	Off
Safety contour	**10 m**	Highlight date dependent	Off
Safety depth	**10 m**	Highlight document	Off
Deep Contour	**30 m**	Highlight info	Off
Shallow contour	**2 m**	Shallow pattern	Off
Four shades	Off	Unknown	Off
Radar overlay	Off	Update review	Off
Plain boundaries	**On**	**Text Groups**	
Simplified symbols	Off	Chart Text	Off
Full light lines	Off	Important text	Off
Ignore scale minimum	**On**	**Other Text**	
Shallow water dangers	Off	Names	Off

Palette		Light description	Off
Day		All other chart text	**On**
Date Dependent Objects		**Display**	
Start Date		Centre	
End Date		Scale	1:10000
		Orientation	

Viewing Groups			
Standard Display		**Other**	
Drying lines	Off	Spot soundings	**On**
Buoys. Beacons, aids to navigation	**On**	Submarine cables and pipelines	**On**
Buoys, beacons, structures	**On**	All isolated dangers	**On**
Lights	Off	Magnetic variation	**On**
Boundaries and limits	**On**	Depth contours	**On**
Prohibited and restricted areas	**On**	Seabed	**On**
Chart scale boundaries	Off	Tidal	**On**
Cautionary notes	**On**	Miscellaneous (Other)	**On**
Ships' routeing systems and ferry routes	Off		
Archipelagic sea lanes	Off		
Miscellaneous (Standard)	**On**		
Chart (Standard)	Off		
Alert Highlights (Standard)	Off		

Setup

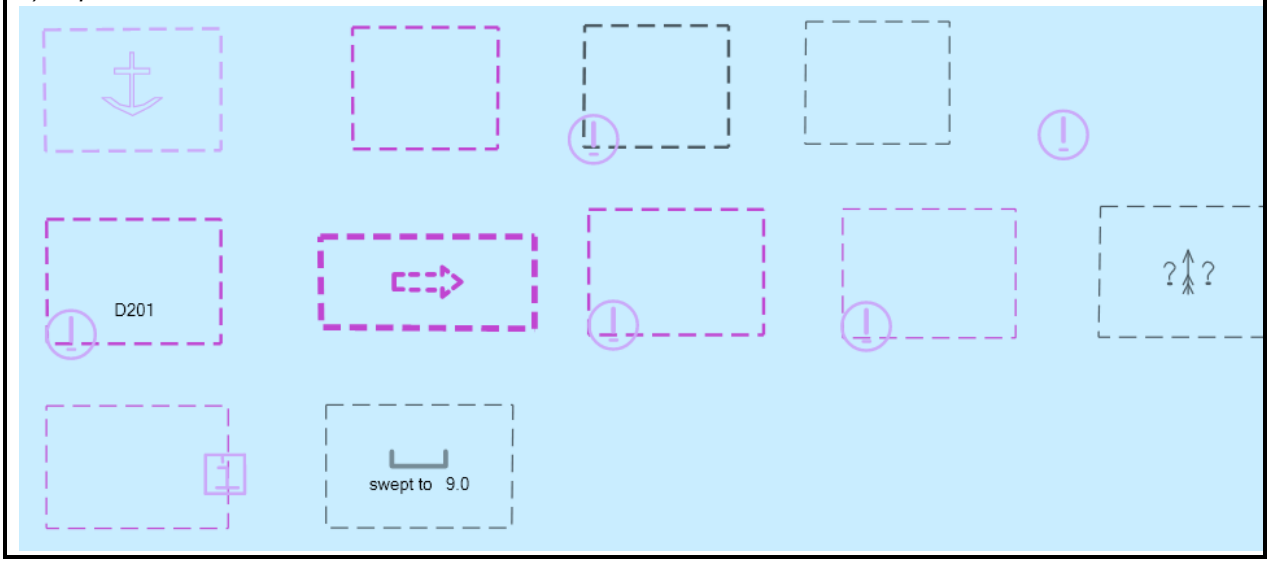
As per SimplifiesSymbolsTrue.

Action

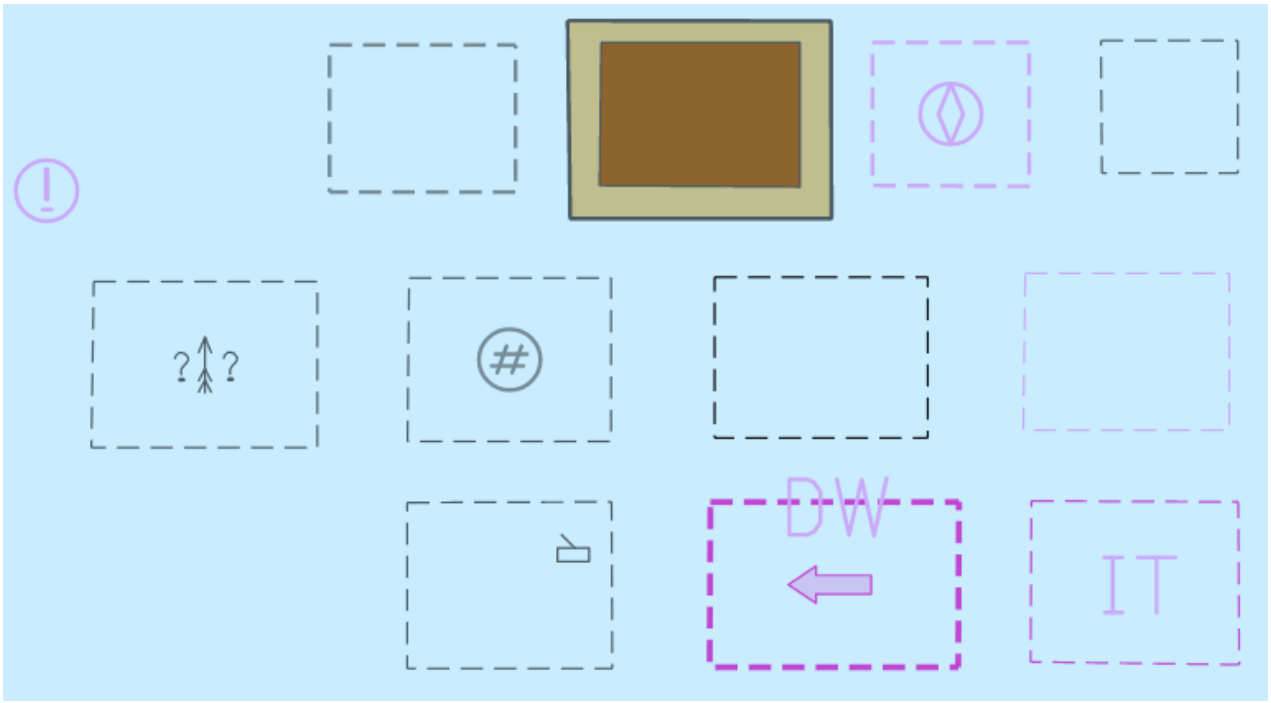
Zoom into 1:5 000 and view the features at position
1) 32°36.900'S 61°20.840'E
2) 32°36.900'S 61°21.400'E
3) 32°36.900'S 61°21.950'E

Results

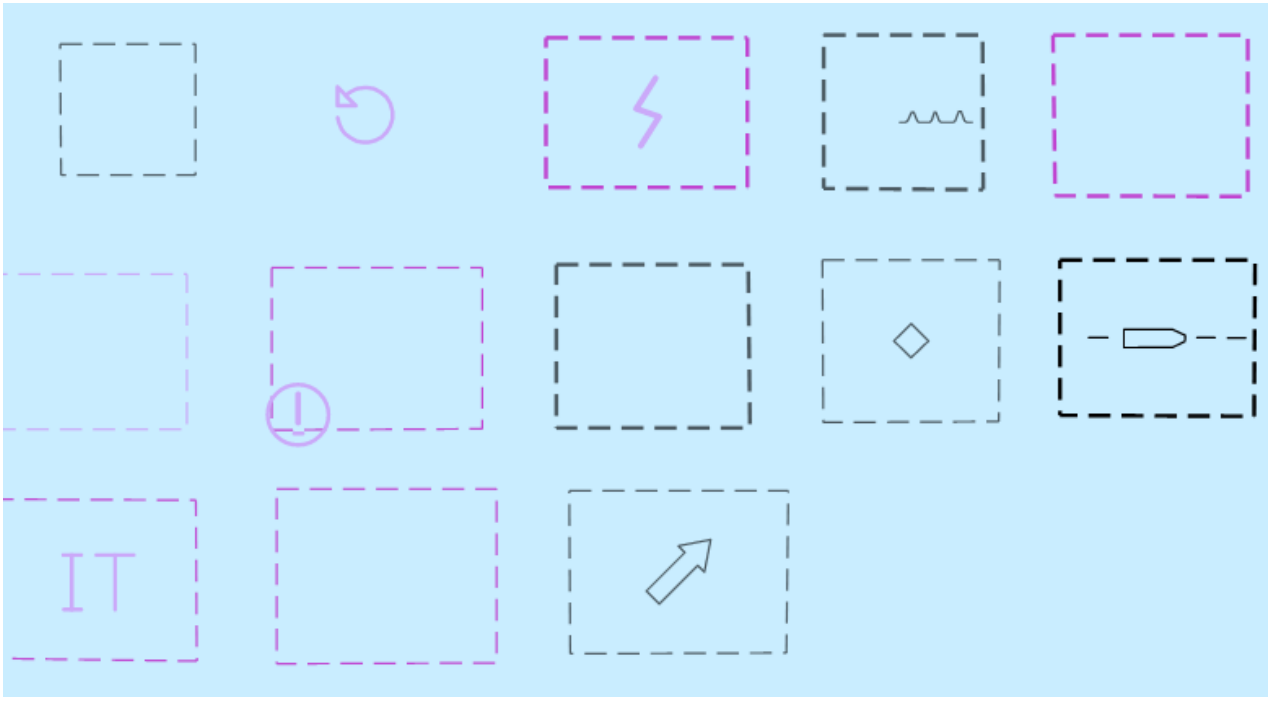
Confirm that the features display as follows:
1) at position 32°36.900'S 61°20.840'E:



2) at position 32°36.900'S 61°21.400'E:



3) at position 32°36.900'S 61°21.950'E:



Test Reference	Symbolisedboundaries	IHO Reference	S-98 6.1.1 S-100 Part 9 S-101 Portrayal

Test Description	
Display of features with symbolised boundaries	
Setup	
Exchange Set Name	
Settings	

Display Mode		Independent Mariner's Selections (Default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour	**10 m**	Highlight date dependent	
Safety depth	**10 m**	Highlight document	
Deep Contour	**30 m**	Highlight info	
Shallow contour	**2 m**	Shallow pattern	
Four shades	Off	Unknown	
Radar overlay	Off	Update review	
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	On
Full light lines	Off	Important text	
Ignore scale minimum	**On**	**Other Text**	On
Shallow water dangers	Off	Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:10000
		Orientation	

Viewing Groups			
Standard Display		**Other**	
Drying lines	Off	Spot soundings	
Buoys. Beacons, aids to navigation	**On**	Submarine cables and pipelines	
Buoys, beacons, structures	**On**	All isolated dangers	
Lights	Off	Magnetic variation	
Boundaries and limits	**On**	Depth contours	
Prohibited and restricted areas	**On**	Seabed	
Chart scale boundaries	Off	Tidal	
Cautionary notes	**On**	Miscellaneous (Other)	
Ships' routeing systems and ferry routes	Off		
Archipelagic sea lanes	Off		
Miscellaneous (Standard)	**On**		
Chart (Standard)	Off		
Alert Highlights (Standard)	Off		
Additional			
Setup			

*As for test **PlainBoundaries***

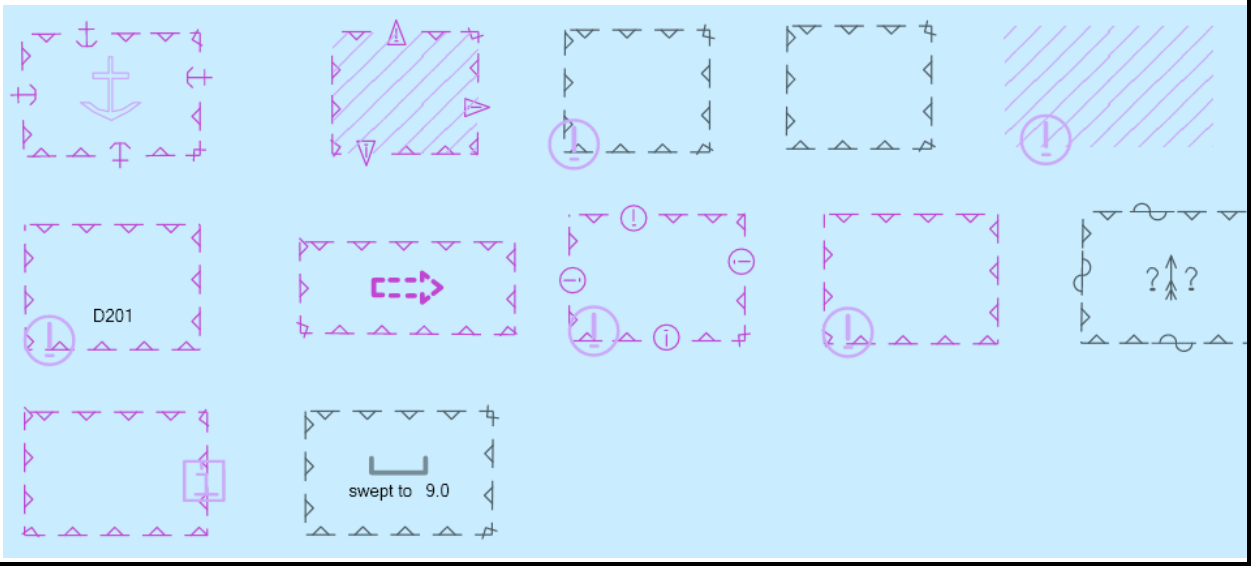
Action

Select Symbolised Boundaries
Zoom into 1:5 000 and view the features at position:
1) 32°36.900'S 61°20.840'E
2) 32°36.900'S 61°21.400'E
3) 32°36.900'S 61°21.950'E

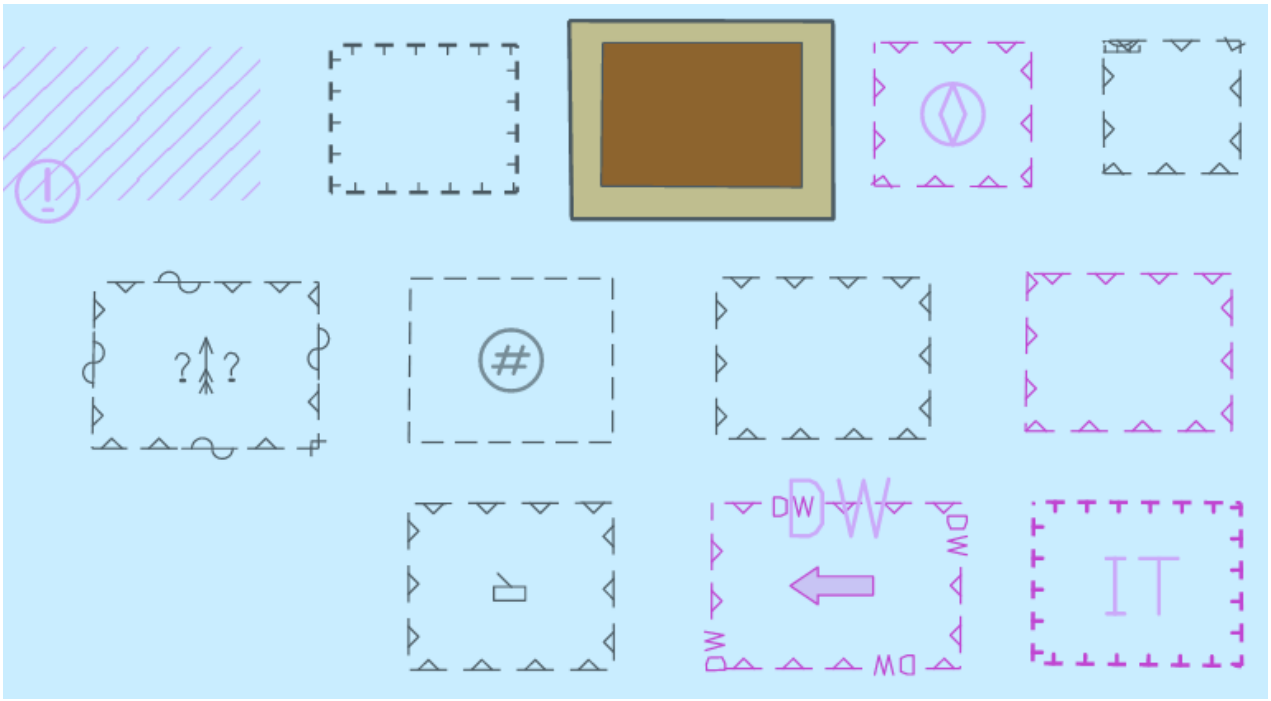
Results

Confirm that the features display as follows:

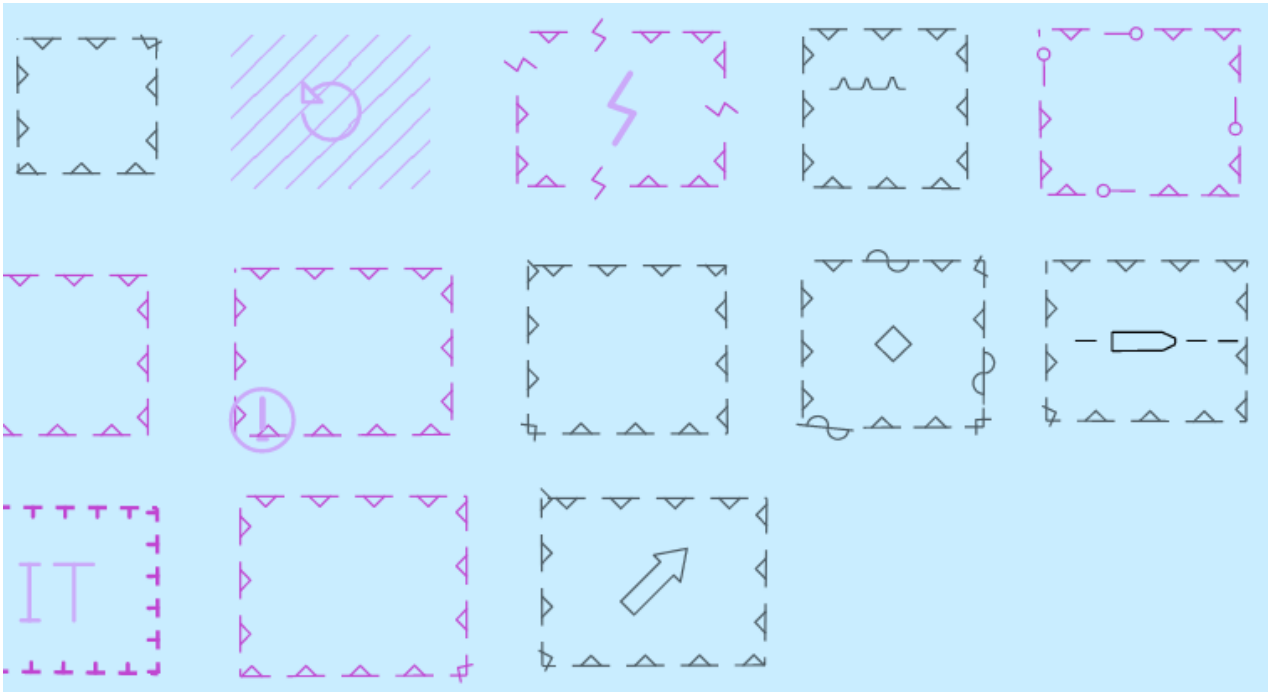
1) at position 32°36.900'S 61°20.840'E:



2) at position 32°36.900'S 61°21.400'E:



3) at position 32°36.900'S 61°21.950'E:



3.5 Date Dependent Display and Functionality

3.5.1 Fixed Date Range

Test Reference	FixedDateRange	**IHO Reference** **IEC Reference**	S-98 12.8.1

Test Description

This test ensures EUT supports the display of date dependent features encoded with a fixed start or end date, or a fixed date range.

Setup

Exchange Set Name

Settings

Display Mode		**Independent Mariner's Selections**	
Other		Accuracy	Off
Context Parameters		Contour label	Off
Safety contour	**10 m**	Highlight date dependent	**On**
Safety depth	**10 m**	Highlight document	Off
Deep Contour	**30 m**	Highlight info	Off
Shallow contour	**2 m**	Shallow pattern	Off
Four shades	Off	Unknown	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	Off
Full light lines	Off	Important text	Off
Ignore scale minimum	**On**	**Other Text**	
Shallow water dangers	Off	Names	Off
Palette		Light description	Off
Day		All other chart text	Off

Viewing Date or Range		**Display**	
Start viewing date	N/A	Centre	32°36.45'S 61°20.90'E
End viewing date	N/A	Scale	1:10 000

Viewing Groups

Standard Display		**Other**	
Drying lines	Off	Spot soundings	Off
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	Off
Buoys, beacons, structures	**On**	All isolated dangers	Off
Lights	Off	Magnetic variation	Off
Boundaries and limits	Off	Depth contours	Off
Prohibited and restricted areas	Off	Seabed	Off
Chart scale boundaries	Off	Tidal	Off
Cautionary notes	Off	Miscellaneous (Other)	**On**
Ships' routeing systems and ferry routes	Off		
Archipelagic sea lanes	Off		
Miscellaneous (Standard)	Off		
Chart (Standard)	Off		
Alert Highlights (Standard)	Off		

Setup

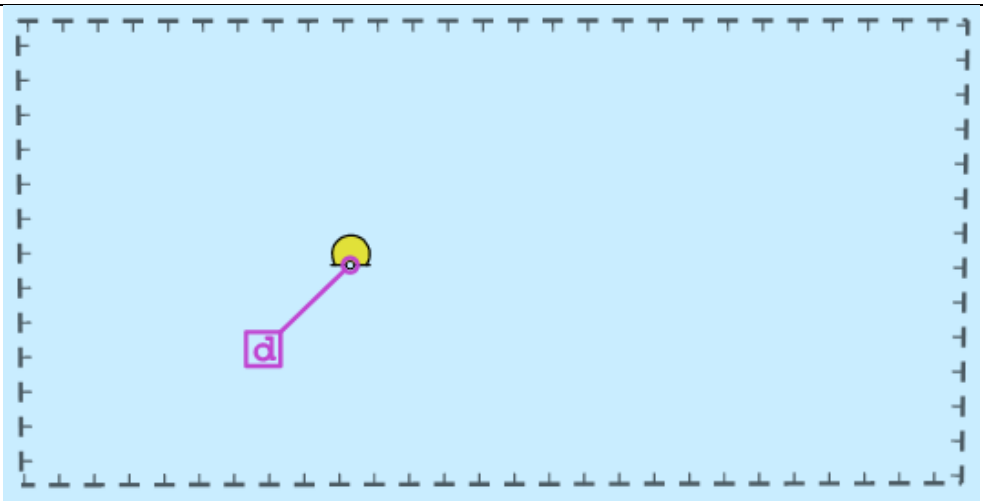
*As per test **SimplifiedSymbolsFalse** (**Settings** exchange set loaded).*

Action

Observe the dataset at indicated scale and position.

Results

Confirm that the feature displays as in the image below:

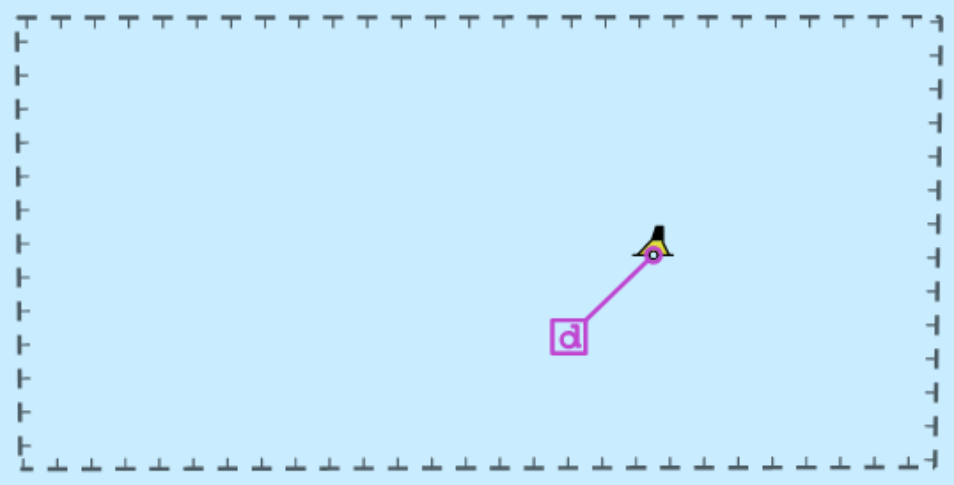


Action

Set the viewing date to 18.02.2013.

Result

Confirm that the feature displays as in the image below and that a permanent indication is shown as specified in S-98 12.8.2: "Display Not Real Time".

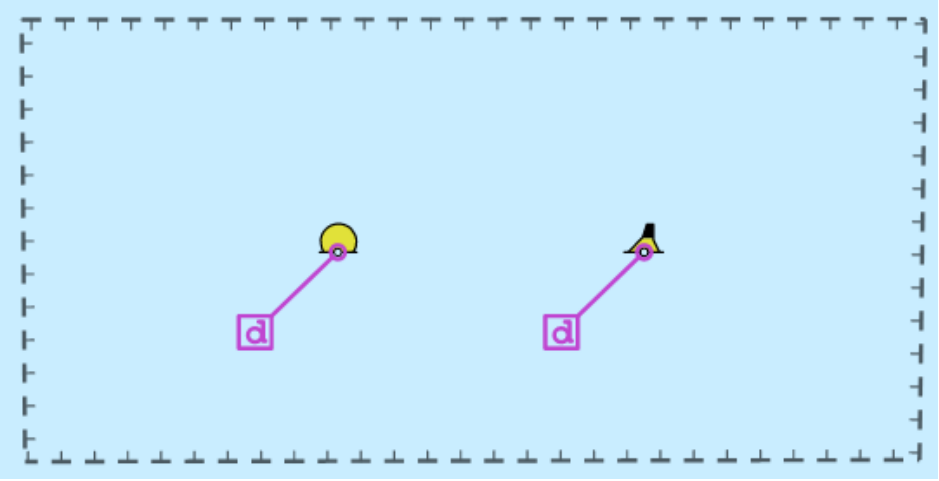


Action

Set the start viewing date to 01.02.2012 and the end viewing date to 01.12.2012.

Result

Confirm that the feature displays as in the image below and that a permanent indication is shown as specified in S-98 12.8.2: "Display Not Real Time".

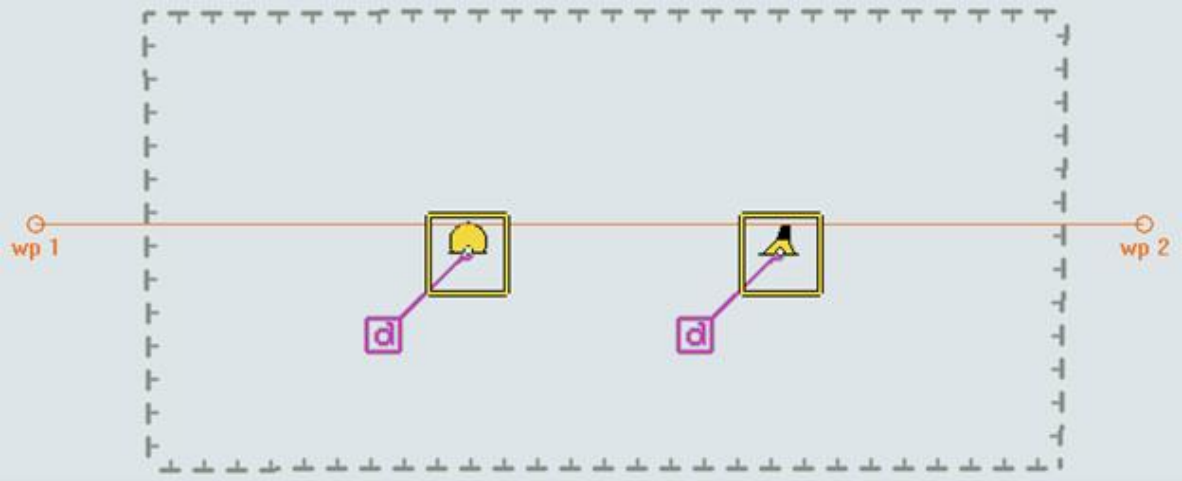


Action

Create a route from 32°36.425'S 61°20.335'E to 32°36.425'S 61°21.400'E with a cross track distance of 0.10NM set for Starboard and for Port.

Result

Check the route and confirm that the following indications are given and the display is as shown:



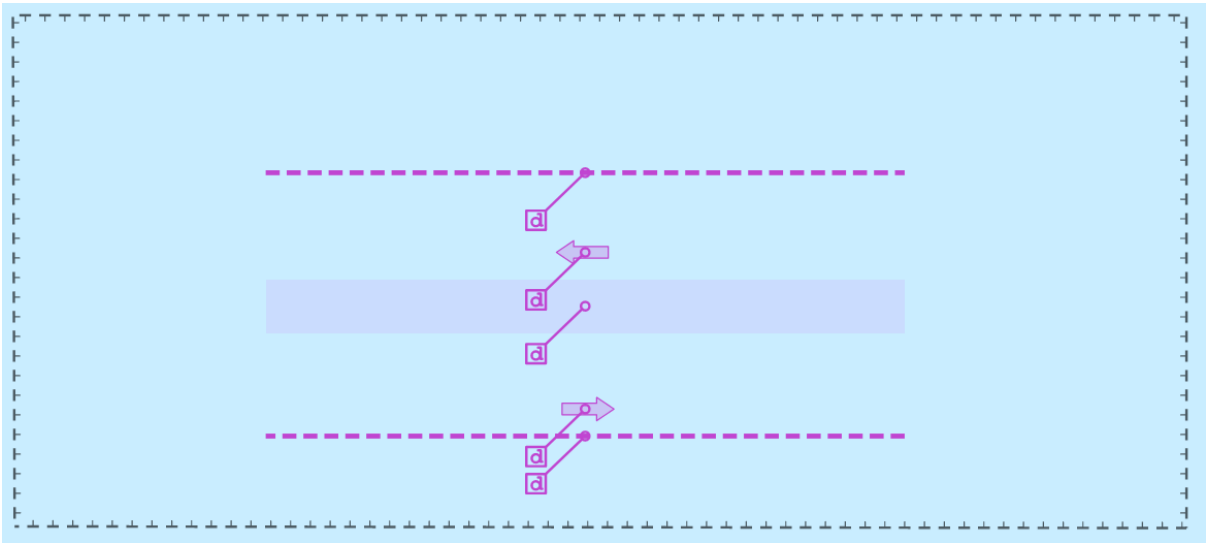
Note: A permanent indication that the date has been adjusted should be shown as specified in S-98.

Action

Set the viewing date to the current date and centre the display on position 32°35.30'S 61°21.38'E.

Result

Confirm that the feature displays as in the image below and that a permanent indication is shown as specified in S-98 12.8.2: "Display Not Real Time".



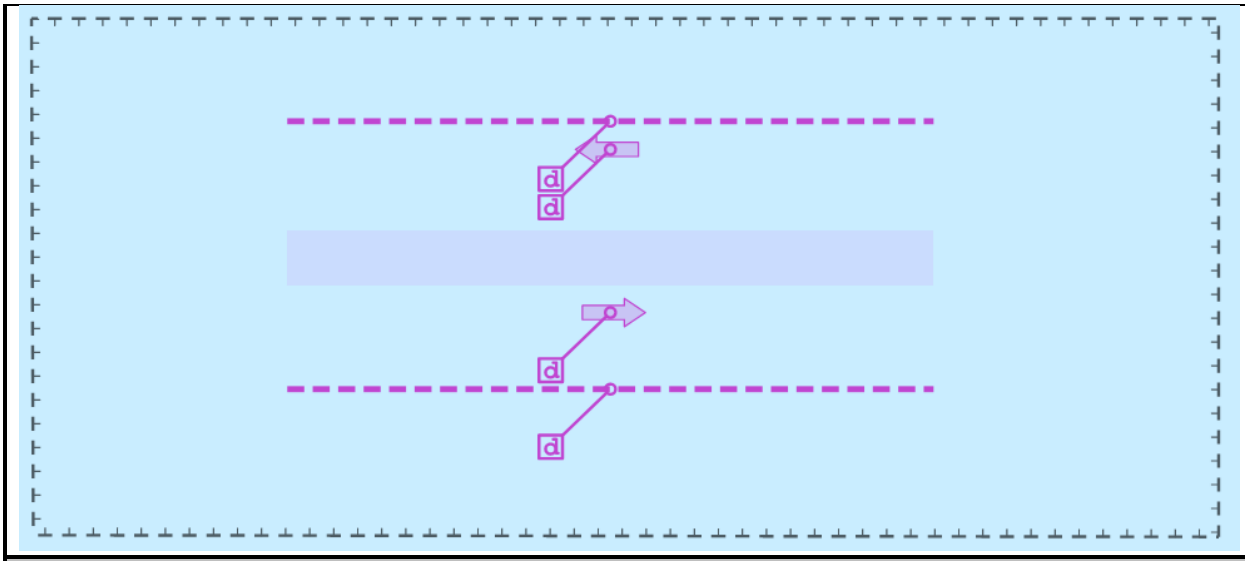
Note: A permanent indication that the date has been adjusted should be shown as specified in S-98.

Action

Set the viewing Date to 30.11.2013.

Result

Confirm that the feature displays as in the image below and that a permanent indication is shown as specified in S-98 12.8.2: "Display Not Real Time".

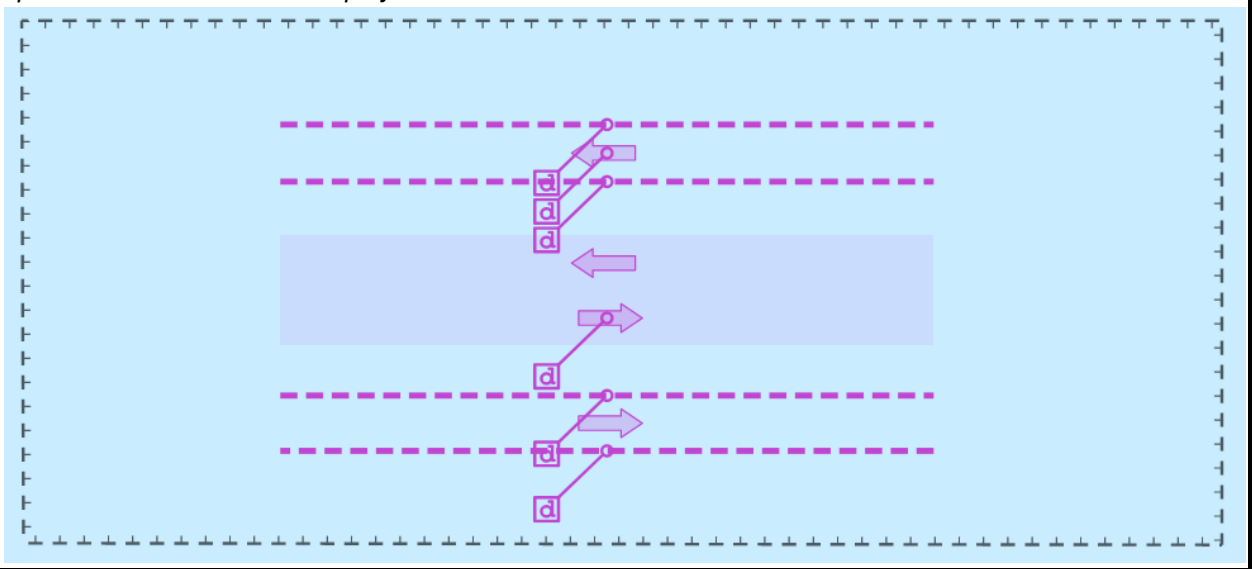


Action

Set the Start viewing date to 01.11.2013 and the End viewing date to 01.12.2013.

Result

Confirm that the feature displays as in the image below and that a permanent indication is shown as specified in S-98 12.8.2: "Display Not Real Time".

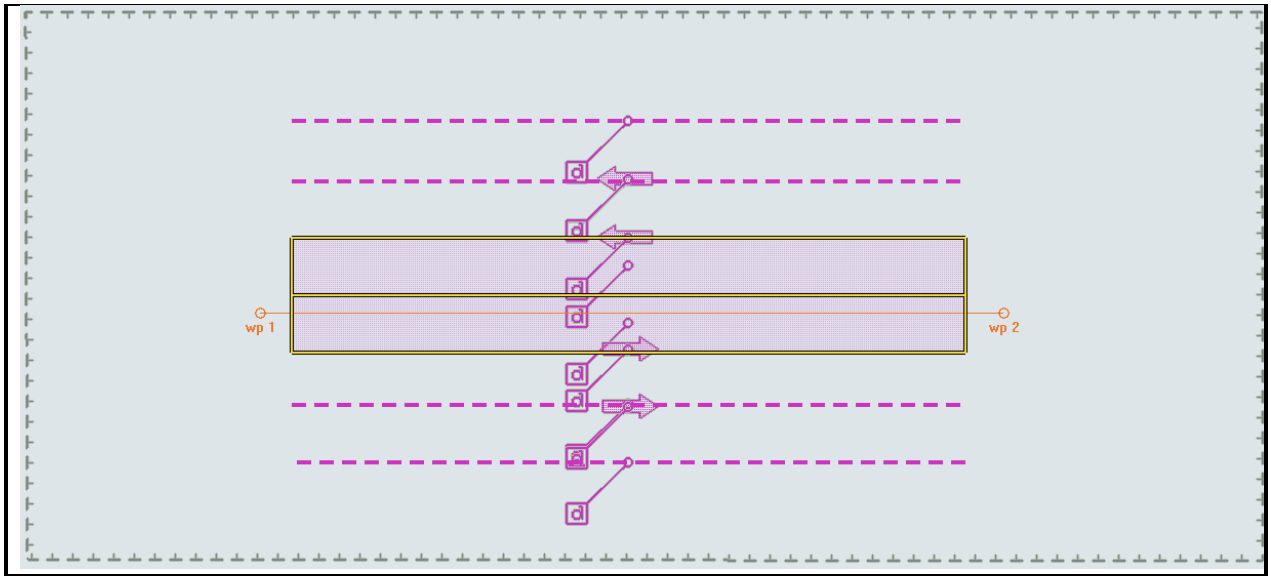


Action

Create a route from 32°35.325'S 61°20.800'E to 32°35.325'S 61°21.960'E with a cross track distance of 0.20NM set for Starboard and for Port.

Result

Confirm that the feature displays as in the image below and that a permanent indication is shown as specified in S-98 12.8.2: "Display Not Real Time".



3.5.2 **Periodic Date Range**

Test Reference	PeriodicDateRange	**IHO Reference** **IEC Reference**	S-98 12.8.1

Test Description			
This test ensures EUT supports the display of features encoded with a periodic date range dependency.			
Setup			
Exchange Set Name			
DisplayOther			
Display Mode		**Independent Mariner's Selections (Default=On)**	
Other		Accuracy	Off
Context Parameters		Contour label	Off
Safety contour	**10 m**	Highlight date dependent	**On**
Safety depth	**10 m**	Highlight document	Off
Deep Contour	**30 m**	Highlight info	Off
Shallow contour	**2 m**	Shallow pattern	Off
Four shades	Off	Unknown	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	Off
Full light lines	Off	Important text	Off
Ignore scale minimum	**On**	**Other Text**	
Shallow water dangers	Off	Names	Off
Palette		Light description	Off
Day		All other chart text	Off
Viewing Date or Range		**Display**	
Viewing date	01.11.2013	Centre	32°36.450'S 61°21.900'E
		Scale	1:10 000

Viewing Groups			
Standard Display		**Other**	
Drying lines	Off	Spot soundings	Off
Buoys. Beacons, aids to navigation	Off	Submarine cables and pipelines	Off
Buoys, beacons, structures	**On**	All isolated dangers	Off
Lights	Off	Magnetic variation	Off
Boundaries and limits	Off	Depth contours	Off

Prohibited and restricted areas	Off	Seabed	Off
Chart scale boundaries	Off	Tidal	Off
Cautionary notes	Off	Miscellaneous (Other)	**On**
Ships' routeing systems and ferry routes	Off		
Archipelagic sea lanes	Off		
Miscellaneous (Standard)	Off		
Chart (Standard)	Off		
Alert Highlights (Standard)	Off		

Setup

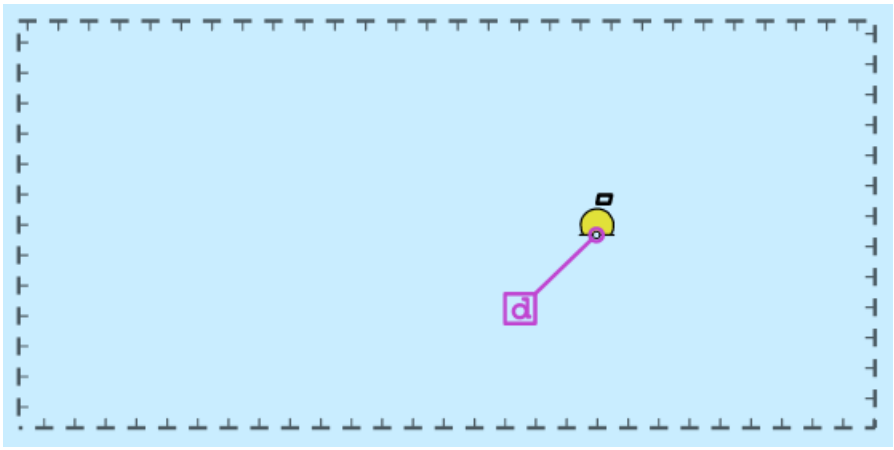
*As for test **FixedDateRange**.*

Action

Observe the dataset at indicated scale and position.

Results

Confirm that the feature displays as in the diagram below:



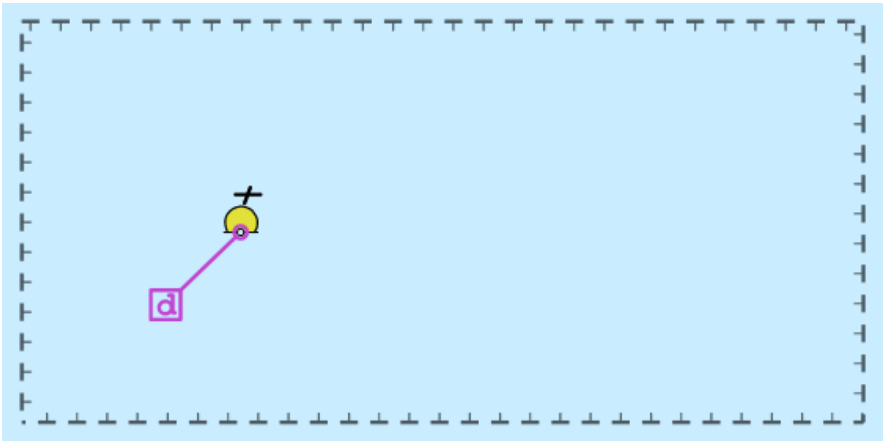
Note: A permanent indication that the date has been adjusted should be shown as specified in S-98 XXX-XXX.

Action

Set the viewing date to 18.03.2013.
Observe the dataset at indicated scale and position.

Results

Confirm that the feature displays as in the diagram below



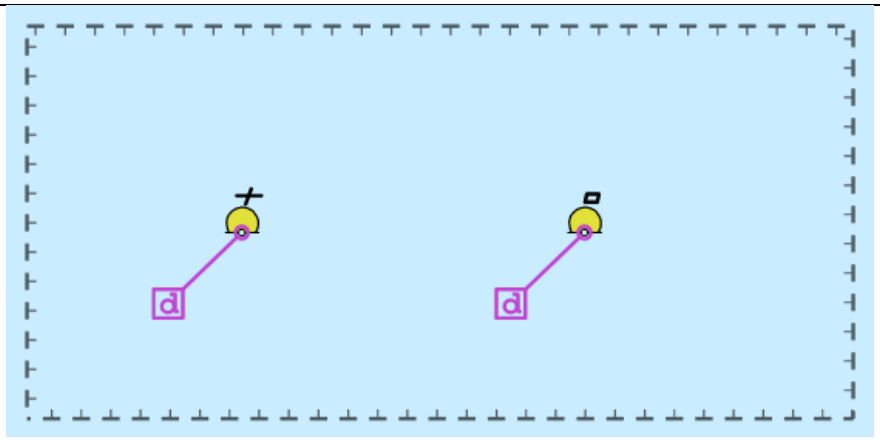
Note: A permanent indication that the date has been adjusted should be shown as specified in S-98 XXX-XXXX

Action

Set the start viewing date to 01.02.2022 and the end viewing date to 14.11.2022.
Observe the dataset at indicated scale and position.

Results

Confirm that the feature displays as in the diagram below:



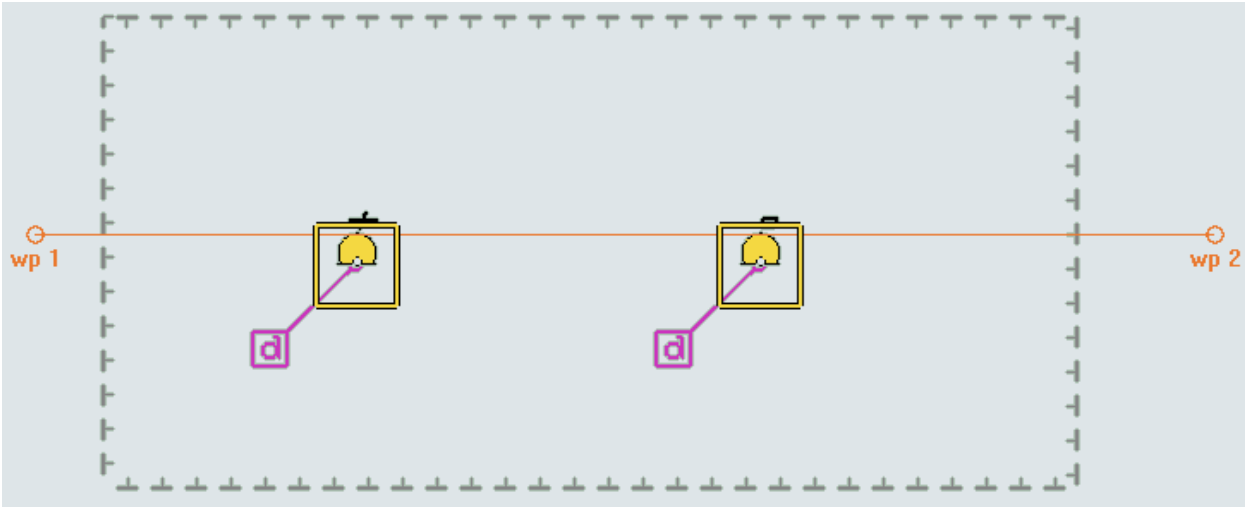
Note: A permanent indication that the date has been adjusted should be shown as specified in S-98 XXX-XXXX

Action

Create a route from 32°36.425'S 61°21.400'E to 32°36.425'S 61°22.500'E with a cross track distance of 0.10NM set for Starboard and for Port.
Observe the dataset at indicated scale and position.

Results

Confirm that the feature displays as in the diagram below:



Note: A permanent indication that the date has been adjusted should be shown as specified in S-98 XXX-XXXX

3.5.3 **Safety contour**

3.6

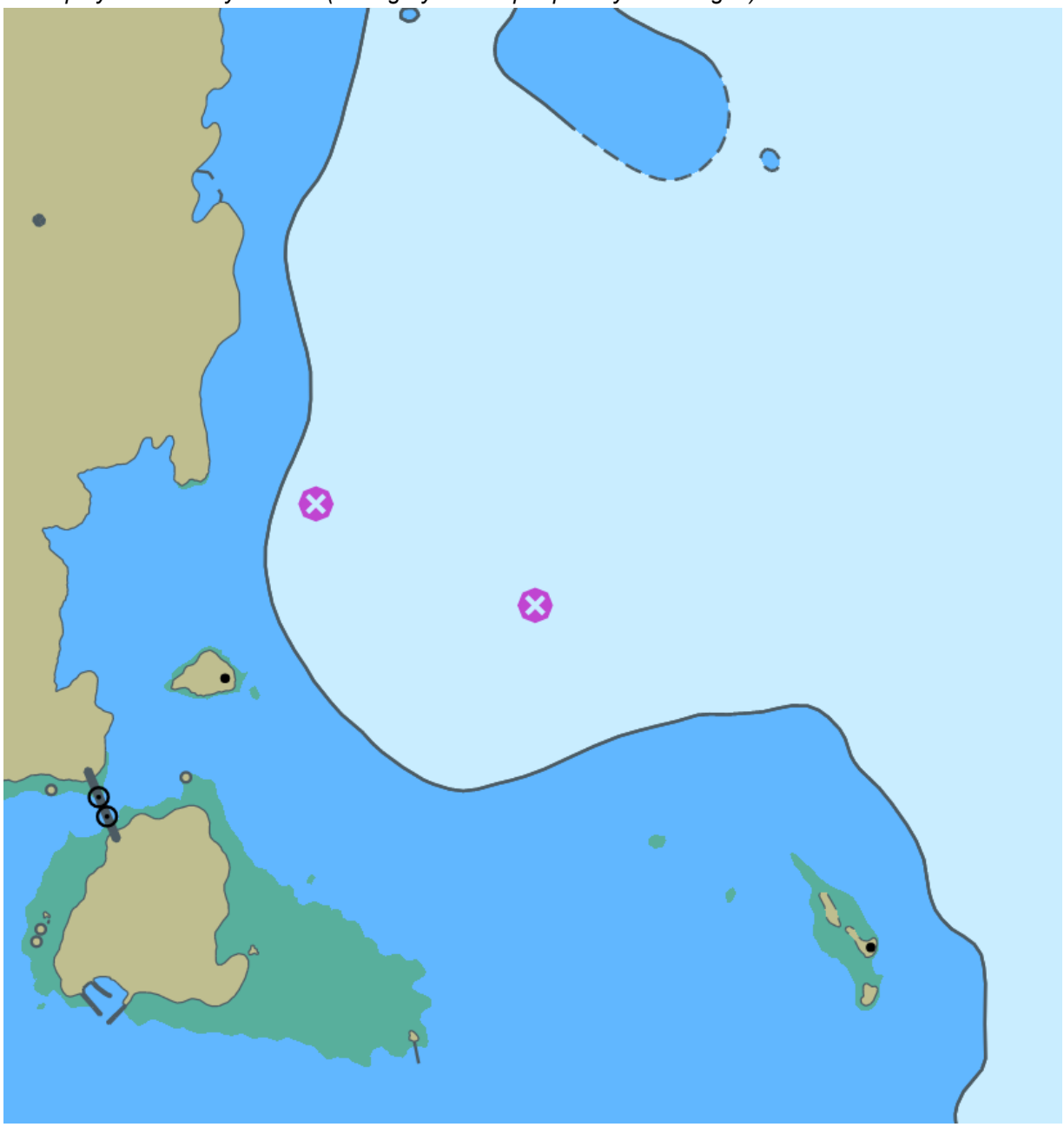
Test Reference	SafetyContourDisplay	**IHO Reference** **IEC Reference**	S-98 12.6.1

Test Description			
This test ensures EUT supports the display of default safety contour.			
Exchange Set Name			
InitialPowerUp			
Display Mode		**Independent Mariner's Selections**	
Displaybase		Accuracy	Off
Context Parameters		Contour label	Off
Safety contour	N/A	Highlight date dependent	Off
Safety depth	N/A	Highlight document	Off
Deep Contour	N/A	Highlight info	Off
Shallow contour	N/A	Shallow pattern	Off
Four shades	Off	Unknown	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	Off
Full light lines	Off	Important text	Off
Ignore scale minimum	Off	**Other Text**	
Shallow water dangers	**On**	Off	
Palette		Light description	Off
Day		All other chart text	Off
Viewing Date or Range		**Display**	
Start viewing date	N/A	Centre	32°28.00'S 61°00.00'E
End viewing date	N/A	Scale	1:60 000

Viewing Groups			
Standard Display		**Other**	
Drying lines	Off	Spot soundings	Off
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	Off
Buoys, beacons, structures	Off	All isolated dangers	**On**
Lights	Off	Magnetic variation	Off
Boundaries and limits	Off	Depth contours	Off
Prohibited and restricted areas	Off	Seabed	Off
Chart scale boundaries	Off	Tidal	Off
Cautionary notes	Off	Miscellaneous (Other)	Off
Ships' routeing systems and ferry routes	Off		
Archipelagic sea lanes	Off		
Miscellaneous (Standard)	Off		
Chart (Standard)	Off		
Alert Highlights (Standard)	Off		

Setup
As per InitialPowerUp test.
Action
Ensures the EUT is set without Safety contour value (factory default setting); *Load all datasets from the exchange set **InitialPowerUp;*** *Display dataset 10100AA_X0000.000 at indicated scale and centred position.*
Results

The Safety contour value must be set to 30 m and the 30 m contour in chart 10100AA_X0000.000 must be displayed as Safety contour (thick grey line as per portrayal catalogue).

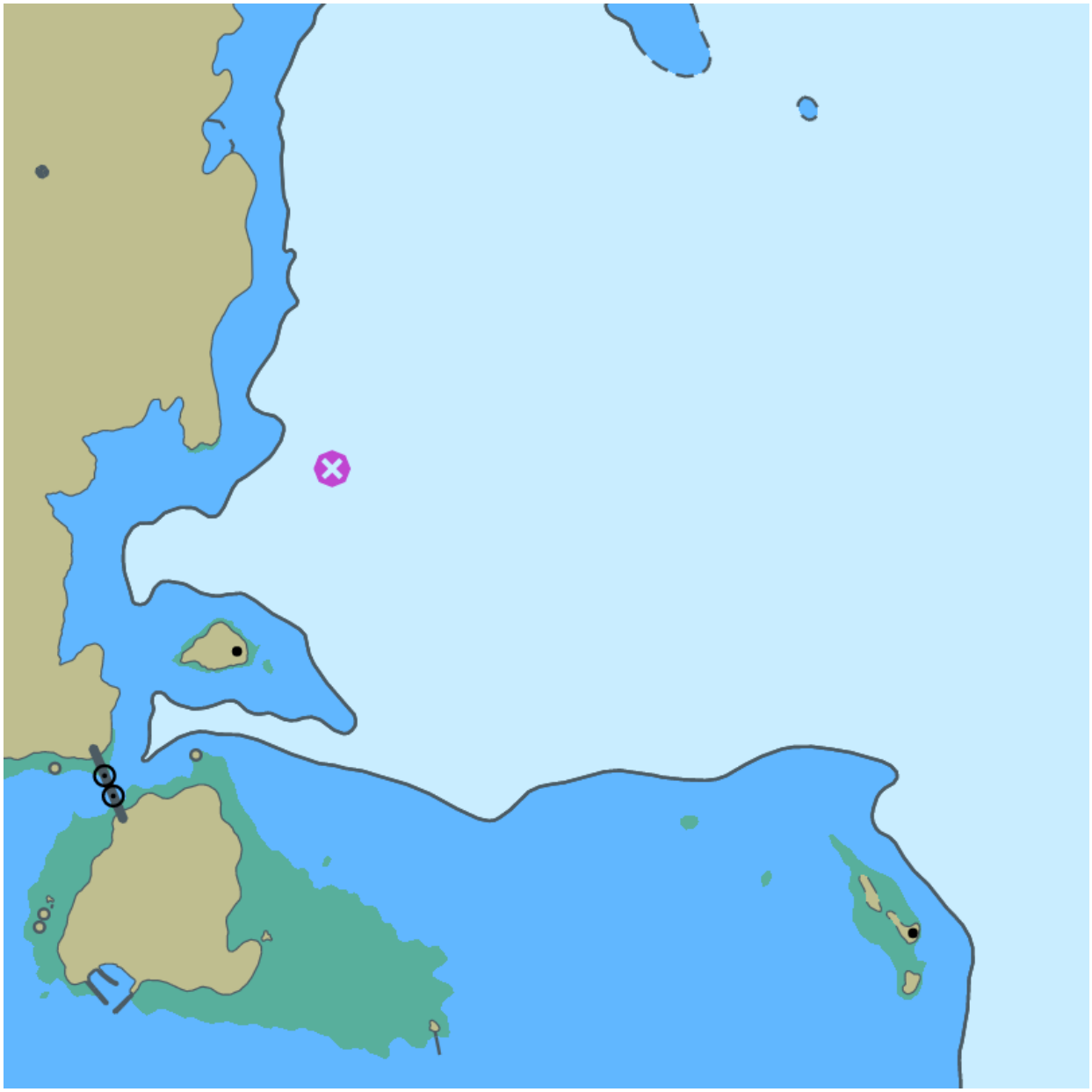


Action

Select Safety contour value to 15 m (the ENC has no 15 m Depth Contour);
*Load all datasets from the exchange set **InitialPowerUp;***
Display dataset 10100AA_X0000.000 at indicated scale and centred position.

Results

The 20m contour must be highlighted as the safety contour.

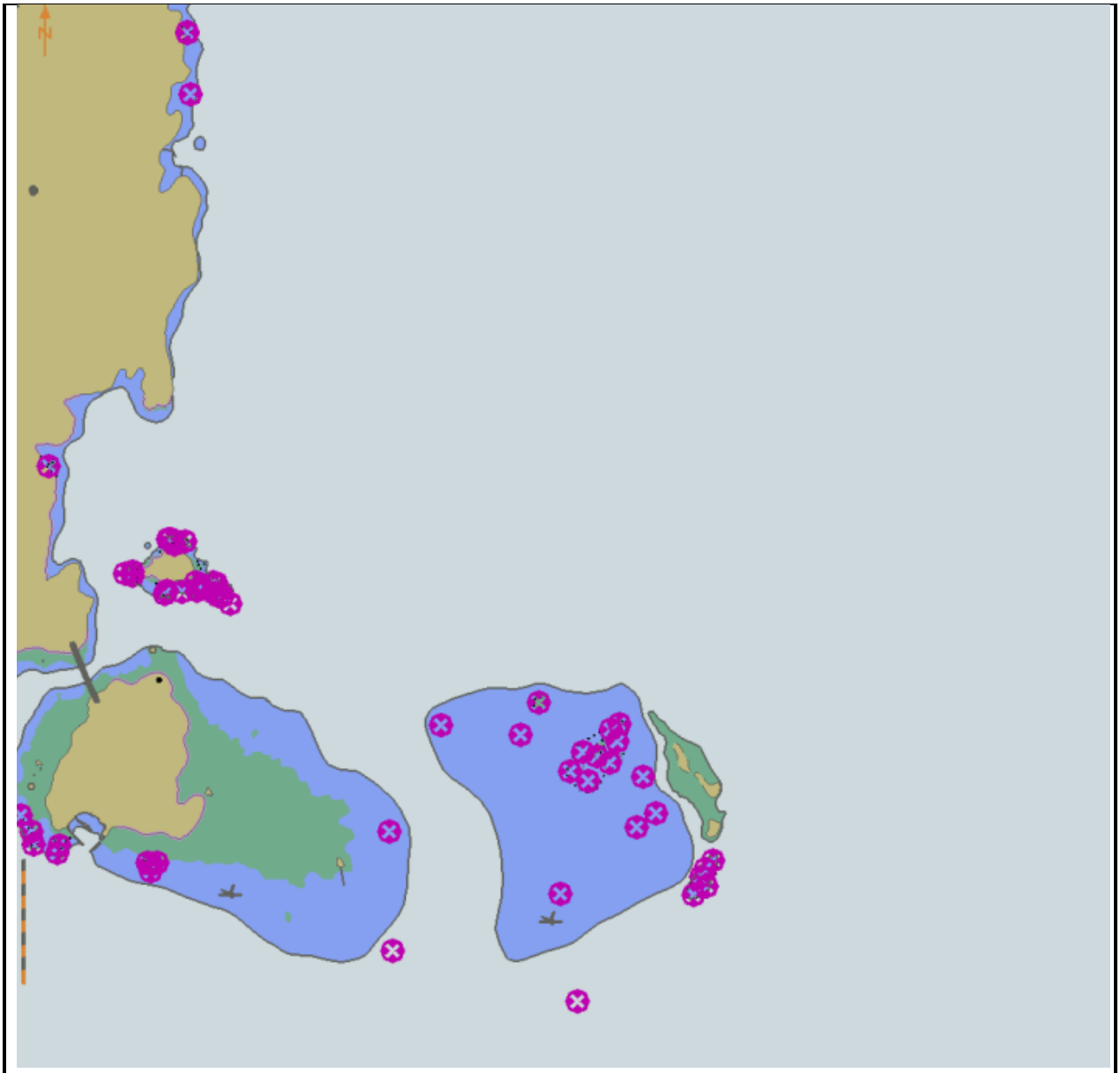


Action

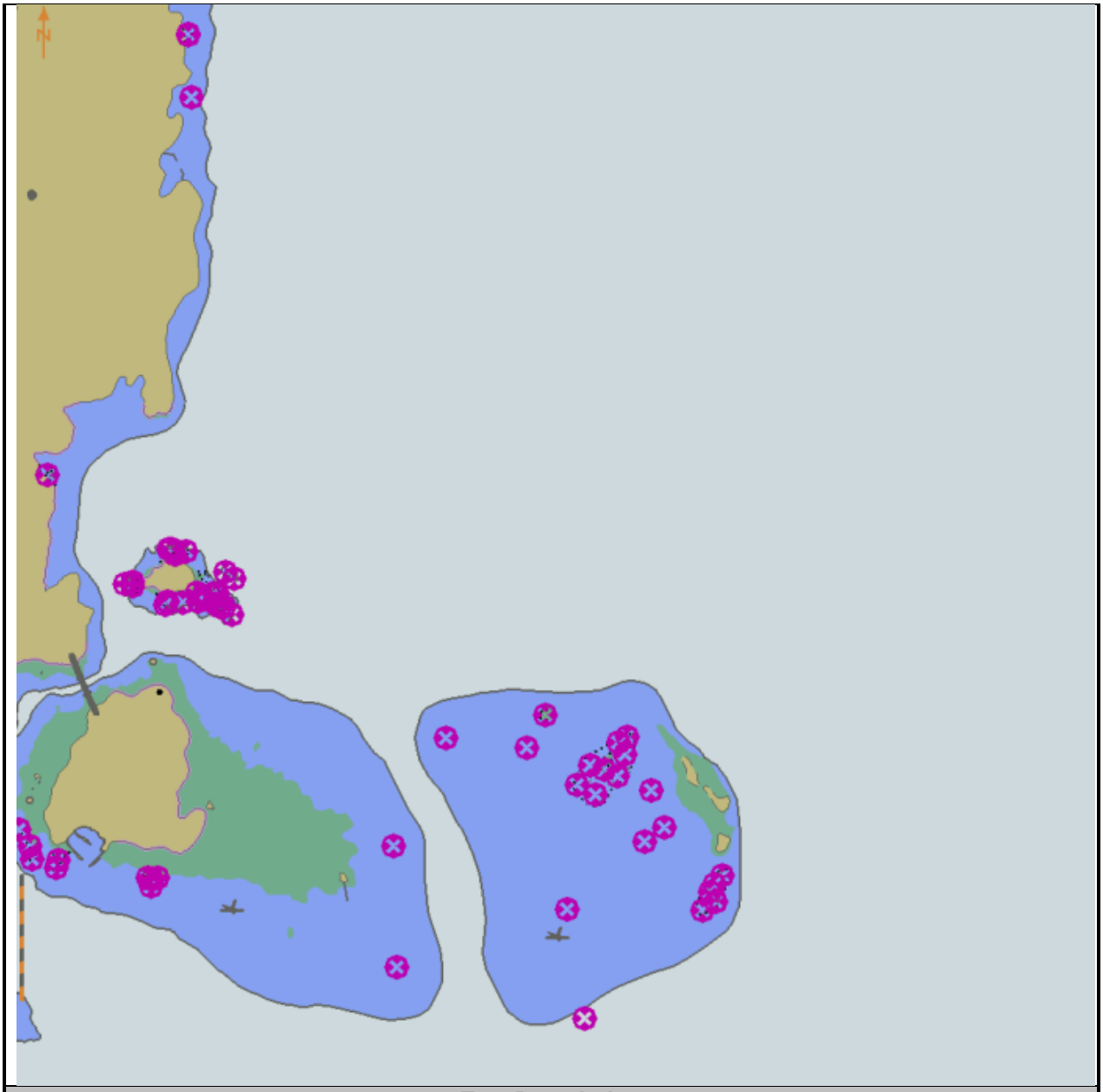
Select Safety contour value to 5 m.

Results

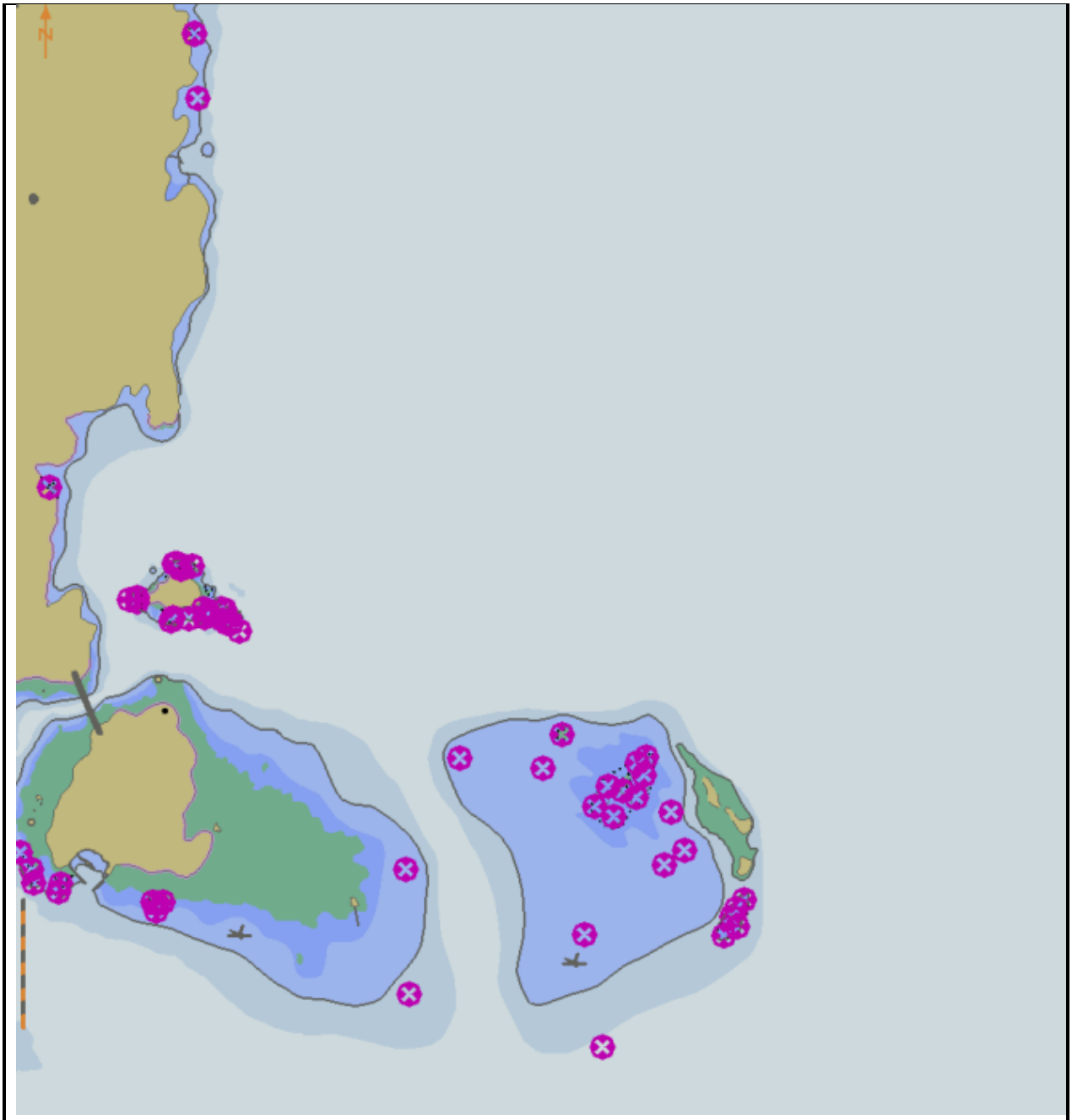
The Safety Contour must be emphasised and the isolated dangers within the unsafe water enclosed by the ship's Safety Contour must be displayed as shown in the image below.



