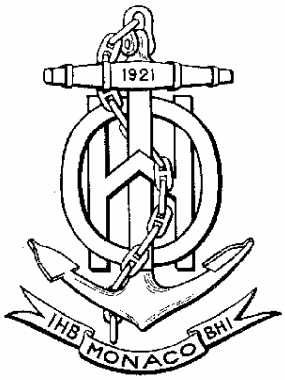
INTERNATIONAL HYDROGRAPHIC ORGANIZATION



IHO ECDIS
PRESENTATION LIBRARY

Edition ~~3.4~~4.0, January ~~2008~~2014

Special Publication No. 52
ANNEX A ~~of APPENDIX 2~~

published by the
International Hydrographic Bureau
MONACO

~~INTERNATIONAL HYDROGRAPHIC ORGANIZATION~~

~~IHO ECDIS~~
~~PRESENTATION LIBRARY~~

~~**Edition 3.4, January 2008**~~

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~~ANNEX A of APPENDIX 2~~

~~published by the~~

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Organization 2014

FOREWORD

~~The "IHO ECDIS Presentation Library", together with the "Colour & Symbol Specifications for ECDIS", form Appendix 2 to the IHO S52 "Specifications for chart content and Display for ECDIS".~~

~~The original 1st Edition of the Presentation Library was developed in 1992 by SevenCs GmbH, Hamburg, on behalf of the Colours and Symbols Working Group of the International Hydrographic Organization, under contract to the Canadian Hydrographic Service and the Royal Australian Navy Hydrographic Service, with funding shared by the United States Coast Guard and the Canadian Coast Guard.~~
This version of the Presentation Library includes some substantial changes to bring it up to date with existing maintenance documents and also modernise its content. At the time of writing ECDIS has progressed to a carriage requirement part of a vessel's bridge and much feedback on chart display has been received and digested. It is hoped that the information contained in this publication will be clear, concise and a comprehensive guide to implementing the IHO S-52 symbology in ECDIS.

~~The overall structure of the Presentation Library has changed little since 1992, but many changes in detail have been made and this Edition 3.3 marks a considerable change in format. The Symbol Library is now specified in hard-copy format with the offsets of the pivot point specified explicitly, a major development carried out by Hochschule Wismar, Fachbereich Seefahrt Warnemünde, funded by the BSH. The entire Presentation Library is now published in man-readable form as a word-processed file on a CD-ROM, which carries a subscription charge for each new edition to help to cover maintenance costs, and this will become the authoritative "official" version. The digital version will also be issued for those who prefer it, but its continued existence depends on a voluntary provider, in this case Furuno Navintra. ECDIS Chart 1, which will be issued with the Presentation Library as a graphic file will be also available in the pseudo-S57 format for edition 3.4 making use of the the SYMINS attribute of the generic object NEWOBJ introduced by the Supplement No.1 to S-57, Edition 3.1.1~~In keeping with previous versions of the presentation library the contents of the symbols, lookups and other ancillary files are published as a set of files which carry a subscription charge for each new edition to help to cover maintenance costs. These files are the authoritative statement of the presentation library contents.

Edition ~~3.4~~4.0 brings into effect all the deferred amendments issued since Edition ~~3.3.~~3.4. A Change Control History for this period is given below.

The main content changes consist of:

S-52 Section	Change
	Removed **Raster Chart symbols**, not used in previous versions of the Presentation Library
	New section added **Detecting the Safety Contour**
	New section **Detection of dangers of navigation**
	New section **Detection of areas, for which special conditions exist**
	New Section **Pick reports - Tidal stream template**
	Nassi-Schnidermann diagrams replaced with UML activity diagrams
	Various user driven display enhancements

~~Quotations from these specifications may be used in the manufacturer's manuals. The source should be acknowledged.~~

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CHANGE CONTROL HISTORY ~~& GRACE PERIODS~~(SINCE 1996) & ECDIS IMPLEMENTATION DATE

The ~~history of the~~tables below list all previous changes to the ~~C&S~~Colour & Symbol Specifications and the Presentation Library ~~is as follows:~~.

~~Notes~~Abbreviations : MD ~~stands for IHO~~ - Maintenance Document [11]
IA ~~stands for~~ - Immediate ~~Amendment~~Ammendment
DA ~~stands for~~ - Deferred Amendment

1. Colours & Symbols Specifications (Former S-52 Appendix 2)

- ~~Edition 4.0 (July 1997) + MD1 IA i01 --> Edition 4.1 (January 1999)~~
- ~~Edition 4.1 + MD2 DA d02 + MD4 DA d06 --> Edition 4.2 (2004)~~
- ~~Edition 4.2 + MD5 DA d7 → Edition 4.3 (January 2008)~~

Edition	Publication Date	Maintenance Document	Immediate Amendment	Deferred Amendment
4.0	July 1997	MD1	IA i01	
4.1	Jan 1999	MD2, MD4		DA d02, DA d06
4.2	2004	MD5		DA d7
4.3	Jan 2008			

2. ~~2.~~ Presentation Library (Annex A to S-52 Appendix 2)

- ~~Edition 3.0 (July 1997) + MD1 IA i01 --> Edition 3.1 (January 1999)~~
- ~~Edition 3.1 + MD 3 IA i04 --> Edition 3.2 (May 2000)~~
- ~~Edition 3.2 + MD2 DA d02 + MD3 DA d05 + MD4 DA d06 --> Edition 3.3 (2004)~~
- ~~Edition 3.3 + MD5 IA i5 + MD5 DA d7 + MD6 IA i6 → Edition 3.4 (2008)~~

Edition	Publication Date	Maintenance Document	Immediate Amendment	Deferred Amendment
3.0	July 1997	MD1	IA i01	
3.1	Jan 1999	MD 3	IA i04	
3.2	May 2000	MD2, MD3 MD4		DA d02, DA d05, DA d06
3.3	2004	MD5, MD6	IA i5, IA i6	DA d7
3.4	2008	MD7, MD8		DA d8, DA d9
4.0	Jan 2014			

- Digital versions:
  - PRSLIB03.dai (July 1997),
  - PSLB03_1.dai (December 1998),
  - PSLB03_2.dai (May 2000),
  - PSLB03_3.dai (March 2004),
  - PSLB03_4.dai (January 2008)

- Temporary digital files: PSTY03_0.dai (June 1999), PSTY3_2b.dai (October 2001) (see amendment d05.cl.005)

- Paper based description of symbols:
  - Addendum to Part I, Users' Manual (2003)
  - Addendum to Part I, Users' Manual (2007)
  - Addendum to Part I, Users' Manual (2008), Edition 3.4

~~Edition 4.2 of the CSMWG Specs and Edition 3.3 of the Presentation Library (PresLib), issued in March 2004, brought all outstanding deferred amendments to Editions 4.1 of the CSMWG Specs (issued January 1999) and 3.2 of the PresLib (issued May 2000) into effect. Edition 4.3 of the CSMWG Specs does not contain substantial changes compared to the preceding version with the exception of the reference to Edition 3.4 of the PresLib, which was triggered by the introduction of new objects, object attributes and attribute values in S-57 Supplement No. 1, (Edition 3.1.1) issued in January 2007.~~

The grace periods from the issuing date of a new edition after which changes are required to be included in an ECDIS nominally are:

- for new development	one year
- for new selling (already type-approved before date of issue)	one year

~~As an exceptional case, Edition 3.4 of the PresLib itself is to be set in force in conjunction with the S-57 Supplement No. 1 by **1. January 2008** to meet IMO requirements for depiction of archipelagic sea lanes and particularly sensitive sea areas. In addition, this issue of the PresLib reflects the consequences of the adoption of the revised ECDIS Performance Standard by IMO in 2006 to the chart presentation. The revised ECDIS Performance Standards of IMO itself will be set into force by 1. January **2009**. However, the implementation of Edition 3.4 allows compliance with the changed requirements as far as chart presentation matters are affected, in advance of this date.~~

GENERAL LAYOUT OF THE PRESENTATION LIBRARY

PART I:

USERS' MANUAL
sections 1-~~8~~10 Description of symbolisation methods,
sections ~~9 & 10~~11 -12Description of the digital Presentation Library.

TABLES AND SYMBOLISATION PROCEDURES
section ~~11~~13 Look-up Tables,
section ~~12~~14 Conditional Symbology Procedures,
section ~~13~~15 Colour Tables, Viewing ~~Groups~~groups and Text Groups,3

SYMBOL LIBRARY AND SYMBOL PLOTS
section ~~14~~16 Symbol Library, description (detailed specifications in Addendum)
section ~~15~~17 ECDIS Chart 1, Symbol plots, symbol meanings, colour test diagram. ~~REFERENCES AND NOTES~~
~~sections 16,17 References, Bibliography, Glossary,~~
section 18 contents of the accompanying digital files,
section 19 use of colour calibration software, digital Chart 1, colour test diagram.

Appendix A Colour Table
Appendix B Lookup areas plain boundaries
Appendix C Lookup areas symbolized boundaries
Appendix D Lookup lines
Appendix E Lookup paper chart point
Appendix F Lookup simplified points

PART II[~~1~~]:

MARINERS' NAVIGATIONAL OBJECTS
sections 1,2 Introduction, explanations,
section 3 Mariners' Object Classes,
section 4 Navigational Attributes,
section 5 References.

ADDENDUM:

Symbol Specifications Library for use on ECDIS. (paper based description of symbols)
- Addendum to Part I, Users' Manual (2008), Edition 3.4

DIGITAL FILES ON CD-ROM:

- .DAI file version of the Presentation Library,
- pseudo-S-57 file version of ECDIS Chart 1,
- colour test diagram (pseudo S-57 code with look-up table),
- 'C' program for conditional symbology procedure LITDSN, plus LITTST

~~[1] To be superseded by IEC standards 61174, 3rd edition, and 62288, 1st edition, when they are published.~~

- CRT calibration software.

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PART I

USERS' MANUAL

TABLES AND SYMBOLISATION PROCEDURES

SYMBOL LIBRARY AND SYMBOL PLOTS

REFERENCES AND NOTES

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CONTENTS

USER'S MANUAL

1. INTRODUCTION

1. Scope

This manualdocument is intended to explain the mechanisms of the IHO ECDIS Presentation Library to the ECDIS manufacturer, and to help him to usethem implement the library correctly. Therefore, it provides the software developer with the information he needsneeded to translate the relatively abstract descriptiondescriptions of an S-57 [76] objectobjects into an effective ECDIS display according to S-52 [4]. However, it is not a picture book for ECDIS symbology, since the symbology itself is provided by diagrams showing shapes, dimensions, colours and offsets rather than scaled facsimiles of the symbols in a word-processed form in the Addendum. The scaled symbols are given in machine readable form on the distribution CD-Rom. This manual3]. The symbols used in the Presentation Libray are described by a vector drawing language. There are many components to the ECDIS display and this document presents them in a structured fashion describing how the ENC data is to be rendered on screen and what facilities should be provided to the user by the display. This document also explains how the various parts of the ECDIS Presentation Library are related to each other, how these parts should be used to achieve an ECDIS presentation and how the symbol library can be transferred in a machine readable form.

The concepts and methods defined by the Presentation Library to deal with S-57 will significantly effect the ECDIS System design. Manufacturers are advised to consider how to implement the Presentation Library at an early stage in their system development.Like in the past, modifications of ECDIS presentation will inevitably be required due to sea experience, to developments in mariners' and users' requirements, and to technical improvements. Changes may be in data or may affect the manufacturers' software (which will be avoided whenever possible). Manufacturers should build into their ECDIS a means of applying such changes once the ECDIS are installed on board ship.

This manual assumes, that the reader has carefully studied in advance the various standards for ECDIS, i.e., IHO S-52/S-57 [4,5,6,7] and IMO Performance Standards for ECDIS [3]. Although this manual is revised from time to time, the authors try to concentrate related information in one place, but some details remain buried in various sections of the manual. Therefore, it is strongly recommended to read this manual thoroughly before designing ECDIS software.2].

Sections 24, 5 and 36 of this documentation start with an overview of the Presentation Library. They were written for the reader who is interested in the basic concept. Details that address especially the designer of an ECDIS system are explained from section 47 onwards.

Note that the: The Presentation Library does not cover all aspects of the ECDIS display. Therefore theThe IMO Performance Standards as well as the C&S Specifications and IEC publication 61174 [97] must also be studiedused inconjunction with this document. The IHO Test Data Sets (S-64) [1310] willmust also be usefulused when testing ECDIS software.

2. Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

2.1 Alarm

An alarm or alarm system which announces by audible means, or audible and visual means, a condition requiring attention. [2]

2.2 CIE Colours

One of the first mathematically defined colour spaces the CIE XYZ color space was created by the International Commission on Illumination 1931.

2.3 Colour Token

A five letter, code identifying a colourand its use in ECDIS. The day and night colours which are identified by the token are given in the colour tables (in CIE coordinates). Note that several colour tokens may share the same colour.

2.4 Complex Line Styles

Lines that are themselves symbols, or that have symbols interlaced. Examples of a line as a symbol are a submerged pipeline LC(PIPSOL05), or the T T T lines indicating the inside of an area LC(ENTRES51). A simple or complex line may have a symbol interlaced, such as an anchor for anchorage area LC(ACHARE51).

2.5 Conditional Symbology Procedure

A decision-making procedure used to link an object-class and its attributes to a symbol. Used in cases where the symbol depends on system configuration, user options and the objects spatial relationship to other features (e.g. whether a wreck is symbolized as an "isolated danger" depends on its relationship to the safety contour chosen by the mariner) or where symbolization is complex (e.g. light sector).

2.6 Display Category

IMO PS [2] establishes three display categories for the presentation of SENC objects **Display base**: vital info, always on the display. **Standard display**: important objects,the ECDIS' default display. **Other**: all other objects in the SENC.

2.7 Display Priority

Hierarchy to decide which object is to be shown when two objects overlap. Priority 2 overwrites 1

2.8 ECDIS

A navigation information system which with adequate back-up arrangements can be accepted as complying with the up-to-date chart required by regulations V/19 and V/27 of the 1974 SOLAS Convention, as amended, by displaying selected information from a system electronic navigational chart (SENC) with positional information from navigation sensors to assist the mariner in route planning and route monitoring, and if required display additional navigation-related information.

2.9 ECDIS Chart 1

An ECDIS version of chart 1, including all symbols, line styles and colour coding used for chart presentation. Intended for the mariner to both familiarize himself with ECDIS and to look up specific symbols. The manufacturer must program the look-up of symbols drawn from the Presentation Library, including certain diagrams which are copied from INT 1 [1].

2.10 Geometric Primitive
A plain point, a plain line, a plain area as defined in geometry (i.e. without any meaning attached).

2.11 Indication
Visual indication giving information about the condition of a system or equipment. [2]

2.12 Look-up Table
A table that links SENC objects to area, point symbol and line representation on ECDIS, and provides display priorities, radar flag, IMO category and viewing groups

2.13 "No symbol" Object
In some cases, the database contains information that is not intended for display. (An example might be a general area such as 'Great Australian Bight' which would be available for an answer to cursor interrogation of the sea area.)

2.14 Opaque fill
The background is completely filled with the colour fill. (e.g. depth area). The point and line SENC features may be overwritten. The raw RADAR image is a special case of opaque fill which overwrites all other features expect those with "priority over radar" (OVERRADAR).

2.15 Pattern fill
A method of identifying areas by large, faintly coloured symbols well spaced out across the area. A pattern spacing algorithm ensures that the pattern symbols are visible without being so dense as to cause clutter. Used to ensure pattern symbols are always visible at any display scale.

2.16 Pivot Point
The pivot point is the point around which the symbol gets scaled and rotated. When the symbol is placed in the world space, the symbol's pivot point is positioned exactly on the object's position and all elements of the symbol are geometrically related to that position.

2.17 Radar priority
IMO PS [2] require that radar can be switched off with a "single action control" in order to see SENC and mariners info clearly. However certain other info, such as planned route, safety contour, coastline must always be written over the radar.

2.18 Radar Transparency
A method of varying the transparency of radar in a continuous progression from no radar to a totally opaque radar overlay, by merging the radar colour with the colour of the object it overlays at each pixel

2.19 SCAMIN
The smallest scale at which an object is displayed (e.g. a minor light, SCAMIN of 1:50,000, would not be displayed at a scale of 1:75,000).

2.20 Simple line styles
Solid lines, dots and dashes.

2.21 Symbol Size
The size is specified in normalized units of 0.01 mm. The minimum dimension is always more than 4 mm. This size applies to display on a standard minimum screen specified in PC&SS [5] and S-52 [3].

2.22 Symbology Instruction

A machine readable symbolization order used in look-up tables to link object-classes to symbols, in straight forward cases (i.e. where a conditional symbology instruction is not required)

2.23 Text label

A textual description of an object. Can be formatted to include standard text as well as feature attribute values. For example, light descriptions, place names etc.

2.24 TFT

Thin film transistor (used in LCD display technology).

2.25 Transfer, Exchange

These words are used as verbs or nouns to mean "provide" or "carry information".

2.26 Transparent Fill

A method of identifying areas by covering a given percentage of each 4 pixel square with the fill colour, leaving the remainder "transparent". Used to ensure the information underneath shows through.

2.27 Unknown Object Vector format symbol

If an object-class is not listed in the look-up table, the ECDIS must advice the mariner that an unknown object exists in the display area, and symbolize all such objects with a question mark.

2.28 Vector format symbol

A symbol described in vector coordinates.

3 References

[1] International Hydrographic Organization. - International Chart Series INT 1: Symbols, Abbreviations, Terms used on Charts. Bundesamt für Seeschiffahrt und Hydrographie, Hamburg, Germany. (Current Edition).

[2] International Maritime Organization: Performance Standards for Electronic Chart Display and Information Systems; (Current Edition).

[3] International Hydrographic Organization: Specifications for Chart Content and Display Aspects of ECDIS / International Hydrographic Bureau, Monaco. (Special Publication No.52, Current Edition)

[4] International Hydrographic Organization: Colour & Symbol Specifications for ECDIS / International Hydrographic Bureau, Monaco. (Special Publication No.52. Appendix 2, Current Edition).

[5] International Hydrographic Organization: Hydrographic Dictionary, Glossary of ECDIS-related Terms / International Hydrographic Bureau, Monaco. (Special Publication No.32. Appendix 1, Current Edition)

[6] International Hydrographic Organization: IHO Transfer Standard for Digital Hydrographic Data / International Hydrographic Bureau, Monaco. (Special Publication No.57, Current Editions)

[7] International Electrotechnical Commission Publication 61174: Electronic Chart Display and Information System (ECDIS) - Operational and performance requirements, methods of testing and required test results; Geneva, Switzerland (Current Edition).

[8] International Electrotechnical Commission Publication 62288: Presentation of navigation related information - General requirements, methods of test and required test results; Geneva, Switzerland (Current Edition).

[9] International Hydrographic Organization: C&S Maintenance Document for Colours and symbols specifiactions for ECDIS and its Annex A: IHO ECDIS PRESENTATION LIBRARY (Current Edition)

[10] International Hydrographic Organization: ECDIS Test Data Set, International Hydrographic Bureau, Monaco. (Special Publication No.64, (Current Edition)

[11] International Hydrographic Organization: Maintenance Section under (www.iho.int > Publications > Download List)

1.1 Status of the Presentation Library

4 Structure of the Presentation Library

The IHO Presentation Library is annex A to the IHO "Colour and Symbol Specifications" (C&SS), which is in turn appendix 2 to IHO S-52 "Specifications for Chart Content and Display Aspects of ECDIS".

The Presentation Library implements the display specifications in the S-52 App.2 by decoding and symbolising the SENC. It contains:

1. the ECDIS symbol library, excluding the Navigation Symbols to be found in IEC 61174 [9] and IEC 62288 [10],

2. the ECDIS colour tables for day, dusk and night viewing,

3. look-up tables, with symbology instructions linking SENC objects to the appropriate colour and symbol and giving their IMO category, draw priority, priority over radar, and suggested viewing group,

4. conditional symbology procedures for:

   cases where symbolising depends on circumstances, such as the mariner's choice of safety contour,
   cases where symbolising is too complex to be defined in a direct look-up table,

5. description of the symbology instructions,

6. mariner's navigational objects, specified in the same format as chart objects for convenience in processing in ECDIS,

7. supplementary features such as the ECDIS chart 1, colour differentiation test diagram, colour calibration software.

The symbols of the Presentation Library should be replicated in size and shape, using any convenient format. The colour tables should be reproduced within the tolerances given in C&S Specifications, section 5.2.3. The remaining items may be implemented in any convenient form which produces the same results as the Presentation Library.

1.24.1 S-57 and the Presentation Model for ECDIS

The Presentation Model for ECDIS refers to the official IHO Transfer Standard for Digital Hydrographic Data (S-57) [76]. The IHO Transfer Standard states in Part 2, section 3, which describes the concept of presentation of S-57 chart data representing the real world: "3;

"The model described in this part of the Standard does not contain any rules for the presentation or display of information. It provides only the means for the factual description of the real world. The presentation of this information may vary to suit a particular use (e.g., it may be presented either graphically, using symbols, or in a textual form). Therefore, the presentation of information is considered to be independent of its storage. Different applications must provide their own specific '"presentation models'". A presentation model defines, via a set of presentation rules, howthe way in which real world information should be displayed for a specific application. ... must be displayed for a specified application. The concept of keeping information storage independent of presentation provides for greater

versatility and flexibility. It allows the same data to be used for many purposes without requiring any change to its structure or content. If the presentation style or medium changes, only the presentation model has to be changed."

In contrast to a presentation model suitable for paper chart application, a presentation model to be used by ECDIS systems must take into account the requirements of the IMO/IHO "Performance Standard for ECDIS" [32] and the IHO "Specifications for Chart Content and Display Aspects of ECDIS", IHO Special Publication No.52 [43]. In particular, this means, that the presentation of charts on an ECDIS screen changes depending on parameters and selections defined by the mariner, such as safety contour, time of the day, traditional or simplified symbology, etc. Thus the presentation model must cover not only colour and symbol definitions but also instructions how to handle a dynamically changing presentation as well.

1.34.2 Structure of the Presentation Model for ECDIS

The **Presentation Model for ECDIS** is built from two major parts:

- A library of colours, line styles, fill styles, point symbols and a set of symbology instructions and look-up tables for the translation of object descriptions into symbology instructions. This part is called "**Presentation Library for ECDIS**". It is provided on a CD-ROM and may also be available in a machine readable form.
- A description of athe required programmable structure, which serves as a functional model for the graphic ofdisplay within an ECDIS system and which explains how to use the elements of the Presentation Library and how to ensure the correct display of data structured according to S-57. This part is called **"Display Generator Concept"**.

1.44.3 Supply and amendment of the Presentation Library

From edition 3.3 onwards the word-processed version of the Presentation Library is the "official" version. A limited digital version in .dai format is provided on the same CD-ROM as a manufacturer's option for edition 3.4, but may not be provided for succeeding editions.4.0. It consists of look-up tables; symbols; and colour tables and is supplied in ASCII format in the .dai file.

The name of the file on this CD which contains the official, word processed Presentation Library is "PSLBmm_n.pdf" where mm_n is the edition number. **The edition number of the PresLib installed shouldmust be available to the mariner on request**.

Further details of the numbering and amendment of S-52 App.2 are given in sections 1.2.3 and 1.2.4 of the "Colour & Symbol Specifications".

The general layout of the Presentation Library is shown on page iii of this publication. The various components of the Presentation Library are supplied and amended as follows:

1.4.1 The Presentation Library as a word processed file is issued on a CD-ROM, which carries a subscription charge for each new edition to help to cover maintenance costs. The word-processed Presentation Library includes:

1. .1 the look-up tables, colour tables and symbol library.

2. .2the narrative and diagram conditional symbology procedures in Nassi-ShneidermanUML form, together with symbolizing instructions (in section 814) for special IMO and IHO requirements which are needed to complete the symbolizing of an ENC,

3. .3further information needed for implementing the above in a display generator (inECDIS given in all sections 1 to 8).

1.4.2 On each occasion of an immediate amendment of the Presentation Library:

1. .1a description of the items in the amendment will be freely available from the IHO web site under the Maintenance Section (www.iho.int > Publications > Download List) [1211].

2. .2the amended word-processed Presentation Library will be posted on the IHO web site (www.iho.int > Catalogue) together with the ECDIS Test Data Set (S-64) [1310]. A subscription may be required.

Note that only the contents of: Only immediate amendments and not those of deferred amendments, will be included in the amended Presentation Library of .2 above.

1.4.3 The following digital files are also provided on the CD-ROM containing the word-processed Presentation Library:

1. .1 The .dai file of the Presentation Library, consisting of look-up tables;, symbols; and colour tables.

Note that the: The .dai version is provided as a manufacturer's option for edition 3.4,4.0, but may not be available for succeeding editions.

Also note that theThe "Test Edition Version" of the .dai file provided with old editions of the presentation library is no longer required in IEC 61174 and has been removed permanently from the digital Presentation Library. However symbol SY(CHKSYM 01) has been retained for use in checking symbol size.

The amendments, procedures, the formats and the naming of the digital Presentation Library files are described in sections 911 and 10,12, and the contents of the files are described in more detail in section 18.

1. .2. A “C” program LITDSN for generating light descriptions,

2. .3. ECDIS Chart 1 & Colour Differentiation Test Diagram, consisting of:

   - S-57 files containing a collection of all symbols coded as NEWOBJ using the SYMINS attribute and similarly arranged as INT1 [21] for paper charts
   - S-57 files containing combinations of foreground and background colours as line and area geometries.

3. .4 Colour calibration software.

5 The following two sections describe the Display Generator Concept and give an overview of the Presentation Library.Basic Concept of ECDIS DIsplay

2. BASIC CONCEPT OF A 'DISPLAY GENERATOR' FOR AN ECDIS SYSTEM

TheAll elements of the Presentation Library are handled by the ECDIS Display Generator that is designed by each manufacturer, following the guidelines of this documentation and which performsrequired to be implemented by a manufacturer unless otherwise stated. OEMs developing ECDIS display must follow this documentation to perform the link between the S57 feature object characteristic according to S-57 and the actual presentation on the ECDIS screen. Note that the basic concept for a Display Generator that is described in this section is only an example. There are other concepts to realize the ECDIS presentation. NOTE ALSO THAT THE DISPLAY GENERATOR IS NOT PROVIDED IN THE PRESENTATION LIBRARY; THE MANUFACTURER MUST DEVELOP THIS.

Figure 1 showsis an example of how the various elements of the Presentation Library can be linked together in order to display an S-57 object from the SENC. Only the individual elements (symbol library, look-up tables, etc.) are provided in the Presentation Library. It is understood, that theThe ECDIS manufacturer writes software linking these elements. Please note, that section 8 of this manual gives further details that are of interest to the programmerthe elements.

Note particularly section 8.4 dealing with the display of objects depending on date (e.g. DATSTA, DATEND, PERSTA, PEREND) or on display scale (SCAMIN). The requirement to display date-dependent information outside the date at which it is active (for route planning etc.) means that the date-filter in the first diamond of figure 1 will be deliberately by-passed on request by the mariner. When this option is in use, the mariner must be reminded that the information on the display may not be correct for the actual, current, date and time.
Section 10 gives further details of key functions that must be taken into consideration by the ECDIS developer.

Each graphic command is assigned to the display priority that was retrieved from the look-up table before. The display priorities are defined according to the requirements of the IMO and IHO (see 8.3.4).

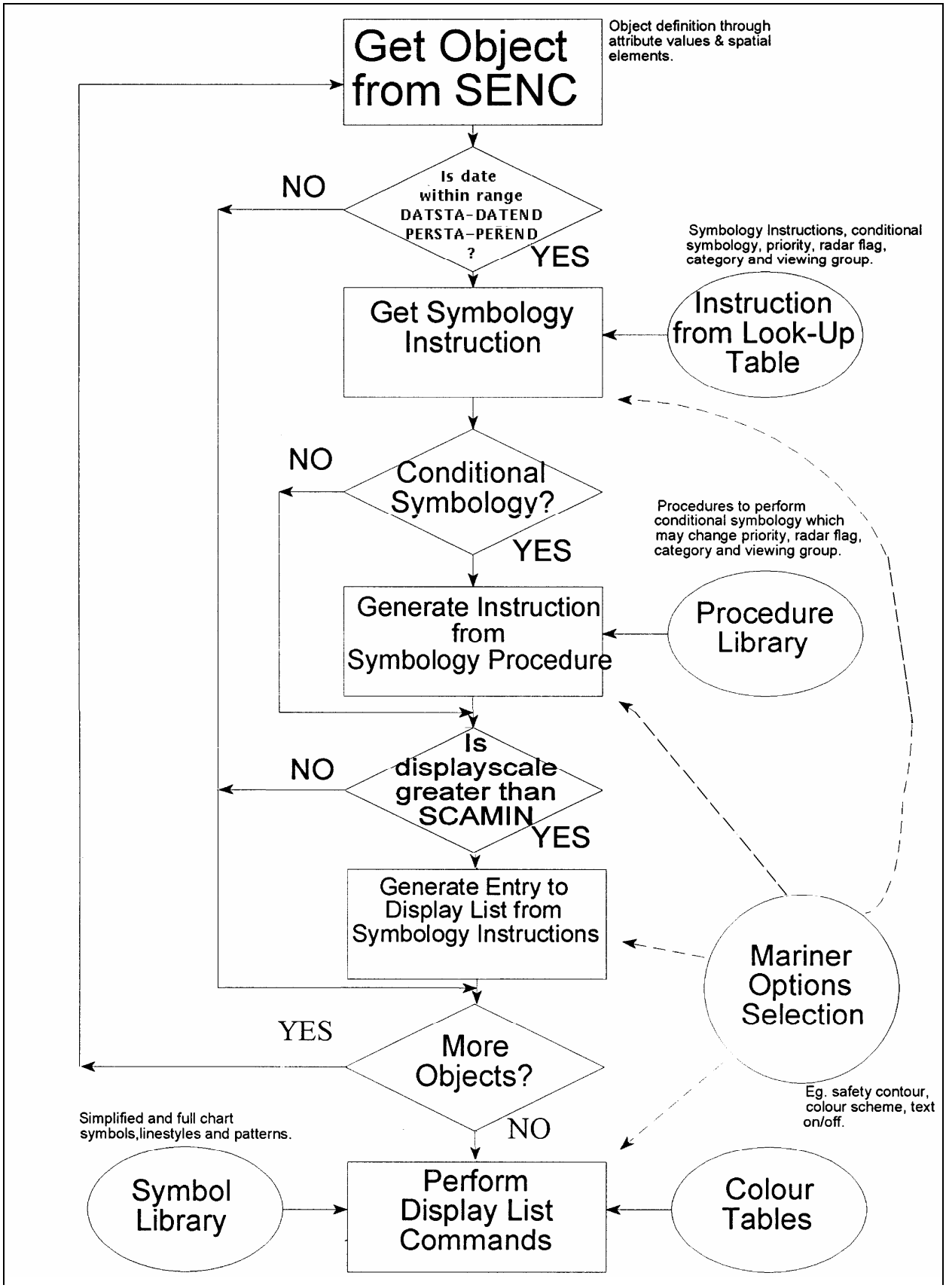


Fig. 1 ~~– Display generator~~ – ECDIS display concept

The basic concept of ECDIS display is as follows:

After all objects have been examined by the programmed loop, the display list is filled with graphic commands. The commands are then performed by the ECDIS graphic, which in turn loads symbols from the symbol library and gets the colour values from the colour tables. This method to generate an ECDIS display gives the mariner control over the contents and the appearance of the presentation:

1. The ECDIS determines which feature objects contained within the SENC are required for display.
2. The ECDIS maintains a set of user defined parameters (such as safety contour, safety depth, display level).
3. Each feature object, whether point, line or area geometric primitive are transformed into symbolisation instructions using lookup tables and conditional symbology procedures described in this document.
4. The symbolisation instructions are drawn to the screen using lookup tables to define colour values for the selected pallete and taking into account data-defined parameters which may affect display, such as DATSTA-DATEND and SCAMIN.

- If helf, for example, the user subsequently selects, e.g., another safety contour, the display list isof symbolisation instructions are renewed in the programmed loop and the depth areas distinguishing shades are changed by a symbology procedure which is called to generate symbology instructions for the object class DEPARE (depth area);. There are many display options, some of which are mandatory and which are described in this document. The ECDIS manufacturer is also able to provide user features within their ECDIS which build on the mechanisms described in this document.

- or symbology instructions which refer to the simplified or paper_chart points, plain_boundaries or symbolized boundaries areas, and lines by switching to another look-up table;

- or the generation of the display list is influenced by a filter suppressing text commands;

- or the colour values for the day time are replaced with the values for the night time by selecting another colour table.

Note that the ECDIS should not initiate any change of state automatically or by linkage, e.g., it should not automatically select “lights” because the mariner selects the night colour table. All changes to the composition of the display should be initiated by the mariner.

3. THE ELEMENTS OF THE PRESENTATION LIBRARY - AN OVERVIEW

6 The Elements of the Presentation Library - An Overview

The Presentation Library consists currently of seven elements:

1. A library of symbols, line styles and fill styles
1. A colour coding scheme defining the IHO colour tables for day and night time

2. A .tif file (or other medium) set of diagrams that can be displayed or printed on demand and explain the symbology to the mariner (mariners' ECDIS Chart 1)
2. A library of symbols, line styles and fill styles

3. A colour coding scheme which includes the IHO colour tables for day and night time

3. A set of symbology command words from which symbolisation instructions can be assembled. These are used to symbolize S-57 [6] objects.

4. A set of symbology command words from which machine readable instructions can be assembled. The result is a symbology instruction which in turn is processed to symbolize S-57 [7] objects.

4. A set of conditional symbology procedures to decide the appropriate symbolization in cases determined by the mariner's selection (e.g., safety contour) or in complex symbols (e.g., light sectors).

5. A set of look-up tables that link object description from the SENC databaseS57 feature object descriptions and geometric primitives to the appropriate symbology instructions depending on whethercommand words using one of two separate mechanisms:

   a) TheA simple lookup where the link is straight forward, i.e., a direct relationship between an object's description and its presentation such as a buoy or land area. In this case the look-up table provides the symbology instruction to show a symbol, an area fill or a line style.

   b) The link is conditional, i.e., depending on circumstancesA more complex lookup where the link between the feature and its symbology is dependent on a parameter or other context, for example a depth area, whose colour fill depends on the choice of the safety contour. In this case the look-up table refers the decision to a conditional symbology procedure thatwhich then selects the appropriate symbology instructions.

6. A set of conditional symbology procedures to decide the appropriate symbolization in cases determined by the mariner's selection (e.g., safety contour) or in complex symbols (e.g., light sectors).tif file (or other medium) set of diagrams that can be displayed or printed on demand and explain the symbology to the mariner (mariners' ECDIS Chart 1)

7. A catalogue of navigational object classes that comprise objects that the mariner may add to the chart in accordance with IEC 61174 [97], IEC 62288 [108] and that cannot beare not defined by means ofwithin S-57.57[6]. (These are specified in Part II of the Presentation Library [4])

The following sections givesection gives a short description of each of the elements of the Presentation Library.

3.16.1 The Colour Coding Scheme

The Presentation Library uses a colour scheme, which classifies colours by their usage (see section 47). Each colour usage is represented by a token that is a five- letter codecolour token. Each colour token corresponds to a colour definition given in CIE coordinates in one of a set of colour tables for different bridge lighting conditions. Each colour table is referred to as a "pallete" such as "Day-Bright", "Dusk" and "Night".

Symbols, fill styles and line styles refer to the colour tables by using the standardized colour tokens as part of the symbol definition. See section 47 and 15 on how to use colour tokens, section 10.412.4 on how colour tables are transferred in the digital version and section 13 for a listing of the colour coordinates. ECDIS manufacturers should also refer to section 4 of the Colour and Symbol Specifications (C&SS) [5] for details of the design and use of colours. Appendix A of this document provides the XYL values for each colour token in Day, Dusk and Night palette.

3.26.2 The Library of Symbols, Fill Styles and Line Styles

Symbols, area fill patterns and line styles are described in detail in the Symbol Library (section 16 and the Addendum). They are also supplied in a machine readable format on the digital file. ECDIS manufacturers should also refer to section 3 of the C&SS [53] for details of the design and use of symbols, line & fill styles.

Symbols, area fill patterns and line styles are described in detail in the Symbol Library (section 14 and the Addendum). For edition 3.4, they are also supplied in a machine readable format on the digital file.

3.2.1 Symbols

The Presentation Library provides two sets of symbols, referred to as “simplified” and “traditional”. The symbols for point objects which are generally based on the traditional paper chart symbols. In and, in addition to buoy and beacon symbols based on the paper chart, it also provides a set of more compact, but more visible, 'simplified' buoy and beacon symbols are provided for use under difficult viewing conditions.

See section 7.2 for symbology instructions and 10.6 for details of the digital format.

3.2.2 Fill Styles

Area Fills

The Presentation Library offers various ways to fill areas. They can be filled with an opaque colour; or with a colour shown with some transparency; or with a pattern of symbols (fill pattern) or with a centred symbol. Fill patterns and centred symbols are introduced as a solution for the symbolization of areas in special situations. When using the traditional (paper chart) way, e.g., to symbolize the traffic direction by using an arrow, it might happen that the arrow-symbol moves off the screen because the size and position of the viewing window on the ECDIS chart cannot be predetermined. A fill pattern showing arrows does not have a certain position on the chart like the paper chart arrow-symbol. It shows up as long as any part of the traffic separation lane can be seen on the screen. A centred symbol moves to the centre of the part of the area that remains in the display window.

The Presentation Library provides two options for area boundaries, referred to as “plain” and “symbolised”. There are look-up tables for plain area boundaries (intended for use at small scale to reduce clutter) and symbolized area boundaries (intended for use at very large scale to show immediately on which side of the boundary the area lies and to identify the area)larger scales to assist area identification. Note that centred symbols should still be used with symbolized boundaries to symbolize the case when the entire display window lies within an area. See section 7.416.5 for symbology instructions and 10.512.5 for details of the digital format.

3.2.3 Line Styles

The Presentation Library uses two types of line styles: simple line styles and complex line styles. Simple line styles are solid, dashed or dotted lines with varying colour and thickness. Complex line styles are composed of repeating line patterns. See section 7.316.4 for symbology instructions and 10.712.7 for details of the digital format.

3.36.3 Symbology Instructions

The ECDIS picturechart display is generated from symbology instructions. The symbology instructions are in turn assembled from a set of symbology command wordscommands which have been designed for the Presentation Library. Symbology command wordscommandss are intended to be machine readable orders,instructions which can be easily decoded in a straightforward manner to low level graphic actions that are performed by the ECDIS program to generate the ECDIS picturedisplay.

These symbology instructions are also used in the look-up table of the word-processed version.

Currently there are five types of symbology instructions:

1. instructions for line objects
2. instructions for area objects
3. instructions for point objects
4. instructions for text labels
5. call to conditional symbology procedureprocedures

Symbology instructions are explained in section 7.16.