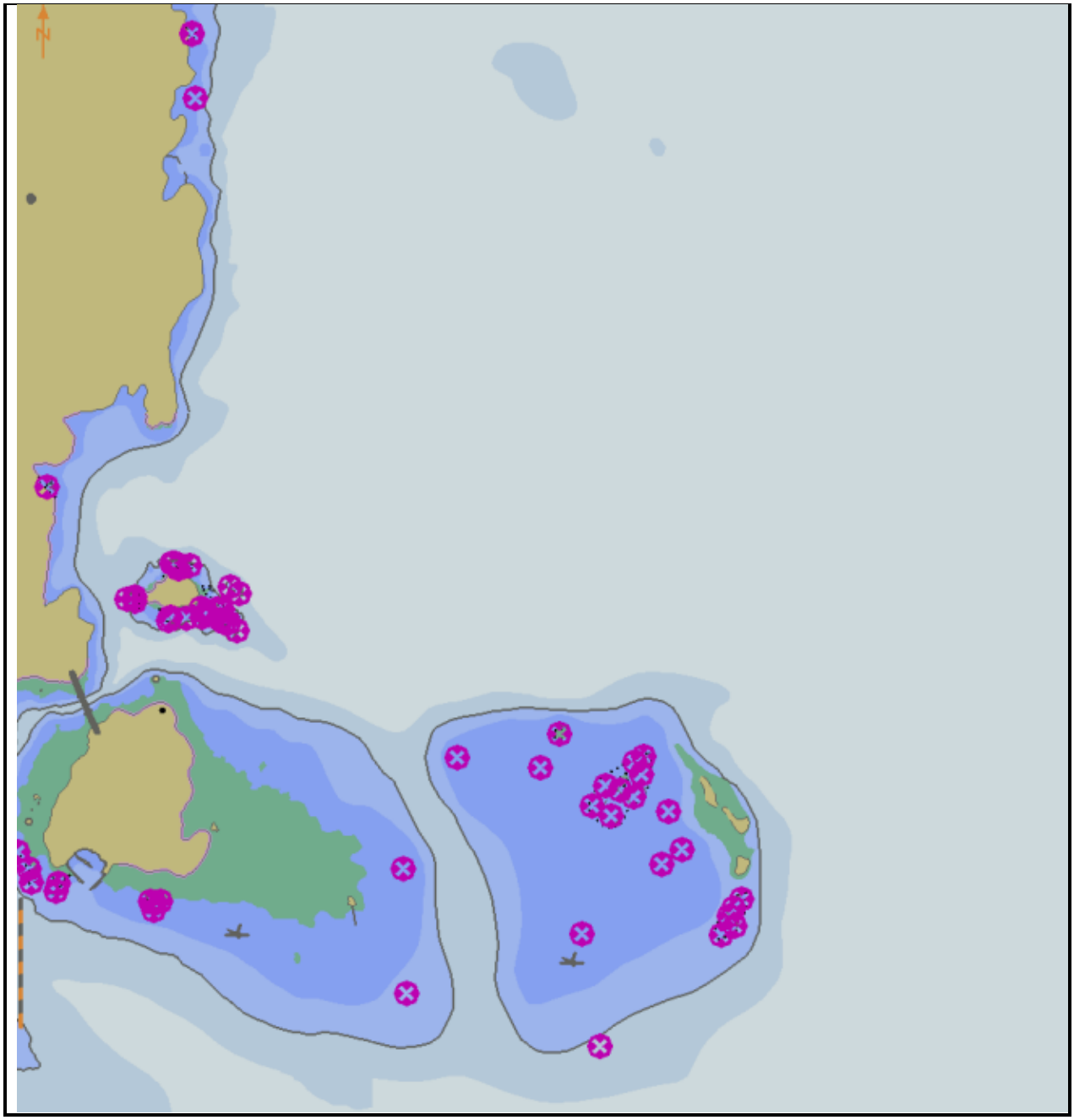
Action
Select Safety contour value to 10 m.
Results
The Safety Contour must be emphasised and the isolated dangers within the unsafe water enclosed by the ship's Safety Contour must be displayed as shown in the image below.



Test Description
This test ensures the EUT display the Safety Contour and isolated dangers within the safe water enclosed by the ship's Safety Contour using four shades for depth areas.
Action
Select Safety contour value to 5 m.
Results
The Safety Contour must be emphasised and the isolated dangers within the unsafe water enclosed by the ship's Safety Contour must be displayed as shown in the image below.



Action
Select Safety contour value to 10 m.
Results
The Safety Contour must be emphasised and the isolated dangers within the unsafe water enclosed by the ship's Safety Contour must be displayed as shown in the image below.



3.7 Display of User Selected Safety contour.

3.7.1 Setting User Selected Safety contour.

Test Reference	UserSelectedSafetyContour	IHO Reference	S-98 Appendix D-1

Test Description

This test ensures the user is able to set a user selected safety contour in areas of S-102 and S-104 coverage.

Loaded Data	
Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			

Chart (Standard)			
Alert Highlights (Standard)			
Additional			
Setup			
*Load the exchange set **PowerUp** with the following settings:* - *Set User selected safety contour = 11.4m* - *Set Water Level Adjustment = false*			
Action			
1. Set ship's position to XX YY, Viewing Scale NN,000			
Results			

The ENC depth area is substituted for the S-102 values and a safety contour drawn delimiting the area deeper than 11.3m

Verify

1. User is able to set a user defined safety contour
2. Verify portrayal of DepthArea, DredgedArea and DepthContours in area of S-102 coverage.



TBD

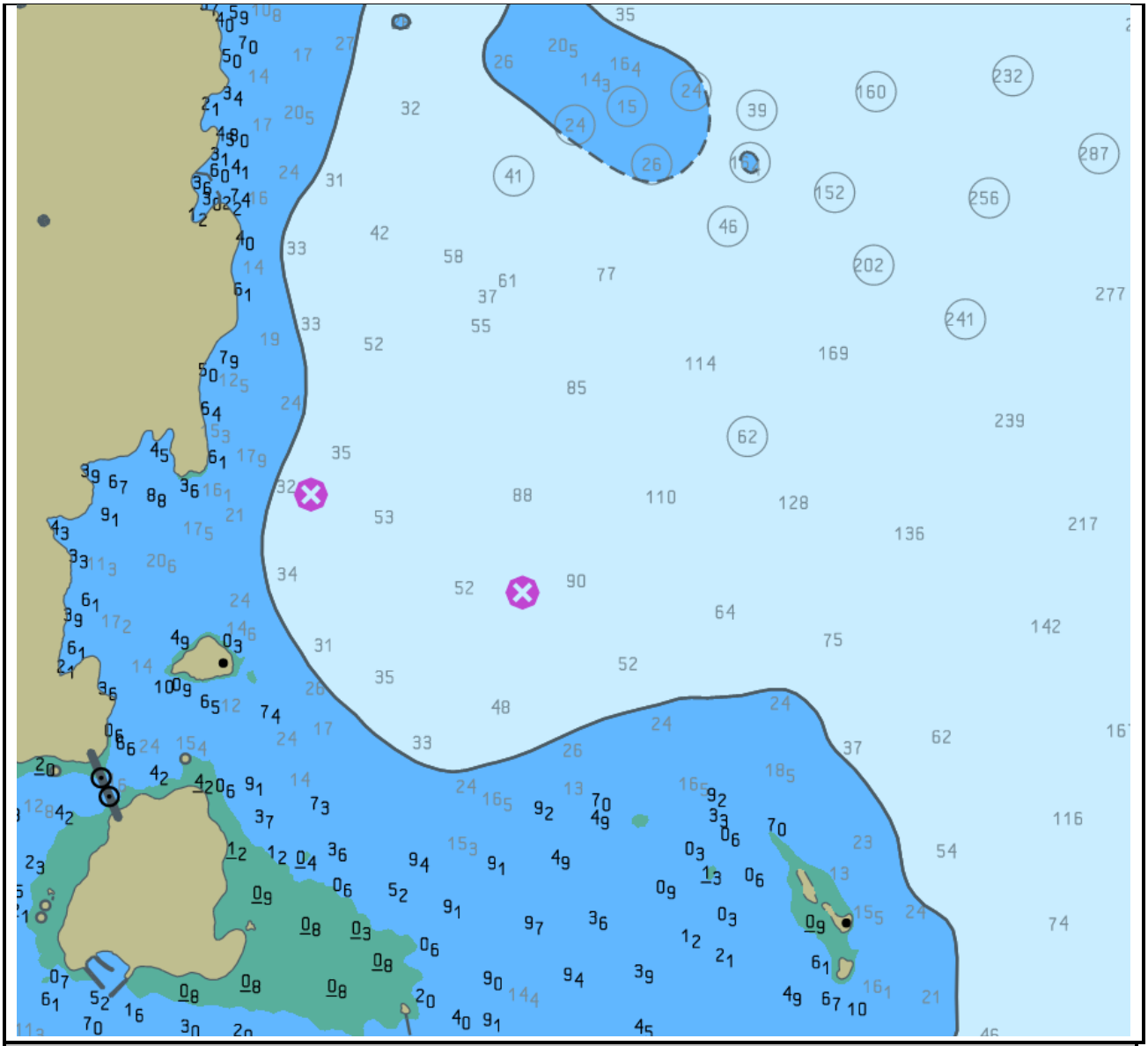
3.7.2 **Safety depth**

Test Reference	SafetyDepth	**IHO Reference**	

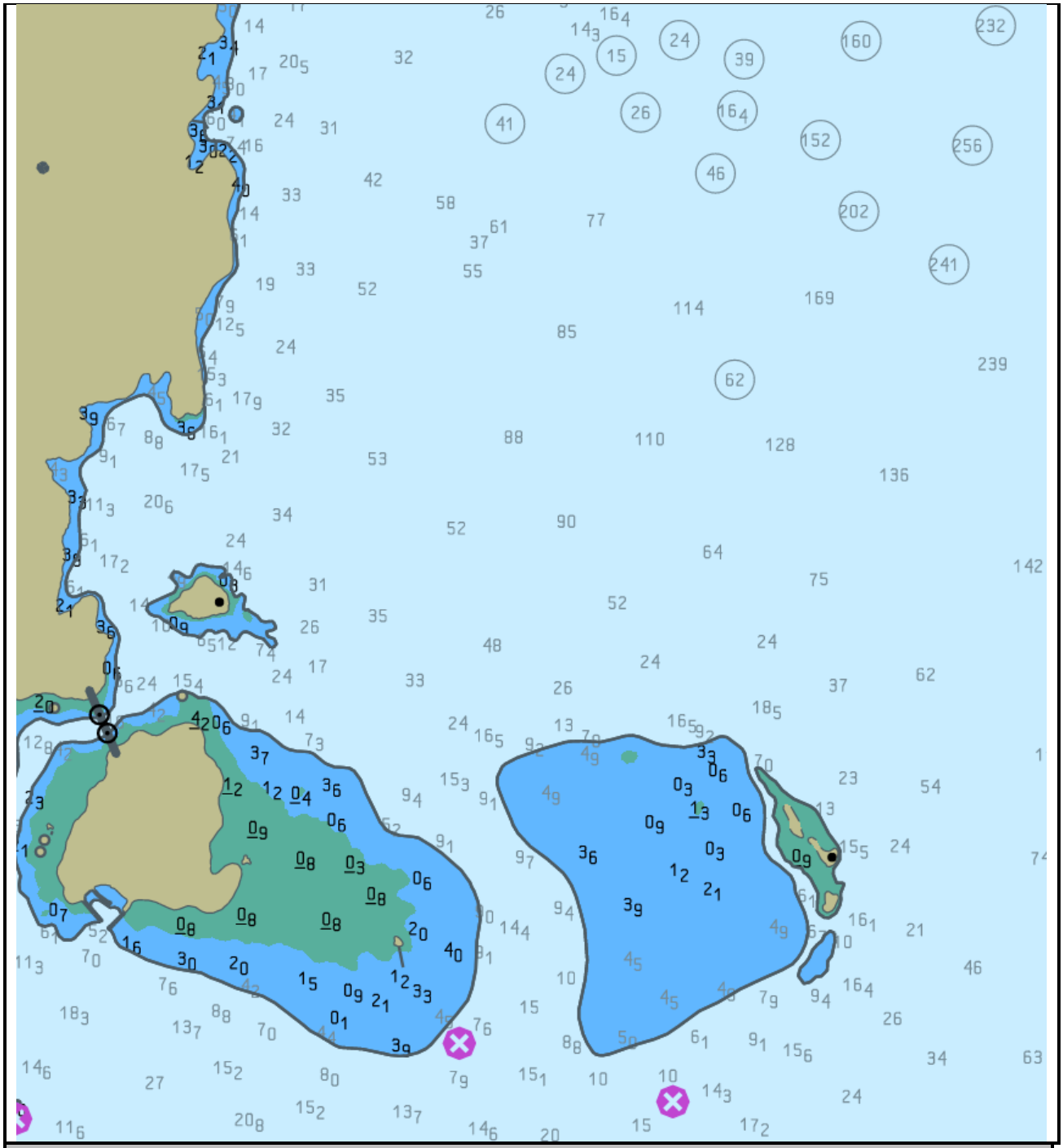
Test Description			
This test ensures EUT supports the display of default safety contour.			
Exchange Set Name			
InitialPowerUp			
Display Mode		**Independent Mariner's Selections**	
Other		Accuracy	Off
Context Parameters		Contour label	Off
Safety contour	N/A	Highlight date dependent	Off
Safety depth	N/A	Highlight document	Off
Deep Contour	N/A	Highlight info	Off
Shallow contour	N/A	Shallow pattern	Off
Four shades	Off	Unknown	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	Off
Full light lines	Off	Important text	Off
Ignore scale minimum	**On**	**Other Text**	
Shallow water dangers	Off	Names	Off
Palette		Light description	Off
Day		All other chart text	Off
Viewing Date or Range		**Display**	
Start viewing date	N/A	Centre	32°28.00'S 61°00.00'E
End viewing date	N/A	Scale	1:60 000

Viewing Groups			
Standard Display		**Other**	
Drying lines	Off	Spot soundings	**On**
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	Off
Buoys, beacons, structures	Off	All isolated dangers	Off
Lights	Off	Magnetic variation	Off
Boundaries and limits	Off	Depth contours	Off
Prohibited and restricted areas	Off	Seabed	Off
Chart scale boundaries	Off	Tidal	Off
Cautionary notes	Off	Miscellaneous (Other)	Off
Ships' routeing systems and ferry routes	Off		
Archipelagic sea lanes	Off		
Miscellaneous (Standard)	Off		
Chart (Standard)	Off		
Alert Highlights (Standard)	Off		

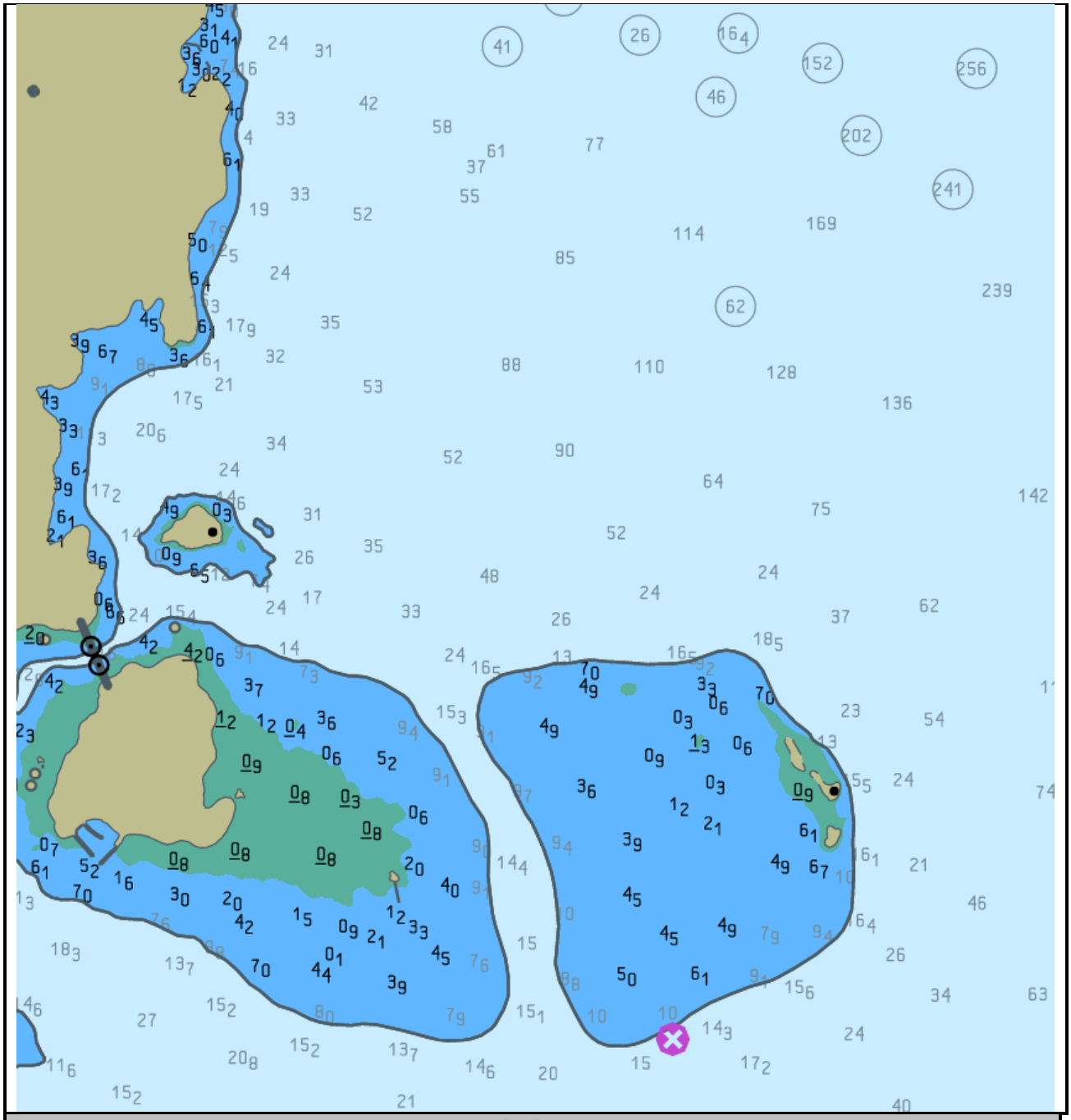
Setup
*As per **SafetyContourDisplay** test.*
Action
Display dataset 10100AA_X0000.000 at indicated scale and centred position.
Results
The features shown with depth values shallower than 10 m must be emphasised.



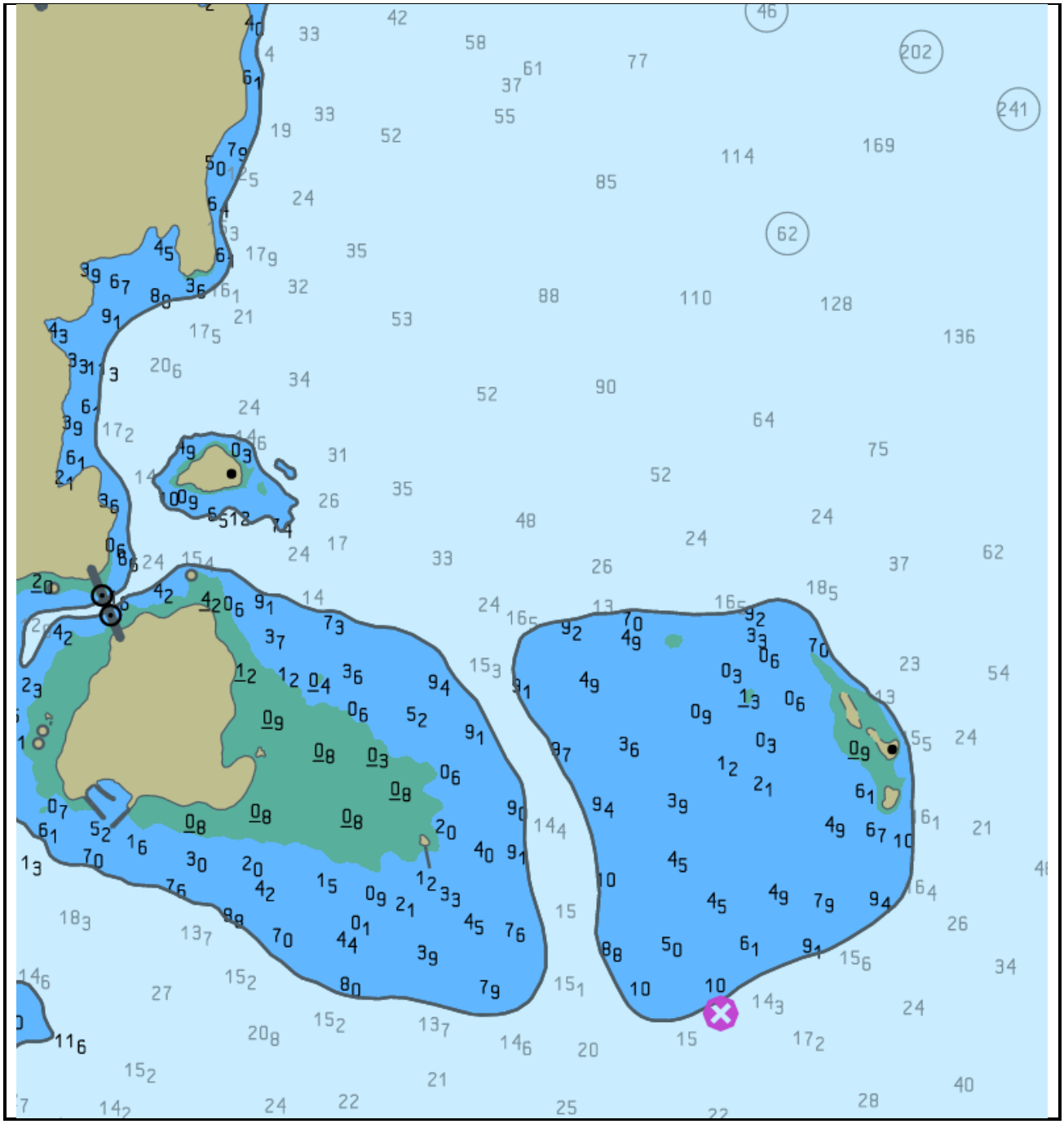
Action
Set the Safety depth value to 4 m (Safety contour 5 m).
Results
The objects shown with depth values shallower than 4 m must be emphasised.



Action
Set the Safety depth value to 7 m (Safety contour 10 m).
Results
The objects shown with depth values shallower than 7 m must be emphasised.



Action
Set the Safety depth value to 12 m (Safety contour 10 m).
Results
The spot soundings shallower than 12 m must be emphasised.



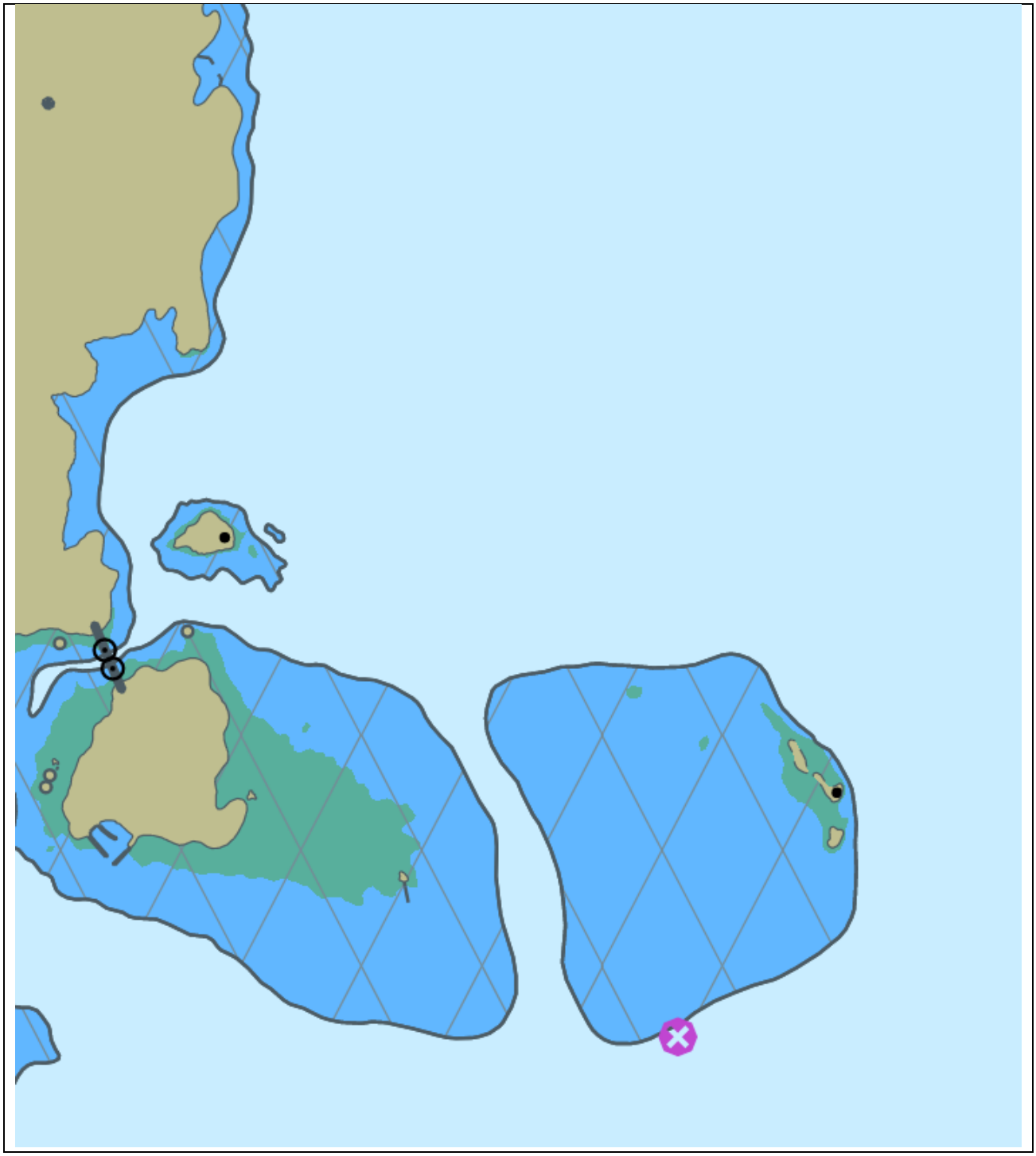
3.7.3 **Shallow pattern**

Test Reference	ShallowPattern	**IHO Reference**	S-101 Portrayal

Test Description			
This test ensures EUT supports the display of default safety contour.			
Exchange Set Name			
Display Mode		**Independent Mariner's Selections**	
Other		Accuracy	Off
Context Parameters		Contour label	Off
Safety contour	N/A	Highlight date dependent	Off
Safety depth	N/A	Highlight document	Off
Deep Contour	N/A	Highlight info	Off
Shallow contour	N/A	Shallow pattern	Off
Four shades	Off	Unknown	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	Off
Full light lines	Off	Important text	Off
Ignore scale minimum	**On**	**Other Text**	
Shallow water dangers	Off	Names	Off
Palette		Light description	Off
Day		All other chart text	Off
Viewing Date or Range		**Display**	
Start viewing date	N/A	Centre	32°28.00'S 61°00.00'E
End viewing date	N/A	Scale	1:60 000

Viewing Groups			
Standard Display		**Other**	
Drying lines	Off	Spot soundings	Off
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	Off
Buoys, beacons, structures	Off	All isolated dangers	Off
Lights	Off	Magnetic variation	Off
Boundaries and limits	Off	Depth contours	Off
Prohibited and restricted areas	Off	Seabed	Off
Chart scale boundaries	Off	Tidal	Off
Cautionary notes	Off	Miscellaneous (Other)	Off
Ships' routeing systems and ferry routes	Off		
Archipelagic sea lanes	Off		
Miscellaneous (Standard)	Off		
Chart (Standard)	Off		
Alert Highlights (Standard)	Off		

Setup
*Load the exchange set **PowerUp** with the above settings:*
Action
Display dataset 10100AA_X0000.000 at maximum display scale (1:52 000), select Display Category Display Base
Results
Confirm that the diamond shallow pattern is displayed as follows:



3.7.4 Contour labels

Test Reference	ContourLabels	IHO Reference	S-101 Portrayal

Test Description

Contour labels are an optional Mariners' selection. This test shall be performed, if the contour label option is provided.

Exchange Set Name

Display Mode		Independent Mariner's Selections	
Other		Accuracy	Off
Context Parameters		Contour label	Off
Safety contour	N/A	Highlight date dependent	Off
Safety depth	N/A	Highlight document	Off
Deep Contour	N/A	Highlight info	Off
Shallow contour	N/A	Shallow pattern	Off
Four shades	Off	Unknown	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	Off
Full light lines	Off	Important text	Off
Ignore scale minimum	Off	**Other Text**	
Shallow water dangers	Off	Names	Off
Palette		Light description	Off
Day		All other chart text	Off

Viewing Date or Range		Display	
Start viewing date	N/A	Centre	32°28.00'S 61°00.00'E
End viewing date	N/A	Scale	1:60 000

Viewing Groups

Standard Display		Other	
Drying lines	Off	Spot soundings	Off
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	Off
Buoys, beacons, structures	Off	All isolated dangers	Off
Lights	Off	Magnetic variation	Off
Boundaries and limits	Off	Depth contours	Off
Prohibited and restricted areas	Off	Seabed	Off
Chart scale boundaries	Off	Tidal	Off
Cautionary notes	Off	Miscellaneous (Other)	Off
Ships' routeing systems and ferry routes	Off		
Archipelagic sea lanes	Off		
Miscellaneous (Standard)	Off		
Chart (Standard)	Off		
Alert Highlights (Standard)	Off		

Setup

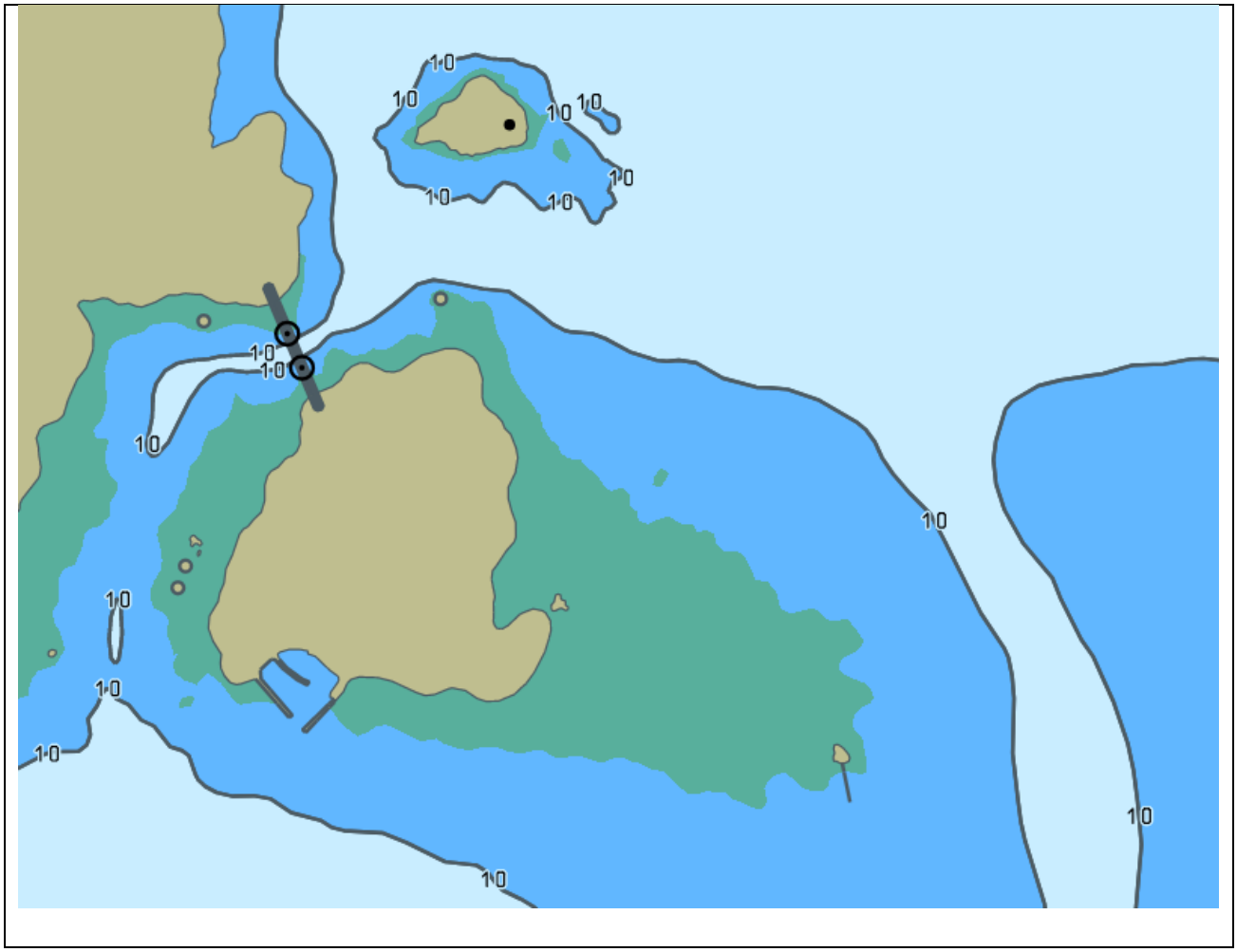
*Load the exchange set **PowerUp** with the above settings:*

Action

Display dataset 10100AA_X01NE.000 at maximum display scale (1:25 000)

Results

Confirm that the features display as follows
:


1.0
1.0
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1.0
1.0
1.0

3.7.5 Colour Palettes

Test Reference	ColourPalettes1	IHO Reference	S-101 PC

Test Description

Display of ENC in Day palette

Setup

*Load all datasets from the exchange set **PowerUp** with the following settings:*

Exchange Set Name	
DisplayBase	

Display Mode		Independent Mariner's Selections	
Displaybase		Accuracy	Off
Context Parameters		Contour label	Off
Safety contour	**10 m**	Highlight date dependent	Off
Safety depth	**10 m**	Highlight document	Off
Deep Contour	**20 m**	Highlight info	Off
Shallow contour	**5 m**	Shallow pattern	Off
Four shades	**On**	Unknown	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	Off
Full light lines	Off	Important text	Off
Ignore scale minimum	Off	**Other Text**	
Shallow water dangers	Off	Names	Off
Palette		Light description	Off
Day		All other chart text	Off

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:52000

Viewing Groups

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional

Setup

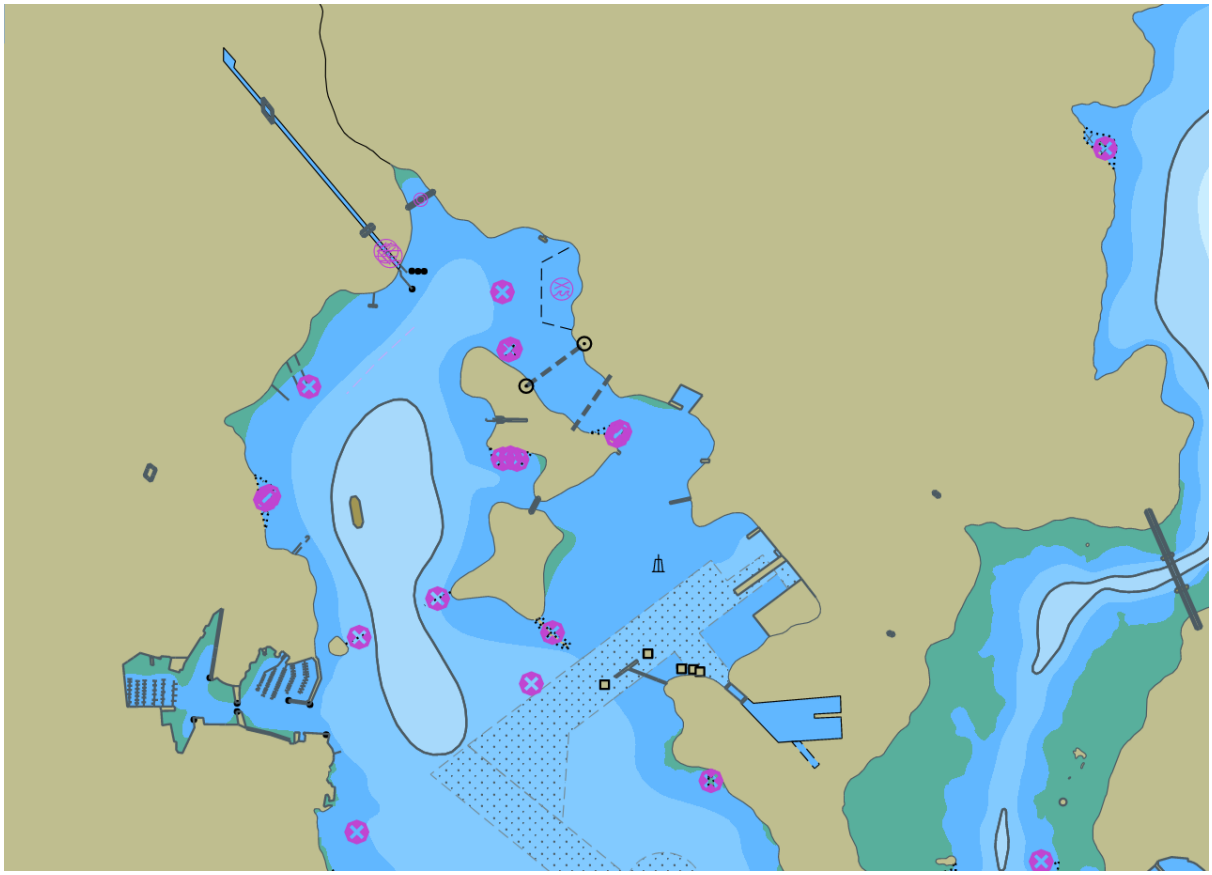
*Load all datasets from the exchange set **PowerUp** with the above settings:*

Action

Display dataset 10100AA_X01NW.000 at maximum display scale (1:25 000)

Results

Confirm that the features display as follows:

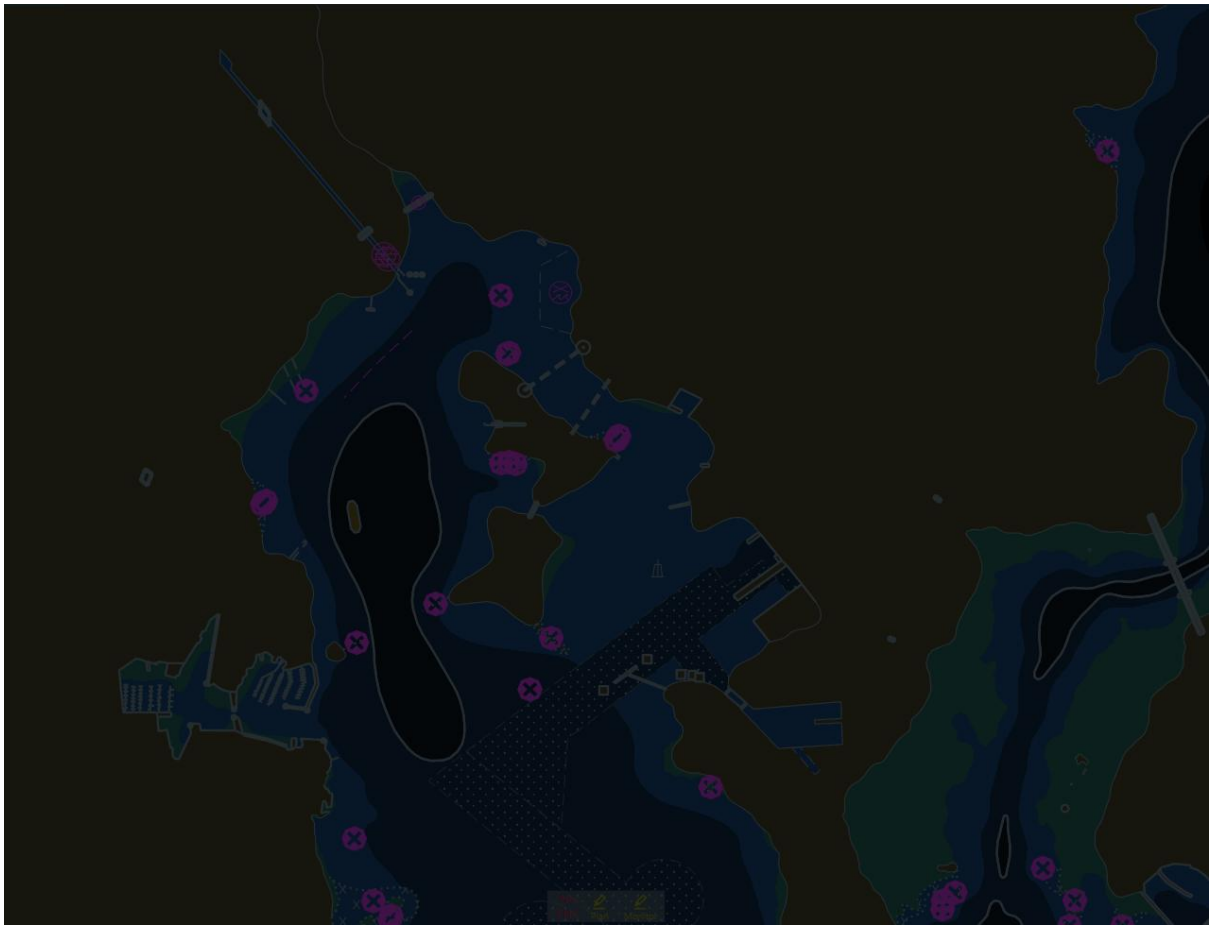


Action
Select Dusk palette.
Results

Confirm that the features display as follows:



Action
Select Night palette.
Results
Confirm that the features display as follows



3.7.6 Display of Additional Chart Information Symbol

Test Reference	AdditionalInformation1	IHO Reference IEC Reference	

Test Description

*Display of additional chart information symbol (**Information**).*

Setup

*Load the exchange set **Settings** with the following settings:*
Ensure that the system date is set to the current date and time.

Exchange Set Name	
DisplayOther	

Display Mode		Independent Mariner's Selections	
Other		Accuracy	Off
Context Parameters		Contour label	Off
Safety contour	**8 m**	Highlight date dependent	Off
Safety depth	**8 m**	Highlight document	Off
Deep Contour	30 m	Highlight info	Off
Shallow contour	2 m	Shallow pattern	Off
Four shades	Off	Unknown	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	**On**
Full light lines	Off	Important text	**On**
Ignore scale minimum	Off	**Other Text**	
Shallow water dangers	Off	Names	**On**
Palette		Light description	**On**
Day		All other chart text	**On**

Date Dependent Objects		Display	
Start Date		Centre	32°34.00'S 61° 21.70'E
End Date		Scale	1:20 000

Viewing Groups

Standard Display		Other	
Drying lines	Off	Spot soundings	Off
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	Off
Buoys, beacons, structures	**On**	All isolated dangers	Off
Lights	**On**	Magnetic variation	Off
Boundaries and limits	Off	Depth contours	Off
Prohibited and restricted areas	Off	Seabed	Off
Chart scale boundaries	Off	Tidal	Off
Cautionary notes	Off	Miscellaneous (Other)	Off
Ships' routeing systems and ferry routes	**On**		
Archipelagic sea lanes	Off		
Miscellaneous (Standard)	Off		
Chart (Standard)	Off		
Alert Highlights (Standard)	Off		

Setup

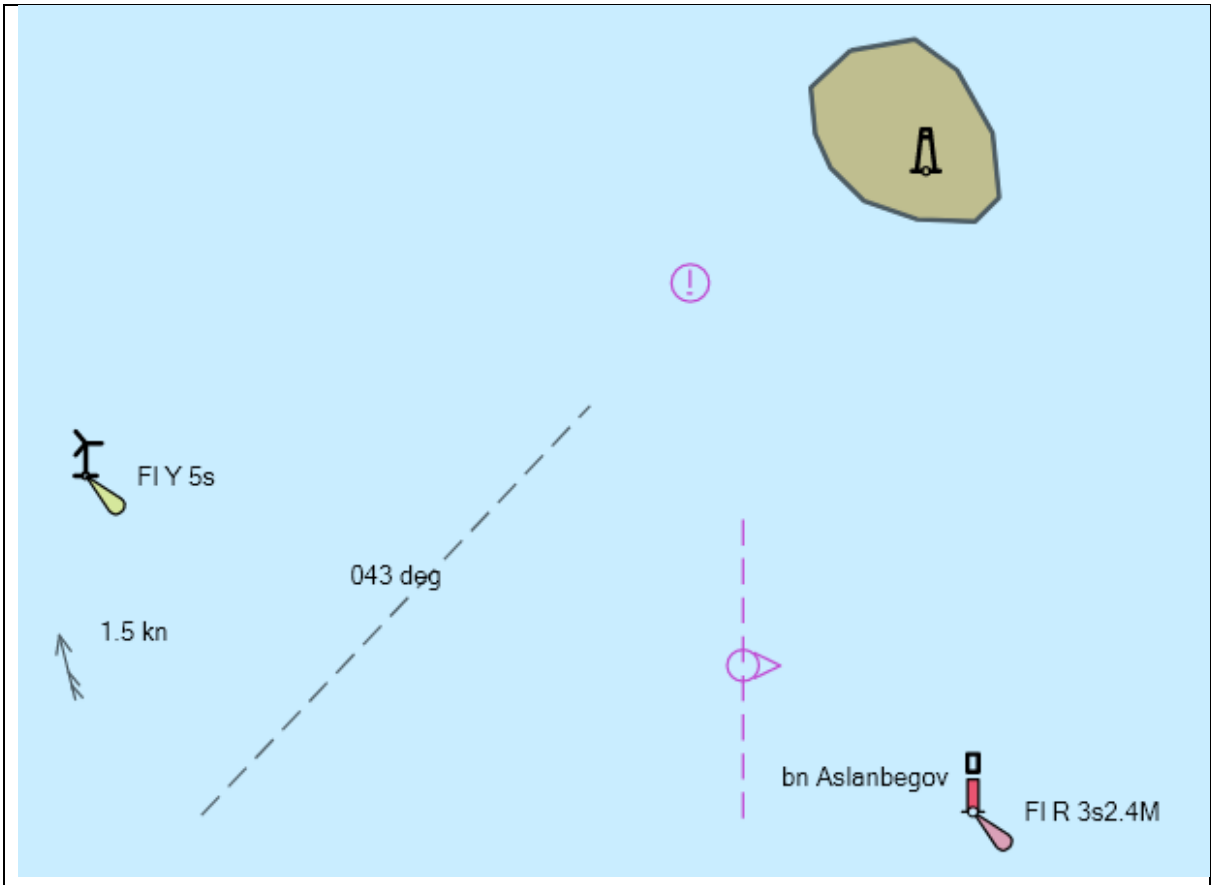
*Load the exchange set **Settings** with the above settings:*
Ensure that the system date is set to the current date and time.

Action

Centre the display on position 32°34.000'S - 61° 21.705'E and then zoom in to a scale of 1:20,000.

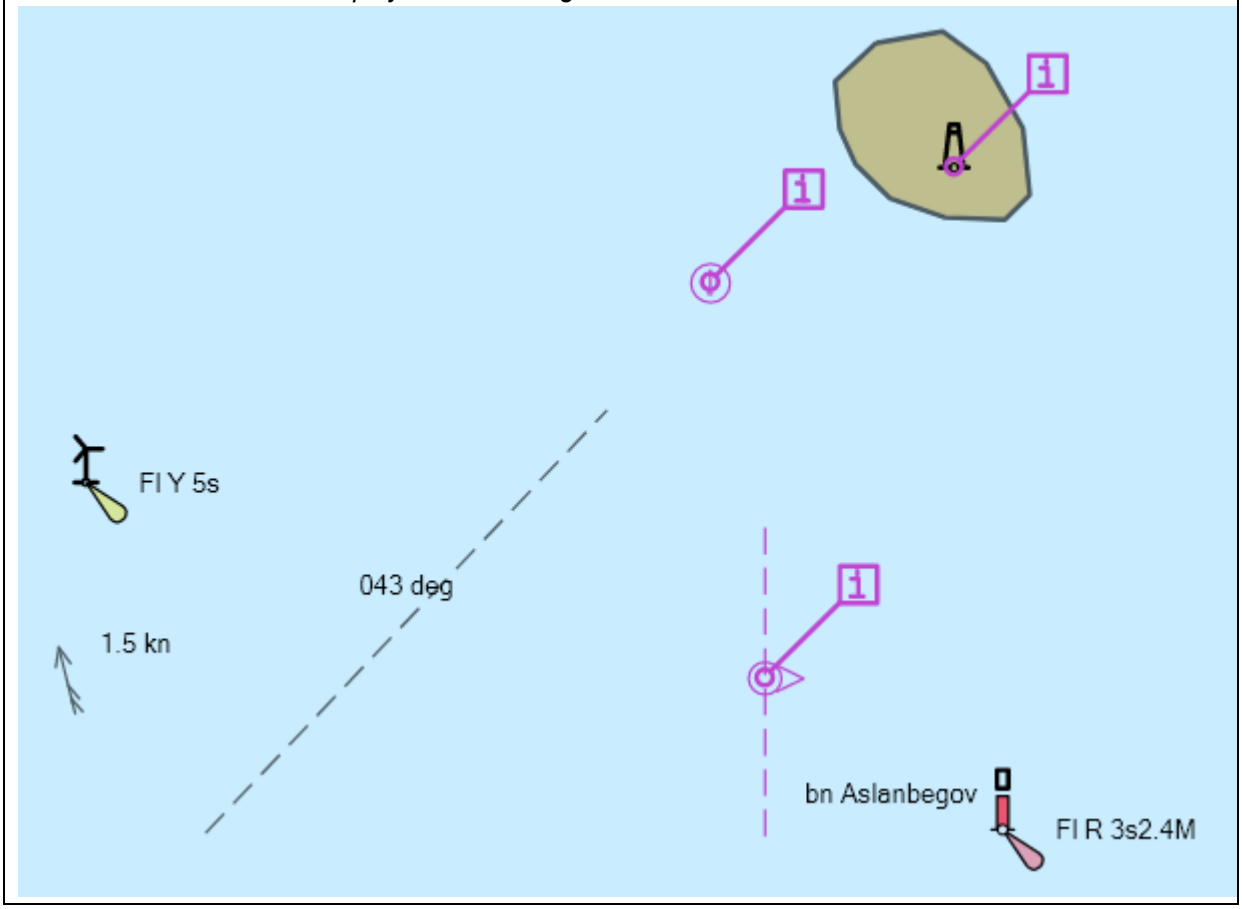
Results

Confirm that the features display as in the image below:

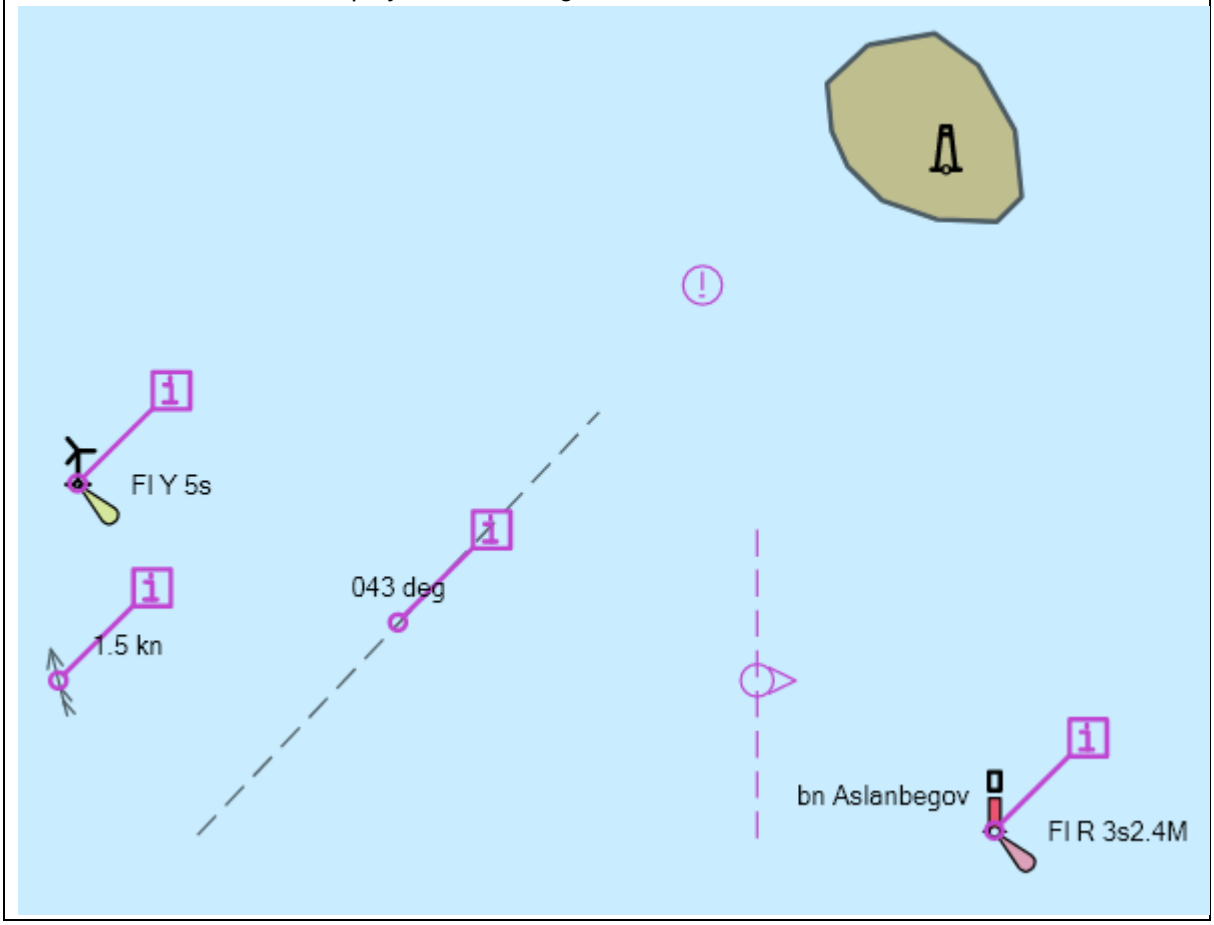


Note: the display should show all of the features above without the chart information symbols.

Action
*Turn "Highlight document" selector **On**.*
Results
Confirm that the features display as in the image below:



Action
Turn "Highlight info" selector ***On****.*
As for test AdditionalInformation1
Confirm that the features display as in the image below:



3.7.7 Scale minimum

Test Reference	ScaleMinimum	IHO Reference IEC Reference	S-98 12.9

Test Description
Disabling Scale Minimum using the Scale min context parameter

Setup	
*Load the exchange set **PowerUp** with the following settings:*	
Exchange Set Name	
DisplayBase	

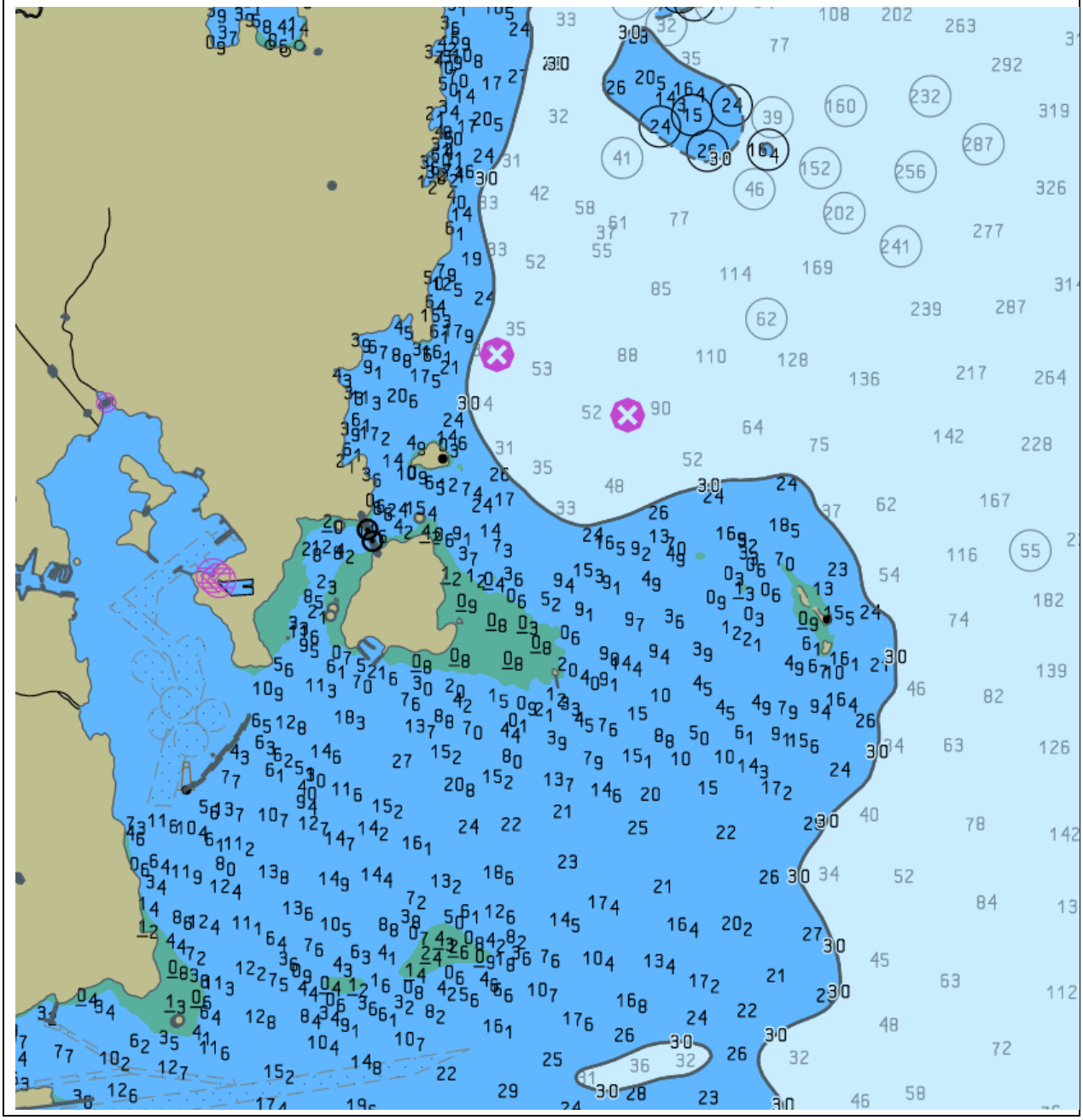
Display Mode		Independent Mariner's Selections (Default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour	30m	Highlight date dependent	
Safety depth	30m	Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols	Off	Chart Text	
Full light lines		Important text	
Ignore scale minimum	Off	**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Night		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:52000
		Orientation	

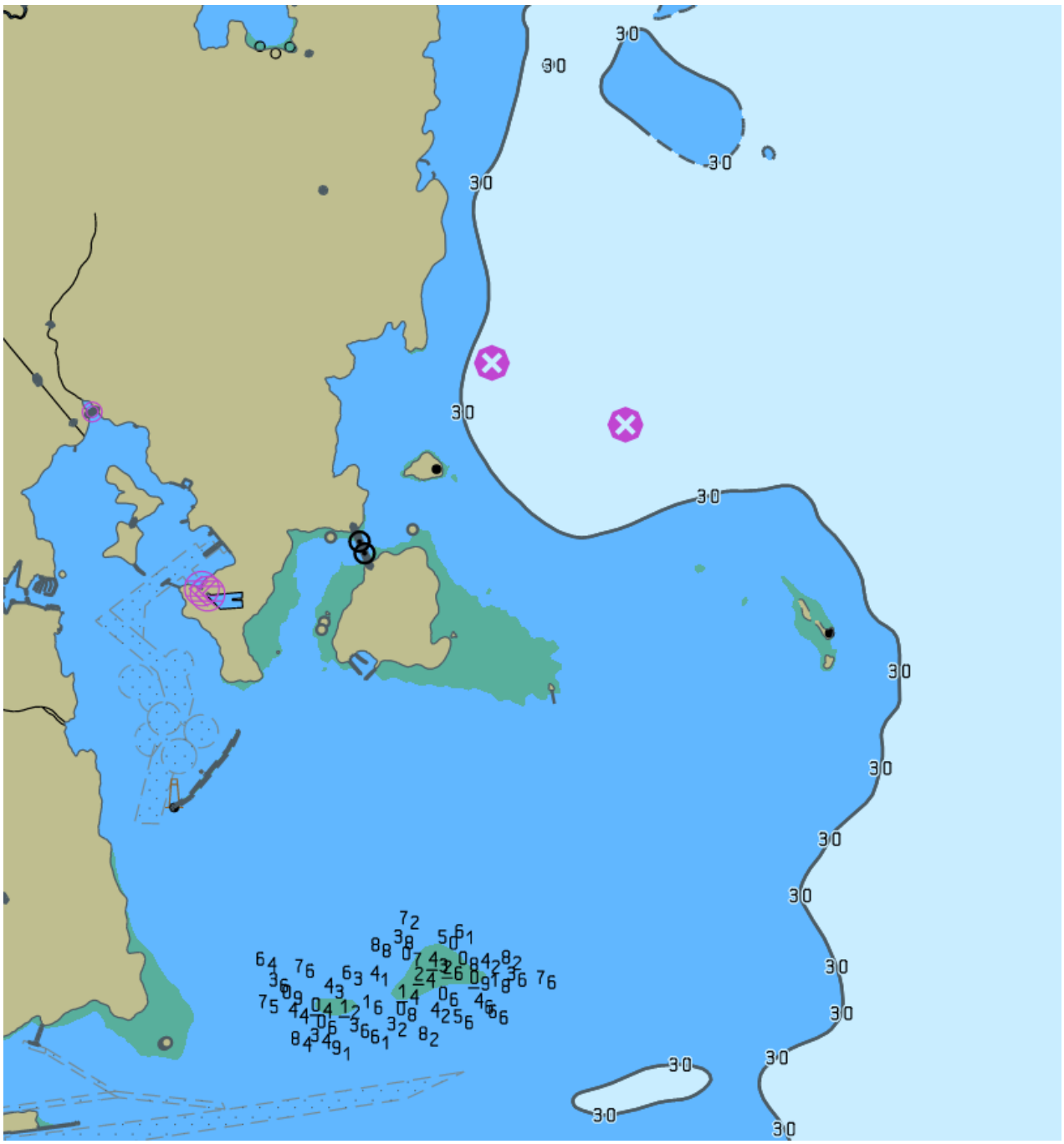
Viewing Groups			
Standard Display		**Other**	
Drying lines		Spot soundings	On
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional			

Setup

*Load the exchange set **PowerUp** with the above settings:*
Action
Centre the display on position 32°28.600'S 61° 02.800'E and then zoom in to a scale of 1:100 000. *1. Observe the display*
As for test AdditionalInformation1
1. Confirm that the features display as in the image below (scale 1:100 000): 

*2. After selecting "Ignore Scale Minimum" to **On** confirm that the features display as in the image below:*



3.7.8 **Full light lines**

Test Reference	FullLightLines	**IHO Reference**	

Test Description
Disabling Full light lines using the Full light lines Mariner's Selection
Setup
*Load the exchange set **PowerUp** with the following settings:*

Exchange Set Name	
InitialPowerUp	

Display Mode		**Independent Mariner's Selections (Default=On)**	
Displaybase		Accuracy	
Context Parameters		Contour label	
Safety contour	30m	Highlight date dependent	
Safety depth	30m	Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols	Off	Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Night		All other chart text	

Date Dependent Objects		**Display**	
Start Date		Centre	
End Date		Scale	1:52000
		Orientation	

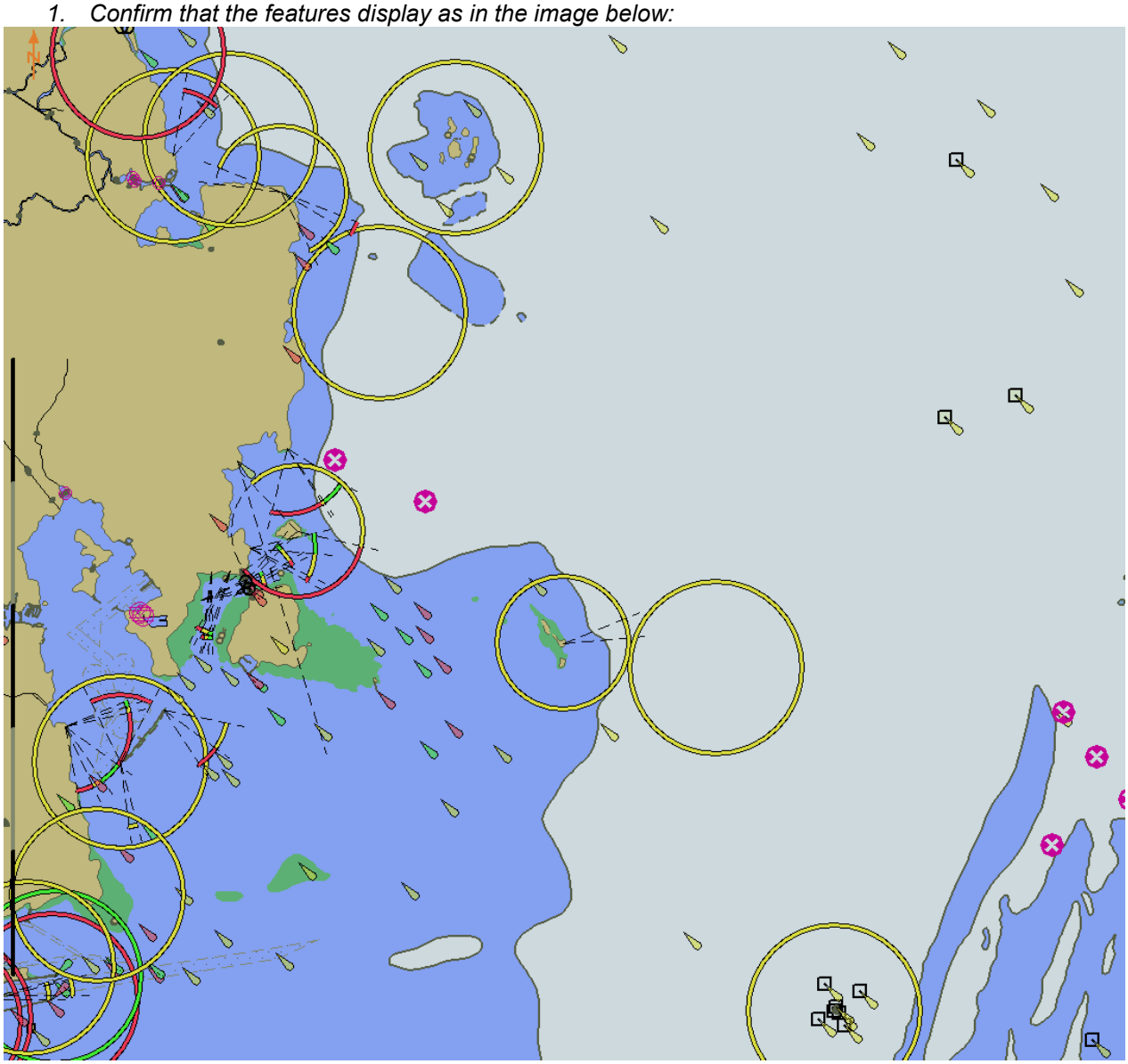
Viewing Groups			
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights	**On**	Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional			

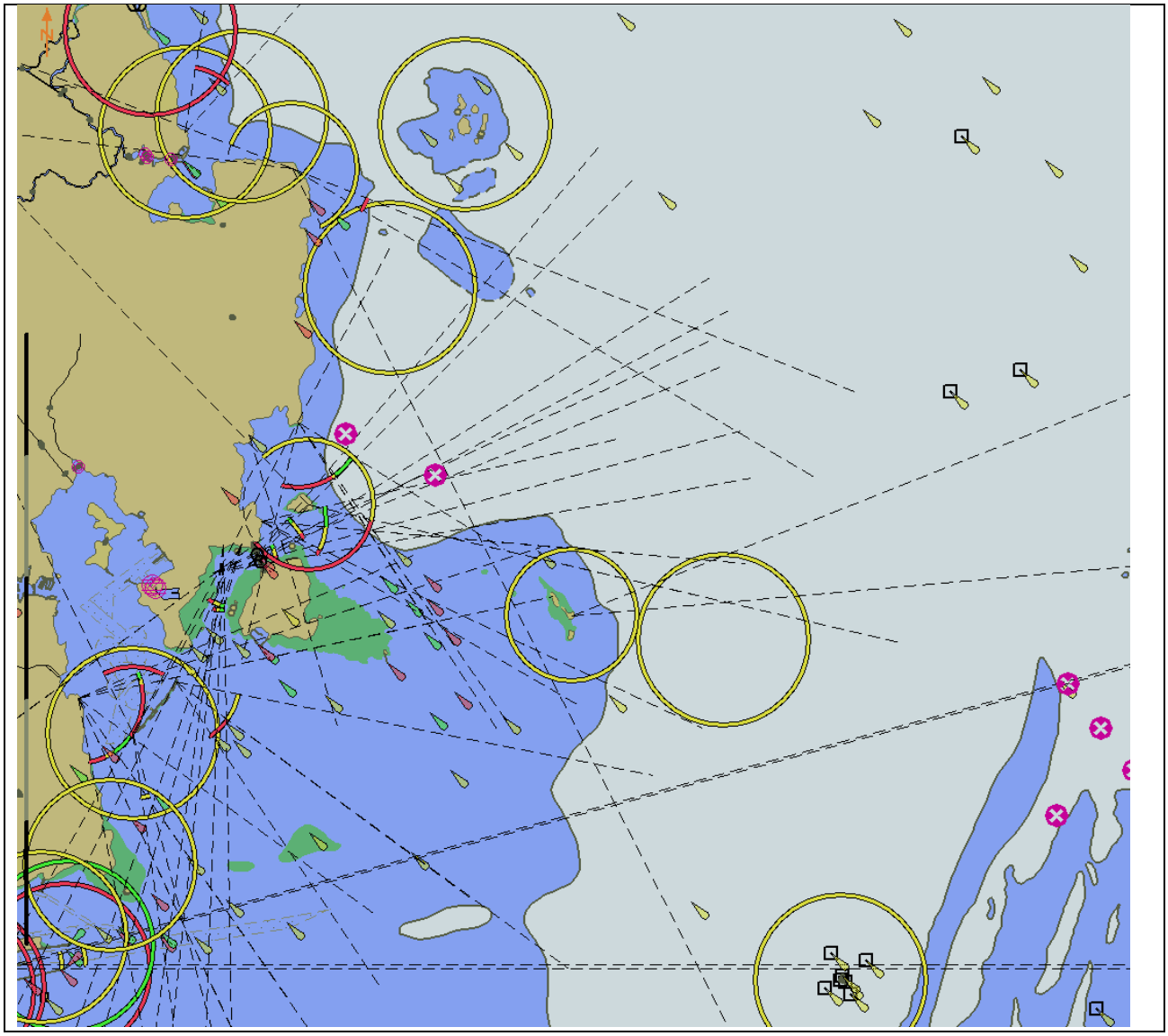
Setup

*Load the exchange set **PowerUp** with the above settings:*
Action
Centre the display on position 32°29.000'S 61° 04.000'E and then zoom in to a scale of 1:100,000. *1. Observe the display* *2.Select Full light lines*
As for test AdditionalInformation1

1. Confirm that the features display as in the image below:



2. After selecting Full light lines confirm that the features display as in the image below:



3.7.9 Display of Text in other languages

Test Reference	OtherLanguages	IHO Reference	S-98 10.3

Test Description
Selecting the display of text in other languages.

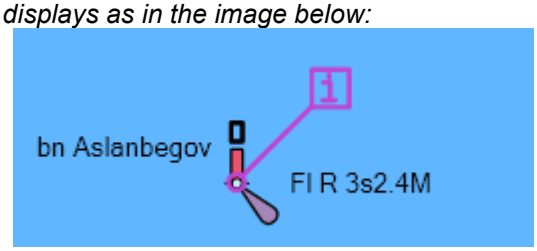
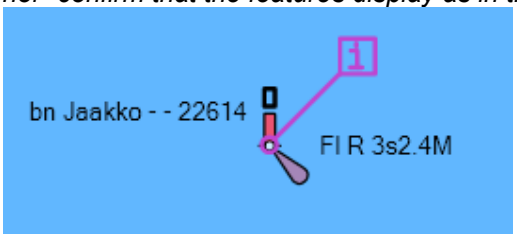
Setup
*Load the **Settings** exchange set*

Exchange Set Name	
DisplayOther	

Display Mode		Independent Mariner's Selections (Default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour	8m	Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	On
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	On
Simplified symbols	false	Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Night		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:52000
		Orientation	

Viewing Groups			
Standard Display		**Other**	
Drying lines		Spot soundings	On
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			
Additional			

Setup			
*Load the **Settings** exchange set :*			
Action			
Centre the display on position 32°34.700'S 61° 22.300'E and then zoom in to a scale of 1:10 000. *1. Observe the display* *2.Select language setting "nor"*			
Result			
1. *Confirm that the feature displays as in the image below:*  2. *After selecting language "nor" confirm that the features display as in the image below:*  *Note: This feature has names in multiple languages.*			

Test Reference	Language Selections	**IHO Reference**	S-98 10.3
Test description			
Multiple language preferences are now mandatory in S-100 ECDIS under S-98: • *New tests for nameUsage values* • *Set user preference list* • *Show display. Need to note multiple languages in labels on screen* • *Change preference ?* • *Also make sure default edge case is included. This will require multiple features and multiple languages. Also include cases where no nameUsage is given (a default).* • *Also include information.text and picrep which have language preferences as well. A check of the S-101 FC should be done to ensure all cases are captured.*			

3.7.10 **Use of language packs.**

Test Reference	LanguagePacks	**IHO Reference**	S-98 15.1

Test description

This test ensures the ECDIS is capable of displaying text and catalogue entries in multiple languages.

This is likely to be using the S-124 language pack (currently under development)

Setup

- *Load exchange set **InitialPowerUp***
- *Load exchange set **LanguagePacks***

Action

Centre the display on position 32°34.700'S 61° 22.300'E and then zoom in to a scale of 1:10 000.

1. Observe the display
2.Select language setting "fra"

Results

Verify

1. Confirm that the pick report contains the following information:
[**TBD]**

2. After selecting language "fra" confirm that the pick report contains the following information:
[**TBD]**

3.8 Display priority

3.8.1 Different priority

Test Reference	DifferentPriority	IHO Reference	S-101PC

Test Description	
Different priority and different geometry	
Exchange Set Name	
DisplayOther	

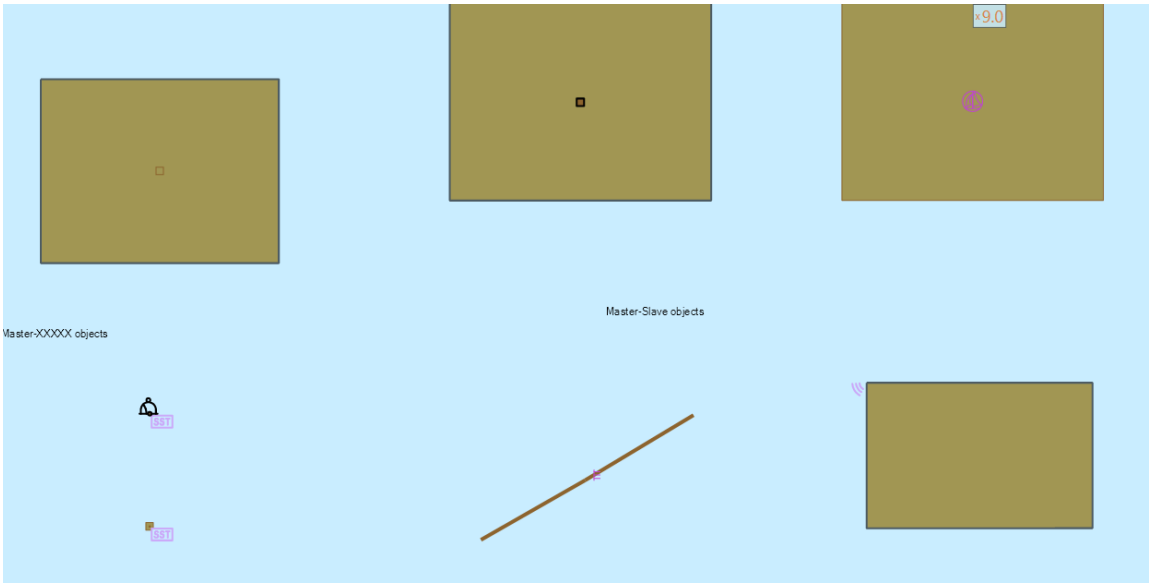
Display Mode		Independent Mariner's Selections (Default=On)	
Other		Accuracy	Off
Context Parameters		Contour label	Off
Safety contour	**30 m**	Highlight date dependent	Off
Safety depth	N/A	Highlight document	Off
Deep Contour	N/A	Highlight info	Off
Shallow contour	N/A	Shallow pattern	**On**
Four shades	Off	Unknown	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	**On**
Full light lines	Off	Important text	**On**
Ignore scale minimum	Off	**Other Text**	
Shallow water dangers	Off	Names	**On**
Palette		Light description	**On**
Day		All other chart text	**On**

Date Dependent Objects		Display	
Start Date		Centre	*32°20.400'S 61°20.650' E*
End Date		Scale	1:5 000
		Orientation	

Viewing Groups			
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			
Additional			

Setup
Action
*Import the exchange set **DisplayPriorities1** (101AA002J5X0001.000)* *View the features at indicated scale and position*
Result

Confirm that items 1-6 display as shown in the graphic below:



3.9 Display Priorities

3.9.1 Same priority

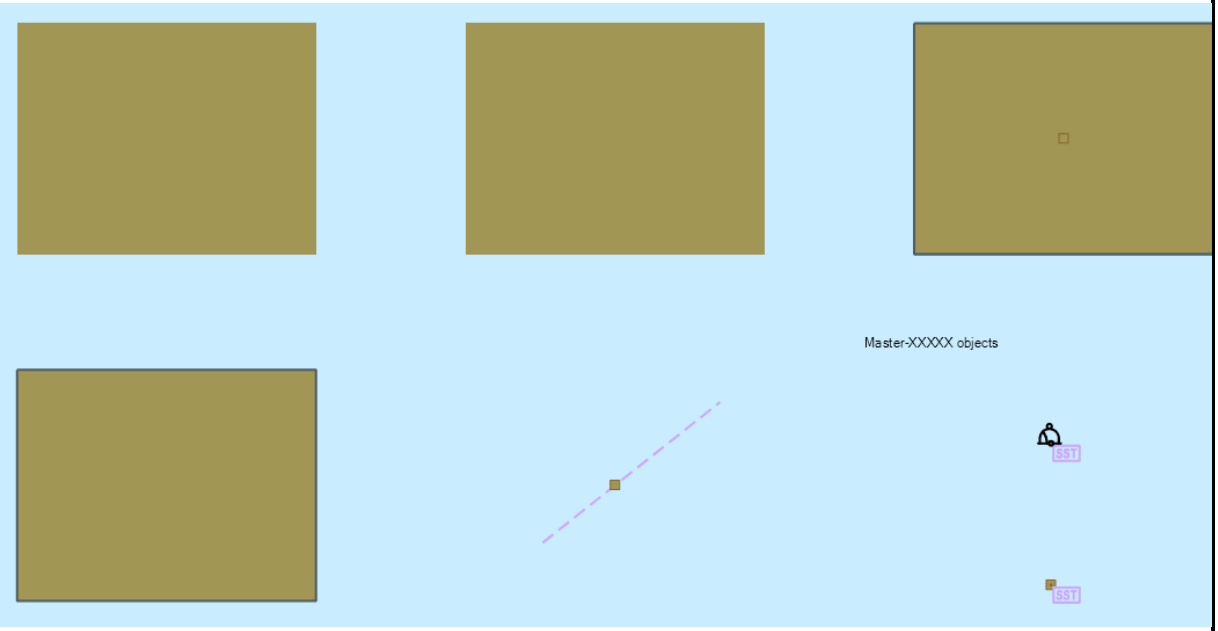
Test Reference	SamePriority	IHO Reference	S-101PC
Test Description			
Same priority and different geometry			

Loaded Data	
Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)			
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			

Alert Highlights (Standard)			
Additional			
Setup			
As for test DifferentPriority ..			
Action			
View the features at position 32°20.400'S 61°21.900' E scale 1:5000			
Results			
Confirm that items 1-6 display as shown in the graphic below 			

3.9.2 Line Suppression

Test Reference	LineSuppression	IHO Reference	S-101PC

Test Description

Test for correct Line suppression

Loaded Data

Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

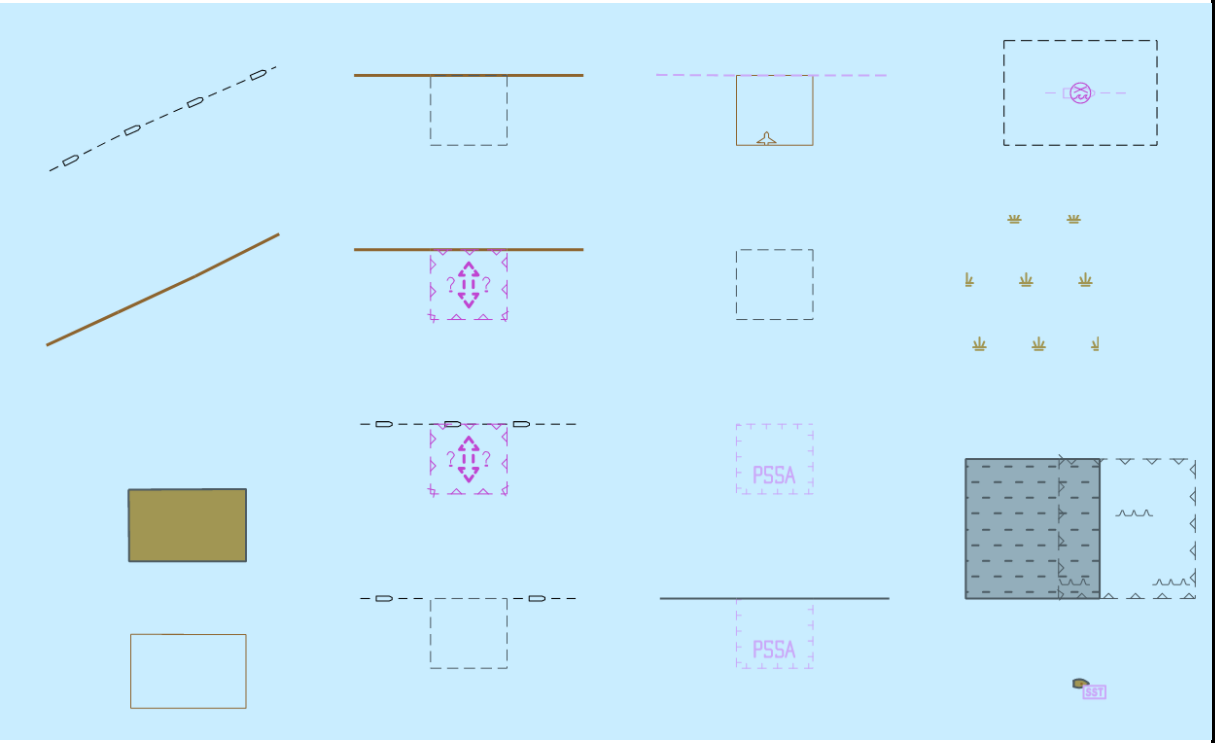
Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional

Setup
As for test DifferentPriority
Action
View the features at position 32°20.400'S 61°23.150' E scale 1:5 000
Results
Confirm that items 1-16 display as shown in the graphic below



3.9.3 Manual Updates

Test Reference	ManualUpdates	IHO Reference	S-98 12.12.1

Test Description

Manual updates. Test for support for creation and correct alert/indication behaviour. S-98 12.12 and Appendix A

Loaded Data

Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	On
Full light lines		Important text	On
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	On
Palette		Light description	On
Day		All other chart text	On

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional

Setup

As for test DifferentPriority

TODO:

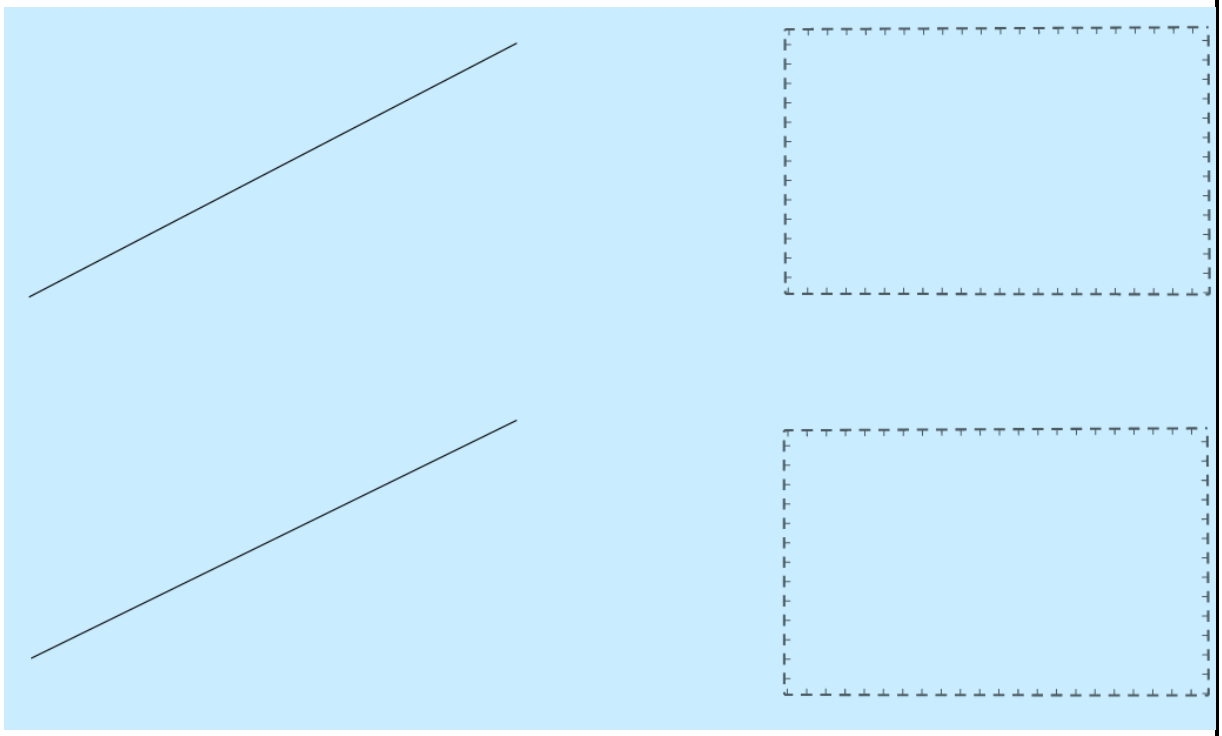
- ***Make manual updates of a selection of primitives and features from the Manual Updates FC***
- ***Test portrayal matches displayed screen shots***
- ***Construct route across manual update features.***
- ***Ensure alerts and indications are preserved for manual updates.***

Action

View the feature at position 32°21.100'S-61°20.650'E scale 1:5 000

Results

Confirm that items 1-4 display as shown in the graphic below



3.9.4 **Text Display**

Test Reference	TextDisplay1	**IHO Reference**	

Test Description

Text display

Loaded Data

Exchange Set Name	

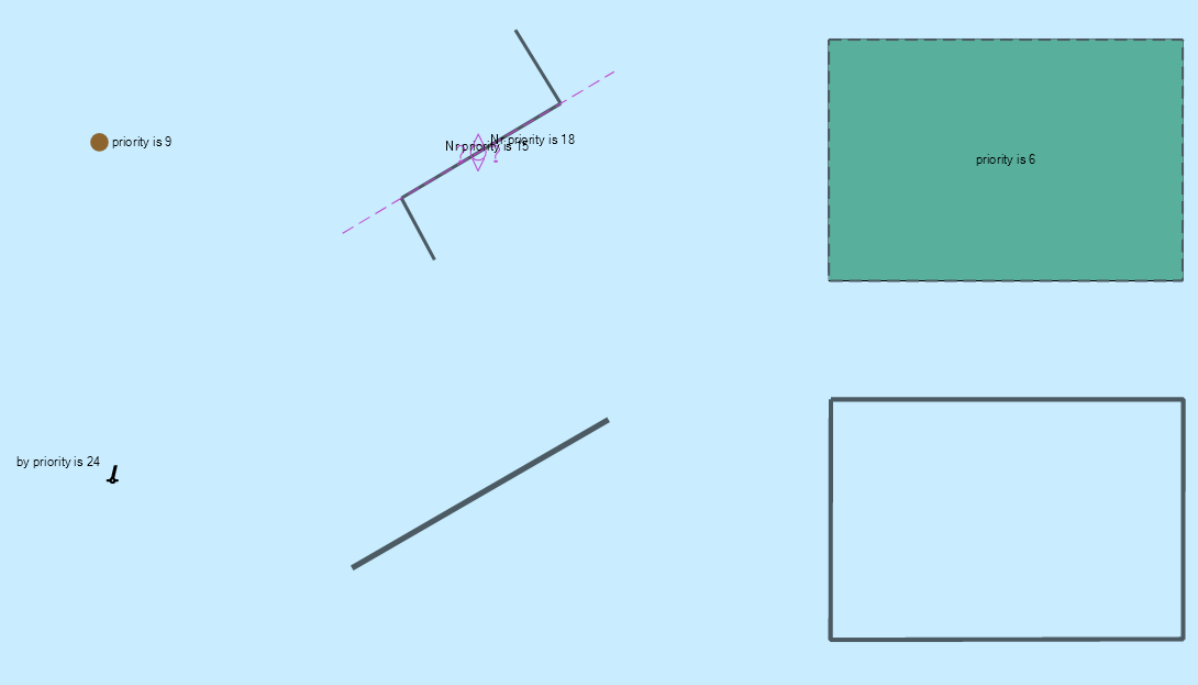
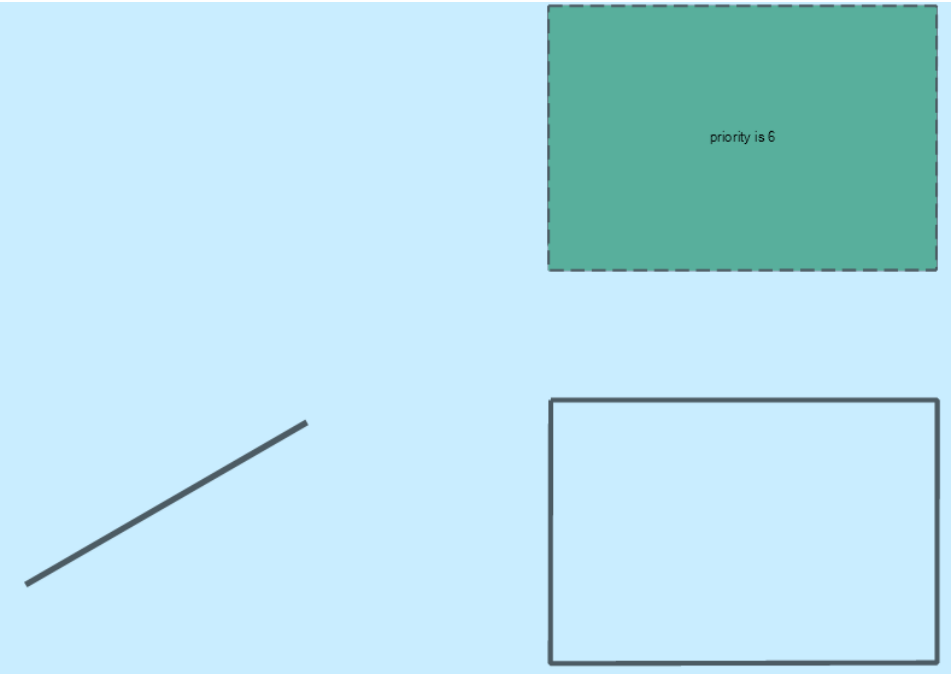
Display Mode		**Independent Mariner's Selections (default=On)**	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		**Display**	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

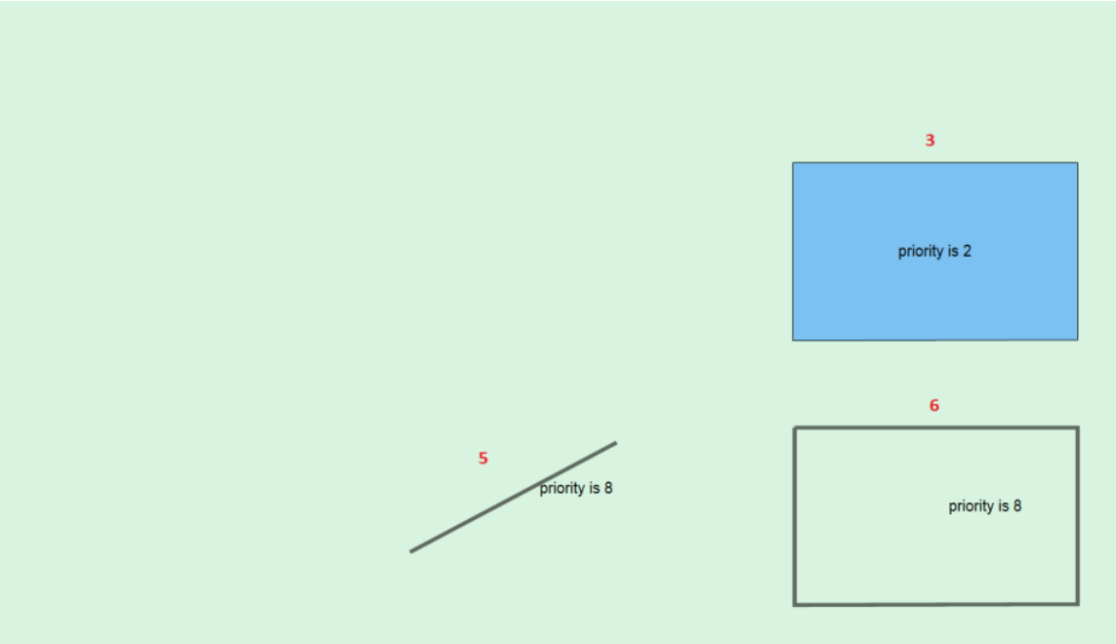
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional

Setup
As for test DifferentPriority..
Action
View the features at position 32°21.100'S 61°21.900'E scale 1:5 000
Results
Confirm that items 1 to 6 display as shown in the graphic below:  *(Alternative 1: Manufacturer may implement display of text only once for a feature which is masked)*
Set Display Category Standard *Confirm that items 1 to 6 display as shown in the graphic below* 

set Display Category Base Display
View the features at position 32°21.100'S 61°21.900'E scale 1:5 000

Confirm that items 3,5 and 6 display as shown in the graphic below:



3.9.5 Display of area borders

Test Reference	AreaBorders	IHO Reference	S-101PC

Test Description

Display of area borders

Loaded Data

Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

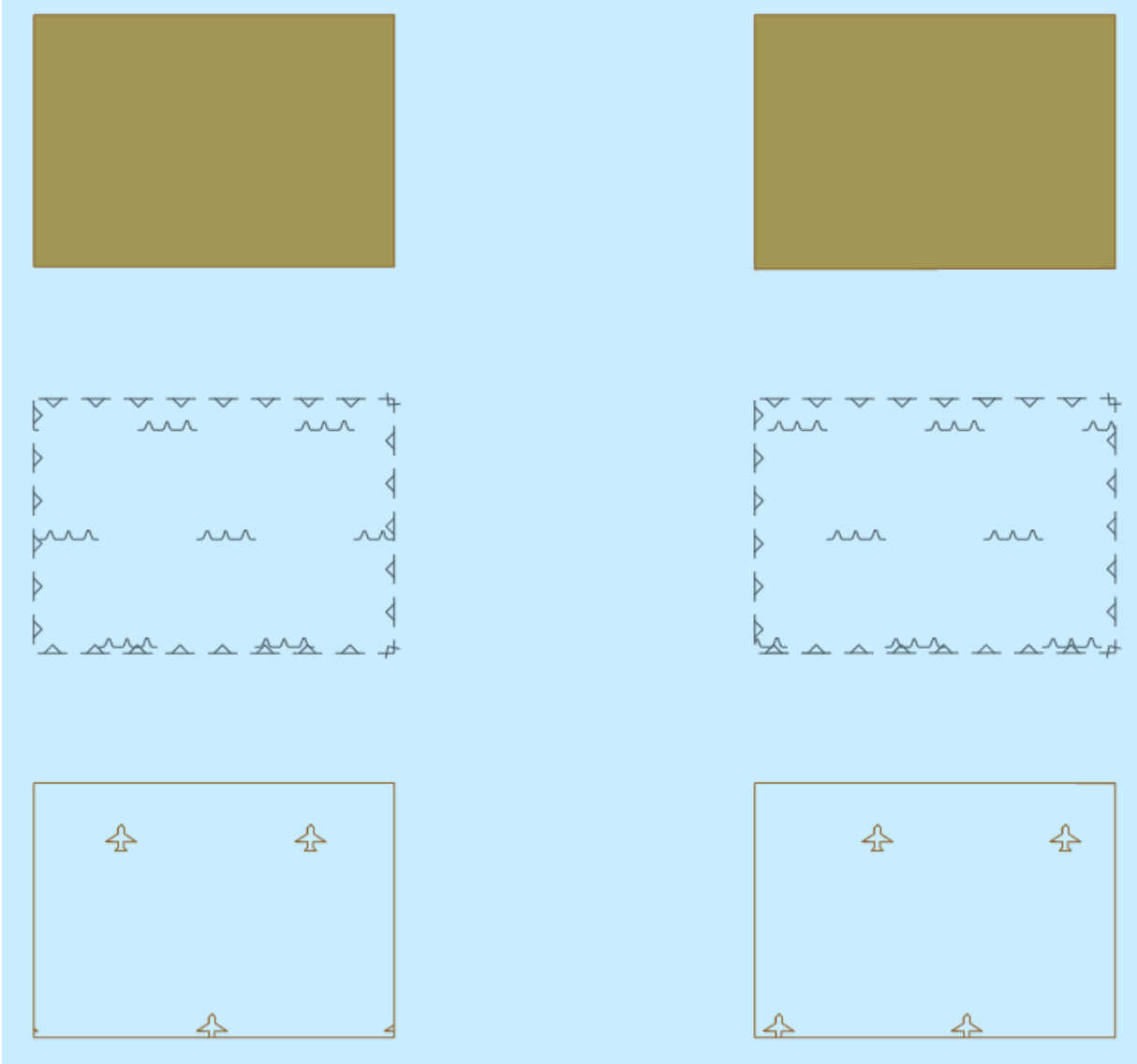
Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional

Setup			
As for test TextDisplay1 *except* *Set Display Category Other*			
Action			
View the features at position 32°21.100’S 61°23.150’E scale 1:5 000			
Results			
Confirm that items 1-6 display as shown in the graphic below:			



3.9.6 Display of unknown symbols

Test Reference	UnknownSymbols	IHO Reference	S-101PC

Test Description

Display of unknown symbol

Loaded Data

Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

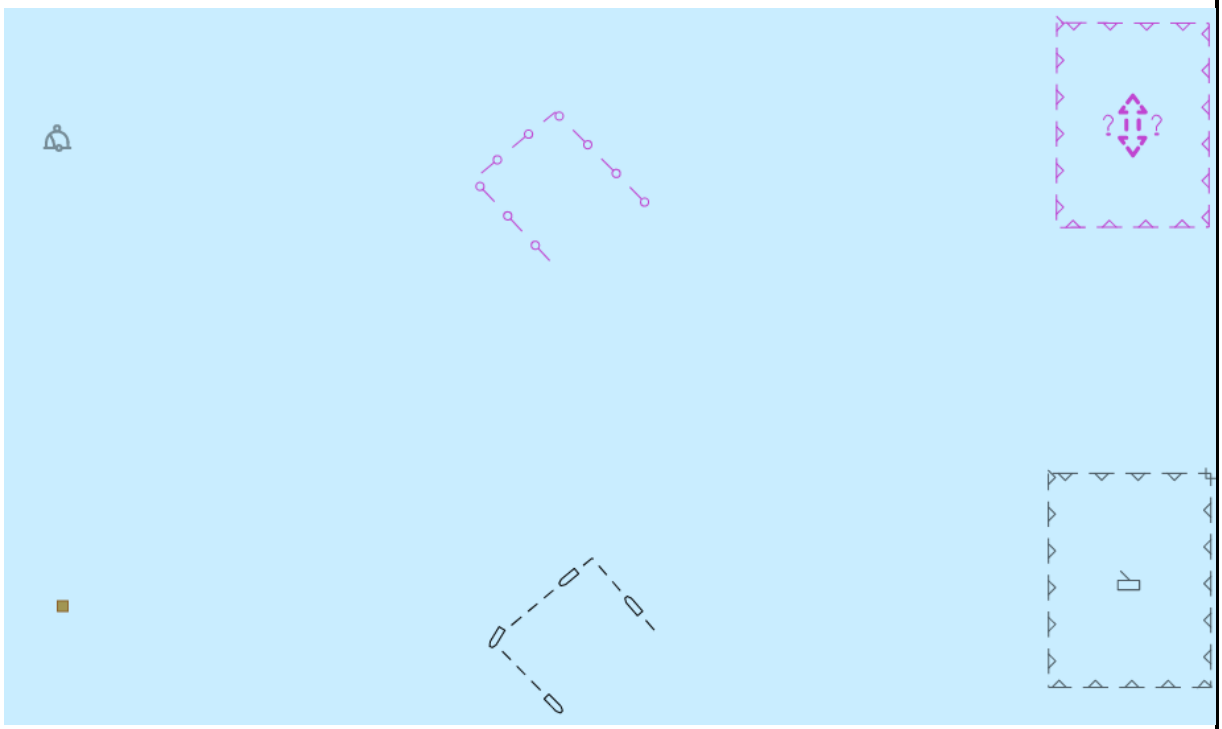
Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional

Setup
As for test AreaBorders
Action
View the features at position 32°21.850'S 61°20.650'E scale 1:5000
Results
Confirm that items 1-6 display as shown in the graphic below:



3.9.7 **Boundary display for unofficial data**

Test Reference	BoundaryDisplay1	**IHO Reference**	S-98 9.1.1

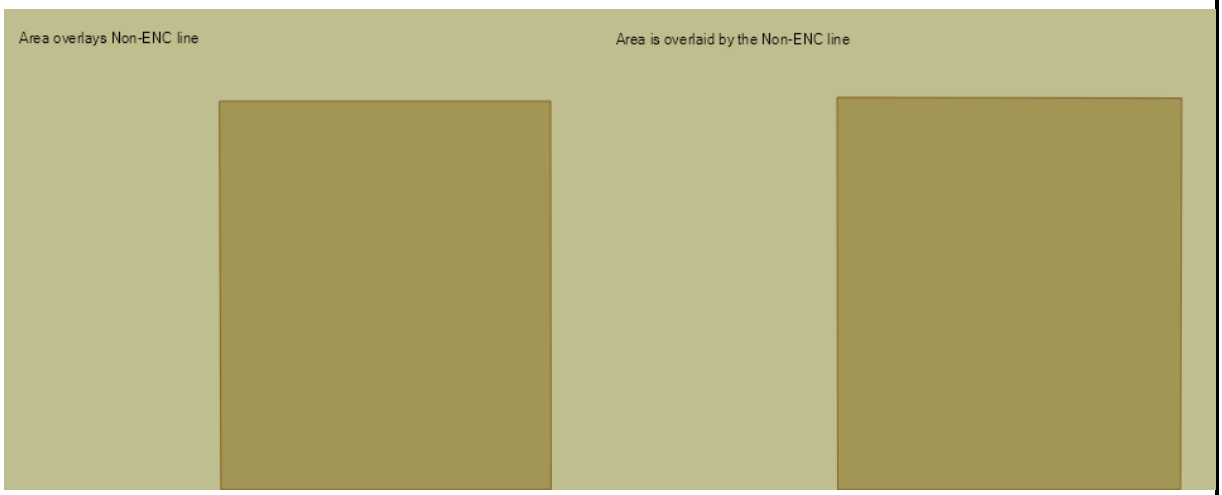
Test Description			
Unofficial data boundary display.			
Loaded Data			
Exchange Set Name			

Display Mode		**Independent Mariner's Selections (default=On)**	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		**Display**	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

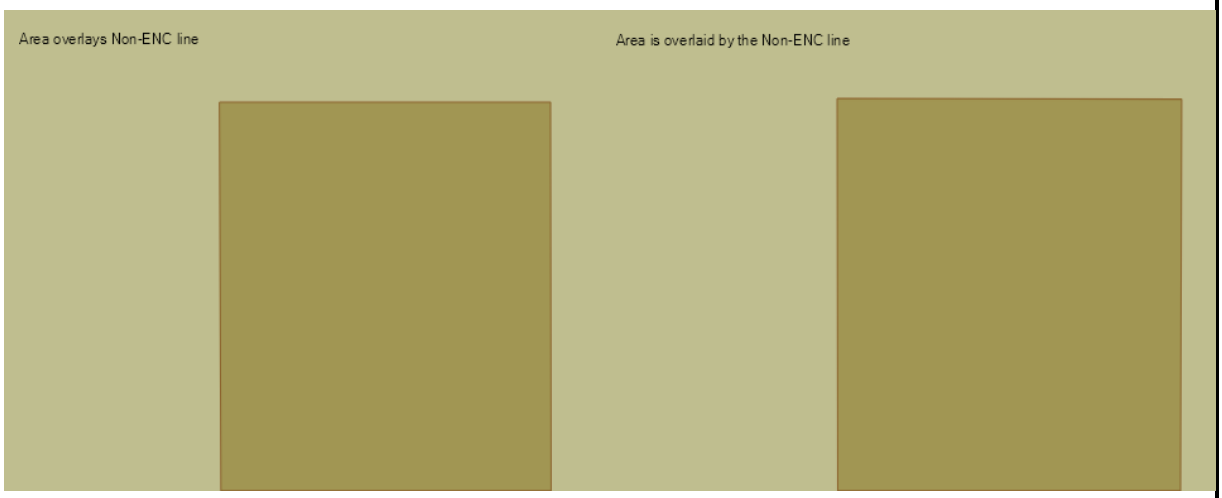
Viewing Groups (Default = On)			
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			
Additional			

Setup			
*As for test AreaBorders and in addition, load the exchange sets **Settings** and **1012J005X0002***			
Action			
View the features at position 32°22.450'S 61°24.250'E scale 1:2 000			
Results			
Confirm that items 1 and 2 display as shown in the graphic below:			



TBD

Alternative 1: Orange slashes are under left hand side dark brown area



Alternative 2: Orange slashes are above left hand side dark brown area

TBD

Test Reference	BoundaryDisplay2	IHO Reference	S-98 12.3.1

Test Description

Scale boundary display

Loaded Data

Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries	**On**	Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional

Setup
*As for test AreaBorders and in addition Load dataset **101AA002J4X0001.000**, contained in exchange set **DisplayPriorities.***

Action
View the features at position 32°22.450'S 61°23.800'E scale 1:2 000
Results

Confirm that items 1 and 2 display as shown in the graphic below:



Alternative 1: Line style indicating side of larger scale available (complex line style with thick line at edge and double 1 pixel lines on larger scale available side)

tbd



Alternative 2: Line style just indicating scale border (1 pixel line)

TBD

3.9.8 Overscale Pattern

Test Reference	OverscalePattern1	IHO Reference	S-98 12.3.2

Test Description

Overscale pattern display

Loaded Data

Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

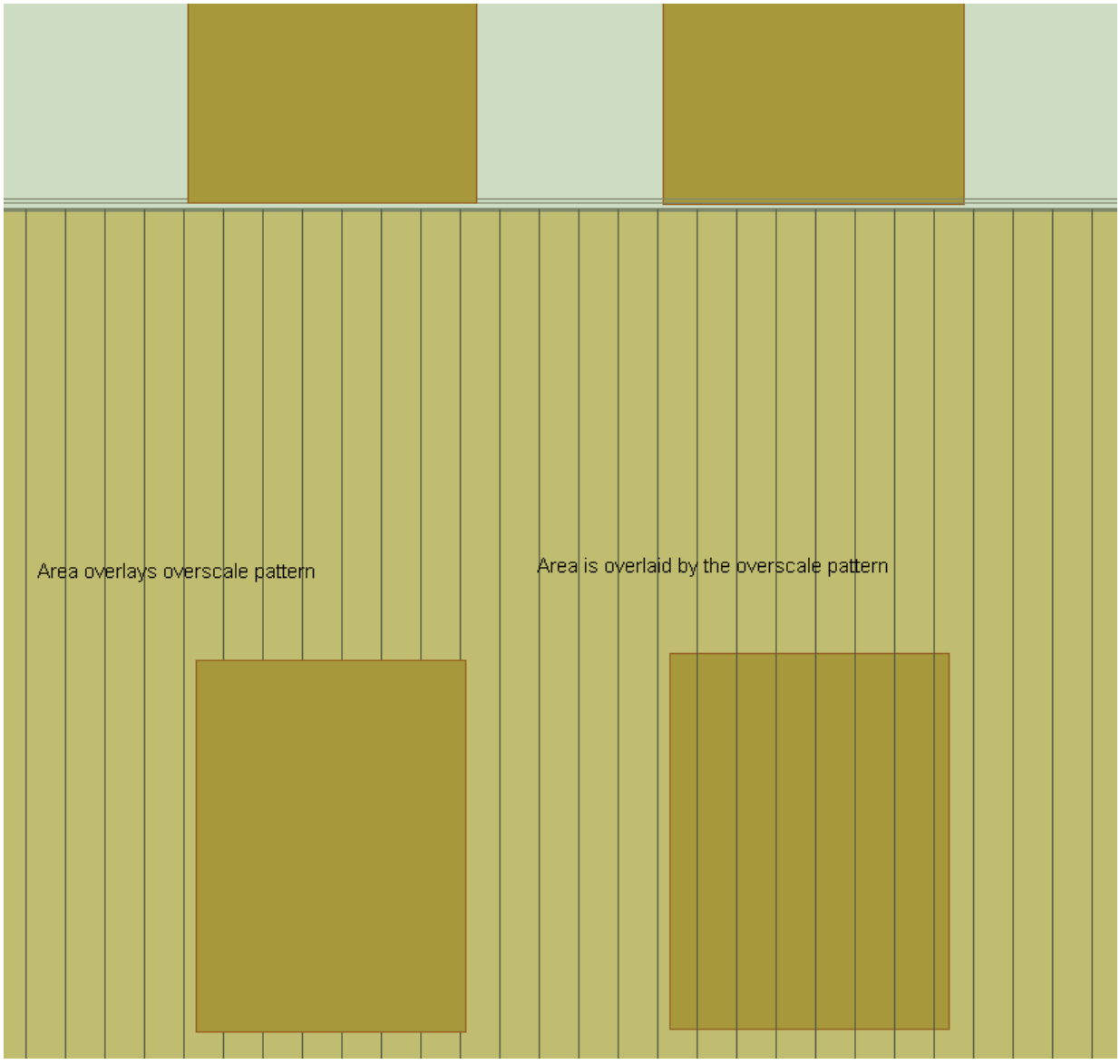
Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries	**On**	Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional

Setup
As for test BoundaryDisplay2
Action
View the features at position 32°22.600'S 61°23.800'E scale 1:2 000
Results

Confirm that items 1 and 2 display as shown in the graphic below:



3.9.9 Display of features affected by Complex Portrayal Procedures

Test Reference	ComplexPortrayal	IHO Reference	S-101PC

Test Description

Display of features with priority affected by complex portrayal algorithms

Loaded Data	
Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

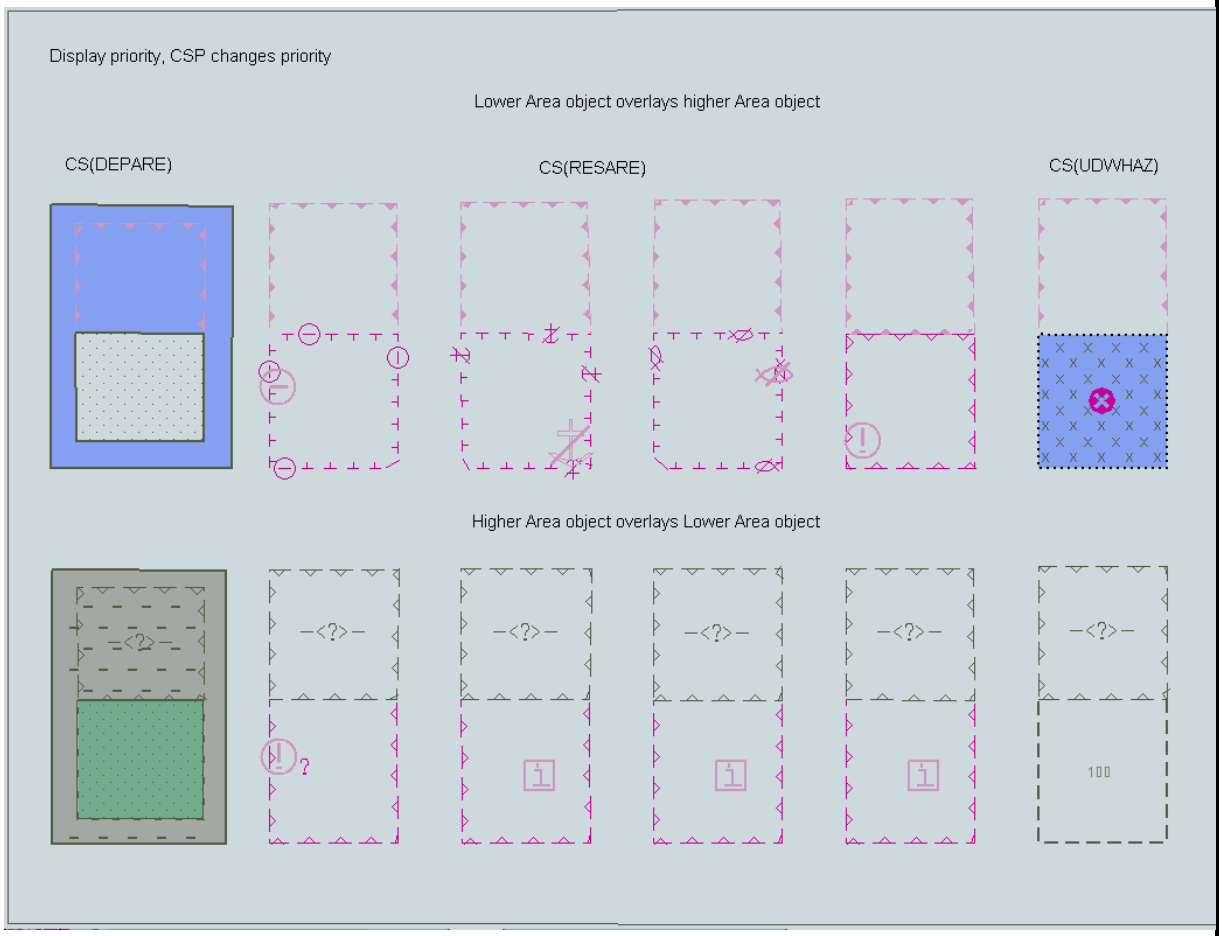
Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional			

Setup
As for test DifferentPriority
Action
View the features at position 32°21.850’S 61°23.150’E scale 1:5 000
Results
Confirm that items 1-12 display as shown in the graphic below:



3.9.10 Display of Centred Symbols

Test Reference	CentredSymbols1	IHO Reference	S-101PC

Test Description

Display of centred symbol in the centre of an area

Loaded Data

Exchange Set Name	

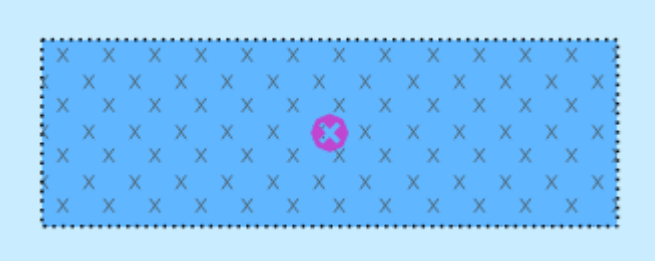
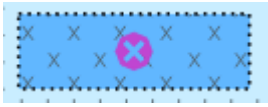
Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

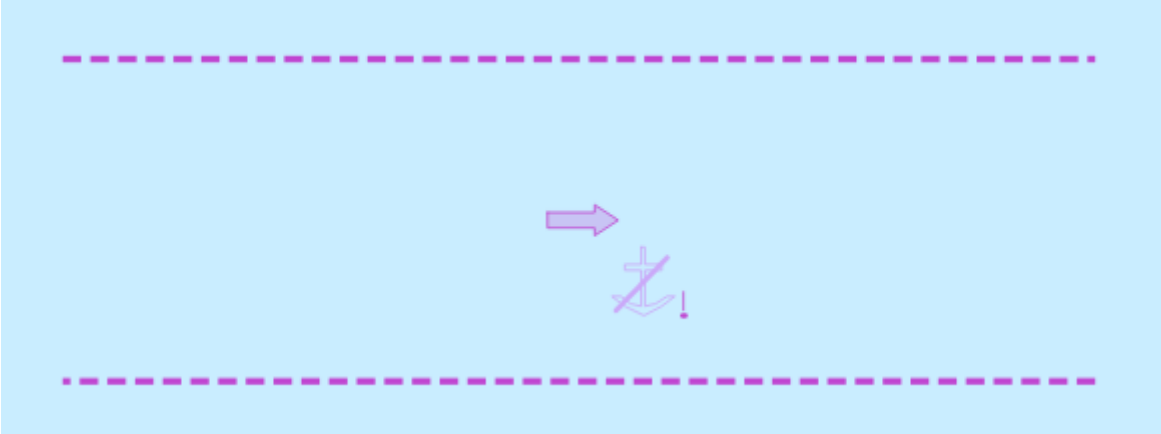
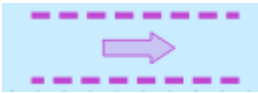
Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

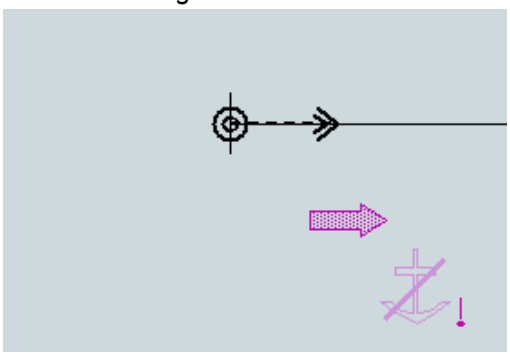
Viewing Groups (Default = On)

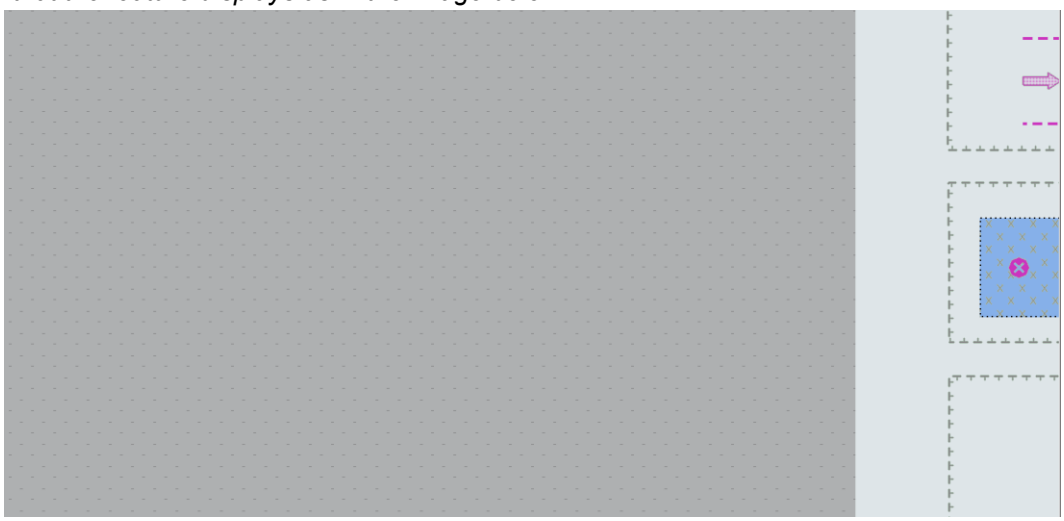
Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

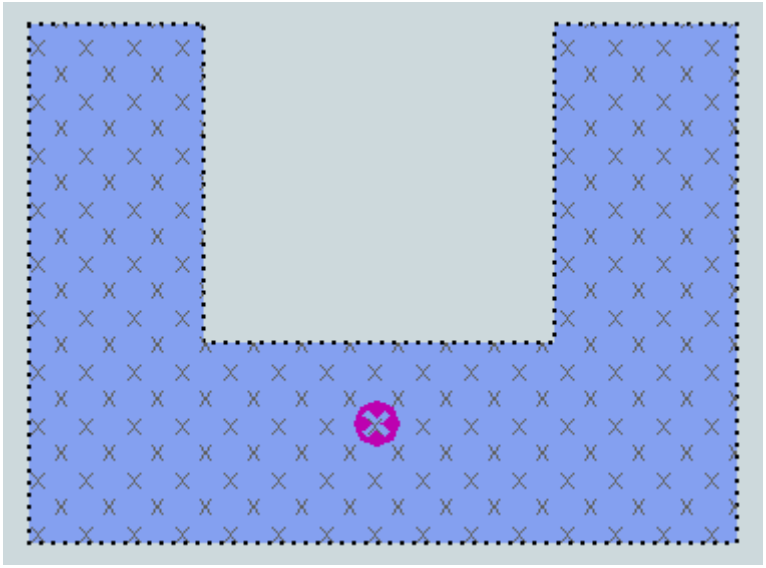
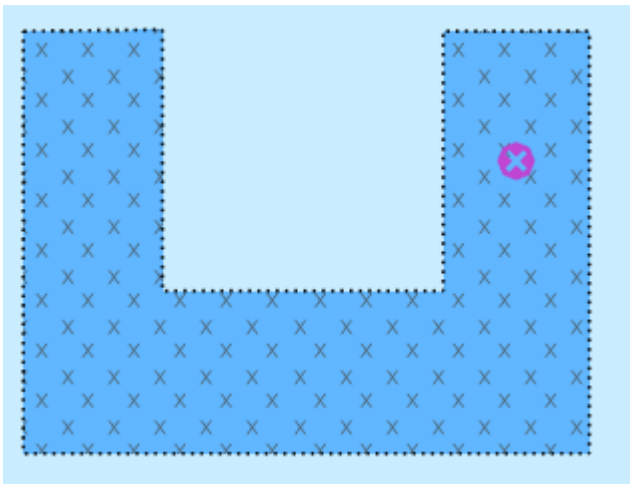
Additional

Setup
*Load the exchange set **Settings** with the following settings:* • *Select Display Category Other* • *Select Symbolized Boundaries* • *Select Simplified Point Symbols = false* • *Set Safety contour value to 10 m* • *Select Shallow water dangers* ..
Action
Centre the display on position 32°32.805'S 61° 21.290'E and then zoom in to a scale of 1:20 000
Results
Confirm that the feature displays as in the image below:  *Zoom out to scale 1:50 000 and confirm that the feature now displays as follows* 

Action
Centre the display on position 32°32.085'S 61° 21.415'E and then zoom in to a scale of 1:10 000.
Results
Display of centred symbols offset *Confirm that the feature displays as in the image below:*  *Note: the display should show the centred symbol(s) offset.* *Zoom out to scale 1:50 000 and confirm that the feature now displays as follows:*  *Note: the display should only show the arrow as above without the centred symbol(s) offset.*

Action
Centre the display on position 32°32.085'S 61° 21.415'E and then zoom in to a scale of 1:1 000. *Simulate own ship on position 32°32.085'S 61° 21.415'E*
Results
Confirm that the feature displays as in the image below:  **tbd** *Note: the display should show own ship symbol centred with the arrow and restriction symbol(s) offset. Even when changing the display scale the separation between own ship and the symbols shall be maintained.* *Note the offset between arrow and restriction symbol is specified while the own ship symbol just has to be not overlapping the centred symbols in the chart.*

Action
Display of centred symbols when area is partially off screen *Centre the display on position 32°32.805'S 61° 18.460'E and then zoom in to a scale of 1:20 000.*
Results
Confirm that the feature displays as in the image below:  *Note: the display should show the centred symbol in the centre of the visible area.*

Setup
As for test CentredSymbols1
Action
Display of centred symbols within complex areas *Centre the display on position 32°30.970'S 61° 21.330'E and then zoom in to a scale of 1:20 000.*
Results
Confirm that the feature displays as in the image below:  **TBD**  *Note: the display should show the centred symbol within the* ***Obstruction*** *area. The display may be different from the example shown above as long as the centre of the centred symbol remains within the* ***Obstruction*** *area.*

3.10 Overscale

3.10.1 Display of overscale indication

Test Reference	OverscaleIndication1	IHO Reference	S-98 12.3

Test Description

Display of overscale indication

Loaded Data

Exchange Set Name	

Display Mode		Independent Mariner's Selections	
Other		Accuracy	**On**
Context Parameters		Contour label	Off
Safety contour	7 m	Highlight date dependent	Off
Safety depth	7 m	Highlight document	Off
Deep Contour	N/A	Highlight info	**On**
Shallow contour	N/A	Shallow pattern	Off
Four shades	Off	Unknown	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	Off
Full light lines	Off	Important text	Off
Ignore scale minimum	Off	**Other Text**	
Shallow water dangers	Off	Names	**On**
Palette		Light description	**On**
Day		All other chart text	**On**

Date Dependent Objects		Display	
Start Date		Centre	32°27.447'S 060°58.599'E
End Date		Scale	1:60 000
		Orientation	

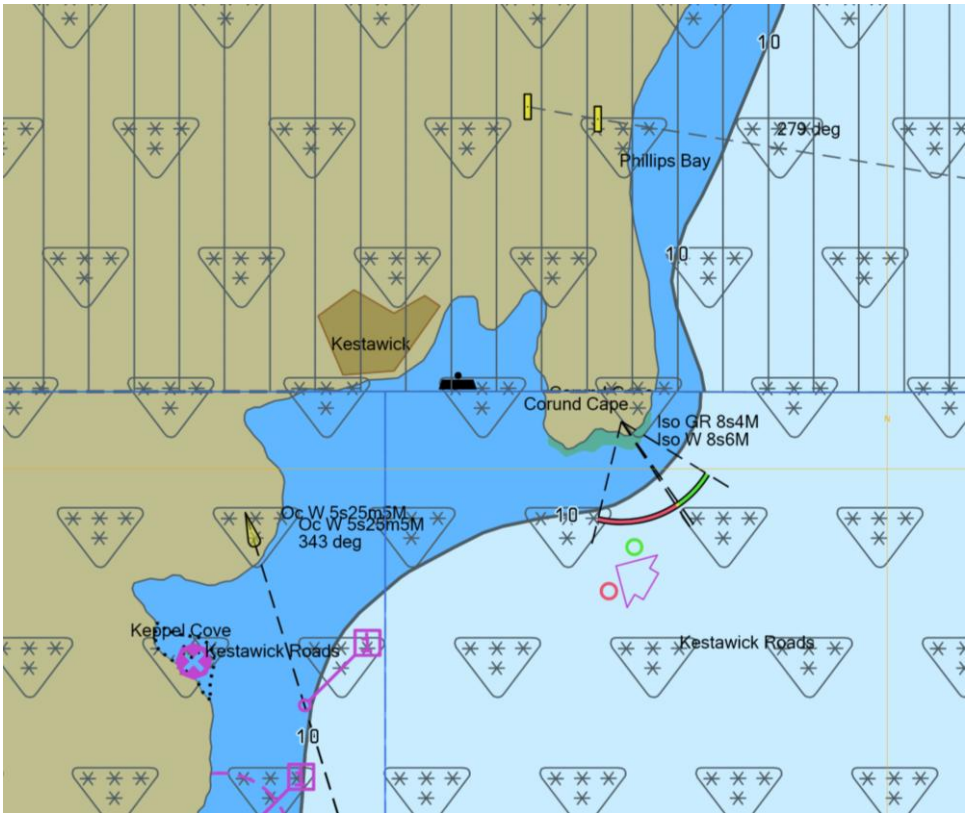
Viewing Groups

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional

Setup

As per test *UpdateCatalogues.*
Action
Import the exchange set ***PowerUp.***   *Zoom to 1:40 000 or beyond. This is larger than the optimum display scale of the largest scale dataset.*
Results
Confirm that an overscale indication is provided.   *For example, if scale zoomed is 1:40 000 then for areas based on optimum display scale 1:45 000 the overscale factor shown in the indication shall be* ***x1.1****.*

Results
Confirm that the overscale pattern AP(OVERSC01) is displayed.   

3.10.2 Indication of larger scale data

Test Reference	LargerScaleData	**IHO Reference**	S-9812.3.3
Test description			
Indication of better (larger) scale data being available.			
Setup			
Load the exchange set ***PowerUp*** *Position the own ship at 32°29.668'S, 060°55.864'E with a heading of 234.0 degrees. This will place the ship at the jetty in Micklefirth.*			
Action			
Select a viewing scale of 1:100 000. *Observe this dataset.*			
Results			
Position the displayed area over the own ship. *Confirm that an indication is provided that larger scale is available.*			

3.10.3 Boundaries between optimum display scales

Test Reference	ScaleBoundary	IHO Reference	S-98 12.3.1

Test Description

Scale Boundaries between different areas of Optimum Display Scale

Loaded Data

Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Displaybase		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

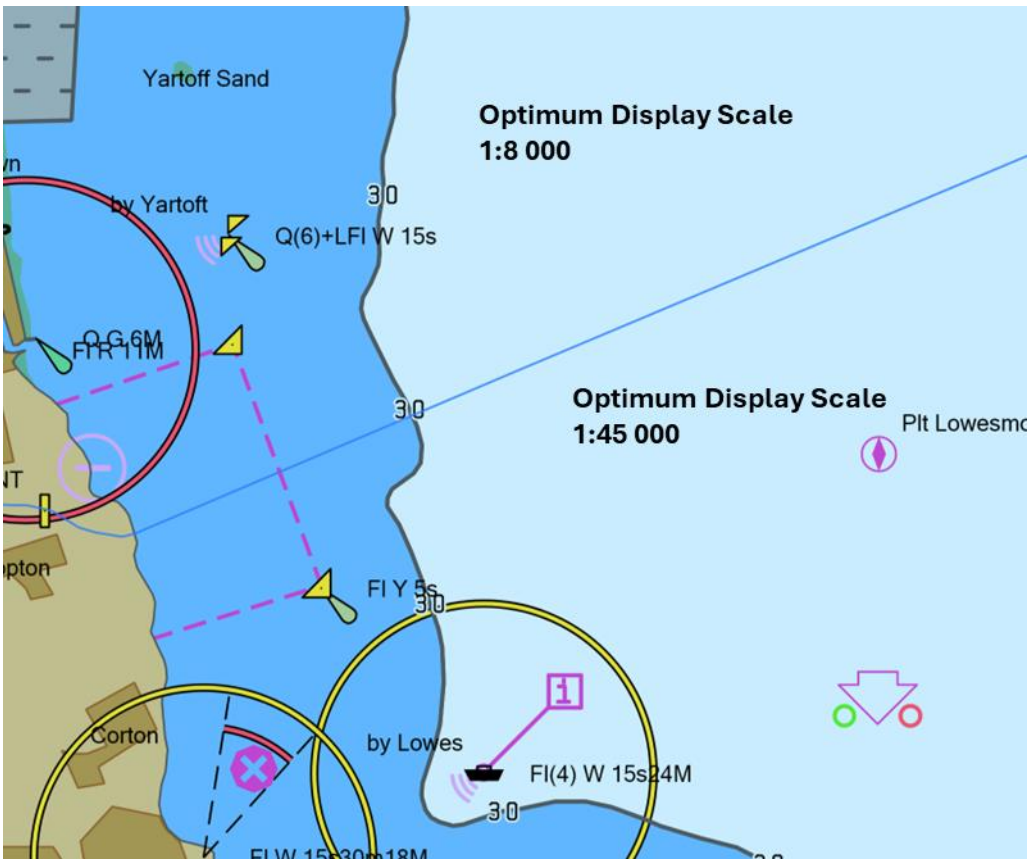
Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries	On	Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional

Setup			
*Load the exchange set **PowerUp***			
Action			
Centre the display on 32°21.071'S 060°57.730'E and zoom to 1:40 000			
Results			

1. *Confirm that the **LS(SOLD,1,CHGRD) or LC(SCLBDY51)** is shown for the diagonal limit across the dataset (upper section has optimumDIsplayScale of 8,000)*
2. *Also confirm that the overscale indication is provided for the area in which the maximum display scale is 1:45 000 (the lower section)*



3.10.4 Display of data from another scale

Test Reference	DifferentScale1	IHO Reference	S-98 Appendix E

Test Description

Display of data from a smaller scale to completely cover the display

Loaded Data

Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour	10m	Highlight date dependent	
Safety depth	10m	Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	32°33.000'S 60°56.000'E
End Date		Scale	1:20 000
		Orientation	

Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional

Setup

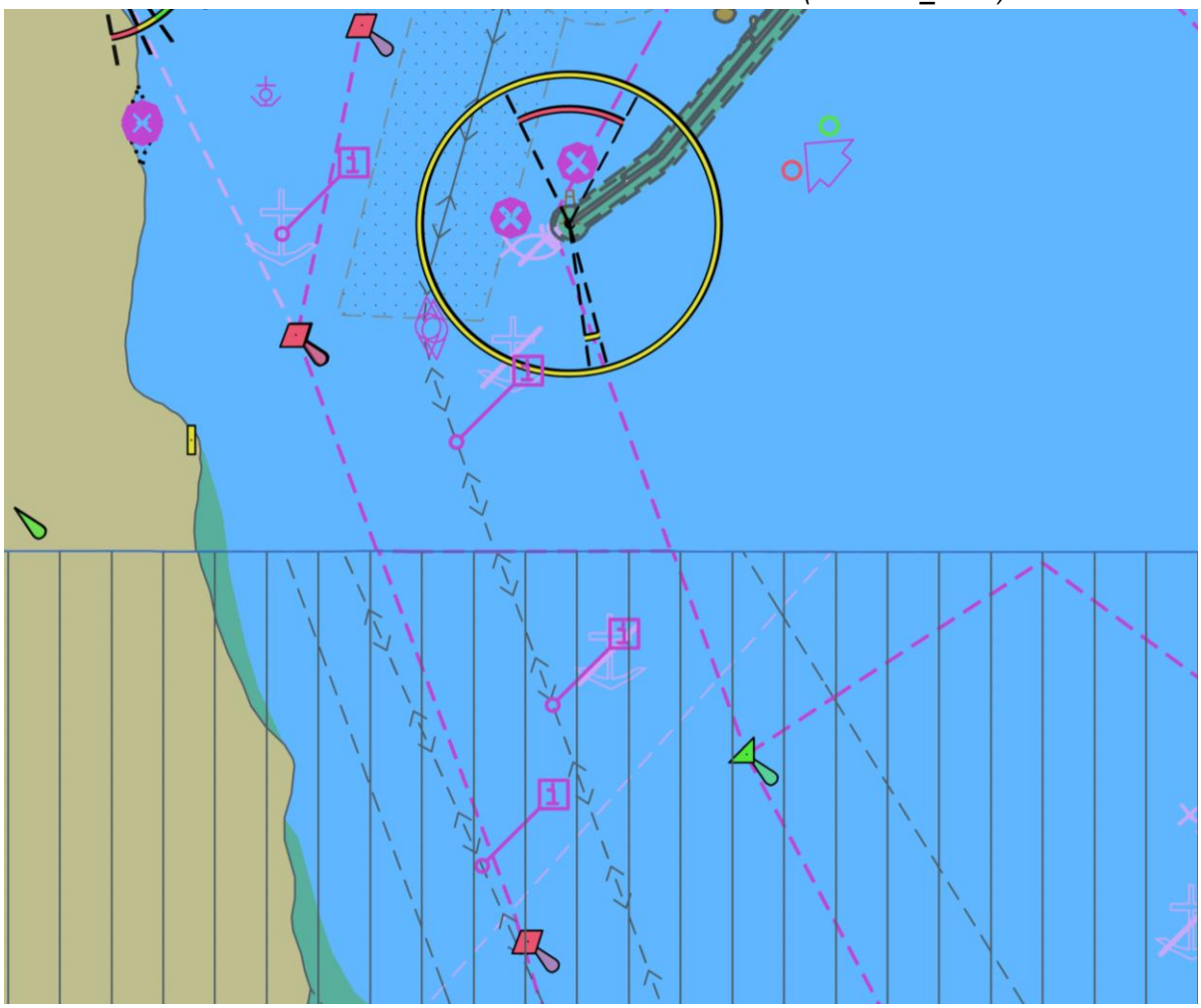
*.. Load the exchange set **PowerUp***

Action

Centre the display at 32°33.000'S 60°56.000'E
Select scale 1:20 000 so that larger scale detail (buoyage, lights) is shown

Results

Confirm that south of 32°33.141'S data from the smaller scale chart (10100AA_X000) is shown.



Test Reference	OverlappingData	IHO Reference	S-98 20.3.1

Test Description

Display of overlapping data

Loaded Data

Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	Off
Context Parameters		Contour label	
Safety contour	10	Highlight date dependent	
Safety depth	10	Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	Off
Four shades		Unknown	
Radar overlay		Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols		Chart Text	Off
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	32°23.000'S 60°40.000'E
End Date		Scale	1:90000
		Orientation	

Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional

Setup

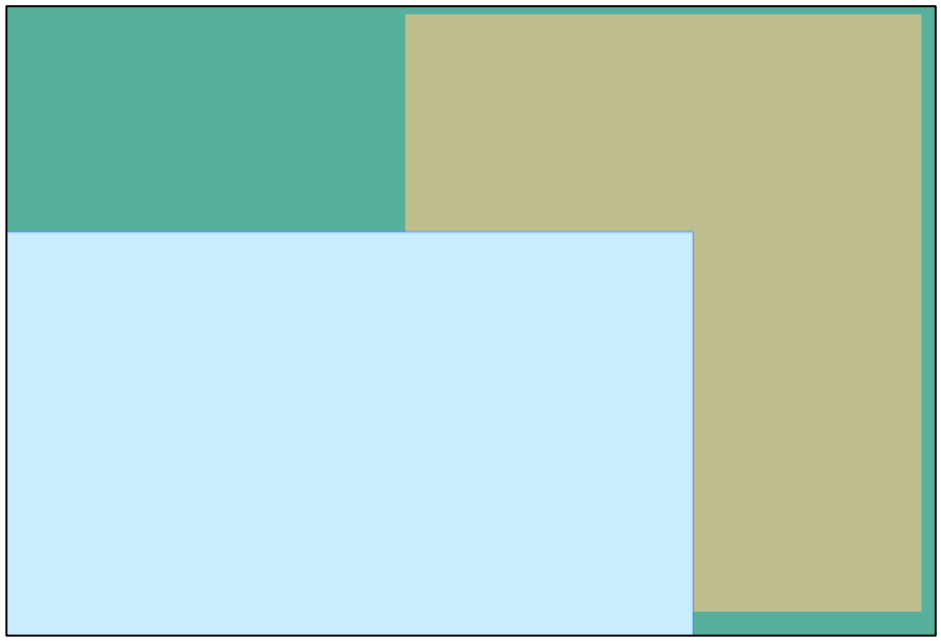
*Load exchange set **Overlap***
*Load exchange set **ScaleMinimum***

Action

Display cell 101AA00OVRLP at maximum display scale (1:90 000)

Results

Confirm that only one cell is displayed in a given area. In this case displays as shown in a) or b) are acceptable.
Confirm also that a permanent indication “overlap” is provided.
a) Chart 101AA00SCAMN overlaps chart 101AA00OVRLP at the same Optimum Display Scale





b) Chart 101AA00OVRLP overlaps chart 101AA00SCAMN



3.10.5 **Display of graphical index**

Test Reference	GraphicalIndex	**IHO Reference**	S-98 12.4.1
Test description			
Display of graphical index of cell boundaries.			
Setup			
*Load the exchange set **PowerUp***			
Action			
Navigate to a graphical index of dataset boundaries.			
Results			
Confirm that a graphical index of the dataset boundaries is displayed and access to the edition number and, where applicable, update number of each dataset is available. ***[Add S-102 and S-104 which are mandatory]*** ***[add test for graphical index of other products? ENC/102/104 only is mandatory]***			

3.10.6 Change of display scale

Test Reference	DisplayScaleChange	**IHO Reference**	S-98 12
Test description			
Change of display scale by chart scale values and by increments of displayed range values in nautical miles.			
Setup			
*Load the exchange set **PowerUp***			
Action			
Change display scale by chart scale values or by increments of displayed range values in nautical miles.			
Results			
Confirm that the display changes accordingly.			