3.46.4 Conditional Symbology Procedures

The majority of objects can be presented in a straightforward manner: symbology instructions for lines, areas or symbols are used.
To handle complex presentation situations conditional symbology is required. Conditional symbology is different from standard symbology in that a procedure is processed rather than a straightforward symbology lookup instruction. Thus decisions are made by the computer while it is creating the presentation of an object,ECDIS at run time which affect symbolization and perhaps alsoother display factors such as priority, radar flag, category, viewing group. Further conditional symbology procedures will be used as future requirements arise for which conditional symbology gives the simplest or most effective solution. groups. The conditional Symbology Procedures are givendefined in section 12.14.

3.56.5 The Look-Up Tables and other symbolizing instructions

3.5.1 The Look-Up Tables

Instructions on how to symbolize an instance of an object class can be found in look-up tables that come with the Presentation Library on the distribution CD-Rom.Due to the need for ECDIS to operate as a real-time navigation display, using an electronic display screen in place of the paper chart, a number of new symbols have been introduced. These identify the safety contour, no data areas, etc. In addition, a simplified and more visible set of buoy and beacon symbols have been developed for bad viewing conditions, such as bright sunlight or at nightROM.

There are five look-up tables:

1. o paper chart point symbols
2. o simplified point symbols
3. o line symbols
4. o plain area boundary symbols
5. o symbolized area boundary symbols

Important: The manufacturer shouldmust allow the mariner to select freely between the two point symbol tables and the two area symbol tables. There should be no linkages, for example linking simplified point symbols to plain area boundaries, etc.

Each line of a look-up table, called a look-up table entry, contains the code of the addressed objectS57 feature class., a string of attribute-value combinations and symbology instructions or a call to a conditional symbology procedure which in turn creates symbology instructions.

To find the correct symbolization for an instance of an object class the look-up table is entered with the object class code and its presentation-relevant attribute values. The resulting symbology instructions can then be processedused by the Display Generator of the ECDIS systemECDIS to render the symbol on screen.

Every entry to the look-up tables matches either all objects of an object class or a subset. Therefore, the look-up tables are also used to assign the objects to the IMO/IHO display category, display priority, radar flag and optional viewing group. The viewing groups may be used by the mariner to either reduce or add information shown on the screen.

Look-up table entries are supplied in section 1113 and in a machine readable format in the .DAI file of edition 3.3. See 8.3, 10.26.5, 10.3 and section 1113 for further details.

3.5.2 Extended Presentation Instructions which cannot be described by Look-Up Tables

ManySome display features cannot be handled by look-up tables, generally because they are not discretedefined S-57 objects and fall between the look-up tables and the conditional symbology procedures. Some examples are the scalebar, the ECDIS chart legendledgend, manual correction identifiers, cursor pick etc. These are described in sections 8.510.5 through 8.8.10.8.

3.66.6 Mariners' ECDIS Chart 1 and Colour Differentiation Test diagrams

To familiarise the mariner with ECDIS symbology, a printable set of symbol diagrams, following the sequence of the paper chart INT 1 [21], is provided in section 15,17, along with a numbered list of symbol meanings to explain the use of each symbol.

The digital equivalent, a set of symbol diagrams in the form of S-57 compliant charts, is included on the CD-ROM for edition 3.3. These provide symbol meaning, through cursor picking referring to the symbol descriptions given in the symbol library.

A Colour Differentiation Test diagram is included to enable the mariner to verify the ability of his ECDIS display screen to distinguish between differently colour-coded areas, lines and point symbols. See 15.417.3 for the diagram and 19.4 for its use.

3.76.7 Catalogue of Mariners' Navigational Object Classes

IEC 61174 [97] and IEC 62288 [108], describes the Navigational Symbols required by Appendix 3 of the IMO Performance Standards for ECDIS. These symbols for which IEC is the authority represent non-chart objects which are not defined in S-57, e.g., a way point or a line of position. Thus, by agreement with the IEC, and to allow ECDIS manufacturers to handle navigation symbols by the same means as S-57 or chart objects, the Presentation Library includes as Part II a catalogue of navigational objects. As a result, a waypoint can be stored in the SENC and it will be presented on the ECDIS screen using symbols, line styles and fill styles of the Presentation Library. The symbology instruction suitable for a navigational object can be found in the look-up tables like the symbology instruction suitable for any S-57 object class.

Because navigational object classes are non-standard object classes, the class code is a lowercase 6 character acronym according to S-57. Therefore, they do not interfere with S-57.

Please see Part II for further details and definitions of the mariners' navigational object classes.

3.86.8 Test Edition of the Presentation Library

The Test Edition is no longer required in IEC 61174 [7] and has been removed permanently from the Presentation Library. However symbol SY(CHKSYM 01) has been retained for use in checking symbol size.

4. DESCRIPTION OF THE COLOUR CODING SYSTEM

7 Description of the Colour Coding System

The colours of the Presentation Library for ECDIS are named with a five character code that reflects their usage, e.g., CHMGD for "chart magenta, dominant". These names are called "colour tokens". The colour tokens are usedreferred to by symbology instructions, symbols, symbol definitions and line &/ fill styles and to enter the colour tables (see section 13) where the colours are identified. The colour tokens are defined by CIE-coordinates. The method of converting CIE colour coordinates into RGB values for a specific CRT is given in Annex B to the C&S Specifications [4]. The softwareof this Specification. Software for processing colour calibration observations, converting CIE to RGB colour coordinates, and verifying the results is described in section 19.2 and Annex B. ECDIS manufacturers should also refer to section 4 of the Colour and Symbol Specifications for details of the design and use of colours. The colours are designed to meet different conditions of illumination on the bridge.

The colour tokens are organized in a colour scheme that groups the tokens in colour sections. Each colour section contains a set of colour tokens that serves a special purpose, e.g., to provide colours for the chart content. Note that the number of tokens is currently limited to 64, to fit the architecture of present day computers.

7.1 The Sections of the Colour Scheme

Because user interfaces based on window systems will have a strong influence on the design of ECDIS Systems, colours for the user interface are included in the colour scheme as well.

Changes to the CIE colour coordinates must be expected as experience accumulates; these should be relatively easy to handle. Changes to the organization of the scheme may also be required, but these will be avoided as far as possible. The colour definitions in CIE coordinates as well as the usage of the colours are required. To handle changes to the colour values in a flexible way, the tables for the CIE coordinates are attached to this publication in a separate section (see section 13).

4.1 The Colour SchemeThis section explains the structure of the colour scheme and the usage of the colour tokens. Note that the is split into several sections based on intended usage.. The colour values themselves are listed in the colour tables of section 13.. This section describes each of the tokens within each section.

General Uses

Token	Colour	Usage
TRNSP	transparent	(invisible pixels)
NODTA	grey	(areas without chart data)
CURSR	orange	(cursor colour,VRM,EBL)

Colour Section I / Chart Contents (31 uses)

Token	Colour, day/night	Usage
CHBLK	black/grey	(general)
CHGRD	grey, dominant	(general)
CHGRF	grey, faint	(general)

CHRED	red	(general)
CHGRN	green	(general)
CHYLW	yellow	(general)
CHMGD	magenta, dominant	(general)
CHMGF	magenta, faint	(general)
CHBRN	brown	(general)
CHWHT	white	(general)
OUTLW	black	(symbol outline on sea area background)
OUTLL	pale/dark brown	(symbol outline on land area background)
LITRD	red	(red lights)
LITGN	green	(green lights)
LITYW	yellow	(white/yellow/orange/amber lights)
ISDNG	magenta	(isolated danger)
DNGHL	red	(danger highlight)
TRFCD	magenta, dominant	(traffic control features)
TRFCF	magenta, faint	(traffic control features)
LANDA	brown	(Land areas)
LANDF	brown	(Landforms, land features)
CSTLN	black/grey	(Coastline, shoreline constructions)
SNDG1	grey	(deep soundings > safety depth)
SNDG2	black/white	(shallow soundings <= safety depth)
DEPSC	grey	(safety contour)
DEPCN	grey	(depth contours)
DEPDW	white/black	(deeper than selected deep contour)
DEPMD	pale/dark blue	(safety contour to selected deep contour)
DEPMS	light/medium blue	(shallow contour to selected safety contour)
DEPVS	medium/light blue	(zero meter contour to shallow contour)
DEPIT	yellow-green	(high water line to zero meter contour)

Colour Section II / Radar Image Overlay (3 uses)

Token	Colour	Usage
RADHI	green	(high intensity echo or single int. echo)
RADLO	green	(low intensity echo & target trail)
ARPAT	green, dashed	(ARPA, target symbols & infos)

Colour Section III / Mariners' & Navigation Information (3 uses)

Token	Colour	Usage
SCLBR	orange	(scalebar)
CHCOR	orange	(chart corrections)
NINFO	orange	(Navigators Notes)
ADINF	yellow	(mariners' transparent area fill and manufacturers' points and lines)

Colour Section IV / Reserved for Special Requirements (7 uses)

Token	Colour	Usage
RESBL	blue	(AIS features and symbols)
RESGR	grey	(reserved for line features & screened areas)
BKAJ1	black	(black level test symbol background)
BKAJ2	grey	(black level test symbol foreground)
RES01	grey	(reserved for future use)

RES02	–	grey	(reserved for future use)
RES03	–	grey	(reserved for future use)

Colour Section V / Ship symbol & Planned Route (5 uses)

Token	Colour,day/night	Usage
SHIPS	black/white	(own ship, Co&SpMG vector)
PSTRK	black/white	(Past Track)
SYTRK	grey	(Secondary Track)
PLRTE	red	(planned route & notations)
APLRT	orange	(alternate planned route)

Colour Section VI / User Interface (11 uses)

Token	Colour,day/night	Usage
UIBCK	white/black	(background user interface components)
UIBDR	grey, dominant	(user interface border components)
UIAFD	medium/light blue	(dominant fill colour)
UIAFF	brown	(faint fill colour)
UINFD	black/white	(dominant textual information)
UINFF	grey	(faint textual information)
UINFR	red	(textual information)
UINFG	green	(textual information)
UINFO	orange	(textual information)
UINFB	blue	(textual information)
UINFM	magenta	(textual information)

7.1.1 General Colours

Note: These colours are to be used whenever a user interface is on the same screen as the chart display. Note: keep the use of UINFD to a minimum !

4.2 Notes on the Sections of the Colour Scheme

4.2.1 General Uses The colours of this section are in useThe colours of this section are used in combination with every section of the whole colour scheme:

Token	Colour	Usage
TRNSP	transparent	invisible pixels
NODTA	grey	areas without chart data
CURSR	orange	cursor colour,VRM,EBL

TRNSP - This means a 100% "transparent" colour. This is not a "real" colour since it is invisible. Every pixel on the screen, which has the colour value 0 shows up as 100% transparent. In case the pixel was already painted with another (visible, e.g., black) colour this colour is not overwritten by the transparent colour. In case the pixel was cleared before or not yet painted the "background" colour shows up (see **NODTA**).

NODTA - This abbreviation stands for "No Data". This colour shows up on every pixel on the screen, which is neither covered by chart features nor covered by other elements of the ECDIS display (e.g., radar overlay, user interface). Thus, it can also be called the "empty background colour" (see **TRNSP**).

CURSR - In most graphic systems the cursor is treated as an item that can be handled completely independent from the graphic of the chart area. Therefore the cursor wasis given

its own colour and it is kept separately from the other sections of the colour scheme. The cursor colour is also used by variable range marker (VRM), electronic bearing line (EBL), parallel indexing lines and other tools to perform absolute and relative measurements in the chart.

4.2.2 Colour Section I / 7.1.2 Chart ContentsColours

The colours in this section are specifically designed for chart display. The selection of the colours is a compromise between minimum bitplane consumption (5 bits) and flexibility for future changes in the colour composition. Some colours can be used in general, others are reserved for specific types of feature purposes.

Token	Colour, day/night	Usage
CHBLK	black/grey	general
CHGRD	grey dominant	general
CHGRF	grey, faint	general
CHRED	red	general
CHGRN	green	general
CHYLW	yellow	general
CHMGD	magenta, dominant	general
CHMGF	magenta, faint	general
CHBRN	brown	general
CHWHT	white	general
OUTLW	black	symbol outline on sea area background
OUTLL	pale/dark brown	symbol outline on land area background
LITRD	red	red lights
LITGN	green	green lights
LITYW	yellow	white/yellow/orange/amber lights
ISDNG	magenta	isolated danger
DNGHL	red	danger highlight
TRFCD	magenta, dominant	traffic control features
TRFCF	magenta, faint	traffic control features
LANDA	brown	Land areas
LANDF	brown	Landforms, land features
CSTLN	black/grey	Coastline, shoreline constructions
SNDG1	grey	deep soundings > safety depth
SNDG2	black/white	shallow soundings <= safety depth
DEPSC	grey	safety contour
DEPCN	grey	depth contours
DEPDW	white/black	deeper than selected deep contour
DEPMD	pale/dark blue	safety contour to selected deep contour
DEPMS	light/medium blue	shallow contour to selected safety contour
DEPVS	medium/light blue	zero meter contour to shallow contour
DEPIT	yellow-green	high water line to zero meter contour

CHBLK, CHGRD, CHGRF, CHRED, CHGRN, CHYLW, CHMGD, CHMGF, CHBRN, CHWHT - This selection of colours is used in general to design symbols and chart line features as well as fill styles. They are not used in cases where other colours are available for a special usage.

OUTLW, OUTLL - These colours are used to outline symbols depending on which background they are normally shown (water/land).

LITRD, LITGN, LITYW - Light symbols have their own colours to give the opportunity to influence their colour luminance individually. Yellow (**LITYW**) is used for white, yellow, orange and amber lights because it might be difficult to distinguish these colours from each other on a badly calibrated monitor. It also follows the tradition to show up white lights with a yellow flare or coloured arc.

ISDNG - Since the isolated danger symbol forms one of the most important items on the ECDIS screen, it wasis given a separate colour.

DNGHL - This colour is used for symbology that highlights mariner selected dangers. The mariner decides during route planning which features are highlighted by this colour.

TRFCD, TRFCF - Traffic separation schemes are complex chart features. The navigator is confronted with important elements of the schemes and with less important elements as well.

TRFCD is used to distinguish important traffic routeing features.

LANDA - This colour is used for land areas in general.

LANDF - Landforms and land features are given a contrasting brown.

CSTLN - The coastline is a very important feature of the chart. If a radar image is combined with the chart picture it is required that coastline elements clearly show up on top of the green radar picture (see also **RADHI/RADLO**). To have full control over this combination under all conditions (day/night) a separate colour is reserved for coastline features.

SNDG1 - This colour is used for soundings that are deeper than the selected safety depth ("safe" soundings).

SNDG2 - This colour is used for soundings that are shallower than or equal to the selected safety depth ("unsafe" soundings).

DEPSC - This colour is reserved for the selected safety contour.

DEPCN - All depth contours other than the safety contour shouldmust use this colour.

DEPDW, DEPMD, DEPMS, DEPVS, DEPIT - These are depth shades. The depth zones are:

DEPDW: areas deeper than the mariner-selected deep contour;

DEPMD: areas between deep contour and the mariner-selected safety contour;

DEPMS: areas between safety contour and the mariner-selected shallow water contour;

DEPVS: areas between shallow water contour and the low water line (zero meter contour);

DEPIT: areas between zero meter contour and coastline (intertidal).

For route monitoring it may be desirable to distinguish only two water shades, plus **DEPIT**: deeper than own-ship's safety contour and shallower than safety contour. In that case **DEPDW** and **DEPVS** shouldmust be used. At night it may be difficult to distinguish between **DEPMD** and **DEPDW**.

4.2.3 Colour Section II / 7.1.3 Radar Image Overlay Colours

4.2.3.1 Radar Overlay

Token	Colour	Usage
RADHI	green	high intensity echo or single int. echo
RADLO	green	low intensity echo & target trail
ARPAT	green, dashed	ARPA, target symbols & infos

The radar image overlay can be generated by using either one intensity colour or a range of intensities of the radar colour. The colour for high echo intensity (**RADHI**) should be used in case you showwhere only one intensity is used. If you prefer to show more than one echo intensity or fading target trails, the corresponding colour intensities should be interpolated between the colour for high echo intensity (**RADHI**) and the colour for low echo intensity (**RADLO**). A separate colour token is used for ARPA targets and information tagged on them (**ARPAT**).

4.2.3.2 Transparent Radar

Optionally, the manufacturer may vary the radar green overlay by making it transparent. As described in section 7.4.2,8.4.2, there are two ways of doing this:

1) Use "pixel swap" transparency, as described in detail in section 7.4.2.8.4.2.

2) by mixing the fill and underlayingunderlying colour at each pixel to give a continuous transparency change from 0% to 100%. This must be done in such a way that no appearance of colour or shape change occurs in any SENC feature on the display, at any intermediate transparency value. The underlying SENC information must remain distinguishable, except when the overlay colour approaches 100%, in which case Colour & Symbol Specifications 2.3.2 (b) applies and an indication is required.

4.2.4 Colour Section III / 7.1.4 Mariners' & Navigation Information Colours

Token	Colour	Usage
SCLBR	orange	scalebar
CHCOR	orange	chart corrections
NINFO	orange	Navigators Notes
ADINF	yellow	mariners' transparent area fill and manufacturers' points and lines

This section provides colours for mariners' notes and navigation info. **SCLBR** is used**SCLBR** Used to generate the scalebar.

CHCOR Hand-entered chart corrections are marked by the colour **CHCOR**.

NINFO Mariners' notes of any form (Symbols, Text) are generated using the colour **NINFO**.

4.2.5 Colour Section IV / Reserved for Future Requirements

There is little experience with ECDIS up to now. The colours of this section are reserved for future requirements.

7.1.5 Other Colours

Token	Colour	Usage
RESBL	blue	AIS features and symbols
RESGR	grey	reserved for line features & screened areas
BKAJ1	black	black level test symbol background
BKAJ2	grey	black level test symbol foreground

4.2.67.1.6 Colour Section V / Ship Symbol & Planned Route

Token	Colour,day/night	Usage
SHIPS	black/white	own ship, Co&SpMG vector
PSTRK	black/white	Past Track
SYTRK	grey	Secondary Track
PLRTE	red	planned route & notations
APLRT	orange	alternate planned route

This section groups colours that apply to the ship symbol and objects associated to it. Own ship symbol, course over ground and the speed over ground vector are shown in the colour **SHIPS**.

The past track of the main position sensor and a secondary position sensor isare shown in **PSTRK** and **SYTRK**.

The planned route uses the colour **PLRTE** as well as the symbol set for the planned route elements (waypoints, etc.). TheAny alternate route is shown in **APLRT.**

4.2.7 Colour Section VI / User Interface

The following is advisory. The manufacturer is responsible for the design of the user interface panel, subject to the requirement in Colours and Symbols Specifications section 3.4.3 that "The colours, symbols and luminance of this user interface panel should not degrade the SENC information on the chart display".

This section is composed of eleven colour tokens to be used in coding information in the user interface area. The foreground and background colours have been selected with the intent of ensuring the visibility and legibility of information in this area and, at the same time, not distracting the mariner while viewing the chart. Thus, UIBCK is white in the light background colour sets and black in the dark background colour sets. This helps ensure the visibility of information in bright sunlight and helps maintain the mariner's dark adaptation at night. At the same time, it keeps average luminance in the two areas consistent. Large differences in brightness between the chart and the user interface area could be distracting to the mariner when viewing the chart. For the same reason, the amount of information in the user interface area should be keep to a minimum and excessive differences in luminance between the foreground and background should be avoided. Thus, UINFD should be used for limited important text information only.

To ensure legibility, alphanumerics should be between 24 and 30 minutes of arc at the viewer's eye. The use of the UINFR (red) and UINFB (blue) tokens should be avoided for large amounts of text especially under low ambient illumination. The use of colours that vary widely across the spectrum can be fatiguing because of the need to constantly refocus when switching between them. In addition, the eye is less sensitive to red in low ambient illumination. In general, the use of several different colours, several different fonts, and excessive highlighting should be avoided because these practices can interfere with human processing of information.

The user interface area should have a border, especially at night to delineate it from the chart area. The use of a solid line, 3 pixels wide, in UIBOR is recommended. Note that the selection of colours for the user interface area and the guidelines given above are likely to change as experience accumulates.

For further information on the design of visual interfaces, the following articles are recommended:

1. HFS (1988). American National Standard for Human Factors Engineering of Visual Display Terminal Workstations. ANSI/HFS 100-1988. Santa Monica, CA: The Human Factors Society Inc.

2. Mullet, K. and Sano, D. (1995). Designing Visual Interfaces. Mountain View, CA: SunSoft Press.

3. Post, D. L. (1992). Applied color vision research. In H. Widdel and D. L. Post (Eds.), Color in Electronic Displays, (pp. 137-174). New York, NY: Plenum Press.

4. Walraven, J. (1992). Color basics for the display designer. In H. Widdel and D. L. Post (Eds.), Color in Electronic Displays. (pp. 3-38). New York, NY: Plenum Press.

5. THE VECTOR SYMBOL DESCRIPTION LANGUAGE

7.1.7 User Interface Colours

NOTE: section 5 applies primarily to the digital Symbol Library in the .DAI file, which is available with edition 3.3 but may not be updated and may not be available with succeeding editions. The "official" version of the Symbol Library is given in section 14 and the Addendum of the word processed version of the Presentation Library. However many parts of section 5, particularly figures 2 and 3 and sections 5.1, 5.2 and 5.3.3, are also helpful in explaining the word-processed version.

For ECDIS user interface colours please refer to MSC.191(79) and IEC 62288.

8. The Vector Symbol Description Language

This section describes the format that is used by the digital Presentation Library to define point symbols, complex line-styles and fill patterns.

Note that the manufacturer may construct his own bitmap version of these symbols if he wishes.

The vector format uses an imaginary "pen". The pen is moved to absolute to draw on a "canvas" (an area of the screen). Positions on the canvas are referred to by two-dimensional cartesian coordinates (x,y). The coordinates are always within the range of 0 to 32767 units. Each unit represents 0.01 mm on screen. The origin of the coordinates (location 0,0) is on the upper left corner of the two-dimensional spacecanvas. Thus x-coordinates extend to the right and y-coordinates extend downwards.

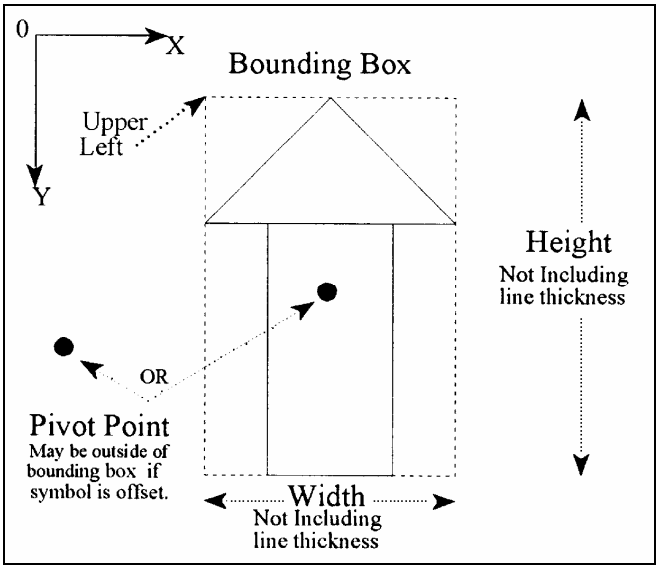


Figure 1: Pivot point, bounding box and symbol coordinates.

Note that vectorThe definitions of point symbols, complex line styles and fill patterns are composed of multiple instrructions. Vector symbol definitions described by the vector format are transferreddefined within the 'PVCT/SVCT/LVCT'-fields (see section 1012). The vector format uses the following additional instructions:

; The semicolon separates the instructions from each other. Every instruction must be terminated by a semicolon.

, The comma separates the parameters of an instruction from each other. If an instruction does not have any parameterparameters no comma is allowed following the instruction.

SP colour

The SP instruction selects a pen with a certain colour. The parameter is a single letter (ASCII >= 64) which identifies a colour token. The token is given in "Colour Reference" fields (see 10.5.4). The colour token in turn represents a colour defined in the colour tables (see section 13). An SP instruction remains in effect

until a new pen is selected. Thus, all following instructions are performed using the selected pen colour.

ST transparency

The ST instruction defines the transparency of the colour that is currently selected (see SP). The transparency is given in steps of 25% (0-3, see 7.4.2). The transparency only affects the polygon fill instruction (see FP) while other instructions (AA, CI, EP, PD) produce opaque drawings.

SW width

The SW instruction parameter defines the physical pen-tip width in units of 0.3 millimeters. If a single point is defined, (a pen down with no movement followed by a pen up) then a dot would be drawn using the current line width as a diameter or a square using the current width. (standard pixel diameter; see also 7.3.2).

PU x-coordinate, y-coordinate [,x,y, ... x,y]

The PU instruction raises the pen and then moves it to the absolute x,y-coordinates. Thus, no line is drawn by the PU instruction.

PD x-coordinate, y-coordinate [,x,y, ... x,y]

The PD instruction lowers the pen at the current position and then moves it to the absolute x,y coordinates. Thus a line in the current colour (see SP) and width (see SW) is drawn by the PD instruction.

CI radius

The CI instruction draws a circle of a specified radius. The radius determines the size of the circle. The current pen position is the centre of the circle. The CI instruction includes an automatic pen down feature. When a CI instruction is used the pen lifts, moves from the centre of the circle to the starting point on the circumference, lowers the pen, draws the circle, then returns with the pen up to the centre of the circle. The circle is drawn using the current pen colour (see SP) and pen width (see PW).

AA x-coordinate, y-coordinate, arc angle

The AA instruction draws an arc based on the present pen position and the specified centre point. The x,y coordinates specify the centre of the arc. The arc angle is the angle through which the arc is drawn. A positive angle draws counterclockwise from the current pen position, and a negative angle draws clockwise. The arc is drawn starting at the current pen position and using the current pen colour (see SP) and pen width (see PW). After the arc has been drawn, the pen position will remain at the end of the arc, rather than returning to the beginning.

PM n

The PM instruction places the command interpreter in polygon definition mode. In this mode you can construct polygons using other instructions (PU, PD, CI, AA). These instructions are stored in the polygon buffer; they are not executed until the polygon is completely defined. In order to draw the polygon you must fill it with the FP instruction and/or outline it with the EP instruction. To define a polygon move the pen to the desired starting location (see PU or PD). Then execute PM 0 to enter the polygon mode and specify the appropriate instructions to define the shape of the polygon. If you want to define a subpolygon, end the shape with a PM 1 instruction and define the next shape; execute PM 2 to exit the polygon mode. The current pen position before PM 0 is the first point (vertex) of the polygon. The vertices can be defined with the pen up or down (see PU, PD). However, if you intend to outline the polygon with the EP instruction, note that EP will only draw those points that are defined with the pen down. The FP instruction, on the other hand, fills the polygon, regardless of the pen up / down status.

EP

The EP instruction outlines any polygon that has been previously stored in the polygon buffer (see PM). Only vertices that were defined with the pen down are edged. They are edged using the current pen colour (see SP) and pen width (see PW). Upon completion of the EP instruction, the original pen position and status are restored.

FP

The FP instruction fills a polygon that has been previously placed in the polygon buffer (see PM). The polygon is filled using the current pen colour (see SP) and transparency (see ST). Upon completion of the FP instruction, the original pen position and status (pen up/down) are restored.

SC symbol name, orientation

The SC instruction calls another symbol definition. Orientation specifies whether the called symbol is drawn upright (orientation = 0) or rotated to the direction of the last pen moving instruction (orientation = 1), or rotated at 90degrees to the tangent of the symbolized edge at the location of the symbol (orientation = 2). The pivot point of the symbol will be placed on the current pen position. Upon completion of the SC instruction, the original pen position and status (pen up/down) are restored.

Vector Instruction	Parameter	Description
SP	Colour	The SP instruction selects a pen with a certain colour. The parameter is a single letter which identifies a colour token. The colour tokens used are defined in the "Colour Reference"-fields (see 10.5.4) which map the single letter definition to one of the standard colour tokens. An SP instruction remains in effect until a new pen is selected. Thus, all following instructions are performed using the selected pen colour.
ST	Transparency	The ST instruction defines the transparency of the colour that is currently selected. The transparency is given in steps of 25% (0-3, see 7.4.2). The transparency only affects the polygon fill instruction (see FP) while other instructions (AA, CI, EP, PD) produce opaque drawings.
SW	Width	The SW instruction parameter defines the physical pen-tip width in units of 0.3 millimetres. If a single point is defined, (a pen down with no movement followed by a pen up) then a dot would be drawn using the current line width as a diameter or a square using the current width. (standard pixel diameter).
PU	x-coordinate, y-coordinate	The PU instruction raises the pen and then moves it to the absolute x,y-coordinates. Thus, no line is drawn by the PU instruction.
PD	x-coordinate, y-coordinate [,x,y, ... x,y]	The PD instruction lowers the pen at the current position and then moves it to the absolute x,y-coordinates. Thus a line in the current colour (see SP) and width (see SW) is drawn by the PD instruction.
CI	Radius	The CI instruction draws a circle of a specified radius. The radius determines the size of the circle. The current pen

		position is the centre of the circle. The CI instruction includes an implicit pen down feature. When a CI instruction is used the pen lifts, moves from the centre of the circle to the starting point on the circumference, lowers the pen, draws the circle, then returns with the pen up to the centre of the circle. The circle is drawn using the current pen colour (see SP) and pen width (see PW).
AA	**x-coordinate, y-coordinate, arc angle**	*The AA instruction draws an arc based on the present pen position and the specified centre point. The x,y coordinates specify the centre of the arc. The arc angle is the angle through which the arc is drawn. A positive angle draws counter clockwise from the current pen position, and a negative angle draws clockwise. The arc is drawn starting at the current pen position and using the current pen colour (see SP) and pen width (see PW). After the arc has been drawn, the pen position will remain at the end of the arc, rather than returning to the beginning.*
PM	**n**	The PM instruction places the command interpreter in polygon definition mode. In this mode you can construct polygons using other instructions (PU, PD, CI, AA). These instructions are stored in the polygon buffer; they are not executed until the polygon is completely defined. In order to draw the polygon you must fill it with the FP instruction and/or outline it with the EP instruction. To define a polygon move the pen to the desired starting location (see PU or PD). Then execute PM 0 to enter the polygon mode and specify the appropriate instructions to define the shape of the polygon. If you want to define a sub polygon, end the shape with a PM 1 instruction and define the next shape; execute PM 2 to exit the polygon mode. The current pen position before PM 0 is the first point (vertex) of the polygon. The vertices can be defined with the pen up or down (see PU, PD). However, if you intend to outline the polygon with the EP instruction, note that EP will only draw those points that are defined with the pen down. The FP instruction, on the other hand, fills the polygon, regardless of the pen up / down status.
EP		The EP instruction outlines any polygon that has been previously stored in the polygon buffer (see PM). Only vertices that were defined with the pen down are edged. They are edged using the current pen colour (see SP) and pen width (see PW). Upon completion of the EP instruction, the original pen position and status are restored.
FP		The FP instruction fills a polygon that has been previously placed in the polygon buffer (see PM). The polygon is filled using the current pen colour (see SP) and transparency (see ST). Upon completion of the FP instruction, the original pen position and status (pen up/down) are restored.
SC	**symbol name, orientation**	*The SC instruction calls another symbol definition. Orientation specifies whether the called symbol is drawn upright (orientation = 0) or rotated to the direction of the last pen moving instruction (orientation = 1), or rotated at 90degrees to the tangent of the symbolized edge at the*

		location of the symbol (orientation = 2). The pivot point of the symbol will be placed on the current pen position. Upon completion of the SC instruction, the original pen position and status (pen up/down) are restored.

Note: The Vector drawing language defines how symbols should look on the ECDIS screen when drawn. The ECDIS manuafacturer does not have to replicate the drawing mechanism itself within their ECDIS. The choice of SENC storage and symbol drawing procedures are up to the manufacturer. The only requirement is that the colours and symbols are replicated from the specifications contained within this document to the satisfaction of the manufacturers type approval body.

5.18.1 Size and Orientation of a Vector-Symbol

For each vector symbol the height and width are givendefine in units of 0.01 mm. Note that the size of a symbol is related to the display resolution specified in S-52 [4] and C&SS. To maintain clarity, any symbol should always be drawn with at least as many pixels as if it were drawn on a chart with a resolution specified by C&SS section 3.1.5. .Symbols in the Presentation Library are already sized to give good readability and appropriate prominence. Only the ship symbol is currently allowed to be scaled to the actual dimension of the ship.

Every symbol has its own pivot point. The pivot point is the point around which the symbol is scaled and rotated. When thea point symbol is placed on the display, the symbol's pivot point is positioned exactly on the object's position and all elements ofthe instructions in the symbol's definition are geometrically relatedrelative to that position. For further information about location of the pivot point and the transfer of symbol definitions please see 10.6.11.6.

Fig. 2 - Pivot point and symbol information

5.2 Usage8.2 Description of a Complex Line Style rendering.

5.2.1 A complex linestyle is formed from a repeating symbol. The symbol definition for a line style is very similar to the symbol definition for a point symbol and uses cartesian coordinates as defined in the previous section. The linestyle symbol has its own pivot point around which it is rotated. The orientation is given by the direction between the two vertices of the **segment of the** line object that the symbol will represent on the ECDIS displaybeing drawn.

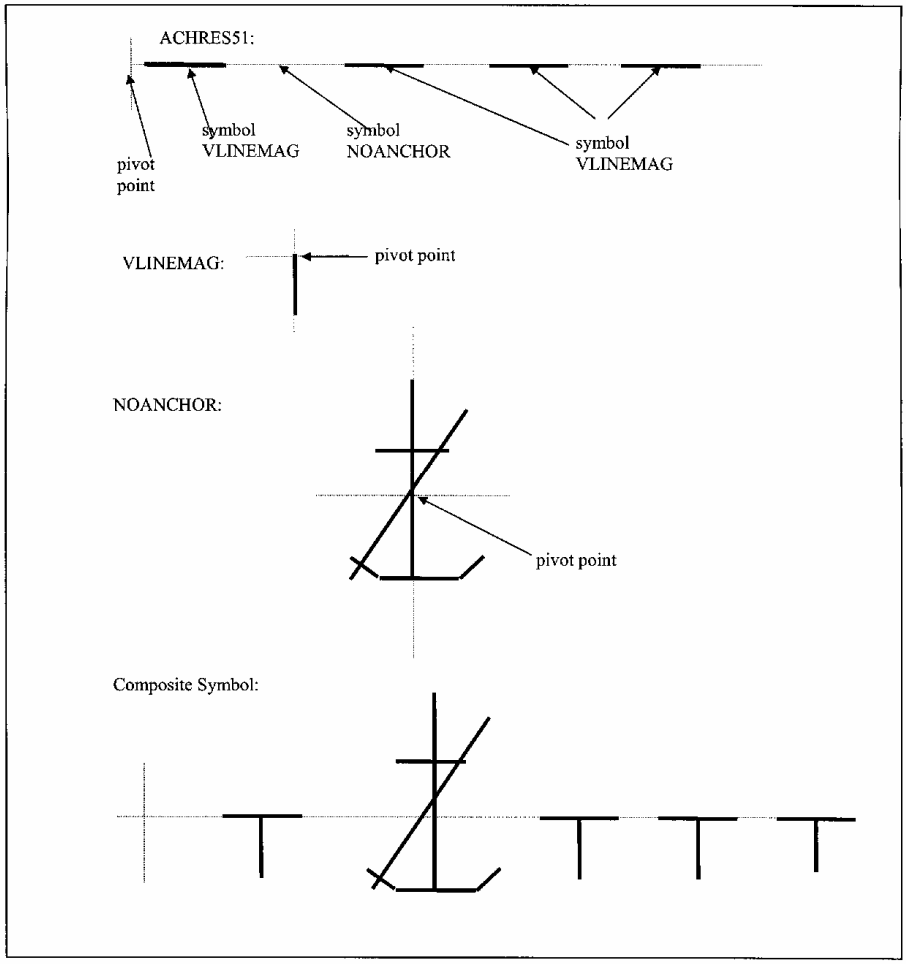
5.2.2 To symbolize allsome lines, straight or curved, a composite type of complex linestyle is used, in which the unit is composed of a series of horizontal lines and symbols, strung together along the line object to form the linestyle unit, using a continually changing orientation if the line object is a curve (figure 3).

For further information about linestyle definitions, see section 10.7

5.2.3 To composeIn order to draw a complex linestyle, first locate the start and end position of each horizontal line in the complex linestyle along the edge to be symbolized. Then draw the complex line along the edge between the start and end positions repeating as necessary depending on the length of the line segment. If a symbol needs to be drawn, then determine the angle of rotation by calculating the slope of the tangent of the edge at the location where the symbol is to be drawn. The symbol will then be rotated 90 degrees to the slope of the tangent. Figure 3 embedded in the line, then the rotation angle relative to the line segment must be determined. The diagram below.shows how the composite symbol is created from the linestyle and thetheir embedded symbols.

Fig. 3 – Usage of composite type of complex line style

5.3 Samples of



Formats

Figure 2: Complex Line Styles.

8.3 Vector Format Examples

5.3.1 Sample Definitions in Vector Format 8.3.1 Sample Definition in Vector Format

The following instruction sequences are samples for the use of the Vector Symbol Description Language:

SPA;SW1;PU1000,1000;PD1000,2000;

selects pen 'A', width 1 x 0.3mm, moves the pen to coordinate 1000,1000 without drawing a line, then draws a vertical line from there to coordinate 1000,2000.

SPB;SW2;PU1000,1000;PD1000,2000,2000,2000,2000,1000,1000,1000;

selects pen 'B', width 0.6mm (2 x 0.3mm), moves the pen to coordinate 1000,1000 without drawing a line and then draws a rectangle with upper left corner 1000,1000 and lower right corner 2000,2000.

SPB;ST2;PM0;PU1000,1000;PD1000,2000,2000,2000,2000,1000;PM2;FP;

draws the same rectangle but this time it is defined as a polygon; note that the closing edge is automatically inserted by the PM2 instruction; the polygon fill is performed after the PM2 instruction with the colour of pen B and with a transparency of 50%.

PU100,100;PM0;CI50;PM2;SPE;ST0;FP;SPA;EP;

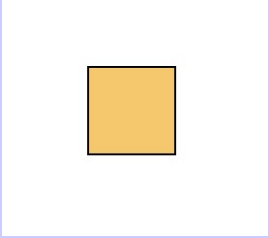
moves the pen to location 100,100; then a polygon is defined using a circle instruction; after this the circle is filled with an opaque fill using the colour of pen 'E'; at last the circle is outlined with pen 'A'.

SPU;SW1;PU100,100;PD200,100;AA200,150,-90;PD250,200;

draws a horizontal line from location 100,100 to location 200,100 using pen 'U' and width 0.3mm; then an arc is drawn clockwise with radius 50; the centre of the arc is located at 200,150 (remember: origin of coordinate system is the upper left corner); the drawing is finished with a vertical line going from 250,150 (the last vertex of the arc) to location 250,200.

SPC;SW3;PU500,500,1000,1000;SCsample99,1;PD1000,500;

moves the pen to location 1000,1000 drawing an invisible line (pen is up) with a nautical angle of 135 degrees (remember: origin of coordinate system is the upper left corner); then symbol definition sample99 is called; the symbol's pivot point is located at 1000,1000 and it is rotated 135 degrees; Upon completion of the symbol drawing a vertical line is drawn going from 1000,1000 to 1000,500; the draw instruction is performed using pen 'C' and a line width of 0.9mm (3x0.3mm).

S-57 Feature Object	S52 Symbol	Vector Drawing Instruction	ECDIS Display
Mooring/Warping Facility	MORFAC03	SPA;SW2;ST0;PU603,617;PM0;PD856,617;PD856,870;PD605,870;PD603,617;PM2;FP;	

5.3.28.3.2 Sample Symbol Library format for composite complex linestyle symbolsFormat for Composite Complex Linestyle Symbols

The following sample Symbol Library sequence illustrates the step from the “Single Unit" type of complex linestyle to the "Composite" type. We modified theThe complex linestyle achres51.lin LC(ACHRES51) has been modified as follows (refer to definitions of file formats):

Complex Linestyle achres51.lin:

```
LNST    10LS03354NIL
LIND    38ACHRES5100108008100272900503004460057 2
LXPO    64boundary of an area where anchoring is prohibited or
restricted^_
LCRF    6ACHMGD
LVCT    29SPA;SW1;PU446,810;PD747,810;^_
LVCT    24PU595,810;SCVLINEMAG,2;^_
LVCT    25PU1208,810;SCNOANCHOR,2;^_
LVCT    31SPA;SW1;PU1655,810;PD1957,810;^_
LVCT    25PU1808,810;SCVLINEMAG,2;^_
LVCT    31SPA;SW1;PU2248,810;PD2552,810;^_
LVCT    25PU2404,810;SCVLINEMAG,2;^_
LVCT    31SPA;SW1;PU2874,810;PD3175,810;^_
LVCT    25PU3024,810;SCVLINEMAG,2;^_
```

(NOTESNOTE: The VLINEMAG and NOANCHOR symbols will be imbeddedembedded in the linestyle at the location given by the last position of the pen before the inclusion the embedded symbol. The only vectors in this linestyle are the four horizontal dashes that are to be drawn.)

Symbol noanchor.sym:

```
SYMB    7SY00000
SYMD    39NOANCHORV012070084800431005030098700572
SXPO    36Anchor symbol with a line through it^_
SCRF    6ACHMGD
SVCT    32SPA;SW1;PU1208,572;PD1208,1074;^_
SVCT    31SPA;SW1;PU1052,721;PD1356,721;^_
SVCT    55SPA;SW1;PU1005,971;PD1111,1075;PD1309,1075;PD1407,974;^_
SVCT    31SPA;SW1;PU1418,640;PD987,1071;^_
```

Symbol vlinemag.sym:

```
SYMB    7SY00000
SYMD    39VLINEMAGV005950081000010000100059500810
SXPO    28Vertical Chart-Magenta Line^_
SCRF    6ACHMGD
SVCT    29SPA;SW1;PU595,810;PD595,970;^_
```

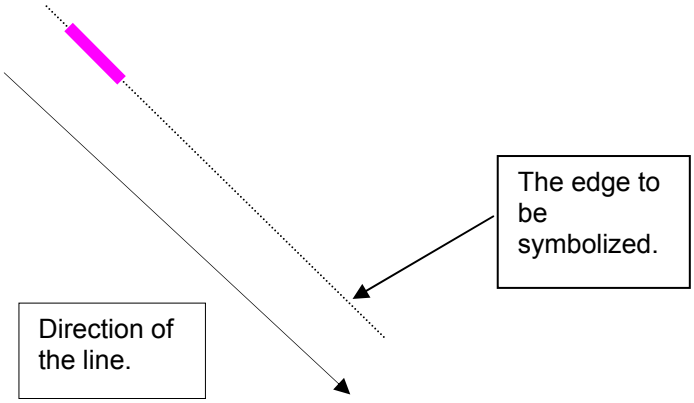
5.3.3 Sample implementation of the composite complex linestyle symbols8.3.3 Sample Implementation of the Composite Complex Linestyle Symbols

The following is a simplified example for determining rotation of the symbol that is part of the complex linestyle. NOTE: this examplesThis example uses the ACHRES51 complex linestyle described in the documentation.

Each symbolization instruction will be drawn in sequence. The diagrams are as follows:

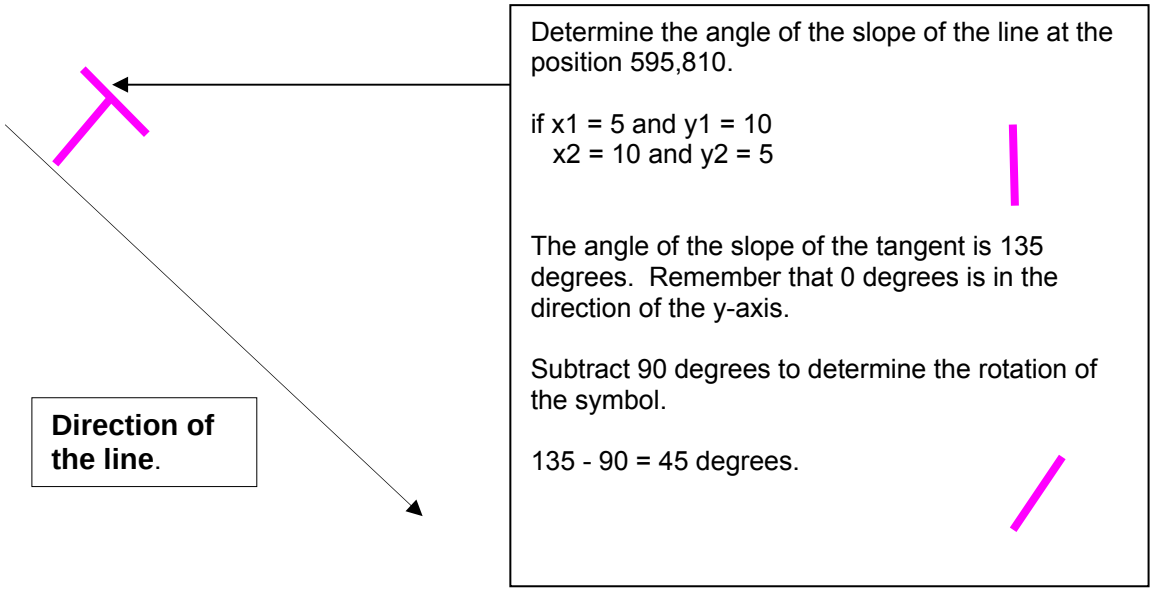
STEP 1: Draw the first straight line segment along the edge of the object.

LVCT 2928SPA;SW1;PU446,810;PD747,810;^_



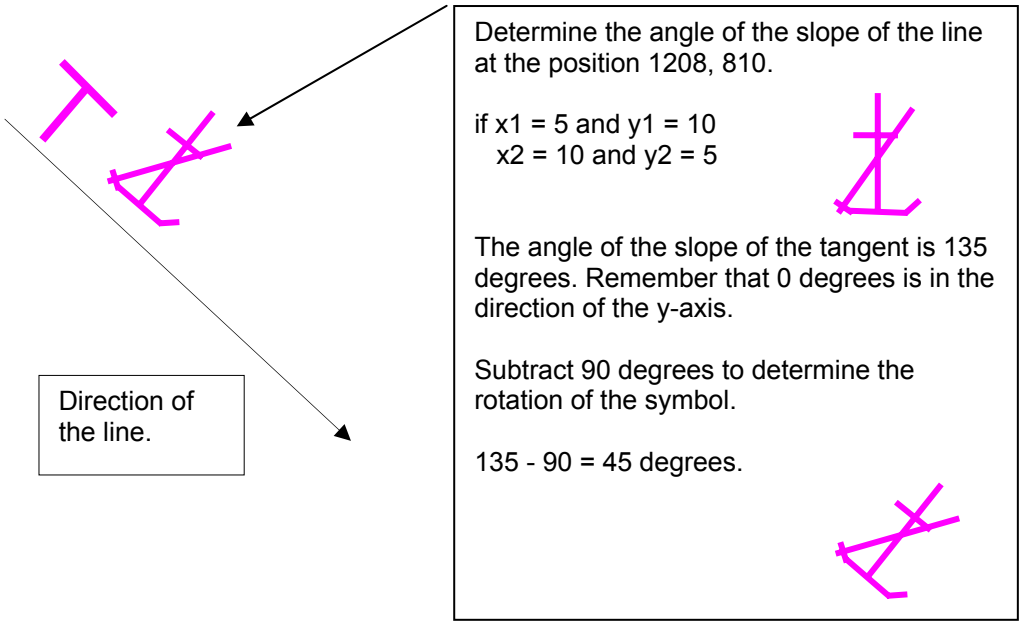
STEP 2: Draw the first LINEMAG symbol at position 595, 810.

LVCT 2423PU595,810;SCVLINEMAG,2;^_



STEP 3: Draw the first NOANCHORsymbolNOANCHOR symbol at position 1208, 810.

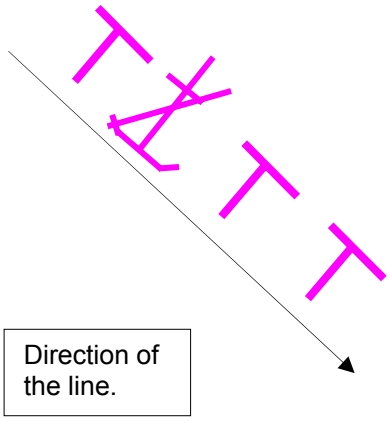
LVCT 2524PU1208,810;SCNOANCHOR,2;^_



STEP 4: Repeat with the other straight line segments and the VLINEMAG symbols.

LVCT 3130SPA;SW1;PU1655,810;PD1957,810;^_
LVCT 2524PU1808,810;SCVLINEMAG,2;^_
LVCT 3130SPA;SW1;PU2248,810;PD2552,810;^_
LVCT 2524PU2404,810;SCVLINEMAG,2;^_
LVCT 3130SPA;SW1;PU2874,810;PD3175,810;^_
LVCT 2524PU3024,810;SCVLINEMAG,2;^_

The resulting line is ...



5.4 Colours and Descriptions for Symbols

5.4.1 The colours and descriptions for all symbols in the symbol library are listed in the hard copy addendum containing the "ECDIS Chart 1", which is bound with the Colour **& Symbol Specifications**.

5.4.2 The general naming convention for symbols etc. is as follows:

Symbols: "SY(AAAAAAnn)" point symbol: where A = abbreviated name, n = serial number.
"SY(AAAAAA5n)" centred symbol for area.
"SY(AAAAAA6n)" centred symbol for area with added caution restriction.
"SY(AAAAAA7n)" centred symbol for area with added information restriction.

Lines: "LS(type, thickness, colour)" is a simple line of type solid, dashed or dotted.
"LC(AAAAAAnn)" is a complex line (e.g. a pipeline).
"LC(AAAAAA5n)" is a complex linestyle for an area boundary.

Areas: "AC(CCCCC)" is an area colour fill, where C is the colour token.
"AC(CCCCC,n)" is a transparent area colour fill, where n = transparency (see 7.4.8).
"AP(AAAAAAnn)" is an area pattern fill.

All names (A,n) for symbols, complex lines and area patterns (but not colour fills) have 8 characters.

6. THE RASTER-SYMBOL DESCRIPTION FORMAT

Raster symbols are not supplied in the Presentation Library. However, the manufacturer may optionally make up his own raster version of the vector symbols supplied, so long as they conform to the original in size, colour and general shape.

The following is just one possibility for a raster format:

Each pixel in the raster is represented by a single letter which in turn stands for a specific colour. Every letter with an ASCII value greater or equal than '@' can be used. Raster locations carrying the '@' sign are representing a transparent (invisible) pixel.

The following example illustrates the raster description of an anchorage symbol. The raster shows an anchor in red (CHRED, identified by letter' A') and black (CHBLK, identified by letter 'B'):

```
@@@@@@@@@@@@@@@@@@@@@
@@@@@@AAAAAABB@@@@@@@
@@@@@@AAAAAABB@@@@@@@
@@AAAAAABBAAAAAABB@@
@@AAAAAABBAAAAAABB@@
@@@@@@AAAAAABB@@@@@@@
@@@@@@AAAAAABB@@@@@@@
@@@@@@@@AABB@@@@@@@@@
@@@@@@@@AABB@@@@@@@@@
@@@@@@@@AABB@@@@@@@@@
@@@@@@@@AABB@@@@@@@@@
@@AABB@@AABB@@AABB@@
@@AABB@@AABB@@AABB@@
@@@@AABBAABBAABB@@@@
@@@@AABBAABBAABB@@@@
@@@@@@AAAAAABB@@@@@@@
@@@@@@AAAAAABB@@@@@@@
@@@@@@@@@@@@@@@@@@@@@
```

The pivot point of a raster symbol is given by the row number and column number. Note that the size of a raster symbol is not given because it can only be derived from the actual pixel size on the screen of a respective ECDIS system. Rotation of raster symbols is not supported.

7. DESCRIPTION OF THE SYMBOLOGY INSTRUCTIONS

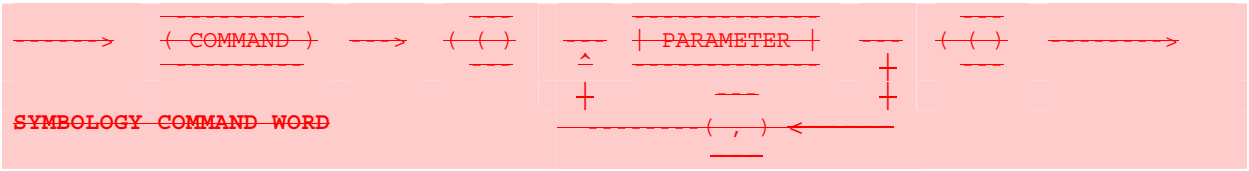
Symbology instructions are used in the look-up table entries to perform the symbolization of objects. Currently there is a choice of five symbology instructions:

- SHOWTEXT to display text labels
- SHOWPOINT to symbolize points and place symbols inside areas
- SHOWLINE to symbolize lines and borders of areas
- SHOWAREA to symbolize areas
- CALLSYMPROC to call conditional symbology procedures

Symbology instructions are composed of symbology command words. Symbology command words are machine readable orders, which can be decoded in a straight forward manner to low level graphic actions e.g. an action like "fill an area" or "draw a line".

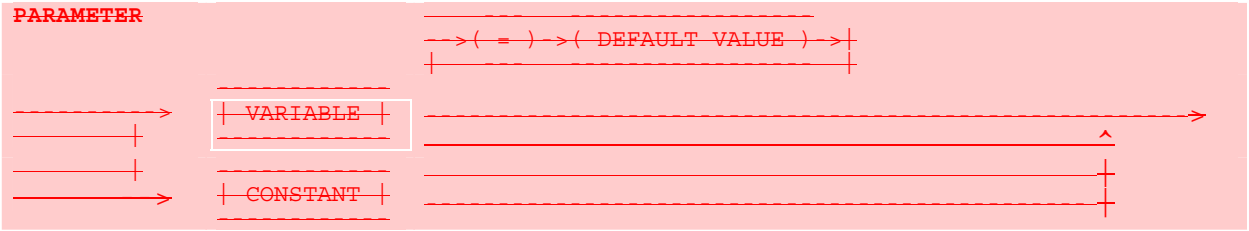
These symbology command words and the symbology instructions formed with them are also used in reading and when necessary revising the word-processed version of the Look-up tables.

The general definition of a symbology command word in Backus-Naur form is:



Symbology command words have parameters. The Backus-Naur definition above shows that such a command word can have more than one parameter separated by a comma. There are two types of parameters: constants and variables. Constant parameters pass fixed values like a colour or a line width on to the ECDIS Display Generator which then "knows" e.g. which colour to use to fill an area or which width to use to draw a line. A constant parameter may also be the name of a symbol that the ECDIS Display Generator then can look for in the symbol library.

Variable parameters are the six character codes of S-57 attributes. This is a very powerful construction. For example, to rotate a "traffic arrow" symbol the name of the S-57 attribute that contains the traffic direction (ORIENT) is passed as rotation parameter of the "show pattern" command. The ECDIS Display Generator then searches in the SENC for the exact value of the ORIENT attribute of the respective object and rotates the arrow symbol by this value. Thus every time another object is shown by the command, different values from the attribute will be passed to the ECDIS Display Generator.

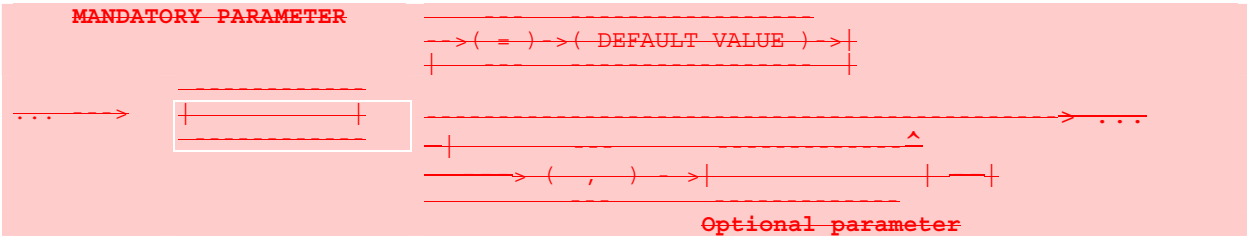


For example, «TSSLPT», «ORIENT», «SY(TSSLPT51,ORIENT) ...» means «orient symbol TSSLPT51 in the direction given by the value of attribute ORIENT.»

For variable parameters default values can be provided as a fail safe in case the attribute cannot be found in the feature object description. This can be done by assigning a default value to the parameter e.g. ORIENT='90.0'. The assignment is done within the parameter list of the command word.

A default value is assumed by the Display Generator if a parameter is optional (does not have to be passed). Thus the default value is given in the documentation where the command word is described and it must be encoded in the Display Generator. For an example, see the TRANSPARENCY parameter of the SHOWAREA instruction (section 7.4.6).
The symbology command must be terminated, if a parameter is mandatory (has to be passed) and no value is assigned to it either because a constant is missed from the parameter list or an attribute value cannot be found (attribute is missed from the object definition and no default value was assigned). Note that this does not necessarily mean that the whole symbology instruction is terminated since it may be composed of more than one command word e.g. the first command word in a symbology instruction shows a light flare and the second shows a buoy symbol. If the first command fails the second is still performed and the buoy is shown in the chart.

Whether a parameter is optional or mandatory can be seen from the Backus-Naur diagram of the command word:



The following sections explain the symbology instructions.

7.1 Symbology Instruction for Text Labels

The text instruction was designed to provide a suitable text placement for ECDIS. It is used to label point, line and area objects.

Text labels are treated as individual symbols, which are not part of the symbol library but part of the S-57 data itself(value of Attribute 'OBJNAM' etc.). Thus text instructions do not call a certain symbol, complex line style or fill pattern but the respective text string within the definition of a feature object or cartographic object.

Note that the Presentation Library does not provide a machine readable version of a font, because there are copyrights on fonts. Manufacturers should purchase a font on their own. For ECDIS presentation, a plain sans serif, non italic font should be used. Other fonts should not be used.

Please also note, that sounding objects are not symbolized as text labels. The Presentation Library provides a set of symbols that were designed to present soundings. See section 12 for the diagram of the conditional symbology procedure "SNDFRMnn". Similarly, some abbreviations such as the "DW" and "IT" used in traffic routing areas are treated as symbols.

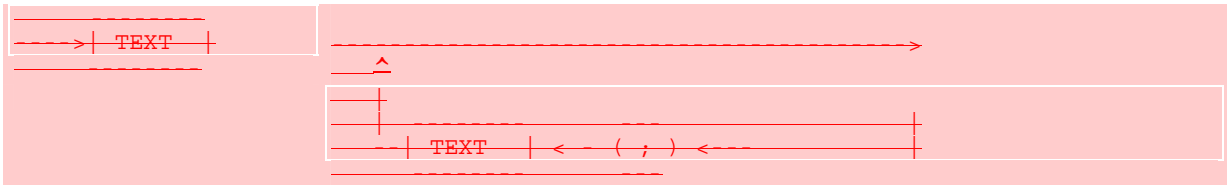
7.1.1 Rotation & Positioning of Text Labels

Text is not rotated. The pivot-point for text for an area object is the centre of the area. The pivot-point for text for a line is the centre of a single segment line. For a multi-segment-line the pivot-point is the mid-point of the run-length of the line.

If the text string is truncated by the ECDIS window, it can be left truncated, or alternatively it need not be drawn. If it relates to an object ahead of the ship, the display refresh will eventually permit a full draw.

7.1.2 Syntax of the SHOWTEXT Instruction

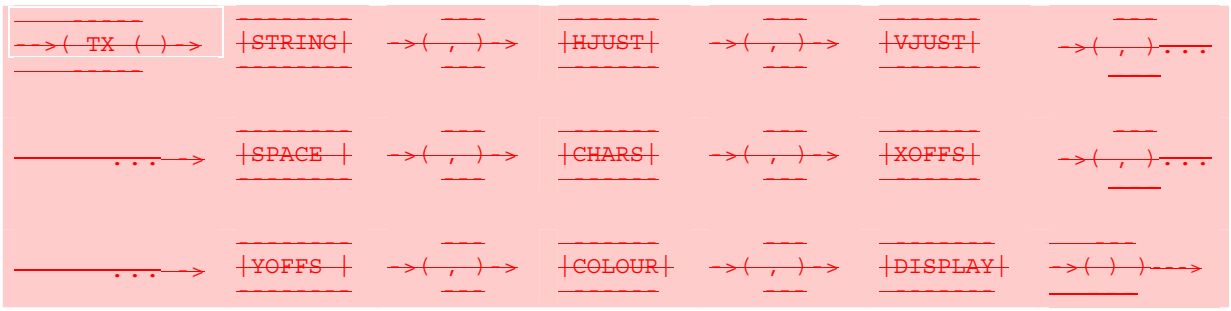
SHOWTEXT instruction (usage: point, line, area objects)



7.1.2.1 TEXT "show text" command word:

Two text command words are used:

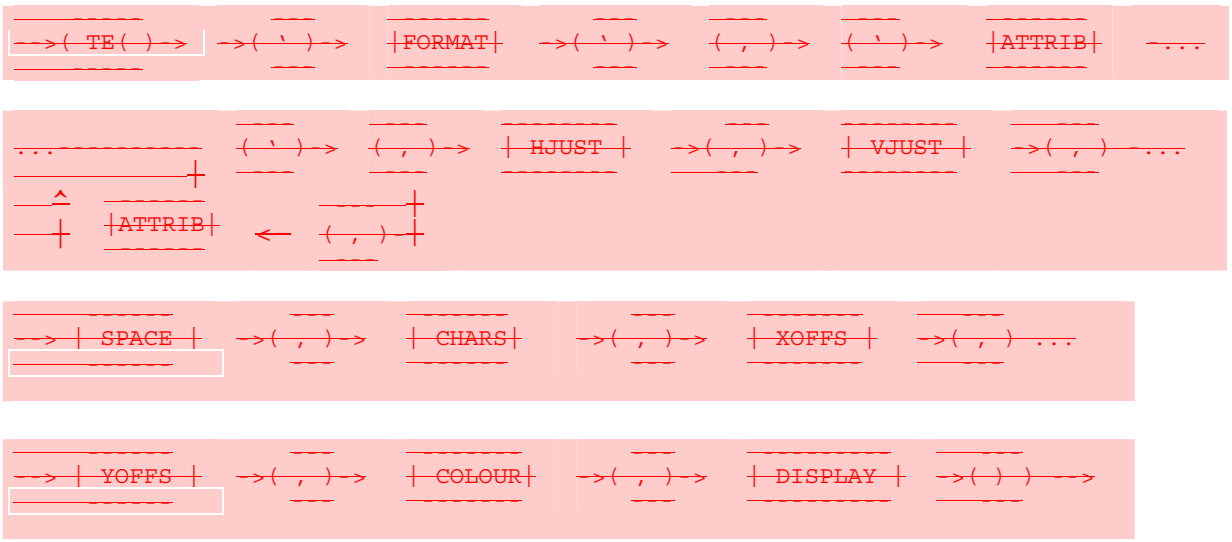
(1.) For purely alphanumeric text, the «TX» command:



(2.) For numeric text, an alphanumeric prefix or suffix is needed to avoid confusion between the numbers of the text and the numbers representing soundings. For this purpose the »C« format «TE» command is used. This substitutes «format» and «attribute list» parameters for the «string» parameter, but is otherwise the same as the «TX» command word. Other character strings, such as LITDSN, may be used in place of the attribute list in the Bachus-Naur diagram.

Where '/n' is used in a «TE» command, each successive line should have the same justification (HJUST,VJUST) as the first line.

Section 7.1.4 describes how “TE” commands are handled in the look-up table. The alphanumeric prefixes and suffixes used, and the "C" format commands, are listed in section 13.4. The meanings of these prefixes and suffixes must be available to the mariner.



7.1.2.2 Parameters

STRING "text string" parameter:

The STRING parameter passes a text string that shall appear on the ECDIS screen.

Note: the six character acronym of a S-57 attribute (e.g. ,LITVES, OBJNAM) can be passed as STRING parameter; if the attribute is either of enumeration type or list type (e.g. COLOUR), the enumeration value shall be converted into the respective text string from the attribute definition in the object catalogue; if the attribute is of a numerical type, just convert the attribute value to a string. In the case that the text originates in an L-type attribute (e.g. SBDARE, NATSUR) the text equivalent of the listed attribute values should be written sequentially separated by a space with no punctuation marks.

HJUST "horizontal justification" parameter:

'1' means CENTRE justified
(i.e. pivot point is located at the centre of the overall length of text string)

'2' means RIGHT justified
(i.e. pivot point is located at the right side of the last character of text string)

'3' means LEFT justified. This is the default value.
(i.e. pivot point is located at the left side of the first character of text string)

VJUST "vertical justification" parameter:

'1' means BOTTOM justified. This is the default value.
(i.e. the pivot point is located at the bottom line of the text string)

'2' means CENTRE justified
(i.e. the pivot point is located at the centre line of the text string)

'3' means TOP justified
(i.e. the pivot point is located at the top line of the text string)

SPACE "character spacing" parameter:

'1' means FIT spacing
(i.e. the text string should be expanded or condensed to fit between the first and the last position in a spatial object)

'2' means STANDARD spacing. This is the default value.
(i.e. the standard spacing in accordance with the typeface given in CHARS should be used)

'3' means STANDARD spacing with word wrap
(i.e. the standard spacing in accordance with the typeface given in CHARS should be used; text longer than 8 characters should be broken into separate lines)

CHARS "Character Specification" parameter:

the CHARS parameter defines style (font), weight, width (upright/italic), and size of the text characters:

STYLE
"1" a plain, sans serif font should be used.

WEIGHT
4 means "light"
5 means "medium". This is the default value.
6 means "bold"

WIDTH
"1" means upright i.e. non-italic, ENC $CHARS attributes using "2" for width should be converted to "1".

BODY SIZE
This given in pica points (1 point = 0.351 mm) that specify the height of an uppercase character. The smallest size to be used is pica 10, and this is also the default size. Larger sizes may be used.

XOFFS "x-offset" parameter:

defines the X-offset of the pivot point given in units of BODY SIZE (see CHARS parameter) relative to the location of the spatial object (0 is default if XOFFS is not given or undefined); positive x-offset extends to the right (the "units of BODYSIZE" means that if for example, the body size is 10 pica points each unit of offset is 10 (0.351) = 3.51 mm).

YOFFS "y-offset" parameter:

defines the y-offset of the pivot point given in units of BODY SIZE (see CHARS parameter) relative to the location of the spatial object (0 is default if YOFFS is not given or undefined); positive y-offset extends downwards.

COLOUR "text colour" parameter:

colour token as described in section 4 and 13.

DISPLAY "Text display" parameter:

define text groupings for selection by the mariner.

7.1.3 Display of Text

7.1.3.1 Text Groupings

The display of text should be controlled independently of the display of the object it applies to. The mariner should have full control over the display of text. All text is in the IMO Category "Other Information".

- Text is in colour black, to give best readability under all light conditions.
- Text should only be displayed when the object it applies to is displayed.
- Text should always have display priority 8, to ensure it is readable, independent of the object it applies to.

As a guide to organizing the display of text, the last two digits of the SHOWTEXT instruction give a text classification that distinguishes between "Important" and "Other" text, and gives further suggested text groupings. The manufacturer should provide at least the capability to select "Important Text" and/or "Other Text", and he may provide further text groupings if he so wishes.

The text groupings are given in section 13.3

7.1.3.2 Abbreviations

The abbreviations used on the ECDIS display are listed in Section 13.4. All the abbreviations in section 13.4 must be readily accessible to the mariner.

Note that a few abbreviations, such as «DW» for deep water route and «IT» for inshore traffic zone, are used as symbols; these are explained in the relevant sections of ECDIS Chart1.

7.1.4 How text is handled in the Look-up Table

The existence of an attribute or other character string in a text command means that the command should be implemented whenever that attribute or character string exists, with a value, in the SENC object being symbolized. (But, remember that text is only written when selected by the mariner.)

If the attribute or character string named in a text command is not included in the SENC object, the text command should be disregarded. If the symbology instruction for an object includes more than

one text command, only the text command whose attribute value or character string is missing should be disregarded; the other text command should be implemented.

7.1.5 Examples:

"BUAARE","AC(CHBRN);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26)

Writes the name of the built up area.

"BOYCAR","CATCAM4","SY(BOYCAR04);TE('by %s','OBJNAM',2,1,2,'15110', 1, 1,CHBLK,21)

Writes the name or number of the buoy above and to the left, clear of fog signals, retro-reflectors etc., with a prefix «by» to distinguish a buoy number from a sounding.

"BRIDGE","CATBRG2","LS(SOLD,5,CHGRD);SY(BRIDGE01);TE('clr cl %4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11); TE('clr op %4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11)","8","O","DISPLAYBASE","12210"

In the case where the value of attribute VERCCL = 16.2 and VERCOP = 17.8, this text command writes "clr cl 16.2" and above that "clr op 17.8", both of them to the right of the object. The prefix, e.g. "clr cl" (clearance closed), explains the meaning of the numbers and distinguishes the numbers from soundings.

7.2 Symbology Instruction for Point Objects

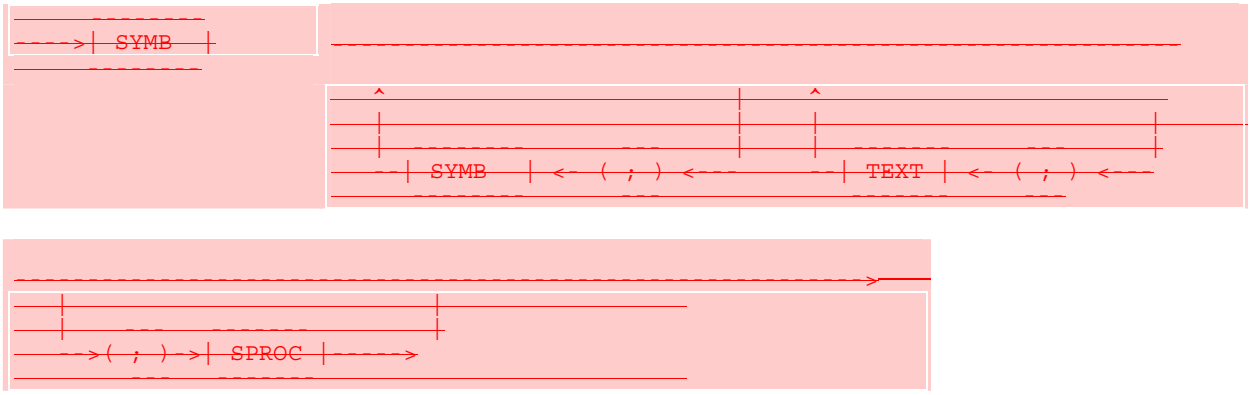
The SHOWPOINT instruction was designed to symbolize point objects. It gets a symbol from the symbol library, places the pivot point of the symbol (see 5.1) or text at the object's position, rotates the symbol if necessary and then displays symbol or text. Note that SHOWPOINT can handle more than one symbol and text at a time.

The Presentation Library provides look-up tables for simplified point symbols (intended primarily to provide smaller but more prominent buoy and beacon symbols, symbolized by function - lateral buoy etc.) and paper chart symbols (intended to convey shape).

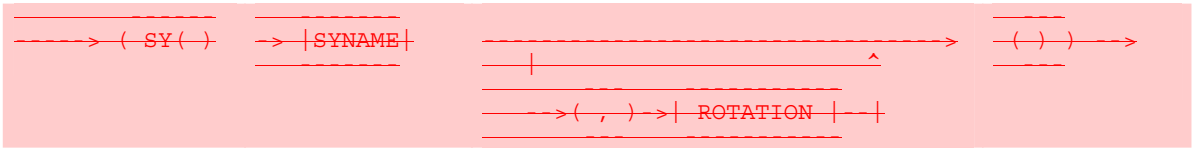
The mariner should be given the option of choosing paper chart or simplified symbols.

7.2.1 Syntax of the SHOWPOINT Instruction

SHOWPOINT instruction (usage: point objects)



7.2.2 SYMB 'show symbol' command word:



7.2.3 Parameters

.1 SYNAME "symbol name" parameter:

The symbol name is an 8 letter-code that is composed of a class code (6 letters) and a serial number (2 letters).

.2 ROTATION "symbol rotation" parameter:

.2.1 Symbols with no rotation should always be drawn upright with respect to the screen.

.2.2 Symbols with a rotation instruction should be rotated with respect to the top of the screen (-y axis in figure 2 of section 5.1). (See example below).

.2.3 Symbols rotated by means of the six-character code of an S-57 attribute such as ORIENT should be rotated with respect to true north.

.2.4 The symbol should be rotated about its pivot point. Rotation angle is in degrees clockwise from 0 to 360. The default value is 0 degrees."

7.2.4 Examples:

SY(BOYCAR01);SY(LIGHTS05,135) :

shows symbols 'BOYCAR01' and 'LIGHTS05' at the same location in the given sequence, rotate symbol 'LIGHTS05' by 135 degrees from upright.

7.3 Symbology Instruction for Line Objects

7.3.1.1 (Details of the above)

The SHOWLINE instruction was designed to symbolize line objects. It is also used within the SHOWAREA instruction to symbolize area boundaries. It uses a simple or complex line-style (see below) and may add a symbol or text. Note that SHOWLINE can handle more than one line-style at a time.

7.3.1.2 (Details of the above)

The pivot point of symbols or text should be the midpoint of the visible run-length of the line. If the symbol or text is truncated by the display window, it may be removed or it may remain truncated until screen refresh remedies the problem.

7.3.2.1 Line Styles

There are two types of line styles available: simple line styles and complex line styles. Complex line styles are composed from repeating symbols. A complex line style is transferred in a special line style module (see 10.7).

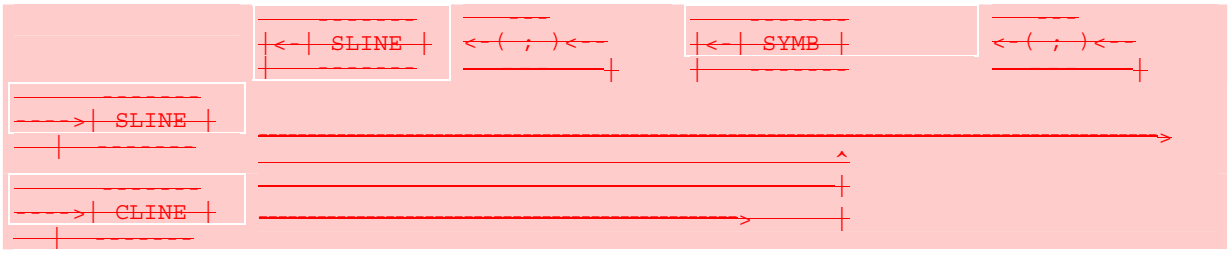
Simple line styles are used to allow for a variety of basic line styles without having them defined in the format of complex line styles. Simple line styles are based on a solid, dashed or dotted line that can be modified in width and colour. Because of their simplicity they can be 'hard'-coded in the ECDIS software and do not have to be transferred in a machine readable format. See 7.3.3 for simple linestyles.

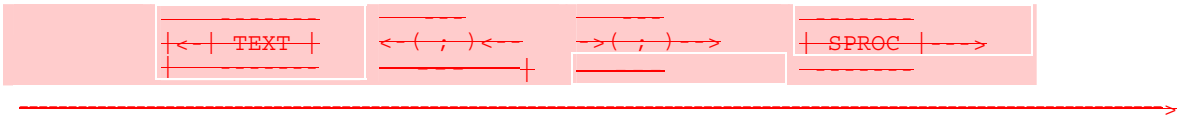
7.3.2.2 Line Width

The line width is given in units of the line spacing (pixel size) specified in section 9 of S-52. This is currently 0.32 mm. If the pixel-diameter or line-spacing is grossly smaller, the line-width should be compensated by drawing the line in an appropriate width. If possible the "Display Generator" should smooth line ends with a width of more than 0.6 mm. Note that the given width of a line should never contain fewer pixels than at the standard display size and resolution specified in the C&S Specifications section 3.1.5.

7.3.3 Syntax of the SHOWLINE Instruction

SHOWLINE instruction (usage: line objects)





7.3.4 SLINE 'show simple line style' command word:

7.3.5 Parameters

PSTYLE "predefined line style" parameter:

'SOLD' ( )
'DASH' ( ) dash: 3.6 mm; space: 1.8 mm
'DOTT' (.....) dot: 0.6 mm; space: 1.2 mm

WIDTH "line spacing" parameter:

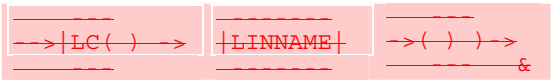
'1' x 0.32 mm <= WIDTH <= '8' x 0.32 mm;

line width is given in units of 0.32 mm pixel diameter or whatever size is required in section 8 of S-52.

COLOUR "line colour" parameter:

colour token as described in section 4 and 13.

CLINE "complex line style" command word:



LINNAME "line-style name" parameter:

The line-style name is an 8 letter-code that is composed from an object class code and a serial number (2 letters).

7.3.6 Examples:

LS(DASH,2,CHMGD)

dashed line in "chart magenta, dominant", 0.6 mm (2 x 0.3 mm) width.

LC(ACHARE51)

complex line-style defined for borders of anchorage areas.**7.4** **8.4** **Symbology Instruction for Area Objects**

The SHOWAREA instruction was designed to symbolize area objects. It performs a variety of fill operations. The prime requirement is that the area symbolization should always be clearly visible in the part of the area that lies within the viewing window of the ECDIS. If the area covers a large part of the viewing window, more than one symbol may be required. On the other hand, a secondary requirement is not to show more symbols than necessary, as this will cause distracting clutter. One solution is to centre a symbol in the part of the area exposed by the viewing window. Eventually, dynamic fill patterns whose density varies according to the size and shape of the area should be developed.

7.4.18.4.1 Fill Operations

An area can be identified in several ways:

- with an opaque colour fill (e.g. depth areas);
- with a transparent colour fill (e.g. traffic separation zone);
- with a pattern of symbols (e.g. traffic arrows) or texture (e.g. packicepack ice)
- with a symbol or text located on a position inside the area (e.g. traffic arrow)

A transparent colour fill may overlap an opaque fill and a patterned fill may overlap any other fill, including another patterned fill. For overlapping fills the respective area has to be filled more than once in a sequence of several area-fill operations.