3.10.7 **Impact of Scale Minimum on display**

Test Reference	ScaleMinimum	**IHO Reference**	S-98 12.9

Test Description

Impact of ScaleMinimum values on display of charted features

Loaded Data

Exchange Set Name	

Display Mode		**Independent Mariner's Selections**	
Other		Accuracy	Off
Context Parameters		Contour label	Off
Safety contour	10 m	Highlight date dependent	Off
Safety depth	10 m	Highlight document	Off
Deep Contour	N/A	Highlight info	Off
Shallow contour	N/A	Shallow pattern	Off
Four shades	Off	Unknown	Off
Radar overlay	Off	Update review	Off
Plain boundaries	Off	**Text Groups**	
Simplified symbols	Off	Chart Text	Off
Full light lines	Off	Important text	Off
Ignore scale minimum	Off	**Other Text**	
Shallow water dangers	Off	Names	Off
Palette		Light description	Off
Day		All other chart text	Off

Date Dependent Objects		**Display**	
Start Date		Centre	
End Date		Scale	1:90 000
		Orientation	

Viewing Groups

Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional

Setup

*Load the exchange set **ScaleMinimum***

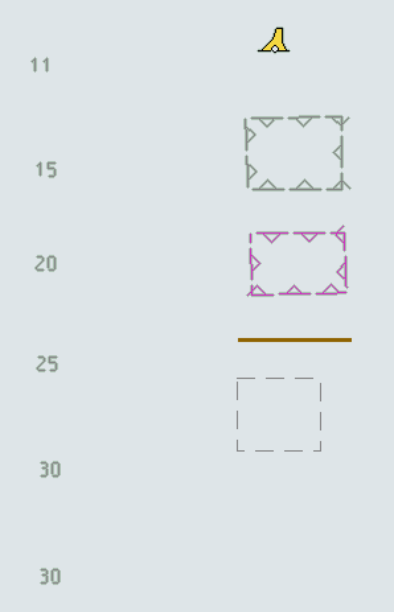
..

Action

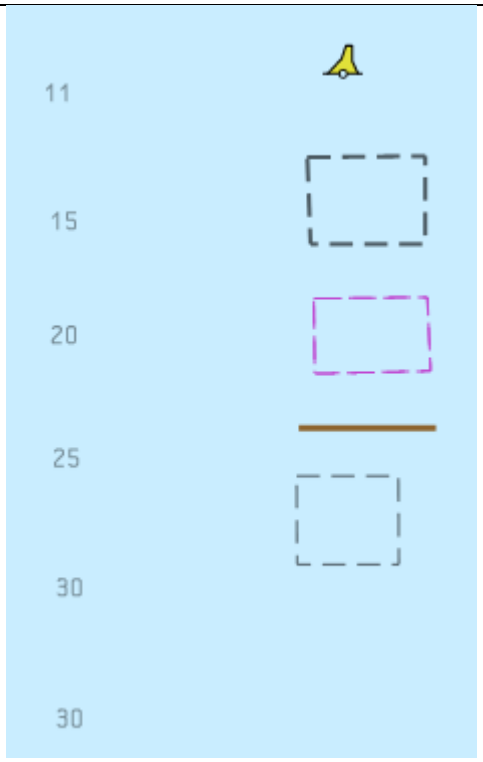
1. Centre the display on position 32°24.000'S 60°20.500'E
2. Change scale to 1:100 000
3. Change scale to 1:200 000
4. Deselect ScaleMinimum

Results

1. All features shall be shown.



2. All features shall be shown



3. The features with ScaleMinimumvalues of 119 000 and 179 999 shall not be shown.



4. All features shall be shown



3.11 Display and Operation of Water Level Adjustment.

3.11.1 Enabling Water Level Adjustment

Test Reference	WaterLevelAdjustment	**IHO Reference**	S-98 Appendix D-2

Test Description

This test verifies the ECDIS can harmonise S-104 Water Level with S-101 Depth Values.

TODO: Add test for control of WLA based on data producer code

Loaded Data	
Exchange Set Name	

Display Mode		**Independent Mariner's Selections (default=On)**	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		**Display**	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)			
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			

Alert Highlights (Standard)			
Additional			

Setup

*.. Load the exchange set **PowerUp** with the following settings.*

- *User Selected Safety contour = 11.4m*
- *Water Level Adjustment = true*
- *Interoperability Level = 2*
- *Water Level Adjustment boundary = 100 metres (S-98 D-3)*

Action

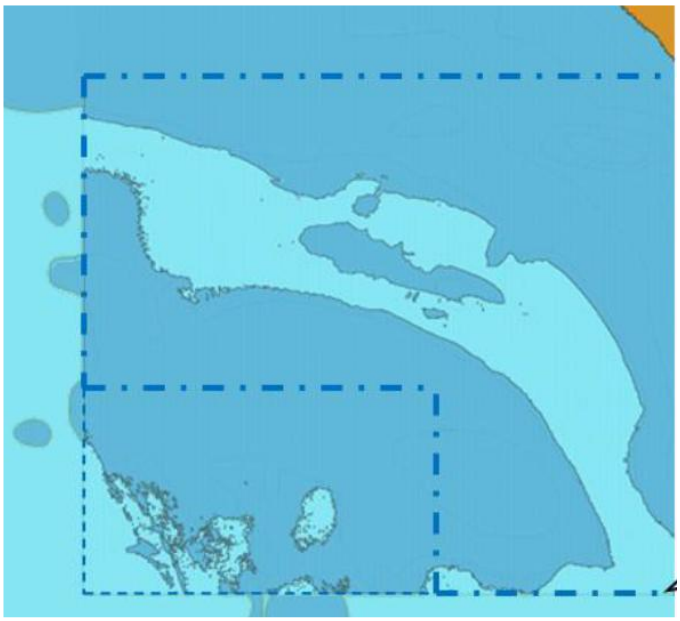
Navigate to point (Xx,YY Coverage Area S-102, S-104

Results

Verify

1. Water Level Adjustment is enabled and a permanent message is displayed to user as per S-98 Appendix D-3.1

2. The boundary of the Water Level Adjustment is shown.



3. Verify the ECDIS legend correctly reports the vertical datum of the S-102 and S-104 data

3.11.2 **Adjustment of Other Depth Values**

Test Reference	AdjustmentOfDepthValues	**IHO Reference**	S-98 Appendix D-3.1

Test Description

This test verifies the ECDIS can harmonise S-104 Water Level with S-101 Depth Values on other features

Loaded Data

Exchange Set Name	

Display Mode		**Independent Mariner's Selections (default=On)**	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		**Display**	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional			

Setup

As for test WaterLevelAdjustment

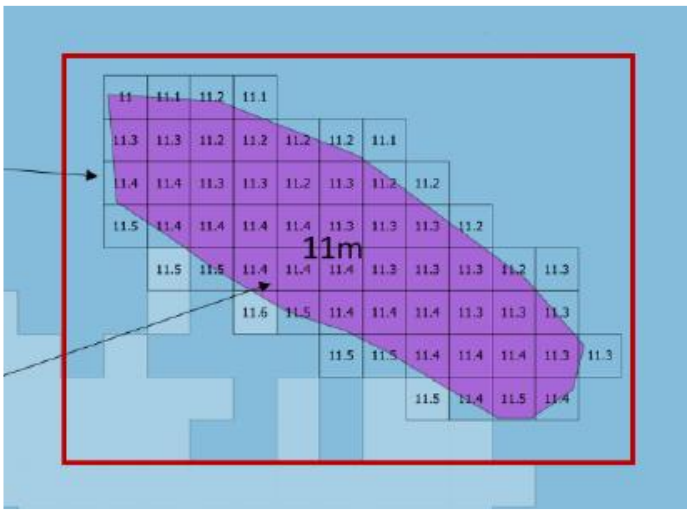
Action

A) Navigate to Point (XX,YY). Inspect Adjusted Depth Values (S-102 and S-104)
B) Navigate to Point (XX,YY) Inspect Adjusted Depth Values (S-104 only

Results

Verify

1) All depth values in ENC are adjusted according to the S-104 values as shown



3.11.3 Feature information - Water Level Adjustment.

Test Reference	WLAFeatureInformation	IHO Reference	S-98 Appendix D-3

Test Description

This test verifies the ECDIS Water Level Adjustment communicates correct information to the user during feature interrogation

Loaded Data	
Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)			
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional			

Setup

As for test WaterLevelAdjustment

Action

A) Navigate to Point (XX,YY).
B) Interrogate each of the features as shown in the image

Results

Verify

1. All depth values in ENC are adjusted according to the S-104 values as shown
2. Pick Report information contains the correct values including the source of the depth values as defined in S-98 D-3.1

S-102 Coverage only.	**Value Of Sounding 12.3 m [S-102]**
S-104 and S-102 Coverage	**Value Of Sounding 15.5m [WLA 12:34 08 Nov 2021]**
Vertical Clearance value	**Vertical Clearance Value 5.3 m Mean Sea Level [WLA 12:34 08 Nov 2021]**

3.11.4 Water Level Adjustment Uncertainty

Test Reference	UncertaintyWLA	**IHO Reference**	S-98 Appendix D-2

Test description

- *Test that the vertical uncertainty values are included in the WLA calculations.*
- *This is done with the specific datasets and via interrogation to ensure the user is aware of the WLA uncertainty values (from S-104) and their addition to S-102.*
- *Datasets must include vertical uncertainty in **both** S-102 and S-104 and the values / calculations be visible to the end user.*
- *The calculations must also be carried out on drying heights as well as depth.*
- *Projected and unprojected test cases should be added.*

3.11.5 Water Level Adjustment across a time period

Test Reference	WLATimePeriod	**IHO Reference**	S-98 Appendix D-2.5
Test description			
This test verifies that the ECDIS is able to correctly adjust water level depth values across a user defined time period.			
Setup			
As for test WaterLevelAdjustment *Set Water Level Adjustment time Period = 2021-11-08 12:30:00 to 2021-11-08 14:00:00*			
Action			
A) Navigate to Point (XX,YY). *B) Interrogate features as shown in the image.*			
Results			
Verify the permanent indication is given: **WLA from 12:34 08 Nov 2021 to 14:56 08 Nov 2021** *Verify the Adjusted Water Level values as follows:* *[ADJUSTED values from S-102, S-104 and S-102/S-104 features across the area of coverage]*			

3.11.6 WLA with non matching vertical datums

Test Reference	IncompatibleDatums	**IHO Reference**	
Test description			
This test verifies the ECDIS will correctly reject the installation of data for Water Level Adjustment if the layers are incompatible.			
Setup			
*Load Exchange set **PowerUp***			
Action			
*Load exchange set **WLAInvalid***			
Results			
Verify the ECDIS rejects the installation of the following datasets: - *104AA005X01NW.H5* - *102AA005X01NW.H5* - *111AA005X01NW.H5* *Verify the ECDIS correctly load the following dataset* - *102AA005X01SE.H5*			

3.11.7 Route planning with Water Level Adjustment

Test Reference	WLAPlanning1	IHO Reference	S-98 Appendix D-2.7
Test description			
Verify the ECDIS correctly allows routes to be planned accounting for Water Level Adjustment corrections			
Setup			
As for test WaterLevelAdjustment			
Action			
1. Ensure exchange set is loaded correctly *2. Load cell 10100AA_X01NW.000* *3. Plot a route between the waypoints WP1-WP4 using the following parameters* *i) Speed = 11knots* *ii) Planned route start date/time = 2022-14-11:00:00:00* *4. Run a route check on the defined route.* *5. Reset route start date/time to 2022-04-22:00:00:00* *6. Rerun the route check*			
Results			
Verify the route contains the following warnings when run at (4) *[list of warnings – this is because the S-104/S-102 adjusts Water Level to shoaler than 11.4m at the defined time)* *Verify the route check is clear when run at (6) (Water Level adjustment is clear at this time)* *Verify a permanent message is shown to the user as per S-98 Appendix D-3* **WLA from 12:34 08 Nov 2021 to 14:56 08 Nov 2021**			

3.12 Display of ENC covering Polar Regions

Test 3.10.1 and 3.10.2 is for all ECDIS. Test 3.10.3 is optional and should only be carried out on ECDIS claiming to be approved to function in Polar Regions.

3.12.1 Display of ENC Data up to 85 degrees

Test Reference	PolarData1	**IHO Reference**	

Test Description

Display of charts up to 85 degrees

Loaded Data

Exchange Set Name	

Display Mode		**Independent Mariner's Selections (default=On)**	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		**Display**	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			

Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			
Additional			

Setup

*Load the exchange set **PolarData***

- *Select Display Category Other*
- *Select Safety contour value to 30 m*
- *Select Plain boundaries*
- *Select Simplified Point Symbols = false*
- *Select Accuracy*

Select Contour label

..

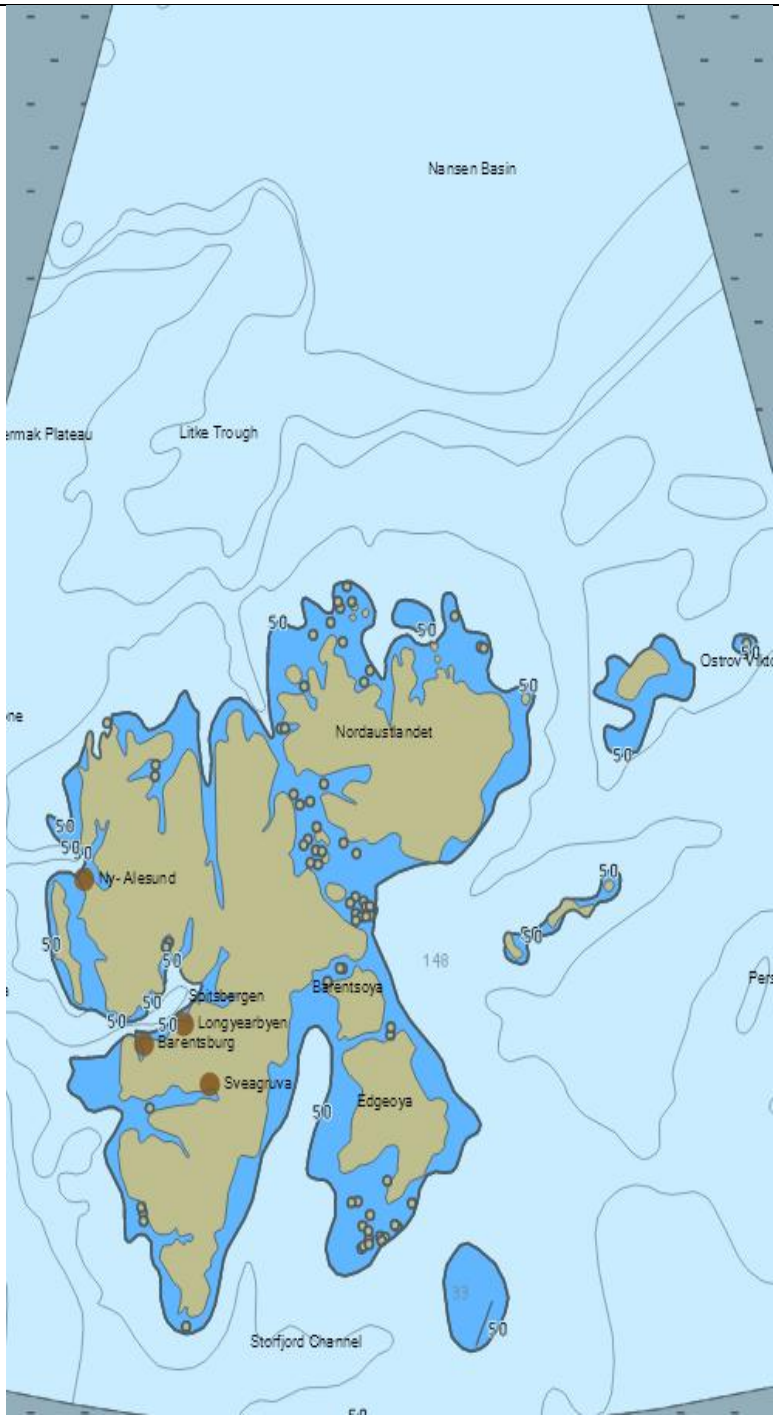
Action

Select chart 101AA00NPOL3.000 at maximum display scale (1:3 000 000). Check ENC symbols shown in the ECDIS against the graphical plot

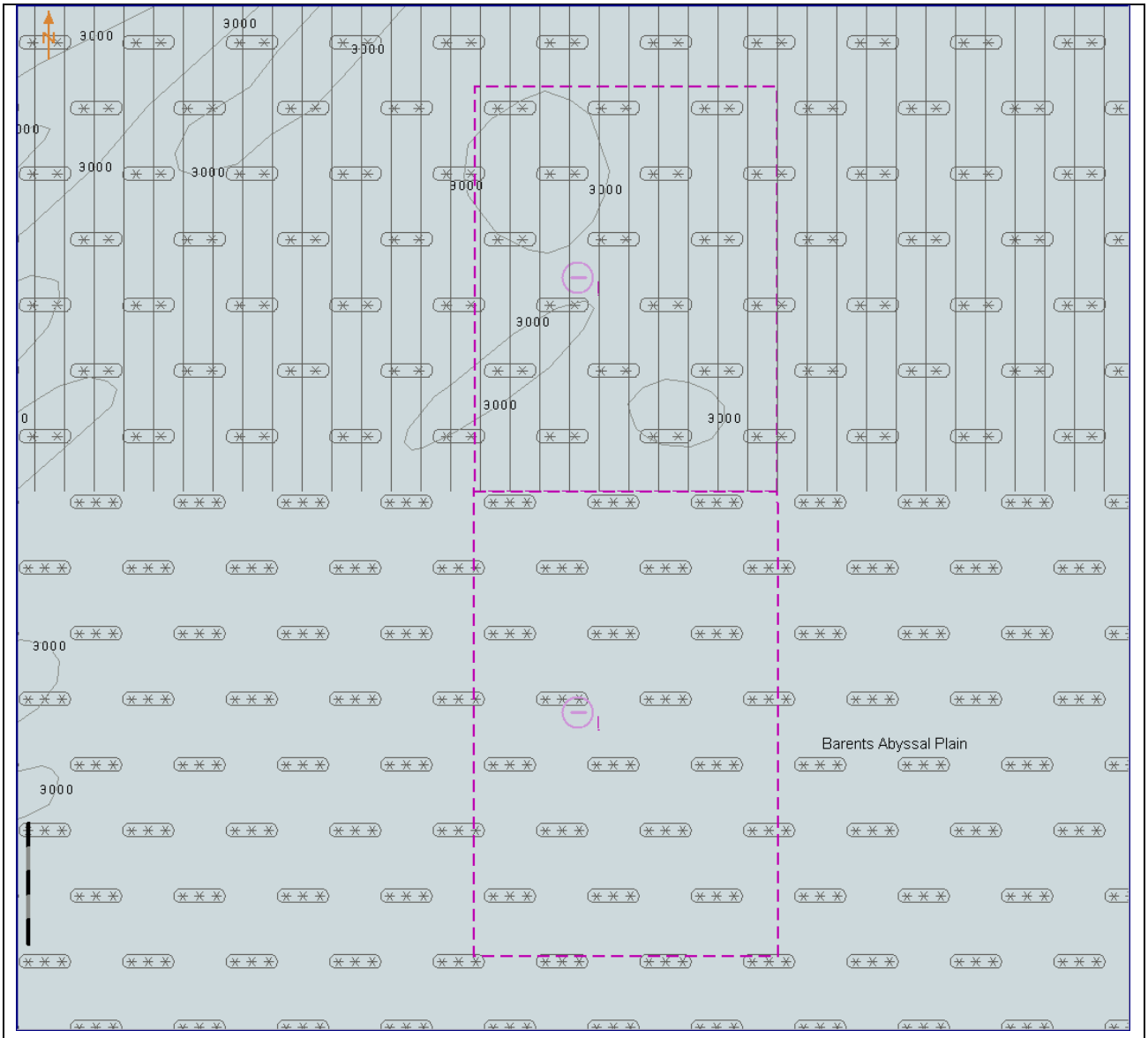
Results

The ENC should be displayed in the ECDIS like one of the options below


Nansen Basin
Litke Trough
Yermak Plateau
Nordaustlandet
Ny-Alesund
Spitsbergen
Barentsoya
Longyearbyen
Barentsburg
Sveagruva
Edgeoya
Persej Bank
Barents Sea
Stor Bank
Storfjord Channel



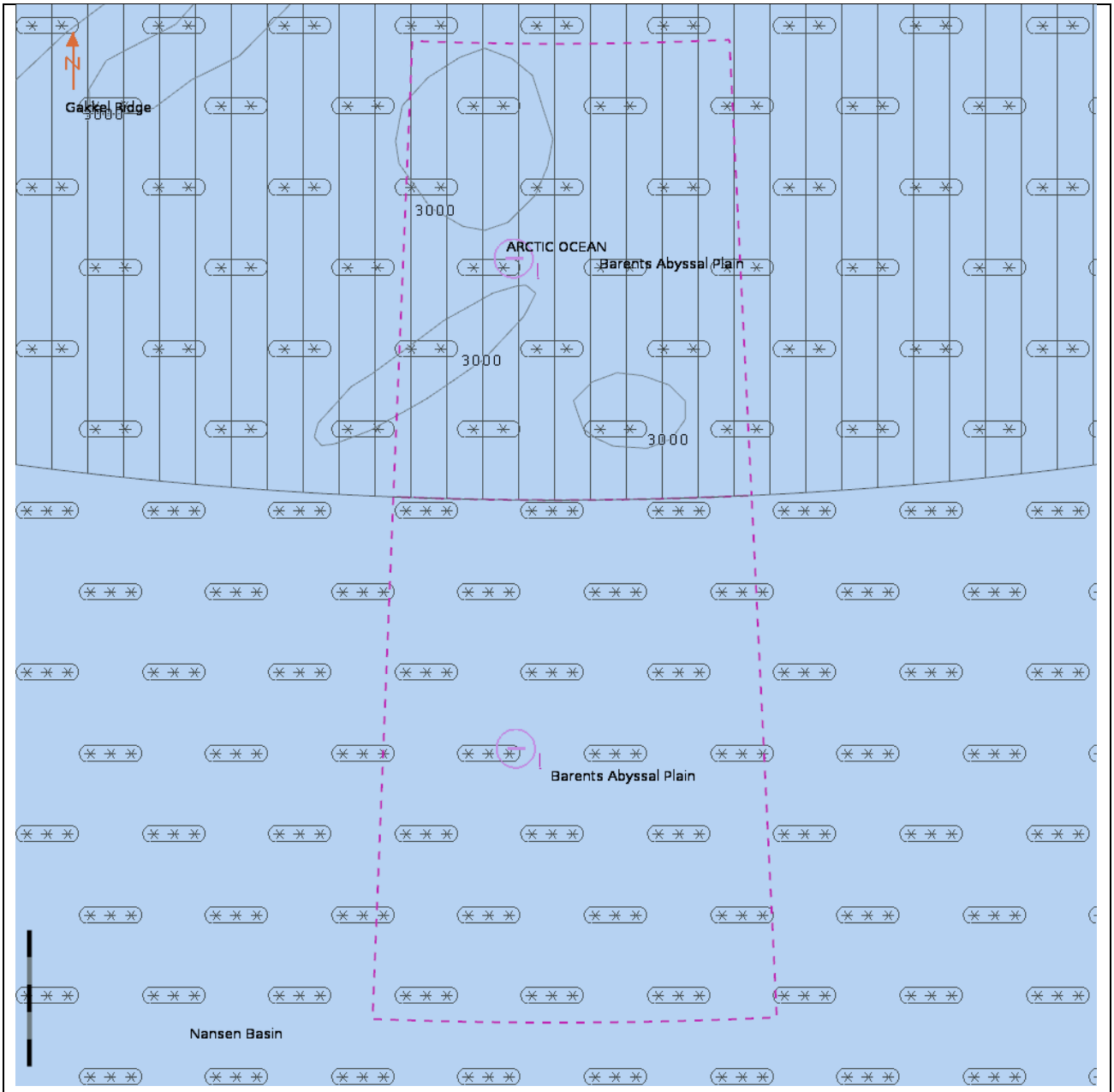
TBD: *Note: Implementation of support for latitudes higher than 85º is an option for ECDIS. Polar projection is typically used for latitudes higher than 85º. ECDIS image in this example is based on polar projection*



Select 85°00.000'N 25°00.000'E as centre of the display, scale is 1:500 000
Display is based on Mercator projection

TBD

Note: Implementation of support for latitudes higher than 85º is an option for ECDIS. If not implemented, then there should be no chart displayed above latitude 85º. If implemented, the chart above latitude 85 º may or may not have overscale pattern depending of the chart available in the ECDIS for the area above latitude 85 º.



TBD

Select 85°00.000'N 25°00.000'E as centre of the display, scale is 1:500 000
Display is based on polar projection
Note: Implementation of support for latitudes higher than 85° is an option for ECDIS. If not implemented, then there should be no chart displayed above latitude 85°. If implemented, the chart above latitude 85 ° may or may not have overscale pattern depending of the chart available in the ECDIS for the area above latitude 85 °.

3.12.2 **Scale Bar at high latitudes**

Test Reference	HighLatitudeScaleBar	**IHO Reference**	S-98 12.10.1
Test description			
Display of latitude bar in high latitudes			
Setup			
As Per PolarData1			
Action			
Position display in a location > 70d North.			
Results			
If the displayed area together with the used projection is such that scale is not uniform over the displayed area then the scale bar (more than 5% difference in uniformity for all directions or displayed area is over latitude 70º) or latitude scale (more than 5% difference in uniformity for latitude direction or displayed area is over latitude 70º) shall indicate the scale either at own ship location or at the centre of the displayed area. In such case a permanent indication "at own ship" or "at centre" shall be close to the scale bar or latitude scale. [IEC 61174:2015]. ***Verify "at own ship" is displayed close to the scale bar.***			

3.12.3 Display of data at extreme high latitudes

Test Reference	PolarData2	IHO Reference	S-52 10.1.10.2

Test Description

ONLY TO BE TESTED FOR EQUIPMENT CLAIMING THE CAPABILITY TO DISPLAY ENC DATA AT LATITUDES GREATER THAN 85 DEGREES

Display of charts above 85 degrees

Loaded Data	
Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional

Setup

*.. Load the exchange set **PolarData***

- *Select Display Category Other*
- *Select Safety contour value to 30 m*
- *Select Plain boundaries*
- *Set symbolized symbols to Off*
- *Select Accuracy*

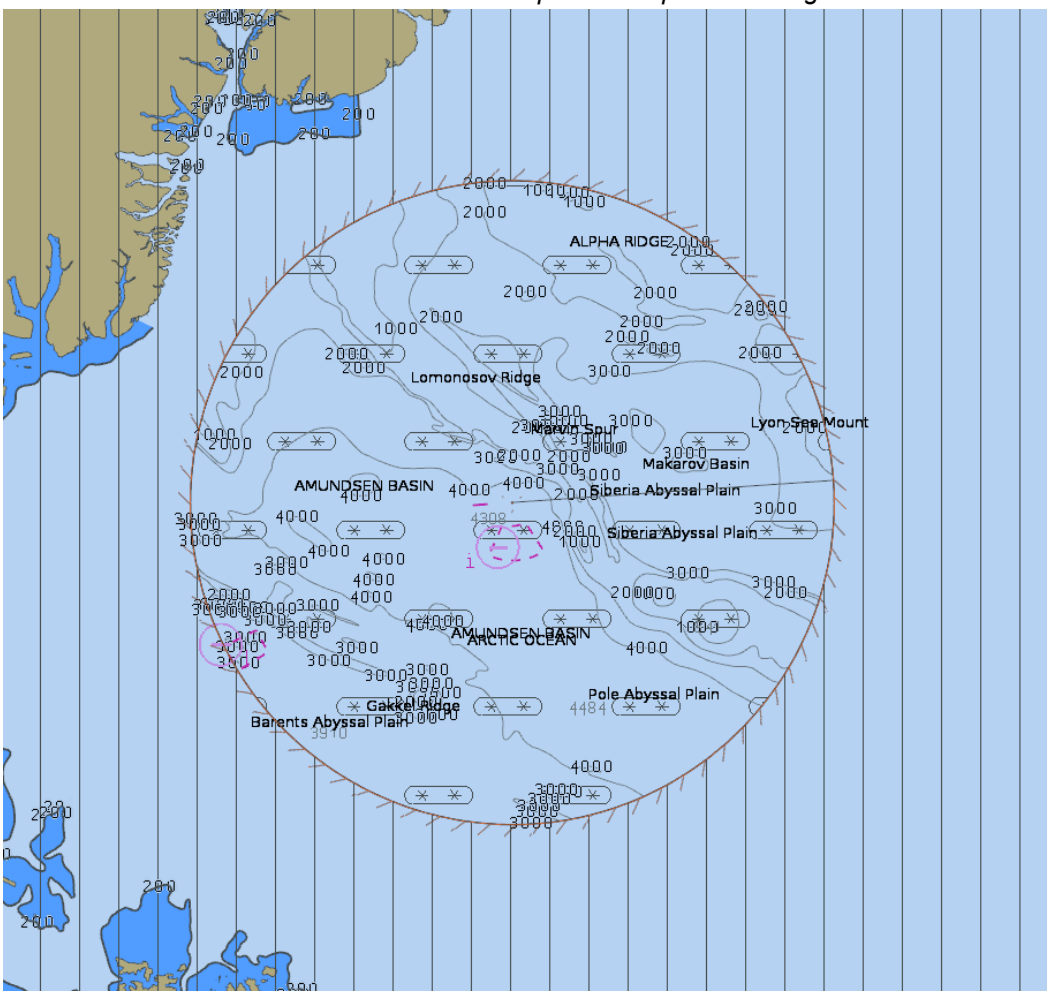
Select Contour label

Action

Check ENC symbols shown in the ECDIS against the graphical plot

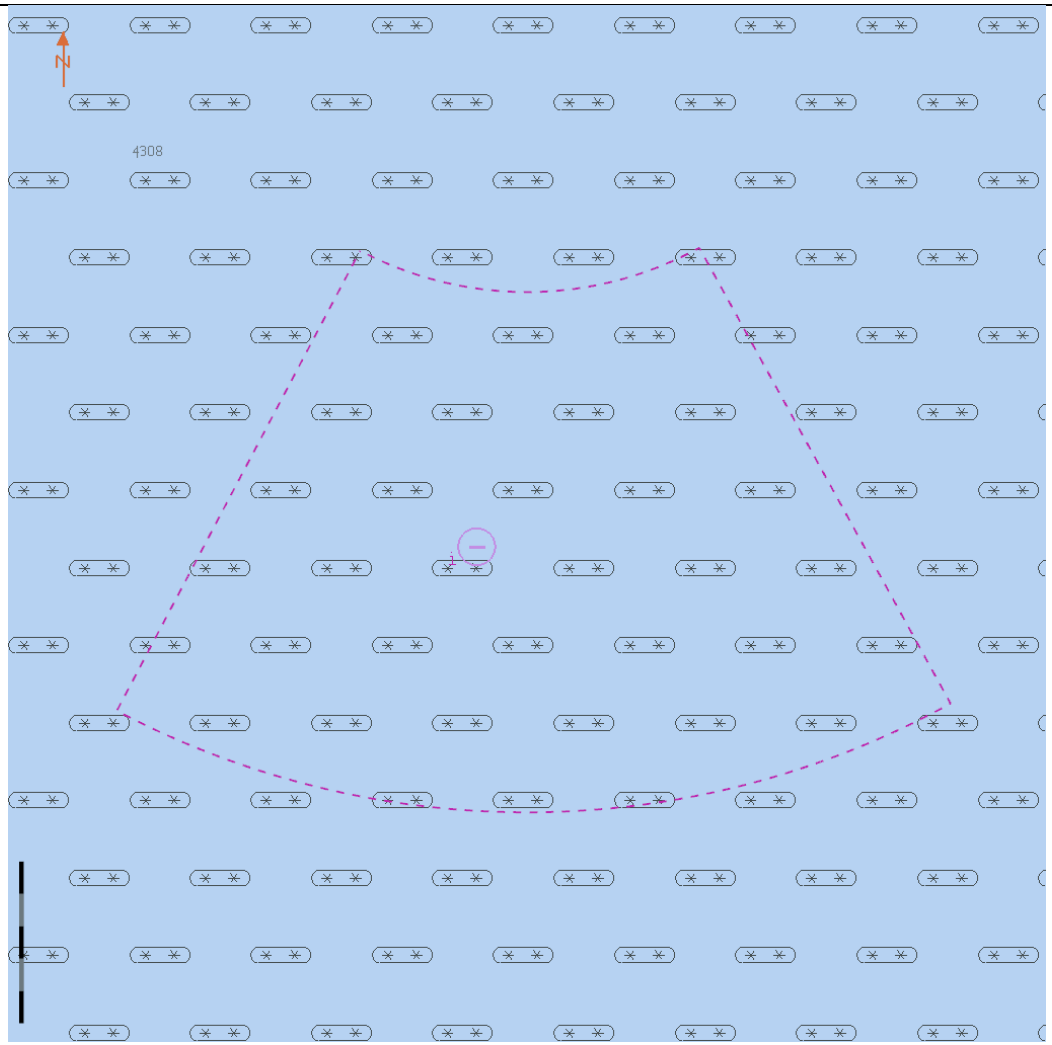
Results

The ENC in the ECDIS should be shown like in the picture below.
Note: The chart outside the circular area is an example of an optional background chart.



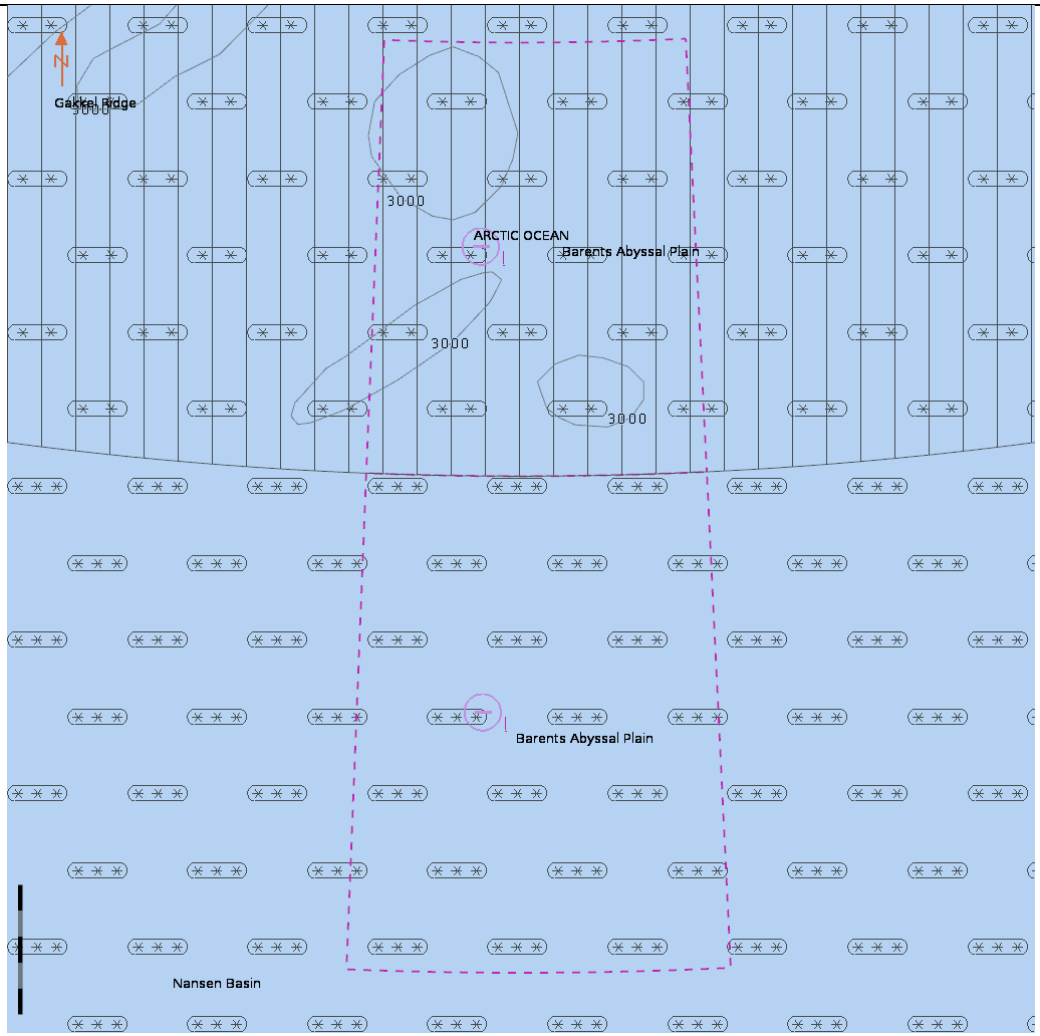
North Pole is in the centre of the display

TBD



Select 89°22.000'N 90°00.000'E as centre of the display

TBD



Select 85°00.000'N 025º00.000'E as centre of the display

TBD

4. Chart related functions

3.12.4 Mode and orientation

Test Reference	ModeOrientation1	**IHO Reference**	
Test description			
Display of the north arrow symbol.			
Setup			
Load the exchange set ***PowerUp***			
Action			
Observe the display. *If the EUT offers the capability to show other than north-up presentation; Change the presentation to non-north up and observe the display.*			
Results			
Confirm that the north arrow symbol is always displayed at the top left corner of the chart area, not overlapping the scale or latitude bar when the scale bar extends to the full height of the display *If the EUT supports changing to non-north up presentations confirm that the symbol realigns to north.*			

Test Reference	ModeOrientation2	**IHO Reference**	
Test description			
True motion operation.			
Setup			
As for ModeOrientation1			
Action			
Ensure that true motion is provided. *Reset the display and check that the generation of the neighbouring area takes place automatically at a distance selected by the Mariner.*			
Results			
Confirm that true motion operation is provided and that the generation of the neighbouring area takes place automatically at a distance selected by the Mariner.			

Test Reference	ModeOrientation3	**IHO Reference**	
Test description			
Manual adjustment of chart display area and own ship position.			
Setup			
As for ModeOrientation			
Action			
Manually adjust the chart display area. *Change the position of own ship relative to the edge of the display.*			
Results			
Confirm that it is possible to change manually the chart area and the position of own ship relative to the edge of the display.			

Test Reference	NoDataAvailable	**IHO Reference**	
Test description			
No ENC data available.			
Setup			
As for ModeOrientation *Ship position as follows: 32°27.88'S 061°20.66'E (an area with no ENC)*			
Action			
Observe the display.			
Results			
Confirm that a "No ENC available" indication is provided.			

Test Reference	NonNorthUp	**IHO Reference**	
Test description			
Display in non 'north-up' orientation.			
Setup			
As for ModeOrientation			
Action			
For each bearing-stabilised orientation other than 'north-up' that may be provided, confirm by analytical evaluation that for turning rates between 0 deg/s and 20 deg/s the displayed chart symbols and text do not re-orient more often than 2 times per second and remain legible if they do not remain fixed.			
Results			
Confirm that the displayed symbols and text do not re-orient more often than 2 times per second and remain legible. The symbols and text may remaining fixed and in this case will not re-orientate.			

3.13 **Scale bar**

3.13.1 **Display of scale bar**

Test Reference	ScaleBar	**IHO Reference**	S-98 12.10.1
Test description			
Display of scale bar at appropriate scales.			
Setup			
Load exchange set ***PowerUp*** *Set Display Category Base Display.*			
Action			
Zoom to a display scale greater than 1:80 000 (such as 1:25 000), observe the display.			
Results			
Confirm that a scale bar is displayed. Also confirm that the scale bar is displayed between 2mm and 4mm from the left side of the chart display area.			

3.13.2 Display of scale bar

Test Reference	LatitudeBar	**IHO Reference**	S-98 12.10.1
Test description			
Display of latitude bar at appropriate scales.			
Setup			
*Load exchange set **PowerUp*** *Set Display Category Base Display.*			
Action			
Zoom to a display scale less than 1:80 000 (such as 1:300 000), observe the display.			
Results			
Confirm that a latitude bar is displayed. Also confirm that the scale bar is displayed between 2mm and 4mm from the left side of the chart display area.			

3.14 Feature information

Test Reference	FeatureInformation1	**IHO Reference**	S-98 15.1
Test description			
General rules for cursor pick report			
Setup			
*Load exchange set **PowerUp*** *Select Display Category Other.*			
Action			
1. Select several features of *- depth area;* *- restricted area;* *- sea area;* *- depth contour;* *- ferry route;* *- recommended track;* *- buoy (for example buoy and light at 32°29.50'S - 061°00.46'E);* *- light;* *- wreck.* *2. Observe feature information.* *3. Remove feature information from display.*			
Results			

1) The following rules shall be applied to the pick report:

- Full feature and attribute names must be displayed. If a language pack is installed then the feature and attribute names must use the translated names contained in the language pack according to user preference – user language preferences are described in clause **Error! Reference source not found.**
- Listed value names must be displayed instead of the numerical code.
- 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.
- Units of measure must be included after all attribute values when available.
- Cursor pick report must extend to include both information associations and feature associations, including aggregations and compositions, which may link to information types or features that carry additional information such as a *featureName*.
- Dates must be given in the form “Day Month Year” DD-MMM-YYYY.
    - Month abbreviations must be: JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC.
- The Pick Report must only return information about the visible features on the ECDIS display. If the viewing group is turned on all features, even “no symbol” features without visible presentation within that viewing group, must be provided in the cursor Pick Report, i.e. only active drawing instructions must be included.
- Pick Report must include the information associated with the spatial object limited to the area of the cursor pick. For example, information related to accuracy.
- Complex or Simple Attributes with private visibility must not be included.
- Descriptions of attributes and their values, available in the feature catalogue, must be shown on demand.

2. Text associated with chart features must be removed from the display.

Note: The text and background colour of pick report is specified by the OEM

[This test needs to also include other data products (particularly S-124 where the area covered by NW is not portrayed]

Test Reference	FeatureInformation2	**IHO Reference**	S-98 15.1
Test description			
Pick report descriptions and sorting			
Setup			
As for test FeatureInformation1.			
Action			
Select several features as mentioned in 4.3			
Results			
1. A plain language explanation of each symbol shall be used as included in portrayal catalogue to provide quick and understandable information which is not always obvious from the feature class and attribute information. *2. Attribute values provided in addition to the above explanation shall be connected to their meaning, and the definitions shall also be available.* *3. The feature information shall be sorted by the drawing priority of the feature as defined in the portrayal catalogue. When the drawing priority of features is equal, the geometric primitive shall be used to order the information (points followed by curves and finally surfaces).* *4. Check that the content displayed in the pick report is configurable by the user.*			

Test Reference	FeatureInformation3	**IHO Reference**	S-98 15.2.2
Test description			
User defined cursor pick parameters, if available			
Setup			
As for test FeatureInformation1.			
Action			
1. Configure the cursor pick parameter as available. *2. Select several features as mentioned in 4.3*			
Results			
1. The cursor pick parameters may be configurable by the user and available for presentation. *2. The content of the pick report shall be presented as configured.*			

Test Reference	FeatureInformation4	IHO Reference	S-98 15.1

Test description

Hover-over function for feature information (optional)
Test shall only be performed if a hover-over function for feature information is provided.

Setup

As for test FeatureInformation1.

Action

1. Configure the hover-over function OFF.
2. Move cursor to one of the features in the table below and to features where additional information is available or date dependent features:
3. Configure the hover-over function ON.
4. Move cursor to one of the features mentioned in 2.
5. Move cursor to any other features.

Features	S-101 Acronym
Lights	***AllRoundLight***
Beacon, cardinal	***BuoyCardinal***
Beacon, isolated danger	***BuoyIsolatedDAnger***
Beacon, lateral	***BeaconLateral***
Beacon, safe water	***BeaconSafeWater***
Beacon, special purpose/general	***BeaconSpecialPurpose***
Buoy, cardinal	***BuoyCardinal***
Buoy, installation	***BuoyInstallation***
Buoy, isolated danger	***BuoyIsolatedDanger***
Buoy, lateral	***BuoyLateral***
Buoy, safe water	***BuoySafeWater***
Buoy, special purpose/general	***BuoySpecialPurpose***
Landmarks	***Landmark***

Results

1. It shall be possible to switch OFF the hover-over function.
2. There shall be no information of chart features displayed when hovering over it.
3. It shall be possible to switch ON the hover-over function.
4. Important information of chart features shall be displayed when hovering over it.
5. When hovering over other chart features no information shall be displayed.

Test Reference	FeatureInformation5	IHO Reference	S-98 15.1

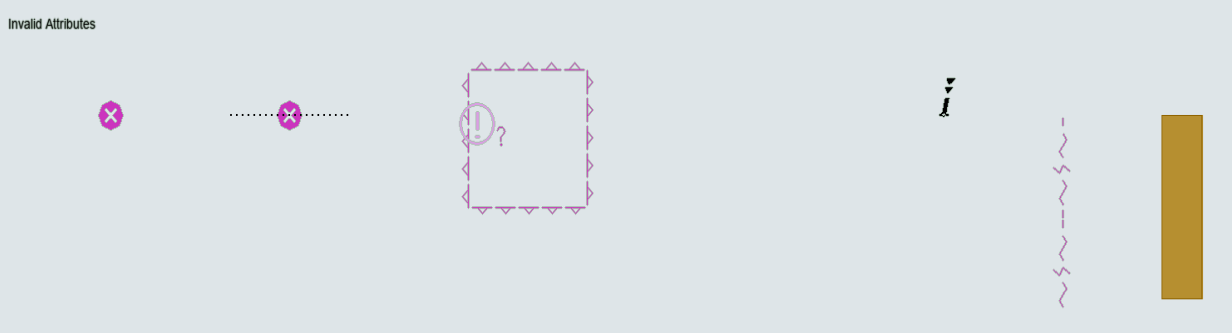
Test description

Presentation of unknown attributes
There is no generic special presentation for unknown attributes. Some presentations may indicate question mark, but that is because something mandatory is missing for the feature. The main purpose of this test is to check
that ECDIS is able to accept ENC datasets which contain unknown attributes. The real use case is when ECDIS is not upgraded for latest IHO standard and therefore the
ECDIS does not understand all attributes.

Setup

Load the exchange set ***InvalidFeatures*** *dataset 101AA00INVOB.000 :*

- *Select Display Category Other*
- *Set the Safety contour value to 0 m*
- *Select Symbolized Boundaries*
- *Set symbolized symbols to Off*

Action
Select chart features with unknown attribute for cursor pick report.
Results
Check ENC symbols shown in the ECDIS against the corresponding graphical plot. Select one by one each of 6 features for cursor pick report. *The result of cursor pick shall be:* *a) Wreck with attribute Water level effect (covers and uncovers);* *b) Obstruction with attribute Value of Sounding (no value) and Water Level Effect (no value);* *c) Restricted area without any attribute;* *d) Buoy, cardinal with attributes Buoy shape (spar (spindle)), Category of cardinal mark (north cardinal mark), Colour, Colour pattern (horizontal stripes), Topmark and UnknownAtt2;* *e) Cable, submarine with attribute UnknownAtt1;* *f) Silo/Tank with attribute UnknownAtt2.*  **TBD**

Test Reference	InteroperabilityIdentifer	**IHO Reference**	15.1 (10)
Test description			
TODO: • Test pick report function where the feature picked has an interoperabilityIdentifier which is referred to by an S-124 *featureReference.interoperabilityIdentifier*. This tests that NW can link to ENC features. • This is accomplished by setting interoperabilityIdentifier in S-101 features then setting featureReference.interoperabilityIdentifier in S-124 to the same value and executing a pick report on the S-101.			

Test Reference	TidalStreamPanelData	**IHO Reference**	S-98 15.4
Test description			
Display of tidal stream panel Data			
Setup			
*Load exchange set **PowerUp***			
Action			
1. Select an example of TidalStreamPanelData (tidal stream panel information) *1a. select the complex attribute tidal stream panel values at 32°31.45'S 60°56.35'E for display;* *2. Select an example of TidalAStreamPanelData (tidal stream prediction by harmonic methods)* *2a. select tidal stream prediction by harmonic methods feature at 32°32.57'S 60°57.69'E for display;* *3. Repeat step 1 and 2 for different light conditions (DAY, DUSK, NIGHT).*			

Results
1a. The data must be displayed in a way that it can be easily read and is logically presented, in a format as follows:

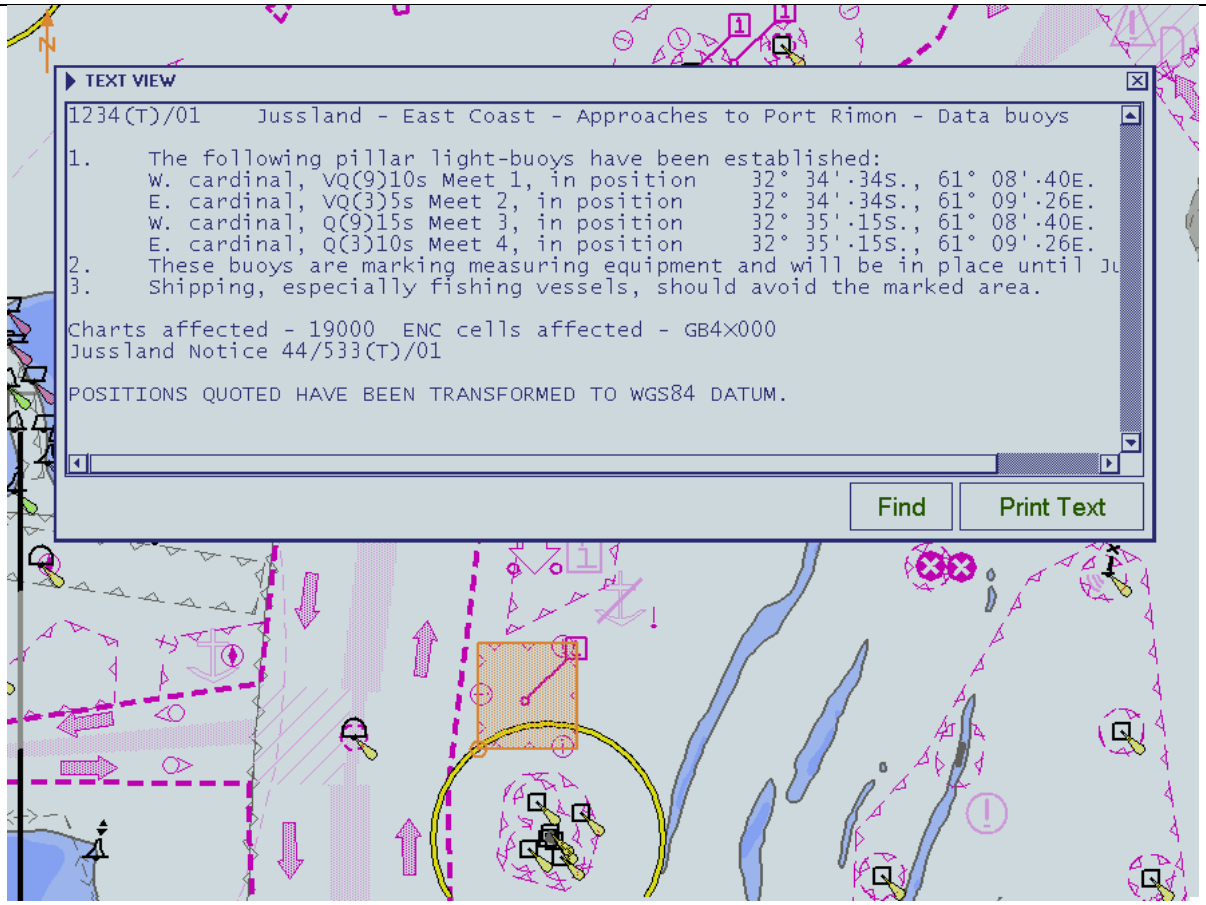
Tidal Station: PLYMOUTH (DEVONPORT)			
Tidal Station Identifier: 0014		Data from: ENC	
	Hours	Direction of stream (degrees)	Rates at spring tides (knots)
Before	-6	113	0.1
	-5	332	0.6
	-4	331	1.1
	-3	342	1.0
	-2	347	0.7
	-1	333	0.5
high water	0	317	0.3
After	+1	178	0.3
	+2	146	0.6
	+3	140	1.0
	+4	143	1.1
	+5	143	0.8
	+6	138	0.3

TODO: replace with S-98 Updated Image

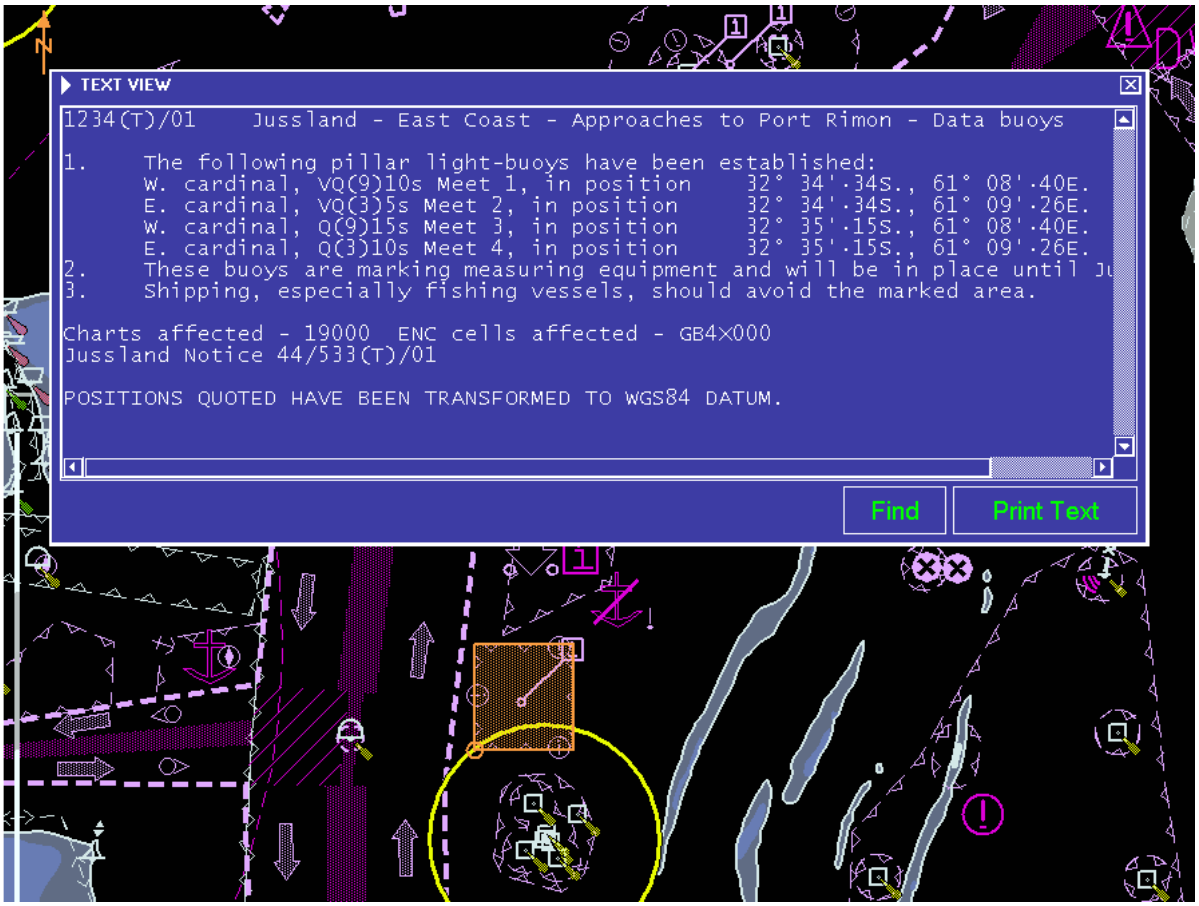
3. The data must be displayed as appropriate for the selected light condition (DAY, DUSK, NIGHT).

Test Reference	Tidal panels (2)	**IHO Reference**	S-98 15.4
Test description			
Show multiple tidal panels when more than one is included in the feature.			

Test Reference	SupplementaryFile2	**IHO Reference**	S-98 15.2.2
Test description			
Display of supplementary text file			
Setup			
As for test FeatureInformation1.			
Action			
1. Select an example of a note encoded using information attributes (for example Caution Area at approximately 32°34.74'S 061°08.92'E); *2. Repeat step 1 for different light conditions (DAY, DUSK, NIGHT).*			
Results			
1. The note must be displayed within the light level of the current display and in a way that it can be easily read, for example by displaying the note as it might appear on a paper chart (for example content of 10100AAIECTMP.TXT file as contained in the directory of loaded ENCs). *2. The note must be displayed as appropriate for the selected light condition (DAY, DUSK, NIGHT).* *3. The content of the note must commence at the location specified by the fileLocator reference, as shown in the image*			

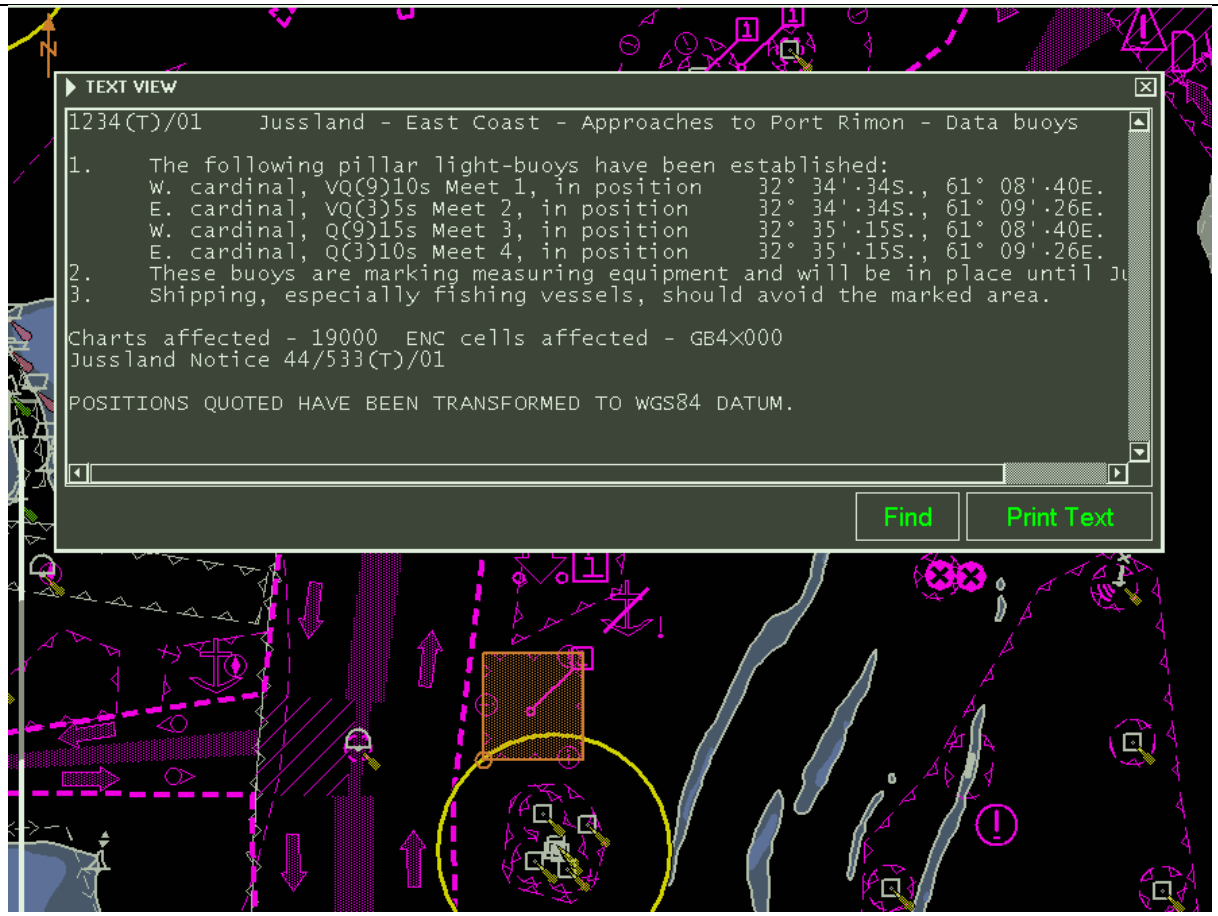


*Example of Text 101AA00IECTMP.TXT over cell 10100AA_X0000.000, Day palette **tbd***



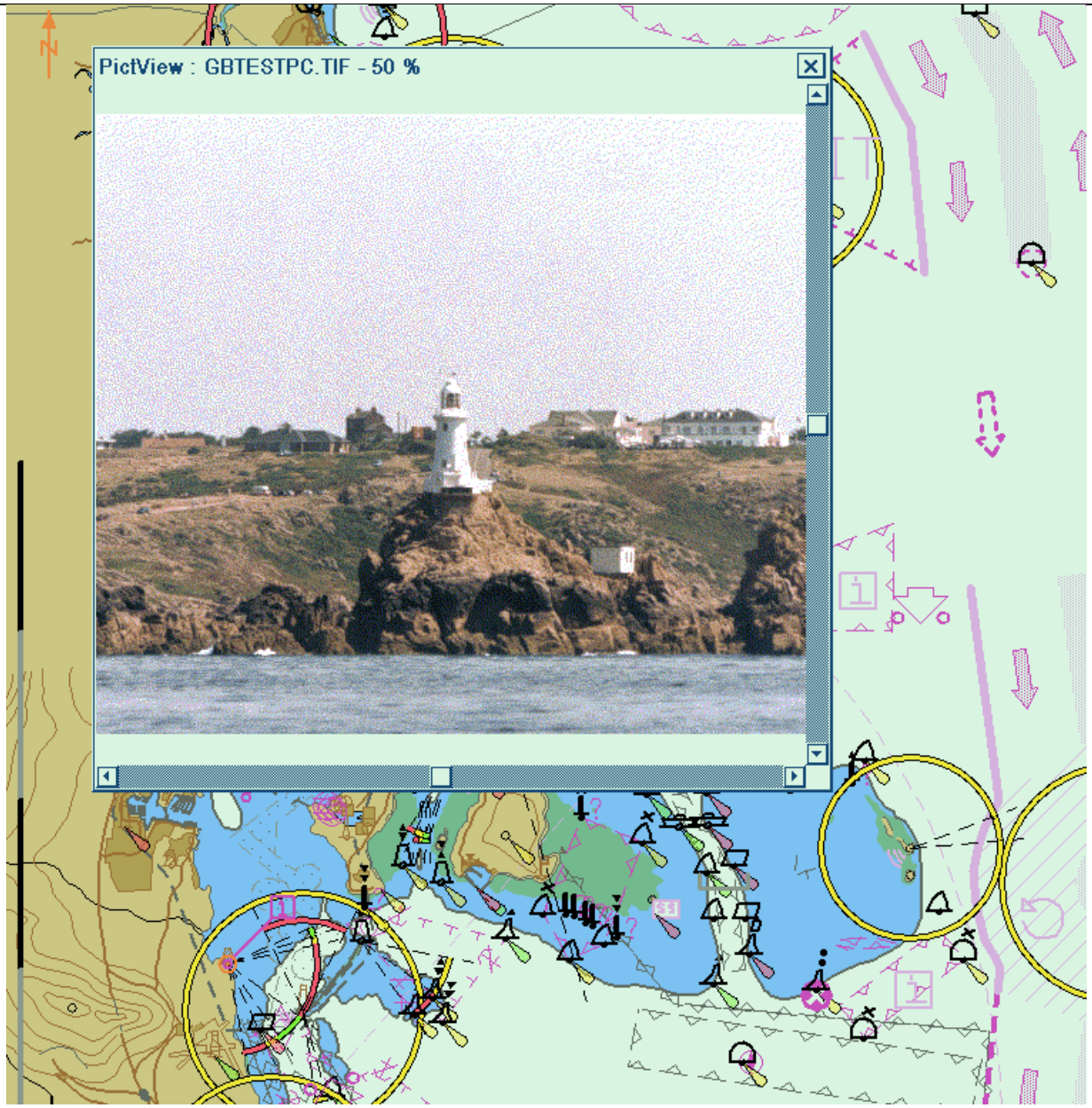
Example of Text 101AA00IECTMP.TXT over cell 10100AA_X0000.000, Dusk palette

TBD



Example of Text 101AA00IECTMP.TXT over cell 10100AA_X0000.000, Night palette ***tbd***

Test Reference	PictorialRepresentation	IHO Reference	S-98 15.2.2
Test description			
Display of picture representation			
Setup			
As for test FeatureInformation			
Action			
1. Select an example of the attribute pictorialRepresentation *1a. select landmark feature at 32°31.95'S 60°54.34'E and select picture representation for display;* *1b. select area feature of 32°30.25'S 60°54.64'E with NauticalInformation and select picture representation for display;* *2. Repeat step 1a and b for different light conditions (DAY, DUSK, NIGHT).*			
Results			
1a. The picture 101AA00TESTPC.TIF must be displayed; *1b. The picture 101AA00X4000T.TIF must be displayed;* *2. The pictures must be displayed as appropriate for the selected light condition (DAY, DUSK, NIGHT). It shall not affect the user's night vision.*			



Example of Picture 101AA00TESTPC.TIF over cell 10100AA_X0000.000, Day palette

TBD



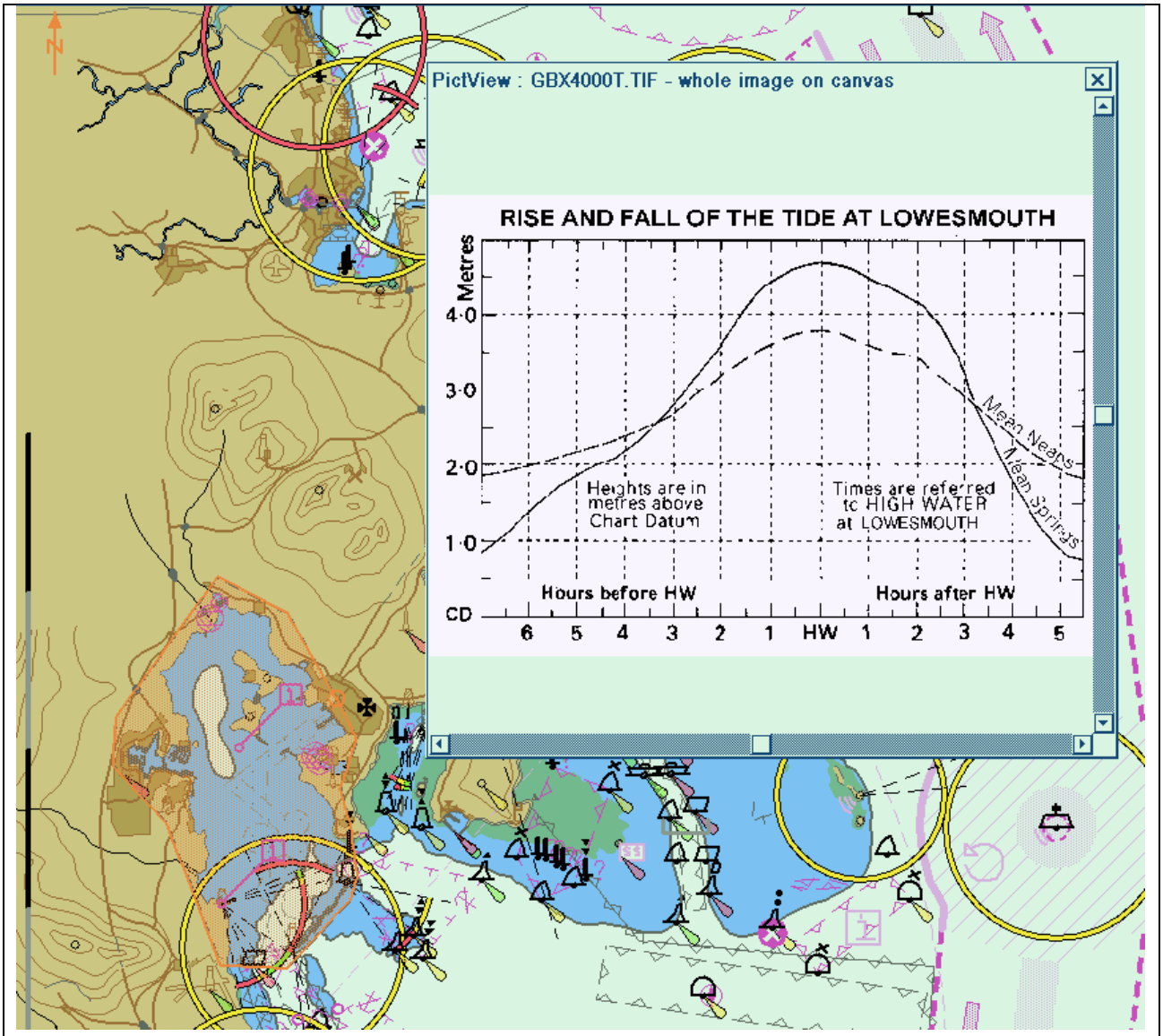
Example of Picture 101AA00TESTPC.TIF over cell 10100AA_X0000.000, Dusk palette

TBD



Example of Picture 101AA00TESTPC.TIF over cell 10100AA_X0000.000, Night palette

TBD



Example of Picture 101AA00X4000T.TIF over cell 10100AA_X0000.000, Day palette

TBD

3.15 Radar and Plotting Information

Where the capability for displaying radar or radar tracks is provided, in addition to the requirements of IEC 62288 for radar displays and presentation of target information, perform the following:

Test Reference	RadarOverlay	**IHO Reference**	S-98 9.2
Test Description			
Display of Radar overlays with System Database information			

Loaded Data	
Exchange Set Name	

Display Mode		**Independent Mariner's Selections (default=On)**	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		**Display**	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)			
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			

Alert Highlights (Standard)			
Additional			

Setup

*Load exchange set **PowerUp***
Display cell 10100AA_X01NE at 3 NM range scale

- *Select Safety contour value to 8 m*
- *Select Safety depth value to 8 m*
- *Select Plain boundaries*

Set symbolized symbols to Off..