7.4.28.4.2 Transparent Fill

AThe presentation library supports two methods of transparent fill can be achieved in two ways:.

1.) 1.) with only a percentage of the pixels having the fill colour (stippled fill, pseudo transparency);

2.) by mixing the fill and underlying colour at each pixel, according to the fill percentage.

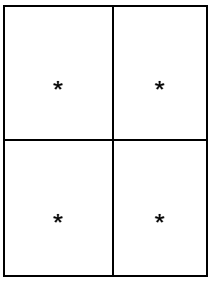
Since the secondWhen method is not easy1 and a 4 pixel group is used to achieve and needs a true colour graphic, the simulation of real transparency then only the percentages 25%, 50% and 75% can be used for the transparency. For compatibility with both transparency methods only percentage values 25%, 50% and 75% are used within the presentation library.

The following explains the pseudo-transparency that can be achieved by the first method is supported by the Presentation Library. That means e.g. if1.
If an area of 4 by 4 pixels has to be filled with a transparent colour only 3, 2 or 1 pixel(s) of this area are tinted with the opaque fill colour while the remaining pixel(s) are tinted using the colour 'TRNSP' (= 100% transparent, see 4.2.1), which means the colour fill is not performed for these pixels. Thus the colour of the underlying pixels still can be seen through. On a high resolution screen the result will be very close to a real transparent fill.

The following explains the pseudo-transparency that can be achieved by this method:

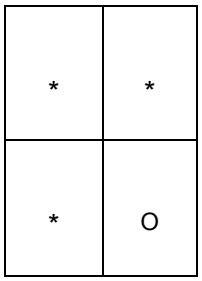
* = pixel tinted in fill colour

O = pixel tinted in TRNSP (transparent)



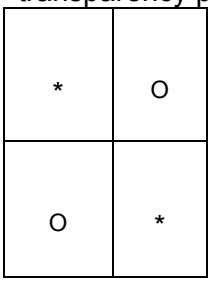
opaque fill with
0% transparancey

transparency parameter = 0



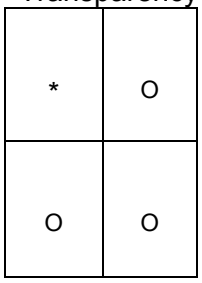
25% transparency

Transparency parameter = 1



50% transparency

transparency parameter = 2



75% transparency

Transparency parameter = 3

Because it is very likely that most of the ECDIS systems do a transparent fill with this technique only the 25%, 50% and 75% percentages for the transparency are used within the presentation library.

~~7.4.3~~ 8.5 Area Symbolization by a centred Symbol

~~7.4.3.1 Introduction~~

Centred symbols are used to reduce clutter in areas of heavy traffic. Since such areas may be large we use large symbols and since many restrictions may apply to a given area (e.g. traffic lane; precautionary area; no anchoring or fishing) the symbols have built-in offsets to prevent overwriting ~~(see figure 4a)~~.

~~7.4.3.2~~8.5.1 Positioning centred symbols and text

A pivot point for centred symbols and text should be at the centre of the area, or close enough to the centre that it is evident which area the symbol applies to. The offsets for symbols and text are given with respect to the pivot point.

Multiple centred symbols are often used. For example, a traffic lane with restrictions on entry and on fishing will have a centred traffic arrow and an offset ~~«~~"entry restricted~~»~~" symbol with a subscript ~~«~~"!~~»~~" to indicate that other restrictions apply.

NOTE: If, due to an offset built in by the Presentation Library, the whole of a symbol falls outside the area it applies to, it should not be drawn. If it overlaps the area boundary it should be drawn. Text may be allowed to extend beyond the boundary. The result should be that the mariner can clearly identify the area.

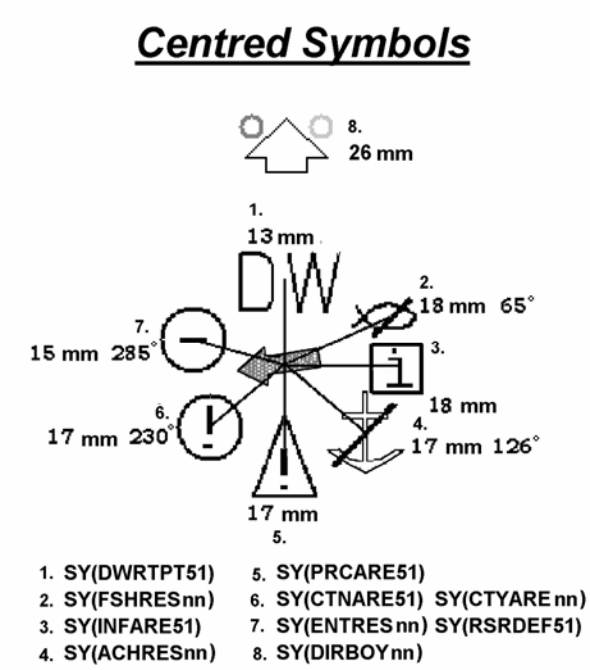


Fig. 4a - Centred symbol

Fig. 4b - Centred symbol

A centred symbol should remain within the area even when the border of the display progressively truncates the area at each chart re-draw. If this is done by repeatedly re-calculating the centre of gravity (c of g) of the area, make sure the symbol remains within the area if this should be concave (e.g. L shaped, or a disc). One method of doing this if the c of g falls outside the area is to subdivide the area by the x,y coordinates of the calculated c of g then recalculate the component areas recursively until a point within the object is found.

7.4.3.38.5.2 Centred symbols on a ship-centred display

Some ECDIS draw a true-motion display which is updated frequently enough to keep own-ship close to the centre. If, when using this display mode, the situation arises that the display window lies completely within an area which is symbolised by centred symbols, these symbols will draw close to or under the own-ship symbol (having lower display priority) and will cause clutter and confusion. It is the responsibility of a manufacturer

IMPORTANT: Manufacturers who uses a ship-centred display to avoid this potentially dangerous situation by keepingmust keep any centred area symbols at least 20 mm from the own-ship symbol to avoid a potentially dangerous confusion.

7.4.3.48.5.3 Calculating the centre of gravity (c of g)

An understanding of the underlying mathematics can be found in books on computer graphics. The following equations for c of g were derived by a Stokes' Theorem transformation of the appropriate surface integrals to line integrals around the boundary:

A method for finding the centre of gravity of an area must be adopted by the ECDIS manufacturer. This must ensure that the correct symbol is viewable on screen even when the area is only partially on screen. It must also be robust enough to uniquely identify areas which are concave, and where the centre is outside the area (for example, in an L-shaped area the centre is not within the area but the symbol must be drawn inside).

It shall be noted that drawing of the centred symbol requires that the complete centred symbol is inside the corresponding area when it is drawn with the specified offset from the centre of gravity. (IHO S-64 contains examples of cases which an ECDIS must be capable of handling)

(J.K. Hall in Computers & Geosciences Vol pp. 203-205 Pergamon Press 1976)

7.4.48.5.4 Fill Patterns & Textures for areas

Fill patterns use widely spaced symbols, as for example for a prohibited area. Textures consist of continuous shapes, such as the dots of a dredged area or the diamond pattern that highlights water of depth less than the safety contour at night.

The form of a pattern symbol or texture unit may be described by a pixel array or vector description (see section 5 for further details).

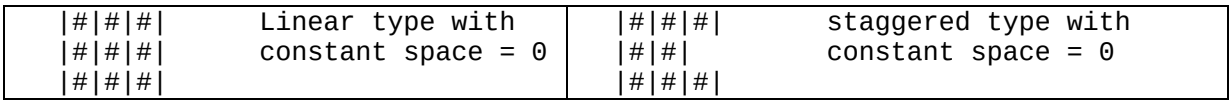
Fill patterns may be either staggered or linear:

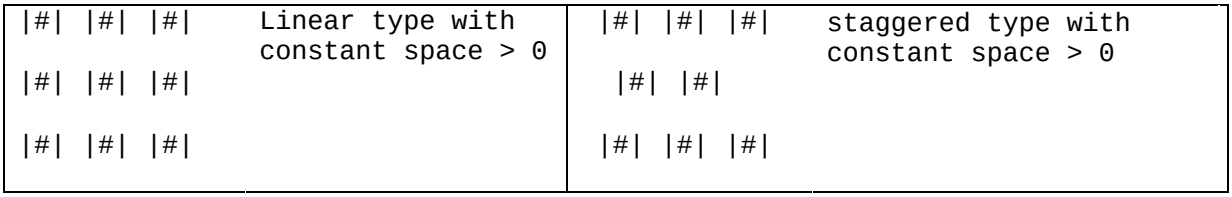
The Presentation Library only uses fixed pattern fill spacing, the pattern must not move as the user pans the chart display .

The position where an area fill with a pattern symbol is started should be based on a geographical position and not on an edge of the screen. If the fill pattern was based on an edge of the screen the pattern symbols would not stay on the same position of the chart while the picture was moving underneath in centred mode. Also do not base a fill pattern on the edge of the area to be filled. This will result in a strange looking pattern fill when two adjacent areas are filled by the same pattern.

Note: Ideally the symbols of a pattern fill should be closer together for a small or thin area, to ensure enough symbols are seen, and farther apart for a large area, to avoid clutter. But until simple, proven algorithms for variable symbol spacing are developed, the Presentation Library will use fixed spacing.

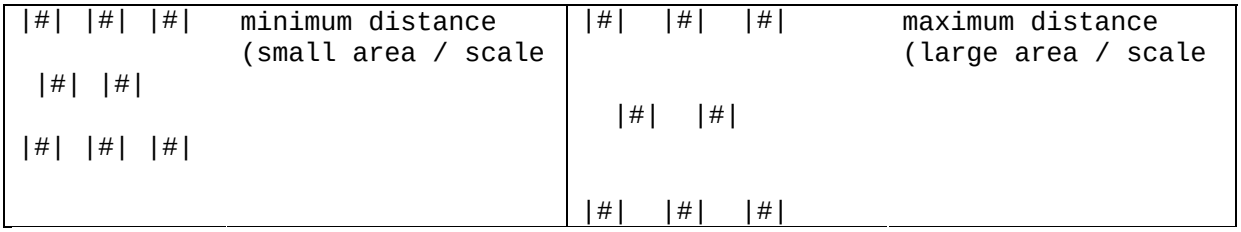
The pattern type and the symbol spacing gives full control over a set of variations (|#| represents the pattern symbol):





Linear type with variable spacing

Staggered type with variable spacing



The vertical and horizontal distance between pattern symbols is given in the pattern definition (see section ~~10.5~~12.5). This distance is the space between symbol covers. The symbol cover is calculated by taking the symbol's bounding box and expanding it to include the pivot point. This mechanism allows the pivot point to be used for fine adjustments to symbol spacing.

~~The position where an area fill with a pattern symbol is started should preferably be based on a geographical position and not on an edge of the screen. If the fill pattern was based on an edge of the screen the pattern symbols would not stay on the same position of the chart while the picture was moving underneath in centred mode. Also do not base a fill pattern on the edge of the area to be filled. This will result in a strange looking pattern fill when two adjacent areas are filled by the same pattern.~~

Note: An area pattern which is described in the written «Description of Symbols» of the symbol library as a «pattern of symbols» (e.g., FSHHAV02) may be substituted by a single centred symbol. However, this should never be done with an area texture (pattern of symbols, e.g., NODATA03, RCKLDG01, TSSJCT02, etc.)

~~7.4.5~~ 8.4 Area Boundaries

~~7.4.5.1~~8.4.1 Plain and Symbolized Boundaries

The Presentation Library provides look-up tables for plain area boundaries (intended for use at small scale to reduce clutter) and symbolized area boundaries (intended for use at very large scale to show immediately on which side of the boundary the area lies and to identify the area).

Note that centred**:** Centred area symbols should still be used with symbolized boundaries to symbolize the case when the entire display window lies within an area.

The mariner should be given the option of using plain or symbolized boundaries. See also section 5.28.2 about the limitations of symbolized linestyles on curved boundaries.

7.4.5.28.4.2 Masked Lines

Masked lines (MASK subfield of FSPT field set to {1}) and cell boundary lines (edges encoded with [USAG] = {3}) should not be drawn."

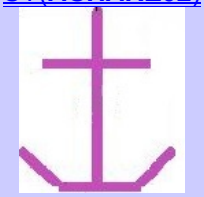
7.4.5.3 (Details of the above)

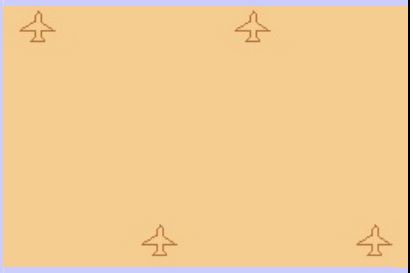
8.4.3 Area Borders

Note that if an area isWhen areas are filled with a colour or a pattern the borders must be included in the fill as well. This generates an image without gaps between neighbouring areas. It is also important for a perfect fit of adjacent cells. If the borders of the area are to be distinguished from the area's fill, the borders have to be re-drawn on top of the fill. This is forced when a SHOWLINE instruction (see 7.3.4) is called within a SHOWAREA instruction. The SHOWLINE instruction then performs the presentation of the border.

8.5 Colours and Descriptions for Symbols

The colours and descriptions for all symbols in the symbol library are listed in the hard copy addendum containing the "ECDIS Chart 1", which is bound with the Colour & Symbol Specifications. The general naming convention for symbols is described in the following table:

Objects	Drawing Instructio	Description	Example
Symbols	SY(AAAAAAnn)	where A = abbreviated name, n = serial number Anchorage area as a point at sma scale, or anchor points of mooring trot at large scale	SY(**ACHARE02**) 
	SY(AAAAAA5n)	centred symbol for area Area where anchoring is prohibited or restricted	SY(**ACHRES51**) 
	SY(AAAAAA6n)	centred symbol for area wit added caution restriction Area where anchoring is prohibited or restricted, with other cautions	SY(**ACHRES61**) 
	SY(AAAAAA7n)	centred symbol for area wit added information restricti Area where anchoring is prohibite or restricted, with other informatio	SY(**ACHRES71**) 
Lines	LS(type, thicknes colour)	simple line of type solid, dashed or dotted NAVNLE	LS(DASH,1,CHGRD)
	LC(AAAAAAnn)	is a complex line Ferry Route	LC(**FERYRT01**) 
	LC(AAAAAA5n)	is a complex linestyle for an area boundary Boundary of a deep water route	LC(**DWRUTE51**) 
Area	AC(CCCCC)	is an area colour fill, where C is the colour token Built-Up Area	AC(**CHBRN**) 

	AC(CCCCC,n)	is a transparent area colour fill where n = transparency Traffic Separation Zone TRFCF = magenta, faint 75% transparency	AC(**TRFCF,3**)
	AP(AAAAAAnn)	is an area pattern fill Airport pattern fill	AP(**AIRARE02**) 

NOTE: All names (A,n) for symbols, complex lines and area patterns (but not colour fills) have 8 characters.

Description of the Symbology Commands

Symbology commands are used in the look-up table entries to perform the symbolization of objects. Currently there is a choice of five commands used in the lookup tables.:

SHOWTEXT (TE and TX) to display text labels
SHOWPOINT (SY)to symbolize points and place symbols inside areas
SHOWLINE (LC and LS) to symbolize lines and borders of areas
SHOWAREA (AP and AC) to symbolize areas
CALLSYMPROC (CS) to call conditional symbology procedures

The entries in the lookup tables map S57 object/attribute combinations to sequences of command words which describe in precise detail the symbology required to be displayed. This section describes the meaning, syntax and operation of the command words used in the lookup tables.

Entries in the lookup tables may be composed of more than one command word, for example the lookup for ACHARE is:

"SY(ACHARE51);LS(DASH,2,CHMGF);CS(RESTRN01)"

This displays the ACHARE51 symbol in the centre of the area as well as a dashed linestyle in CHMGF colour and then executes the RESTRN01 conditional symbology procedure in case other symbols are required.

Each command is capable of accepting one or more parameters. These parameters affect the way the chosen symbol, line style or pattern fill is displayed. Some parameters can be linked to the value of an S57 attribute of the feature object which is the subject of the lookup table entry. For example, "SY(TSSLPT51,ORIENT)" translates as the symbol TSSLPT51 oriented in the direction given by the value of attribute ORIENT.

For variable parameters default values can be provided as a fail-safe in case the attribute cannot be found in the feature object description. This can be done by assigning a default value to the parameter e.g. ORIENT='90.0'. The assignment is done within the parameter list of the command word.

IMPORTANT: The symbology command must be terminated, if a parameter is mandatory (has to be passed) and no value is assigned to it either because a constant is missed from the parameter list or an attribute value cannot be found (attribute is missed from the object definition and no default value was assigned).

This does not mean that the whole symbology instruction is terminated since it may be composed of more than one command word e.g. the first command word in a symbology instruction shows a light flare and the second shows a buoy symbol. If the first command fails the second is still performed and the buoy is shown in the chart.

The full command syntax and parameters are listed in the following sections

9.1 SHOWTEXT

Name:

TX (Display of textual labels) or
TE (Display of numeric or other formatted text strings)

7.4.6 Syntax of the SHOWAREA Instruction

Syntax:

TX (STRING, HJUST, VJUST , SPACE , 'CHARS' , XOFFS , YOFFS , COLOUR , DISPLAY);

TE ('FORMAT' , 'ATTRIB1,ATTRIB2,...', HJUST, VJUST, SPACE, CHARS, XOFFS, YOFFS,COLOUR, DISPLAY);

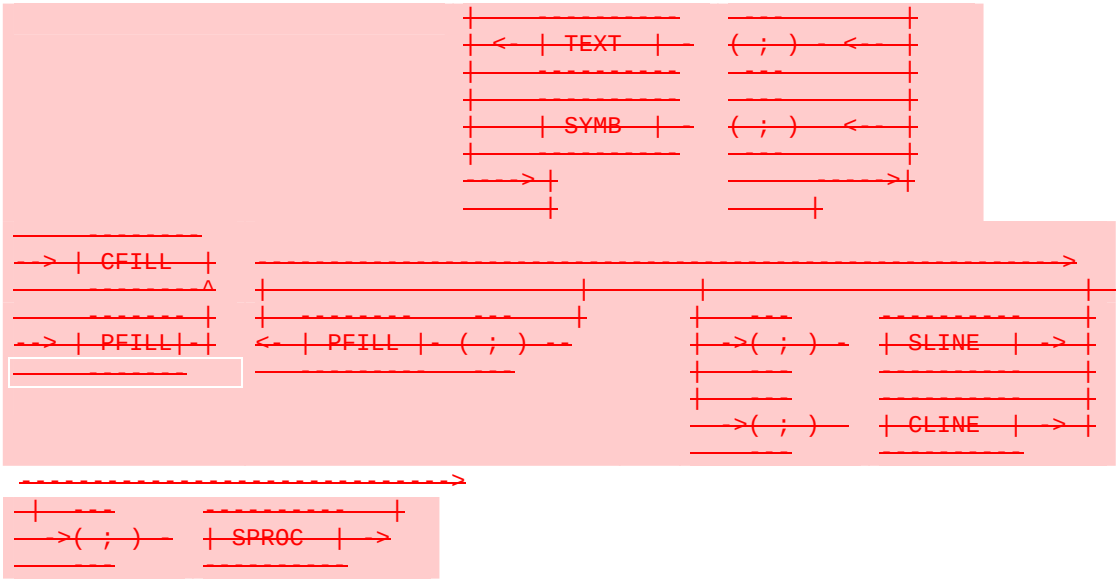
SHOWAREA instruction (usage: area objects)

Description:

Show a text string at a particular position on screen. In order to show text on the display two commands are used.:

For purely alphanumeric text, the "TX" Command is used.

For numeric text, a prefix is normally used to distinguish between numbers and soundings. For this purpose the "TE" command is used to format the text string shown on the display.



The description of how the FORMAT/ATTRIB lookups and prefixes work is documented in section 16.3. The following should be borne in mind when rendering text on the display.

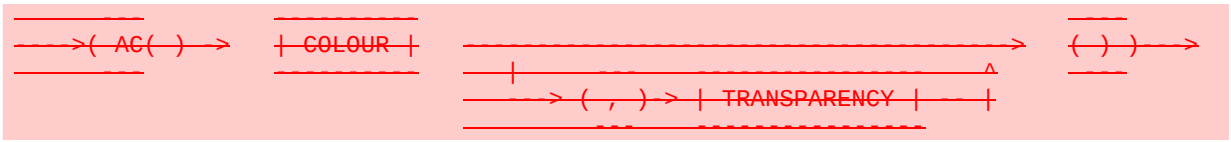
7.4.7 CFILL 'colour fill' command word

Text is normally coloured black, to give best readability under all light conditions.

Text should only be displayed when the object it applies to is displayed.

Text should always have display priority 8, to ensure it is readable, independent of the object it applies to.

The manufacturer should provide at least the capability to select "Important Text" and/or "Other Text", and he may provide further text groupings if he so wishes.



The display of text should be controlled independently of the display of the object it applies to and the mariner should have full control over the display of text. All text is in the IMO Category "Other Information". As a guide to organizing the display of text, the last two digits of the SHOWTEXT instruction give a text classification that distinguishes between "Important" and "Other" text, and

gives further suggested text groupings. The abbreviations used on the ECDIS display are listed in Section 15.4. All the abbreviations in section 15.4 must be readily accessible to the mariner.

7.4.8 ParametersParameters:

STRING: Represents the alphanumeric string to be displayed on the display. The STRING parameter passes a text string in single quotes that must be written on the ECDIS screen.For example:TX('DR',2,3,2,'15110',-1,1,CHBLK,50);
Note: the six character acronym of a valid S-57 attribute (e.g. ,LITVES, OBJNAM) can also be passed as a parameter to STRING parameter. If the attribute is either of an enumeration type or list type (e.g. COLOUR), then the enumeration value shall be converted into the respective text string from the attribute definition in the object catalogue. If the attribute is of a numerical type, it may just be written as a string. If the attribute is an L-type attribute (e.g. SBDARE, NATSUR) the text equivalent of the listed attribute values should be written sequentially separated by a space with no punctuation marks. If the attribute or character string named in a text command is not included in the SENC object, the text command should be disregarded. If the symbology instruction for an object includes more than one text command, only the text command whose attribute value or character string is missing should be disregarded; the other text command should be implemented.

HJUST: Horizontal justification parameter: These can have three distinct values:
CENTRE – The pivot point is located at the centre of the overall length of text string
RIGHT - The pivot point is located at the right side of the last character of text string)
LEFT (default) - This is the default value. The pivot point is located at the left side of the first character of text string

VJUST: Vertical justification parameter. These can have three distinct values:
BOTTOM (default) - This is the default value. The pivot point is located at the bottom line of the text string
CENTRE - The pivot point is located at the centre line of the text string
TOP The pivot point is located at the top line of the text string

SPACE: Character spacing parameter. These can have three distinct values:
Fit (not used) - The text string should be expanded or condensed to fit between the first and last position in a spatial object
Standard (default) - The standard spacing in accordance with the typeface given in CHARS should be used
Standard (with word wrap) - the standard spacing in accordance with the typeface given in CHARS should be used; text longer than 8 characters should be broken into separate lines by whole words.

CHARS: Font specification parameter. This defines the font to be used for the text display. There are four numeric components to this parameter and they are concatenated together and enclosed in single quotes in order to be passed as a single value, e.g '15110'. The format is therefore 'abcdd' where :
a = 1, a plain serif font.
b = 4, 5 or 6 for light, medium or bold text. The default is Medium.
c = 1, meaning upright, non-italic text.
d = Body size given in pica points (1 point = 0.351 mm) that specify the height of an uppercase character. The smallest size to be used is pica 10, and this is also the default size. Larger sizes may be used.

XOFFS X offset parameter: defines the X-offset of the pivot point given in units of BODY SIZE (see CHARS parameter) relative to the location of the spatial object (0 is default if XOFFS is not given or undefined); positive x-offset extends to the right (the "units of BODYSIZE" means that if for example, the body size is 10 pica points each unit of offset is 10 (0.351) = 3.51 mm).

YOFFS Y offset parameter: defines the y-offset of the pivot point given in units of BODY SIZE (see CHARS parameter) relative to the location of the spatial object (0 is default if YOFFS is not given or undefined); positive y-offset extends downwards.

COLOUR "area Text colour" parameter: colour token as described in section 4 and 13.7 and 15.

DISPLAY Text display parameter: defines which text grouping the string belongs to.

9.1.1 Show Text Example

"BUAARE","AC(CHBRN);TX(OBJNAM,*1,2,3*,'15110',0,0,CHBLK,26)

Name	Lookup table value	Description	ECDIS Display
S-57 Object	BUAARE	Built Up Area	
Area Fill	CHBRN	Brown	
ECDIS Textual Output	OBJNAM	Charmouth	
Horizontal Justification	1	Centre	
Vertical Justification	2	Centre	
Spacing	3	Standard with word wrap	
Font Style	1	Sans serif	
Text Weight	5	Medium	
Width	1	Upright	
Body Size	10	3.51mm	
X-offset	0	No text offset	
Y-offset	0	No text offset	
Colour	CHBLK	Black	
Display	26		

Insert EXAMPLE of TE with % lookups….

Add example of the purely alphanumeric text = TX('DR',2,3,2,'15110',-1,1,CHBLK,50);

9.2 SHOWPOINT

Name:

SY – Showpoint, Show symbol command.

Syntax:

SY(SYMBOL [, ROT]);

Description:

TRANSPARENCY "area transparency" parameter:

The SY command displays a symbol at a given point on the display. The command takes a standard symbol name as its first mandatory argument. A second parameter can impose a rotation on the symbol about the pivot point. In the case of an area object the “SY” command is used to display a centred area symbol.

0 opaque (= default value)
1 25 % (3 of 4 pixels use COLOUR, 1 uses TRNSP)
2 50 % (2 of 4 pixels use COLOUR, 2 use TRNSP)
3 75 % (1 of 4 pixels use COLOUR, 3 use TRNSP)

Parameters:

Note: the TRANSPARENCY parameter is an optional part of the colour fill command; if it is not included, the command defaults to opaque fill.

SYMBOL: The name of the symbol to be displayed, e.g ISODGR01. This will be the name as defined in the vector description language SYNM field.

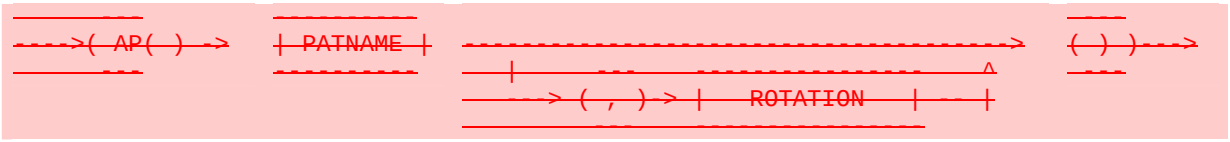
ROT: An optional rotation parameter. The following notes apply to this parameter.

Symbols with no rotation should always be drawn upright with respect to the screen.

Symbols with a rotation instruction should be rotated with respect to the top of the screen (-y axis in figure 2 of section 8.1).

Example: AC(CHMGF,3)Symbols rotated by means 25% magenta, 75% TRNSP

PFILL "pattern fill" command word:



PATNAME "pattern symbol name" parameter:

The pattern symbol name is an 8 letter code which is composed of a class code (6 letters) and a serial number (2 letters).

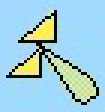
ROTATION "pattern symbol rotation" parameter:

0 to 360 nautical degrees (clockwise, starting North);
default: 0 degree;Note: the ROTATION parameter is optional; if a raster symbol is called the ROTATION parameter is ignored; the six of the six-character code of an S-57 attribute can be passed as ROTATION parameter.such as ORIENT should be rotated with respect to true north.

The symbol should always be rotated about its pivot point. Rotation angle is in degrees clockwise from 0 to 360. The default value is 0 degrees."

9.2.1 SHOWPOINT Example

SY(BOYCAR01);SY(LIGHTDEF,135) :

S-52 Symbol	Description	ECDIS Example
BOYCAR01	Simplified symbol - North Cardinal Mark	
LIGHTDEF, 135	LIGHTDEF is a aymbol selected by a conditioanl symbology procedure (LIGHTS05). The command string "SY(LIGHTDEF,135)" selects a default light flare rotated by 135 degrees	

SY(EBBSTR01,ORIENT)

selects a default ebb stream symbol rotated by the ORIENT value

9.3 SHOWLINE

Name:

LS – Showline (complex linestyle) or
LC – Showline (simple linestyle).

Syntax:

LS(PSTYLE, WIDTH, COLOUR);
LC(LINNAM);

Description:

The SHOWLINE instruction is designed to symbolize line objects. It is also used within the SHOWAREA instruction to symbolize area boundaries. The command is used to show simple or complex line-styles (described below) and subsequent commands may add a symbol or text as well.

Parameters:

PSTYLE: Predefined line style parameter: One of three values:

'SOLD' (_____)
'DASH' (- - - - -) dash: 3.6 mm; space: 1.8 mm
'DOTT' (. . . . .) dot: 0.6 mm; space: 1.2 mm

WIDTH Line spacing parameter. Units are 0.32 mm (approximately pixel diameter)

COLOUR Line colour parameter. A valid colour token as described in section 7

LINNAM: Name of complex linestyle. This parameter will symbolise the line using the complex linestyle named by the LINNAM parameter.

The rotation function would operate on individual symbols of the pattern and not on the pattern as a whole. It is not in use at present.

7.4.9 Examples:

9.3.1 SHOWLINE Example

AC(CHBRN,0) or AC(CHBRN)
LS(DASH,2,CHMGD). Displays a dashed line in "chart magenta, dominant", 0.6 mm (2 x 0.3 mm) width.

area filled with opaque colour 'chart brown'
LC(ACHARE51). Displays the complex line-style called ACHARE51 defined for borders of anchorage areas. (see below).

AP(DQUALA21);LS(DASH,2,CHGRD)

9.4 SHOWAREA

area filled with pattern for 'category of zone of confidence in bathymetry', no symbol rotation; bordered by a dashed line in 'chart grey , dominant', 0.6 mm width

Name:

AP – Showarea (area fill) or
AC – Showarea (pattern fill).

Syntax:

AP(PATTERN)
AC(COLOUR [,TRANSP])

SY(TSSLPT51,ORIENT);SY(DWRTPT02);CS(RESTRN01)

Description:

The two showarea commands are used for symbolising area objects (often in conjunction with linestlyes for border rendering). There are two types of colour fill:

area fill with a basic colour using one of the standard colour tokens.
pattern fill using a pattern to fill areas.

area with oriented centred traffic arrow; offset centred symbol «DW» symbol; and with whatever restriction symbol is required by conditional symbology procedure RESTRN01.

Parameters:

COLOUR: colour fill parameter. A valid colour token as described in section 7

7.5 Calls to Conditional Symbology Procedures

PATTERN: the name of the pattern

7.5.1 The CALLSYMPROC instruction was designed to call a conditional symbology procedure.

TRANSP: Transparency, an optional parameter for colour fills used to make a fill partially transparent. If the transparency parameter is not set then the default value is 0%, i.e an opaque colour fill. There are three permissible values:

25% where 3 out of every 4 pixels use TRNSP
50% where 2 out of every 4 pixels use TRNSP
75% where 3 out of every 4 pixels use TRNSP

This call is used in two ways:

(1) As the sole instruction in field 3 of the look-up table.

In this case it does the symbolization and may change the values given in the look-up table (for the succeeding fields of that line, e.g., «LIGHTS», «CS(LIGHTS05)», «8», «O», «STANDARD», «27070».

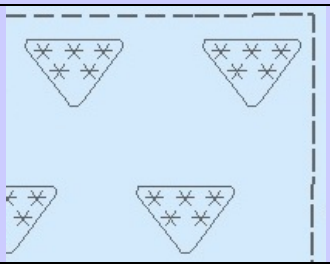
(2) As the last command in a symbolization instruction.

In this case it may change the values in the succeeding fields of that line, as in case 1. In addition, it may add to or amend the symbolization instructions already given in the same field, e.g., «ACHARE», «», «SY(ACHARE51); LC(ACHARE51); CS(RESTRN01); «3», «S», «STANDARD», «26220»

9.4.1 SHOWAREA Examples

The placing of the CALLSYMPROC is shown in the Backus-Naur diagrams for the SHOWPOINT, SHOWLINE and SHOWAREA instructions.

S-52 Instruction	Description	Example

AC(CHBRN)	area filled with opaque colour 'chart brown'	
AP(DQUALA21);LS(DASH,2,CHGRD)	area filled with pattern for 'category of zone of confidence; bordered by a dashed line in 'chart grey , dominant', 0.6 mm width	

9.5 CALLSYMPROC

7.5.2 Syntax of a Call to a Conditional Symbology Procedure

Name:

CS – CALLSYMPROC: Call conditional symbology procedure.

CALLSYMPROC instruction (usage: point, line, area objects)

Syntax:

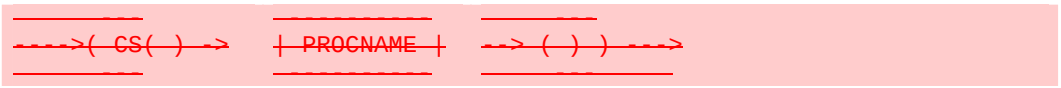
CS(PROCNAME);

Description:

The CALLSSYMPROC command “CS” calls a named conditional symbology procedure. It is used either on its own in order to symbolise a particular class of object/attribute combinations or in conjunction with other commands in order to add symbols to the display dependent on ECDIS user settings, e.g

SPROC "symbology procedure call" command word:

The lookup for ACHARE is “SY(ACHARE51);LS(DASH,2,CHMGF);CS(RESTRN01)”



Note that the calling of the conditional symbology may affect values in the rest of the lookup table entry, for instance the viewing group or display priority may be affected by the operation of the conditional symbology procedure invoked by the SY command.

PROCNAME "symbology procedure name" parameter:

Parameters:

PROCNAME: The name of the conditional symbology procedure to invoke, e.g RESTRN01 in the above example. Conditional symbology procedures are normally named by the object class that is interpreted by the procedure. The name is normally an 8 letter-code that is composed of the class code (6 letters) and a serial number (2 letters)

Example:

CS(DEPARE02)

The symbology procedure no. 01 for objects of the class 'DEPARE' (depth area) is called.

8. SOME DETAILS FOR THE DESIGNER OF THE ECDIS DISPLAY GENERATOR

ECDIS Requirements

This section gives program designers some hints whichprovides ECDIS developers with other details have toof ECDIS display that must be taken into account while designing an ECDIS Display Generator. It will be amended as feedback from program designers will accumulate. It is recommended that designers study S-57 before reading this section since S-57 terminology and references to S-57 are used to wide extentECDIS.

8.110.1 Data Consistency Requirements

The quality of theENC presentation depends very much on the consistency of the data with respect to S-57. underlying S-57 data. Thus ECDIS manufacturers should be aware of the consistency of the data that will be processed by their ECDIS Display Generator. Some criteria that are important:.

10.1.1 Unknown Objects

Feature objects must be of an officially adopted object class. If feature objects are of proprietary non-ENC classes (i.e. not included in S-57 Product SpecificationsSpecification for ENC[ref]) they willmust be treated as members of unknown object classes. There will be no appropriate entry in the look-up tables but even in that case theyall objects must be presented on the ECDIS screen in accordance with 8.3.3.7a below. The occurrence of such an object should be recordedlogged during transformation from ENC to SENC as an anomaly and the unknown objects should be displayed as by means of '?' symbols.using the question mark symbol QUESMRK1 as per section 10.3.3.4.

All polygons within the data set should be properly closed. This is especially important for group 1 of objects within a S-57 data set . This group contains all area objects that represent the natural surface of the earth (depth areas, , land areas etc.). If polygons of group 1 objects are not properly closed, some of the conditional symbology procedures will fail.

In order to avoid ambiguous situations for the conditional symbology procedures, no area objects of group 1 may overlap each other. For example, a symbology procedure that processes underwater hazards must be capable of detecting whether e.g. an obstruction is located within a safe water area or not. If adjacent areas of group 1 overlap each other the depth information will be ambiguous.

10.1.2 Unknown or Missing Mandatory Attributes

In the perfect world, allAll mandatory attributes required by S-57 Appendix B1 «1. ENC Specification» would should be populated, except for cases where S-57 Appendix B1 Annex A, «Use of the Object Catalogue», deliberately codes by omission (e.g., clauses 5.8.2 and 10.2.1.1). In reality, sometimes the dataattribute values may not always be available and thea producer will codemay encode the attribute but omit the value to indicate it is unknownvalue as unknown. S57 defines how null/unknown and missing attributes are encoded within ENCs. It should be noted that a missing attribute is not "unknown". The Presentation Library provides default symbolization for many cases of attribute value omitted (e.g., in the first line for every object class in the look-up table). However, it is impossible to foresee all potential problems, and the possibility exists that an omitted mandatory attribute or missing mandatory attribute value may cause processing to hang up,, and/or unpredicted symbolization.

10.1.3 Data Overlaps

The S-57 Product specification for ENC prohibits data overlaps in ENC data of the same usage band.

Despite the best efforts of the IHO to enforce this rule, there are still some areas of the world where territorial disputes result in ENC overlaps. This situation is unlikely to change in the foreseeable future, therefore ECDIS manufacturers must be aware that data will be loaded into ECDIS that in some cases may have significant overlaps within the same usage band.

To enable the ECDIS to still function correctly OEMs must build contingencies into their systems to cope with overlaps in disputed areas.

10.1.4 Gaps

~~8.2 Display Generator Requirements~~

During route monitoring the Mariners attention must be drawn to areas where there are gaps in the data coverage

10.2 Queries

To successfully use the Presentation Library make sure that the Display Generator is capable of: -

- Detecting whether a point object is located inside or outside of any of the area objects of group 1 (earth's surface). Some conditional symbology procedures are based on this capability.ECDIS must be capable of performing spatial queries on ENC data during import and symbolisation. Spatial query is understood as possibility to inspect graphical location and numerical value of spatial coordinates associated with a charted object. Spatial query could be available as a part of cursor pick (see 10.8) or as an independent function. Due to the complex nature of these queries it is recommended that the inspector of this requirement tests extensively that all required geometric primitives are accounted for in these tests and that the conditional symbology procedures are thoroughly understood during manufacture. Refer to section 12 for further details of which queries are required.
- Detecting whether two or more feature objects are referring to the same spatial object like an area, line or point. Duplicate spatial objects that are located at the same position and share the same extent (their coordinates are identical) should be treated as one. The relationship of a group of feature objects to one or a group of identical spatial objects is needed to derive the correct symbolization. For example, a depth contour and the two adjacent depth areas are referring to ("use") the same edge (or a set of identical edges) since the edge is part of the depth contour as well as part of the boundaries of the depth areas. Such a relationship should be derived from the data to allow for a decision by a conditional symbology procedure whether the contour is a safety contour.

IHO S-64 contains examples of cases which an ECDIS at least shall be able to handle.

8.310.3 How to use the Look-Up Tables

As a fail-safe measurePrior to drawing any chart objects on screen, the first action in drawing the ECDIS display should bemust perform as a fail-safe measure, is to cover the screen with grey NODTA colour fill together with fill pattern NODATA03. Display priority is 0, supressed by radar, category «"displaybase»", viewing group is 11050.

8.3.1 Items not in the Look-up TableA few This section describes how S57 features objects are converted to drawable symbols, line and fill styles using the lookup tables. A number of ECDIS display requirements ofderived from the IMO Performance Standards and the IHO specifications cannot beare not handled by look-up tables. These are described in section 8.5.10.5.

8.3.210.3.1 Layout of the Look-Up tables

8.3.2.1 (Details of the above)

The S-52 look-up tables are made up of five separate lists. The look-up tables specify how object classes are presented graphically on the ECDIS screenchart display. Each look-up table entry (i.e. look-up table line) contains sixcontains six mandatory fields plus one optional (see section 11, for examples)field separated by commas "," and using the double quote " as a text delimiter for each value. The following lookup tables are defined:

Symbolised boundaries for area features.

Plain boundaries for area features

Line features

Simplified point features

Traditional point features.

10.3.2 Lookup Table Line Example

"BOYCAR","BOYSHP2","SY(BOYCAN01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"

Field	Description	Look-Up Table Entries Example
1	feature object acronym	BOYCAR
2	feature attribute	BOYSHP2
3	symbolization instruction	SY(BOYCAN01);TE('by%s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)
4	display priority	8
5	OVERRADAR flag	O
6	display category	STANDARD
7	optional viewing group	27010

The fields are defined as follows:

~~1. field - code of the object class~~
~~2. field - attribute combination~~
~~3. field - symbolization instruction~~

Feature object acronym – This is the S57 acronym for a particular feature class, e.g BOYCAR, LNDARE etc. A default value of "######" is also defined.

Feature attribute combination – This field is used to define a set of feature attributes which may be matched. It consists of a concatenated list of valid S57 attribute acronyms together with optional values. A line in the lookup tables matches a given feature object if, and only if, fields 1 and 2 match according to the rules defined in this section.

Symbolisation instructions. The instructions to be used to symbolise the feature objects. This may be composed of any of the sybmolisation commands defined in section XX of this document.

~~4. field - display~~Display priority

~~5. field -~~ OVERRADAR flag

~~6. field - display category membership~~

Display category – can be "DISPLAYBASE", "STANDARD", "OTHER", "MARINERS STANDARD" or "MARINERS OTHER".

~~7. field - optional viewing~~Viewing group.

~~8.3.3~~10.3.3 Matching ~~to~~Entries in the ~~Look-up Table~~Lookup Tables

~~8.3.3.1 (Details of the above)~~

~~Note~~It is important to note that look-up table lines ~~of~~with the same feature object class in field 1 must be ~~kept~~grouped together and the order ~~used~~defined in the Presentation Library must be

preserved, in order to provide correct symbolization. The order of the attributes within a given line has no significance, but the order of the attribute values within a given attribute field (2) is significant (see 8.3.3.3). When a matching line is found for a feature object the lookup table line used for its symbology instructions must then also be used for display priority, over radar flag, IMO category and optional viewing group unless modified by a conditional symbology procedure..

8.3.3.2 (Details of the above)
10.3.3.1 Look-Up Table Entry Matching

To find the symbology instruction for a specific object, enter the look-up table with the object's class code and gather all lines that contain the class code in field 1. If only a single line is found, field 2 of that line shall be empty and the object is always shown with the same symbology regardless of its description.

8.3.3.3 (Details of the above)

If there is more than one line in the look-up table, search for the first line each of whose attribute values in field 2 can also be found in the attribute values of the object. If more than one attribute value is given in the look-up table, the match to the object must be exact, in order as well as content.

For example, a look-up table attribute value 4,3,4 is not matched by object attribute values 3,4,3 or 4,3. However, the existence of further attribute values does not invalidate the match: in the above example object attribute values 4,3,4,7 would match the look-up table, (because value 7 is not used in symbolizing). Use the symbology instruction given by that line in field 3 to symbolize the object's geometry. As a further example, an object "BCNLAT","COLOUR3,1", for which there is no exact match in the simplified point look-up table, should be symbolized using the line for "BCNLAT","COLOUR3".

Look- Up Table	Data Match	Result
attribute value 4,3,4	attribute values 3,4,3	No Match
	attribute values 4,3	No Match
	attribute values 4,3,4,7	Match (value 7 is not used in symbolization)

IMPORTANT: If no look-up table line can be identified where all attribute values in field 2 match the object's attributes, select the symbology instruction from the first line that contains the object class code in field 1. Field 2 of this line shall be empty and field 3 shall contain a fail-safe generic symbolization instruction.

8.3.3.4 (Details of the above)
10.3.3.2 Look-Up Table Attribute Matching

The rule in the paragraph above applies in the usual case when the look-up table contains specific values of the attribute in field 2. In this case fields 1 and 2 are of the general form: "OBJCLS", "ATTRBAiATTRBBj", where ATTRBA (attribute A value "i") and ATTRBB (attribute B value "j" may be found in) are drawn from the SENC. Only values «"i»"" and «j»"j" of ATTRBA and ATTRBB respectively will give a match.

Other forms of look-up table linefeature object/attribute matching may be used in certain cases:

(i) No value is given for the attribute value in field 2; the value is missing.
This look-up table line is of the form "OBJCLS", "ATTRBA".
It is used when the same symbolization is to be employed for all values of attribute A.

Any value of the attribute except «unknown» will give a match.

(ii) The placeholder “?” is given for the attribute value.
This look-up table line is of the form "OBJCLS", "ATTRBA?".
Only the attribute value=unknown (i.e., omitted in the data) will give a match in this case. S57 defines how “unknown” is encoded as a value for various attribute types.

Example: "DEPARE","DRVAL1?DRVAL2?","AC(NODTA);AP(PRTSUR01)" etc., which is the symbolization for an incompletely surveyed area.

(iii) There is one instance where S-57 uses the «omission» of a mandatory attribute (i.e., the mandatory attribute is not there, itspresent and the attribute code is omitted) to code a specific object: “TSSLPT”,””, where ORIENT is omitted, codes a traffic junction.

In every other case, the first look-up table line for each object class omits all attributes and is used to give the default symbolization. for that feature object..

Note: there are no spaces in any of these formats.

8.3.3.5 (Details of the above)

The line used for symbology instructions must also be used for display priority, over radar flag, IMO category and optional viewing group.

8.3.3.6 (Details of the above)

10.3.3.3 Look-Up Table Conditional Symbology

For some object classes the relation between attribute values and symbology instruction is too complex or the presentation depends on mariners' selection. Therefore a conditional symbology procedure is calleddefined in the "symbolization instruction"- field which in turn produces the symbology instructions for presentation and may modify the priority and/or, the radar flag and/or IMO, theIMO category and/or viewing group.

8.3.3.7a10.3.3.4 Symbolizing an object ofa non-ENC object class

IfWhen there is no look-up table lineentry matching the object at all, the look-up table is incomplete or the object is of an unknown object class. If this happens, a caution should be shown on the mariners' interface and a '?'. The ECDIS presentation should take the symbol ('QUESMRK1' symbol, pattern or line style) should be shown) as a fail-safe presentation, which on cursor inquiry of attributes INFORM and or TXTDSC would display text explaining the object in the SENC. All standard S-57 attributes permitted for ENCs that have been populated, must also be available for cursor enquiry. For an area use SY(QUESMRK1) as a centred symbol and for the areas with symbolized boundaries use LC(QUESMRK1) to symbolize the boundary. Display priority is 5, over radar, IMO category is 'standard', and viewing group is 21010.

8.3.3.7b Symbolizing an object with non-ENC attributes or non-ENC attribute values

Closely following sections 8.3.3.2 and 8.3.3.3 will result in a fail-safe symbolization of the object by the default symbolization for that object class." For a non-ENC attribute, apply default symbology for the valid object class. For a non-ENC attribute value, apply default symbology for the valid object class/attribute combination. INFORM and or TXTDSC attributes (and any other valid ENC-

attributes that have been populated) must be available to the mariner in every case by Pick Reports.

Symbol	QUESMRK1
Display Priority	**5**
Over Radar	**O**
Display Category	**Standard**
Viewing Group	**21010**

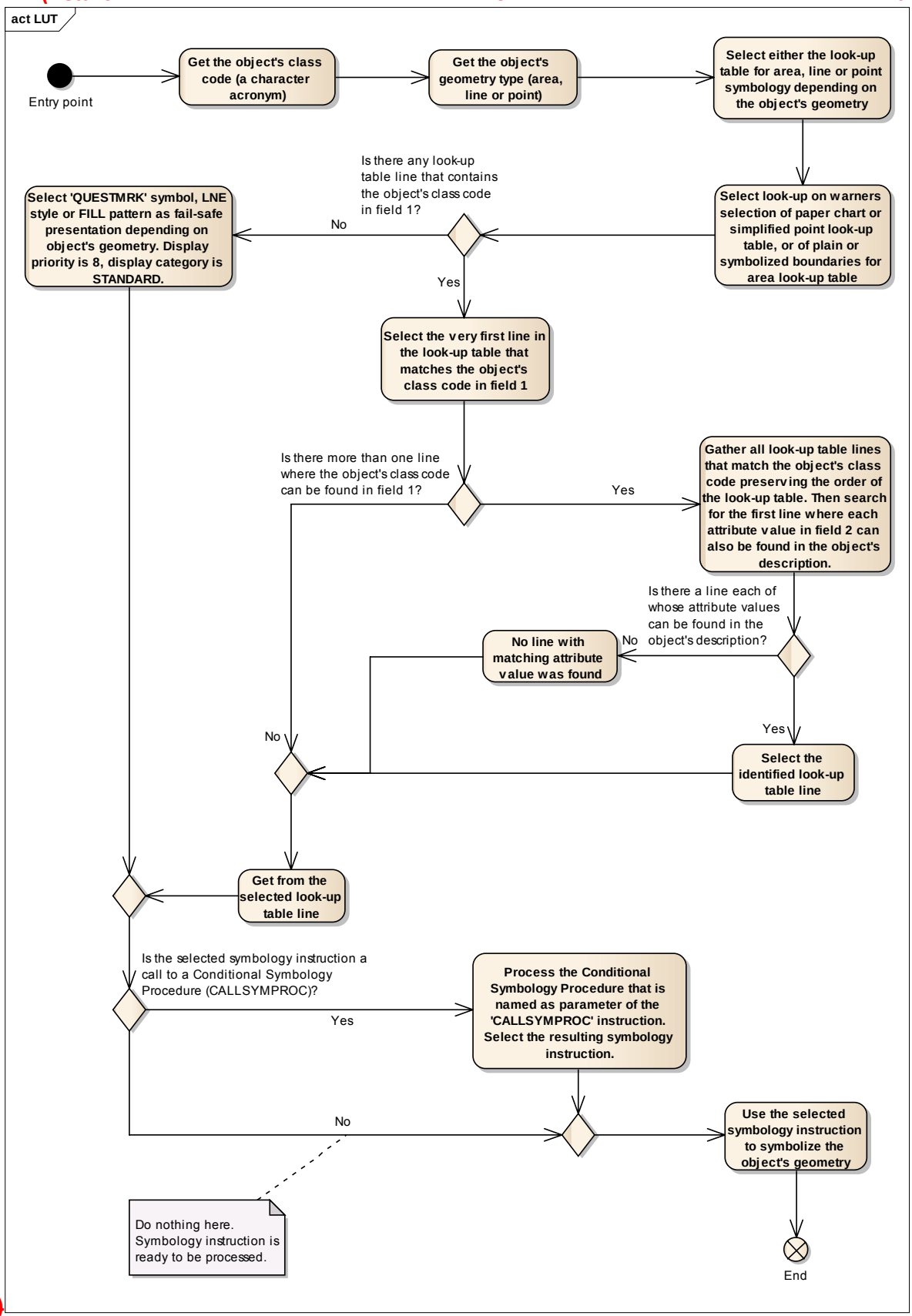
8.3.3.8 (Details of the above)

10.3.3.5 UML Diagram, How to use the Lookup Tables

The following flow chart diagram explains in detail how to use the look-up tables.

Fig. 5 - How to use the look-up tables

8.3.3.9 (Details of the above)



10.3.3.6 Undefined atttributes

The symbology instruction may refer to attributes that are not listed in field 2, for example CS(RESTRNnn) or TX(OBJNAM...). If these attributes are not includedundefined in the SENCfeature object, this particular command word should be passed overignored and the rest of the symbology instruction should be completed.

8.3.3.1010.3.3.7 'No symbolSymbol' - Objects

In some cases the "symbolization instruction"-fields in a look-up table line are empty. Such an explicitly "empty" instruction means that no actual presentation for the respective object is required by the presentation library. Such objects are not symbolized and they are not shown on the screen. For example, anthere is no symbolisation of a point object of the class BRIDGE is not shown since the coding of a bridge crossing waters as point object is not useful and will not occur. BRIDGE feature The empty entry into the look-up table is simply for completeness.

8.3.3.11 Presentation of New Object NEWOBJ10.3.3.8 Presentation of New Object NEWOBJ (S-57 3.1.1)

The 'New Object' feature class has been added to the S-57 Object Catalogue for detail on its use and encoding please see the S-57 Use of the Object Catalogue. NEWOBJ will cater for future requirements specified by the IMO that affect safety of navigation which cannot adequately be encoded by any existing S-57 object class. It will not be used unless approved by the Transfer Standard Maintenance and Application Development Working Group (TSMAD) and the Digital Imaging and Portrayal Working Group (DIPWG).

For the presentation of objects of class NEWOBJ two alternative presentation options are provided by the PresLib which do not rule each other out. On the contrary, both solutions cover different options of application.there are two defined presentations to be used depending on whether the SYMINS attribute is defined.

8.3.3.11a Default symbol for NEWOBJ

BecauseAs there may be very little information available (beside the values of the attributes INFORM and/or TXTDSC), a well -known attention grabbing symbol seems to be appropriatehas been used as the default symbolisation when SYMINS is undefined. To distinguish a new object symbol from the standard "Non ENC object" symbol (magenta question mark), an exclamation mark shaped in a magenta filled circle has been developed. The new symbol is named 'NEWOBJ01'. This symbol is called by Look-up table entries to by found under 11.1, 11.2 and 11.3.If the SYMINS attribute is defined then it is used to symbolise the feature object using the 'SYMINS01' conditional symbology procedure.

8.3.3.11b Encoded symbolization for NEWOBJ

The 'New Object' feature object class has been supplemented to the S-57 object catalogue in order to cater for possible future requirements specified by the IMO and that affect safety of navigation which cannot adequately be encoded by any existing object class. It must not be used unless approved by the Transfer Standard Maintenance and Application Development Working Group (TSMAD) and the Colours and Symbols Maintenance Working Group (CSMWG) and issued as an ENC Encoding Bulletin.

As stated for the use of NEWOBJ01 to depict the NEWOBJ, its visualisation is a generic one, which means that the symbol is not self-explanatory but has been designed to grab attention. The user must select the pick report if he wants to learn more about the nature and designation of this object. To visualise such objects in a more meaningful way, the concept of cartographic objects from earlier editions of S-57 (Version 2.0) and the S-52 PresLib has been re-introduced. This

"encoded symbolisation is given as second alternative option to visualise NEWOBJ. This method effectively binds a direct call of a symbol by its dedicated PresLib symbol name to the encoded object. This call is activated by a new optional attribute called symbol instruction (SYMINS). If this new attribute is populated with a valid symbol name (to be taken from the PresLib, Edition 3.4 Addendum), the specified symbol will be displayed on ECDIS. If this new attribute is not populated, or populated with an invalid symbol name, the default symbology as described under 8.3.3.11a will be displayed by default. This approach provides encoders with an option to select the symbol they consider best reflects the nature of the feature.

If it is required to encode a new object specified by the IMO and that affects safety of navigation which cannot adequately be encoded by any existing S-57 E3.1 object class, it must be done using the feature object class NEWOBJ. The 'New Object' feature object class must only be used in conjunction with an Encoding Bulletin issued by the IHO. The Bulletin will provide the specifics on how to use the object class for a particular application. The 'New Object' feature object class must not be used under any other circumstances.

Geo Object: New Object (NEWOBJ)
Attributes: CLSDEF CLSNAM COLOUR COLPAT CONDTN CONRAD CONVIS DATEND DATSTA NATION NOBJNM OBJNAM PEREND PERSTA RESTRN STATUS WATLEV INFORM NINFOM NTXTDS SYMINS TXTDSC

Remarks:

- When approved for use, the attribute CLSDEF must be defined in the data itself and is the detailed definition of all objects comprising the new object class. It is comparable to the definition section of an existing object class in the object catalogue. All objects that belong to the same object class (CLSNAM) must use an identical definition and this definition must also be used for the proposal to the S-100 feature data dictionary manager.

- When approved for use, the attribute CLSNAM must also be defined in the data itself and contains the descriptive name of the object class. For an object class that is defined in an existing object catalogue, this is the name of the object class e.g. 'Depth Area'. CLSNAM must not be used for the common name of the real world object. Common names must be encoded by use of OBJNAM and or NOBJNM. CLSNAM is a generic name to categorize all objects of one class and therefore all objects that belong to the same object class must have an identical CLSNAM. The value used for CLSNAM must also be used for the new feature object class when it is proposed to the S-100 feature data dictionary manager.

- At least one of INFORM or TXTDSC is mandatory, not both. INFORM is used to describe the feature for ECDIS systems that are not yet E3.1.1 compatible, as was done for the new attribute values for S-57 E3.1. For consistency, when one or both of these attributes is used, the text must commence with the approved object class name (CLSNAM) of the feature, such as 'Archipelagic Sea Lane'.

- This object class has default symbology in the S-52 Presentation Library Edition 3.4 (and later editions), however for features that are considered to affect safety of navigation, an existing symbol must be approved by TSMAD and CSMWG from the S-52 Symbol Library, in order to portray the feature more accurately on an ECDIS. If the attribute SYMINS is populated with a valid symbol instruction, this will override the default symbology. Note that there are separate symbol names for point, simple and complex lines, area and text symbology.

- A corresponding Encoding Bulletin will provide the specific attribute values (strings) and instructions on how to use the object class for a particular application. This

object class must not be used without an ENC Encoding Bulletin issued by the IHO on the authority of TSMAD/CSMWG.

In addition to the issue of the Encoding Bulletin, a new feature object class proposal (and new attributes if necessary) must also be made to the S-100 feature data dictionary manager. For future editions of the product specification, the new object class will be considered for inclusion in the object catalogue.

8.3.410.3.4 Display Priority, Radar Priority, Display Category, Viewing Groupgroup

8.3.4.110.3.4.1 Display Priority

Each symbolization instruction except of text drawing from a look-up table line has a display piority given in field 4. Each symbolization instruction from a look-up table line has a display priority given in field 4. The display priority can be of a value between '0' and '9', where '9' identifies the highest priority. The display priority applies irrespective of whether an object is a point, line or area. If the display priority is equal among objects, line objects have to be drawn on top of area objects whereas point objects have to be drawn on top of both. If the display priority is still equal among objects of the same type of geometry (area, line or point) the given sequence in the data structure of the SENC, or some other neutral criterion, should be used for an arbitrary decision as to which object is drawn on top. Text should be drawn last (except for ownship etc.), in priority 8.

The display priority should be used to ensure that objects that overlap each other are drawn in the right sequence. Thus, an object with a higher priority should be drawn after (on top of) an object with a lower display priority. However, if two line objects, or two area boundaries, or a line and an area boundary, are located at the same position and share the same extent (their coordinates are identical), then the line symbolization with the higher display priority must suppress the line symbolization of the other object (line or area). Therefore only the line symbolization of the object (line or area) of the higher display priority is drawn. Please study the following example:

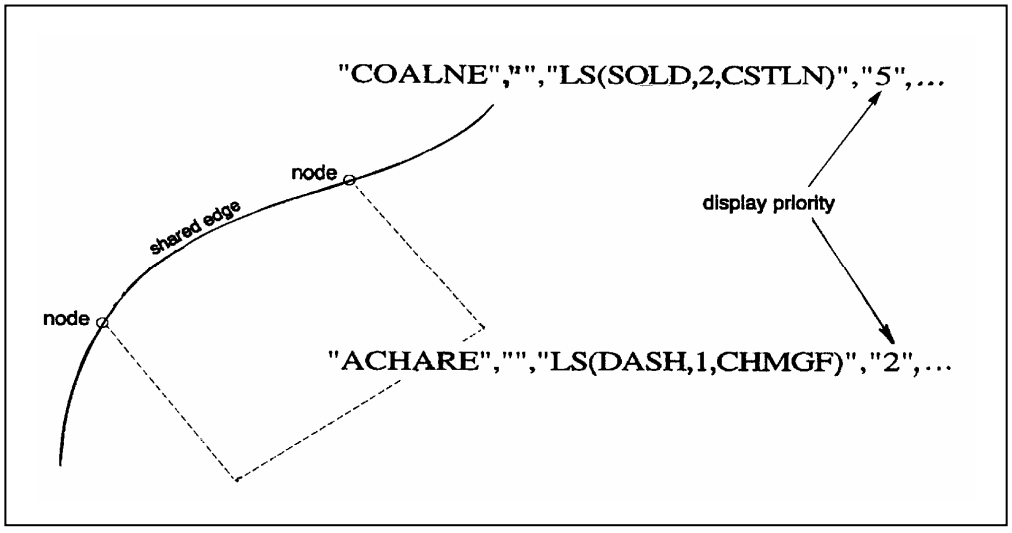


Fig. 6 – ??Symbolization of shared edges

The coastline object is symbolized with a solid line while the anchorage area is bordered with a dashed line. Both objects share an edge that is part of the coastline. The symbolization of the coastline object suppresses the border of the anchorage area since the display priority of the coastline symbolization is higher. Note that priorities have to be evaluated again, if the presentation scale changes (see 8.4).

Remember, thisThis suppression only applies betweento line objects, which includes and area boundaries. The rule for centred symbols, area patterns and point symbols is that all symbols should be drawn ,with the highest priority object being drawn last independent of whether it be the geometric primitive (point, line or area).

There is one exception to this rule for suppressing overlapping lines. The manual chart correction lines LC(CHCRIDnn) and LC(CHCRDELn) should coexist with the underlying line. Both LC(CHCRIDnn) or LC(CHCRDELn) and the underlying line should be drawn.

Overdrawing may be essential, for example in thatthe case of a buoy, and its name, its and light flare. These are given offsets in the symbol library to avoid overwriting.the symbols being drawn over each other..

The following table gives a general indication of how priorities are allocated. Within each group priorities are adjusted to meet specific cases:

Data Groupings	Display Priorities
no data filled area pattern	priority 0
S-57 group 1 filled areas	priority 1
superimposed areas	priority 2, 3
restricted area	priority 5
traffic areas	priority 6
land features	priority 4, 5
water features	priority 3, 4, 5, 6
coastline features	priority 5, 6, 7
routeing lines	priority 5, 6, 7
symbols for lines and areas	priority 4, 5, 6
no data filled area pattern S-57 group 1 filled areas superimposed areas (e.g. CANALS) restricted area traffic areas land features water features coastline features routeing lines symbols for lines and areas hazards (bridge, safety contour) mariners VRM & EBL own ship	priority 0 priority 1 priority 2, 3 priority 5 priority 6 priority 4, 5 priority 3, 4, 5, 6 priority 5, 6, 7 priority 5, 6, 7 priority 4, 5, 6 priority 8 priority 9 priority 9
mariners VRM & EBL	priority 9
own ship	priority 9

Note that the display priorities for look-up table entries are provisional values that may change in the light of experience.

Display Priorities table

8.3.4.2 'Overradar' layer
10.3.4.2 RADAR Flag

Field 5 of the look-up table lines contain the OVERRADAR flag. It classifies whether objects are shown on top of the raw radar picture. Two different values can occur in this field:

'O' which puts the object's presentation over radar; and
'S' which means that presentation is suppressed by radar

Value	Description
O	puts the object's presentation over radar
S	the presentation is suppressed by radar

Radar Table

Thus, OVERRADAR is similar to a display layer that assigns objects to the information shown on top of the raw radar picture. As a fail-safe, objects are automatically assigned 'O' OVERRADAR if field 5 of a look-up table line is empty.

8.3.4.310.3.4.3 Display Categories

Every entry to the look-up table matches either all objects of an object class or a subset of objects. Therefore the look-up table can be used to assign the objects to the IMO Display Categories (see IMO Performance Standards for ECDIS [32]).

The IMO "display categories" are as follows:

Display Base is that part of the Standard Display which should be permanently retained on the display (see IMO Performance Standards [2]).

The **Standard Display** information is that part of the SENC which should be presented when the ECDIS display is first switched on, and at any time by a single operator action (see IMO Performance Standards [32]).

~~The Display Base is that part of the Standard Display which should be permanently retained on the display (see IMO Performance Standards [3]).~~

All Other ~~information~~**Information** includes all SENC information that is not in the Standard Display, to be displayed on demand by the mariner.

10.3.4.4 Independent Mariner Selections

There are a number of settings in ECDIS that can be operated by the Mariner that will alter the charted display. Each of these objects has a display category assigned but must only be shown in that display cataory if the Mariner has decided to select this option. Listed below are the features that can be operated by the Mariner.

ECDIS Function	Function Description
Optional	Four Colour Depth Shades
Mandatory	Shallow Water Pattern
Mandatory	Turn SCAMIN Off
	Full Light Lines
	Show Correction – This function turns on colour highlighting for the objects which have undergone modification in the process of the latest accepted correction;
	Highlight Info - “i” symbol on top of objects with INFORM attribute;
	M-quality Objects [Quality of data]
	National Names
	Date Dependant Objects – to turn on the display of temporary objects regardless of their effective time;
	Question Mark – to turn on the display of objects which are

	not specified in S-52 standard;
	Shallow Danger – to turn on the display of isolated danger objects which are located in the unsafe waters.
	Contour Labels – to turn on the display of contour labels (incl. label of safety contour).

10.3.4.5 Mariners objects

The own-ship symbol and planned route are always required on the route monitoring display by IMO PS clause 10.5.1, and so must be contained in the display category Display base. All other mariners' navigational objects, which are listed in the look-up table under "Non-standard classes", are initially assigned in the look-up tables to a default "Mariners' Standard" or "Mariners' Other" category. However the mariner should have the option of changing the category of any non-standard object class (except for Display base), to suit his operational needs.

The following key words in field 6 are used to assign the look-up table entries to display categories:

DISPLAY BASE - assigns the object to the Display Base
STANDARD - assigns the object to the Standard Display
OTHER - assigns the object to Other Information

MARINERS STANDARD - assigns the object to Standard Display, or which ever category the mariner assigns them to
MARINERS OTHER

Look-up table - Field 6 values	Description
DISPLAY BASE	assigns the object to the Display Base
STANDARD	assigns the object to the Standard Display
OTHER	assigns the object to Other Information
MARINERS STANDARD	assigns the object to Standard Display, or whichever category the mariner assigns them to
MARINERS OTHER	

8.3.4.4 10.3.4.6 Viewing Groups groups

The mariner should have effective control over which features appear on the display (subject to the over-riding requirements of IMO category), as required by the IMO ECDIS Performance Standard section 3.5.

The viewing groups suggested in table 13.214.2 are intended as a framework on which the ECDIS manufacturer can base his own method of providing this capability. The minimum mandatory ECDIS implementation is described in 14.3 and 14.5.

Viewing groups are 'on' or 'off' switches for use by the mariner to control the information appearing on the display. An item in the viewing group table may be a chart object; a mariners' or other time-variable object; a special symbol such as the "depth less than safety contour" pattern; or a non-ENC feature such as the shallow water pattern. In edition 3.3 further 'symbol viewing groups' have been added, to allow auxiliary symbols such as contour labels, the 'low accuracy' symbol, etc., to be switched on or off without affecting the primary symbolisation of the object.
Items in the viewing group tables in section 13.214.2 are arranged in numbered groups (e.g. group 26230 consisting of the items pipeline area and cable area) which in turn are arranged in setslayers (e.g. setlayer 26000 consisting of cautionary areas). The groups are arranged by IMO Category, in the sequence of INT 1 [2] for the paper chart. Mariners are generally familiar with INT 1 [21].

The manufacturer may use the viewing group scheme or not, as he prefers. If he does use it, then in some cases a single item, such as soundings (33010) should probably be selectable. In other cases several groups from different sets may be combined. However groups

IMPORTANT: Groups from different IMO categories should not be combined.

Although the viewing groups reflect the IMO category, the authority for category is the classification in field 6 of the look-up table.

The Presentation Library provides a similar classification for text - see section 7.1.3 and 13.3. 15.

8.3.4.5

10.3.4.7 Display Priority & Display Category in Conditional Symbology Procedures

A conditional symbology procedure is called from the look-up tables (see 7.514). Thus the symbolization that is generated by the procedure has the display priority, OVERRADAR classification and display category which is given in field 4, 5 & 6 of the look-up table entry from which the procedure was called.

A conditional symbology procedure can assign the symbolization to another display category, put it on top of radar or give it a different display priority if necessary. Thus it 'overwrites' the default assignments given in the look-up table e.g. if a depth contour is identical with the safety contour the depth contour is assigned to the DISPLAYBASE category (see symbology procedure diagram 'DEPCNT03', section 1214).

In the symbology procedure diagram the new assignment is given explicitly if the conditional symbology procedure overwrites the default look-up table assignments. The default assignments from the look-up tables are valid if there is no explicit assignment for display category, display priority or OVERRADAR.

8.3.5 Test Edition of the Presentation Library
10.3.5 Check Symbol SY(CHKSYM 01)

The Test Edition is no longer required in IEC 61174 and has been removed permanently from the digital Presentation Library. However symbol SY(CHKSYM 01) has been retained for use in checking symbol size.

8.4

10.4 Display of objects depending on date or on display scale- Date Dependent and Display Scale

8.4.1 Date-dependant objects

10.4.1 Date Dependent Objects

SomeThere are a number of objects within the Marine environment, which are seasonal, such as seasonalracing buoys,. These objects are only to be displayed over a certain period. S-57 uses the attributes Period Start (PERSTA to) and Period End (PEREND) to encode these dates. Other objects, such as a traffic separation scheme, may have a date on which they are introduced (DATSTA) or discontinued (DATEND)traffic separation schemes, use the attributes Date Start (DATSTA) and Date End (DATEND) to indicate their introduction or removal. In order for the Mariner to receive important changes to traffic separation schemes before the event Hydrographic Offices are required to provide updates or new editions containing the alterations at least one month before they come into force. Any object with one of the above attributes shouldmust not **normally** be displayed outside its effective dates (see figure 1)unless requested by the Mariner.

However toTo provide forthe Mariner with effective route planning; capabilities and for the look-ahead function during route monitoring; or for other purposes, the ECDIS should allow the mariner to view chart data for any required date and time for the purpose of reviewing pre-planned changes in chart data. The ECDIS manufacturer may provide this either: ECDIS must allow the display of date dependent chart data based on a selectable date range (start viewing date and end viewing date).

During route planning and monitoring the mariner must be able to select a date or date range in the future to display all chart objects.

Example: A new traffic separation scheme is coming into effect on 01.01.2013, it has been encoded by the ENC producer using the attribute date start (DATSTA). The current date is 12.12.2012 and the Mariner is planning a route that will cross this area over the effective start period.

The ECDIS must be capable of providing the Mariner the ability to set the date he will be in the area (02.01.2013) and the system must show the new traffic scheme.

IMPORTANT: When viewing date or date range do not include current date. The mariner must be informed by a permanent warning on the chart display that the date has been adjusted. Please use one of the following options below:

Display Not Real Time – Display is based on date dd mmm yyyy

Or

(a.) By allowing the mariner to select a date for displaying all chart objects active at that date and time, OR

Display Not Real Time – Display is based on viewing date range from dd mmm yyyy to dd mmm yyyy

(b.) By allowing the mariner to display all objects in the ENC, irrespective of the current date. Information on the date and time window for which objects of interest are in existence should then be available by cursor pick report through viewing the date-dependent attributes.

(Note: dd mmm yyyy = Day, Month, Year, example; 28 Jan 2014)

When this option is in use, the mariner must be reminded that the information on the display may not be correct for the actual, current, date and time.

8.4.2 10.4.2 Scale-dependant objectsDependent Objects

SomeTo reduce screen clutter most objects (such as intermediate depth contours) maywithin ENC will carry the attribute SCAMIN to specify the smallest display scale at which they shouldmust be drawn. At display scales smaller than SCAMIN the object should not be drawn, in order to avoid clutter. For example, an object with a SCAMIN value of 50,000, indicating a scale of 1/50,000, should not be drawn on an ECDIS display of 1/60,000.

ECDIS must provide a function to turn off the SCAMIN attribute to display all objects in the chart display.

8.5 IMO presentation nstructions which cannot be handled10.5 IMO Presentation Instructions not Handled by Look-up Tables

In some cases the Presentation Library does not provide a symbology instruction in the look-up tables or flow chart of a conditional symbology procedure that specifies how to present a specific feature on the ECDIS screen. The reason is, that such a feature cannot be clearly identified as an S-57 object class or it appears to be illogical to include it to the mariners' navigational object classes (see Part II for further details and definitions of the mariners' navigational object classes).

Therefore, the following presentation instructions are in free text in order to assist the manufacturer to set up a satisfactory and comprehensive ECDIS display. The manufacturer can achieve a correct presentation by handling these cases in his software individually. All symbols, line styles or fill pattern mentioned in the text are on the distribution CD. Note that this section will always be necessary, since nothing is perfect in our world.

8.5.1 Detecting the Safety Contour

IMO Performance Standards for ECDIS [3] requires that "ECDIS should give an alarm if the ship, within a specified time set by the mariner, is going to cross the safety contour".

Note that the HO may not draw any contours round small isolated dangers. However conditional symbology procedure UDWHAZ identifies all rocks, wrecks and obstructions that require a safety contour, and the output of this procedure through calling procedures OBSTRN and WRECKS may be used in generating alarms. One object, LNDARE as a point (islet) or line (isthmus) is not covered by procedure UDWHAZ; it should be added to the safety contour detection process as a separate item.

8.5.2 Units of depths:

IMO PS [3] requires that units of depth be part of the display base. However S57 does not permit any other unit of depth than metres, and so it is no longer necessary to display the earlier symbols UNITFTH1 and UNITMTR1. These symbols are hereby removed from the PresLib.

8.5.310.5.1 Scalebar and latitude scale:Latitude Scale

For display scales larger than 1/80,000 (e.g. a scale of 1/50,000) draw symbol 'SCALEB10' on the left side of the chart display (so that the mariner knows where to look for it), bottom justified and about 3mm in from the border of the display. Make sure the symbol is properly sized by your software to represent 1 nautical mile (1852 m) at the scale of the display. For display scales of 1/80,000 or smaller (e.g. 1/250,000) use symbol 'SCALEB11', similarly located, and scaled to represent 10 miles at the scale of the display. For both symbols the display priority is 9, over radar, category display base, viewing group 11030.

Symbol	SCALEB10 SCALEB11
Display Priority	9
Over Radar	O
Display Category	Base
Viewing Group	11030

8.5.4 10.5.4 North arrow: Arrow

Use symbol 'NORTHAR1' to indicate true north. Place it in the top left corner of the chart display, inside the scalebar. Rotate the symbol to true north if the display is other than north up, and make sure it is clear of the scalebar even if the latter extends the full height of the display. Display priority is 9; over radar; category display base, viewing group 11040.

Symbol	NORTHAR 1
Display Priority	9
Over Radar	O
Display Category	Base
Viewing Group	11040

8.5.5 10.5.5 Graticule:

If the ECDIS shows a graticule (IMO PS [32]) the lines should be one unit wide, CHBLK.

8.5.6 10.5.6 Display mode: Mode

The ECDIS manufacturer should provide the indication of display mode required in the display base by IMO PS [32].

8.5.7 Night-time shallow water indicator:
10.5.7 Shallow Water Indicator

If When the entire water area on the ECDIS display is of less depth than the safety contour, it will is not be possible to for the Mariner to easily detect this problem at. The issue is exacerbated when the ECDIS is set to night mode due to the small differences between the depth area shades. A in the ECDIS chart display. Therefore S-52 provides a faint lattice pattern DIAMOND1 is provided to distinguish shallow water at night (see conditional symbology procedure SEABEDnn). Display priority is 3, suppressed by radar, IMO category is standard and viewing group is 23010. This is not a required feature, but it is recommended that it be made available. The mariner should be given the option of whether he wishes to use the pattern (see section 12.2.18 conditional symbology procedure "SEABED", last question).

IMPORTANT: The mariner must be provided with an option to turn the shallow water pattern on or off from within the ECDIS

Symbol	DIAMOND1
Display Priority	3
Over Radar	S
Display Category	Standard
Viewing Group	23010

8.5.8 Black level adjustment symbol:
10.5.8 Black Level Adjustment Symbol

Unless the brightness and contrast controls of the CRT, or similar controls for other types of monitor, are properly adjusted there is a danger that information may be lost from the chart display, particularly at night. Symbol BLKADJ is provided for checking correct adjustment and for re-adjusting as necessary. It should be available for call-up by the mariner as required. Instructions for its use are given in section 19.4 and Colour & Symbol Specifications, section 4.1.4.5. Display priority is 9; over radar; IMO category is standard display; viewing group does not apply as the black level adjustment symbol is a case of special call-up.

10.5.9 Detection and Notification of Navigational Hazards

The IMO Performance Standard for ECDIS MSC.232(82) clause 11.4.6 requires "ECDIS should give an indication, if, within a specified time set by the mariner, own ship pass closer than the user-specified distance for a danger (e.g. obstruction, wreck, rock) that is shallower than the mariner's safety contour or an aid to navigation". The following table lists the S-57 objects and their attributes that satisfy this condition and must precipitate an indication within the ECDIS. The point, line or area shall be graphically indicated using the presentation named as "dnghlt" in the look-up tables.

NOTE: The ECDIS manufacturer must always give an indication of the following dangers to the Mariner, however this requirement does not preclude providing additional functionality to allow the user options to alarm on these features.

S-57 Objects	Condition (if any)	Geometric primitive
BCNCAR		POINT
BCNISD		POINT
BCNLAT		POINT
BCNSAW		POINT
BCNSPP		POINT
BOYCAR		POINT
BOYINB		POINT
BOYISD		POINT
BOYLAT		POINT
BOYSAW		POINT
BOYSPP		POINT
BRIDGE		POINT, LINE, AREA
BUISGL		POINT, AREA
DAYMAR		POINT
DAMCON		POINT, LINE
FSHFAC		POINT, LINE, AREA
ICEARE		AREA
LITFLT		POINT
LITVES		POINT
LNDARE		POINT, LINE
LNDMRK		POINT, LINE, AREA
LOGPON		POINT, AREA
MORFAC		POINT, LINE, AREA
OFSPLF		POINT, AREA
OILBAR		LINE
PILPNT		POINT
PYLONS		POINT, AREA
SLCONS		POINT, LINE, AREA
OBSTRN	UDWHAZ04 "DANGER=False"	POINT, LINE, AREA
UWTROC	UDWHAZ04 "DANGER=False"	POINT
WRECKS	UDWHAZ04 "DANGER=False"	POINT, AREA
OBSTRN	CATOBS=8	POINT, LINE, AREA
SOUNDG	EXPSOU=2	POINT

10.5.10 Detection of Areas, for which Special Conditions Exist.

The IMO Performance Standard for ECDIS MSC.232(82) clause 11.4.4 requires "ECDIS should give an 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 Performance Standard for ECDIS also specify that the following areas should be detected:

- Traffic separation zone
- Inshore traffic zone
- Restricted area
- Caution area
- Offshore production area
- Areas to be avoided
- Military practice area
- Seaplane landing area
- Submarine transit lane
- Anchorage area
- Marine farm/aquaculture
- PSSA (Particularly Sensitive Sea Area)

The following table provides an authoritative mapping between the areas identified within the IMO Performance standard for ECDIS and S57 feature objects, their attributes and geometric primitives. The point, line or area features must be graphically indicated using the presentation named as “dnghlt” in the look-up tables.