Action

Switch on the following (where available):

- *Radar image overlay*
- *Radar tracked target information*

AIS information

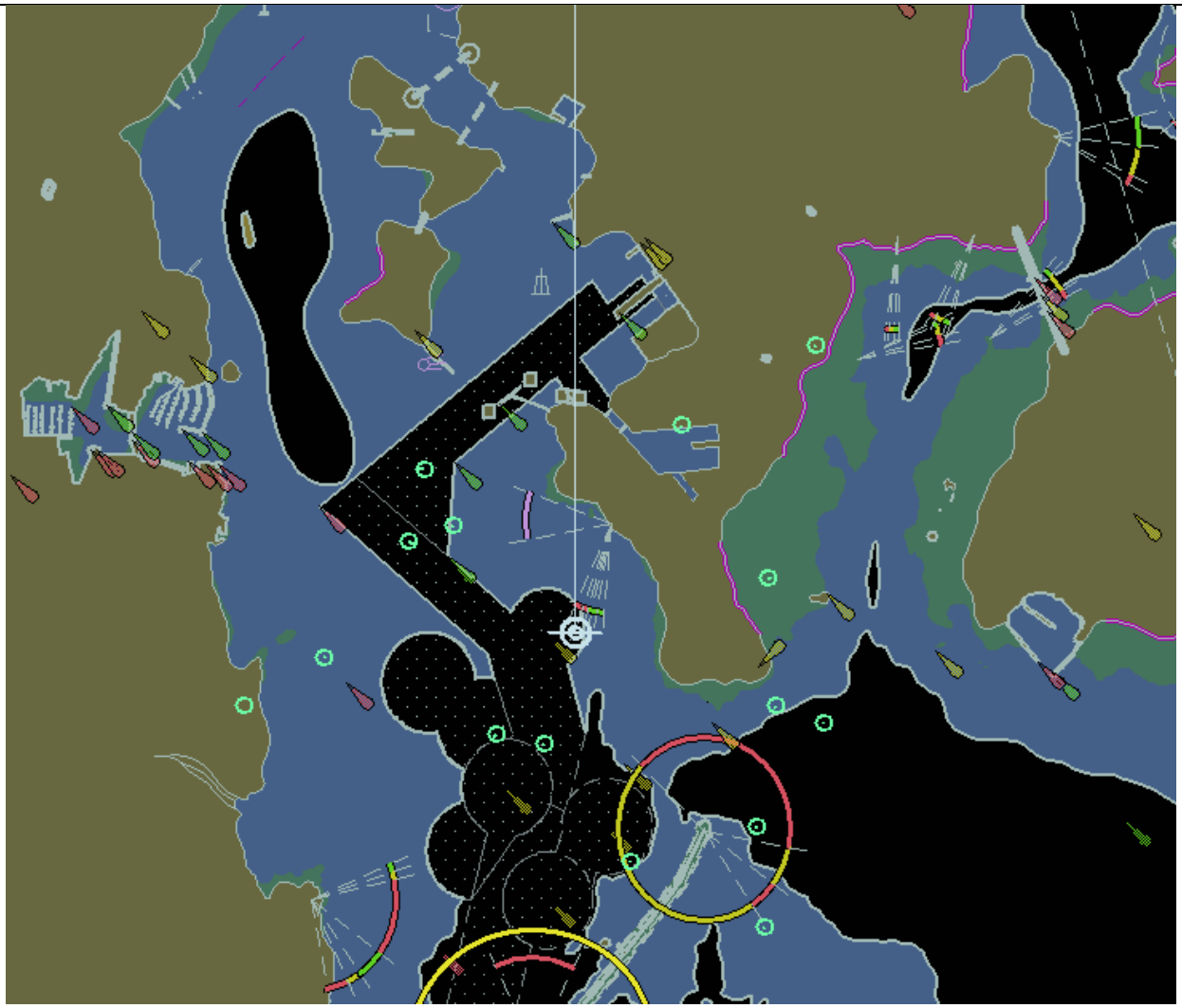
Results

Confirm by observation that same System Database features are under or over radar echoes as in the example pictures. Note that some examples contain intentionally a lot of radar echo noise in order to give many examples of the System Database features which shall be over or under radar echoes



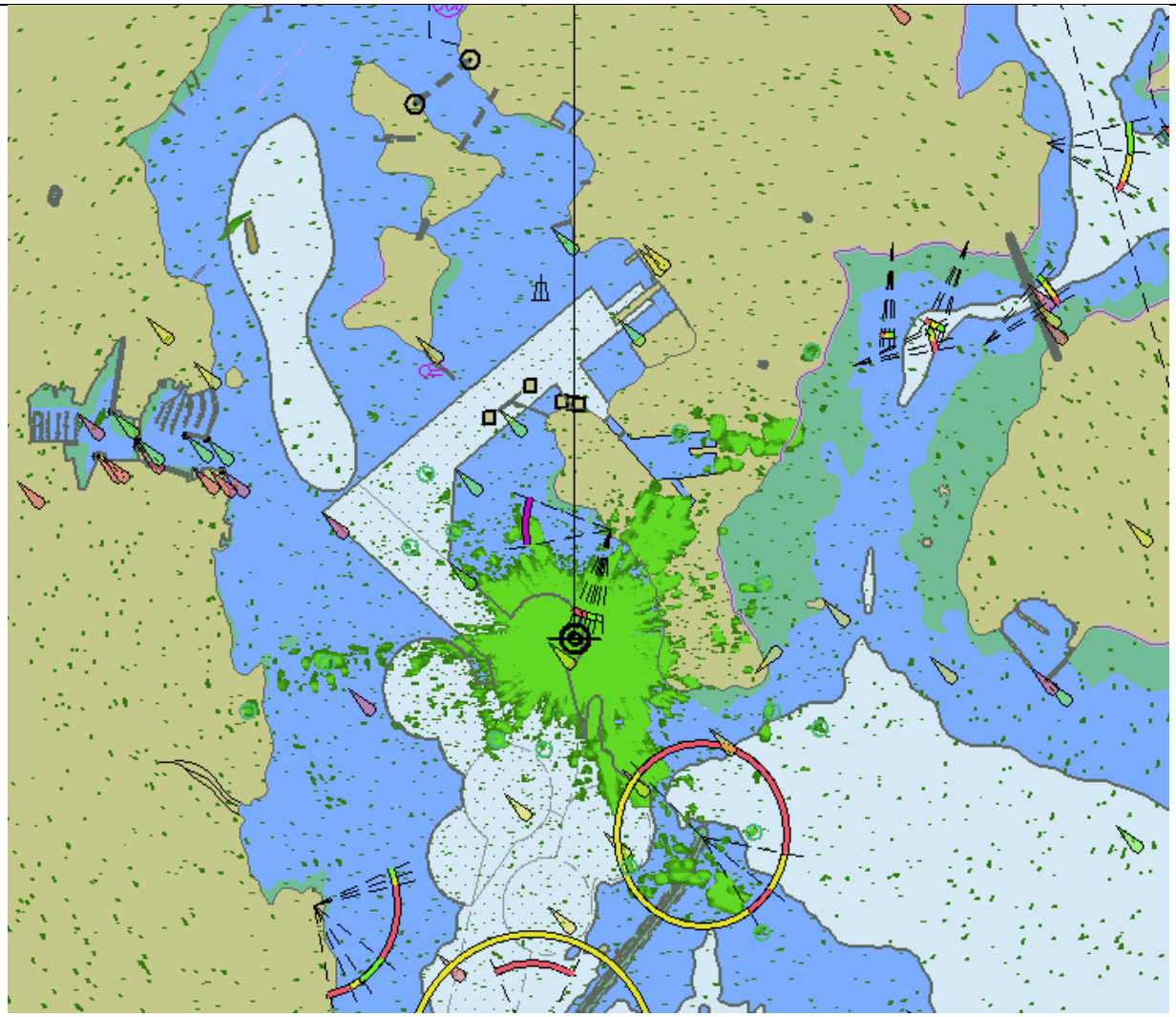
Day with radar tracked targets. Display Category Display Base + Lights

TBD



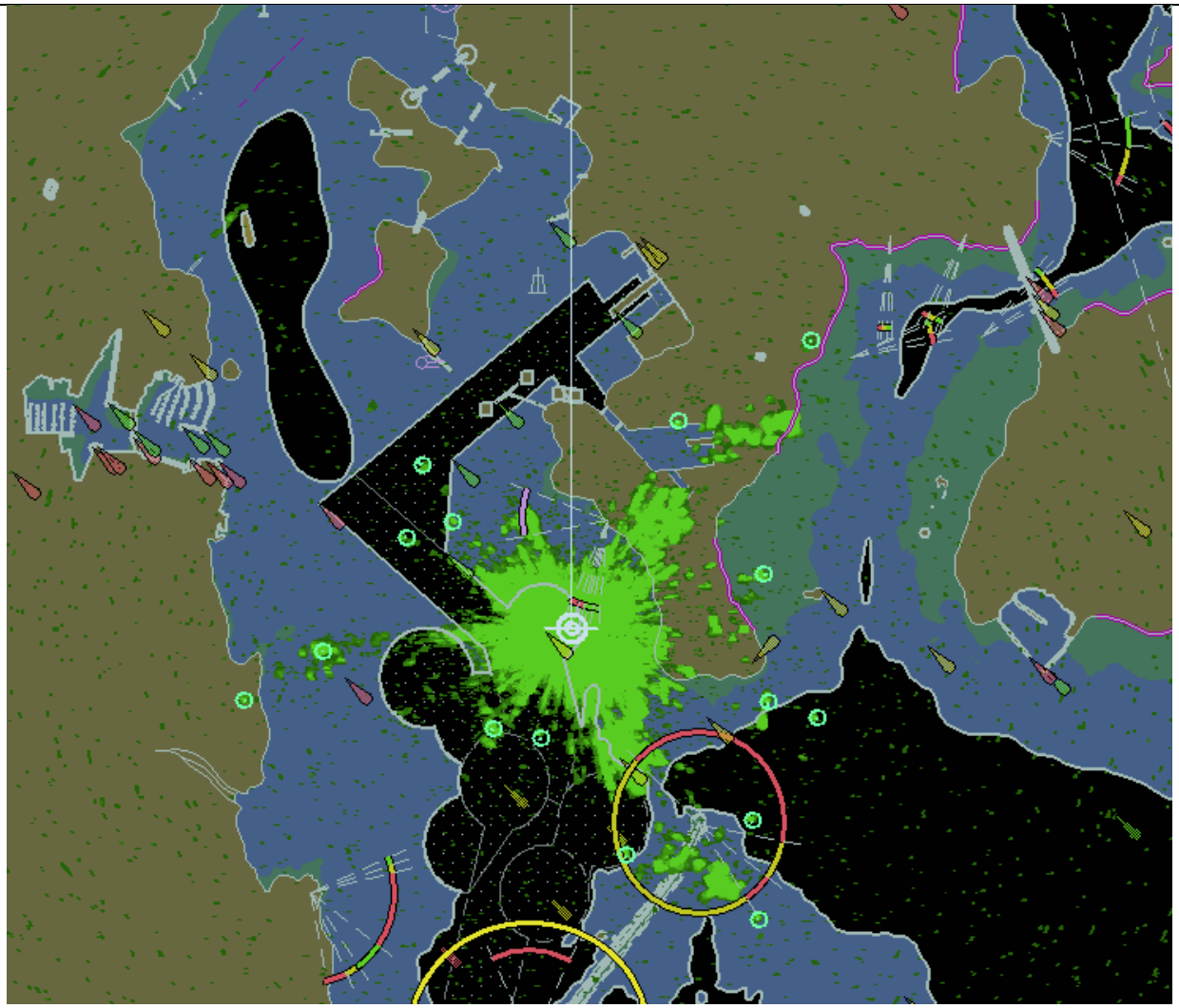
Dusk with radar tracked targets. Display Category Display Base + Lights

TBD



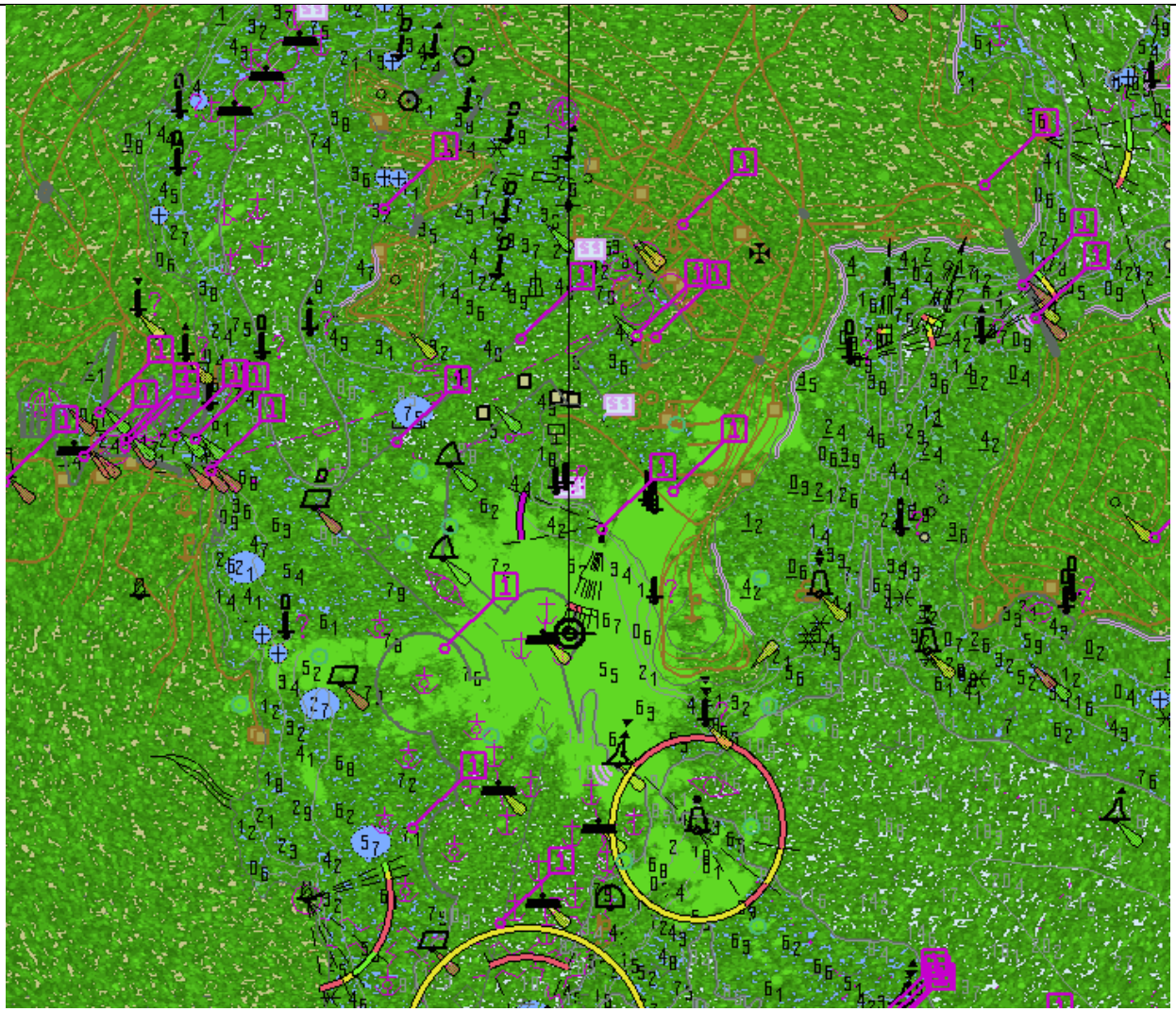
Day with radar echoes and tracked targets. Display Category Display Base + Lights

TBD



Dusk with radar echoes and tracked targets. Display Category Display Base + Lights

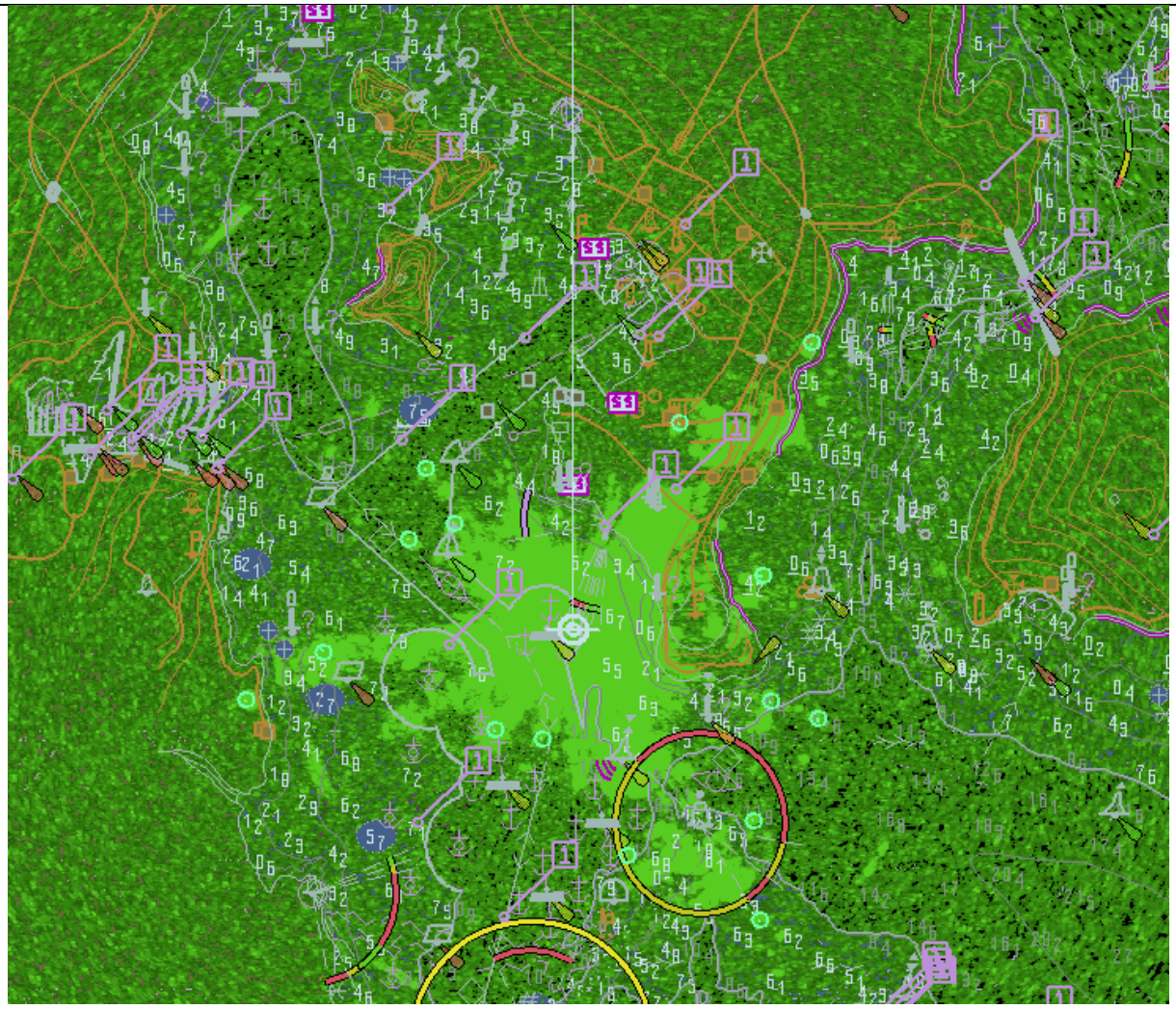
TBD



Day with very noisy radar echoes and tracked targets. Display Category Other, Select Highlight info, Select Shallow water dangers.

Note: This example clearly shows which SYSTEM DATABASE features are above radar echoes

TBD



Dusk with very noisy radar echoes and tracked targets. Display Category Other, Select Highlight info, Select Shallow water dangers.

Note: This example clearly shows which SYSTEM DATABASE features are above radar echoes

TBD

3.16 Accuracy

Note:
In this section calculations are based on the WGS-84 spheroid:
Semi-major axis 6378137.0000m
Semi-minor axis 6356752.3142m
Eccentricity squared 0.00669437999013
Flattening 298.257223563

The WGS-84 spheroid is defined by its semi-major axis and flattening 1/f = 1/298.257223563.
The other parameters are derived from a and f.

Conversion of metres (m) to nautical miles (NM) uses
1 NM = 1852 m.

The tests contained within this section shall be executed using the Electronic Bearing Line (EBL) and Variable Range Marker (VRM) tools provided by the ECDIS system.

The tolerance for distances is 1% or 30m whichever is greater. The tolerance for bearings is 1º.

The positions used in this section are also included in the files “4.6 Accuracy-Geodesic.doc” and “4.6 Accuracy-Rhumb Lines.doc” in the “4.6 Accuracy” folder within the TDS.

3.16.1 Distance and azimuth between geographical positions

Test Reference	Accuracy1	**IHO Reference**	
Test description			
True distance and azimuth between two geographical positions a).			
Setup			
*Load the exchange set **PowerUp***			
Action			
Measure the distance and azimuth between the following two features: *Viking 49/27-B 32º35.224’S 061º17.710’E* *Corund Cape Light 32º27.436’S 060º58.609’E*			
Results			
Confirm that the results are as follows: *True Distance 33193.554 m / 17.9231 NM* *Bearing from Viking 49/27-B to Corund Cape Light is 295.614 degrees* *Bearing from Corund Cape Light to Viking 49/27-B is 115.785 degrees*			

Test Reference	Accuracy2	**IHO Reference**	-
Test description			
True distance and azimuth between two geographical positions b).			
Setup			
As for test Accuracy1			
Action			
Measure the distance and azimuth between the following two features: *Viking 49/27-B 32º35.224'S 061º17.710'E* *Castlerigg Light 32º23.280'S 060º58.496'E*			
Results			
Confirm that the results are as follows: *True Distance 37326.351 m / 20.1546 NM* *Bearing from Viking 49/27-B to Castlerigg Light is 306.172 degrees* *Bearing from Castlerigg Light to Viking 49/27-B is 126.344 degrees*			

Test Reference	Accuracy3	**IHO Reference**	-
Test description			
True distance and azimuth between two geographical positions c).			
Setup			
As for test Accuracy1			
Action			
Measure the distance and azimuth between the following two features: *Corund Cape Light 32º27.447'S 060º58.599'E* *Worm Head Light 32º31.958'S 060º54.337'E*			
Results			
Confirm that the results are as follows: *True Distance 10680.859 m / 5.7672 NM* *Bearing from Corund Cape Light to Worm Head Light is 218.665 degrees* *Bearing from Worm Head Light to Corund Cape Light is 38.703 degrees*			

3.16.2 **Geographical position from a known position and distance/azimuth**

Test Reference	Accuracy4	**IHO Reference**	-
Test description			
Geographical position from known position and distance/azimuth a).			
Setup			
As for test Accuracy1.			
Action			
From the following position: *Viking 49/27-B 32º35.224'S 061º17.710'E* *Enter a distance and bearing of:* *True Distance 33193.554 m / 17.9231 NM* *Bearing 295.614 degrees*			
Results			
Confirm that the end geographical position is: *Corund Cape Light 32º27.436'S 060º58.609'E*			

Test Reference	Accuracy5	**IHO Reference**	-
Test description			
Geographical position from known position and distance/azimuth b).			
Setup			
As for test Accuracy1			
Action			
From the following position: *Viking 49/27-B 32º35.224'S 061º17.710'E* *Enter a distance and bearing of:* *True Distance 37326.351 m / 20.1546 NM* *Bearing 306.172 degrees*			
Results			
Confirm that the end geographical position is: *Castlerigg Light 32º23.280'S 060º58.496'E*			

Test Reference	Accuracy6	**IHO Reference**	-
Test description			
Geographical position from known position and distance/azimuth c).			
Setup			
As for test Accuracy1			
Action			
From the following position: *Corund Cape Light 32º27.447'S 060º58.599'E* *Enter a distance and bearing of:* *True Distance 10680.859 m / 5.7672 NM* *Bearing 218.665 degrees*			
Results			
Confirm that the end geographical position is: *Worm Head Light 32º 31.958'S 60º 54.337'E*			

3.16.3 Rhumb line distance and azimuth between geographical positions

Test Reference	Accuracy7	**IHO Reference**	-
Test description			
Rhumb line distance and azimuth between two geographical positions a).			
Setup			
Load the exchange set ***PowerUp***			
Action			
Measure the distance and azimuth between the following two features: *Viking 49/27-B 32º35.224'S 061º17.710'E* *Corund Cape Light 32º27.436'S 060º58.609'E*			
Results			
Confirm that the results are as follows: *True Distance 33193.567 m / 17.9231 NM* *Bearing from Viking 49/27-B to Corund Cape Light is 295.699 degrees* *Bearing from Corund Cape Light to Viking 49/27-B is 115.699 degrees*			

Test Reference	Accuracy8	**IHO Reference**	-
Test description			
Rhumb line distance and azimuth between two geographical positions b).			
Setup			
As for test Accuracy1			
Action			
Measure the distance and azimuth between the following two features: *Viking 49/27-B 32º35.224'S 061º17.710'E* *Castlerigg Light 32º23.280'S 060º58.496'E*			
Results			
Confirm that the results are as follows: *True Distance 37326.365 m / 20.1546 NM* *Bearing from Viking 49/27-B to Castlerigg Light is 306.258 degrees* *Bearing from Castlerigg Light to Viking 49/27-B is 126.258 degrees*			

Test Reference	Accuracy9	**IHO Reference**	-
Test description			
Rhumb line distance and azimuth between two geographical positions c).			
Setup			
As for test Accuracy1			
Action			
Measure the distance and azimuth between the following two features: *Corund Cape Light 32º27.447'S 060º58.599'E* *Worm Head Light 32º31.958'S 060º54.337'E*			
Results			
Confirm that the results are as follows: *True Distance 10680.859 m / 5.7672 NM* *Bearing from Corund Cape Light to Worm Head Light is 218.684 degrees* *Bearing from Worm Head Light to Corund Cape Light is 38.684 degrees*			

3.16.4 **Geodesics**

Test Reference	Accuracy10	**IHO Reference**	-
Test description			
Geodesic lines and circle, northern quadrant.			
Setup			
As for test Accuracy1			
Action			
Plot positions listed in sets 2-6 of the positions listed in section "Positions for use in Accuracy Tests – Geodetics".			
Results			
Confirm that the lines drawn pass through or sufficiently close to the listed positions and that the Geodesic circle corresponds to range rings at 2 000 000 m intervals.			

Test Reference	Accuracy11	**IHO Reference**	-
Test description			
Geodesic lines and circle, crossing the equator.			
Setup			
As for test Accuracy1			
Action			
Plot positions listed in sets 7-11 of the positions listed in section "Positions for use in Accuracy Tests – Geodetics".			
Results			
Confirm that the lines drawn pass through or sufficiently close to the listed positions and that the Geodesic circle corresponds to range rings at 2 000 000 m intervals.			

Test Reference	Accuracy12	**IHO Reference**	-
Test description			
Geodesic lines southern quadrant.			
Setup			
As for test Accuracy1			
Action			
Plot positions listed in sets 12-16 of the positions listed in section "Positions for use in Accuracy Tests – Geodetics".			
Results			
Confirm that the lines drawn pass through or sufficiently close to the listed positions and that the Geodesic circle corresponds to range rings at 2 000 000 m intervals.			

3.16.5 **Rhumb Lines**

Test Reference	Accuracy13	**IHO Reference**	-
Test description			
Rhumb lines, northern quadrant.			
Setup			
As for test Accuracy1			
Action			
Plot positions listed in sets 2-5 of the positions listed in section "Positions for use in Accuracy Tests – Rhumb Lines".			
Results			
Confirm that the lines drawn pass through or sufficiently close to the listed positions.			

Test Reference	Accuracy14	**IHO Reference**	-
Test description			
Rhumb lines, crossing the equator.			
Setup			
As for test Accuracy1.			
Action			
Plot positions listed in sets 6-9 of the positions listed in section "Positions for use in Accuracy Tests – Rhumb Lines".			
Results			
Confirm that the lines drawn pass through or sufficiently close to the listed positions.			

Test Reference	Accuracy15	**IHO Reference**	-
Test description			
Rhumb lines, southern quadrant.			
Setup			
As for test Accuracy1.			
Action			
Plot positions listed in sets 10-13 of the positions listed in section "Positions for use in Accuracy Tests – Rhumb Lines".			
Results			
Confirm that the lines drawn pass through or sufficiently close to the listed positions.			

3.16.6 Positions for use in Accuracy Tests - Geodesics

The following sections contain a series of latitudes and longitudes which define a number of geodesics. These points are intended to allow type approval authorities to test the ability of ECDIS to calculate geodesics correctly.

Conversion of metres (m) to nautical miles (NM) uses
1 NM = 1852 m.

Set 1 Micklefirth

Usage Band 4

Viking 49/27-B 32º35.224S 061º17.710E
Corund Cape Light 32º27.436S 060º58.609E
True Distance 33193.554 m / 17.9231 NM
Forward Bearing 295.614 degrees
Reverse Bearing 115.785 degrees

Viking 49/27-B 32º35.224S 061º17.710E
Castlerigg Light 32º23.280S 060º58.496E
True Distance 37326.351 m / 20.1546 NM
Forward Bearing 306.172 degrees
Reverse Bearing 126.344 degrees

Usage Band 5

Corund Cape Light 32º27.447S 060º58.599E
Worm Head Light 32º31.958S 060º54.337E
True Distance 10680.859 m / 5.7672 NM
Forward Bearing 218.665 degrees
Reverse Bearing 38.703 degrees

Long Geodesics - North West Quadrant.

Set 2 Long Diagonal (30ºN, 60ºW to 60ºN, 30ºW)

Point1	30º00.0000N	060º00.0000W
Point2	31º38.1452N	059º05.9571W
Point3	33º15.8706N	058º09.9924W
Point4	34º53.1348N	057º11.9156W
Point5	36º29.8923N	056º11.5178W
Point6	38º06.0926N	055º08.5692W
Point7	39º41.6796N	054º02.8166W
Point8	41º16.5909N	052º53.9805W
Point9	42º50.7564N	051º41.7515W
Point10	44º24.0976N	050º25.7868W
Point11	45º56.5257N	049º05.7067W
Point12	47º27.9409N	047º41.0895W
Point13	48º58.2294N	046º11.4681W
Point14	50º27.2626N	044º36.3244W
Point15	51º54.8937N	042º55.0855W

Point16	53º20.9554N	041º07.1195W
Point17	54º45.2565N	039º11.7330W
Point18	56º07.5789N	037º08.1699W
Point19	57º27.6730N	034º55.6135W
Point20	58º45.2547N	032º33.1935W
Point21	60º00.0000N	030º00.0000W

Set 3 Long Diagonal (30ºN, 30ºW to 60ºN, 60ºW)

Point1	30º00.0000N	030º00.0000W
Point2	31º38.1452N	030º54.0429W
Point3	33º15.8706N	031º50.0076W
Point4	34º53.1348N	032º48.0844W
Point5	36º29.8923N	033º48.4822W
Point6	38º06.0926N	034º51.4308W
Point7	39º41.6796N	035º57.1833W
Point8	41º16.5909N	037º06.0195W
Point9	42º50.7564N	038º18.2485W
Point10	44º24.0976N	039º34.2132W
Point11	45º56.5257N	040º54.2933W
Point12	47º27.9409N	042º18.9105W
Point13	48º58.2294N	043º48.5319W
Point14	50º27.2626N	045º23.6756W
Point15	51º54.8937N	047º04.9145W
Point16	53º20.9554N	048º52.8805W
Point17	54º45.2565N	050º48.2670W
Point18	56º07.5789N	052º51.8301W
Point19	57º27.6730N	055º04.3865W
Point20	58º45.2547N	057º26.8065W
Point21	60º00.0000N	060º00.0000W

Set 4 Long Horizontal (45ºN, 60ºW to 45ºN, 30ºW)

Point1	45º00.0000N	060º00.0000W
Point2	45º11.2519N	058º31.7916W
Point3	45º21.3608N	057º03.0317W
Point4	45º30.3133N	055º33.7738W
Point5	45º38.0973N	054º04.0740W
Point6	45º44.7022N	052º33.9908W
Point7	45º50.1188N	051º03.5849W
Point8	45º54.3397N	049º32.9185W
Point9	45º57.3588N	048º02.0555W
Point10	45º59.1720N	046º31.0608W
Point11	45º59.7767N	045º00.0000W
Point12	45º59.1720N	043º28.9392W
Point13	45º57.3588N	041º57.9446W
Point14	45º54.3397N	040º27.0815W
Point15	45º50.1188N	038º56.4152W
Point16	45º44.7022N	037º26.0092W
Point17	45º38.0973N	035º55.9260W
Point18	45º30.3133N	034º26.2263W
Point19	45º21.3608N	032º56.9684W
Point20	45º11.2519N	031º28.2085W
Point21	45º00.0000N	030º00.0000W

Set 5 Long Vertical (30ºN, 45ºW to 60ºN, 45ºW)

The geodesic runs along the 45ºW meridian.

Set 6 Circle (Centre 45ºN, 45ºW Radius 2 000 000 m Points every 15 degrees)

Point1	62º58.1482N	045º00.0000W
Point2	62º02.9175N	035º13.1324W
Point3	59º29.7703N	027º21.3716W
Point4	55º47.3417N	022º13.6842W
Point5	51º25.6105N	019º41.1668W
Point6	46º49.0062N	019º14.2861W
Point7	42º16.1548N	020º24.1958W
Point8	38º1.4970N	022º48.2871W
Point9	34º16.6609N	026º09.5368W
Point10	31º11.2085N	030º14.5458W
Point11	28º52.8672N	034º51.8044W
Point12	27º27.4359N	039º50.5197W
Point13	26º58.5455N	045º00.0000W
Point14	27º27.4359N	050º09.4803W
Point15	28º52.8672N	055º08.1956W
Point16	31º11.2085N	059º45.4542W
Point17	34º16.6609N	063º50.4632W
Point18	38º01.4970N	067º11.7129W
Point19	42º16.1548N	069º35.8042W
Point20	46º49.0062N	070º45.7139W
Point21	51º25.6105N	070º18.8332W
Point22	55º47.3417N	067º46.3158W
Point23	59º29.7703N	062º38.6284W
Point24	62º02.9175N	054º46.8676W
Point25	62º58.1482N	045º00.0000W

Long Geodesics (Crossing Equator).

Set 7 Long Diagonal (15ºN, 60ºW to 15ºS, 30ºW)

Point1	15º00.0000N	060º00.0000W
Point2	13º31.8194N	058º26.4185W
Point3	12º03.0524N	056º53.9818W
Point4	10º33.7708N	055º22.5552W
Point5	09º04.0440N	053º52.0065W
Point6	07º33.9393N	052º22.2057W
Point7	06º03.5224N	050º53.0251W
Point8	04º32.8574N	049º24.3384W
Point9	03º02.0073N	047º56.0210W
Point10	01º31.0343N	046º27.9492W
Point11	00º00.0000N	045º00.0000W
Point12	01º31.0343S	043º32.0508W
Point13	03º02.0073S	042º03.9789W
Point14	04º32.8574S	040º35.6615W
Point15	06º03.5224S	039º06.9749W
Point16	07º33.9393S	037º37.7942W
Point17	09º04.0440S	036º07.9935W
Point18	10º33.7708S	034º37.4447W
Point19	12º03.0524S	033º06.0182W
Point20	13º31.8194S	031º33.5815W

Point21	15º00.0000S	030º00.0000W

Set 8 Long Diagonal (15ºN, 30ºW to 15ºS, 60ºW)

Point1	15º00.0000N	030º00.0000W
Point2	13º31.8194N	031º33.5815W
Point3	12º03.0524N	033º06.0182W
Point4	10º33.7708N	034º37.4448W
Point5	09º04.0440N	036º07.9935W
Point6	07º33.9393N	037º37.7943W
Point7	06º03.5224N	039º06.9749W
Point8	04º32.8574N	040º35.6616W
Point9	03º02.0073N	042º03.9790W
Point10	01º31.0343N	043º32.0508W
Point11	00º00.0000N	045º00.0000W
Point12	01º31.0343S	046º27.9492W
Point13	03º02.0073S	047º56.0211W
Point14	04º32.8574S	049º24.3385W
Point15	06º03.5224S	050º53.0251W
Point16	07º33.9393S	052º22.2058W
Point17	09º04.0440S	053º52.0065W
Point18	10º33.7708S	055º22.5553W
Point19	12º03.0524S	056º53.9819W
Point20	13º31.8194S	058º26.4185W
Point21	15º00.0000S	060º00.0000W

Set 9 Long Horizontal (0ºN, 60ºW to 0ºN, 30ºW)

The geodesic runs along the Equator.

Set 10 Long Vertical (15ºS, 45ºW to 15ºN, 45ºW)

The geodesic runs along the 45ºW meridian.

Set 11 Circle (Centre 0ºN, 45ºW Radius 2 000 000 m Points every 15 degrees)

Point1	18º04.8887N	045º00.0000W
Point2	17º26.7433N	040º12.0936W
Point3	15º35.6306N	035º47.3375W
Point4	12º40.8191N	032º05.0570W
Point5	08º55.8234N	029º18.7826W
Point6	04º36.5608N	027º36.4877W
Point7	00º00.0000N	027º02.0217W
Point8	04º36.5608S	027º36.4877W
Point9	08º55.8234S	029º18.7826W
Point10	12º40.8191S	032º05.0570W
Point11	15º35.6306S	035º47.3375W
Point12	17º26.7433S	040º12.0936W
Point13	18º04.8887S	045º00.0000W
Point14	17º26.7433S	049º47.9064W
Point15	15º35.6306S	054º12.6625W
Point16	12º40.8191S	057º54.9430W
Point17	08º55.8234S	060º41.2174W
Point18	04º36.5608S	062º23.5123W
Point19	00º00.0000N	062º57.9783W
Point20	04º36.5608N	062º23.5123W

Point21	08º55.8234N	060º41.2174W
Point22	12º40.8191N	057º54.9430W
Point23	15º35.6306N	054º12.6625W
Point24	17º26.7433N	049º47.9064W
Point25	18º04.8887N	045º00.0000W

Long Geodesics - South West Quadrant.

Set 12 Long Diagonal (30ºS, 60ºW to 60ºS, 30ºW)

Point1	30º00.0000S	060º00.0000W
Point2	31º38.1452S	059º05.9571W
Point3	33º15.8706S	058º09.9924W
Point4	34º53.1348S	057º11.9156W
Point5	36º29.8923S	056º11.5178W
Point6	38º06.0926S	055º08.5692W
Point7	39º41.6796S	054º02.8166W
Point8	41º16.5909S	052º53.9805W
Point9	42º50.7564S	051º41.7515W
Point10	44º24.0976S	050º25.7868W
Point11	45º56.5257S	049º05.7067W
Point12	47º27.9409S	047º41.0895W
Point13	48º58.2294S	046º11.4681W
Point14	50º27.2626S	044º36.3244W
Point15	51º54.8937S	042º55.0855W
Point16	53º20.9554S	041º07.1195W
Point17	54º45.2565S	039º11.7330W
Point18	56º07.5789S	037º08.1699W
Point19	57º27.6730S	034º55.6135W
Point20	58º45.2547S	032º33.1935W
Point21	60º00.0000S	030º00.0000W

Set 13 Long Diagonal (30ºS, 30ºW to 60ºS, 60ºW)

Point1	30º00.0000S	030º00.0000W
Point2	31º38.1452S	030º54.0429W
Point3	33º15.8706S	031º50.0076W
Point4	34º53.1348S	032º48.0844W
Point5	36º29.8923S	033º48.4822W
Point6	38º06.0926S	034º51.4308W
Point7	39º41.6796S	035º57.1833W
Point8	41º16.5909S	037º06.0195W
Point9	42º50.7564S	038º18.2485W
Point10	44º24.0976S	039º34.2132W
Point11	45º56.5257S	040º54.2933W
Point12	47º27.9409S	042º18.9105W
Point13	48º58.2294S	043º48.5319W
Point14	50º27.2626S	045º23.6756W
Point15	51º54.8937S	047º04.9145W
Point16	53º20.9554S	048º52.8805W
Point17	54º45.2565S	050º48.2670W
Point18	56º7.5789S	052º51.8301W
Point19	57º27.6730S	055º04.3865W
Point20	58º45.2547S	057º26.8065W
Point21	60º00.0000S	060º00.0000W

Set 14 Long Horizontal (45ºS, 60ºW to 45ºS, 30ºW)

Point1	45º00.0000S	060º00.0000W
Point2	45º11.2519S	058º31.7916W
Point3	45º21.3608S	057º03.0317W
Point4	45º30.3133S	055º33.7738W
Point5	45º38.0973S	054º04.0740W
Point6	45º44.7022S	052º33.9908W
Point7	45º50.1188S	051º03.5849W
Point8	45º54.3397S	049º32.9185W
Point9	45º57.3588S	048º02.0555W
Point10	45º59.1720S	046º31.0608W
Point11	45º59.7767S	045º00.0000W
Point12	45º59.1720S	043º28.9392W
Point13	45º57.3588S	041º57.9446W
Point14	45º54.3397S	040º27.0815W
Point15	45º50.1188S	038º56.4152W
Point16	45º44.7022S	037º26.0092W
Point17	45º38.0973S	035º55.9260W
Point18	45º30.3133S	034º26.2263W
Point19	45º21.3608S	032º56.9684W
Point20	45º11.2519S	031º28.2085W
Point21	45º00.0000S	030º00.0000W

Set 15 Long Vertical (30ºS, 45ºW to 60ºS, 45ºW)

The geodesic runs along the 45ºW meridian.

Set 16 Circle (Centre 45ºS, 45ºW Radius 2 000 000 m Points every 15 degrees)

Point1	62º58.1482S	045º00.0000W
Point2	62º02.9175S	035º13.1324W
Point3	59º29.7703S	027º21.3716W
Point4	55º47.3417S	022º13.6842W
Point5	51º25.6105S	019º41.1668W
Point6	46º49.0062S	019º14.2861W
Point7	42º16.1548S	020º24.1958W
Point8	38º01.4970S	022º48.2871W
Point9	34º16.6609S	026º09.5368W
Point10	31º11.2085S	030º14.5458W
Point11	28º52.8672S	034º51.8044W
Point12	27º27.4359S	039º50.5197W
Point13	26º58.5455S	045º00.0000W
Point14	27º27.4359S	050º09.4803W
Point15	28º52.8672S	055º08.1956W
Point16	31º11.2085S	059º45.4542W
Point17	34º16.6609S	063º50.4632W
Point18	38º01.4970S	067º11.7129W
Point19	42º16.1548S	069º35.8042W
Point20	46º49.0062S	070º45.7139W
Point21	51º25.6105S	070º18.8332W
Point22	55º47.3417S	067º46.3158W
Point23	59º29.7703S	062º38.6284W
Point24	62º02.9175S	054º46.8676W
Point25	62º58.1482S	045º00.0000W

3.16.7 Positions for use in Accuracy Tests – Rhumb Lines

The following sections contain a series of latitudes and longitudes which define a number of rhumb lines. These points are intended to allow type approval authorities to test the ability of ECDIS to calculate rhumb lines correctly.

All calculations are based on the WGS-84 spheroid:

Semi-major axis	6378137.0000m
Semi-minor axis	6356752.3142m
Eccentricity squared	0.0066943800
Flattening	298.25722356

Conversion of metres (m) to nautical miles (NM) uses
1 NM = 1852 m.

Set 1 – not applicable

Long Rhumb Lines - North West Quadrant.

Set 2 Long Diagonal (30ºN, 30ºW to 60ºN, 60ºW)

Point1	30º00.0000N	030º00.0000W
Point2	31º30.2165N	031º11.4806W
Point3	33º00.4119N	032º24.1146W
Point4	34º30.5854N	033º37.9913W
Point5	36º00.7368N	034º53.2065W
Point6	37º30.8656N	036º09.8628W
Point7	39º00.9713N	037º28.0713W
Point8	40º31.0539N	038º47.9519W
Point9	42º01.1129N	040º09.6347W
Point10	43º31.1484N	041º33.2615W
Point11	45º01.1601N	042º58.9871W
Point12	46º31.1481N	044º26.9812W
Point13	48º01.1124N	045º57.4306W
Point14	49º31.0531N	047º30.5417W
Point15	51º00.9704N	049º06.5435W
Point16	52º30.8645N	050º45.6910W
Point17	54º00.7358N	052º28.2698W
Point18	55º30.5845N	054º14.6010W
Point19	57º00.4111N	056º05.0479W
Point20	58º30.2161N	058º00.0234W
Point21	60º00.0000N	060º00.0000W

Set 3 Long Diagonal (60ºN, 30ºW to 30ºN, 60ºW)

Point1	60º00.0000N	030º00.0000W
Point2	58º30.2161N	031º59.9767W
Point3	57º00.4111N	033º54.9521W
Point4	55º30.5845N	035º45.3990W
Point5	54º00.7358N	037º31.7302W
Point6	52º30.8645N	039º14.3090W
Point7	51º00.9704N	040º53.4565W
Point8	49º31.0531N	042º29.4583W
Point9	48º01.1124N	044º02.5694W
Point10	46º31.1481N	045º33.0188W

Point11	45º01.1601N	047º01.0129W
Point12	43º31.1484N	048º26.7385W
Point13	42º01.1129N	049º50.3653W
Point14	40º31.0539N	051º12.0481W
Point15	39º00.9713N	052º31.9287W
Point16	37º30.8656N	053º50.1372W
Point17	36º00.7368N	055º06.7935W
Point18	34º30.5854N	056º22.0087W
Point19	33º00.4119N	057º35.8854W
Point20	31º30.2165N	058º48.5194W
Point21	30º00.0000N	060º00.0000W

Set 4 Long Horizontal (45ºN, 60ºW to 45ºN, 30ºW)

The rhumb line runs along the 45ºN parallel.

Set 5 Long Vertical (30ºN, 45ºW to 60ºN, 45ºW)

The rhumb line runs along the 45ºW meridian.

Long Rhumb Lines (Crossing Equator).

Set 6 Long Diagonal (15ºN, 60ºW to 15ºS, 30ºW)

Point1	15º00.0000N	060º00.0000W
Point2	13º30.0344N	058º28.2185W
Point3	12º00.0581N	056º57.0084W
Point4	10º30.0722N	055º26.3012W
Point5	09º00.0778N	053º56.0303W
Point6	07º30.0761N	052º26.1306W
Point7	06º00.0683N	050º56.5384W
Point8	04º30.0555N	049º27.1908W
Point9	03º00.0391N	047º58.0260W
Point10	01º30.0202N	046º28.9826W
Point11	00º00.0000N	045º00.0000W
Point12	01º30.0202S	043º31.0173W
Point13	03º00.0391S	042º01.9740W
Point14	04º30.0555S	040º32.8092W
Point15	06º00.0683S	039º03.4616W
Point16	07º30.0761S	037º33.8694W
Point17	09º00.0778S	036º03.9697W
Point18	10º30.0722S	034º33.6988W
Point19	12º00.0581S	033º02.9916W
Point20	13º30.0344S	031º31.7815W
Point21	15º00.0000S	030º00.0000W

Set 7 Long Diagonal (15ºN, 30ºW to 15ºS, 60ºW)

Point1	15º00.0000N	030º00.0000W
Point2	13º30.0344N	031º31.7815W
Point3	12º00.0581N	033º02.9916W
Point4	10º30.0722N	034º33.6988W
Point5	09º00.0778N	036º03.9697W
Point6	07º30.0761N	037º33.8694W
Point7	06º00.0683N	039º03.4616W
Point8	04º30.0555N	040º32.8092W

Point9	03º00.0391N	042º01.9740W
Point10	01º30.0202N	043º31.0174W
Point11	00º00.0000N	045º00.0000W
Point12	01º30.0202S	046º28.9827W
Point13	03º00.0391S	047º58.0260W
Point14	04º30.0555S	049º27.1908W
Point15	06º00.0683S	050º56.5384W
Point16	07º30.0761S	052º26.1306W
Point17	09º00.0778S	053º56.0303W
Point18	10º30.0722S	055º26.3012W
Point19	12º00.0581S	056º57.0084W
Point20	13º30.0344S	058º28.2185W
Point21	15º00.0000S	060º00.0000W

Set 8 Long Horizontal (0ºN, 60ºW to 0ºN, 30ºW)

The rhumb line runs along the Equator.

Set 9 Long Vertical (15ºS, 45ºW to 15ºN, 45ºW)

The rhumb line runs along the 45ºW meridian.

Long Rhumb Lines - South West Quadrant.

Set 10 Long Diagonal (30ºS, 30ºW to 60ºS, 60ºW)

Point1	30º00.0000S	030º00.0000W
Point2	31º30.2165S	031º11.4806W
Point3	33º00.4119S	032º24.1146W
Point4	34º30.5854S	033º37.9913W
Point5	36º00.7368S	034º53.2065W
Point6	37º30.8656S	036º09.8628W
Point7	39º00.9713S	037º28.0713W
Point8	40º31.0539S	038º47.9519W
Point9	42º01.1129S	040º09.6347W
Point10	43º31.1484S	041º33.2615W
Point11	45º01.1601S	042º58.9871W
Point12	46º31.1481S	044º26.9812W
Point13	48º01.1124S	045º57.4306W
Point14	49º31.0531S	047º30.5417W
Point15	51º00.9704S	049º06.5435W
Point16	52º30.8645S	050º45.6910W
Point17	54º00.7358S	052º28.2698W
Point18	55º30.5845S	054º14.6010W
Point19	57º00.4111S	056º05.0479W
Point20	58º30.2161S	058º00.0234W
Point21	60º00.0000S	060º00.0000W

Set 11 Long Diagonal (60ºS, 30ºW to 30ºS, 60ºW)

Point1	60º00.0000S	030º00.0000W
Point2	58º30.2161S	031º59.9767W
Point3	57º00.4111S	033º54.9521W
Point4	55º30.5845S	035º45.3990W
Point5	54º00.7358S	037º31.7302W
Point6	52º30.8645S	039º14.3090W

Point7	51º00.9704S	040º53.4565W
Point8	49º31.0531S	042º29.4583W
Point9	48º01.1124S	044º02.5694W
Point10	46º31.1481S	045º33.0188W
Point11	45º01.1601S	047º01.0129W
Point12	43º31.1484S	048º26.7385W
Point13	42º01.1129S	049º50.3653W
Point14	40º31.0539S	051º12.0481W
Point15	39º00.9713S	052º31.9287W
Point16	37º30.8656S	053º50.1372W
Point17	36º00.7368S	055º06.7935W
Point18	34º30.5854S	056º22.0087W
Point19	33º00.4119S	057º35.8854W
Point20	31º30.2165S	058º48.5194W
Point21	30º00.0000S	060º00.0000W

Set 12 Long Horizontal (45ºS, 60ºW to 45ºS, 30ºW)

The rhumb line runs along the 45ºS parallel.

Set 13 Long Vertical (30ºS, 45ºW to 60ºS, 45ºW)

The rhumb line runs along the 45ºW meridian.

3.17 Symbols

3.17.1 Symbol Size

Test Reference	SymbolSize	**IHO Reference**	S-98 10.2.3
Test description			
Display of symbols in size shown in the IHO Presentation Library.			
Setup			
Load the exchange set ***PowerUp***			
Action			
Perform zoom-in and zoom-out operations in each Display Category.			
Results			
Confirm that the symbols do not decrease in size below that shown in the IHO Presentation Library.			

3.17.2 Display of ECDIS chart 1 symbols of correct size

Test Reference	Chart1Symbols	**IHO Reference**	S-98 19.6.1 S-98 10.2.2
Test description			
Display of the check symbol of the correct size (in mm).			
Setup			
Use the ECDIS to access Chart 1 ***OR*** *Load the exchange set* ***Chart1***			
Action			
Observe the CHKSYM01 symbol within the Information about the chart display (A,B) section.			
Results			
Confirm that the height of the CHKSYM01 symbol is not less than 5.0mm and not greater than 5.5mm.			

3.17.3 Size in pixels of the check symbol CHKSYM01

Test Reference	CheckSym	**IHO Reference**	S-98 10.2.2
Test description			
Display of the check symbol of the correct size (in pixels).			
Setup			
As for test Chart1Symbols			
Action			
Observe the CHKSYM01 symbol within the Information about the chart display (A,B) section.			
Results			
Confirm that the number of pixels (lines) which comprise the vertical extent of the symbol CHKSYM01 is not less than 16. *This test may be conducted by calculation based on the properties of the EUT.*			

3.17.4 Display of text at the correct size

Test Reference	TextSize	IHO Reference	S-52 [3.1.5]
Test description			
Display of text within the chart display and pick report.			
Setup			
*Load the exchange set **PowerUp***			
Action			
Observe the chart display. *Pick a feature and observe the text within the pick report.* *Create a Mariner's note with text and observe its display.*			
Results			
Based on viewing distance specified in manufacturer manuals, confirm that for all text observed the height of upper-case characters is not less than 3.5 mm per 1 metre viewing distance			

3.17.5 ECDIS Chart 1

Test Reference	Chart 1	IHO Reference	S-98 Chart 1
Test description			
Access to chart 1 datasets			
Setup			
*Load the exchange set **Chart 1***			
Action			
Monitor the display at a viewing scale of 1:20,000			
Results			
TODO: Align these tests with full S-98 text *Confirm correct display of Chart 1 datasets*			

3.17.6 Display redraw

Test Reference	Redraw	IHO Reference	S-98 19.1
Test description			
Display of text within the chart display and pick report.			
Setup			
*Load the exchange set **PowerUp*** • *Select North up true motion* • *Select Display Category Other* • *Select All Independent Mariner selectors* • *Simulate the own ship's movement from Micklefirth through the Mickelfirth channel and to the Mickleden TSS roundabout.*			
Action			
Monitor the display at a viewing scale of 1:20,000			
Results			
Confirm that the display redraws in less than 5 seconds for the duration of the own ship movement. *Select the display of the area north of the Lowesmore Oilfield and confirm that the display redraws in 5 seconds or informs the user and retains the previous display until ready.*			

3.18 Units and Legend

Test Reference	UnitsLegend	**IHO Reference**	S-98 9.1.5
Test description			
Display units and chart legend.			
Setup			
*Load the exchange set **PowerUp***			
Action			
Select a position for display applicable chart legend			
Results			

As a minimum the information listed below must be presented clearly (the complete list needs not always to be shown). Examples from the dataset loaded are listed in bold text where appropriate.

ECDIS Legend	*Values*
Units for depth	*m*
Units for height	*m*
Note: Units for depth and height: Although the ENC Product Specification, S-101 does not allow any other than metric depths and heights, these two elements shall be stated for clarity for the Mariner.	
Scale of display	*Selected by Mariner. (The default display scale is defined by the optimum display scale)* *Overscale indication where appropriate.*
Data quality indicator	*a. category of zone of confidence attribute of the Quality of Bathymetric Data feature for bathymetric data.* *b. Quality of Non Bathymetric Data attribute (if available) for non-bathymetric data.*
Note: Due to the way quality is encoded in the ENC, both values (a. and b.) shall be used.	
Sounding/vertical datum	*Sounding datum – **Lowest astronomical tide** Vertical datum – **Mean high water springs** (VERDAT attributes of individual features shall not be used for the legend).*
Horizontal datum	*HDAT subfield of the DPSM field.* ***WGS 84***
Value of safety depth	*Selected by Mariner (default is 30 m).*
Value of safety contour	*Selected by Mariner (default is 30 m).*
Note: If the Mariner has selected a contour that is not available in the ENC and the EUT displays a default contour, both the contour selected and the contour displayed shall be quoted.	
Magnetic variation	*Value of Magnetic variation, RYRMGV and VALACM of the MAGVAR feature shall be displayed as:* *VALMAG RYRMGV (VALACM)* *For example, 4°15W 1990 (8'E)*
Edition number and date of issue of the datasets currently in use	*Edition number and date of issue of the datasets currently in use* ***Edition Number –*** ***Issue date -***
Date and number of latest update affecting chart cells currently in use	*Issue date and update number of the last update cell update file (ER data set) applied.* ***Issue Date – 20010409*** ***Update Number - 0***
Projection	*The ENC chart projection in use*
WLA Method	*The method of water level adjustment (if used)*

In addition, the following units shall be indicated:

- *position;*
- *distance;*
- *speed.*

3.18.1 **Legend – Multiple Product Specifications.**

Test Reference	LegendItems	**IHO Reference**	S-98 9.1.5
Test description			
Multiple product specifications (particularly gridded data) may have an effect on the Legend and the interpretation of the requirement in S-98: This test adds those elements. • *Test behaviour of the legend with multiple product specifications loaded.*			

3.19 Other ECDIS and Chart Related Functionality

3.19.1 ECDIS Chart 1

Test Reference	ChartOne	IHO Reference	S-52 19.6.1

Test Description

Display of ECDIS chart 1

Loaded Data

Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	On
Safety contour	10	Highlight date dependent	
Safety depth	8	Highlight document	
Deep Contour	30	Highlight info	
Shallow contour	5	Shallow pattern	
Four shades	On	Unknown	On
Radar overlay		Update review	
Plain boundaries	Off	**Text Groups**	On
Simplified symbols	Off	Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional

Setup

Ensure the ECDIS has a feature to allow Chart 1 to be displayed

Action

Navigate to ECDIS chart 1.

Compare the displayed image with the plots shown below

[any other instructions for display? NFN?]

Screen plots are as displayed by compilation scale, that is 1:60 000 or 1:14 000. Screen plot number 1 is 1:60 000 and all others are 1:14 000.

1. *Two of the screen plots (numbers 11 and 13) use "Select Simplified Point Symbols"*
2. *One screen plot (number 6) use "Select Accuracy".*

Results

Confirm that ECDIS chart 1 is displayed and fills the screen when first displayed
Confirm that the displayed images are consistent with the plots provided
Ensure Chart 1 is labelled Not For Navigation
Confirm Revision information of Chart 1 – issue date and edition number ***should be 2.0.0***

Test Reference	ChartOne2	**IHO Reference**	S-52 19.6.1
Test description			
Interrogation of ECDIS chart 1.			
Setup			
With ECDIS chart 1 displayed.			
Action			
Interrogate 3 symbols by cursor pick.			
Results			
[Requires input from the Chart 1 datasets according to S-98] *Upon interrogation the description of the feature is presented.*			

3.19.2 Use of the Colour Differentiation Diagram

The following preparatory text has been brought from S-98 into S-164 and provides instructions for testers carrying out ECDIS type approval.
These procedures should be carried out prior to executing the tests on the colour differentiation diagram.
The dusk and night tables should be checked by means of the colour differentiation test diagram, which is provided as an S-101 file.

Prior to the test:

(1) The person carrying out the test should have passed the Isihara colour blindness test, or other test used to qualify bridge watch keepers, and should adapt to night viewing for 10 minutes before checking the night display;

(2) The controls should be set to their calibrated settings;

(3) While the display is off, adjust the ambient light reflected from white paper positioned on the display screen to the following values:

Colour profile	Light level
Day	200 cd/sq. m
Dusk	10 cd/sq. m
Night	darkness (the ECDIS display is the predominant light source)

Preferably use natural daylight for the day table;

The tester should also ensure that the colour differentiation diagram has the correct issue date and edition number (from IHO).

The Colour Test must be applied on the day and dusk colour tables.

Before the Colour Test diagram is used, the black-adjust symbol BLKADJ01 must be brought up on the screen and the contrast and brightness controls (or equivalent controls for an LCD) must be adjusted as follows:

1 First, set contrast to a maximum, brightness to a minimum. Look at the black-adjust symbol. Then either:

2A If the centre square is not visible, turn up the brightness until it just appears;

or

2B If the centre square is clearly visible (with contrast at maximum, brightness at minimum), turn the contrast down until the inner square disappears, then turn contrast back up until the inner square is just visible again.

(If the above adjustment is not successful, select a more appropriate colour table and repeat this procedure).

The "black level" is then correctly set. If a brighter display is required use the contrast control, but preferably do not adjust the controls unless lighting conditions on the bridge change.

The test consists of being able to distinguish the background colours and to pick out the like foreground colours, that is to say that squares 3, 5, 11, 15, 18 and 20 all have a shallow water blue background, and that squares 3, 10 and 17 have a grey line.

Test Reference	ColourDifferentiation	**IHO Reference**	S-98 19.6.2
Test description			
Under each of the conditions described in the introduction, display the colour differentiation test diagram for the colour profiles. Select each table in turn and ensure that: • Each foreground diagonal line is clearly distinguished from its background; and • The foreground lines representing yellow, orange, magenta (purple), green, blue and grey may be clearly identified.			

Test Reference	ColourCalibration	IHO Reference	S-98 19.3.5

Test description

- *Relocated test from S-98 on colour calibration.*
- *Ensure the ECDIS has instructions for colour calibration, as per S-98 19.3.5*
- *Check colour calibration controls have a provision to return to the calibrated settings.*
- *Check for a warning that uncalibrated settings may adversely affect visibility of information on the display.*
- *For instance:*

> First, set brilliance to calibration position. Look at the black-adjust symbol.
>
> Then either:
>
> - If the centre square is not visible, turn up the brilliance until it just appears;
>
> or
>
> - If the centre square is clearly visible, turn down the brilliance until the inner square disappears, then turn brilliance back up until the inner square is just visible again.
>
> (If the above adjustment is not successful, select a more appropriate colour table and repeat this procedure.)
>
> The "black level" is now correctly set. If a brighter display is required use the brilliance control, but it is better not to re-adjust the controls unless lighting conditions on the bridge change.
>
> Note that the black-adjust symbol should be displayed to check that the inner square remains visible on the following occasions:
>
> - Every time that the brightness or contrast controls are adjusted.
> - Every time that the display is switched to the night colour table.

3.19.3 Data Quality Indicators and Portrayal

Test Reference	DataQualityPortrayal	IHO Reference	S-98 12.10.10
Test description			
• *Test for existence of Data Quality selector.* • *Test that Data quality is taken into consideration, can be configured, and meets the S-98 requirement, particularly when moving between different Data Quality areas.* • *Test that different combinations of data quality portrayal behave correctly.* • *Include all situations from Figure 11.1 in S-101PS.* • *Vertically overlapping QoBD features.* **These tests test horizontal quality portrayal.** **The use of vertical uncertainty in safety contour and water level adjustment processing is included in the WLA tests later**			
Setup			
Action			
Results			

3.19.4 Miscellaneous encoding

Test Reference	ENC encoding	IHO Reference	S-98 DC Annex S-101PC S-100 Part 10a Part 10b
Test description			
TODO: Complete lists of tests from S-98 relating to dataset encoding. • *Tests for complex portrayal of ENC – from portrayal catalogue.* • *Long record test for ISO8211 00000 header* • *Multiple spatial associations (in pick reports)* • *Composite curves and others as multiple records/repeated subfields* • *Exhaustive ISO8211 tests according to S-101's profile of Part 10a* • *Portrayal of Shared Edges* • *GML encoding as per S-98 Data Constraints Annex*			

5 Detection and Notification of Navigational Hazards

5.1 Detection and Notification of Navigational Hazards - Basic test

Test Reference	NavigationalHazards	**IHO Reference**	S-98 12.10.6

Test Description

The purpose of this test is to verify by observation that ECDIS provides an appropriate indication when the Mariner plans a route closer than a user-specified distance from any features satisfying the conditions for this test as listed in the S101 alert and indications catalogue and included in the test dataset 10100AA_NAVHZ.000.

Loaded Data

Exchange Set Name	

Display Mode		**Independent Mariner's Selections (default=On)**	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		**Display**	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			

Alert Highlights (Standard)			
Additional			

Setup

This test is performed by loading the test cell 10100AA_NAVHZ.000, manually creating a route connecting all way points between features marked as WP1 through WP18 and checking display against the corresponding graphical plot

View dataset 101AA00NAVHZ.000 from exchange set ***NavigationalHazards***

- *Select Display Category Other*
- *Set the Safety contour value to 0 m*
- *Set the Safety depth value to 30 m*
- *Set Plain Boundaries to On*
- *Set Simplified symbols to Off*
- *Select all Text groups*
- *Manually create a route connecting all way points between features marked WP1 through WP18*

Set user-specified distance for indication navigational hazards as 0.1 NM

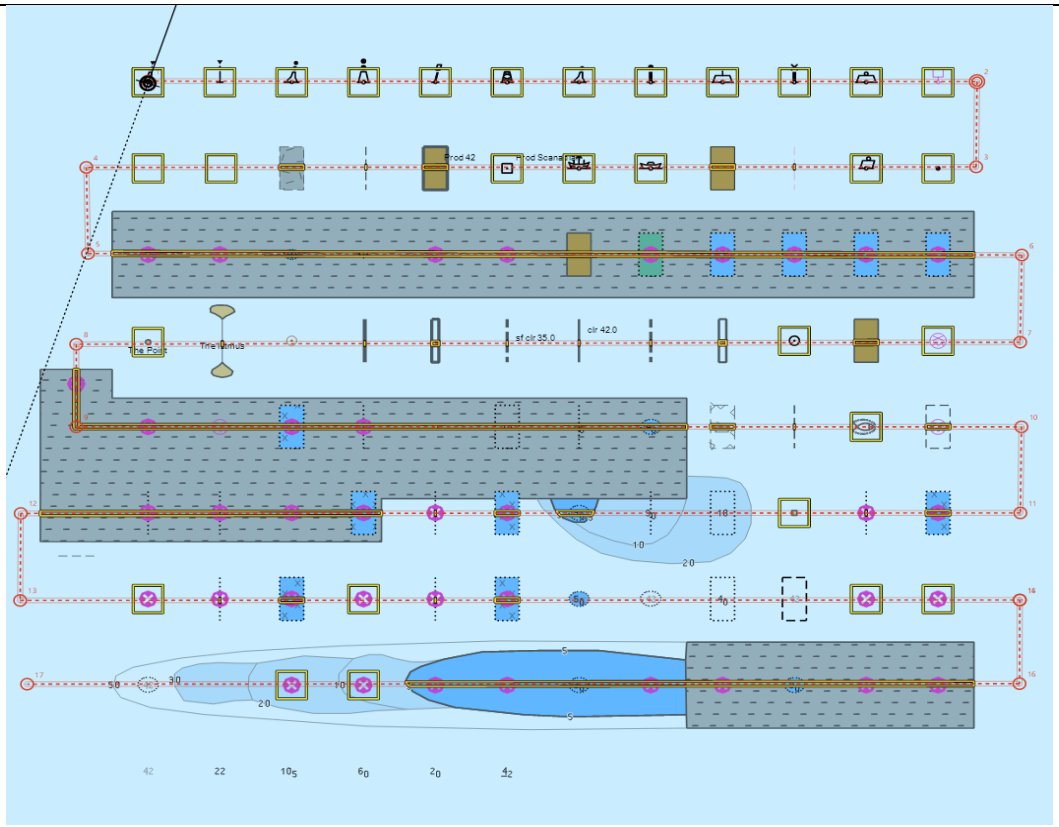
Action

Check ENC symbols shown in the ECDIS against the corresponding graphical plot.