IMO Special condition	**S-57 Object**	**Attribute**	**Geometry**
Traffic separation zone	TSEZNE		AREA
Inshore traffic zone	ISTZNE		AREA
Restricted area	RESARE		AREA
Caution area	CTNARE		AREA, POINT
Offshore production area	OSPARE		AREA
Areas to be avoided	RESARE	RESTRN = 14	AREA
Military practice area	MIPARE		AREA, POINT
Seaplane landing area	SPLARE		AREA, POINT
Submarine transit lane	SUBTLN		AREA
Anchorage area	ACHARE		AREA, POINT
Marine farm/aquaculture	MARCUL		AREA, LINE, POINT
PSSA (Particularly Sensitive Sea Area)	RESARE	CATREA = 28	AREA

10.5.11 Visulaization of the Safety Contour

The safety contour is defined as an edge between safe and unsafe skin of the earth objects. This edge shall be visualized using the presentation below.

"SAFCON","","LS(SOLD,3,DEPSC)","8","O","DISPLAYBASE","13000"

10.5.12 Detection of Safety Contour

The IMO Performance Standard for ECDIS MSC.232(82) clause 11.4.3 requires for route monitoring "ECDIS should give an alarm if the ship, within a specified time set by the mariner, is going to cross the safety contour". For route planning the IMO Performance Standard for ECDIS requires that "ECDIS should give an indication if the mariner plans a route across an own ship's safety contour".
The following table specifies the S-57 objects, conditions and geometry that constitute the safety contour and must therefore be used when raising the safety contour alarm.

The point, line or area shall be graphically indicated using the presentation named as "dnghlt" in the look-up tables.

S-57 Object	Condition	Geometry
DEPARE	CSP DEPARE02 "UNSAFE=TRUE"	AREA
DRGARE	DEPARE02 "UNSAFE=TRUE"	AREA
FLODOC	-	LINE, AREA
HULKES	-	POINT, AREA
LNDARE	-	AREA, POINT, LINE
PONTON	-	LINE, AREA
WRECK UWTROC OBSTRN	UDWHAZ	AREA, POINT, LINE
UNSARE	-	AREA

~~Although the controls of an LCD display differ from those of a CRT, the black-adjust symbol is also useful for checking LCD adjustment as well.~~

Note that the ENC may not have contours round small isolated dangers. However conditional symbology procedure UDWHAZ identifies all rocks, wrecks and obstructions that require a safety contour, and the output of this procedure through calling procedures OBSTRN and WRECKS must also be used in generating alarms as defined in the table above. One object, LNDARE as a point (islet) or line (isthmus) is not covered by procedure UDWHAZ and therefore has been added to the safety contour detection process as defined in the table above...

~~8.6 HO specified display features~~
10.6 HO-Specified Display Features

~~8.6.1 INFORM, etc., National Language~~
10.6.1 Additional Chart Information

~~8.6.1.1 (Details of the above)~~
10.6.1.1 Standard Attributes INFORM, NINFOM, TXTDSC, NTXTDS and PICREP

~~HOs may apply the INFORM attribute to any object to carry information that cannot be coded in S-57 format, such as a warning for a traffic junction, an abstract from a nautical publication, a pictorial representation of an object, etc~~Additional chart content is encoded using a number of standard attributes. The INFORM attribute is the most common and is used to carry extra information about feature objects. There are a total of five similar universal attributes:

~~INFORM + national language NINFOM~~
~~TXTDSC + national language NTXTDS~~

PICREP

S-57 Acronym	Description	Attribute Type
INFORM	Information	String, <=300 characters
NINFOM	Information in a national language	String, <=300 characters
TXTDSC	Textual Description	String encodes the file name of an external text file
NTXTDS	Textual Description in a national language	String encodes the file name of an external text file
PICREP	Pictorial Representation	String encodes the file name of an external picture file

~~To identify objects with such additional information, the ECDIS should, on mariner's command, identify all objects having any such attribute populated by means of SY(INFORM01). The mariner should~~**NOTE:** ECDIS must provide a function that allows Mariners to turn on and off the symbol INFORM01. The symbol INFORM01 should be used to indicate the presence of information contained in the INFORM attribute on all feature objects. The Mariner must then be able to access the ~~information by cursor pick. Note that this~~additional content using the pick report. This rule applies to all SENC objects whether symbolized by look-up ~~table~~tables or conditional symbology ~~procedure~~procedures.

The pivot point of SY(INFORM01) should be placed at the position of a point object, at the midpoint of a line object, or at the centre of an area object. SY(INFORM01) is intended as a temporary overlay. ~~It's~~ The display priority is 8, overradar, category other, viewing group 31030.

Symbol (SY)	INFORM01
Display Priority	**8**
Over Radar	**O**
Display Category	**Other**
Viewing group	**31030**

IMPORTANT: The ECDIS manufacturers ~~should~~must provide appropriate solutions that enable PICREP and other ancillary files to be displayed without affecting the night vision~~. (Note: this applies as of September 2001 – particular technical standards may be applied at a later date if found necessary).~~ of the user.

~~**8.6.1.2 (Details of the above)**~~

10.6.1.2 Display of National Language Attributes and Content

Information contained in National language ~~information is an optional supplement for ECDIS, and is not covered by the Presentation Library. See~~attributes and associated ancillary files (such as NOBJNM and information in NTXTDS files) can be encoded in a number of formats and many IHO member states encode such fields in their data. National language information is not covered by the ECDIS Performance Standard but it is however strongly recommended that OEMs support all text formats contained in the national language attributes and files, see S-57 Appendix B1 «ENC Specification» section 3.11 ~~for details.~~lexical level 2 for details.

8.6.2 Relationships and collection objects

The manufacturer should endeavor to develop appropriate solutions that minimize clutter for displaying information associated with collection objects.

The following paragraphs from clause 15 “COLLECTION OBJECTS” of S57 Appendix B.1 - Annex A 'Use of the Object Catalogue" (UOC) are quoted here for information:

“If a collection object extends beyond a cell boundary (i.e. the objects that make up the collection are spread over multiple cells), the collection object should be repeated in each cell that contains one or more component objects. However, only the objects that exist in the cell that contains the instance of the collection object can be referenced by that collection object. If this technique is used, each instance of the original collection object must have the same feature object identifier (LNAM). It is up to the application (e.g. the ECDIS) that uses the cells to rebuild the complete collection object based on the unique feature object identifier.

It is highly recommended that no use be made of pointers that reference objects outside the cell in which the pointer is encoded. Use of such pointers can not be prohibited as no such rule exists in the ENC Product Specification.”

8.6.3 ECDIS legend

A standard legend containing at least the following elements should be available for display. It may either be on the same screen as the ECDIS chart display, or on a separate screen.

10.6.2 ECDIS Legend

The following table indicates which ENC data elements must be used. Values, other than those defined in the data set record, should reflect the situation at the own ship’s position:

A standard chart legend containing as a minimum the following elements must be available for display via the pick report. The ECDIS ledgend will return values from the location selected by the Mariner.

The following table indicates which ENC data elements must be used.

ECDIS Legend	Values
1. unitsUnits for depth	DUNI subfield of the DSPM field.
2. unitsUnits for height	HUNI subfield of the DSPM field.
Note on 1., 2. – units**:**Units for depth and height: although the ENC Product Specification of S-57 does not allow any other than metric depths and heights, these two elements mayshould be stated for the information of unfamiliar users.clarity for the end user..	
3. scaleScale of display	Selected by user. (The default display scale is defined by the CSCL).
4. dataData quality indicator	a. CATZOC attribute of the M_QUAL object for bathymetric data. b. POSACC attribute of the M_ACCY object (if available) for non-bathymetric data.
Note: dueDue to the way quality is encoded in the ENC, both values (a and b) must be used.	
5. soundingSounding/vertical datum	SDAT and VDAT subfields of the DSPM field or the VERDAT attribute of the M_SDAT object and M_VDAT object when available. (VERDAT attributes of individual objects must not be used for the legend.)
6. horizontalHorizontal datum	HDAT subfield of the DSPM field.
7. valueValue of safety depth	Selected by user. Default is 30 metres.
8. valueValue of safety contour	Selected by user. Default is 30 metres.
Note: ifIf the mariner has selected a contour that is not available in the ENC and the ECDIS displays a default contour, both the contour selected and the contour displayed shouldmust be quoted.	
9. magneticMagnetic variation	VALMAG, RYRMGV and VALACM of the MAGVAR object. Item must be displayed as : VALMAG RYRMGV (VALACM) e.g., 4°15W 1990 (8'E).
10. dateDate and number of latest update affecting chart cells currently in use.	ISDT and UPDN subfields of the DSID field of the last update cell update file (ER data set) applied.

11. editionEdition number and date of the ENC.	EDTN and UADT subfields of the DSID field of the last EN data issue of current ENC issue of the ENC set.
12. chartChart projection	Projection used for the ECDIS display (e.g., oblique azimuthal). This must be appropriate to the scale and latitude of the data in use.

The list above is the minimum that should be available, but the complete list need not always be shown. Individual items might be picked by the mariner for display for a period; examples are magnetic variation, data quality for depths (M_QUAL, CATZOC) etc.

10.6.3 Light Description Text Strings

Previous versions of the presentation library provided c-code that enables the building of light description text string that must be presentented on the ECDIS chart display LITDSN01..The c-code has now been removed from the presentation library and a textual description of how light description should be constructed is provided. Control over how the light description is used in the display is still within the conditional symbology LIGHTS05. This section merely defines the syntax, layout and map of the S-57 attributes to the ECDIS text string

NOTE: Care must be taken when constructing Light descriptions for sectored lights.

To produce textual light descriptions in ECDIS, the ECDIS system must use an abbreviated form of the S-57 attributes of the Lights feature in a particular order. The number next to the attribute denotes the draw order in which the ECDIS must output the light description text string. Overall structure:

Category of Light (CATLIT)

Light Characteristic (LITCHR)

Signal Group (SIGGRP)

Colour (COLOUR)

Signal Period (SIGPER)

Height (HEIGHT)

Value of Nominal Range (VALNMR)

Status (STATUS)

The following tables define a map between the ENC attribute values and the required ECDIS textual output.

S-57 Attribute CATLIT - Category of Light

ENC Input	ECDIS Output

S-57 Attribute Code ID	S-57 Category of Light Attribute Value	Abbreviation
1	directional function	Dir
5	aero light	Aero
7	fog detector light	Fog Det Lt

S-57 Attribute - Status

ENC Input		ECDIS Output
S-57 Attribute Code ID	S-57 Status Attribute Value	Abbreviation
2	occasional	occas
7	Temporary	temp
8	Private	priv
11	extinguished	exting
17	un-watched	U

S-57 Attribute - Light Characteristic

ENC Input		ECDIS Output
S-57 Attribute Code ID	S-57 Light Characteristic Attribute Value	Abbreviation
1	Fixed	F
2	Flashing	Fl
3	long-flashing	LFl
4	quick-flashing	Q
5	very quick-flashing	VQ
6	ultra quick-flashing	UQ
7	Isophased	Iso
8	Occulting	Oc
9	interrupted quick-flashing	IQ
10	interrupted very quick-flashing	IVQ
11	interrupted ultra quick-flashing	IUQ
12	Morse	Mo
13	fixed/flashing	FFl
14	flash/long-flash	Fl+LFl
15	occulting/flashing	OcFl
16	fixed/long-flash	FLFl
17	occulting alternating	AlOc
18	long-flash alternating	AlLFl
19	flash alternating	AlFl
20	group alternating	Al
25	quick-flash plus long-flash	Q+LFl
26	very quick-flash plus long-flash	VQ+LFl
27	ultra quick-flash plus long-flash	UQ+LFl
28	Alternating	Al
29	fixed and alternating flashing	AlF Fl
Wrong	alternating occulting/flashing	AlOc Fl

Units of measure suffixes

S-57 Attribute	Description	Units of Measure
Signal Period	Seconds	s
Height	Metres	m
Value of Nominal Range	Miles	M

When the signal group value is set to or include "()" and/or "(1)" there is no requirement for this to be populated in the light description text. Only when the signal group value differs above mentioned values should the value be output on the ECDIS screen, this follows the paper chart convention Mariners are used to seeing.

The default presentation for each numeric value: signal period, height and value of nominal range is no decimals. If the value of the attribute has non-zero decimal part then the value is displayed to one decimal place.

8.6.4 Light description text strings

For example: Given a light with the following attributes:

The mariner may need to label all lights with a description in order to identify those he can see. A mariner-optional light description text-string is provided for this purpose, as a required sub-procedure of conditional symbology procedure LIGHTS (see 'C' program LITDSN on this CD).

Feature	LIGHTS
Light Characteristic	Flashing
Signal Group	(1)
Colour	White
Signal Period	30 seconds
Height	7 metres
Value of Nominal Range	10 miles

The ECDIS would display the lights textual description as follows: **FL W 30s7m10M**

8.7 10.7 Displaying of manual and automatic updates and added chart information Manual and Automatic Updates and Added Chart Information

8.7.1 10.7.1 Manual Updates

Manual updates of ENC information shouldmust be displayed using the same symbology as ENC information and should be distinguished from ENC information as follows:

8.7.1.110.7.1.1 Added feature:Feature

Point object: superimpose SY(CHCRIDnn)*
Line object: overwrite with line LC(CHCRIDnn)*
Area object: overwrite area boundary with line LC(CHCRIDnn) and superimpose SY(CHCRIDnn) on any centred symbol.

8.7.1.210.7.1.2 Deleted feature:Feature

The object should remain on the display and should be marked as follows:

Point object:	Superimpose SY(CHCRDELn)*
Line object:	Overwrite with line LC(CHCRDELn)* (do not remove the original line)
Area object:	Overwrite area boundary with line LC(CHCRDELn) and superimpose SY(CHCRDELn) on any centred symbol.

*SY(CHCRIDnn) means the current version of symbol CHCRID, i.e., CHCRID01 in 1997. CHCRID and CHCRDEL symbols have the category and viewing group of the object they are attached to, display priority «8», radar priority «O».

Note that theNOTE: The line symbols LC(CHCRIDnn) and LC(CHCRDELn) should must not suppress the underlying line (see section 8.3.4.110.3.4.1).

8.7.1.310.7.1.3Moved feature:Feature

As for deleted feature, followed by added feature.

8.7.1.410.7.1.4Modified feature:Feature

a) If the only modification is an addition(e.g., an existing buoy has a retro-reflector added with no other change): superimpose SY(CHCRIDnn) or LC(CHCRIDnn)

b) If the only modification is a deletion of a part (e.g., an existing buoy has a fog signal removed, or an area has a «fishing prohibited» restriction removed), then this creates both a change and a deletion and both should be symbolized:

Point:	superimpose SY(CHCRIDnn) and SY(CHCRDELn)
Line:	overwrite with LC(CHCRIDnn) and LC(CHCRDELn)
Area:	overwrite the boundary with LC(CHCRIDnn) and LC(CHCRDELn) and also superimpose SY(CHCRIDnn) and SY(CHCRDELn) on any centred symbol.

c) If the modification is an addition and a deletion then it is handled as in 8.7.1.410.7.1.4 b above.

A deleted feature should appear on the display only when its IMO category and viewing group are displayed.

S-52 Appendix 1 requires that a manually updated feature should be capable of the same performance in feature selection, response to cursor-picking, etc., as an ENC feature. In addition, it should provide updating information (identification and source of update, when and by whom entered, etc.) on cursor picking.

8.7.1.510.7.1.5Identifying automatic chart corrections on mariners demandAutomatic Chart Corrections On Mariners Demand

The ECDIS manufacturer shouldmust provide a means of identifying automatic chart corrections to the SENC on demand by the mariner.

8.7.210.7.2 Non-HO (nonNon-ENC) chart informationChart Information

8.7.2.1 Limited non-HO data added to existing HO ENC data to augment the chart information should be distinguished from the HO-ENC information as follows:

Point object:	superimpose SY(CHCRIDnn)
Line object:	overwrite with line LC(CHCRIDnn)
Area object:	overwrite area boundary with line LC(CHCRIDnn) and superimpose SY(CHCRIDnn) on any centred symbol.

Non-HO data should be distinguished from manually updated chart information, which uses the same identifiers, by cursor picking.

See IHO Colour & Symbols Specifications section 2.3.1c for information on how to symbolize other cases of non-HO data appearing on the ECDIS display.

8.7.2.2 Non-HO chart information may be updated by any systematic procedure. A record of updates should be maintained.

8.7.2.3 The mariner should be able to remove all non-HO chart information if the need should arise.

8.810.8 Cursor Pick and interface panel displayInterface Panel Display

8.8.1 Cursor Pick

8.8.1.1 IntroductionIntroduction

Previous versions of the presentation library have not given enough guidance on how cursor pick reports should be structured and the chart data presented to the Mariner. This has had a detrimental effect, creating undesired system variability when accessing additional chart information.

The ability to cursor-pick on an object for the additional information that lies behind the symbol is an important part of ECDIS capability. However, an unprocessed cursor pick, which does discriminate or interpret and merely dumps on the interface panel all the information available at that point on the display, will normally result in pages of unsorted and barely intelligible attribute information. This section suggests ways of making the information more useful.
Following consultation with OEMs a new section of of the presentation library devoted to pick reports will be written with clear guidance on how chart data must be presented in the cursor pick report. A deferred amendment will be published informing all OEMs of the all the changes.

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

No	Cursor Pick Rules
1	S-57 Object and Attribute Acronyms must not be used.
2	Enumerate or listed attribute ID number values must not be displayed
3	There must not be any padding of attribute values, e.g. a sounding of 10 metres should not be padded to 10.000000 metres as this could potentially confuse or mislead the user
4	Units of measure must be included after all attribute values which are weights or measures.

5	S-57 category “C” feature attributes must not be displayed unless requested by the user. Attributes in this subset provide administrative information about an object and the data describing it. In most cases it is of no practical use to the mariner. This information is only relevant to S-57 data transferred between Hydrographic Offices. An exception to show the value of SORDAT if it is for the following objects: - WRECKS, OBSTRN, UWTROC, and SOUNDG with value QUASOU= 9 and geometry attribute QUAPOS=8 - DRGARE with QUASOU=11 - SWPARE - Any object class with attribute CONDTN=1or 3 or 5
6	Dates must be given in the form “Day Month Year” DD-MM-YYYY.

8.8.1.2 Interpretation

10.8.1 Pick Report Descriptions

A plain language explanation of each symbol is included in the Symbol Library and in the Presentation Library section 15.17. This gives the mariner quick and understandable information which is not always obvious from the object class and attribute information. The manufacturer shouldmust always provide these explanations to the mariner in response to a cursor pick on the symbol.

Attribute values provided in addition to the above explanation should be connected to their meaning, and the definitions should also be available.

8.8.1.3 Sorting 10.8.2 Sorting

Unsorted cursor-pick results would be useless for route monitoring, when the mariner needs the information immediately. It would be little use even for route planning, as even then the mariner does not have time to scan through multiple lines of attributes (RECDAT, SCAMIN) that are not relevant to him, perhaps belonging to navigationally insignificant object classes (TESARE, SPRING).

Effective cursor-pick sorting will take much thought and experience. Only be covered in the following deferred amendment. Only a limited number of initial considerations are given below:.

8.8.1.3.1 (Details of the above)

Directed cursor enquiry: e.g., The mariner specifies he only wants information on depths and dangers (INT1 II and IK [2]); or aids (IQ); or only chart corrections.

10.8.3 User Defined Curser Pick Parameters

8.8.1.3.2 (Details of the above)

The mariner should be able to configure the the content displayed in the pick report.

Sorting by significance: A general cursor enquiry could be sorted;

10.8.4 Sorting by Significance

(a) by importance of the object class, perhaps using the IMO category,

(b) by the significance of the attribute, the most significant attributes being those used A general cursor enquiry must be sorted by the drawing priority of the object as defined in the look-up table for symbolizing plus:

10.8.5 Hover-over Function

OEMs may wish to include hover over functions for Mariners to access important charted feature details without having to select a pick report. If this function is implemented within an ECDIS the user must be able to configure the system function on and off.

INFORM QUAPOS SURSTA
TXTDSC QUASOU
POSACC
SOUACC (list not complete)

The hover over function must not be used for every charted object within the display, the following feature objects are only allowed for the application of this funtion.

LIGHTS
BUOYS
BEACONS
LANDMARKS

8.8.1.3.3 (Details of the above)

10.9 Tidal Stream Panels : S-57 feature TS_PAD

Sorting by level of detail: The first line might be the symbol description; followed by object and attribute information; with definitions, etc., by further request.

Tidal Stream Panel

When a tidal stream feature object (TS_PAD) is encoded within ENC, the data from the attribute tidal stream - panel values (TS_TSP) must be formatted for display in the ECDIS pick report. The following section describes the template that must be used for displaying the values.

8.8.1.4 Spatial and meta-objects, collection objects

The S-57 attribute catalogue defines the TS_TSP attribute as a coded string. The strings constituent parts are broken down as follows:

Cursor enquiry should extend to the spatial object, which carries accuracy attributes QUAPOS and POSACC. It should include collection objects which carry the OBJNAM of traffic separation systems, navigation lines (NAVLNE, RECTRC, DWRTCL, etc.). It should include meta-objects, for example, attribute HORDAT, which identifies the local datum to be used to enter IHB S-60 for the datum shift parameters needed to convert chart information in the local horizontal datum, to the WGS-84 used in the ENC, for example to enter local chart corrections.

- **Tidal station identifier**
- **Tidal station name**
- **Reference Water level (High or Low Water)**
- **Direction of Stream 13 values given in degrees**
- **Rate of Stream 13 values given in knots**

Example from S-57 Attribute catalogue Edition 3.1

63230,Darwin,HW,124,2.2,128,2.1,125,2.9,116,2.8,110,2.0,095,0.6,020,0.2,320,1.9,315,2.1,300,2.8,268,2.6,200,2.4,165,2.5

8.8.2 Mariner interface panel on the same screen as the chart display.

The following tabular template must be used by ECDIS when displaying the TS_PAD object in the pick report, the fonts, colours and dimensions are all to be defined by the OEM:

8.8.2.1 (Details of the above)

Tidal Station:			
Tidal Station Identifier:			
	Hours	Direction of stream (degrees)	Rates at spring tide (knots)
Before	-6		
	-5		
	-4		
	-3		
	-2		
	-1		
	0		
After	+1		
	+2		
	+3		
	+4		
	+5		
	+6		

Alphanumeric information or pictorial representation on the same screen as the chart display should use the UI colours of the colour tables, which are designed to give clarity without overshadowing the more important graphical display. Information on a separate screen is not subject to this limitation.

8.8.2.2 (Details of the above)

The mariner should be given all possible assistance to select the contents and configure the interface panel to his best advantage. The essential navigational information such as time, course to steer, off track distance, etc., etc., should have top priority. Other mandatory and optional items mentioned in this manual have included:

- Mandatory:
  - overscale factor (if required)
  - "refer to RNC or paper chart" [if LC (NONHODAT) is on display or the display is based on non-ENC data]
- Optional
  - depth data quality (M_QUAL, CATZOC)
  - magnetic variation, etc.

9. SUPPLY AND AMENDMENT OF THE DIGITAL PRESENTATION LIBRARY

As described in section 1.4, from edition 3.3 onwards the word-processed version of the Presentation Library is the "official" version. A limited digital version in .dai format is provided on the CD-Rom containing the word-processed Presentation Library as a manufacturer's option for edition 3.4, but may not be provided for succeeding editions. This digital version consists of look-up tables; symbols; and colour tables and is supplied in ASCII format in the .dai file.

The edition number appears in the LBID line at the start of the .dai file where it is coded digitally and also spelled out in plain language.

9.1 Amending the digital Presentation Library

(See also Colour & Symbol Specifications sections 1.2.3 and 1.2.4)

Amendments to the Presentation Library, if available, will be posted on the IHO website (www.iho.shom.fr > Publications > Download List).

An immediate amendment (but not a deferred amendment) will change the edition number of the Presentation Library.

The edition number of the PresLib installed should be available to the mariner on request.

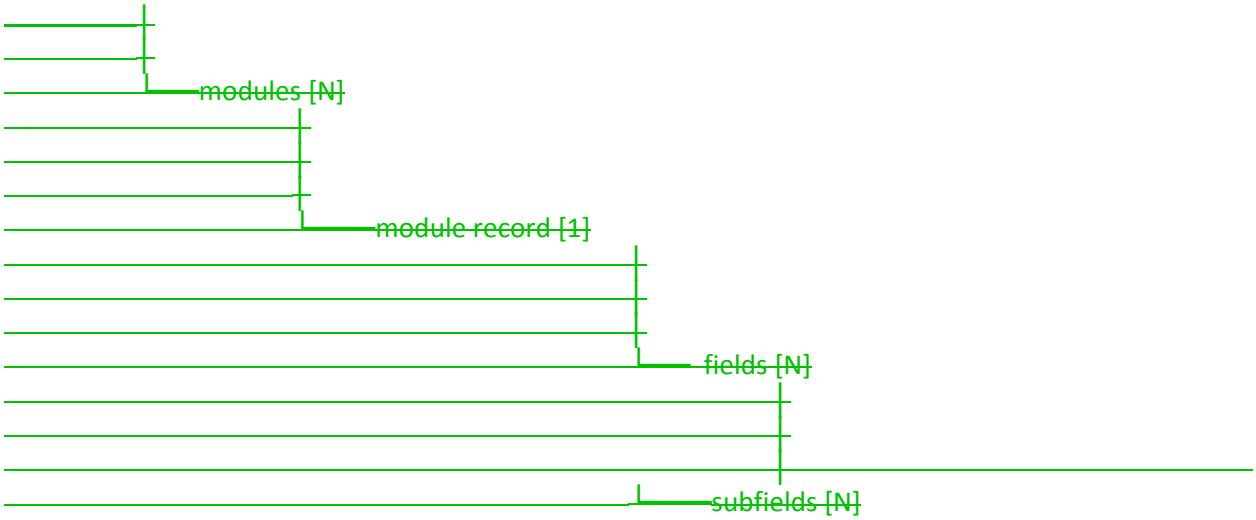
9.2 Internal Structure of the Transfer File

The PSLBmm_n.dai file has a particular internal structure. In the format description (see section 10), several constructs (modules, fields, etc.) are used to convey colour tables, look-up tables, symbols, patterns and linestyles.

The transfer file is formed of one or more modules. Each module is formed of one module record. Each module record is formed of one or more fields which in turn is formed of one or more subfields.

This structure is explained below:

PSLBmm_n.dai (module group)



The lowest level construct, the subfield, must only contain one elementary data item, for example, one colour coordinate or one symbology instruction. Formatted subfields, such as the subfields that contain the vector image definitions, must be further resolved by an application program. In this specification, subfields are not divisible.

Populated TS_PAD cursor pick template using the values from the attribute TS_TSP:

The field tag is a unique 4 character field type which links an instance of a field type in a data record to the data descriptive record that defines the syntax of that field type.

Tidal Station: Darwin			
Tidal Station Identifier: 63230			
	Hours	Direction of stream (degrees)	Rates at spring tides (knots)
Before	-6	124	2.2
	-5	128	2.1
	-4	125	2.9
	-3	116	2.8
	-2	110	2.0
	-1	095	0.6
HW	0	020	0.2

After	+1	320	1.9
	+2	315	2.1
	+3	300	2.8
	+4	268	2.6
	+5	200	2.4
	+6	165	2.5

NOTE : Thewater level should not be hard coded into the TS_PAD template, this is incorrect as the water level in the TS_PAD values can also refer to 6 hours before/after low water.

The subfield label is a 4 character label, present only in the data descriptive record of a file, required to identify the subfields within a field type. A label preceded by an "*" signifies that that subfield, and any subsequent ones, repeat within the field. This, therefore, indicates the presence of an array or table, for which the subfield labels provide the column headings.

Subfield data type codes uses data types as follows:

- **A** signifies character data,
- **I** signifies implicit point representation (integer),
- **R** signifies explicit point representation (real or float),

An extent of X(n) indicates a fixed length subfield of length n. An extent of X(1/15) indicates a variable length subfield terminated by the delimiter "1/15" (that is ASCII 1F hexa-decimal or 31 decimal).

10. DIGITAL PRESENTATION LIBRARY FORMAT DESCRIPTION

Digital Presentation Library Format Description

This section contains a specification of the format which allows for initial transfer and automatic updating of line styles, fill patterns, point symbols, look-up table entries and colour definitions in the digital version of the Presentation Library. The transfer format is '.dai' format.

The initial transfer file contains a library identification, three colour tables, five look-up tables and all line, pattern, and point symbols; written in that order. The '.dai' file is written as modules, where the library identification is a single module, each of the colour tables is a single module, each line in the look-up table is a module unto itself and each symbol (line, pattern or point symbol) is a module unto itself. Modules are terminated with '****'.

Revision data sets will always include a library identification module. The remaining modules will only be included in the revision set as required, with the exception of the look-up table entries which will be written as a complete replacement set.

For each module and field it is specified whether it can repeat in the file or module. Comments that explain and give domains or constraints are included in "/* ... */".

10.111.1 Format of the Library Identification Module

The library identification module contains general information about the status of the transferred library data. It defines the version of the library as well as its purpose.

10.1.011.1.1 'Library Identification' Module

```
||                                  ||
||   Module does not repeat.        ||
||                                  ||
```

10.1.111.1.2 'Library Identification' (LBID)

```
||   Field does not repeat.         ||
||   Subfields do not repeat.       ||
```

```
L B I D  Module Identifier
-------
         /* Forms unique module identification
         within the exchange set. */

MODN     A(2)        /*   Module Name -
                          two alphabetic characters 'LI'
                          indicating module type.          */

RCID     I(5)        /*   Record Identifier -
                          00000 < x < 32768; with MODN shall
                          form unique identification within
                          the exchange set.                */
```

```
EXPP      A(3)        /*    Exchange Purpose -
                            NEW   Denotes that the exchange
                                  set is a NEW library.
                            REV   Denotes that the exchange
                                  set is a REVision to an
                                  existing library.          */

PTYP      A(1/15)     /*    Product Type - e.g.'IHO'         */

ESID      A(1/15)     /*    Exchange Set Identification Number
                            - continuous serial number.      */

EDTN      A(1/15)     /*    Edition Number -
                            continuous serial number.        */

CODT      A(8)        /*    Compilation Date of Exchange Set -
                            YYYYMMDD                         */

COTI      A(6)        /*    Compilation Time of Exchange Set -
                            HHMMSS                           */

VRDT      A(8)        /*    Library-Profile Versions Date -
                            YYYYMMDD                         */

PROF      A(2)        /*    Library Application Profile -
                            PN  Presentation New Information
                            PR  Pres. Revision Information   */

OCDT      A(8)        /*    Date of Version of the applied
                            Object Catalogue - YYYYMMDD      */

COMT      A(1/15)     /*    Comment                          */
```

10.211.2 Format of the Look-Up Table Entry Module

Look-up table entries are transferred in this module. They have to be inserted in the respective look-up table by the recipient. The module allows for the transfer of a complete new edition of a look-up table as well as for the updating of a single entry within a look-up table. To send a new edition this module is repeated for each entry to a look-up table. To update a look-up table a new transmission of a previously transmitted entry (identified by the object class / attribute combination) replaces or deletes the old entry depending on the content of the 'STAT' field ('NIL' for a new edition, 'ADD' for insertion, 'MOD' for replacement, 'DEL' for deletion). Note that where more than one look-up table entry for a specific object class is transferred, look-up table entries shall be grouped and all look-up table entries where the "Attribute Combination"-field is populated must be inserted to the look-up table right after the look-up table entry where the "Attribute Combination"-field is empty and which therefore contains the fail-safe presentation (see section 8.3,10.3. for further details).

10.2.011.2.1 Look-Up Table Entry Module

```
||                                                  ||
||        Module does repeat.                       ||
||                                                  ||
```

10.2.1 '11.2.2 Look-Up Table Entry Identifier'-Field (LUPT)

```
||                                                  ||
||    Field does not repeat.                        ||
||    Subfields do not repeat.                      ||
```

```
L U P T  Look-Up Table Entry Identifier
-------
                    /*   Identifies a look-up table Entry
                         module.                          */

MODN     A(2)       /*   Module Identifier (Module Name):
                         presently a constant string = 'LU';
                         labels a module of 'look-up table'-
                         type.                            */

RCID     I(5)       /*   Record Identifier:
                         continuous numbering where
                         x is 00000 < x < 32768;
                         uniquely identifies an instruction-
                         module within the data-transfer
                         -set.                            */

STAT     A(3)       /*   status of the module contents:
                         'NIL' no change, used for new
                         editions and editions            */

OBCL     A(6)       /*   Name of the addressed object
                         Class                            */

FTYP     A(1)       /*   Addressed Object Type -
                            'A' Area
                            'L' Line
                            'P' Point                     */

DPRI     I(5)       /*   Display Priority                 */
RPRI     A(1)       /*   Radar Priority -
                            'O' presentation on top radar
                            'S' presentation suppressed
                           by radar                       */

TNAM     A(1/15)    /*   Name of the addressed Look Up
                         Table Set -

                         'PLAIN_BOUNDARIES' or 'SYMBOLIZED_
                         BOUNDARIES' (areas)
                         'SIMPLIFIED' or 'PAPER_CHART' (points)
                         and 'LINES' (lines)              */
```

10.2.2 '11.2.3 Attribute Combination'- Field (ATTC)

```
||      Field does repeat.          ||
||     Subfields do repeat.         ||


*A T T C  Attribute Combination
-------
                      /*    Describes individual characteristics
                            of an object which lead to the
                            presentation described in the
                            INST-field.
                            The attributes of the object catalogue
                            shall be used.                    */

*ATTL     A(6)        /*    6 Character Attribute Code.       */

ATTV      A(1/15)     /*    Attribute Value; Shall be a valid
                            value for the domain specified
                            by the attribute label in ATTL.   */
```

10.2.3 '11.2.4 Instruction'-Field (INST)

```
||    Field does not repeat         ||
||    Subfield does not repeat.     ||


*I N S T  Symbology Instruction
-------
                      /*    Describes the instruction entry to
                            The look-up table;                */

SINS      A(1/15)     /*    Symbology Instruction String      */
```

10.2.4 '11.2.5 Display Category'-Field (DISC)

```
||    Field does not repeat         ||
||    Subfield does not repeat.     ||

*D I S C  Display Category
-------
                      /*    Defines membership within a display
                            category                          */

DSCN      A(1/15)     /*    Name of the display category      */
```

10.2.5 '11.2.6 Look-Up Comment'-Field (LUCM)

```
||    Field does not repeat         ||
||    Subfield does not repeat.     ||

 *L U C M  Look-Up Comment
-------
                      /*    Describes look-up table entry     */
LUED      A(1/15)     /*    free text to describe look-up
                            entry                             */
```

10.311.3 Format of the Symbology Procedure Module

This section has been deleted because the module has not been developed.

10.411.4 Format of the Colour Table Module

The colour-definition (colour token, colour coordinate, usage) for colours is transferred by this module. The module allows for the transfer of a complete new edition of a colour table as well as for the updating of a single entry within a colour table. To send a new edition this module contains all entries of a colour table. To update a colour table a new transmission of a previously transmitted entry (identified by the colour token) replaces or deletes the old entry depending on the content of the 'STAT' field ('NIL' for a new edition, 'ADD' for insertion, 'MOD' for replacement, 'DEL' for deletion).

10.4.011.4.1 Colour Table Module

```
||                                  ||
||     Module does repeat.          ||
||                                  ||
```

10.4.111.4.2 'Colour Table Identifier'-Field (COLS)

```
||    Field does not repeat.        ||
||    Subfields do not repeat.      ||
```

```
C O L S  Colour Table Identifier
-------
                      /*   Identifies a colour-table.        */

MODN     A(2)         /*   Module Name:
                           constant string ='CS';
                           marks a module of the
                           'Colour Scheme'-type              */

RCID     I(5)         /*   Record Identifier :
                           continuous numbering where
                           x is 00000 < x < 32768;
                           uniquely identifies a
                           Colour-Table-Module within
                           the transfer-data-set.            */

STAT     A(3)         /*   status of the module contents:
                           'NIL' no change, used for new editions
                           and editions                      */

CTUS     A(1/15)      /*   Name of the addressed Colour Table;
                           valid keywords are: 'DAY_BRIGHT';
                           'DAY_WHITEBACK'; 'DAY_BLACKBACK';
                           'DUSK'; 'NIGHT'.                  */
```

10.4.211.4.2 'Colour Definition CIE'-Field (CCIE

```
||      Field does repeat.          ||
||    Subfields do not repeat.      ||
```

```
*C C I E  Colour Definition CIE
-------
                      /*   Describes CIE-System's colour-
                           definition                        */

CTOK     A(5)         /*   COLOUR (Colour-Token)             */
```

```
CHRX      R(1/15)     /*    x-Coordinate (CIE-System)          */

CHRY      R(1/15)     /*    y-Coordinate (CIE-System           */

CLUM      R(1/15)     /*    Luminance  (CIE-System)            */

CUSE      A(1/15)     /*    Use of colour (free text)          */
```

10.511.5 Format of the Pattern Module

Definitions for fill patterns are transferred by this module which may contain a raster image (bit-map) or a vector definition. The maximum size of the raster image is 122 x 122 pixels. The maximum size of the vector space is 32767 by 32767 units. See section 7.4.48.4.5 for usage of patterns.

The module allows for the transfer of a complete new edition of fill patterns as well as for the updating of a single fill pattern. To update a fill pattern a new transmission of a previously transmitted fill pattern (identified by the pattern name) replaces or deletes the old version of a fill pattern depending on the content of the 'STAT' field ('NIL' for a new edition, 'ADD' for insertion, 'MOD' for replacement, 'DEL' for deletion).

10.5.011.5.1 Pattern Module

```
||                                                          ||
||       Module does repeat.                                ||
||                                                          ||
```

10.5.111.5.2 'Pattern Identifier'-Field (PATT)

```
||                                                          ||
||    Field does not repeat.                                ||
||    Subfields do not repeat.                              ||
||                                                          ||
```

```
P A T T  Pattern Identifier
-------
                        /*    Identifies a pattern-module.      */

MODN      A(2)          /*    Module Identifier (Module Name):
                              presently a constant string = 'PT';
                              labels a module of the
                              'pattern'-type.                   */

RCID      I(5)          /*    Record Identifier:
                              continuous numbering where
                              x is 00000 < x < 32768;

                              uniquely identifies a pattern-module
                                    within the data-transfer-set.
                         */

STAT      A(3)          /*    status of the module contents:
                                                          'NIL'
                              no change, used for new editions
                                         and editions     edition
                         */
```

10.5.211.5.3 'Pattern Definition'-Field (PATD)

```
||    Field does not repeat.          ||
||    Subfields do not repeat.        ||

P A T D  Pattern Definition
-------
                     /*   defines several pattern-
                          parameters.                    */

PANM     A(8)        /*   name of the fill patern;       */


PADF     A(1)        /*   type of pattern definition:
                          V  Vector definition
                          R  Raster definition           */

PATP     A(3)        /*   type of the fill pattern:
                          STG  staggered pattern
                          LIN  linear  pattern           */

PASP     A(3)        /*   pattern-symbol spacing:
                          CON  constant space
                          SCL  scale dependent spacing   */

PAMI     I(5)        /*   minimum distance (units of 0.01 mm)
                          between pattern symbols covers
                          (bounding box + pivot point);
                          where 0 <= PAMI <= 32767       */

PAMA     I(5)        /*   maximum distance (units of 0.01 mm)
                          between pattern symbols covers(bounding
                          box + pivot point);
                          where 0 <= PAMA <= 32767; PAMA is
                          meaningless if PASP = 'CON'    */

PACL     I(5)        /*   pivot-point's column number;
                          PACL is counted from the top,
                                                  left   corner
                          of the vector/raster space
                                   to the right;
                             -9999(left)<= PACL <= 32767(right)
                             */
```

```
      PARW      I(5)        /*    pivot-point's row number;
                                  PARW is counted from the top,
                                  left corner of the vector/raster
                                  space to the bottom;
                                  -9999(top)<= PARW <= 32767(bottom)*/

      PAHL      I(5)        /*    width of bounding box;
                                  where 1<= PAHL <=122 for raster and
                                  where 1<= PAHL <=32767 for vector
                                  Note:does not include vector line
                                  Width                            */

      PAVL      I(5)        /*    height of bounding box;
                                  where 1<= PAVL <=122 for raster and
                                  where 1<= PAGL <=32767 for vector
                                  Note: does not include vector line
                                  width                            */
       PBXC      I(5)        /*    bounding box upper left column number;
                                  where 0<= PBXC <=122 for raster and
                                  where 0<= PBXC <=32767 for vector */

      PBXR      I(5)        /*    bounding box upper left row number;
                                  where 0<= PBXR <=122 for raster and
                                  where 0<= PBXR <=32767 for vector */
```

10.5.311.5.4 'Pattern Exposition'-Field (PXPO)

```
||      Field does repeat.          ||
||    Subfield does not repeat.     ||

P X P O  Pattern Exposition Field
-------
                        /*    describes meaning & use of symbology
                              elements                         */

EXPT      A(1/15)       /*    free text for symbology
                              explanation                      */
```

10.5.411.5.5 'Pattern Colour Reference'- Field (PCRF)

```
||     Field does not repeat.       ||
||     Subfields do repeat.         ||

P C R F  Pattern Colour Reference
-------
                        /*    Contains the colour reference for the
                              bitmap or vector field.          */

*CIDX     A(1)          /*    Letter (ASCII >= 64) used as colour
                              index within PBTM.BITR field or
                              within the PBTM.VECT field.      */

CTOK      A(5)          /*    colour token which is identified
                              by the letter in CIDX.           */
```

10.5.511.5.6 'Pattern Bitmap'- Field (PBTM)

```
||     Field does repeat.                 ||
||   Number of repetitions shall be       ||
||  identical to content of PAVL-field    ||
||    Subfield does not repeat.           ||

*P B T M  Pattern Bitmap
```

```
-------
                        /*    Contains one row of a raster image;
                              Each pixel is represented by a letter
                              (ASCII>=64); The letter represents
                              a colour token defined within the
                              PCRF.CTOK subfield. The letter
                              '@'represents a 100% transparent
                              pixel(TRNSP). Note: PBTM and PVCT
                              are mutual exclusive.              */

BITR      A(1/15)     /*    Raster Bit-map Row -
                              maximal length 122 characters;
                              The length shall be identical to
                              content of PAHL-field.             */
```

10.5.611.5.7 'Pattern Vector'- Field (PVCT)

```
||        Field does repeat.          ||
||      Subfield does not repeat      ||

*P V C T  Pattern Vector
-------
                        /*    Contains a vector image definition;
                              Colours are identified by a letter
                              (ASCII>=64); The letter represents
                              a colour token defined within
                              the PCRF.CTOK subfield. The letter
                              '@'identifies a fully transparent
                              colour. Note: PVCT and PBTM are
                              mutual exclusive.                  */

VECD      A(1/15)     /*    String of vector commands;         */
```

10.5.7 Example for a Raster Image Pattern Definition

The example illustrates the raster definition for the fill pattern of an anchorage area (pattern name 'ACHARE01'). The pattern represents an anchor in red (CHRED, represented by the letter A) and black (CHBLK, identified by letter B). Locations in the pattern carrying the '@'-sign are 100% transparent (TRNSP). It is a "staggered" pattern (STG). The symbol spacing is scale dependent (SCL). The minimum distance between the symbols is 10mm (1000 x 0.01mm), the maximum distance is 50 mm (5000 x 0.01mm). The pivot point of the pattern symbol is situated in row 10, column 10. The size of the pattern symbol is 20 by 18 pixels.

```
PATT  10PT00001NIL
PATD  55ACHARE01RSTGSCL0100005000000100001000020000180000000000
PCRF  12ACHREDBCHBLK
PBTM  21@@@@@@@@@@@@@@@@@@@@@
PBTM  21@@@@@@@AAAAAABB@@@@@@
PBTM  21@@@@@@@AAAAAABB@@@@@@
PBTM  21@@AAAAAABBAAAAAABB@@
PBTM  21@@AAAAAABBAAAAAABB@@
PBTM  21@@@@@@@AAAAAABB@@@@@@
PBTM  21@@@@@@@AAAAAABB@@@@@@
PBTM  21@@@@@@@@@AABB@@@@@@@@@
PBTM  21@@@@@@@@@AABB@@@@@@@@@
PBTM  21@@@@@@@@@AABB@@@@@@@@@
PBTM  21@@@@@@@@@AABB@@@@@@@@@
PBTM  21@@AABB@@AABB@@AABB@@
PBTM  21@@AABB@@AABB@@AABB@@
PBTM  21@@@@AABBAABBAABB@@@@
PBTM  21@@@@AABBAABBAABB@@@@
PBTM  21@@@@@@@AAAAAABB@@@@@@
PBTM  21@@@@@@@AAAAAABB@@@@@@
PBTM  21@@@@@@@@@@@@@@@@@@@@@
```

Note that the use of raster pattern definitions is the subject of further study. Currently, the Presentation Library does not contain any raster image pattern definitions.**10.5.811.5.8 Example for a Vector Image Pattern Definition**

The example illustrates a vector definition for a fill pattern (pattern name 'SAMPLE01') which is sent as a replacement of a previous one. The pattern shows a rectangle drawn in chart grey, dominant (CHGRD, identified by the letter A) with a pen width of 0.6 mm (2 x 0.3mm). It is a linear pattern (LIN). The symbol spacing is constant (CON). The distance between the symbols is 5 mm (500 x 0.01 mm). The pivot point of the pattern symbol is situated in row 500, column 500 of the coordinate space. The pattern has a size of 10mm by 10mm (1000 x 0.01mm). The upper left corner of the bounding box is located at position 1,1.

```
PATT  10PT00001MOD
PATD  55SAMPLE01VLINCON00500000000050000500010000100000000100001
PXPO  32This is a sample vector pattern
PCRF  6ACHGRD
PVCT  15SPA;SW2;PU1,1;
PVCT  31PD1000,1,1000,1000,1,1000,1,1;
```

See section 58 for further explanation of the vector symbol description language.

10.611.6 Format of the Symbol Module

Definitions for symbols are transferred by this module which contains either a raster image (bit-map) or a vector definition of the symbol. The maximum size of the raster image is 64 x 64 pixels. The maximum extent of the vector space is 32767 by 32767 units.

The module allows for the transfer of a complete new edition of point symbols as well as for the updating of a single symbol. To update a symbol a new transmission of a previously transmitted symbol (identified by the symbol name) replaces or deletes the old version of a symbol depending on the content of the 'STAT' field ('NIL' for a new edition, 'ADD' for insertion, 'MOD' for replacement, 'DEL' for deletion).

10.6.011.6.1 Symbol Module

```
||                                          ||
||     Module does repeat.                  ||
||                                          ||
```

10.6.111.6.2 'Symbol Identifier'-Field (SYMB)

```
||    Field does not repeat.                ||
||    Subfields do not repeat.              ||
```

```
S Y M B  Symbol Identifier
-------
                        /*   identifies a symbol-module.        */

MODN     A(2)           /*   Module Identifier (Module Name):
                             presently a constant string ='SY';
                             labels a module of the
                             'Symbol'-type.                      */

RCID     I(5)           /*   Record Identifier:
                             continuous numbering where
                             x is 00000 < x < 32768;
                             uniquely identifies a symbol-
                             module within the
                             data-transfer-set.                  */

STAT     A(3)           /*   status of the module contents:
                             'NIL' no change, used for new
                             editions and editions.              */
```

10.6.211.6.3 'Symbol Definition'-Field (SYMD)

```
||    Field does not repeat.                ||
||    Subfields do not repeat.              ||
```

```
S Y M D  Symbol Definition
-------
                        /*   Defines several symbol-parameters.*/

SYNM     A(8)           /*   name of the symbol;                 */

SYDF     A(1)           /*   type of symbol definition:
                             V  Vector definition
                             R  Raster definition                */
```

```
———     SYCL     I(5)       /*   pivot-point's column-number;
                                  SYCL is counted from the top,
                                  left corner of the vector/raster
                                  space to the right;
                                  -9999(left)<= SYCL <= 32767(right)*/

        SYRW     I(5)       /*   pivot-point's row-number;
                                  PROW is counted from the top, left
                                  corner of the vector/raster space
                                  to the bottom ;
                                  -9999(top)<= SYRW <= 32767(bottom)*/

        SYHL     I(5)       /*   width of bounding box;
                                  where 1<= PAHL <=128 for raster and
                                  where 1<= PAHL <=32767 for vector
                                  Note: does not include vector line
                                  width                          */

        SYVL     I(5)       /*   height of bounding box;
                                  where 1<= PAVL <=128 for raster and
                                  where 1<= PAGL <=32767 for vector
                                  Note: does not include vector line
                                  width                          */

        SBXC     I(5)       /*   bounding box upper left column number;
                                  where 1<= SBXC <=128 for raster and
                                  where 1<= SBXC <=32767 for vector */

        SBXR     I(5)       /*   bounding box upper left row number;
                                  where 1<= SBXR <=128 for raster and
                                  where 1<= SBXR <=32767 for vector */
```

10.6.311.6.4 'Symbol Exposition'- Field (SXPO)

The exposition field for the symbol module is identical to the exposition field for the pattern module (see 10.5.3).

10.6.411.6.5 'Symbol Colour Reference'- Field (SCRF)

The colour reference field for the symbol module is identical to the colour reference field for the pattern module (see 10.5.4).

10.6.511.6.6 'Symbol Bitmap'- Field (SBTM)

The bitmap field for the symbol module is identical to the bitmap field for the pattern module (see 10.5.5).

10.6.611.6.7 'Symbol Vector'- Field (SVCT)

The vector field for the symbol module is identical to the vector field for the pattern module (see 10.5.6).

10.6.7 Example for a Raster Image Symbol Module

Note that the use of raster symbol definitions is the subject of further study. Currently, the Presentation Library does not contain any raster symbol definitions.

The following example illustrates the raster definition for the symbol 'BCNCAR01' (north cardinal beacon). The raster shows two tip-up cones in black (CHBLK, identified by the letter A). Locations carrying the '@'-sign are 100% transparent (TRNSP). The pivot-point is located at the raster's column 8, row 10. The pattern has a size of 16 by 18 pixels. There is a textual explanation available for the symbol within the SXPO field.

```
SYMB  10SY00001NIL
SYMD  39BCNCAR01R0000800010000140001800000000000
SXPO  36This simplified symbol is used for↓
SXPO  27north cardinal buoys only.↓
SCRF  6ACHBLK
SBTM  15@@@@@@AA@@@@@@↓
SBTM  15@@@@@@AA@@@@@@↓
SBTM  15@@@@AAAAAA@@@@↓
SBTM  15@@@@AAAAAA@@@@↓
SBTM  15@@AAAAAAAAAA@@↓
SBTM  15@@AAAAAAAAAA@@↓
SBTM  15AAAAAAAAAAAAAA↓
SBTM  15AAAAAAAAAAAAAA↓
SBTM  15@@@@@@@@@@@@@@↓
SBTM  15@@@@@@@@@@@@@@↓
SBTM  15@@@@@@AA@@@@@@↓
SBTM  15@@@@@@AA@@@@@@↓
SBTM  15@@@@AAAAAA@@@@↓
SBTM  15@@@@AAAAAA@@@@↓
SBTM  15@@AAAAAAAAAA@@↓
SBTM  15@@AAAAAAAAAA@@↓
SBTM  15AAAAAAAAAAAAAA↓
SBTM  15AAAAAAAAAAAAAA↓
```

10.6.811.6.8 Example for a Vector Image Symbol Module

The example shows the vector definition for the symbol 'SAMPLE33'. The pivot point of the symbol is situated in row 400, column 400 of the coordinate space. The symbol has a size of 8mm by 8mm (800 x 0.01mm). The upper left corner of the bounding box is located at position 1,1.

```
SYMB  10SY00001NIL
SYMD  39SAMPLE33V00400004000080000800000100001
SCRF  6ACHBLK
SVCT  15SPA;SW2;PU1,1;↓
SVCT  28PD1000,1,800,800,1,800,1,1;↓
```

See section 5)8 for further explanation of the vector symbol description language.

10.711.7 Format of the Complex Linestyle Module

Definitions for complex linestyles are transferred by this module which contains a vector definition.

The module allows for the transfer of a complete new edition of linestyles as well as for the updating of a single linestyle. To update a linestyle a new transmission of a previously transmitted linestyle (identified by the linestyle name) replaces or deletes the old version of a linestyle depending on the content of the 'STAT' field ('NIL' for a new edition, 'ADD' for insertion, 'MOD' for replacement, 'DEL' for deletion).

10.7.011.7.1 Linestyle Module

```
||                                        ||
||     Module does repeat.                ||
||                                        ||
```

10.7.111.7.2 'Linestyle Identifier'- Field (LNST

```
||    Field does not repeat.              ||
||    Subfields do not repeat.            ||
```

```
L N S T  Linestyle Identifier
-------
                      /*    identifies a linestyle-module.    */

MODN     A(2)         /*    Module Identifier (Module Name):
                            presently a constant string ='LS';
                            labels a module of 'Linestyle'
                            -type.                            */

RCID     I(5)         /*    Record Identifier:
                            continuous numbering where
                            x is 00000 < x < 32768;
                            uniquely identifies a linestyle-module
                            within the data-transfer-set.     */

STAT     A(3)         /*    status of the module contents:
                            'NIL' no change, used for new
                            editions and editions             */
```

10.7.211.7.3 'Linestyle Definition'- Field (LIND)

```
||    Field does not repeat.              ||
||    Subfields do not repeat.            ||
```

```
L I N D  Linestyle Definition
-------
                      /*    Defines several linestyle-
                            parameters.                       */

LINM     A(8)         /*    name of the linestyle;            */

LICL     I(5)         /*    pivot-point's column-number;
                            LICL is counted from the top,
                            left corner of the vector space
                            to the right;
                            -9999(left)<= LICL <= 32767(right)*/
```

```
        LIRW      I(5)        /*    pivot-point's row-number;
                                    LIRW is counted from the top
                                    left corner of the vector space
                                    to the bottom;
                                    -9999(top)<= LIRW <= 32767(bottom)*/

        LIHL      I(5)        /*    width of bounding box;
                                    where 1<= LIHL <=32767;
                                    Note: does not include vector line
                                    width                          */

        LIVL      I(5)        /*    height of bounding box;
                                    where 1<= LIVL <=32767;
                                    Note: does not include vector line
                                    width                          */

        LBXC      I(5)        /*    bounding box upper left column number;
                                    where 0<= LBXC <=32767;        */

        LBXR      I(5)        /*    bounding box upper left row number;
                                    where 0<= LBXR <=32767;        */
```

10.7.311.7.4 'Linestyle Exposition'- Field (LXPO)

The exposition field for the linestyle module is identical to the exposition field for the pattern module (see 10.5.3).

10.7.411.7.5 Linestyle Colour Reference'- Field (LCRF)

The colour reference field for the linestyle module is identical to the colour reference field for the pattern module (see 10.5.4).

10.7.511.7.6 Linestyle Vector'- Field (LVCT)

The vector field for the linestyle module is identical to the vector field for the pattern module (see 10.5.6).

10.7.611.7.7 Example for a Linestyle Module

The example shows the vector definition for the linestyle 'CBLLNE01'. The centre line of the linestyle is situated in column 750, row 750 of the coordinate space. The linestyle shows a curved line, width 0.3mm (1 x 0.3mm).

```
LNST  10LS00000NIL
LIND  38CBLLNE0100750007500020000100007500070O
LCRF  6ICHMGD
LVCT  57SPI;PU850,750;SW1;AA900,750,180;PU850,750;AA800,750,180;
```

See section 58 for further explanation of the vector symbol description language.

~~TABLES AND SYMBOLISATION PROCEDURES~~

~~11. LOOK-UP TABLE LISTINGS~~Look-Up Table Listings

The Presentation Library provides five look-up tables:

~~1a. paper chart point symbols (buoys and beacons are similar to the paper chart)~~
~~1b. simplified point symbols (buoys and beacons are more prominent)~~
~~2. line symbols~~
~~3a. area symbols with plain boundaries (for general use)~~
~~3b. area symbols with symbolized boundaries (for large scale display)~~

	Lookup Tables
1	Paper chart point symbols
2	Simplified point symbols
3	Line symbols
4	Area symbols with plain boundaries
5	Area symbols with symbolized boundaries

The ECDIS ~~should~~must provide all of these ~~and make the~~symbol options ~~available~~ to the mariner.

Some of the look-up table entries describe the presentation of mariners' navigational objects. Please see Part II of the PresLib for further details and definitions of mariners' navigational object classes.

~~See 8.3 for further explanation how to use the look-up tables.~~

~~11.1 Look-Up Table Listing for Object Type Point 'P'~~

~~11.1.1 Look-up Table for paper chart point symbolization~~

~~* *** PAPER CHART POINTS ***~~
~~* *** This is the look-up table for point symbolization. ***~~
~~* *** For edition 3.4 Preslib, dated January 2008 ******~~
~~*~~
~~* Each line contains minimum 6 fields:~~
~~* 1. field - code of the object class~~
~~* 2. field - attribute combination~~
~~* 3. field - symbolization instruction~~
~~* 4. field - display priority~~
~~* 5. field - radar~~
~~* 6. field - IMO display category~~
~~* 7. field - viewing group (optional)~~
~~*~~
~~* Each field entry is framed by "" and fields are separated by ','.~~
~~*~~
~~* Please note, that the entries to this table must be in~~
~~* alphabetic order (sorted by the class code).~~
~~*~~
~~* This table has 2 sections:~~
~~*~~

* - The first section contains symbolization instructions for
*   standard S-57 'real world' objects:
* - The second section contains symbolization instructions for
*   non-standard (class code in lowercase) objects:
*
* default for symbolization failure; must be the first entry to look-up table
"######","","SY(QUESMRK1)","5","O","STANDARD","21010"
*
* ***   ***
* *** section one: REAL WORLD CLASSES ***
* ***   ***
*

"ACHARE","","SY(ACHARE02)","6","O","STANDARD","26220"
"ACHBRT","","SY(ACHBRT07);TE('Nr %s','OBJNAM',3,1,2,'15110',1,0,CHBLK,29)","5","O","STANDARD","26220"
"AIRARE","","SY(AIRARE02)","4","O","OTHER","32240"
"BCNCAR","","SY(BCNGEN03);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27020"
"BCNCAR","BCNSHP1","SY(BCNSTK02);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27020"
"BCNCAR","BCNSHP3","SY(BCNTOW01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNCAR","BCNSHP4","SY(BCNLTC01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNCAR","BCNSHP5","SY(BCNGEN01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNCAR","BCNSHP7","SY(BCNGEN01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNISD","","SY(BCNGEN03);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27020"
"BCNISD","BCNSHP1","SY(BCNSTK02);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27020"
"BCNISD","BCNSHP3","SY(BCNTOW01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNISD","BCNSHP4","SY(BCNLTC01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNISD","BCNSHP5","SY(BCNGEN01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNISD","BCNSHP7","SY(BCNGEN01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNLAT","","SY(BCNGEN03);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27020"
"BCNLAT","BCNSHP2CATLAM1","SY(PRICKE03);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27020"
"BCNLAT","BCNSHP2CATLAM2","SY(PRICKE04);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27020"
"BCNLAT","BCNSHP6CONVIS1","SY(CAIRNS11);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27020"
"BCNLAT","BCNSHP1","SY(BCNSTK02);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27020"
"BCNLAT","BCNSHP3","SY(BCNTOW01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNLAT","BCNSHP4","SY(BCNLTC01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNLAT","BCNSHP5","SY(BCNGEN01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNLAT","BCNSHP6","SY(CAIRNS01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27020"
"BCNLAT","BCNSHP7","SY(BCNGEN01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNSAW","","SY(BCNGEN03);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27020"
"BCNSAW","BCNSHP1","SY(BCNSTK02);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27020"
"BCNSAW","BCNSHP3","SY(BCNTOW01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNSAW","BCNSHP4","SY(BCNLTC01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNSAW","BCNSHP5","SY(BCNGEN01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNSAW","BCNSHP7","SY(BCNGEN01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNSPP","","SY(BCNGEN03);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27020"
"BCNSPP","BCNSHP6CONVIS1","SY(CAIRNS11);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27020"
"BCNSPP","CATSPM18","SY(NOTBRD11);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27020"
"BCNSPP","CATSPM44","SY(BCNGEN01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNSPP","BCNSHP1","SY(BCNSTK02);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27020"
"BCNSPP","BCNSHP3","SY(BCNTOW01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNSPP","BCNSHP4","SY(BCNLTC01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNSPP","BCNSHP5","SY(BCNGEN01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BCNSPP","BCNSHP6","SY(CAIRNS01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27020"
"BCNSPP","BCNSHP7","SY(BCNGEN01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","STANDARD","27020"
"BERTHS","","SY(BRTHNO01);TE('Nr %s','OBJNAM',3,1,2,'15110',1,0,CHBLK,29)","5","O","OTHER","32440"
"BOYCAR","","SY(BOYGEN03);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYCAR","BOYSHP1","SY(BOYCON01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYCAR","BOYSHP2","SY(BOYCAN01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYCAR","BOYSHP3","SY(BOYSPH01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYCAR","BOYSHP4","SY(BOYPIL01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYCAR","BOYSHP5","SY(BOYSPR01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYCAR","BOYSHP6","SY(BOYBAR01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYCAR","BOYSHP7","SY(BOYSUP01);TE('by %s','OBJNAM',2,1,2,'15110',-2,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYCAR","BOYSHP8","SY(BOYSPR01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYINB","","SY(BOYINB01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYISD","","SY(BOYGEN03);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYISD","BOYSHP1","SY(BOYCON01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYISD","BOYSHP2","SY(BOYCAN01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYISD","BOYSHP3","SY(BOYSPH01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYISD","BOYSHP4","SY(BOYPIL01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYISD","BOYSHP5","SY(BOYSPR01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYISD","BOYSHP6","SY(BOYBAR01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYISD","BOYSHP7","SY(BOYSUP01);TE('by %s','OBJNAM',2,1,2,'15110',-2,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYISD","BOYSHP8","SY(BOYSPR01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","","SY(BOYGEN03);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","BOYSHP1","SY(BOYCON01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","BOYSHP2","SY(BOYCAN01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","BOYSHP3","SY(BOYSPH01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","BOYSHP4","SY(BOYPIL01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","BOYSHP5","SY(BOYSPR01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"

"BOYLAT","BOYSHP6","SY(BOYBAR01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","BOYSHP7","SY(BOYSUP01);TE('by %s','OBJNAM',2,1,2,'15110',-2,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","BOYSHP8","SY(BOYSPR01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSAW","","SY(BOYGEN03);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSAW","BOYSHP3","SY(BOYSPH01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSAW","BOYSHP4","SY(BOYPIL01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSAW","BOYSHP5","SY(BOYSPR01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSAW","BOYSHP6","SY(BOYBAR01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSAW","BOYSHP7","SY(BOYSUP01);TE('by %s','OBJNAM',2,1,2,'15110',-2,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSAW","BOYSHP8","SY(BOYSPR01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","","SY(BOYGEN03);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","CATSPM9","SY(BOYSUP01);TE('by %s','OBJNAM',2,1,2,'15110',-2,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","CATSPM15","SY(BOYSUP03);TE('by %s','OBJNAM',2,1,2,'15110',-2,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","BOYSHP1","SY(BOYCON01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","BOYSHP2","SY(BOYCAN01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","BOYSHP3","SY(BOYSPH01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","BOYSHP4","SY(BOYPIL01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","BOYSHP5","SY(BOYSPR01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","BOYSHP6","SY(BOYBAR01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","BOYSHP7","SY(BOYSUP01);TE('by %s','OBJNAM',2,1,2,'15110',-2,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","BOYSHP8","SY(BOYSPR01);TE('by %s','OBJNAM',2,1,2,'15110',-2,-1,CHBLK,21)","8","O","STANDARD","27010"
"BRIDGE","","","","","","",""
"BUAARE","","SY(BUAARE02);TX(OBJNAM,3,2,2,'15110',1,0,CHBLK,26)","3","O","STANDARD","22240"
"BUISGL","","SY(BUISGL01)","4","O","OTHER","32220"
"BUISGL","FUNCTN33CONVIS1OBJNAM","SY(POSGEN03);TX(OBJNAM,3,2,2,'15110',1,0,CHBLK,26)","6","O","STANDARD","22220"
"BUISGL","FUNCTN20CONVIS1","SY(BUIREL13)","6","O","STANDARD","22220"
"BUISGL","FUNCTN21CONVIS1","SY(BUIREL13)","6","O","STANDARD","22220"
"BUISGL","FUNCTN22CONVIS1","SY(BUIREL14)","6","O","STANDARD","22220"
"BUISGL","FUNCTN23CONVIS1","SY(BUIREL14)","6","O","STANDARD","22220"
"BUISGL","FUNCTN24CONVIS1","SY(BUIREL14)","6","O","STANDARD","22220"
"BUISGL","FUNCTN25CONVIS1","SY(BUIREL14)","6","O","STANDARD","22220"
"BUISGL","FUNCTN26CONVIS1","SY(BUIREL15)","6","O","STANDARD","22220"
"BUISGL","FUNCTN27CONVIS1","SY(BUIREL15)","6","O","STANDARD","22220"
"BUISGL","FUNCTN33CONVIS1","SY(POSGEN03)","6","O","STANDARD","22220"
"BUISGL","FUNCTN35CONVIS1","SY(TNKCON12)","6","O","STANDARD","22220"
"BUISGL","FUNCTN33OBJNAM","SY(POSGEN03);TX(OBJNAM,3,2,2,'15110',1,0,CHBLK,26)","4","O","OTHER","32220"
"BUISGL","CONVIS1","SY(BUISGL11)","6","O","STANDARD","22220"
"BUISGL","FUNCTN20","SY(BUIREL01)","4","O","OTHER","32220"
"BUISGL","FUNCTN21","SY(BUIREL01)","4","O","OTHER","32220"
"BUISGL","FUNCTN22","SY(BUIREL04)","4","O","OTHER","32220"
"BUISGL","FUNCTN23","SY(BUIREL04)","4","O","OTHER","32220"
"BUISGL","FUNCTN24","SY(BUIREL04)","4","O","OTHER","32220"
"BUISGL","FUNCTN25","SY(BUIREL04)","4","O","OTHER","32220"
"BUISGL","FUNCTN26","SY(BUIREL05)","4","O","OTHER","32220"
"BUISGL","FUNCTN27","SY(BUIREL05)","4","O","OTHER","32220"
"BUISGL","FUNCTN33","SY(POSGEN03)","4","O","OTHER","32220"
"BUISGL","FUNCTN35","SY(TNKCON02)","4","O","OTHER","32220"
"CGUSTA","","SY(CGUSTA02)","7","O","OTHER","38030"
"CHKPNT","","","","","","",""
"CRANES","","SY(CRANES01)","4","O","OTHER","32440"
"CTNARE","","SY(CHINFO06)","4","O","STANDARD","26050"
"CTRPNT","","SY(POSGEN04)","4","O","OTHER","32250"
"CTSARE","","SY(CHINFO07)","4","O","STANDARD","26250"
"CURENT","","","","","","",""
"CURENT","ORIENTCURVEL","SY(CURENT01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","5","O","OTHER","33060"
"CURENT","ORIENT","SY(CURENT01,ORIENT)","5","O","OTHER","33060"
"DAMCON","","","","","","",""
"DAMCON","CATDAM3","SY(CHINFO06)","4","O","STANDARD","22010"
"DAYMAR","","SY(DAYSQR21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DAYMAR","TOPSHP19","SY(DAYSQR21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DAYMAR","TOPSHP20","SY(DAYSQR21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DAYMAR","TOPSHP21","SY(DAYSQR21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DAYMAR","TOPSHP24","SY(DAYTRI21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DAYMAR","TOPSHP25","SY(DAYTRI25);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DISMAR","","SY(DISMAR03);TX(INFORM,2,1,2,'15110',2,0,CHBLK,21)","7","O","OTHER","32430"
"DISMAR","CATDIS1","SY(DISMAR04);TX(INFORM,2,1,2,'15110',2,0,CHBLK,21)","7","O","OTHER","32430"
"DMPGRD","","SY(CHINFO07)","4","O","STANDARD","26240"
"FOGSIG","","SY(FOGSIG01)","6","O","STANDARD","27080"
"FORSTC","","SY(FORSTC01)","4","O","OTHER","32220"
"FORSTC","CONVIS1","SY(FORSTC11)","4","O","STANDARD","22220"
"FSHFAC","","SY(FSHHAV01)","4","O","OTHER","34040"
"FSHFAC","CATFIF1","SY(FSHFAC03)","4","O","OTHER","34040"
"FSHFAC","CATFIF2","SY(FSHFAC02)","4","O","OTHER","34040"
"FSHFAC","CATFIF3","SY(FSHFAC02)","4","O","OTHER","34040"
"FSHFAC","CATFIF4","SY(FSHFAC02)","4","O","OTHER","34040"
"GATCON","","SY(GATCON04)","8","O","STANDARD","22010"
"GATCON","CATGAT2","SY(GATCON04)","8","O","STANDARD","22010"
"GATCON","CATGAT3","SY(GATCON04)","8","O","OTHER","32440"
"GATCON","CATGAT4","SY(GATCON03)","8","O","OTHER","32440"
"GRIDRN","","","","","","",""
"HRBFAC","","SY(CHINFO07)","4","O","OTHER","32410"
"HRBFAC","CATHAF1","SY(ROLROL01)","4","O","OTHER","32410"
"HRBFAC","CATHAF4","SY(HRBFAC09)","4","O","OTHER","32410"
"HRBFAC","CATHAF5","SY(SMCFAC02)","4","O","OTHER","32410"

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"HULKES","","SY(HULKES01)","5","O","DISPLAYBASE","12410"
"ICNARE","","SY(CHINFO07)","4","O","STANDARD","26250"
"LIGHTS","","CS(LIGHTS05)","8","O","STANDARD","27070"
"LITFLT","","SY(LITFLT01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"LITVES","","SY(LITVES01);TE('LtV %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27011"
"LNDARE","","SY(LNDARE01); TX(OBJNAM,1,2,2,'15110',0,1,CHBLK,26);CS(QUAPOS01)","4","O","DISPLAYBASE","12010"
"LNDELV","","SY(POSGEN04);TE('%3.0lf m','ELEVAT',3,2,2,'15110',1,0,CHBLK,28)","4","O","OTHER","32010"
"LNDMRK","","SY(POSGEN01)","4","O","OTHER","32220"
"LNDMRK","CATLMK17FUNCTN33CONVIS1","SY(TOWERS03);TX(OBJNAM,3,2,2,'15110',1,-1,CHBLK,26)","6","O","STANDARD","22220"
"LNDMRK","CATLMK15FUNCTN20CONVIS1","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK15FUNCTN21CONVIS1","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK17FUNCTN20CONVIS1","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK17FUNCTN21CONVIS1","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20FUNCTN20CONVIS1","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20FUNCTN21CONVIS1","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20FUNCTN26CONVIS1","SY(BUIREL15)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20FUNCTN27CONVIS1","SY(BUIREL15)","6","O","STANDARD","22220"
"LNDMRK","CATLMK17FUNCTN33","SY(TOWERS01);TX(OBJNAM,3,2,2,'15110',1,-1,CHBLK,26)","4","O","OTHER","32220"
"LNDMRK","CATLMK1CONVIS1","SY(CAIRNS11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK3CONVIS1","SY(CHIMNY11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK4CONVIS1","SY(DSHAER11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK5CONVIS1","SY(FLGSTF01)","6","O","STANDARD","22220"
"LNDMRK","CATLMK6CONVIS1","SY(FLASTK11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK7CONVIS1","SY(MSTCON14)","6","O","STANDARD","22220"
"LNDMRK","CATLMK8CONVIS1","SY(POSGEN03)","6","O","STANDARD","22220"
"LNDMRK","CATLMK9CONVIS1","SY(MONUMT12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK10CONVIS1","SY(MONUMT12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK12CONVIS1","SY(MONUMT12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK13CONVIS1","SY(MONUMT12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK15CONVIS1","SY(DOMES011)","6","O","STANDARD","22220"
"LNDMRK","CATLMK16CONVIS1","SY(RASCAN11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK17CONVIS1","SY(TOWERS03)","6","O","STANDARD","22220"
"LNDMRK","CATLMK18CONVIS1","SY(WNDMIL12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK19CONVIS1","SY(WIMCON11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20CONVIS1","SY(POSGEN03)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20FUNCTN20","SY(BUIREL01)","4","O","OTHER","32220"
"LNDMRK","CATLMK1","SY(CAIRNS01)","4","O","OTHER","32220"
"LNDMRK","CATLMK3","SY(CHIMNY01)","4","O","OTHER","32220"
"LNDMRK","CATLMK4","SY(DSHAER01)","4","O","OTHER","32220"
"LNDMRK","CATLMK5","SY(FLGSTF01)","4","O","OTHER","32220"
"LNDMRK","CATLMK6","SY(FLASTK01)","4","O","OTHER","32220"
"LNDMRK","CATLMK7","SY(MSTCON04)","4","O","OTHER","32220"
"LNDMRK","CATLMK8","SY(POSGEN03)","4","O","OTHER","32220"
"LNDMRK","CATLMK9","SY(MONUMT02)","4","O","OTHER","32220"
"LNDMRK","CATLMK10","SY(MONUMT02)","4","O","OTHER","32220"
"LNDMRK","CATLMK12","SY(MONUMT02)","4","O","OTHER","32220"
"LNDMRK","CATLMK13","SY(MONUMT02)","4","O","OTHER","32220"
"LNDMRK","CATLMK15","SY(DOMES001)","4","O","OTHER","32220"
"LNDMRK","CATLMK16","SY(RASCAN01)","4","O","OTHER","32220"
"LNDMRK","CATLMK17","SY(TOWERS01)","4","O","OTHER","32220"
"LNDMRK","CATLMK18","SY(WNDMIL02)","4","O","OTHER","32220"
"LNDMRK","CATLMK19","SY(WIMCON01)","4","O","OTHER","32220"
"LNDMRK","CATLMK20","SY(POSGEN01)","4","O","OTHER","32220"
"LNDMRK","CONVIS1","SY(POSGEN03)","6","O","STANDARD","22220"
"LNDRGN","","SY(POSGEN04);TX(OBJNAM,1,2,2,'15110',0,-1,CHBLK,26)","4","O","STANDARD","21060"
"LOCMAG","","SY(LOCMAG01)","4","O","OTHER","31080"
"LOGPON","","SY(FLTHAZ02)","4","O","OTHER","34050"
"M_NPUB","","SY(CHINFO07)","4","O","OTHER","31020"
"MAGVAR","","SY(MAGVAR01);TX(VALMAG,3,1,2,'15110',1,-1,CHBLK,27)","4","O","OTHER","31080"
"MARCUL","","SY(MARCUL02)","4","O","STANDARD","26210"
"MIPARE","","SY(CHINFO06)","4","O","STANDARD","26040"
"MORFAC","","SY(MORFAC03)","6","O","DISPLAYBASE","12410"
"MORFAC","CATMOR7BOYSHP3","SY(BOYMOR01)","8","O","STANDARD","27010"
"MORFAC","CATMOR7BOYSHP6","SY(BOYMOR03)","8","O","STANDARD","27010"
"MORFAC","CATMOR1","SY(MORFAC03)","6","O","DISPLAYBASE","12410"
"MORFAC","CATMOR2","SY(MORFAC04)","6","O","DISPLAYBASE","12410"
"MORFAC","CATMOR3","SY(PILPNT02)","6","O","OTHER","32440"
"MORFAC","CATMOR5","SY(PILPNT02)","6","O","DISPLAYBASE","12410"
"MORFAC","CATMOR7","SY(BOYMOR11)","8","O","STANDARD","27010"
"NEWOBJ","","SY(NEWOBJ01)","6","S","STANDARD","21020"
"NEWOBJ","SYMINS","CS(SYMINS01)","6","S","STANDARD","21020"
"OBSTRN","","CS(OBSTRN06)","4","O","OTHER","34050"
"OBSTRN","CATOBS7VALSOU","SY(FOULGND1)","4","O","OTHER","34051"
"OBSTRN","CATOBS8VALSOU","SY(FLTHAZ02)","4","O","OTHER","34051"
"OBSTRN","CATOBS9VALSOU","SY(ACHARE02)","4","O","OTHER","34051"
"OBSTRN","CATOBS10VALSOU","SY(FLTHAZ02)","4","O","OTHER","34051"
"OBSTRN","CATOBS7","SY(FOULGND1)","4","O","OTHER","34050"
"OBSTRN","CATOBS8","SY(FLTHAZ02)","4","O","OTHER","34050"
"OBSTRN","CATOBS9","SY(ACHARE02)","4","O","OTHER","34050"
"OBSTRN","CATOBS10","SY(FLTHAZ02)","4","O","OTHER","34050"
"OBSTRN","WATLEV7","SY(FLTHAZ02)","4","O","DISPLAYBASE","12410"
"OFSPLF","","SY(OFSPLF01);TE('Prod %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21)","5","O","DISPLAYBASE","12210"
"PILBOP","","SY(PILBOP02);TE('Plt %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21)","6","O","STANDARD","28010"
"PILPNT","","SY(PILPNT02)","5","O","DISPLAYBASE","12410"