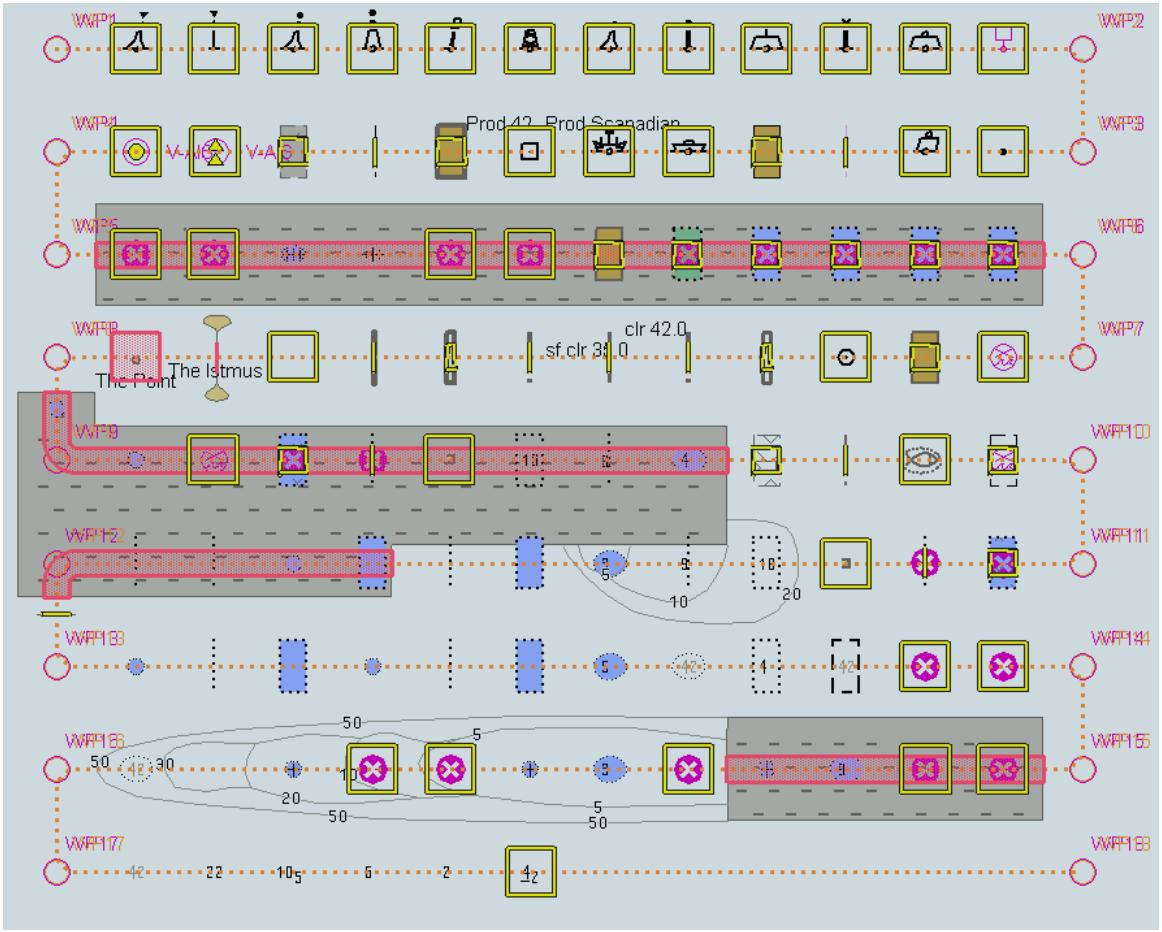
Repeat sequentially with a Safety contour value of 0m, 2m, 4m, 5m, 6m, 8m, 9m, 10m, 11m, 16m, 21m, 31m, 42m, 50m, 51m

Results

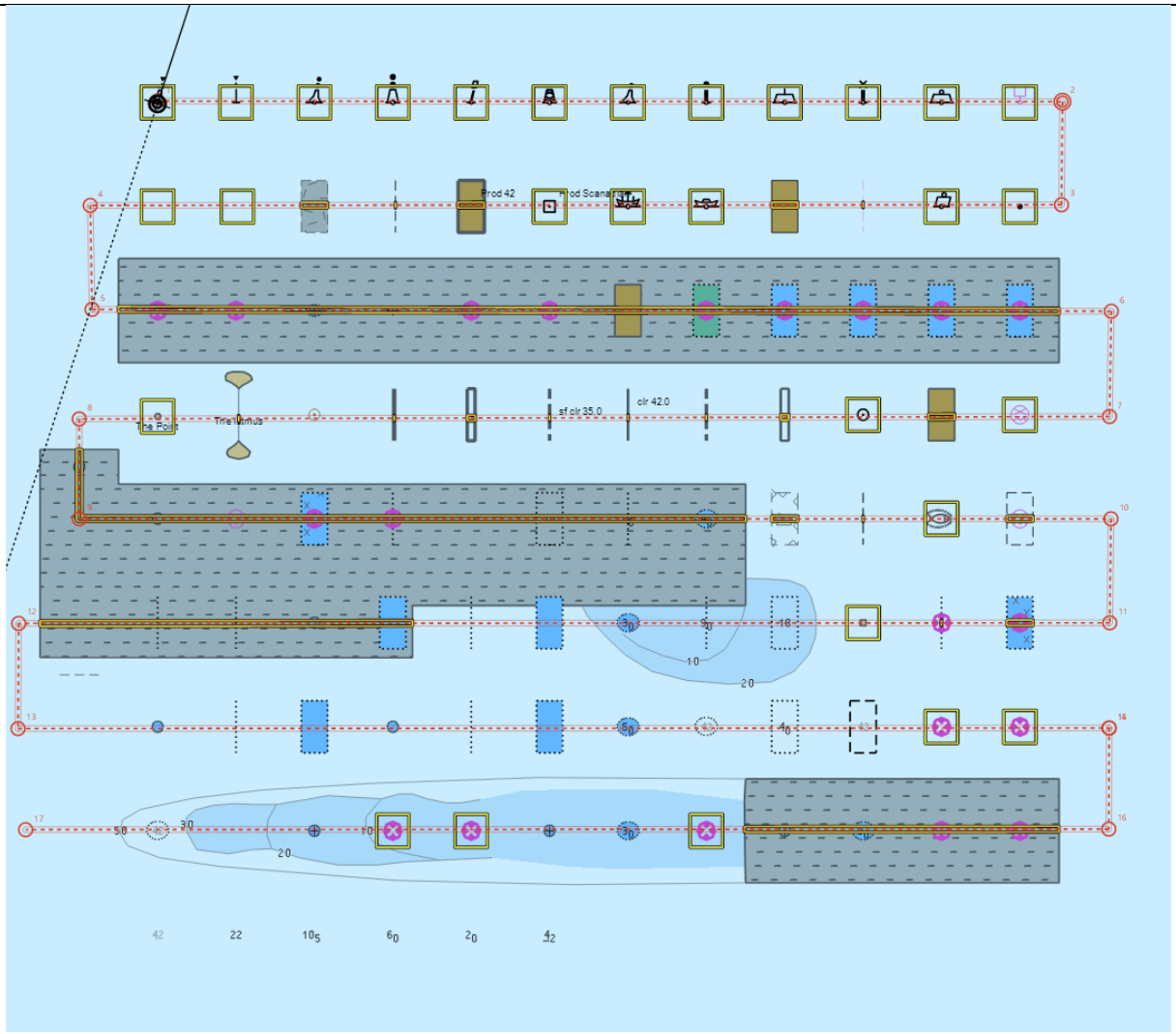
The ENC in the ECDIS should match the corresponding graphical plot shown below.
Note: To increase the prominence of dangers in unsafe waters it is permitted to highlight features with an isolated danger mark when they are wholly located in this area



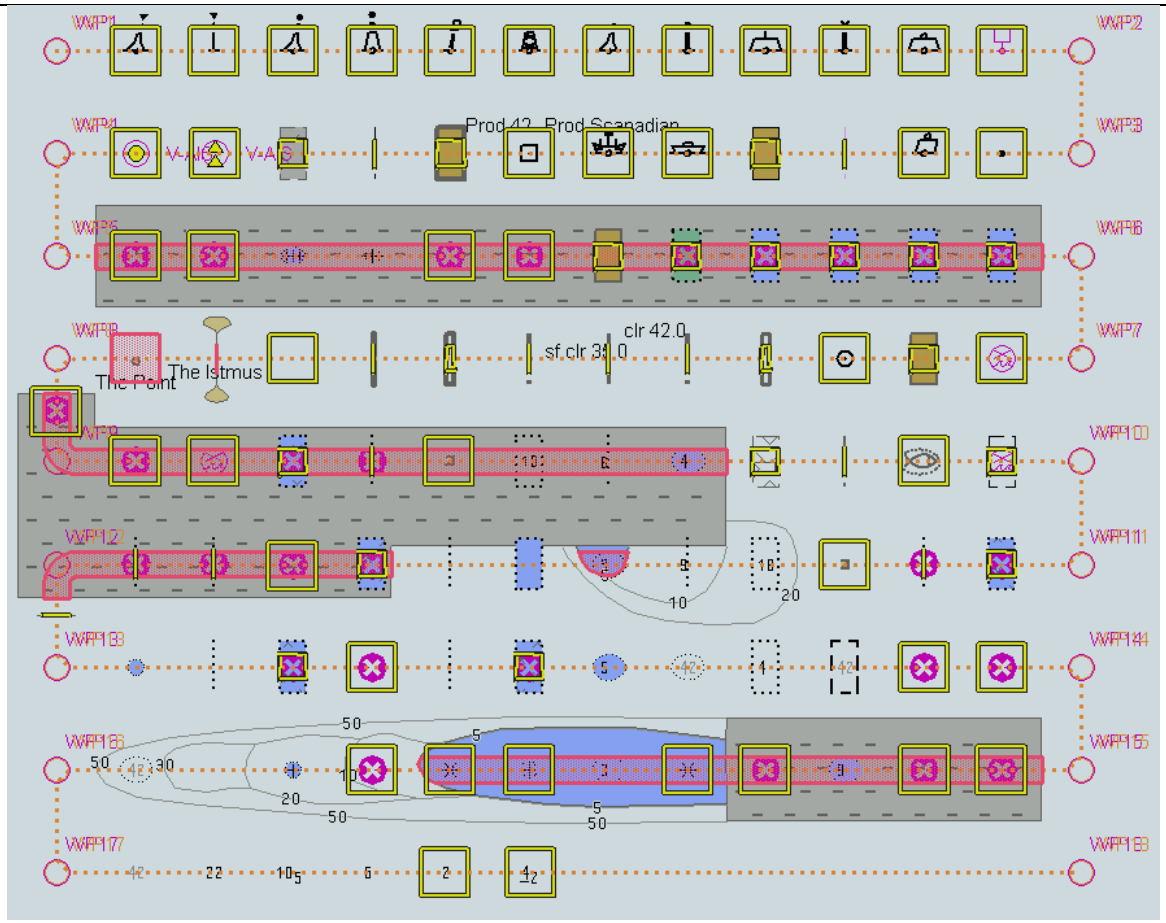
Safety contour = 0 m, Alternative 1



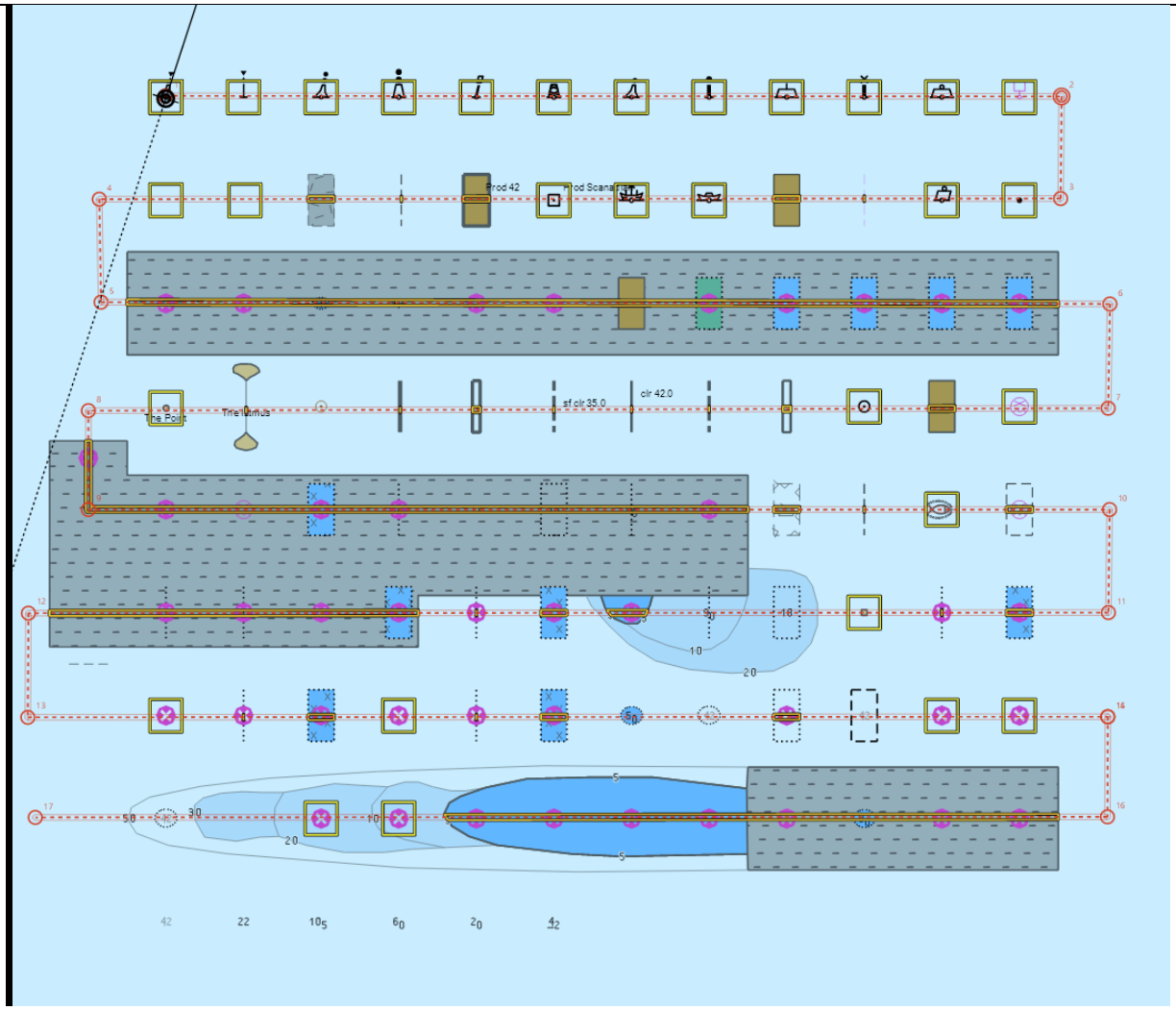
Safety contour = 0 m, Alternative 2



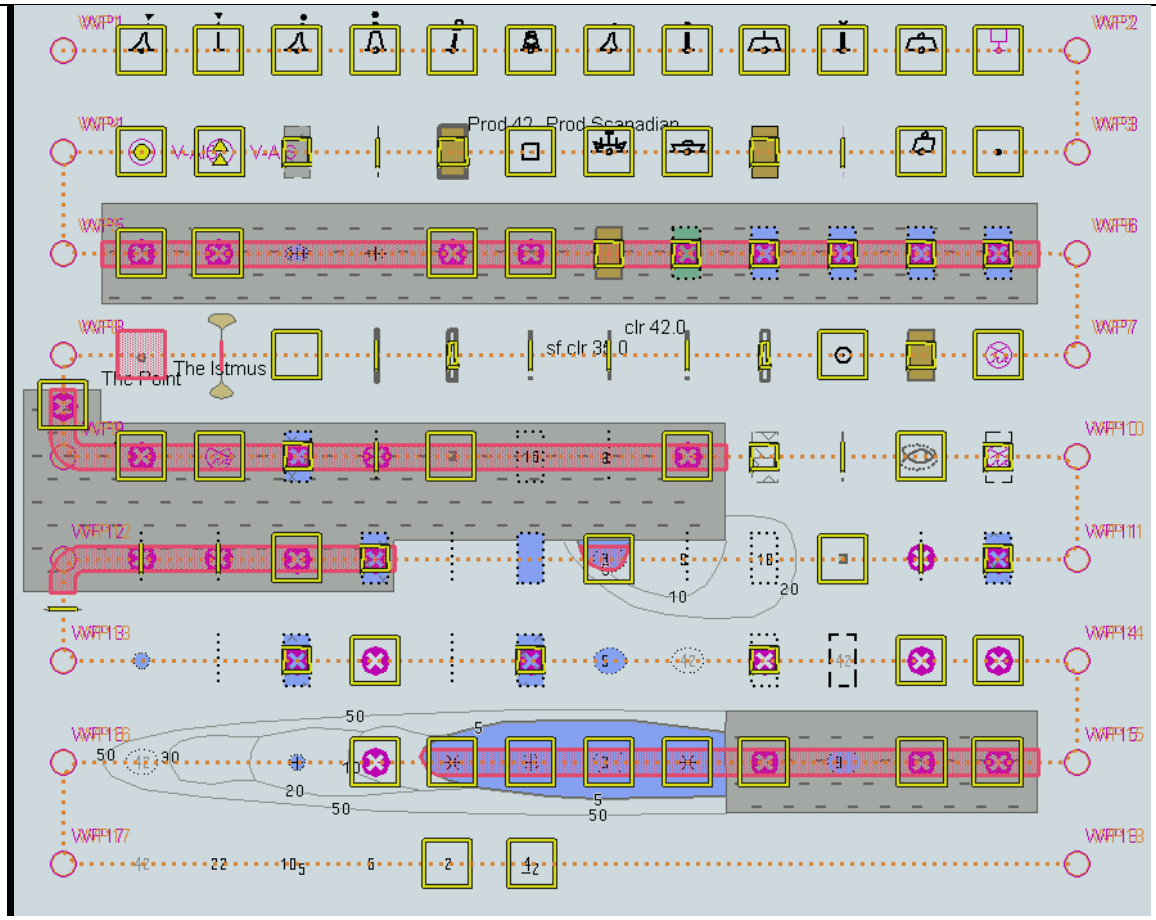
Safety contour = 2 m, Alternative 1



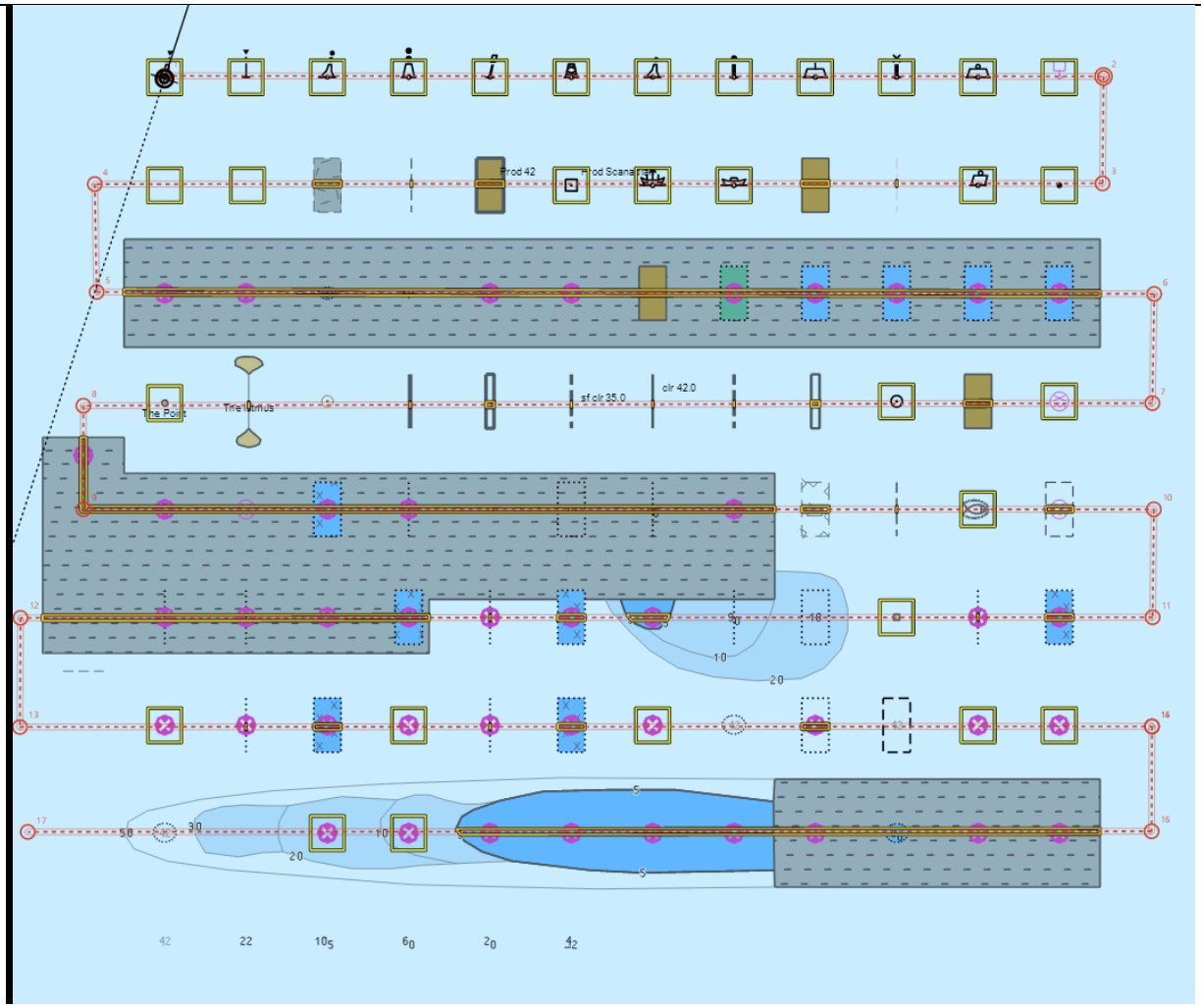
Safety contour = 2 m, Alternative 2



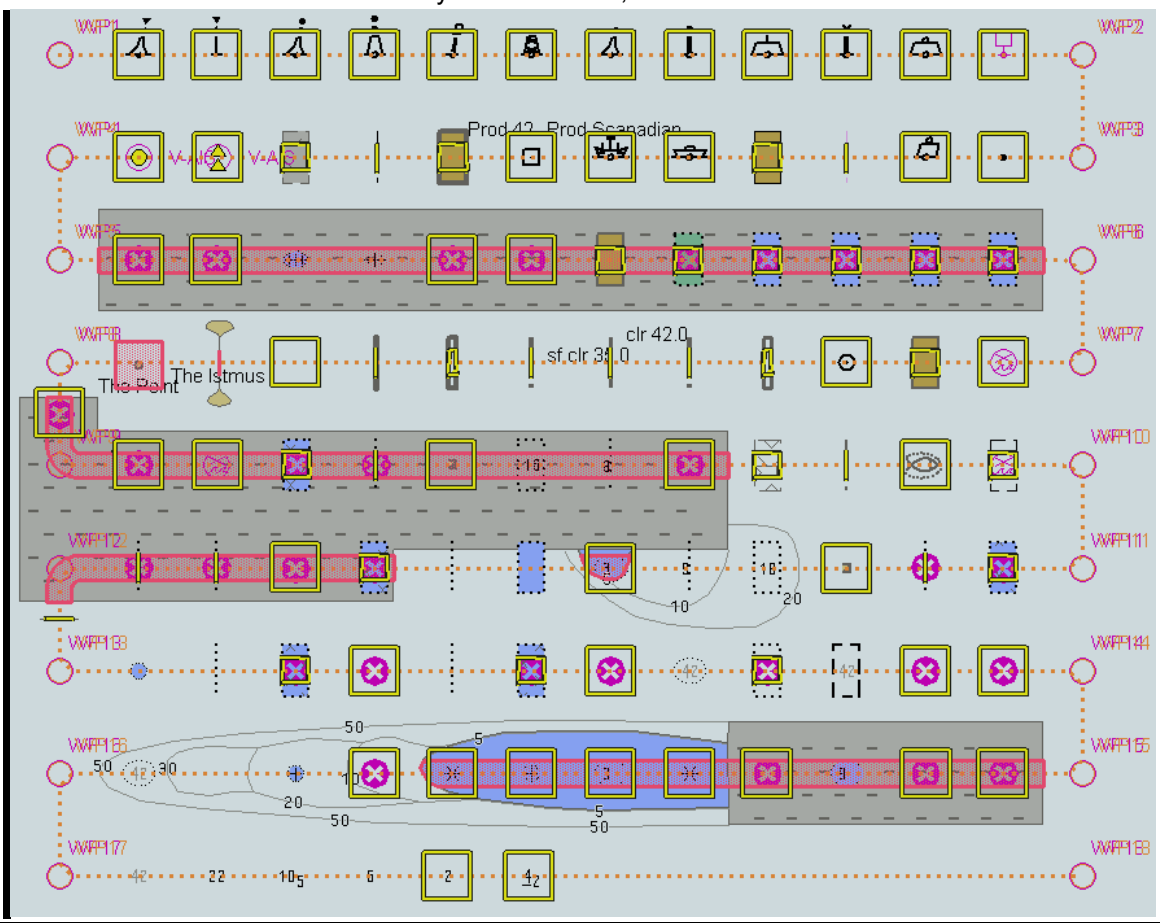
Safety contour = 4 m, Alternative 1



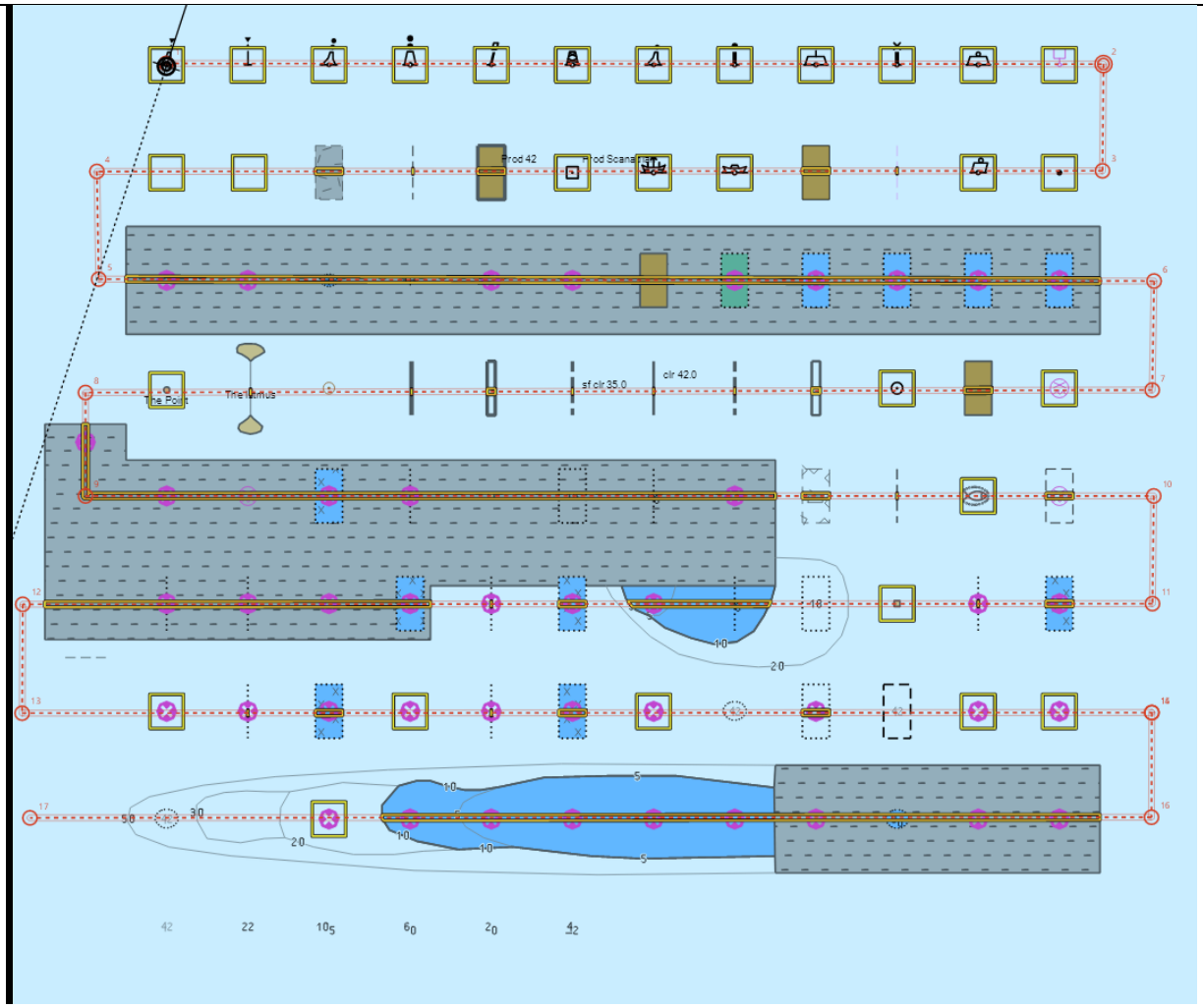
Safety contour = 4 m, Alternative 2



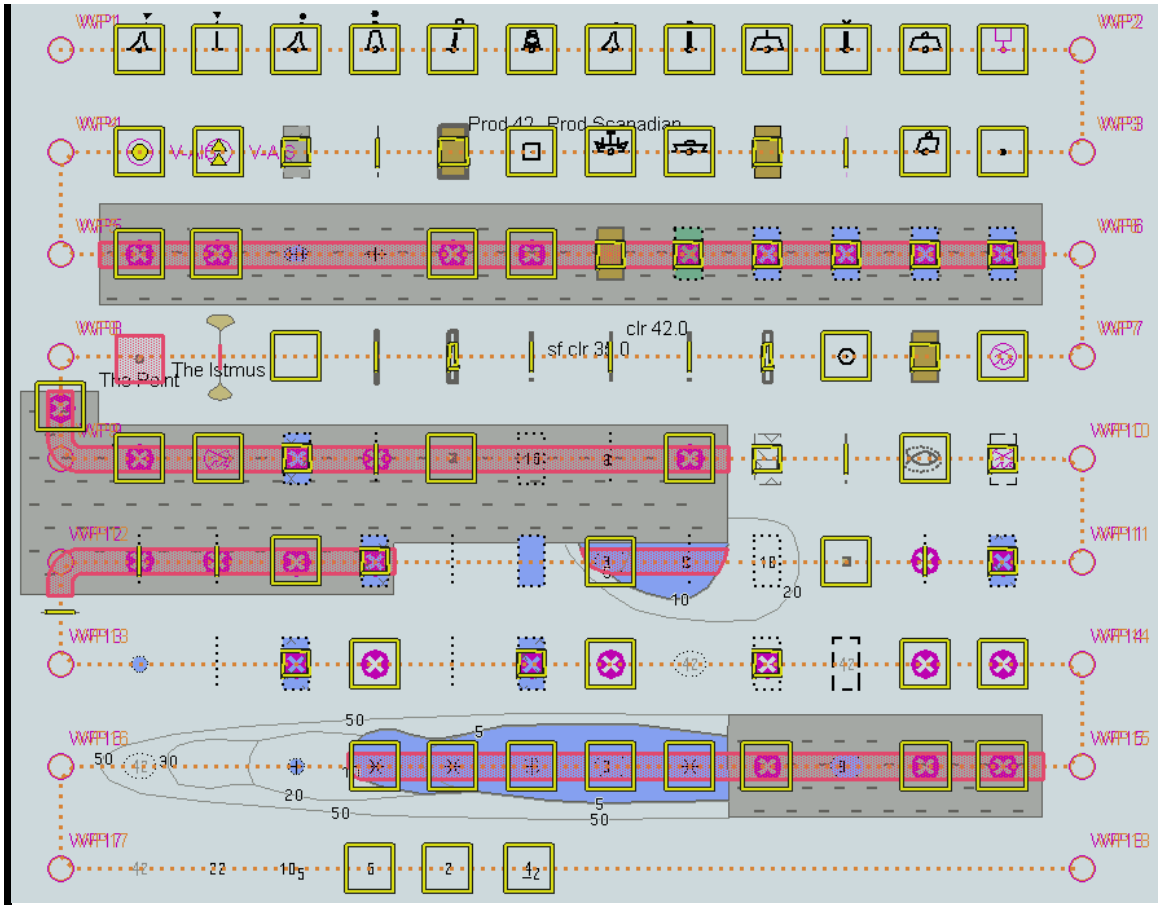
Safety contour = 5 m, Alternative 1



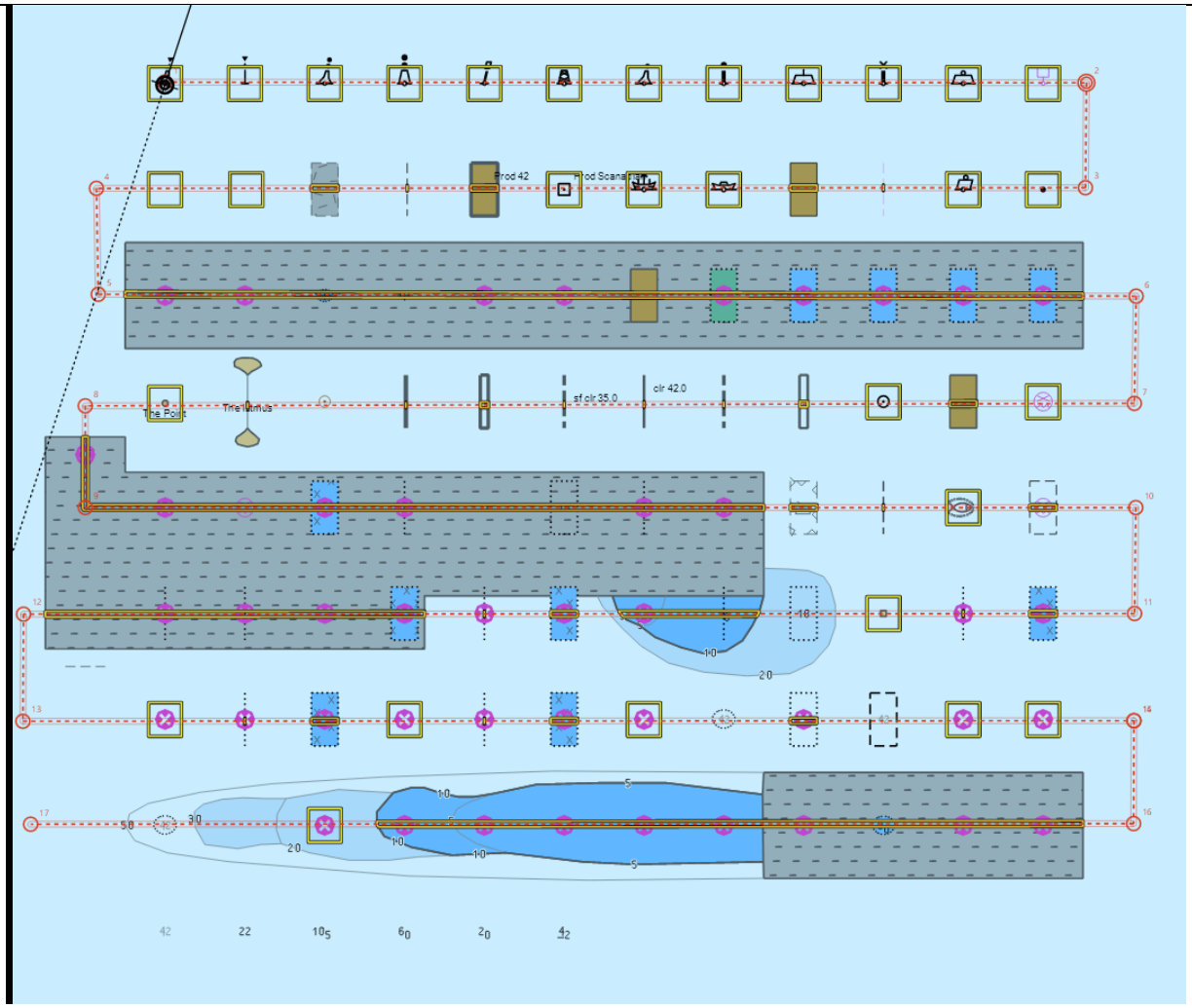
Safety contour = 5 m, Alternative 2



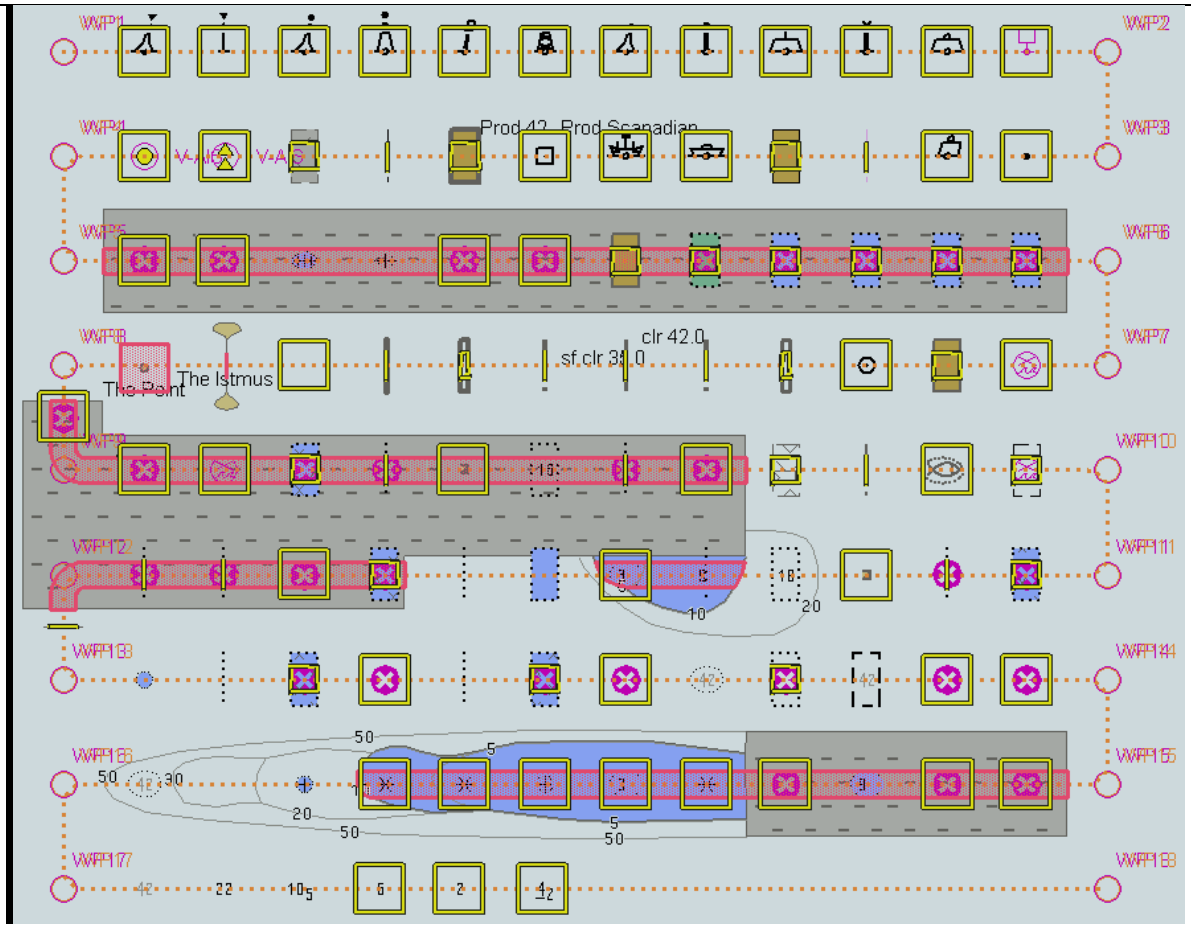
Safety contour = 6 m, Alternative 1



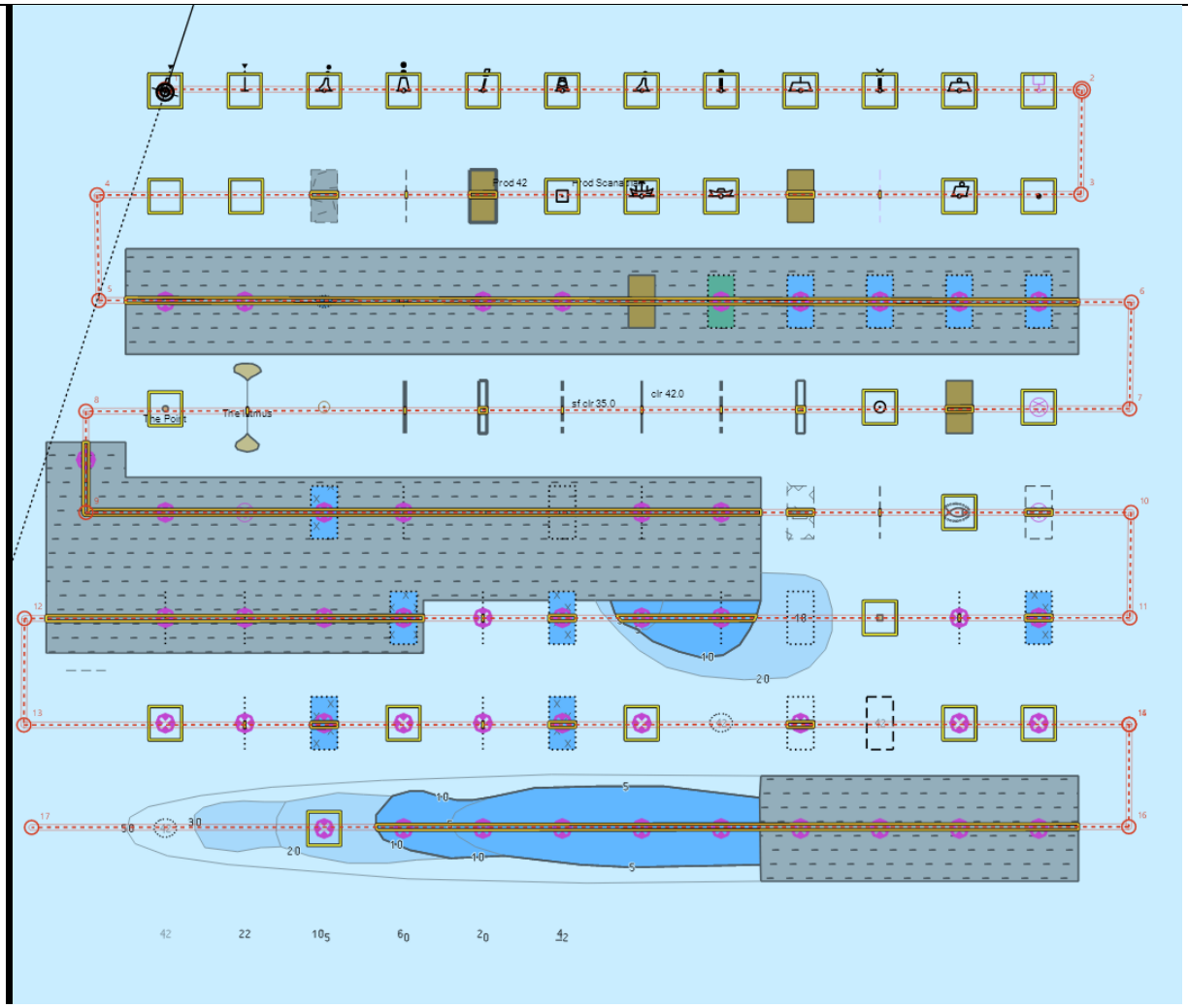
Safety contour = 6 m, Alternative 2



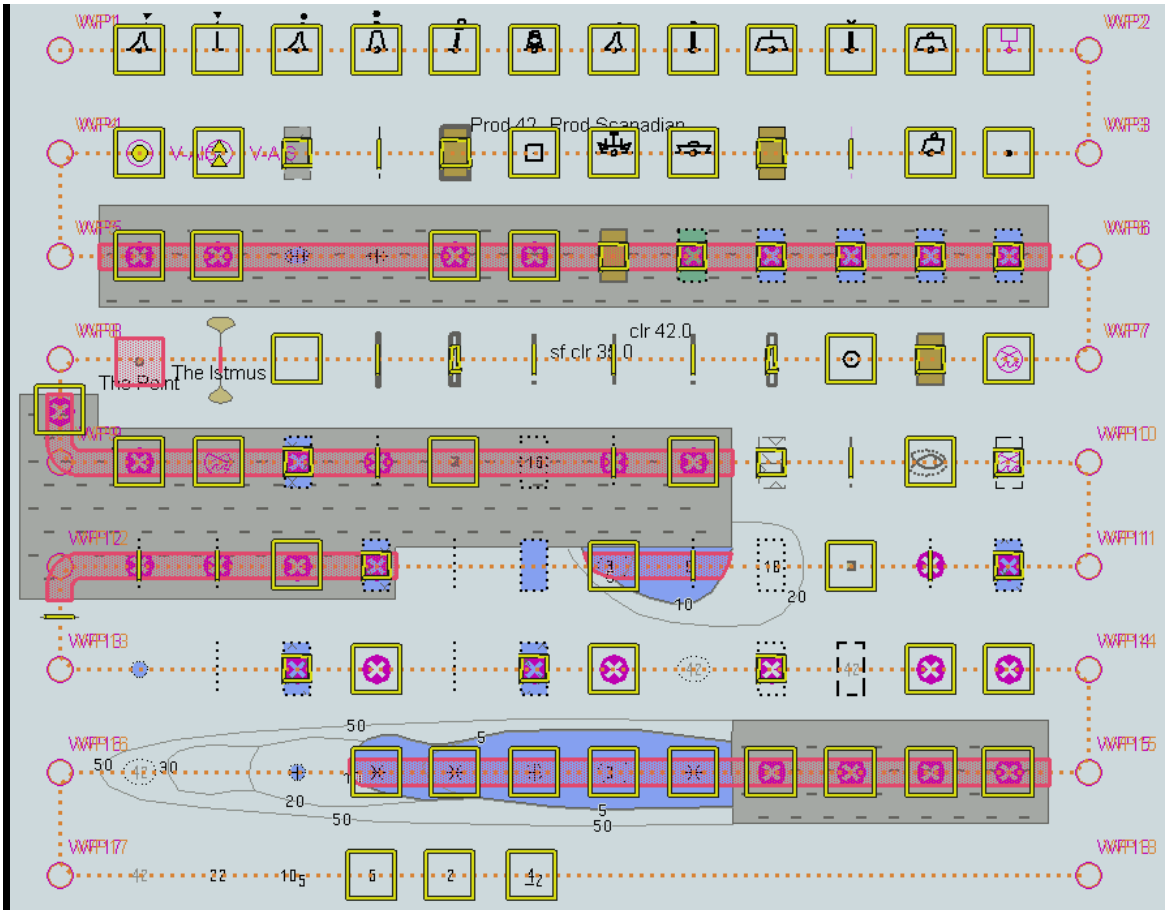
Safety contour = 8 m, Alternative 1



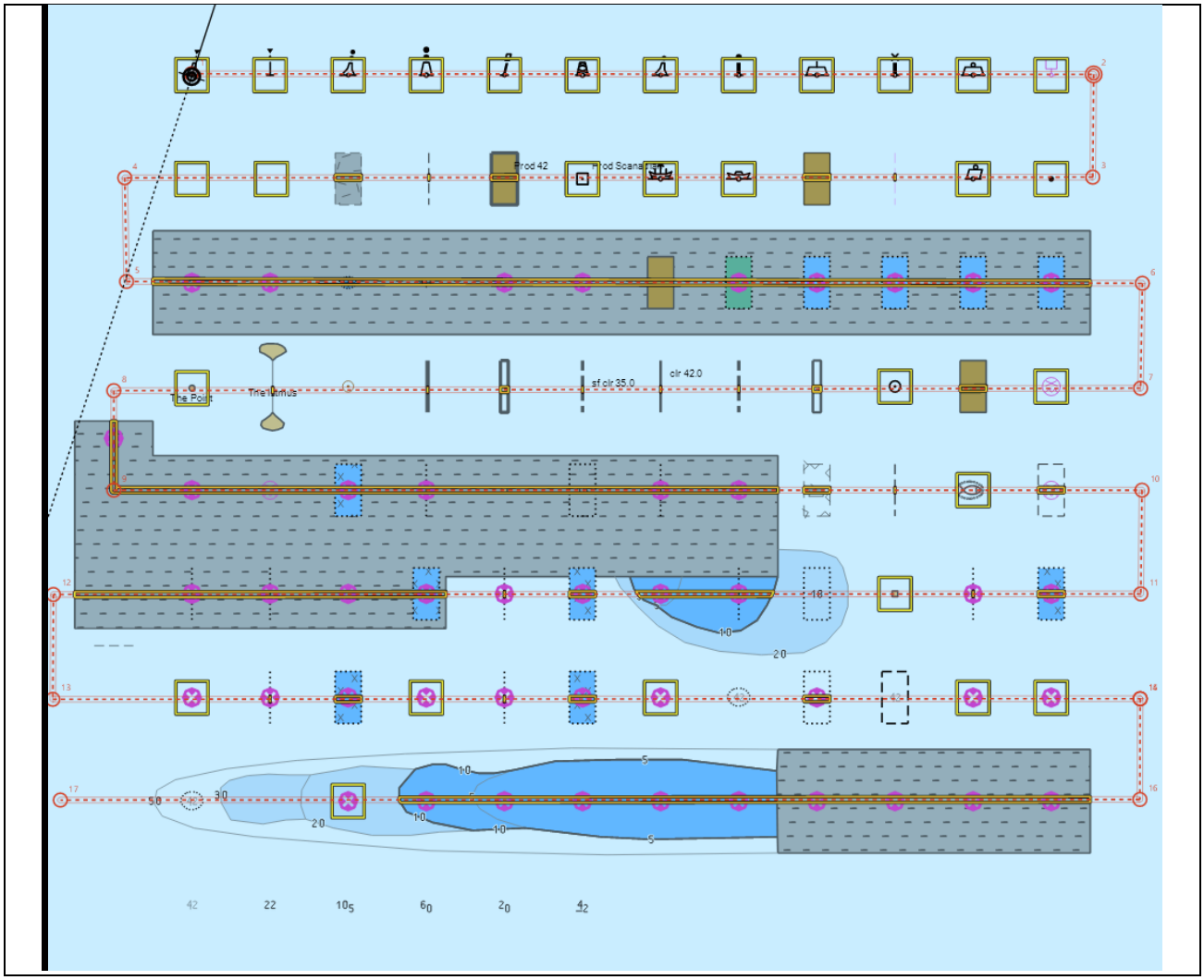
Safety contour = 8 m, Alternative 2

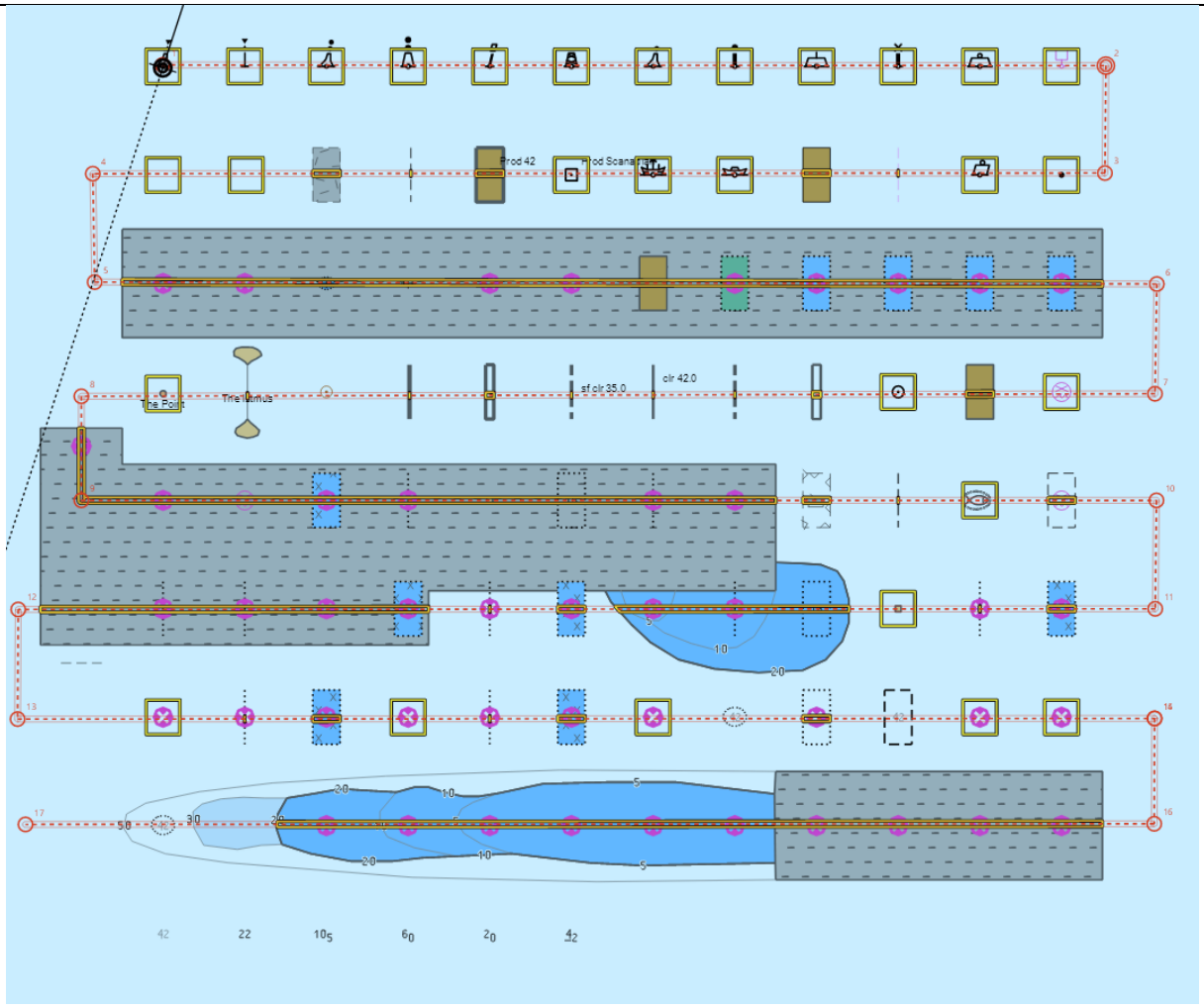


Safety contour = 9 m, Alternative 1

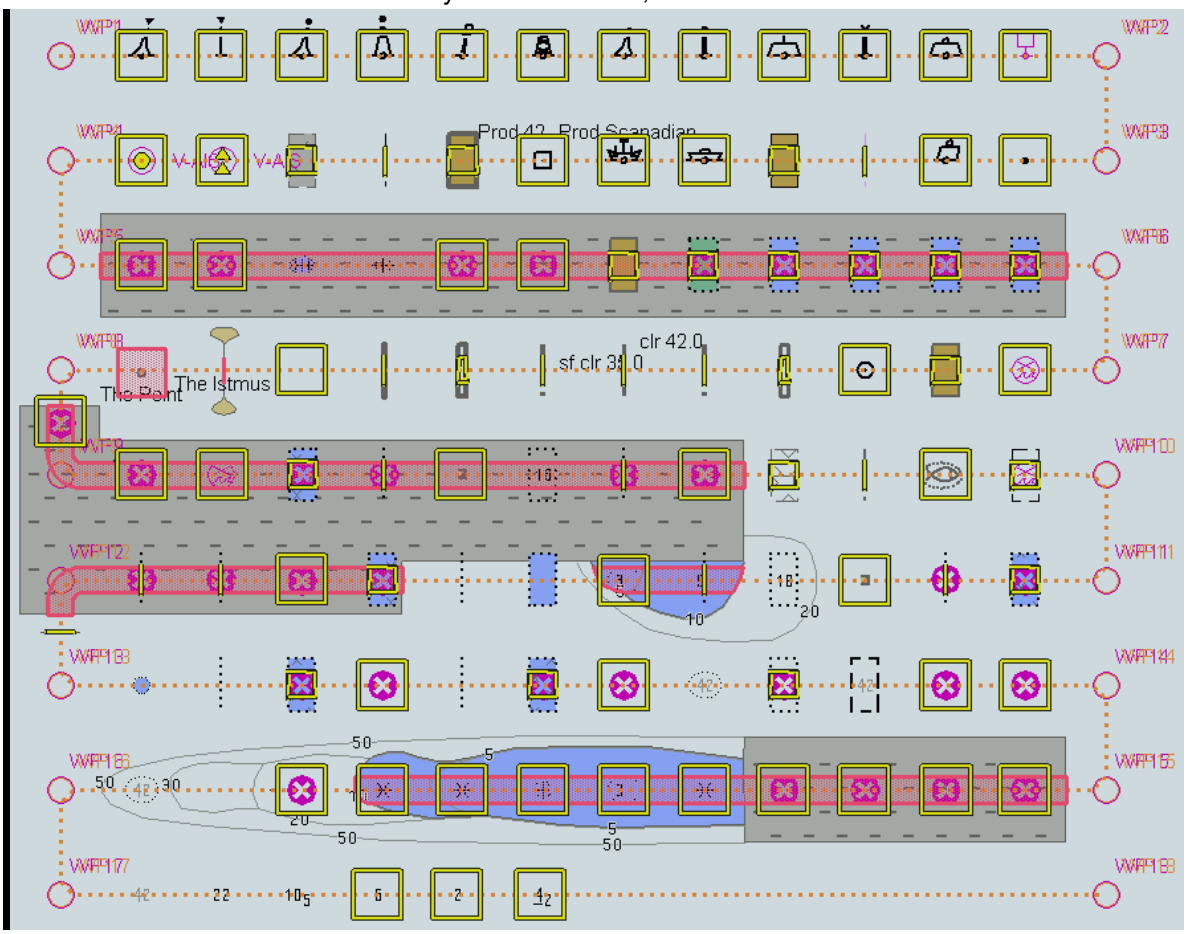


Safety contour = 9 m, Alternative 2

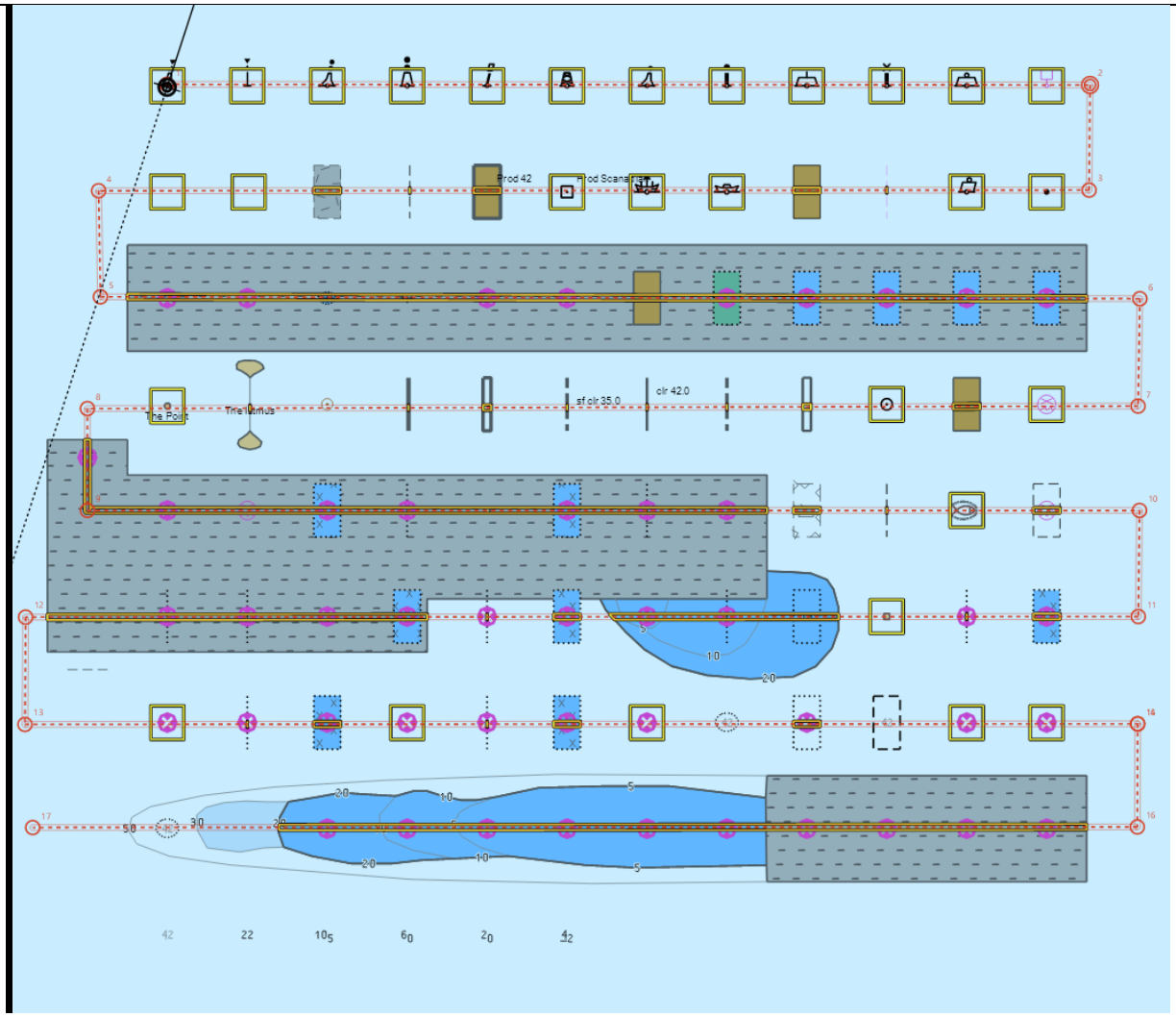

Prod 42
sf clr 35.0
clr 42.0
The Point
The Tumulus
42
22
10 5
6 0
2 0
4 2



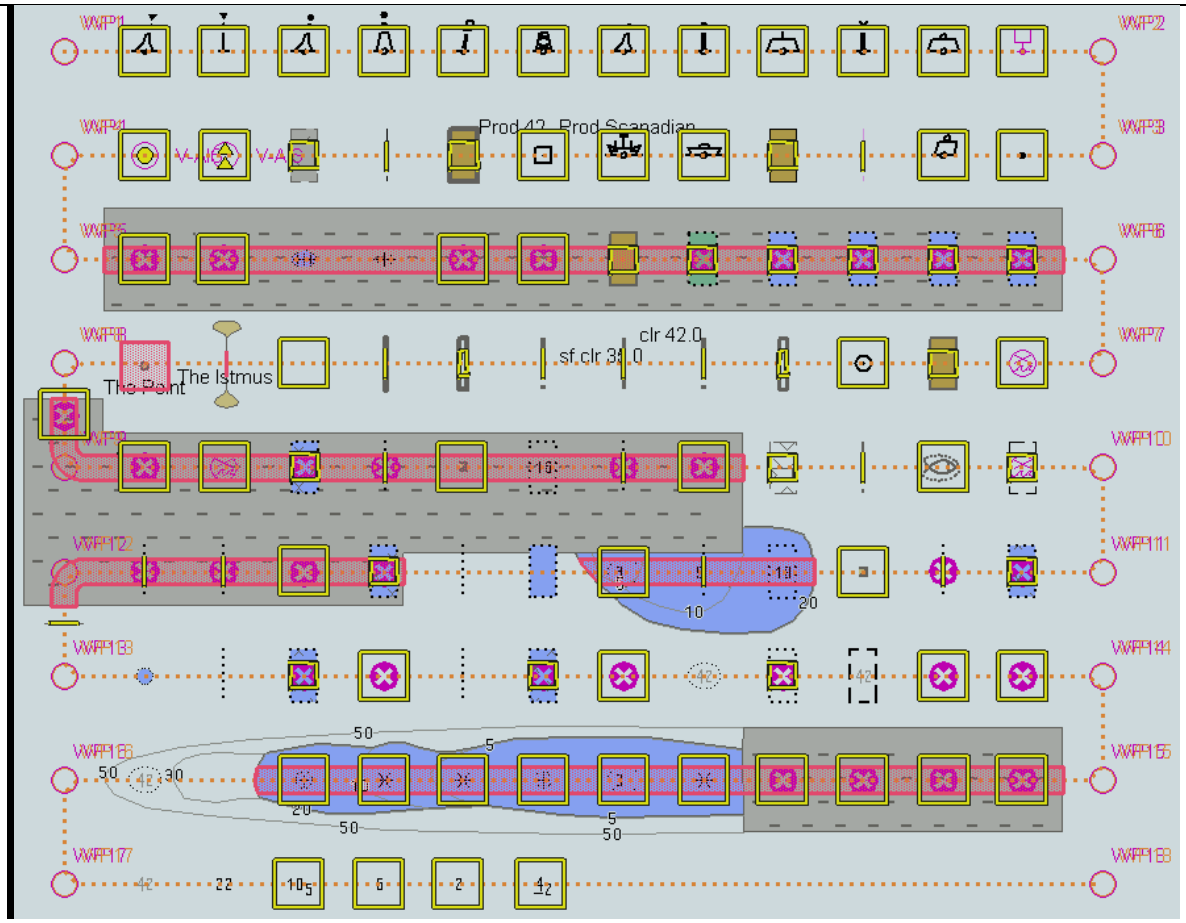
Safety contour = 10 m, Alternative 1



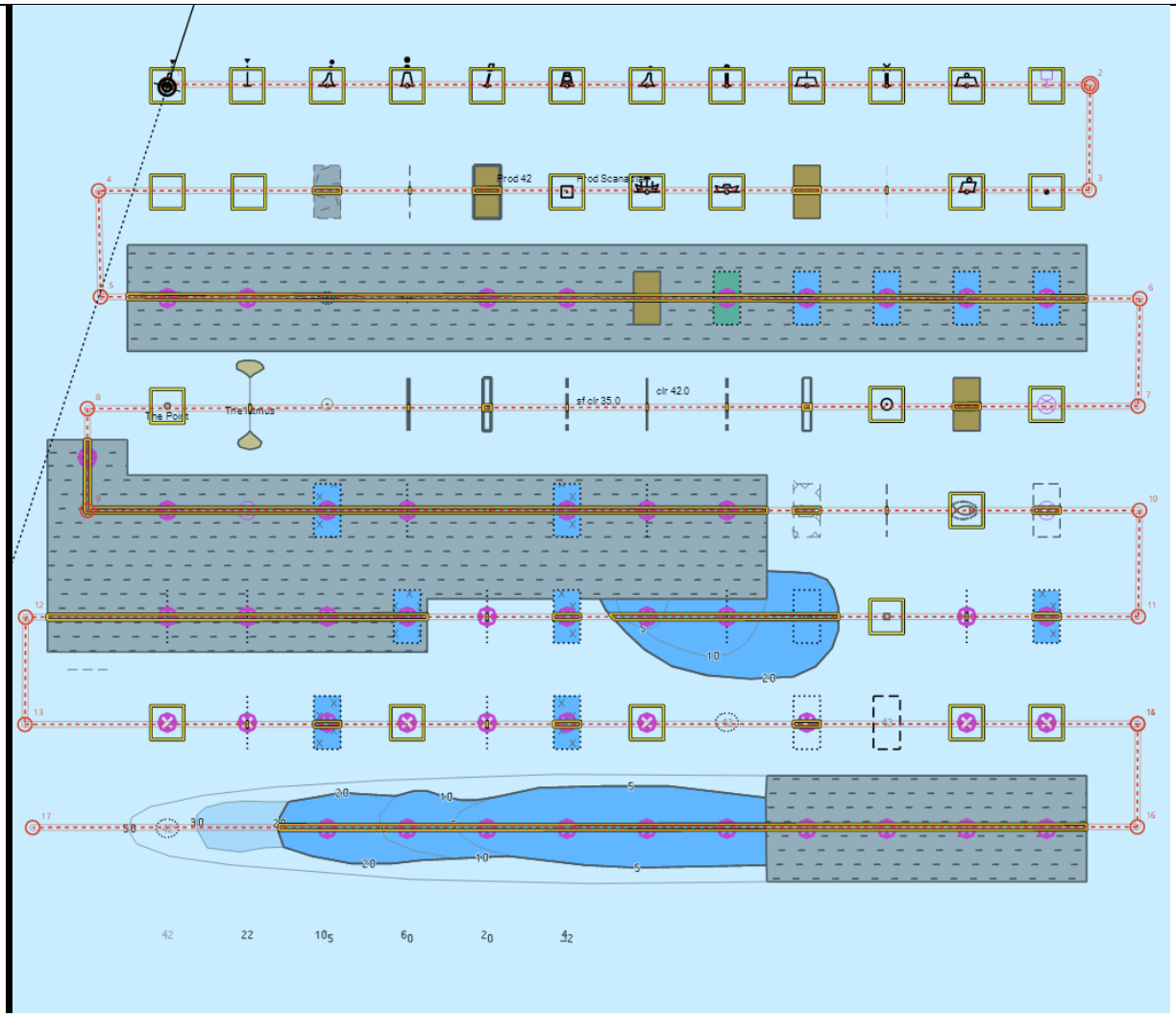
Safety contour = 10 m, Alternative 2



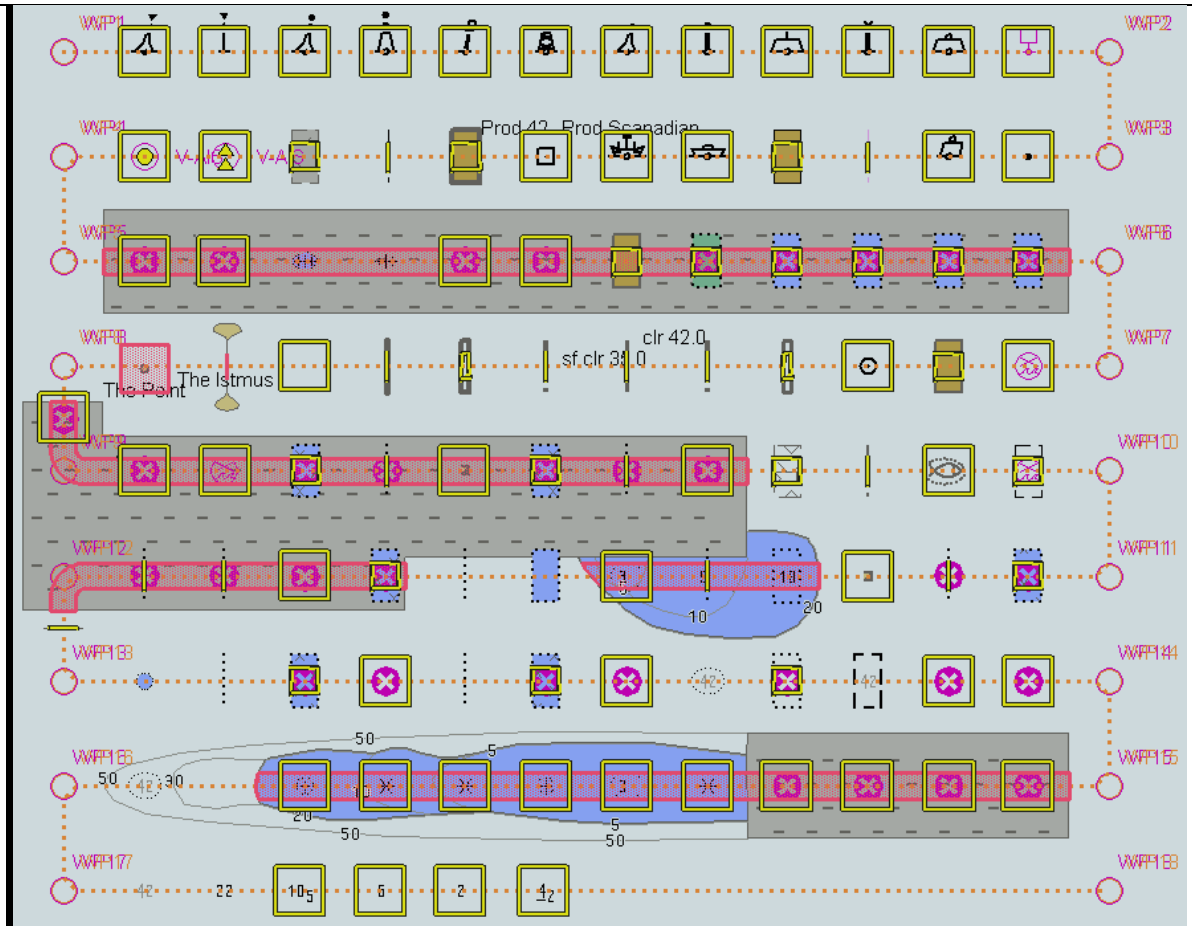
Safety contour = 11 m, Alternative 1



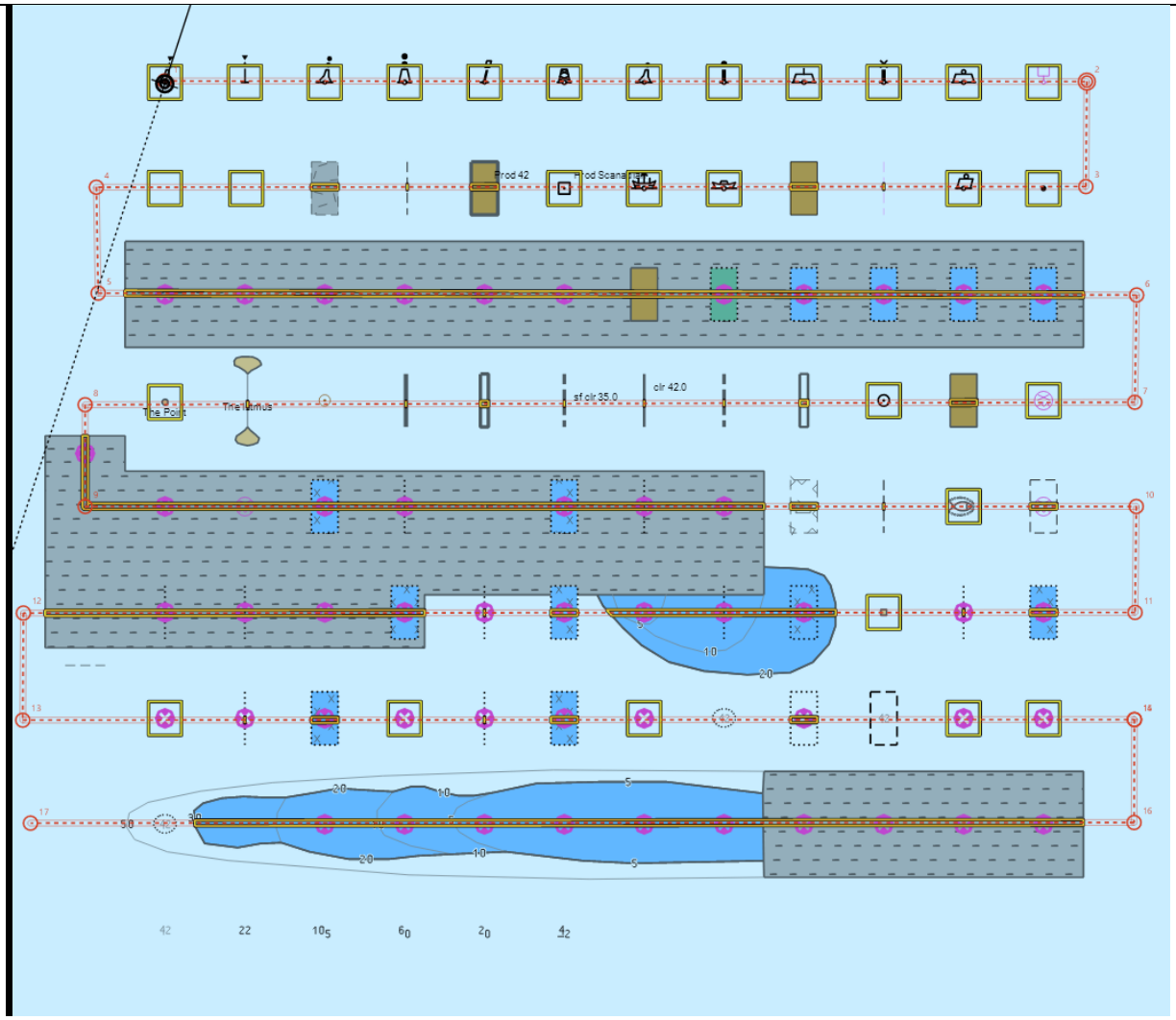
Safety contour = 11 m, Alternative 2



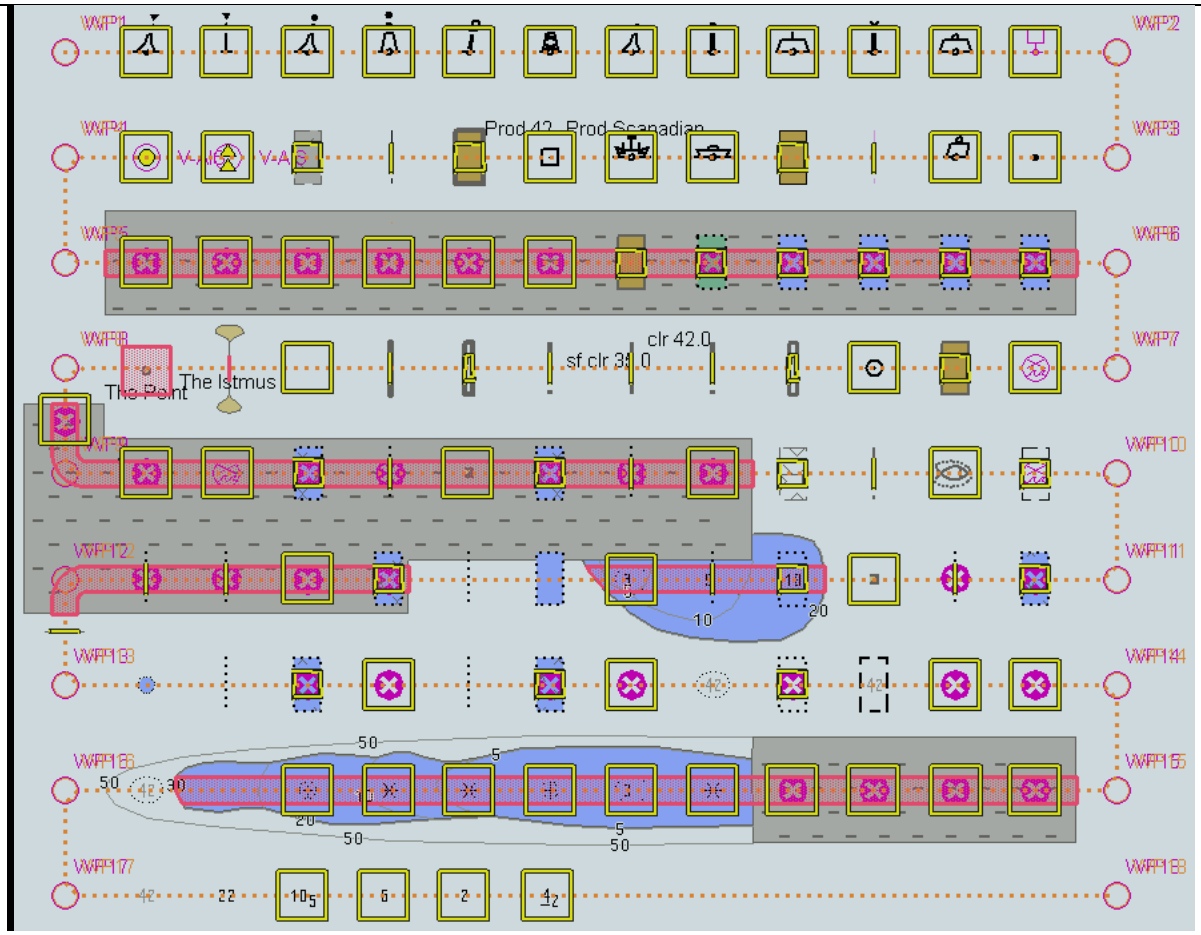
Safety contour = 16 m, Alternative 1



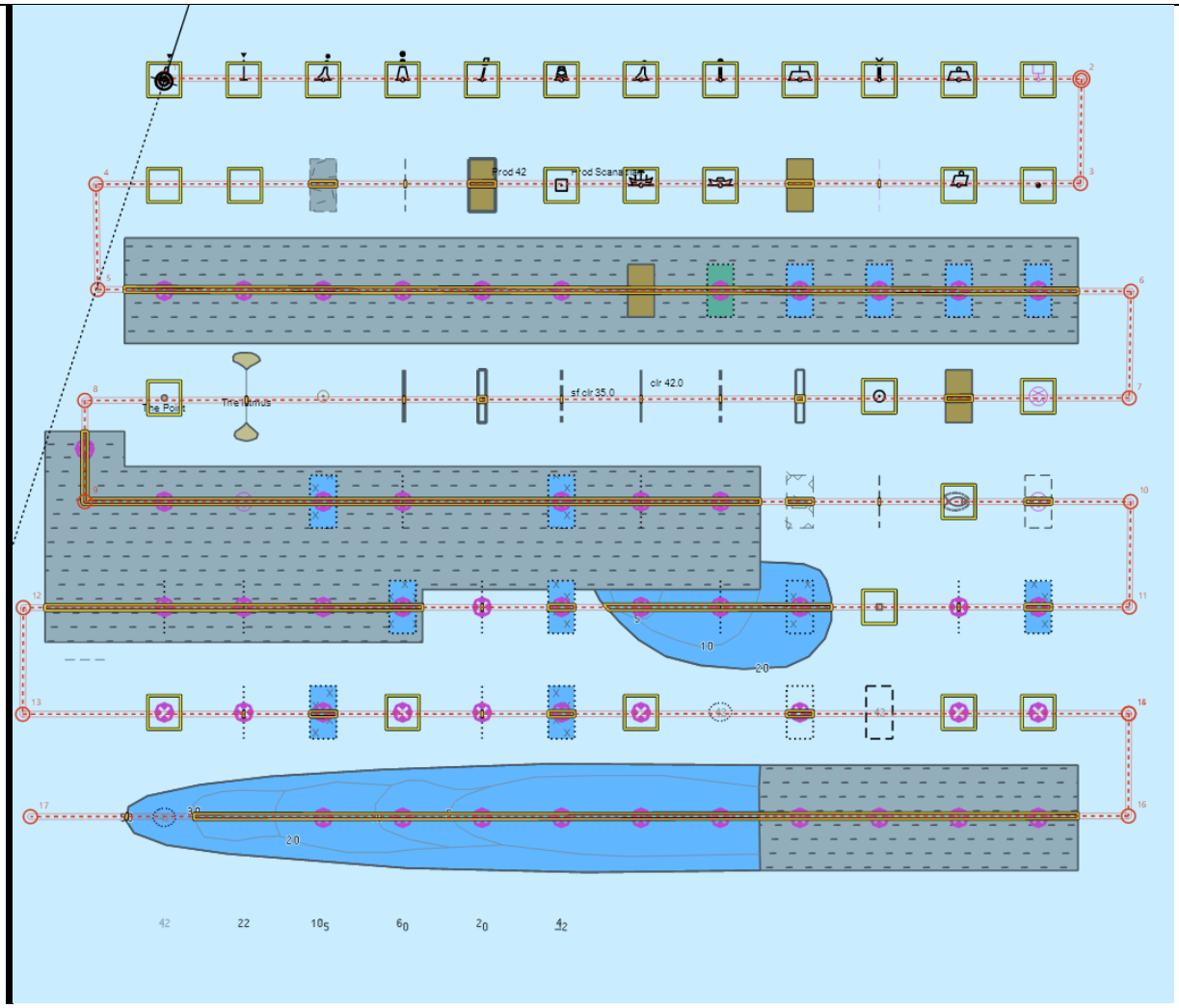
Safety contour = 16 m, Alternative 2



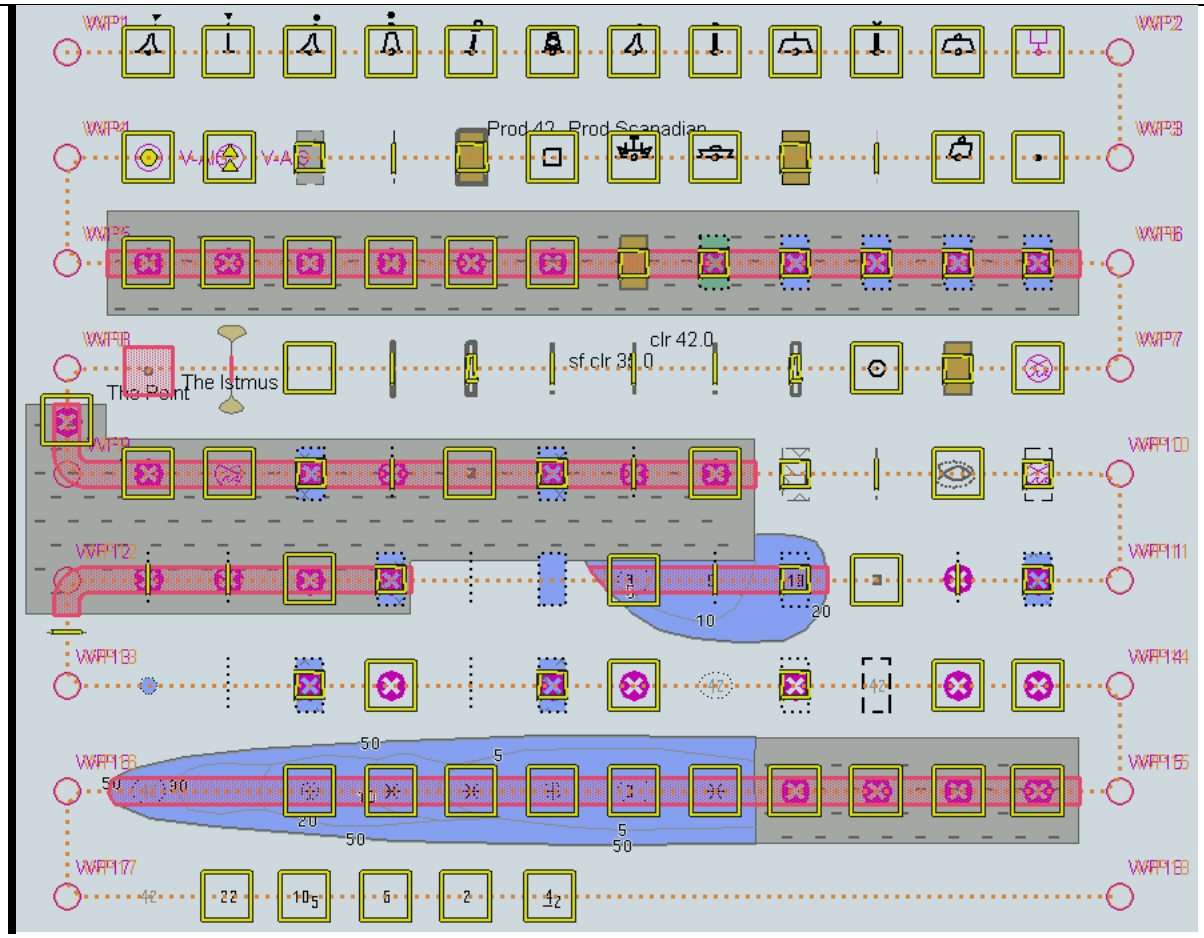
Safety contour = 21 m, Alternative 1



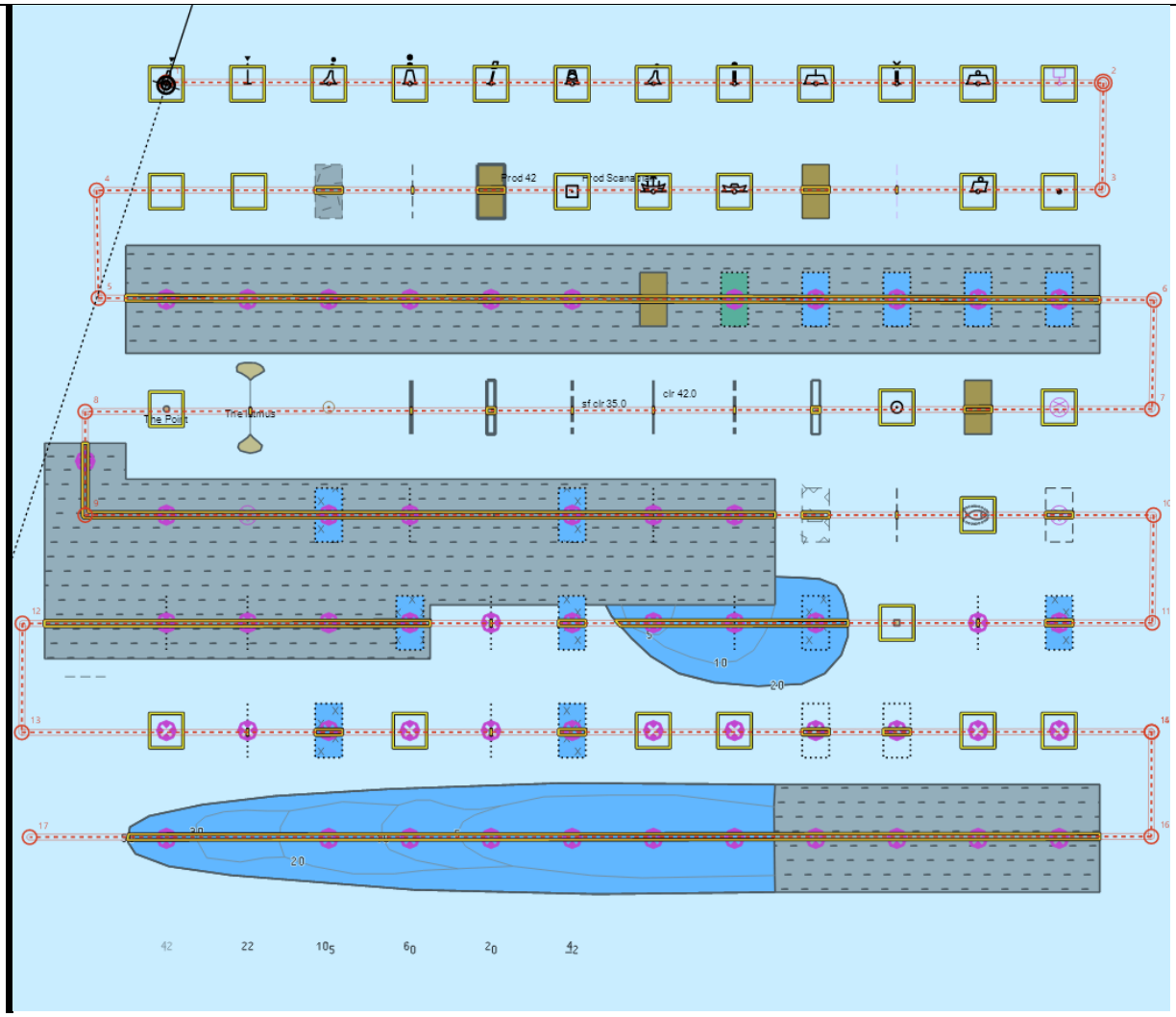
Safety contour = 21 m, Alternative 2



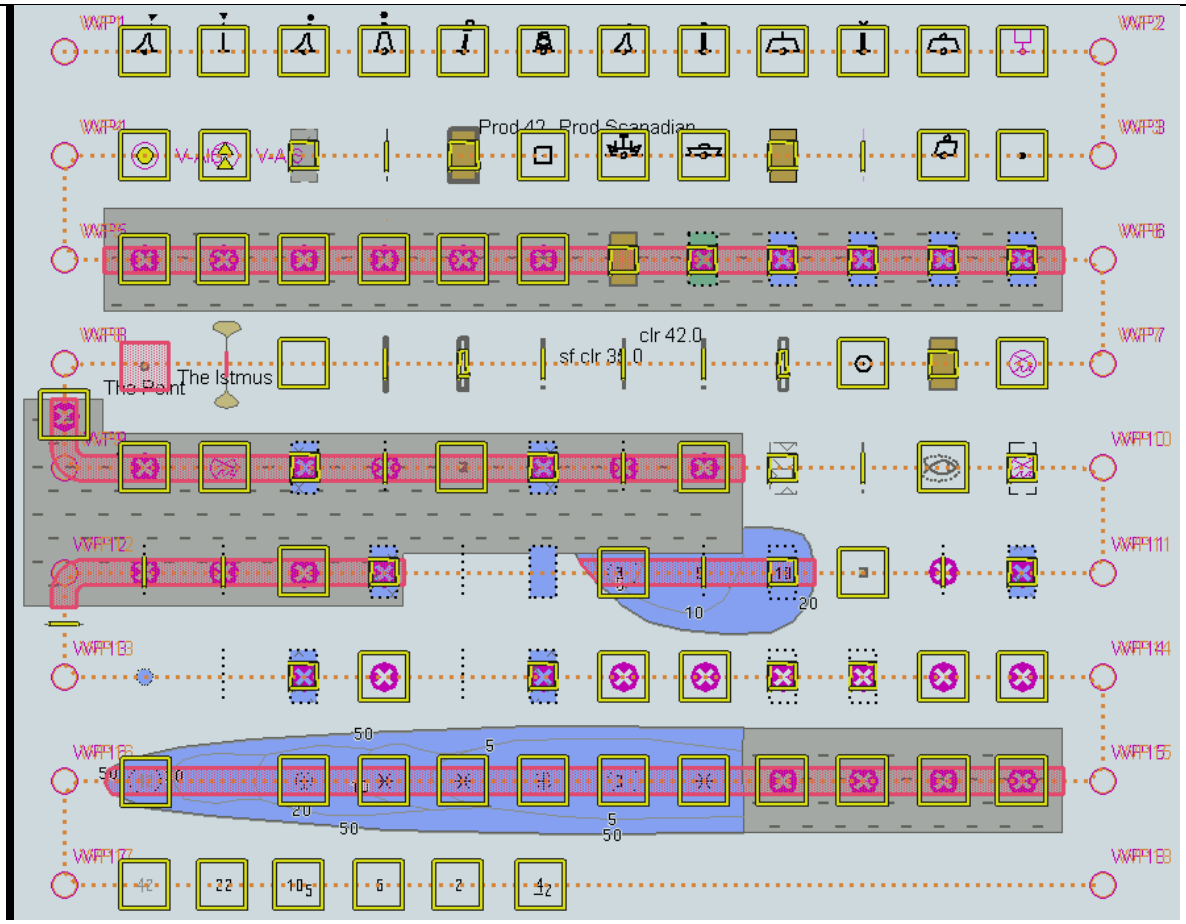
Safety contour = 31 m, Alternative 1



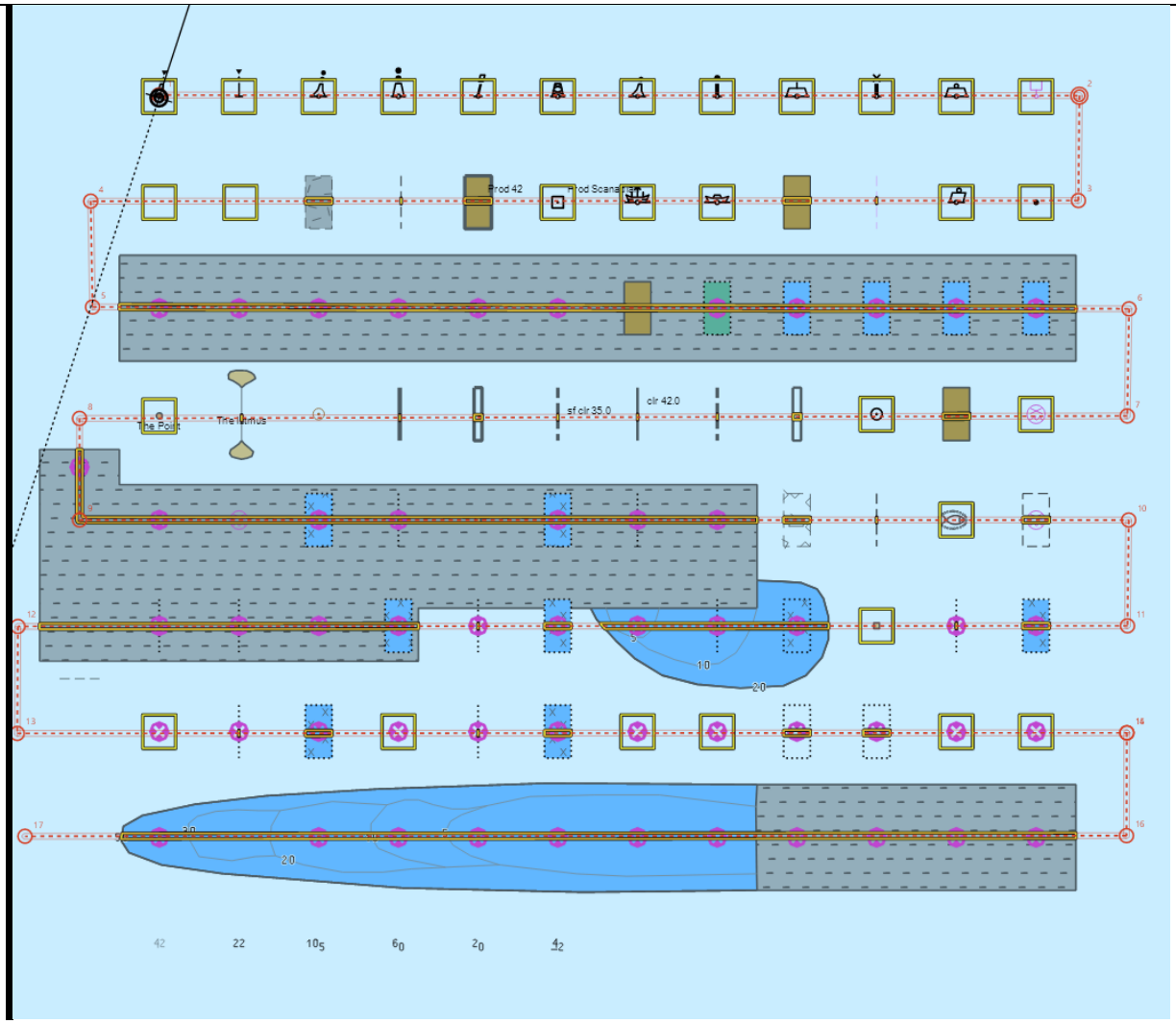
Safety contour = 31 m, Alternative 2



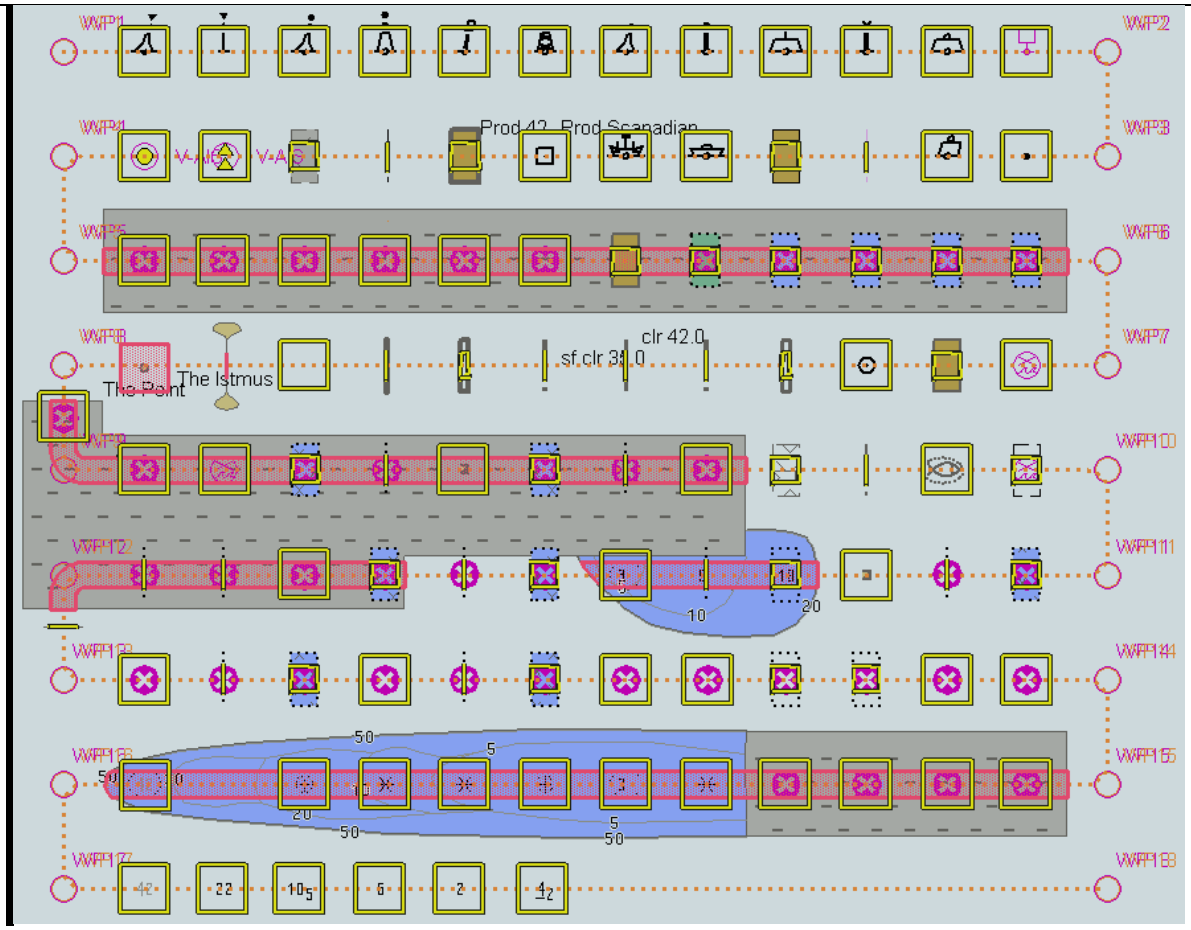
Safety contour = 42 m, Alternative 1



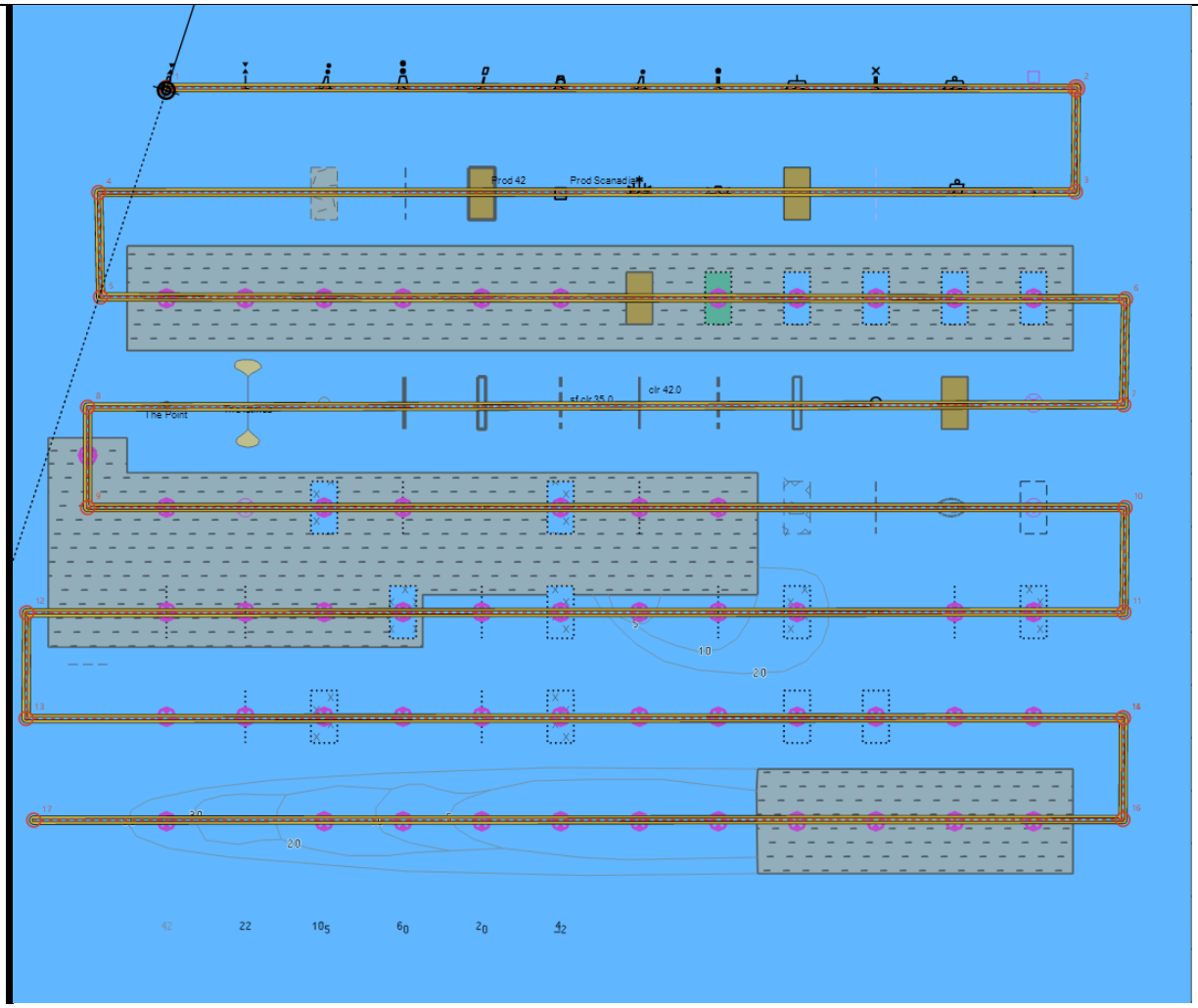
Safety contour = 42 m, Alternative 2



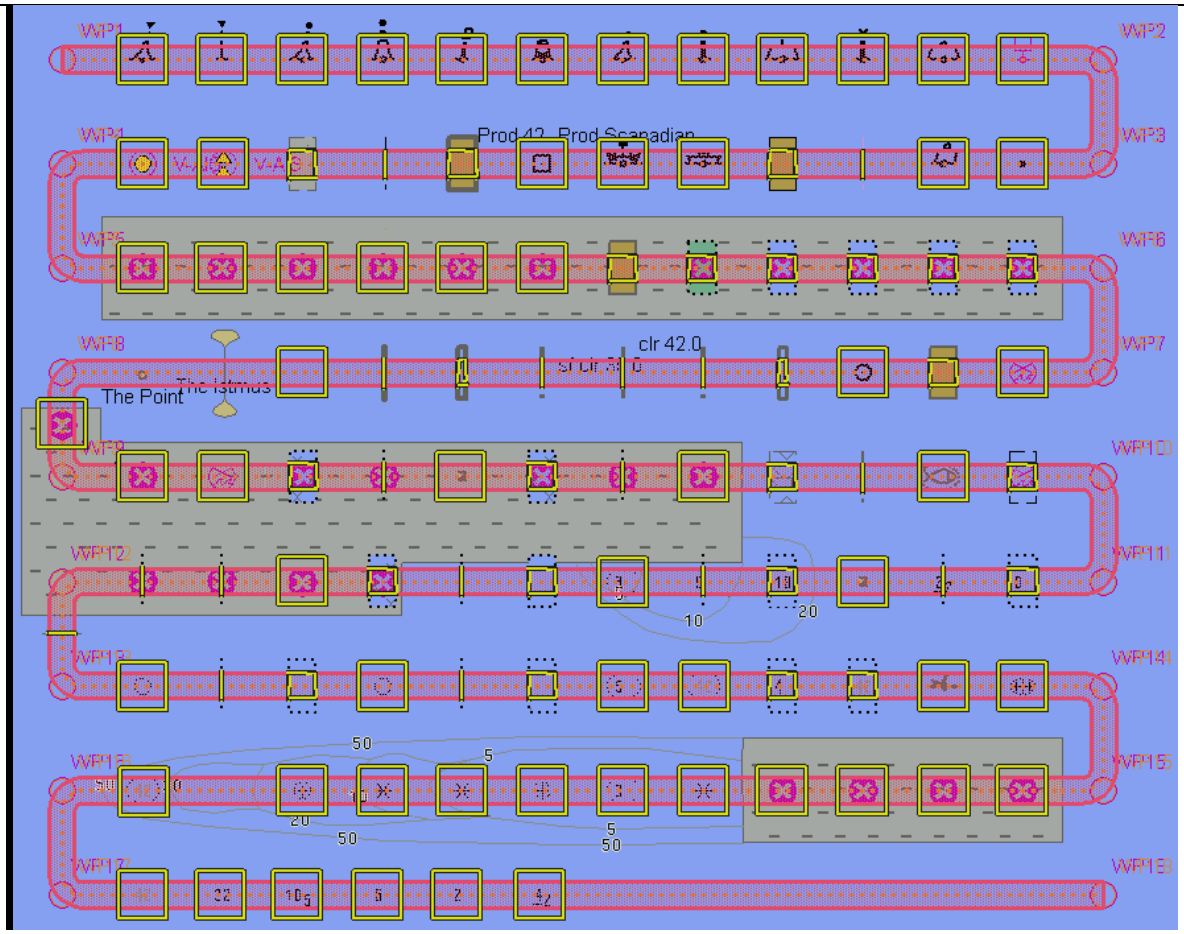
Safety contour = 50 m, Alternative 1



Safety contour = 50 m, Alternative 2



Safety contour = 51 m, Alternative 1



Safety contour = 51 m, Alternative 2

5.1.1 **User selection of prohibited areas**

Test Reference	UserSelectionProhibited Areas	**IHO Reference**	
Test description			

- *From PC (Github Isse 136)*
- *Need to test selectors exist for each individual type of prohibited area.*

5.2 Detection and Notification of Navigational Hazards – Use of largest scale available

Test Reference	NavigationalHazardsLS	IHO Reference	S-98 12.10.6

Test Description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detection of navigational hazards.

Loaded Data	
Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)			
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional			

Setup

This test is performed by loading the TDS 101AA00OVRVU.000 and 101AA00NAVHZ.000, manually creating a route connecting all way points between features marked as WP1 through WP8 and checking display against the corresponding graphical plot

*.. Load the exchange set **NavigationalHazards** and the exchange set **NavigationalHazardsOverview***

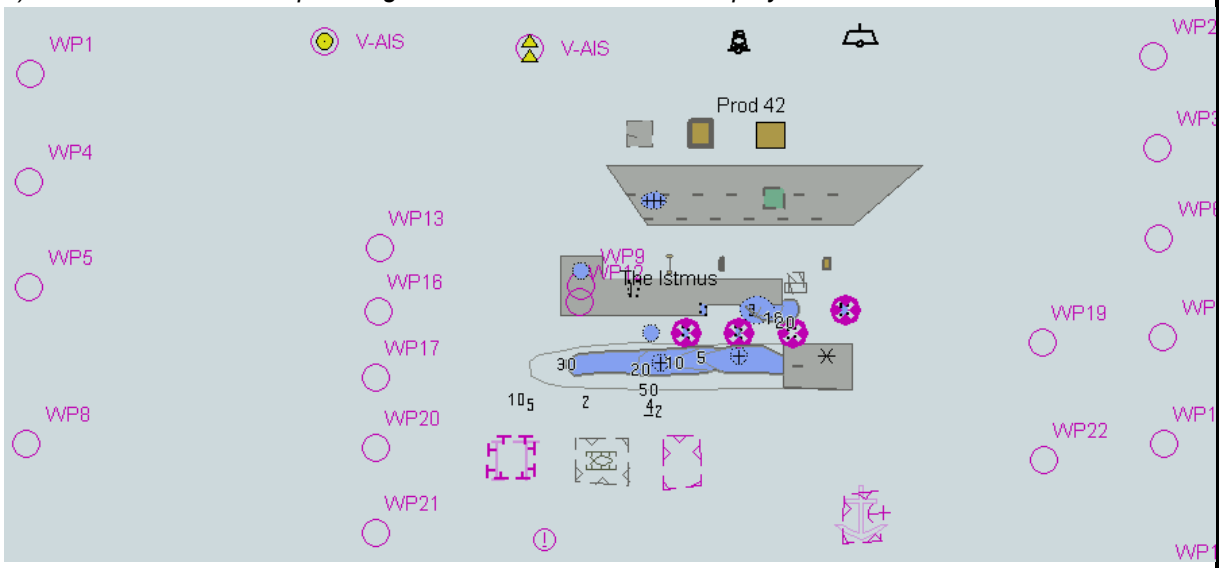
- *Select Display Category Other*
- *Set the Safety contour value to 30 m*
- *Set the Safety depth value to 30 m*
- *Set Plain boundaries to On*
- *Set Simplified symbols to Off*
- *Select all Text groups to On*

Action

Select position 39°57.000'N 104°49.000'W at optimum display scale (1:350 000) of 101AA00OVRVU.
1) View chart before route planning.
2) Manually create a route connecting all way points between features marked WP1 through WP8. Set user-specified distance for indication navigational hazards as 0.5 NM. Check ENC symbols shown in the ECDIS against the corresponding graphical plot

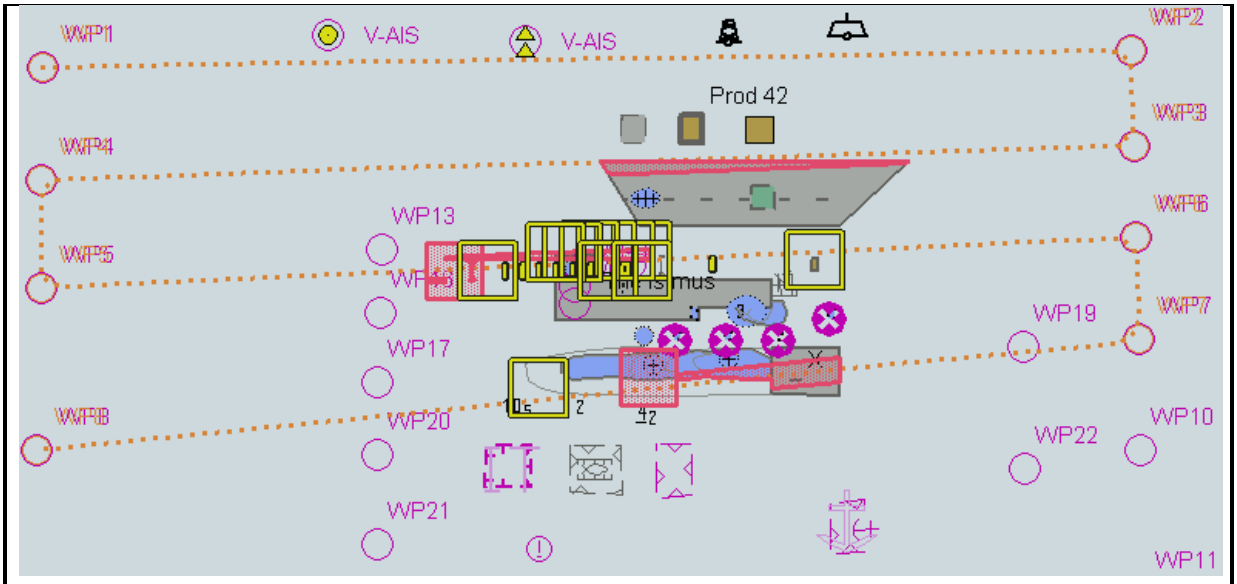
Results

The ENC in the ECDIS should match the corresponding graphical plot shown below
1) Situation before route planning. Chart 101AA00OVRVU displayed as it is



TBD

2) Situation after route planning. Alerts indicated from largest scale available for each location


WP1
V-AIS
V-AIS
WP2
Prod 42
WP3
WP4
WP13
WP16
WP5
WP19
WP7
WP17
WP18
WP20
WP10
WP22
WP21
WP11

TBD

5.3 Detection and Notification of Navigational Hazards – Basic test Monitoring Mode

Test Reference	NavigationalHazardsMon	IHO Reference	

Test Description

The purpose of this test is to verify by observation that ECDIS provides an appropriate indication if, continuing on its present course and speed, over a specified time or distance set by the Mariner, own ship will pass closer than a user-specified distance from any features satisfying the conditions for this test (as listed in section 10.5.9 of IHO S-52 and included in the test cell 101AA00NAVHZ.000) that is shallower than the Mariner's safety contour.

Loaded Data	
Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			

Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			
Additional			

Setup

This test is performed by loading the test cell 101AA00NAVHZ.000, sailing with a simulated ship over the test area, setting the Safety contour to the appropriate values (0m, 2m, 5m, 6m, 8m, 9m, 10m, 11m, 16m, 21m, 31m, 42m, 50m, 51m) and checking display against the graphical plots of test 5.1 (Route plan) corresponding to each set of Safety contour settings

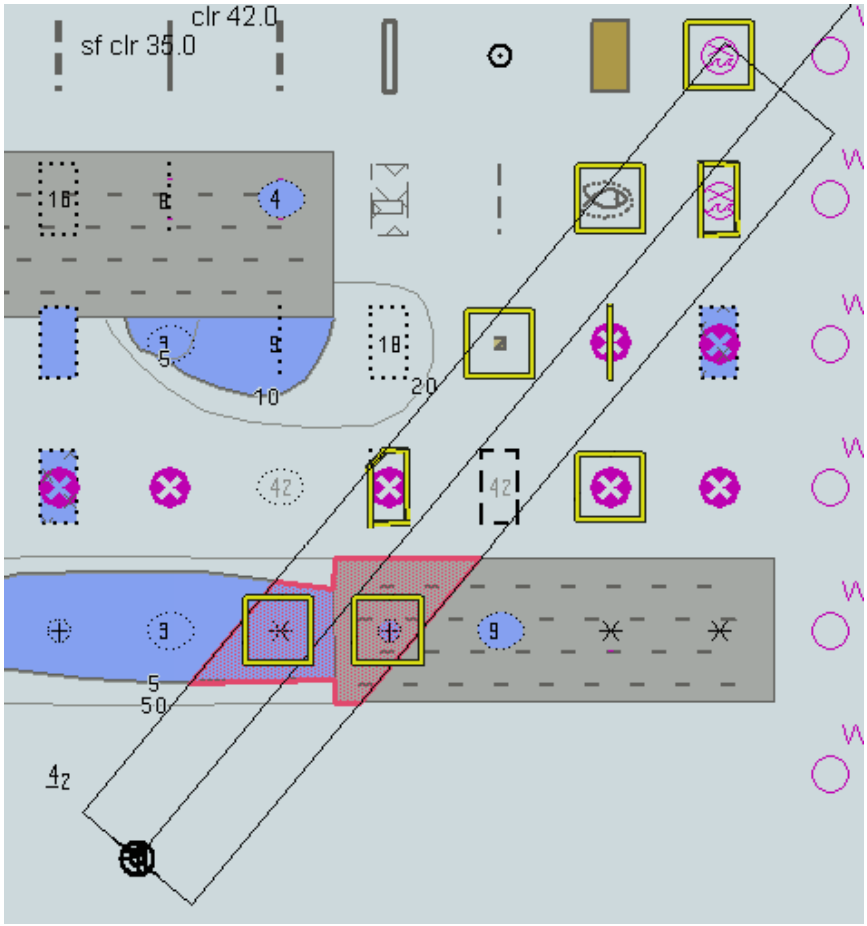
As for test NavigationalHazards.

Action

Select all Text groups
Check ENC symbols shown in the ECDIS for each Safety contour setting against the corresponding graphical plot.

Results

The ENC in the ECDIS should match the corresponding graphical plot of test 5.1.



An example with Safety contour = 10 m.

TBD

5.4 Detection and Notification of Navigational Hazards – Use of largest scale available – Monitoring Mode

Test Reference	NavigationalHazardsMonLS	IHO Reference	

Test Description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detection of navigational hazards. This test is performed by loading the test cells 101AA00OVRVU.000 and 101AA00NAVHZ.000, manually creating a route connecting all way points between features marked as WP1 through WP8 and checking display against the corresponding graphical plot.

Loaded Data	
Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			

Chart (Standard)			
Alert Highlights (Standard)			
Additional			

Setup

*Load the exchange set **NavigationalHazards***
*Load the exchange set **NavigationalHazardsOverview***

- *Select Display Category Other*
- *Set the Safety contour value to 30 m*
- *Set the Safety depth value to 30 m*
- *Select Symbolized Boundaries*

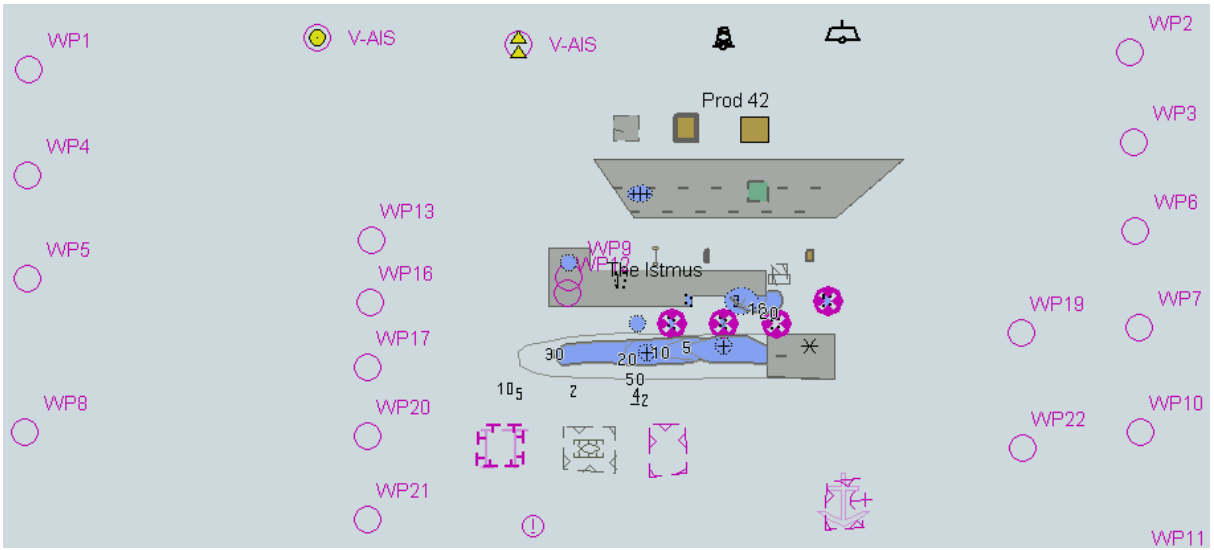
Set symbolized symbols to Off
Select all Text groups
..

Action

Select position 39°57.000'N 104°49.000'W at the maximum display scale (1:350 000) of 101AA00OVRVU.
Set simulated own ship for 39°49.587'N 104°54.930'W with heading set for 10.0°
Select size of own ship check area as 1.0 NM width and 8.0 NM length.

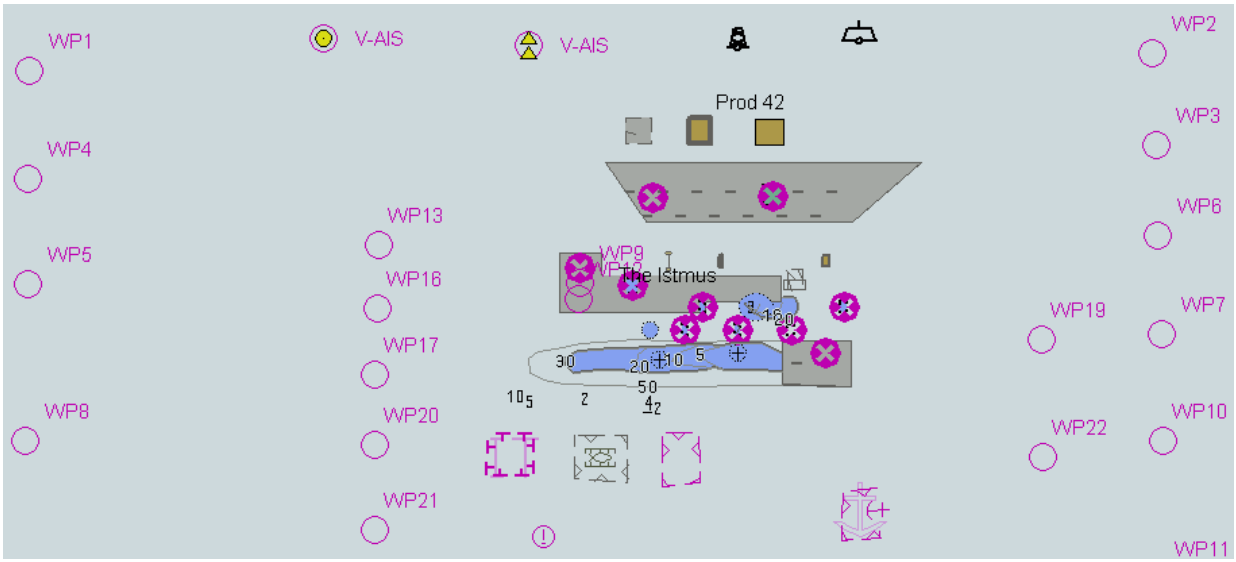
Results

The ENC in the ECDIS should match the corresponding graphical plot shown below.



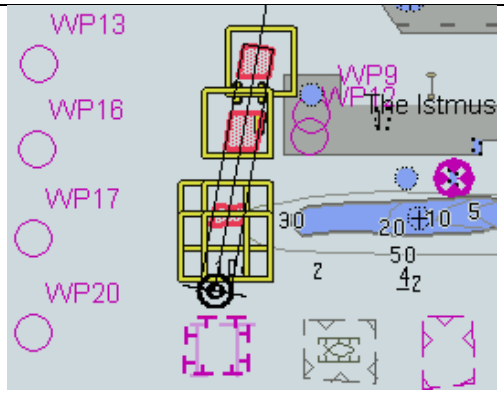
TBD

1) Situation before route monitoring. Chart 101AA00OVRVU displayed as it is. Presentation alternative 1



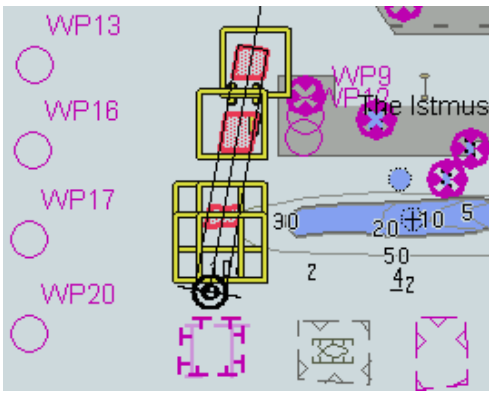
TBD

Situation before route monitoring. Chart 101AA00OVRVU displayed as it is. Presentation alternative 2



TBD

2) Situation during route monitoring. Alerts indicated from largest scale available for each location Presentation alternative 1



TBD

Situation during route monitoring. Alerts indicated from largest scale available for each location. Presentation alternative 2

Note: The parameters and shapes of the ship's check area are examples

5.5 Use of Data Quality Information.

Test Reference	DataQuality	IHO Reference	
Test description			
This new test could be located in the Data Quality section or left here. • *Test use of data quality mode.* • *Test for offset of lookahead for alerts and indications.* • *Also test for different CATZOC zones.*			

6 Detection of Areas for which Special Conditions Exist

6.1 Detection of Areas for which Special Conditions Exist - Basic test

Test Reference	SpecialConditions	IHO Reference	S-98 12.10.7

Test Description

The purpose of this test is to verify by observation that ECDIS provides an appropriate indication when the Mariner plans a route closer than a user-specified distance from the boundary of a prohibited area or a geographic area for which special conditions exist. The features satisfying the conditions for this test are listed the S-101 Alerts and indications catalogue and are included in the test cell 101AA00ARSPC.000.

Loaded Data	
Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			

Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			
Additional			

Setup

This test is performed by loading the test cell 101AA00ARSPC.000, manually creating a route connecting all way points between features marked as WP1 through WP4 and checking display against the corresponding graphical plot

Load the exchange set ***SpecialConditions***

- *Select Display Category Other*
- *Set the Safety contour value to 0 m*
- *Set the Safety depth value to 30 m*
- *Select Symbolized Boundaries*
- *Set symbolized symbols to Off*
- *Manually create a route connecting all way points between features marked WP1 through WP4*

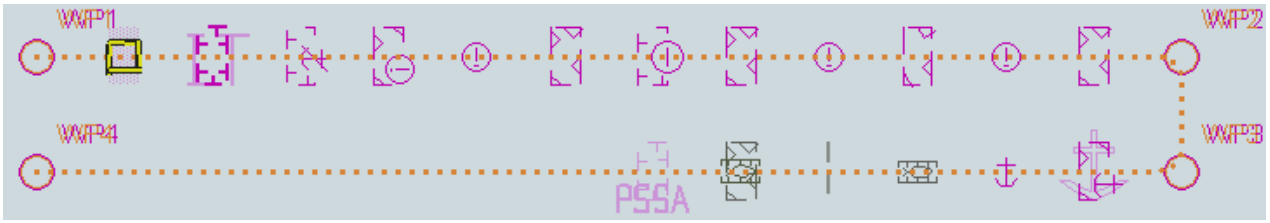
Set user-specified distance for indication of areas with special condition as 0.1 NM

Action

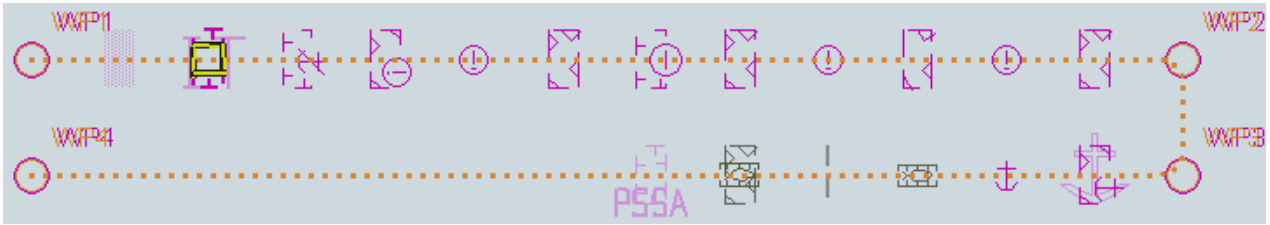
Check ENC symbols shown in the ECDIS against the corresponding graphical plot. selecting one by one each special condition for the test

Results

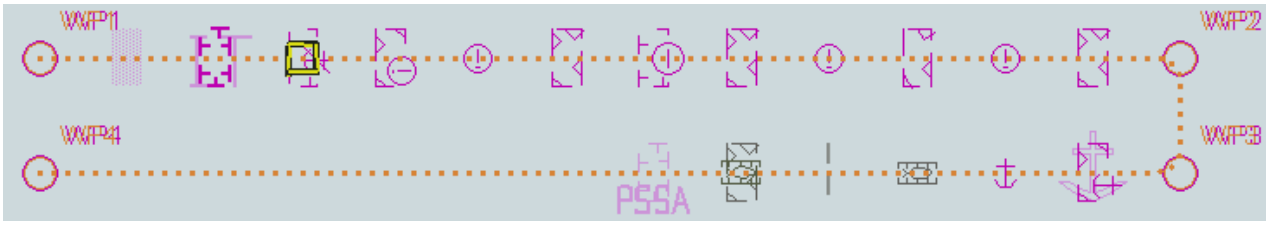
The ENC in the ECDIS should match the corresponding graphical plot shown below.



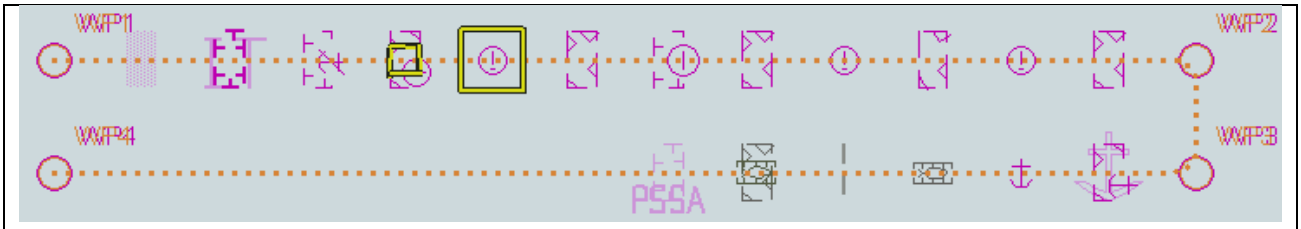
Selected: Traffic separation zone



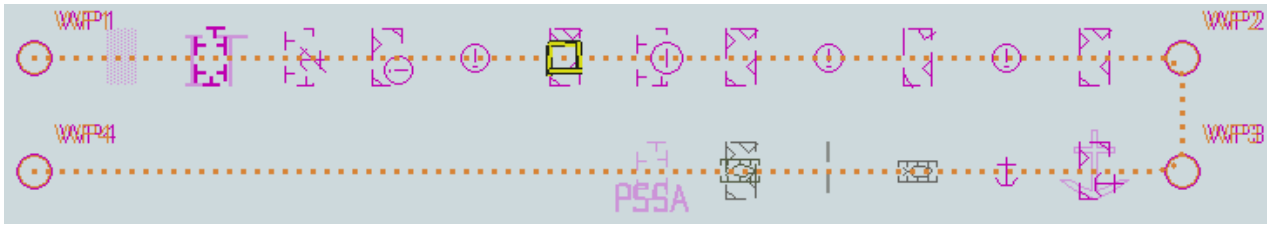
Selected: Inshore traffic zone



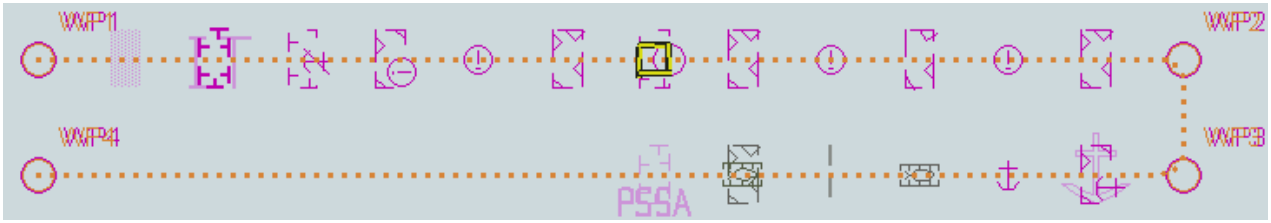
Selected: Restricted area



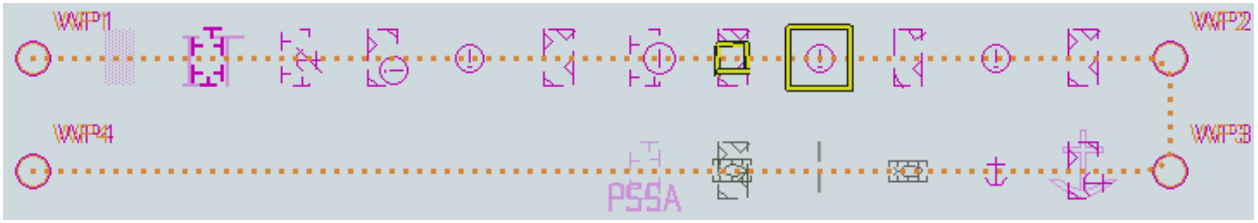
Selected: Caution area



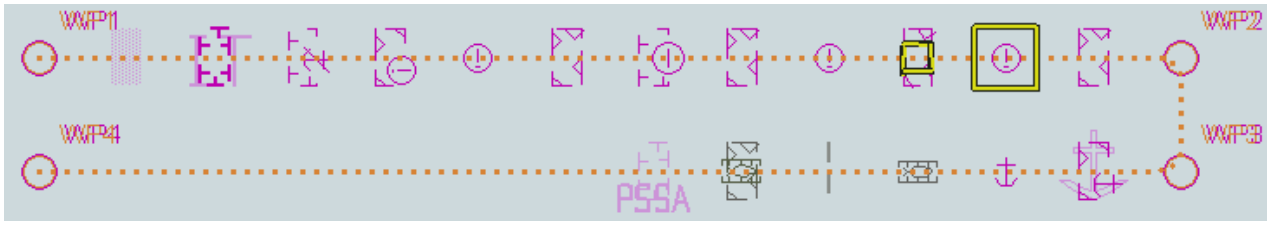
Selected: Offshore production area



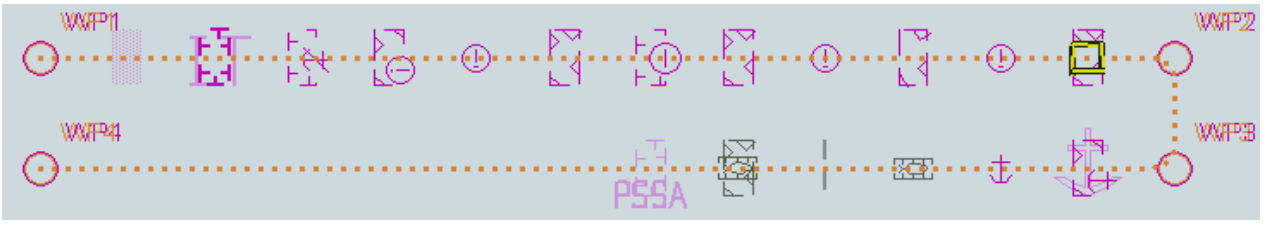
Selected: Area to be avoided



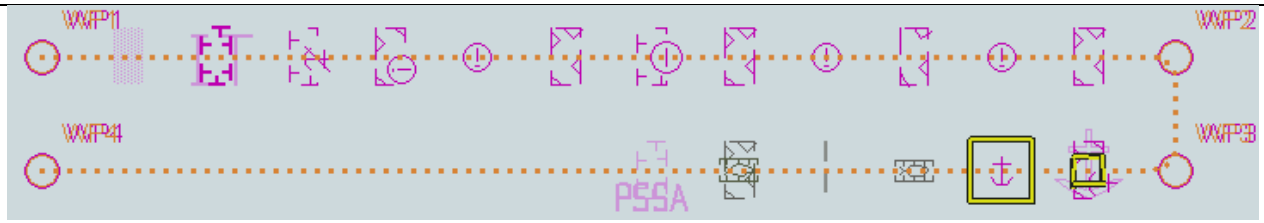
Selected: Military practice area



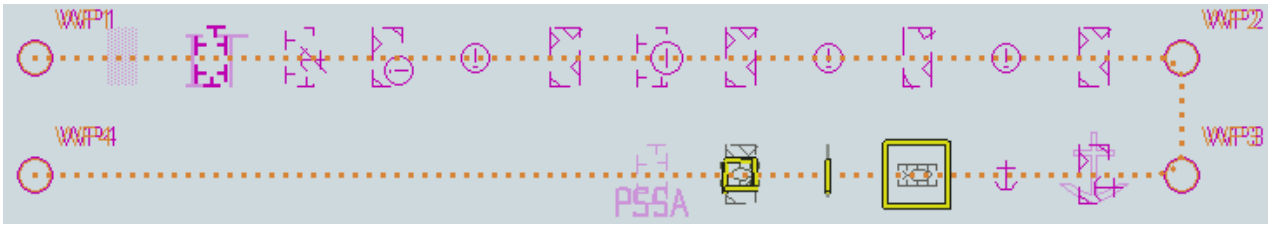
Selected: Seaplane landing area



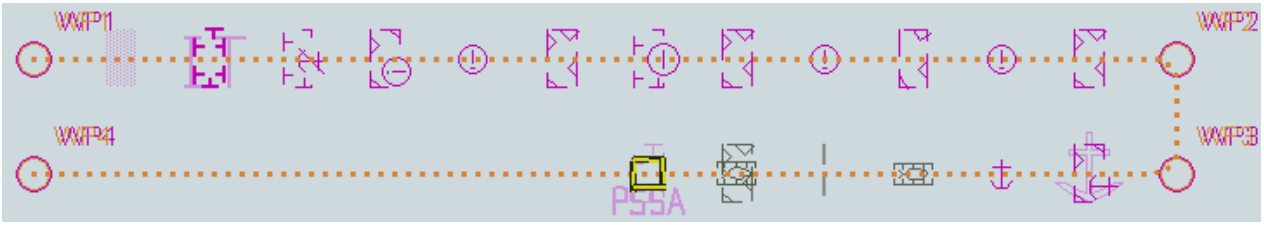
Selected: Submarine transit lane



Selected: Anchorage area



Selected: Marine farm/aquaculture



Selected: PSSA (Particularly Sensitive Sea Area)

tbd

6.1.1 **User selection of Areas with Special Conditions**

Test Reference	UserSelectionProhibited Areas	**IHO Reference**	
Test description			

- *From PC (Github Isse 136)*
- *Need to test selectors exist for each individual type areas with special conditions..*

[check that an S-98 requirement exists? Or is this all in the S-101PC?]

6.2 Detection of Areas for which Special Conditions Exist - Use of largest scale available

Test Reference	SpecialConditionsLS	IHO Reference	S-98 12.10.7

Test Description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detection of areas with special condition.

This test is performed by loading the test cells 101AA00OVRVU.000 and 10100AA_ARSPC.000, manually creating a route connecting way points between features marked as WP20 and WP22 and checking display against the corresponding graphical plot

Loaded Data	
Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)			
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			

Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			
Additional			

Setup

*As for test SpecialConditions and in addition load the exchange set **NavigationalHazardsOverview***

- *Select Display Category Other*
- *Set the Safety contour value to 0 m*
- *Set the Safety depth value to 30 m*
- *Set Plain Boundaries to Off*
- *Set Simplified symbols to On*

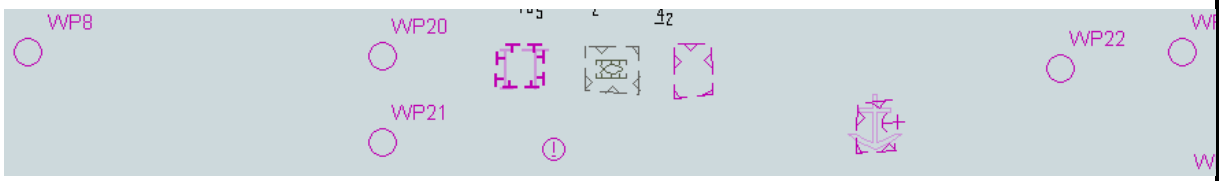
Select all Text groups

Action

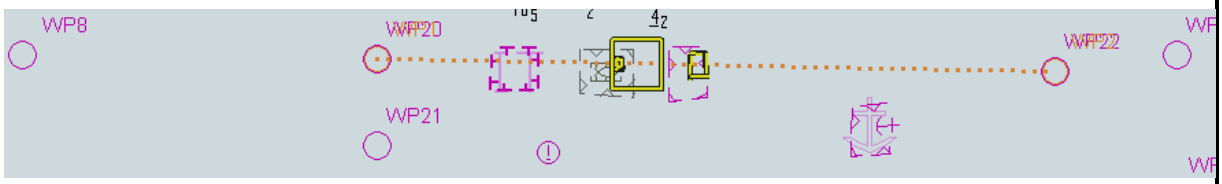
Select position 39°45'•000N 104°49'•000W at compilation scale (1:350 000) of 101AA00OVRVU.
1) View chart before route planning.
2) Manually create a route connecting two way points between features marked WP20 and WP22. Set user-specified distance for indication of areas with special conditions as 0.5 NM. Check ENC symbols shown in the ECDIS against the corresponding graphical plot

Results

The ENC in the ECDIS should match the corresponding graphical plot shown below



1) Situation before route planning. Chart 101AA00OVRVU displayed as it is



2) Situation after route planning. Alerts indicated from largest scale available for each location. An example with Seaplane landing area and Marine farm/culture area as selected.

TBD

6.3 Detection of Areas for which Special Conditions Exist - Monitoring Mode

Test Reference	SpecialConditionsMon	IHO Reference	S-98 12.10.7

Test Description

The purpose of this test is to verify by observation that ECDIS provides an appropriate alarm or indication, as selected by the Mariner, if, within a specified time set by the Mariner, own ship will cross the boundary of a prohibited area or area for which special conditions exist. The features satisfying the conditions for this test are listed in the Alerts and Indications section of the portrayal catalogue and are included in the test cell 101AA00ARSPC.000.

This test is performed by loading the test cell 101AA00ARSPC.000, sailing with a simulated ship over the test area, selecting one by one each special condition for the test and checking display against the graphical plots of test 6.1 (Route plan) corresponding to each set of Safety contour settings

Loaded Data	
Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			

Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			
Additional			

Setup

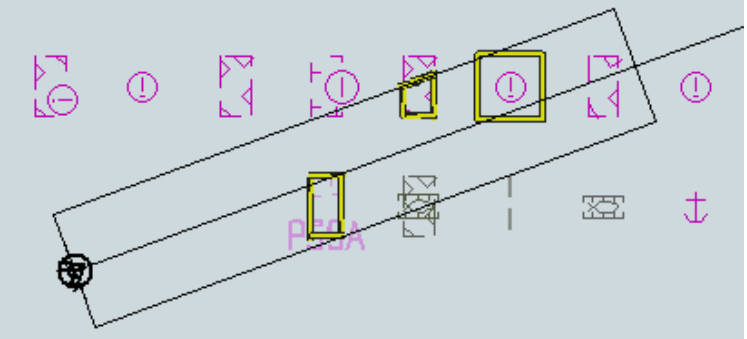
..

Action

Check ENC symbols shown in the ECDIS for each special condition against the corresponding graphical plot

Results

The ENC in the ECDIS should match the corresponding graphical plot of test 6.1.



An example with PSSA and Military practice area as selected.

TBD

6.4 Detection of Areas for which Special Conditions Exist - Use of largest scale available – Monitoring Mode

Test Reference	SpecialConditionsMonLS	**IHO Reference**	S-98 12.10.7

Test description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detection of areas with special condition.

This test is performed by loading the test cells 101AA00OVRVU.000 and 101AA00ARSPC.000, sailing with a simulated ship over the test area, selecting one by one each special condition for the test and checking display against the graphical plots of tests 6.1 and 6.2 (Route plan) corresponding to each special condition settings.

Setup

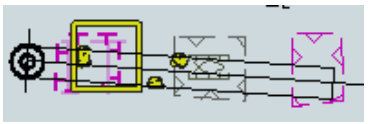
As for test SpecialConditionsLS

Action

Select position 39°45'•000N 104°49'•000W at compilation scale (1:350 000) of 101AA00OVRVU. Heading approximately 100°.
Set vessel position to 39°47.877'N 104°57.590'W, heading 94.3°.
Check ENC symbols shown in the ECDIS for each special condition against the corresponding graphical plot.

Results

The ENC in the ECDIS should match the corresponding graphical plot of test 6.1 and 6.2.



An example with Caution area, Military practice area and PSSA as selected

TBD

7 Detection and Notification of the Safety contour

7.1 Detection and Notification of the Safety contour - Basic test

Test Reference	SafetyContour	IHO Reference	S-98 12.10.9

Test Description

The purpose of this test is to verify by observation that ECDIS provides an appropriate indication when the Mariner plans a route across an own ship's safety contour. The features satisfying the conditions for this test are listed in the alerts and indications catalogue in the S-101 Portrayal Catalogue and are included in the test dataset 10100AA_SAFCO.000.

Loaded Data	
Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			

Chart (Standard)			
Alert Highlights (Standard)			
Additional			
Setup			

This test is performed by loading the test cell 10100AA_SAFCO.000, manually creating a route connecting all way points between features marked as WP1 through WP4 and checking display against the corresponding graphical plot

Action

*Load the exchange set **SafetyContour***

- *Select Display Category Other*
- *Set the Safety contour value to 0 m*
- *Set the Safety depth value to 30 m*
- *Select Symbolized Boundaries*
- *Set symbolized symbols to Off*
- *Select all Text groups*
- *Select Contour label*
- *Manually create a route connecting all way points between features marked WP1 through WP4*

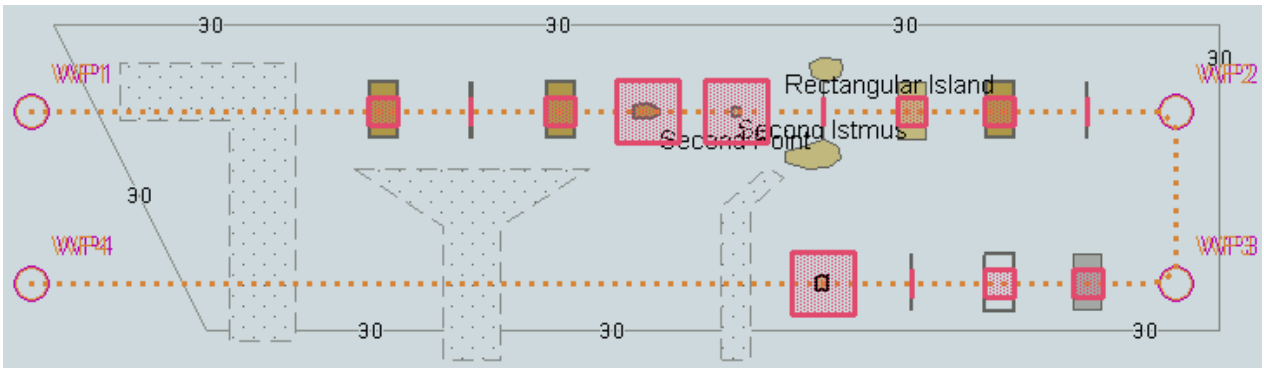
Set user-specified distance for detecting of Safety contour as 0.1 NM

Check ENC symbols shown in the ECDIS against the corresponding graphical plot.

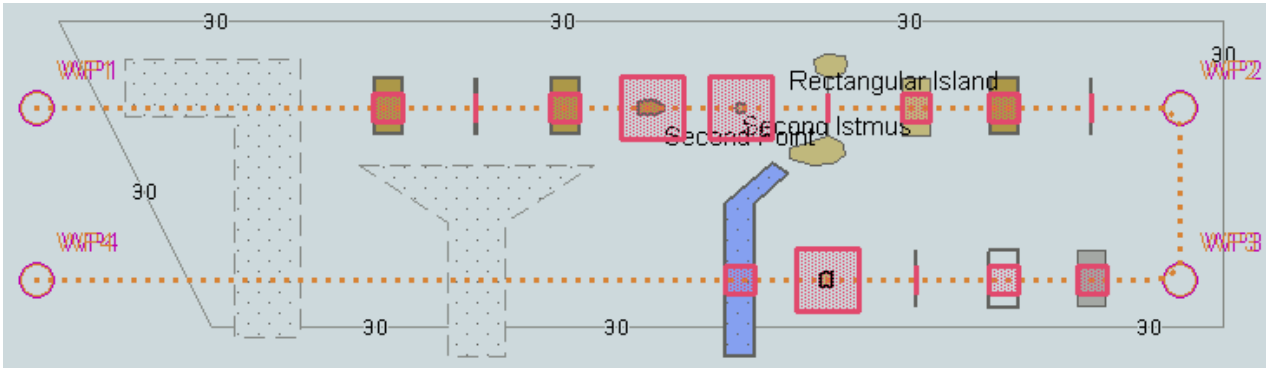
Repeat sequentially for Safety contour value 0m, 6m, 11m, 13m, 43m

Results

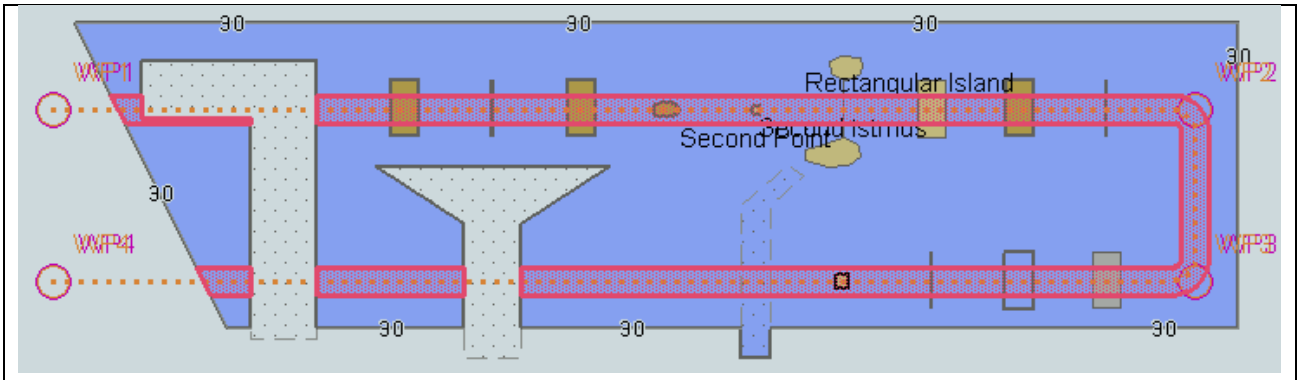
The ENC in the ECDIS should match the corresponding graphical plot shown below.
Note: To increase the prominence of dangers in unsafe waters it is permitted to highlight features with an isolated danger mark when they are wholly located in this area.



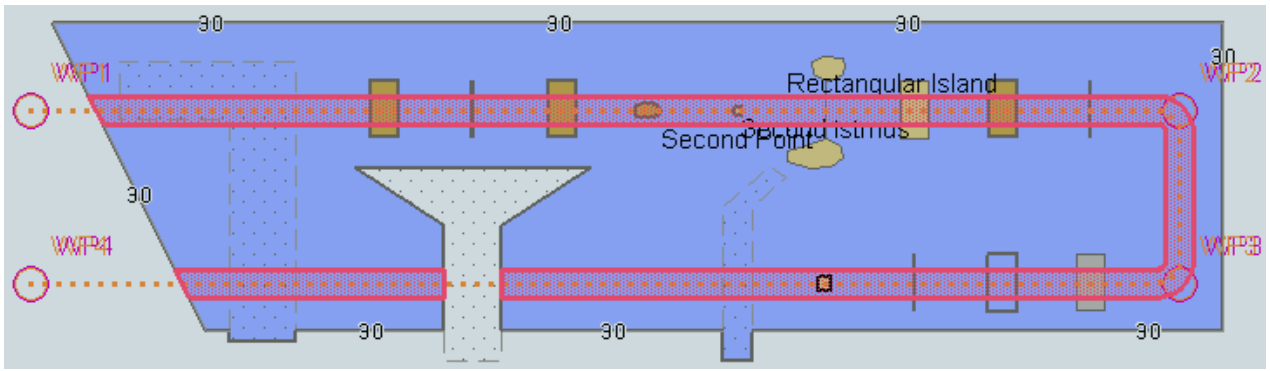
Safety contour = 0 m



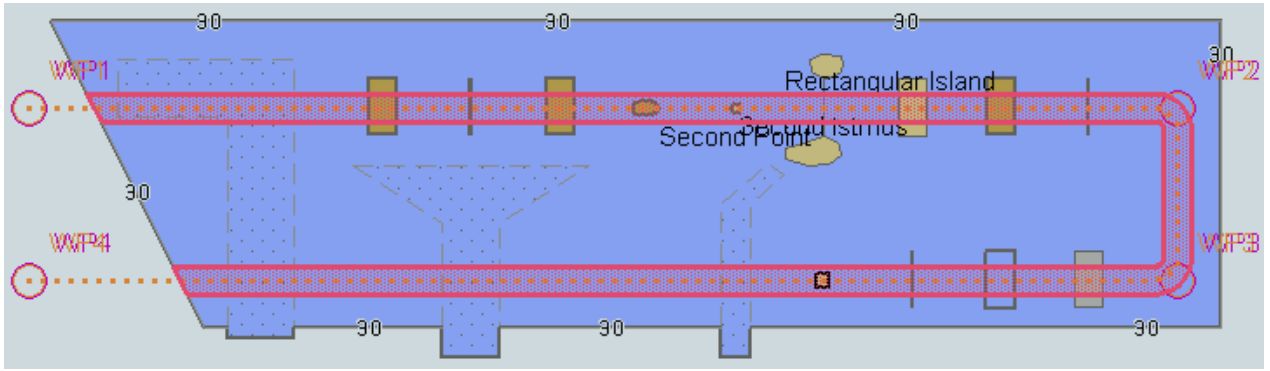
Safety contour = 6 m



Safety contour = 11 m



Safety contour = 13 m



Safety contour = 43 m

tbd

7.2 Detection and Notification of the Safety contour – Use of largest scale available

Test Reference	SafetyContourLS	IHO Reference	S-98 12.10.9

Test Description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detecting that the route crosses an own ship's safety contour.

Loaded Data

Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			

Additional

Setup

This test is performed by loading the test cells 101AA00OVRVU.000 and 101AA00ARSPC.000, manually creating a route connecting way points between features marked as WP11, WP24, WP25 and WP26 and checking display against the corresponding graphical plot

As for test 7.1 and in addition load the exchange set ***NavigationalHazardsOverview***

- *Select Display Category Other*
- *Set the Safety contour value to 11 m*
- *Set the Safety depth value to 30 m*
- *Select Symbolized Boundaries*
- *Select Simplified Point Symbols = false*

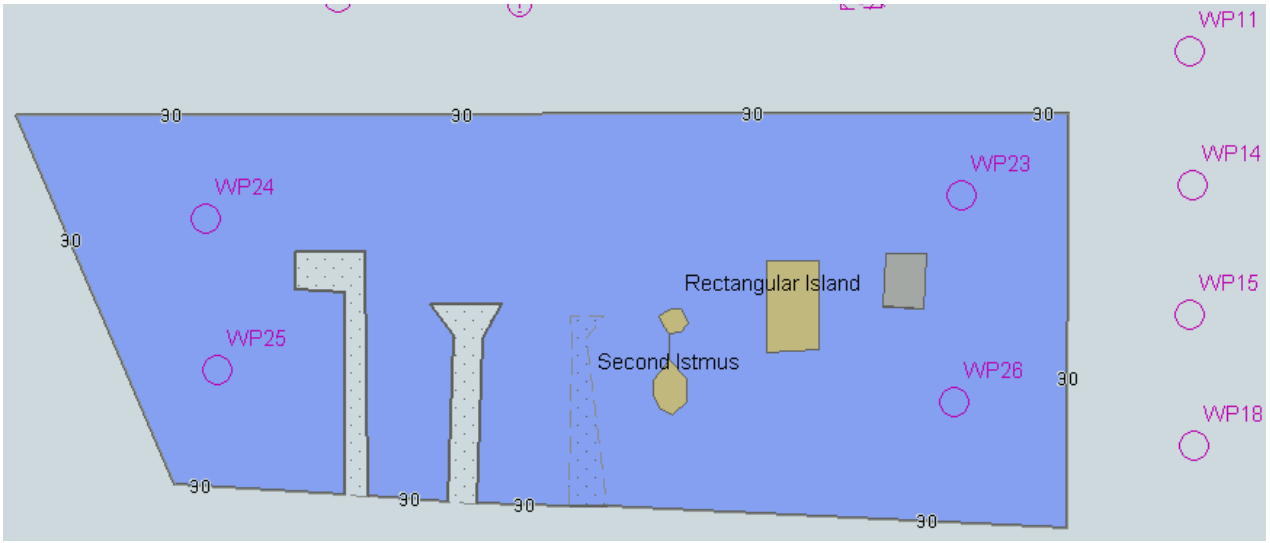
Select Contour label

Action

Select position 39°27'•000N 104°49'•000W at maximum display scale (1:350 000) of 101AA00OVRVU.
1) View chart before route planning.
2) Manually create a route connecting way points between features marked WP11, WP24, WP25 and WP26. Set user-specified distance for indication navigational hazards as 0.5 NM. Check ENC symbols shown in the ECDIS against the corresponding graphical plot.

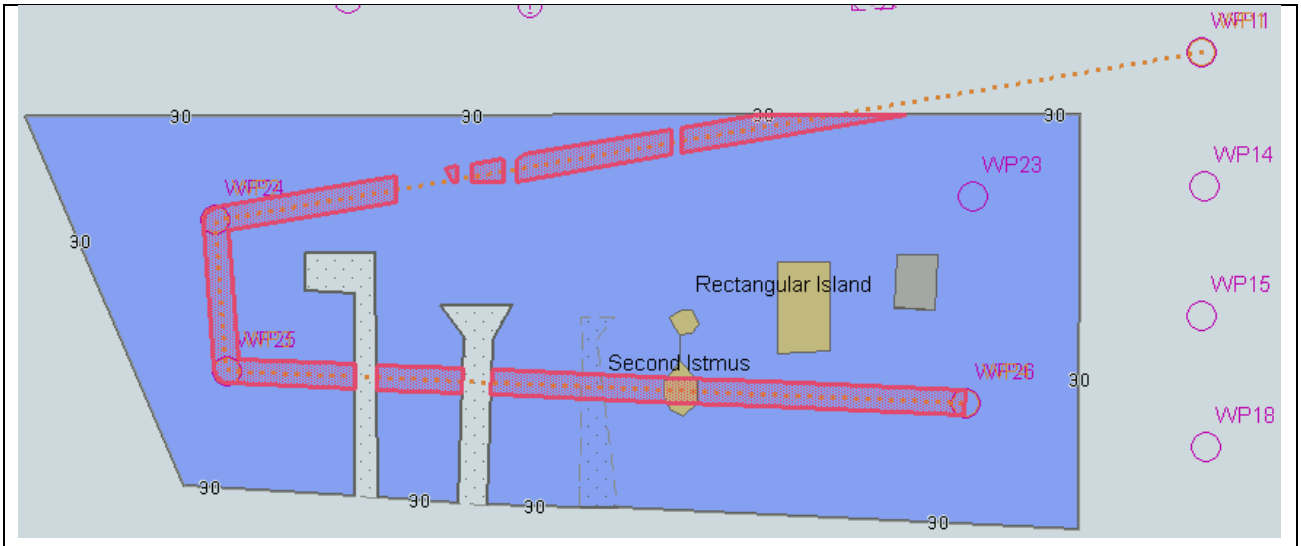
Results

The ENC in the ECDIS should match the corresponding graphical plot shown below.



1) Situation before route planning. Chart 101AA00OVRVU displayed as it is

TBD



2) Situation after route planning. Alerts indicated from largest scale available for each location. An example with Safety contour = 11 m.

7.3 Detection and Notification of Safety contour Next Leg - Planning Mode

Test Reference	SafetyContourNextLeg	IHO Reference	S-98 12.10.9
Test description			
TBD – New Requirement in S-98 requires a new test. *The purpose of this test is to verify by observation that ECDIS provides an appropriate indication when the Mariner plans a route where the next leg passes closer than a user-specified distance from the safety contour.*			
Setup			
-			
Action			
Check ENC symbols shown in the ECDIS against the corresponding graphical plot.			
Results			
Verify safety contour detection in next leg of planned route.			

7.4 Detection and Notification of Safety contour – Water Level Adjustment.

Test Reference	SafetyContourWLA	**IHO Reference**	S-98 Appendix D-3
Test description			
The purpose of this test is to verify by observation that ECDIS provides an appropriate indication when the Mariner plans a route across an own ship's safety contour whilst operating with Water Level Adjustment enabled in areas of S-101, S-102 and S-104 coverage.			
Setup			
As for test SafetyContour with the additional settings: - Set User Selected Safety contour = 11.4m - Select Water Level Adjustment = true - Set system date = 2022-14-11			
Action			
Check ENC symbols shown in the ECDIS against the corresponding graphical plot.			
Results			
Verify correct existence of user selected safety contour in areas without either S-102 or S-104 coverage, areas with only S-102 coverage and areas with both S-102 and S-104 coverage. *Areas should be delimited and permanent indications of WLA mode shown as per test WaterLevelAdjustment.*			

7.5 Detection and Notification of the Safety contour - Basic test – Monitoring Mode

Test Reference	SafetyContourMon	IHO Reference	S-98 12.10.9

Test Description

The purpose of this test is to verify by observation that ECDIS provides an appropriate alarm if the ship, within a specified time set by the Mariner, is going to cross own ship's safety contour. The features satisfying the conditions for this test are listed in the S-101 Alert and indications catalogue and are included in the test cell 101AA00SAFCO.000.

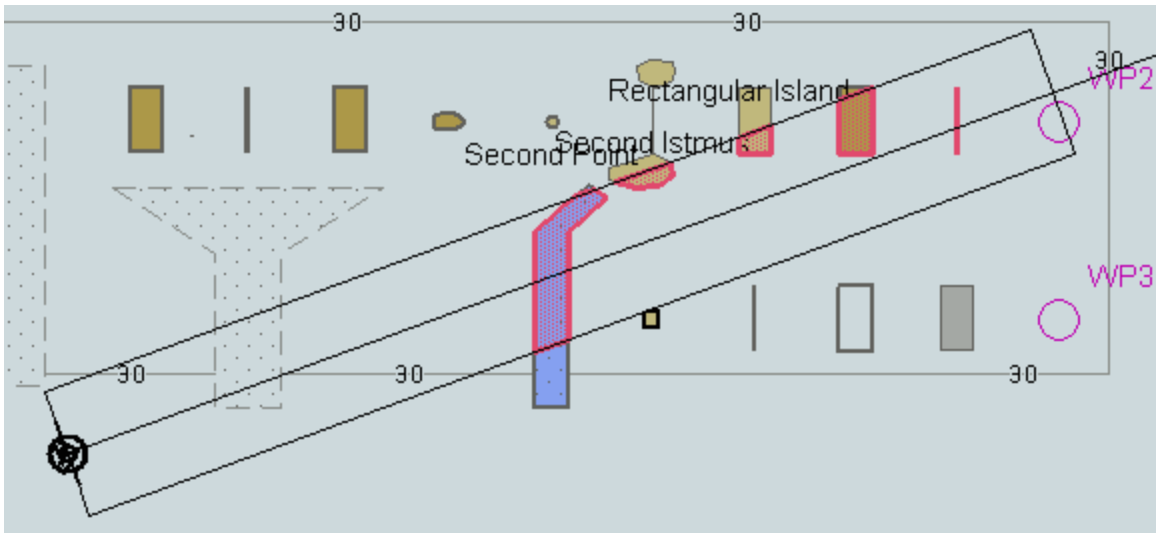
Loaded Data	
Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			

Chart (Standard)			
Alert Highlights (Standard)			
Additional			
Setup			
This test is performed by loading the test cell 101AA00SAFCO.000, sailing with a simulated ship over the test area, setting the Safety contour to the appropriate values (0m, 6m, 11m, 13m, 43m) and checking display against the graphical plots of test 7.1 (Route plan) corresponding to each set of Safety contour settings *As for test* SafetyContour *Select all Text groups* *Select Contour label..*			
Action			
Set vessel position to 39°36.516'N 104°55.737'W, heading 70.3°. Check ENC symbols shown in the ECDIS for each Safety contour setting against the corresponding graphical plot			
Results			
The ENC in the ECDIS should match the corresponding graphical plot of test 7.1  *An example with Safety contour = 6 m.* **TBD**			

7.6 Detection and Notification of the Safety contour – Use of largest scale available – Monitoring Mode

Test Reference	SafetyContourMonLS	IHO Reference	S-98 12.10.9

Test Description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for providing an appropriate alarm if the ship, within a specified time set by the Mariner, is going to cross own ship's safety contour. The features satisfying the conditions for this test are listed in the S-101 Alerts and Indications catalogue and are included in the test cell 10100AA_SAFCO.000.

This test is performed by loading the test cells 101AA00OVRVU.000 and 10100AA_SAFCO.000, sailing with a simulated ship over the test area, setting the Safety contour to the appropriate values (0m, 6m, 11m, 13m, 43m) and checking display against the graphical plots of tests 7.1 and 7.2 (Route plan) corresponding to each set of Safety contour settings

Loaded Data	
Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)

Standard Display		Other	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	

Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			
Additional			

Setup

As for test SafetyContourLS

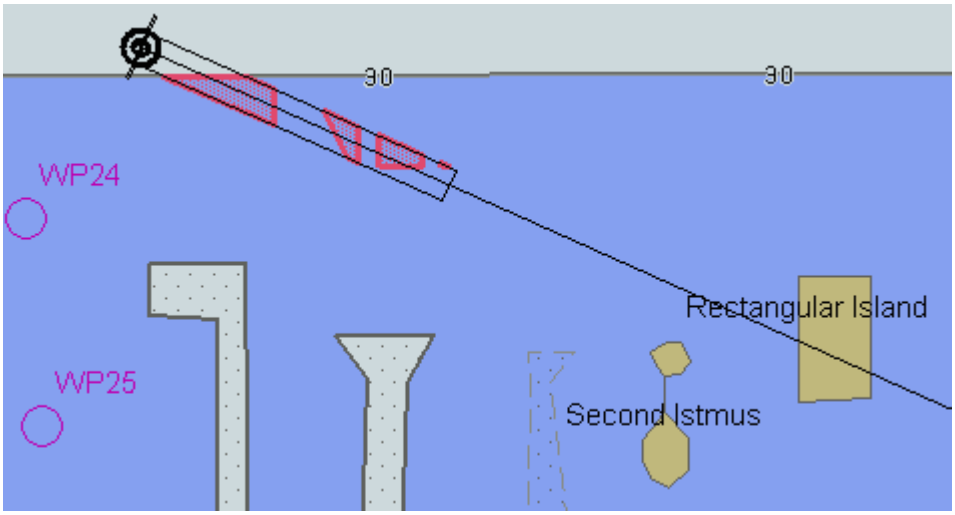
..

Action

Set vessel position to 39°40.522'N 105°05.654'W, heading 112°. Check ENC symbols shown in the ECDIS for each Safety contour setting against the corresponding graphical plot

Results

The ENC in the ECDIS should match the corresponding graphical plot of test 7.1 and 7.2



An example with Safety contour = 11 m.

TBD

8 S-57 Testing

8.1 Introduction

During the transition period to full S-100 operation on all ECDIS parallel operation of S-57 and S-100 services will take place servicing users who still require the S-57 legacy format. During this period ECDIS systems will require compatibility with both S-100 and S-57 formats of ENC data. The next section in this manual deals with testing of the so-called “Duel Fuel mode” of operation of such ECDIS where S-57 and S-101 data are used simultaneously. The next section deals specifically with those test scenarios using both S-57 and S-101 at the same time.

In order to maintain minimum levels of safety and conformance with IMO documentation compatibility with S-57 data must be maintained by systems under test. Therefore, during this period, and by reference from this manual there is a continued requirement for EUT to be tested for correct operation under S-5 and S-63, supported by this manual and IHO TDS.

This manual, therefore, references the existing IHO S-64 guidance for testing the operation of type approved ECDIS available at:

https://iho.int/iho_pubs/standard/S-64/S-64_Edition_3.0.2/index.htm

8.2 Notes on specific tests.

Whilst testing under the existing S-57 is still a requirement during the transition period a number of caveats should be made prior to the execution of the S-64 test suites.

1. It may not be necessary to do all the tests if certain generic functionality has already been tested as part of the S-100 elements of testing done. Some sections should be considered complete if successfully executed in an S-100 mode of operation
    - **To Be Determined from testing**:
2. Skin of the Earth tests relate to anomalies detected in an S-57 mode and do not apply in the S-100 test suite.
3. S-100 replaces many user settings with “Context Parameters”. Where the S-57/S-64 tests refer to certain user controls and parameters there is an equivalence between such parameters. A future edition of this manual will list these exhaustively.

9 Dual Fuel Mode testing

9.1 Introduction

As referenced in the previous section of this manual, during the transition period from S-57 to S-101 ENCs ECDIS will be required to support “Dual Fuel” mode. This entails display of either S-57 or S-101, or both in areas where S-101 is not available yet. The tests in this section verify the ECDIS operation when both S-57 and S-101 are in operation together.

9.2 Data Scheming for Dual Fuel testing

In order to simplify the arrangement of test data for Dual Fuel testing, some original S-57 datasets (from IHO S-64) have been used alongside S-101 versions to create the reference TDS. The arrangement of data coverage for these tests is therefore largely unchanged. A notable exception is the data scheming for the tests for navigational hazards, safety contour detection and areas where special conditions exist. These have been created alongside the original S-57 datasets, allowing exhaustive tests to be run across both types of chart format using single routes. All data is arranged in exchange sets to allow for straightforward test setup and execution.

9.3 Chart Loading and Update

9.3.1 Initial Loading of charts in Dual fuel mode.

Test Reference	DualFuelSimple	**IHO Reference**	S-98 18.2
Test description			
Initial import of a dual fuel exchange set.			
Setup			
*Load exchange set **DualFuelSimple***			
Action			
Ensure exchange set is loaded. Inspect contents of System Database.			
Results			

The System Database should contain the following entries.

ENC	Edition (EDTN)	Update number (UPDN)	Issue Date (ISDT)
10100AA_X0000.000	1	0	20190409
10100AA_X01NE.000	1	0	20210406
GB5X01NW.000	1	0	20210406

9.3.2 **Update(s) of combined exchange set.**

Test Reference	DualFuelSimpleUpdate	**IHO Reference**	S-98 18.2

Test description

This test verifies the ECDIS is able to load updates to Dual Fuel datasets from a combined update exchange set.

[these tests are very basic and may be expanded with more comprehensive exchange sets including ones where S-57 is deleted and S-101 installed instead. Additionally, dual updates, multiple data coverage and exchange sets with multiple datasets at different MSVS will be supplied. The aim is to test all reasonable edge cases when loading and basic portrayal of dual fuel is enabled.

Additionally, the viewing of extra layers on top of dual fuel displays will be tested. This will show interleaving on S-101, not on S-57 – S-98 18.2]

Setup

As per previous test ***DualFuelSimple***

Action

Load exchange set ***DualFuelSimpleUpdate***

Results

System Database contents should show:

ENC	Edition (EDTN)	Update number (UPDN)	Update Application Date (UADT)	Issue Date (ISDT)
GB5X01NW.000	1	1	20190409	20190409
10100AA_X01NE.000	1	1	20210406	20210406

9.4 Functions associated with chart display

9.4.1 Dual Fuel feature information

Test Reference	DualFuelFeatureInformation	**IHO Reference**	S-98 18.2
Test description			
Cursor picking in an area of DF should result in a unified display of information..			
Setup			
As per test DualFuelUpdate			
Action			
1. Set position to (60.9277,-32.4966) 2. Set display scale = 45,000 3. Interrogate features in display			
Results			
Verify the information available to the user contains information from both S-57 and S-101 sources. The pick report information should contain the following information. - *DRGARE (S-57) from GB5X01NW.000* - *DredgedArea (S-101) from 10100AA_X01NW.000*			

9.5 Detection and Notification of Navigational Hazards

9.5.1 Detection and Notification of Navigational Hazards – basic test

Test Reference	*NavigationalHazardsDF*	**IHO Reference**	
Test Description			
The purpose of this test is to verify by observation that ECDIS operating in Dual Fuel mode provides an appropriate indication when the Mariner plans a route closer than a user-specified distance from any features satisfying the conditions for this test as listed in S-98 and the S-101 Alerts and Indications Catalogue. These are included in the TDS AA5NAVHZ.000 and 101AA00NAVHZ.000.			

Loaded Data	
Exchange Set Name	

Display Mode		**Independent Mariner's Selections (default=On)**	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	

Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		**Display**	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)			
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			
Additional			

Setup

This test is performed by loading the dual fuel exchange set NavigationalHazards, WP1 through WP36 and checking the display against the corresponding graphical plot.

*Load the exchange set **NavigationalHazardsDF***

- *Select Display Category Other*
- *Set the Safety contour value to 0 m*
- *Set the Safety depth value to 30 m*
- *Select Symbolized Boundaries*
- *Select Simplified Point Symbols = false*
- *Select all Text groups*
- *Manually create a route connecting all way points between features marked WP1 through WP36*

Set user-specified distance for indication navigational hazards as 0.1 NM

Action

Check ENC symbols shown in the ECDIS against the corresponding graphical plot.

Repeat sequentially with a Safety contour value of 0m, 2m, 4m, 5m, 6m, 8m, 9m, 10m, 11m, 16m, 21m, 31m, 42m, 50m, 51m.

Results

The ENC in the ECDIS should match the corresponding graphical plot shown below.

9.5.2 Dual Fuel Detection and Notification of Navigational Hazards – Use of largest scale available.

Test Reference	*NavigationalHazardsDFLS*	**IHO Reference**	S-101PC

Test description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detection of navigational hazards.

This test is performed by loading dual fuel exchange sets, manually creating a route connecting all way points between marked features and checking display against a corresponding graphical plot. The same test is run twice with different overview exchange sets comprising the smaller scale data.

Setup

*(A) Load the exchange set **NavigationalHazardsDF** and the exchange set **NavigationalHazardsOverviewDF1***

- *Select Display Category Other*
- *Set the Safety contour value to 30 m*
- *Set the Safety depth value to 30 m*
- *Select Symbolized Boundaries*
- *Select Simplfied point symbols = false*
- *Select all Text groups*

*(B) Repeat test using exchange sets **NavigationalHazardsDF** and **NavigationalHazardsOverviewDF2***

Action

For each of (1) and (2)

Select position 39°57.000'N 104°49.000'W at maximum display scale (1:350 000) of 101AA00OVRVU.
1) View chart before route planning.
2) Manually create a route connecting all way points between features marked WP1 through WP8. Set user-specified distance for indication navigational hazards as 0.5 NM. Check ENC symbols shown in the ECDIS against the corresponding graphical plot.

Results

The ENC in the ECDIS should match the corresponding graphical plot shown below.

A) Situation before route planning. Chart 101AA00OVRVU displayed as it is-

B) Situation before route planning. Chart AA5OVRVU displayed as it is-

9.5.3 Detection and Notification of Navigational Hazards – monitoring mode

Test Reference	NavigationalHazardsDFMon	IHO Reference	

Test Description

The purpose of this test is to verify by observation that ECDIS provides an appropriate indication if, continuing on its present course and speed, over a specified time or distance set by the Mariner, own ship will pass closer than a user-specified distance from any features satisfying the conditions for this test. These are included in the test cells AA5NAVHZ.000 and 101AA00NAVHZ.000) that is shallower than the Mariner's safety contour.

Loaded Data	
Exchange Set Name	

Display Mode		Independent Mariner's Selections (default=On)	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	
Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		Display	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)			
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			

Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			
Additional			

Setup

*This test is performed by loading the exchange set **NavigationalHazardsDF**, sailing with a simulated ship over the test area, setting the Safety contour to the appropriate values (0m, 2m, 5m, 6m, 8m, 9m, 10m, 11m, 16m, 21m, 31m, 42m, 50m, 51m) and checking display against the graphical plots of test NavigationalHazardsDF (Route plan) corresponding to each set of Safety contour settings*

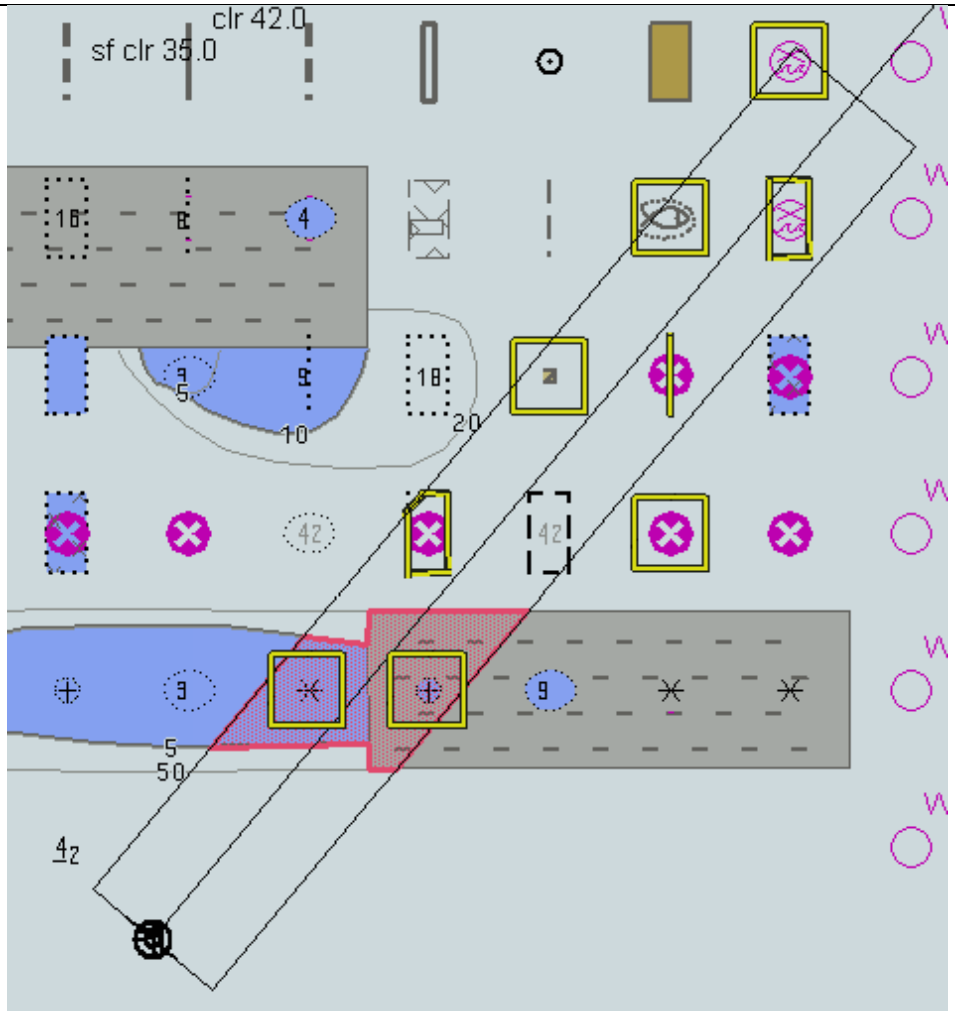
As for test NavigationalHazardsDF
Select all Text groups

Action

Check ENC symbols shown in the ECDIS for each Safety contour setting against the corresponding graphical plot

Results

The ENC in the ECDIS should match the corresponding graphical plot of test NavigationalHazardsDF.



9.5.4 **Detection and Notification of Navigational Hazards – use of largest scale available – monitoring mode**

Test Reference	NavigationalHazardsDFMonLS	**IHO Reference**	

Test Description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detection of navigational hazards in dual fuel mode.

Loaded Data	
Exchange Set Name	

Display Mode		**Independent Mariner's Selections (default=On)**	
Other		Accuracy	
Context Parameters		Contour label	
Safety contour		Highlight date dependent	
Safety depth		Highlight document	
Deep Contour		Highlight info	

Shallow contour		Shallow pattern	
Four shades		Unknown	
Radar overlay		Update review	
Plain boundaries		**Text Groups**	
Simplified symbols		Chart Text	
Full light lines		Important text	
Ignore scale minimum		**Other Text**	
Shallow water dangers		Names	
Palette		Light description	
Day		All other chart text	

Date Dependent Objects		**Display**	
Start Date		Centre	
End Date		Scale	1:60000
		Orientation	

Viewing Groups (Default = On)			
Standard Display		**Other**	
Drying lines		Spot soundings	
Buoys. Beacons, aids to navigation		Submarine cables and pipelines	
Buoys, beacons, structures		All isolated dangers	
Lights		Magnetic variation	
Boundaries and limits		Depth contours	
Prohibited and restricted areas		Seabed	
Chart scale boundaries		Tidal	
Cautionary notes		Miscellaneous (Other)	
Ships' routeing systems and ferry routes			
Archipelagic sea lanes			
Miscellaneous (Standard)			
Chart (Standard)			
Alert Highlights (Standard)			
Additional			

Setup

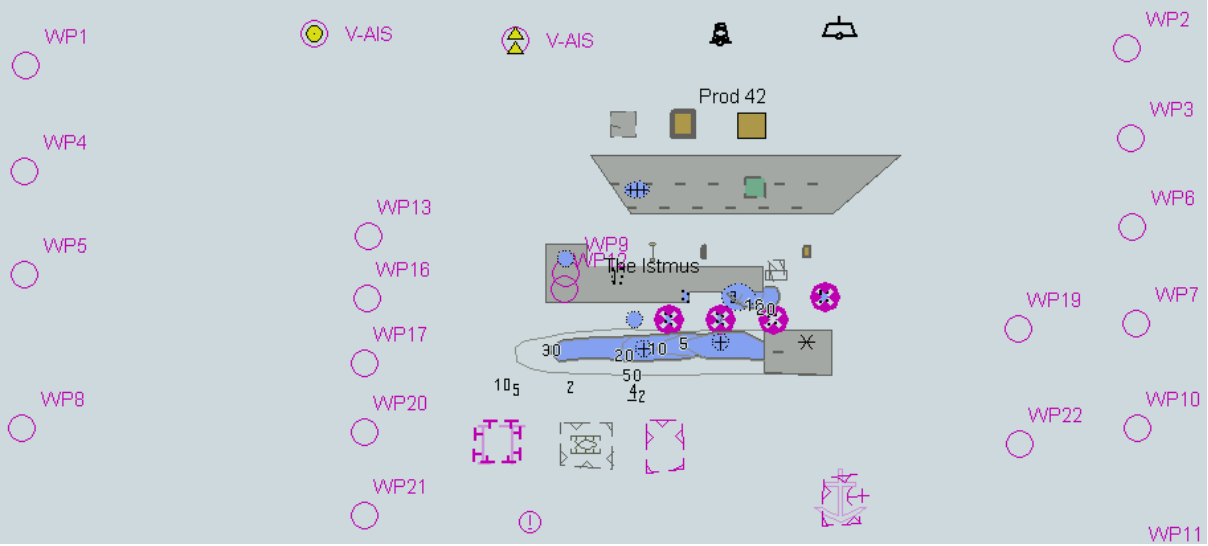
This test is performed by loading the exchange sets NavigationalHazardsOverviewDF1 and NavigationalHazardsDF, manually creating a route connecting all way points between features marked as WP1 through WP8 and checking the display against a corresponding graphical plot

*A) Load the exchange set **NavigationalHazardsDF***
*Load the exchange set **NavigationalHazardsOverviewDF1***

- *Select Display Category Other*
- *Set the Safety contour value to 30 m*
- *Set the Safety depth value to 30 m*
- *Select Symbolized Boundaries*

Set symbolized symbols to Off
Select all Text groups

*(B) The test should then be repeated using the exchange sets **NavigationalHazardsDF** and **NavigationalHazardsOverviewDF2***

Action
Select position 39°57.000'N 104°49.000'W at the maximum display scale (1:350 000) of 101AA00OVRVU (or AA5OVRVU). *Set simulated own ship for 39°49.587'N 104°54.930'W with heading set for 10.0°* *Select size of own ship check area as 1.0 NM width and 8.0 NM length*
Results
The ENC in the ECDIS should match the corresponding graphical plots shown below (A). 

9.6 Detection of Areas for which Special Conditions Exist

9.6.1 Detection and Notification of Areas for which special conditions exist – basic test

Test Reference	SpecialConditionsDF	IHO Reference	

Test description

The purpose of this test is to verify by observation that ECDIS provides an appropriate indication when the Mariner plans a route closer than a user-specified distance from the boundary of a prohibited area or a geographic area for which special conditions exist whilst operating in Dual Fuel mode. The features satisfying the conditions for this test are listed in the alerts and indications catalogue within the S-101 Portrayal Catalogue and are included in the test cells AA5ARSPC.000 and 101AA00ARSPC.000.

Setup

*This test is performed by loading the exchange set **SpecialConditionsDF**, manually creating a route connecting all waypoints between features marked as WP1 through WP4 and checking the display against the corresponding graphical plot*

*Load the exchange set **SpecialConditionsDF***

- *Select Display Category Other*
- *Set the Safety contour value to 0 m*
- *Set the Safety depth value to 30 m*
- *Select Symbolized Boundaries*
- *Set symbolized symbols to Off*
- *Manually create a route connecting all way points between features marked WP1 through WP4*

Set user-specified distance for indication of areas with special condition as 0.1 NM

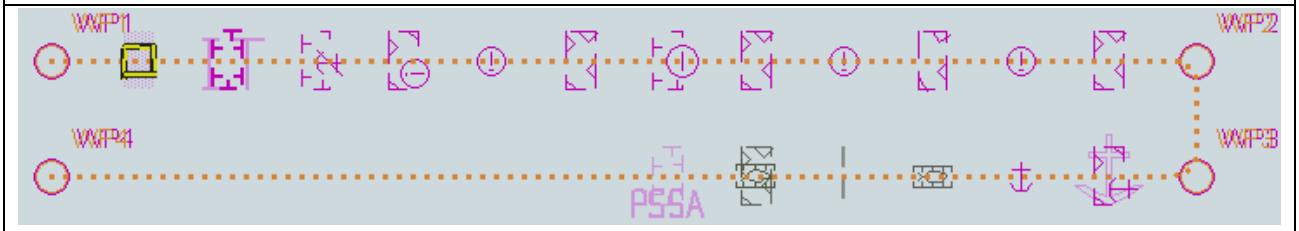
Action

Check ENC symbols shown in the ECDIS against the corresponding graphical plot. selecting one by one each special condition for the test

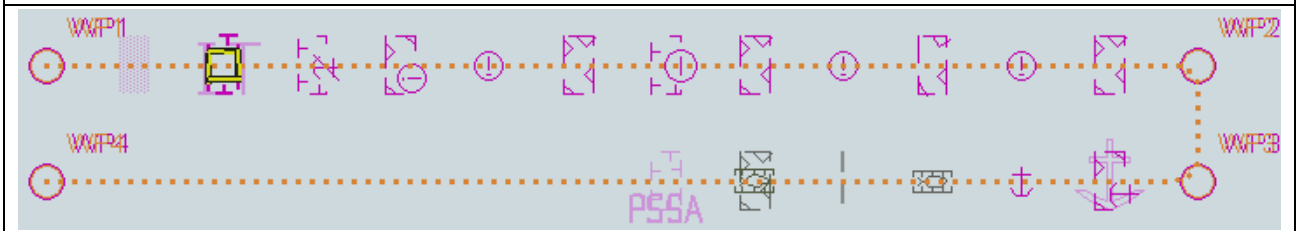
Results

The ENC in the ECDIS should match the corresponding graphical plot shown below.

9.7



Selected: Traffic separation zone



TBD

9.7.1 Detection and Notification of Areas for which special conditions exist – use of largest scale available

Test Reference	SpecialConditionsDFLS	IHO Reference	

Test description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detection of areas with special conditions whilst operating in Dual Fuel mode.

Setup

This test is performed by loading test exchange sets, manually creating a route connecting way points between features marked as WP20 and WP22 and checking the display against a corresponding graphical plot.

(A) As for test SpecialConditionsDF and in addition load the exchange set ***NavigationalHazardsOverviewDF1***

- *Select Display Category Other*
- *Set the Safety contour value to 0 m*
- *Set the Safety depth value to 30 m*
- *Select Symbolized Boundaries*
- *Select Simplified symbols*

Select all Text groups

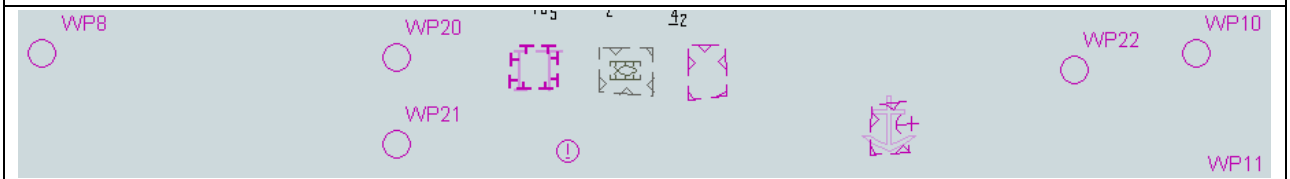
(B) Repeat test using exchange sets ***SpecialConditionsDF*** *and* ***NavigationalHazardsOverviewDF2***

Action

Select position 39°45'•000N 104°49'•000W at compilation scale (1:350 000) of 101AA00OVRVU (or AA2OVRVU).
1) View chart before route planning.
2) Manually create a route connecting two way points between features marked WP20 and WP22. Set user-specified distance for indication of areas with special conditions as 0.5 NM. Check ENC symbols shown in the ECDIS against the corresponding graphical plot.

Results

The ENCs in the ECDIS should match the corresponding graphical plot shown below.



tbd

1) Situation before route planning. Chart 101AA00OVRVU displayed as it is

9.7.2 Detection and Notification of Areas for which special conditions exist – monitoring mode

Test Reference	SpecialConditionsMonDF	IHO Reference	

Test description

The purpose of this test is to verify by observation that ECDIS provides an appropriate alarm or indication, as selected by the Mariner, if, within a specified time set by the Mariner, own ship will cross the boundary of a prohibited area or area for which special conditions exist whilst operating in Dual Fuel mode.

The features satisfying the conditions for this test are listed in listed in the alerts and indications catalogue within the S-101 Portrayal Catalogue and are included in the test cells AA5ARSPC.000 and 101AA00ARSPC.000.

Setup

*This test is performed by loading the exchange set **SpecialConditionsDF**, sailing with a simulated ship over the test area, selecting one by one each special condition for the test and checking display against the graphical plots of test SpecialConditions (Route plan) corresponding to each set of Safety contour settings..*

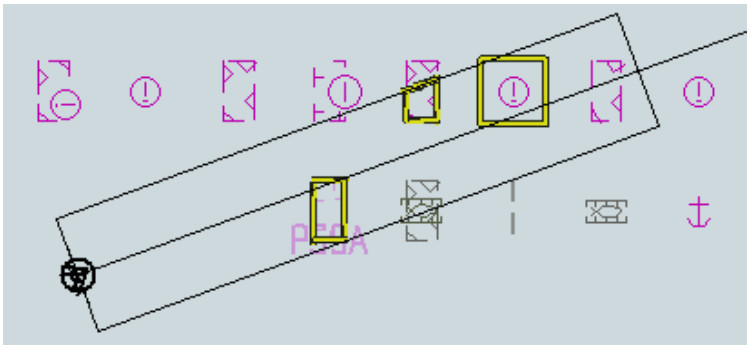
As for test SpecialConditionsDF

Action

Check ENC symbols shown in the ECDIS for each special condition against the corresponding graphical plot

Results

The ENC in the ECDIS should match the corresponding graphical plot of test 6.1.



An example with PSSA and Military practice area as selected.

TBD

9.7.3 Detection and Notification of Areas for which special conditions exist – use of largest scale available – monitoring mode

Test Reference	SpecialConditionsDFLSMon	IHO Reference	

Test description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detection of areas with special condition whilst operating in Dual Fuel mode..

Setup

This test is performed by loading test exchange sets, sailing with a simulated ship over the test area, selecting one by one each special condition for the test and checking display against the graphical plots of tests SpecialConditionsDF and SpecialConditionsDFLS (Route plan) corresponding to each special condition settings.

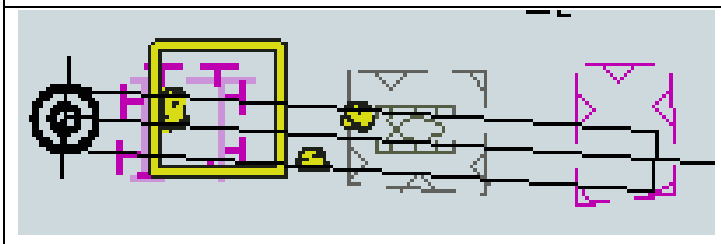
As for test SpecialConditionsDFLS

Action

(1) *Select position 39°45'•000N 104°49'•000W at compilation scale (1:350 000) of 101AA00OVRVU. Heading approximately 100°.*
(2) *Set vessel position to 39°47.877'N 104°57.590'W, heading 94.3°.*
(3) *Check ENC symbols shown in the ECDIS for each special condition against the corresponding graphical plot*
(4) *Repeat test as described in SpecialConditionsDFLS*

Results

The ENC in the ECDIS should match the corresponding graphical plot of tests SpecialConditionsDF and SpecialConditionsDFLS.



TBD

An example with Caution area, Military practice area and PSSA as selected

9.8 Detection and Notification of the Safety contour

9.8.1 Detection and Notification of the safety contour – Basic test

Test Reference	SafetyContourDF	IHO Reference	

Test description

The purpose of this test is to verify by observation that ECDIS provides an appropriate indication when the Mariner plans a route across an own ship's safety contour whilst operating in Dual Fuel mode. The features satisfying the conditions for this test are listed in listed in the alerts and indications catalogue within the S-101 Portrayal Catalogue and are included in the TDS AA5SAFCO.000 and 101AA00SAFCO.000.

Setup

This test is performed by loading the test exchange set, manually creating a route connecting all way points between features marked as WP1 through WP4 and checking the display against the corresponding graphical plot.

*Load the exchange set **SafetyContourDF***

- *Select Display Category Other*
- *Set the Safety contour value to 0 m*
- *Set the Safety depth value to 30 m*
- *Select Symbolized Boundaries*
- *Select Simplified Point Symbols = true*
- *Select all Text groups*
- *Select Contour label*
- *Manually create a route connecting all way points between features marked WP1 through WP4*

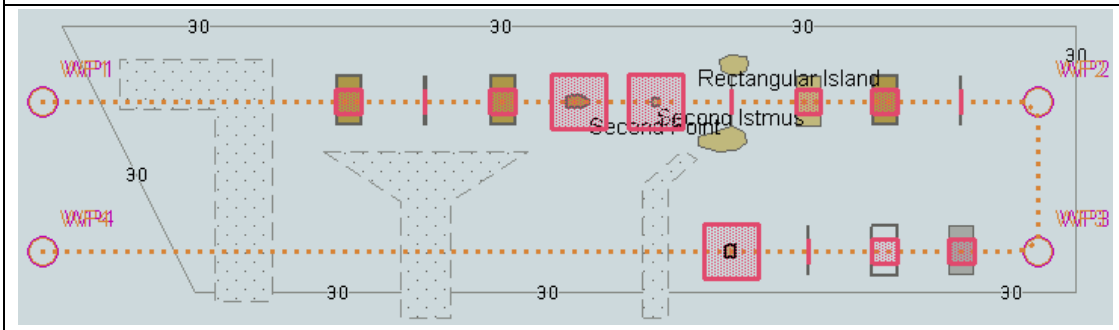
Set user-specified distance for detecting of Safety contour as 0.1 NM

Action

Check portrayal shown in the ECDIS against the corresponding graphical plot.
Repeat sequentially for Safety contour value 0m, 6m, 11m, 13m, 43m.

Results

The ENC in the ECDIS should match the corresponding graphical plot shown below..



Safety contour = 0 m
TBD

9.8.2 Detection and Notification of the safety contour – use of largest scale available.

Test Reference	SafetyContourDFLS	IHO Reference	

Test description

The purpose of this test is to verify by observation that ECDIS uses the largest scale available for detecting that the route crosses an own ship's safety contour whilst operating in Dual Fuel mode.

Setup

This test is performed by loading the test exchange sets, manually creating a route connecting way points between features marked as WP11, WP24, WP25 and WP26 and checking display against the corresponding graphical plot. The same test is run twice with different overview exchange sets comprising the smaller scale data

(A) As for test SafetyContourDF and in addition load the exchange set ***NavigationalHazardsOverview1***

- *Select Display Category Other*
- *Set the Safety contour value to 11 m*
- *Set the Safety depth value to 30 m*
- *Select Symbolized Boundaries*

Set symbolized symbols to Off
Select Contour label

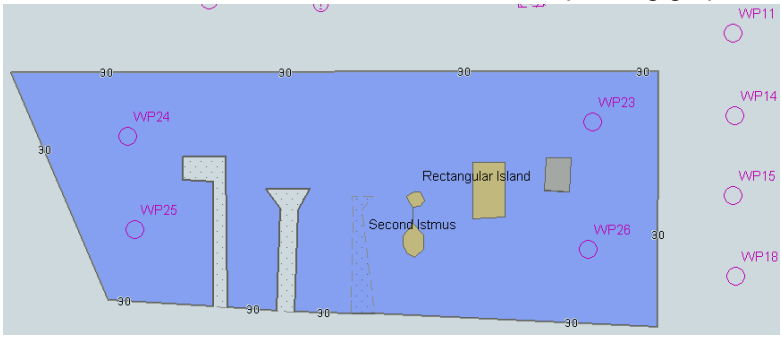
(B) Repeat test using exchange sets ***SafetyContourDF*** *and* ***NavigationalHazardsOverview2***

Action

Select position 39°27'•000N 104°49'•000W at maximum display scale (1:350 000) of 101AA00OVRVU.
1) View chart before route planning.
2) Manually create a route connecting way points between features marked WP11, WP24, WP25 and WP26. Set user-specified distance for indication navigational hazards as 0.5 NM. Check ENC symbols shown in the ECDIS against the corresponding graphical plot.

Results

The ENC in the ECDIS should match the corresponding graphical plot shown below **[Images To Follow]**



TBD

9.8.3 Detection and Notification of the safety contour – use of largest scale available – monitoring mode

Test Reference	SafetyContourDFMonLS	IHO Reference	

Test description

The purpose of this test is to verify by observation that ECDIS provides an appropriate alarm if the ship, within a specified time set by the Mariner, is going to cross own ship's safety contour whilst operating in monitoring mode. The features satisfying the conditions for this test are listed listed in the alerts and indications catalogue within the S-101 Portrayal Catalogue and are included in the TDS AA5SAFCO.000 andl 101AA00SAFCO.000.

.

Setup

*This test is performed by loading the exchange set **SafetyContourDFMon**, sailing with a simulated ship over the test area, setting the Safety contour to the appropriate values (0m, 6m, 11m, 13m, 43m) and checking display against the graphical plots of test SafetyContourDF (Route plan) corresponding to each set of Safety contour settings*

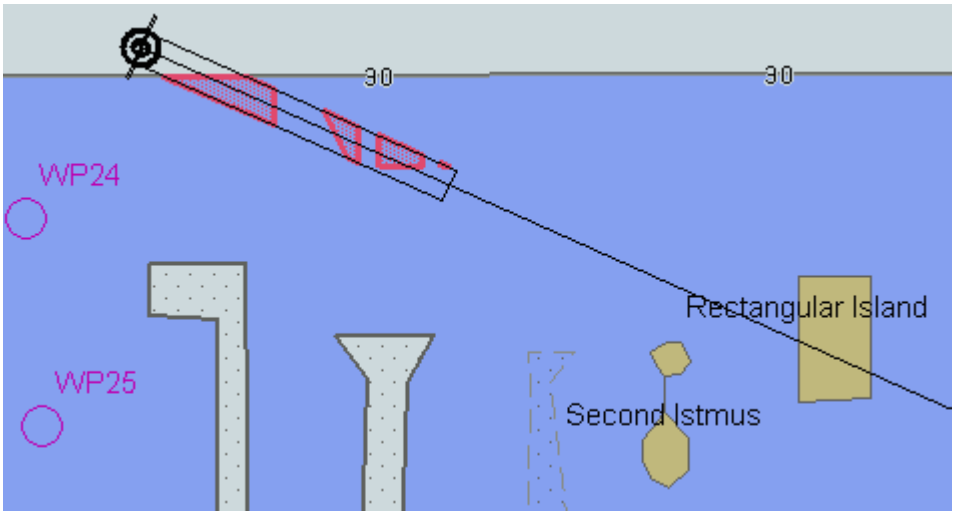
*Load exchange set **SafetyContourDFMon***

Action

Set vessel position to 39°40.522'N 105°05.654'W, heading 112°. Check ENC symbols shown in the ECDIS for each Safety contour setting against the corresponding graphical plot.

Results

The ENC in the ECDIS should match the corresponding graphical plot of test 7.1 and 7.2.



TBD

9.8.4 Detection and Notification of the safety contour – monitoring mode

Test Reference	SafetyContourDFMon	IHO Reference	

Test description

The purpose of this test is to verify by observation that ECDIS provides an appropriate alarm if the ship, within a specified time set by the Mariner, is going to cross own ship's safety contour. The features satisfying the conditions for this test are listed in listed in the alerts and indications catalogue within the S-101 Portrayal Catalogue and are included in the test cells AA5SAFCO.000 and 101AA00SAFCO.000.

Setup

*This test is performed by loading the exchange set **SafetyContourDFMon**, sailing with a simulated ship over the test area, setting the Safety contour to the appropriate values (0m, 6m, 11m, 13m, 43m) and checking display against the graphical plots of test SafetyContourDF (Route plan) corresponding to each set of Safety contour settings.*

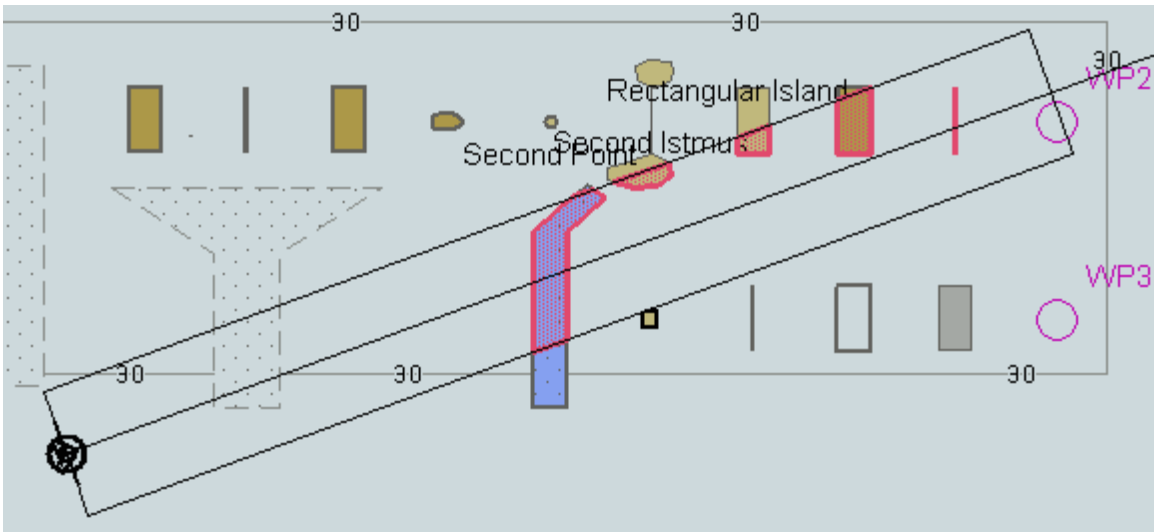
- *As for test SafetyContourDF*
- *Select all Text groups*
- *Select Contour label*

Action

Set vessel position to 39°36.516'N 104°55.737'W, heading 70.3°. Check ENC symbols shown in the ECDIS for each Safety contour setting against the corresponding graphical plot

Results

The ENC in the ECDIS should match the corresponding graphical plot of SafetyContourDF



TBD

An example with Safety contour = 6 m.

ANNEX A: Automatic Updates via Telecommunications networks (SECOM)

As described in the introduction to this manual, S-164 now contains specifications for tests of updates using online services implemented using the SECOM specification (IEC 63173-2).

If the EUT has implemented the capability of receiving S-124 and/or S-129 official updates via a SECOM based telecommunications network, then the following tests should be executed.

These tests are executed using the following IHO standard access details:

To Be Added:

1. ***UserName(s)***
2. ***Addresses***
3. ***Authentication key information***

Connection

Test Reference	SECOMSelection	**IHO Reference** **IEC Reference**	S-98: 20.4.3 (i) 63173-2:
Test Description			
Check SECOM identity.			
Safety contourSafety depthShallow contourShallow patternFour shadesRadar overlayUpdate reviewPlain boundariesSimplified symbolsFull light linesShallow water dangers**Setup**			
Action			
Connect User to SECOM network (IHO hosted, or locally hosted depending on resources) 1- Connect the ECDIS to the IHO based SECOM service using the details provided in this section. 2- Select the update data service for S-124 and S-129 data. 3- Verify that the identity is correctly authenticated on the ECDIS. The details are listed below: **Insert User Details available through the SECOM network.**			
Results			

Service Management

Test Reference	SECOMManagement	**IHO Reference** **IEC Reference**	S-98: 20.4.3 (i)
Test Description			
Check SECOM management.			
Loaded Data			
Exchange Set Name			
Safety contourSafety depthShallow contourShallow patternFour shadesRadar overlayUpdate reviewPlain boundariesSimplified symbolsFull light linesShallow water dangers**Setup**			
Action			
Verify user is able to "manage" the SECOM connection / status [it may be that other mandatory functionality is able to be added here] - *Verify SECOM status is available to the ECDIS user.* - *Reference details are listed below:* - *Ensure that an update is available to the following datasets within the System Database*			

- *129AA00XXXX, 124AA00XXXX*
- ***[user details, history and subscription status – these should all be viewable to the user]***

Results

Update and Acknowledgment.

Test Reference	SECOMAcknowledgment	**IHO Reference** **IEC Reference**	S-98: 20.4.3 (iii)

Test Description

Check SECOM acknowledgment.

Loaded Data

Exchange Set Name	

Safety contourSafety depthShallow contourShallow patternFour shadesRadar overlayUpdate reviewPlain boundariesSimplified symbolsFull light linesShallow water dangers**Setup**

Action

Perform and acknowledge an update to the system database through the SECOM network.

- *Perform an update through the SECOM network to the S-129 and S-124 datasets as listed in the resources available.*
- *Ensure an acknowledgment of receipt and verification of data integrity is observed on the ECDIS.*
- *Ensure the data is correctly ingested into the System Database.*
- *Interrogate the ECDIS System Database and ensure the following revision information is correct.*

Results

Dataset	Edition	Update number	Issue Date (ISDT)
129AA00XXXA	1	0	20240409
124AA00NEWA	1	0	20240406
124AA00UPDB	1	0	20240406