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"PIPARE","","SY(CHINFO07)","4","O","STANDARD","26230"
"PIPSOL","","","","","","",""
"PRCARE","","SY(PRCARE12)","5","O","STANDARD","25010"
"PRDARE","","","","","","",""
"PRDARE","CATPRA5CONVIS1","SY(FLASTK11)","4","O","STANDARD","22220"
"PRDARE","CATPRA8CONVIS1","SY(TNKCON12)","4","O","STANDARD","22220"
"PRDARE","CATPRA9CONVIS1","SY(WIMCON11)","4","O","STANDARD","22220"
"PRDARE","CATPRA1","SY(PRDINS02)","3","O","OTHER","32270"
"PRDARE","CATPRA5","SY(FLASTK01)","3","O","OTHER","32270"
"PRDARE","CATPRA6","SY(TMBYRD01)","3","O","OTHER","32270"
"PRDARE","CATPRA8","SY(TNKCON02)","3","O","OTHER","32270"
"PRDARE","CATPRA9","SY(WIMCON01)","3","O","OTHER","32270"
"PYLONS","","SY(POSGEN03)","8","O","DISPLAYBASE","12210"
"RADRFL","","SY(RADRFL03)","6","O","STANDARD","27230"
"RADSTA","","SY(POSGEN01)","5","O","OTHER","38010"
"RADSTA","CATRAS2","SY(RDOSTA02);TE('ch %s','COMCHA',3,1,2,'15110',0,0,CHBLK,11)","5","O","OTHER","38010"
"RAPIDS","","","","","","",""
"RCTLPT","","SY(RTLDEF51)","4","O","STANDARD","25020"
"RCTLPT","ORIENT","SY(RCTLPT52,ORIENT)","4","O","STANDARD","25020"
"RDOCAL","","SY(RCLDEF01);TE('Nr %s','OBJNAM',3,2,2,'15110',1,-1,CHBLK,21)","6","O","STANDARD","25060"
"RDOCAL","TRAFIC1ORIENT","SY(RDOCAL02,ORIENT);TE('Nr %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch %s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","STANDARD","25060"
"RDOCAL","TRAFIC2ORIENT","SY(RDOCAL02,ORIENT);TE('Nr %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch %s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","STANDARD","25060"
"RDOCAL","TRAFIC3ORIENT","SY(RDOCAL02,ORIENT);TE('Nr %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch %s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","STANDARD","25060"
"RDOCAL","TRAFIC4ORIENT","SY(RDOCAL03,ORIENT);TE('Nr %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch %s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","STANDARD","25060"
"RDOSTA","","SY(RDOSTA02)","4","O","OTHER","38010"
"RDOSTA","CATROS10","SY(DGPS01)","4","O","OTHER","38010"
"RETRFL","","SY(RETRFL01)","6","O","STANDARD","27080"
"ROADWY","","","","","","",""
"RSCSTA","","SY(RSCSTA02)","7","O","OTHER","38030"
"RTPBCN","","SY(RTPBCN02)","6","O","STANDARD","27210"
"RUNWAY","","","","","","",""
"SBDARE","","TX(NATSUR,1,2,2,'15110',0,0,CHBLK,25)","4","O","OTHER","34010"
"SEAARE","","TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26)","3","S","STANDARD","21060"
"SILTNK","","SY(TNKCON02)","4","O","OTHER","32220"
"SILTNK","CATSIL1CONVIS1","SY(SILBUI11)","4","O","STANDARD","22220"
"SILTNK","CATSIL2CONVIS1","SY(TNKCON12)","4","O","STANDARD","22220"
"SILTNK","CATSIL3CONVIS1","SY(TOWERS03)","4","O","STANDARD","22220"
"SILTNK","CATSIL4CONVIS1","SY(TOWERS12)","4","O","STANDARD","22220"
"SILTNK","CONVIS1","SY(TNKCON12)","4","O","STANDARD","22220"
"SILTNK","CATSIL1","SY(SILBUI01)","4","O","OTHER","32220"
"SILTNK","CATSIL2","SY(TNKCON02)","4","O","OTHER","32220"
"SILTNK","CATSIL3","SY(TOWERS01)","4","O","OTHER","32220"
"SILTNK","CATSIL4","SY(TOWERS02)","4","O","OTHER","32220"
"SISTAT","","SY(SISTAT02)","7","O","STANDARD","28020"
"SISTAW","","SY(SISTAT02)","7","O","STANDARD","28020"
"SLCONS","","SY(MORFAC03);CS(SLCONS03)","8","O","DISPLAYBASE","12410"
"SLOGRD","","SY(HILTOP01)","3","S","OTHER","32010"
"SLOTOP","","SY(HILTOP01)","3","S","OTHER","32010"
"SLOTOP","CONVIS1","SY(HILTOP11)","3","S","STANDARD","22220"
"SMCFAC","","","","","","",""
"SNDWAV","","SY(SNDWAV02)","4","O","STANDARD","24010"
"SOUNDG","","CS(SOUNDG02)","6","O","OTHER","33010"
"SPLARE","","SY(CHINFO06)","4","O","STANDARD","26040"
"SPRING","","SY(SPRING02)","4","O","OTHER","34020"
"T_HMON","","SY(TIDEHT01)","4","O","OTHER","33050"
"T_NHMN","","SY(TIDEHT01)","4","O","OTHER","33050"
"T_TIMS","","SY(TIDEHT01)","4","O","OTHER","33050"
"TS_FEB","","SY(CURDEF01)","4","O","OTHER","33060"
"TS_FEB","CAT_TS1ORIENT","SY(FLDSTR01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","O","OTHER","33060"
"TS_FEB","CAT_TS2ORIENT","SY(EBBSTR01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","O","OTHER","33060"
"TS_FEB","CAT_TS3ORIENT","SY(CURENT01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","O","OTHER","33060"
"TS_PAD","","SY(TIDSTR01)","4","O","OTHER","33060"
"TS_PNH","","SY(TIDSTR01)","4","O","OTHER","33060"
"TS_PRH","","SY(TIDSTR01)","4","O","OTHER","33060"
"TS_TIS","","SY(TIDSTR01)","4","O","OTHER","33060"
"TOPMAR","","CS(TOPMAR01)","6","O","STANDARD","27050"
"TUNNEL","","","","","","",""
"UWTROC","","CS(OBSTRN06)","4","O","OTHER","34050"
"VEGATN","","","","","","",""
"WATFAL","","","","","","",""
"WATTUR","","SY(WATTUR02)","3","O","OTHER","33040"
"WEDKLP","","SY(WEDKLP03)","3","O","OTHER","34020"
"WRECKS","","CS(WRECKS04)","4","O","OTHER","34050"
"WRECKS","CATWRK3VALSOU","SY(FOULGND1)","4","O","OTHER","34051"
"WRECKS","CATWRK3","SY(FOULGND1)","4","O","OTHER","34050"
*
* *** ***
* *** section two: NON-STANDARD CLASSES ***

```
* ***                                   ***
*
*Note: category "DISPLAYBASE" should not be removed from the display.
*For non-standard classes, all category "MARINERS STANDARD" and "MARINERS OTHER"
*should be drawn when "STANDARD DISPLAY" is drawn, and thereafter may be re-assigned
*to the category of choosen by the mariner.
*
"cursor","","SY(CURSRA01)","8","O","DISPLAYBASE","11010"
"cursor","cursty2","SY(CURSRB01)","8","O","MARINERS OTHER","61040"
"dnghlt","","SY(DNGHILIT)","8","O","MARINERS STANDARD","53010"
"events","","SY(EVENTS03);TX(OBJNAM,3,2,3,'15110',1,0,CHBLK,50)","8","O","MARINERS STANDARD","52410"
"marfea","","SY(CHINFO09);TX(OBJNAM,3,1,3,'15110',1,-1,CHBLK,50)","8","O","MARINERS STANDARD","53050"
"marnot","","SY(CHINFO09);TX(usrmrk,3,1,2,'15110',0,0,CHBLK,50)","8","O","MARINERS STANDARD","53040"
"marnot","catnot1","SY(CHINFO08);TX(usrmrk,3,1,2,'15110',0,0,CHBLK,50)","8","O","MARINERS STANDARD","53030"
"marnot","catnot2","SY(CHINFO09);TX(usrmrk,3,1,2,'15110',0,0,CHBLK,50)","8","O","MARINERS STANDARD","53040"
"mnufea","","SY(CHINFO10)","5","O","MARINERS STANDARD","55010"
"mnufea","catnot1","SY(CHINFO10)","5","O","MARINERS STANDARD","55010"
"mnufea","catnot2","SY(CHINFO11)","5","O","MARINERS STANDARD","55020"
"ownshp","","CS(OWNSHP02)","9","O","DISPLAYBASE","42010"
"plnpos","","SY(PLNPOS01);SY(PLNPOS02,ORIENT);TX(plndat,1,2,2,'15110',4,3,CHBLK,50);","5","O","MARINERS STANDARD","52030"
"positn","","SY(POSITN02);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth1","SY(POSITN02);TX('DR',2,3,2,'15110',-1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS
OTHER","62010"
"positn","pfmeth2","SY(POSITN02);TX('EP',2,3,2,'15110',-1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS
OTHER","62010"
"positn","pfmeth3","SY(POSITN02);TX('V',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS
OTHER","62010"
"positn","pfmeth4","SY(POSITN02);TX('A',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS
OTHER","62010"
"positn","pfmeth5","SY(POSITN02);TX('R',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS
OTHER","62010"
"positn","pfmeth6","SY(POSITN02);TX('D',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS
OTHER","62010"
"positn","pfmeth7","SY(POSITN02);TX('G',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS
OTHER","62010"
"positn","pfmeth8","SY(POSITN02);TX('GI',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS
OTHER","62010"
"positn","pfmeth9","SY(POSITN02);TX('L',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS
OTHER","62010"
"positn","pfmeth10","SY(POSITN02);TX('M',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS
OTHER","62010"
"positn","pfmeth11","SY(POSITN02);TX('O',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS
OTHER","62010"
"positn","pfmeth12","SY(POSITN02);TX('T',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS
OTHER","62010"
"positn","pfmeth13","SY(POSITN02);TX('dG',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS
OTHER","62010"
"positn","pfmeth14","SY(POSITN02);TX('dGI',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS
OTHER","62010"
"positn","pfmeth15","SY(POSITN02);TX('dO',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS
OTHER","62010"
"refpnt","","SY(REFPNT02)","7","O","MARINERS OTHER","61050"
"tidcur","","SY(TIDCUR01,ORIENT);SY(TIDCUR03);TX(curstr,2,3,2,'15110',-1,2,CHBLK,50);TX(loctim,3,1,2,'15110',1,-
2,CHBLK,50)","7","O","MARINERS STANDARD","53080"
"tidcur","catcur1","SY(TIDCUR01,ORIENT);SY(TIDCUR03);TX('P',2,3,2,'15110',-4,2,CHBLK,50);TX(curstr,2,3,2,'15110',-
1,2,CHBLK,50);TX(loctim,3,1,2,'15110',1,-2,CHBLK,50)","7","O","MARINERS STANDARD","53080"
"tidcur","catcur2","SY(TIDCUR02,ORIENT);SY(TIDCUR03);TX('A',2,3,2,'15110',-4,2,CHBLK,50);TX(curstr,2,3,2,'15110',-
1,2,CHBLK,50);TX(loctim,3,1,2,'15110',1,-2,CHBLK,50)","7","O","MARINERS STANDARD","53080"
"vessel","","CS(VESSEL02)","9","O","MARINERS STANDARD","54030"
"waypnt","","SY(WAYPNT01);TX(OBJNAM,3,1,3,'15110',1,-1,APLRT,50)","8","O","DISPLAYBASE","42210"
"waypnt","select1","SY(WAYPNT01);TX(OBJNAM,3,1,3,'15110',1,-1,CHBLK,50)","8","O","DISPLAYBASE","42210"
"waypnt","select2","SY(WAYPNT03);TX(OBJNAM,3,1,3,'15110',1,-1,APLRT,50)","8","O","MARINERS STANDARD","52210"
*
* ***                   ***
* *** end of look-up table ***
* ***                   ***
```

11.1.2 Look-up Table for simplified point symbolisation

```
* *** SIMPLIFIED POINTS                          ***
* *** This is the look-up table for point symbolization. ***
* *** For edition 3.4 Preslib, dated January 2008   ******
*
* Each line contains minimum 6 fields:
*  1. field - code of the object class
```

```
* 2. field - attribute combination
* 3. field - symbolization instruction
* 4. field - display priority
* 5. field - radar
* 6. field - IMO display category
* 7. field - viewing group (optional)
*
* Each field entry is framed by "" and fields are separated by ','.
*
* Please note, that the entries to this table must be in
* alphabetic order (sorted by the class code).
*
* This table has 2 sections:
*
* - The first section contains symbolization instructions for
*   standard S-57 'real world' objects:
* - The second section contains symbolization instructions for
*   non-standard (class code in lowercase) objects:
*
* default for symbolization failure; must be the first entry to look up table
"######","","SY(QUESMRK1)","5","O","STANDARD","21010"
*
* ***                          ***
* *** section one: REAL WORLD CLASSES ***
* ***                          ***
*
"ACHARE","","SY(ACHARE02)","6","O","STANDARD","26220"
"ACHBRT","","SY(ACHBRT07);TE('Nr %s','OBJNAM',3,1,2,'15110',1,0,CHBLK,29)","5","O","STANDARD","26220"
"AIRARE","","SY(AIRARE02)","4","O","OTHER","32240"
"BCNCAR","","SY(BCNDEF13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNCAR","CATCAM4","SY(BCNCAR04);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNCAR","CATCAM3","SY(BCNCAR03);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNCAR","CATCAM2","SY(BCNCAR02);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNCAR","CATCAM1","SY(BCNCAR01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNISD","","SY(BCNISD21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","","SY(BCNDEF13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR3,4,3BCNSHP1","SY(BCNLAT21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR3,4,3BCNSHP2","SY(BCNLAT21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR3,4,3BCNSHP7","SY(BCNLAT21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR4,3,4BCNSHP1","SY(BCNLAT22);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR4,3,4BCNSHP2","SY(BCNLAT22);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR4,3,4BCNSHP7","SY(BCNLAT22);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR3,4,3BCNSHP3","SY(BCNLAT15);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR3,4,3BCNSHP4","SY(BCNLAT15);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR3,4,3BCNSHP5","SY(BCNLAT15);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR4,3,4BCNSHP3","SY(BCNLAT16);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR4,3,4BCNSHP4","SY(BCNLAT16);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR4,3,4BCNSHP5","SY(BCNLAT16);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR3,4,3","SY(BCNLAT15);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR4,3,4","SY(BCNLAT16);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR3BCNSHP1","SY(BCNLAT21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR3BCNSHP2","SY(BCNLAT21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR3BCNSHP7","SY(BCNLAT21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR4BCNSHP1","SY(BCNLAT22);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR4BCNSHP2","SY(BCNLAT22);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR4BCNSHP7","SY(BCNLAT22);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR3BCNSHP3","SY(BCNLAT15);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR3BCNSHP4","SY(BCNLAT15);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR3BCNSHP5","SY(BCNLAT15);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR4BCNSHP3","SY(BCNLAT16);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR4BCNSHP4","SY(BCNLAT16);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR4BCNSHP5","SY(BCNLAT16);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","BCNSHP6CONVIS1","SY(CAIRNS11);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","BCNSHP6","SY(CAIRNS01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR3","SY(BCNLAT15);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNLAT","COLOUR4","SY(BCNLAT16);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNSAW","","SY(BCNSAW13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNSAW","BCNSHP1","SY(BCNSAW21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNSAW","BCNSHP2","SY(BCNSAW21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNSAW","BCNSHP7","SY(BCNSAW21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNSAW","BCNSHP3","SY(BCNSAW13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNSAW","BCNSHP4","SY(BCNSAW13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNSAW","BCNSHP5","SY(BCNSAW13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
```

"BCNSPP","","SY(BCNSPP21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNSPP","BCNSHP6CONVIS1","SY(CAIRNS11);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNSPP","CATSPM18","SY(NOTBRD11);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNSPP","CATSPM44","SY(BCNSPP13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNSPP","BCNSHP1","SY(BCNSPP21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNSPP","BCNSHP3","SY(BCNSPP13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNSPP","BCNSHP4","SY(BCNSPP13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNSPP","BCNSHP5","SY(BCNSPP13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNSPP","BCNSHP6","SY(CAIRNS01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BCNSPP","BCNSHP7","SY(BCNSPP21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD"," 27020"
"BERTHS","","SY(BRTHNO01);TE('Nr %s','OBJNAM',3,1,2,'15110',1,0,CHBLK,29)","5","O","OTHER","32440"
"BOYCAR","","SY(BOYDEF03);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYCAR","CATCAM4","SY(BOYCAR04);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYCAR","CATCAM3","SY(BOYCAR03);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYCAR","CATCAM2","SY(BOYCAR02);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYCAR","CATCAM1","SY(BOYCAR01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYINB","","SY(BOYMOR11);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYISD","","SY(BOYISD12);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","","SY(BOYDEF03);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","BOYSHP1COLOUR3,4,3","SY(BOYLAT14);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","BOYSHP1COLOUR4,3,4","SY(BOYLAT13);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","BOYSHP2COLOUR3,4,3","SY(BOYLAT24);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","BOYSHP2COLOUR4,3,4","SY(BOYLAT23);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","CATLAM3COLOUR3,4,3","SY(BOYLAT24);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","CATLAM3COLOUR4,3,4","SY(BOYLAT23);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","CATLAM4COLOUR3,4,3","SY(BOYLAT14);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","CATLAM4COLOUR4,3,4","SY(BOYLAT13);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","BOYSHP1COLOUR3","SY(BOYLAT14);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","BOYSHP1COLOUR4","SY(BOYLAT13);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","BOYSHP2COLOUR3","SY(BOYLAT24);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","BOYSHP2COLOUR4","SY(BOYLAT23);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","CATLAM1COLOUR3","SY(BOYLAT24);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","CATLAM1COLOUR4","SY(BOYLAT23);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","CATLAM2COLOUR3","SY(BOYLAT14);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYLAT","CATLAM2COLOUR4","SY(BOYLAT13);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSAW","","SY(BOYSAW12);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","","SY(BOYSPP11);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","CATSPM19BOYSHP1","SY(BOYSPP15);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","CATSPM19BOYSHP2","SY(BOYSPP25);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","CATSPM54BOYSHP1","SY(BOYSPP15);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","CATSPM54BOYSHP2","SY(BOYSPP25);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","CATSPM54BOYSHP4","SY(BOYSPP35);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","CATSPM54BOYSHP5","SY(BOYSPP35);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","CATSPM9","SY(BOYSUP02);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","CATSPM15","SY(BOYSUP02);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","BOYSHP1","SY(BOYSPP15);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","BOYSHP2","SY(BOYSPP25);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","BOYSHP3","SY(BOYSPP11);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","BOYSHP4","SY(BOYSPP35);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","BOYSHP5","SY(BOYSPP35);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","BOYSHP6","SY(BOYSPP11);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","BOYSHP7","SY(BOYSUP02);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BOYSPP","BOYSHP8","SY(BOYSPP35);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"BRIDGE","","","","","","",""
"BRIDGE","","","","","","",""
"BUAARE","","SY(BUAARE02);TX(OBJNAM,3,2,2,'15110',1,0,CHBLK,26)","3","O","STANDARD","22240"
"BUISGL","","SY(BUISGL01)","4","O","OTHER","32220"
"BUISGL","FUNCTN33CONVIS1OBJNAM","SY(POSGEN03);TX(OBJNAM,3,2,2,'15110',1,0,CHBLK,26)","6","O","STANDARD","22220"
"BUISGL","FUNCTN20CONVIS1","SY(BUIREL13)","6","O","STANDARD","22220"
"BUISGL","FUNCTN21CONVIS1","SY(BUIREL13)","6","O","STANDARD","22220"
"BUISGL","FUNCTN22CONVIS1","SY(BUIREL14)","6","O","STANDARD","22220"
"BUISGL","FUNCTN23CONVIS1","SY(BUIREL14)","6","O","STANDARD","22220"
"BUISGL","FUNCTN24CONVIS1","SY(BUIREL14)","6","O","STANDARD","22220"
"BUISGL","FUNCTN25CONVIS1","SY(BUIREL14)","6","O","STANDARD","22220"
"BUISGL","FUNCTN26CONVIS1","SY(BUIREL15)","6","O","STANDARD","22220"
"BUISGL","FUNCTN27CONVIS1","SY(BUIREL15)","6","O","STANDARD","22220"
"BUISGL","FUNCTN33CONVIS1","SY(POSGEN03)","6","O","STANDARD","22220"
"BUISGL","FUNCTN35CONVIS1","SY(TNKCON12)","6","O","STANDARD","22220"
"BUISGL","FUNCTN33OBJNAM","SY(POSGEN03);TX(OBJNAM,3,2,2,'15110',1,0,CHBLK,26)","4","O","OTHER","32220"
"BUISGL","CONVIS1","SY(BUISGL11)","6","O","STANDARD","22220"
"BUISGL","FUNCTN20","SY(BUIREL01)","4","O","OTHER","32220"
"BUISGL","FUNCTN21","SY(BUIREL01)","4","O","OTHER","32220"
"BUISGL","FUNCTN22","SY(BUIREL04)","4","O","OTHER","32220"
"BUISGL","FUNCTN23","SY(BUIREL04)","4","O","OTHER","32220"
"BUISGL","FUNCTN24","SY(BUIREL04)","4","O","OTHER","32220"
"BUISGL","FUNCTN25","SY(BUIREL04)","4","O","OTHER","32220"
"BUISGL","FUNCTN26","SY(BUIREL05)","4","O","OTHER","32220"
"BUISGL","FUNCTN27","SY(BUIREL05)","4","O","OTHER","32220"
"BUISGL","FUNCTN33","SY(POSGEN03)","4","O","OTHER","32220"
"BUISGL","FUNCTN35","SY(TNKCON02)","4","O","OTHER","32220"
"CGUSTA","","SY(CGUSTA02)","7","O","OTHER","38030"
"CHKPNT","","","","","","",""
"CRANES","","SY(CRANES01)","4","O","OTHER","32440"
"CTNARE","","SY(CHINFO06)","4","O","STANDARD","26050"

"CTRPNT","","SY(POSGEN04)","4","O","OTHER","32250"
"CTSARE","","SY(CHINFO07)","4","O","STANDARD","26250"
"CURENT","","","","","",""
"CURENT","ORIENTCURVEL","SY(CURENT01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","5","O","OTHER","33060"
"CURENT","ORIENT","SY(CURENT01,ORIENT)","5","O","OTHER","33060"
"DAMCON","","","","","",""
"DAMCON","CATDAM3","SY(CHINFO06)","4","O","STANDARD","22010"
"DAYMAR","","SY(DAYSQR01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DAYMAR","TOPSHP19","SY(DAYSQR01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DAYMAR","TOPSHP20","SY(DAYSQR01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DAYMAR","TOPSHP21","SY(DAYSQR01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DAYMAR","TOPSHP24","SY(DAYTRI01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DAYMAR","TOPSHP25","SY(DAYTRI05);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DISMAR","","SY(DISMAR03);TX(INFORM,2,1,2,'15110',2,0,CHBLK,21)","7","O","OTHER","32430"
"DISMAR","CATDIS1","SY(DISMAR04);TX(INFORM,2,1,2,'15110',2,0,CHBLK,21)","7","O","OTHER","32430"
"DMPGRD","","SY(CHINFO07)","4","O","STANDARD","26240"
"FOGSIG","","SY(FOGSIG01)","6","O","STANDARD","27080"
"FORSTC","","SY(FORSTC01)","4","O","OTHER","32220"
"FORSTC","CONVIS1","SY(FORSTC11)","4","O","STANDARD","22220"
"FSHFAC","","SY(FSHHAV01)","4","O","OTHER","34040"
"FSHFAC","CATFIF1","SY(FSHFAC03)","4","O","OTHER","34040"
"FSHFAC","CATFIF2","SY(FSHFAC02)","4","O","OTHER","34040"
"FSHFAC","CATFIF3","SY(FSHFAC02)","4","O","OTHER","34040"
"FSHFAC","CATFIF4","SY(FSHFAC02)","4","O","OTHER","34040"
"GATCON","","SY(GATCON04)","8","O","STANDARD","22010"
"GATCON","CATGAT2","SY(GATCON04)","8","O","STANDARD","22010"
"GATCON","CATGAT3","SY(GATCON04)","8","O","OTHER","32440"
"GATCON","CATGAT4","SY(GATCON03)","8","O","OTHER","32440"
"GRIDRN","","","","","",""
"HRBFAC","","SY(CHINFO07)","4","O","OTHER","32410"
"HRBFAC","CATHAF1","SY(ROLROL01)","4","O","OTHER","32410"
"HRBFAC","CATHAF4","SY(HRBFAC09)","4","O","OTHER","32410"
"HRBFAC","CATHAF5","SY(SMCFAC02)","4","O","OTHER","32410"
"HULKES","","SY(HULKES01)","5","O","DISPLAYBASE","12410"
"ICNARE","","SY(CHINFO07)","4","O","STANDARD","26250"
"LIGHTS","","CS(LIGHTS05)","8","O","STANDARD","27070"
"LITFLT","","SY(LITFLT02);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27010"
"LITVES","","SY(LITVES02);TE('LtV %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","STANDARD","27011"
"LNDARE","","SY(LNDARE01); TX(OBJNAM,1,2,2,'15110',0,1,CHBLK,26);CS(QUAPOS01)","4","O","DISPLAYBASE","12010"
"LNDELV","","SY(POSGEN04);TE('%3.0lf m','ELEVAT',3,2,2,'15110',1,0,CHBLK,28)","4","O","OTHER","32010"
"LNDMRK","","SY(POSGEN01)","4","O","OTHER","32220"
"LNDMRK","CATLMK17FUNCTN33CONVIS1","SY(TOWERS03);TX(OBJNAM,3,2,2,'15110',1,-1,CHBLK,26)","6","O","STANDARD","22220"
"LNDMRK","CATLMK15FUNCTN20CONVIS1","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK15FUNCTN21CONVIS1","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK17FUNCTN20CONVIS1","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK17FUNCTN21CONVIS1","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20FUNCTN20CONVIS1","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20FUNCTN21CONVIS1","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20FUNCTN26CONVIS1","SY(BUIREL15)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20FUNCTN27CONVIS1","SY(BUIREL15)","6","O","STANDARD","22220"
"LNDMRK","CATLMK17FUNCTN33","SY(TOWERS01);TX(OBJNAM,3,2,2,'15110',1,-1,CHBLK,26)","4","O","OTHER","32220"
"LNDMRK","CATLMK1CONVIS1","SY(CAIRNS11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK3CONVIS1","SY(CHIMNY11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK4CONVIS1","SY(DSHAER11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK5CONVIS1","SY(FLGSTF01)","6","O","STANDARD","22220"
"LNDMRK","CATLMK6CONVIS1","SY(FLASTK11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK7CONVIS1","SY(MSTCON14)","6","O","STANDARD","22220"
"LNDMRK","CATLMK8CONVIS1","SY(POSGEN03)","6","O","STANDARD","22220"
"LNDMRK","CATLMK9CONVIS1","SY(MONUMT12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK10CONVIS1","SY(MONUMT12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK12CONVIS1","SY(MONUMT12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK13CONVIS1","SY(MONUMT12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK15CONVIS1","SY(DOMES011)","6","O","STANDARD","22220"
"LNDMRK","CATLMK16CONVIS1","SY(RASCAN11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK17CONVIS1","SY(TOWERS03)","6","O","STANDARD","22220"
"LNDMRK","CATLMK18CONVIS1","SY(WNDMIL12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK19CONVIS1","SY(WIMCON11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20CONVIS1","SY(POSGEN03)","6","O","STANDARD","22220"
"LNDMRK","CATLMK15FUNCTN20","SY(BUIREL01)","4","O","OTHER","32220"
"LNDMRK","CATLMK17FUNCTN20","SY(BUIREL01)","4","O","OTHER","32220"
"LNDMRK","CATLMK20FUNCTN20","SY(BUIREL01)","4","O","OTHER","32220"
"LNDMRK","CATLMK3","SY(CHIMNY01)","4","O","OTHER","32220"
"LNDMRK","CATLMK6","SY(FLASTK01)","4","O","OTHER","32220"
"LNDMRK","CATLMK7","SY(MSTCON04)","4","O","OTHER","32220"
"LNDMRK","CATLMK15","SY(DOMES001)","4","O","OTHER","32220"
"LNDMRK","CATLMK16","SY(RASCAN01)","4","O","OTHER","32220"
"LNDMRK","CATLMK17","SY(TOWERS01)","4","O","OTHER","32220"
"LNDMRK","CONVIS1","SY(POSGEN03)","6","O","STANDARD","22220"
"LNDRGN","","SY(POSGEN04);TX(OBJNAM,1,2,2,'15110',0,-1,CHBLK,26)","4","O","STANDARD","21060"
"LOCMAG","","SY(LOCMAG01)","4","O","OTHER","31080"
"LOGPON","","SY(FLTHAZ02)","4","O","OTHER","34050"
"M_NPUB","","SY(CHINFO07)","4","O","OTHER","31020"
"MAGVAR","","SY(MAGVAR01);TX(VALMAG,3,1,2,'15110',1,-1,CHBLK,27)","4","O","OTHER","31080"
"MARCUL","","SY(MARCUL02)","4","O","STANDARD","26210"

"MIPARE","","SY(CHINFO06)","4","O","STANDARD","26040"
"MORFAC","","SY(MORFAC03)","6","O","DISPLAYBASE","12410"
"MORFAC","CATMOR1","SY(MORFAC03)","6","O","DISPLAYBASE","12410"
"MORFAC","CATMOR2","SY(MORFAC04)","6","O","DISPLAYBASE","12410"
"MORFAC","CATMOR3","SY(PILPNT02)","6","O","OTHER","32440"
"MORFAC","CATMOR5","SY(PILPNT02)","6","O","DISPLAYBASE","12410"
"MORFAC","CATMOR7","SY(BOYMOR11)","8","O","STANDARD","27010"
"NEWOBJ","","SY(NEWOBJ 01)","6","S","STANDARD","21020"
"NEWOBJ","SYMINS","CS(SYMINS01)","6","S","STANDARD","21020"
"OBSTRN","","CS(OBSTRN06)","4","O","OTHER","34050"
"OBSTRN","CATOBS7VALSOU","SY(FOULGND1)","4","O","OTHER","34051"
"OBSTRN","CATOBS8VALSOU","SY(FLTHAZ02)","4","O","OTHER","34051"
"OBSTRN","CATOBS9VALSOU","SY(ACHARE02)","4","O","OTHER","34051"
"OBSTRN","CATOBS10VALSOU","SY(FLTHAZ02)","4","O","OTHER","34051"
"OBSTRN","CATOBS7","SY(FOULGND1)","4","O","OTHER","34050"
"OBSTRN","CATOBS8","SY(FLTHAZ02)","4","O","OTHER","34050"
"OBSTRN","CATOBS9","SY(ACHARE02)","4","O","OTHER","34050"
"OBSTRN","CATOBS10","SY(FLTHAZ02)","4","O","OTHER","34050"
"OBSTRN","WATLEV7","SY(FLTHAZ02)","4","O","DISPLAYBASE","12410"
"OFSPLF","","SY(OFSPLF01);TE('Prod %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21)","5","O","DISPLAYBASE","12210"
"PILBOP","","SY(PILBOP02);TE('Plt %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21)","6","O","STANDARD","28010"
"PILPNT","","SY(PILPNT02)","5","O","DISPLAYBASE","12410"
"PIPARE","","SY(CHINFO07)","4","O","STANDARD","26230"
"PIPSOL","","","","","","",""
"PRCARE","","SY(PRCARE12)","5","O","STANDARD","25010"
"PRDARE","","","","","","",""
"PRDARE","CATPRA5CONVIS1","SY(FLASTK11)","4","O","STANDARD","22220"
"PRDARE","CATPRA8CONVIS1","SY(TNKCON12)","4","O","STANDARD","22220"
"PRDARE","CATPRA9CONVIS1","SY(WIMCON11)","4","O","STANDARD","22220"
"PRDARE","CATPRA1","SY(PRDINS02)","3","O","OTHER","32270"
"PRDARE","CATPRA5","SY(FLASTK01)","3","O","OTHER","32270"
"PRDARE","CATPRA6","SY(TMBYRD01)","3","O","OTHER","32270"
"PRDARE","CATPRA8","SY(TNKCON02)","3","O","OTHER","32270"
"PRDARE","CATPRA9","SY(WIMCON01)","3","O","OTHER","32270"
"PYLONS","","SY(POSGEN03)","8","O","DISPLAYBASE","12210"
"RADRFL","","SY(RADRFL03)","6","O","STANDARD","27230"
"RADSTA","","SY(POSGEN01)","5","O","OTHER","38010"
"RADSTA","CATRAS2","SY(RDOSTA02);TE('ch %s','COMCHA',3,1,2,'15110',0,0,CHBLK,11)","5","O","OTHER","38010"
"RAPIDS","","","","","","",""
"RCTLPT","","SY(RTLDEF51)","4","O","STANDARD","25020"
"RCTLPT","ORIENT","SY(RCTLPT52,ORIENT)","4","O","STANDARD","25020"
"RDOCAL","","SY(RCLDEF01);TE('Nr %s','OBJNAM',3,2,2,'15110',1,-1,CHBLK,21)","6","O","STANDARD","25060"
"RDOCAL","TRAFIC1ORIENT","SY(RDOCAL02,ORIENT);TE('Nr %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch %s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","STANDARD","25060"
"RDOCAL","TRAFIC2ORIENT","SY(RDOCAL02,ORIENT);TE('Nr %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch %s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","STANDARD","25060"
"RDOCAL","TRAFIC3ORIENT","SY(RDOCAL02,ORIENT);TE('Nr %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch %s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","STANDARD","25060"
"RDOCAL","TRAFIC4ORIENT","SY(RDOCAL03,ORIENT);TE('Nr %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch %s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","STANDARD","25060"
"RDOSTA","","SY(RDOSTA02)","4","O","OTHER","38010"
"RDOSTA","CATROS10","SY(DGPS01)","4","O","OTHER","38010"
"RETRFL","","SY(RETRFL02)","6","O","STANDARD","27080"
"ROADWY","","","","","","",""
"RSCSTA","","SY(RSCSTA02)","7","O","OTHER","38030"
"RTPBCN","","SY(RTPBCN02)","6","O","STANDARD","27210"
"RUNWAY","","","","","","",""
"SBDARE","","TX(NATSUR,1,2,2,'15110',0,0,CHBLK,25)","4","O","OTHER","34010"
"SEAARE","","TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26)","3","S","STANDARD","21060"
"SILTNK","","SY(TNKCON02)","4","O","OTHER","32220"
"SILTNK","CATSIL1CONVIS1","SY(SILBUI11)","4","O","STANDARD","22220"
"SILTNK","CATSIL2CONVIS1","SY(TNKCON12)","4","O","STANDARD","22220"
"SILTNK","CATSIL3CONVIS1","SY(TOWERS03)","4","O","STANDARD","22220"
"SILTNK","CATSIL4CONVIS1","SY(TOWERS12)","4","O","STANDARD","22220"
"SILTNK","CONVIS1","SY(TNKCON12)","4","O","STANDARD","22220"
"SILTNK","CATSIL1","SY(SILBUI01)","4","O","OTHER","32220"
"SILTNK","CATSIL2","SY(TNKCON02)","4","O","OTHER","32220"
"SILTNK","CATSIL3","SY(TOWERS01)","4","O","OTHER","32220"
"SILTNK","CATSIL4","SY(TOWERS02)","4","O","OTHER","32220"
"SISTAT","","SY(SISTAT02)","7","O","STANDARD","28020"
"SISTAW","","SY(SISTAT02)","7","O","STANDARD","28020"
"SLCONS","","SY(MORFAC03);CS(SLCONS03)","8","O","DISPLAYBASE","12410"
"SLOGRD","","SY(HILTOP01)","3","S","OTHER","32010"
"SLOTOP","","SY(HILTOP01)","3","S","OTHER","32010"
"SLOTOP","CONVIS1","SY(HILTOP11)","3","S","STANDARD","22220"
"SMCFAC","","","","","","",""
"SNDWAV","","SY(SNDWAV02)","4","O","STANDARD","24010"
"SOUNDG","","CS(SOUNDG02)","6","O","OTHER","33010"
"SPLARE","","SY(CHINFO06)","4","O","STANDARD","26040"
"SPRING","","SY(SPRING02)","4","O","OTHER","34020"
"T_HMON","","SY(TIDEHT01)","4","O","OTHER","33050"
"T_NHMN","","SY(TIDEHT01)","4","O","OTHER","33050"
"T_TIMS","","SY(TIDEHT01)","4","O","OTHER","33050"
"TS_FEB","","SY(CURDEF01)","4","O","OTHER","33060"

"TS_FEB","CAT_TS1ORIENT","SY(FLDSTR01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","O","OTHER","33060"
"TS_FEB","CAT_TS2ORIENT","SY(EBBSTR01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","O","OTHER","33060"
"TS_FEB","CAT_TS3ORIENT","SY(CURENT01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","O","OTHER","33060"
"TS_PAD","","SY(TIDSTR01)","4","O","OTHER","33060"
"TS_PNH","","SY(TIDSTR01)","4","O","OTHER","33060"
"TS_PRH","","SY(TIDSTR01)","4","O","OTHER","33060"
"TS_TIS","","SY(TIDSTR01)","4","O","OTHER","33060"
"TOPMAR","","","","","","","","
"TUNNEL","","","","","","","","
"UWTROC","","CS(OBSTRN06)","4","O","OTHER","34050"
"VEGATN","","","","","","","","
"WATFAL","","","","","","","","
"WATTUR","","SY(WATTUR02)","3","O","OTHER","33040"
"WEDKLP","","SY(WEDKLP03)","3","O","OTHER","34020"
"WRECKS","","CS(WRECKS04)","4","O","OTHER","34050"
"WRECKS","CATWRK3VALSOU","SY(FOULGND1)","4","O","OTHER","34051"
"WRECKS","CATWRK3","SY(FOULGND1)","4","O","OTHER","34050"
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* *** ***
* *** section two: NON-STANDARD CLASSES ***
* *** ***
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*Note: category "DISPLAYBASE" should not be removed from the display.
*For non-standard classes, all category "MARINERS STANDARD" and "MARINERS OTHER"
*should be drawn when "STANDARD DISPLAY" is drawn, and thereafter may be re-assigned
*to the category of choosen by the mariner.
*
"cursor","","SY(CURSRA01)","8","O","DISPLAYBASE","11010"
"cursor","cursty2","SY(CURSRB01)","8","O","MARINERS OTHER","61040"
"dnghlt","","SY(DNGHILIT)","8","O","MARINERS STANDARD","53010"
"events","","SY(EVENTS03);TX(OBJNAM,3,2,3,'15110',1,0,CHBLK,50)","8","O","MARINERS STANDARD","52410"
"marfea","","SY(CHINFO09);TX(OBJNAM,3,1,3,'15110',1,-1,CHBLK,50)","8","O","MARINERS STANDARD","53050"
"marnot","","SY(CHINFO09);TX(usrmrk,3,1,2,'15110',0,0,CHBLK,50)","8","O","MARINERS STANDARD","53040"
"marnot","catnot1","SY(CHINFO08);TX(usrmrk,3,1,2,'15110',0,0,CHBLK,50)","8","O","MARINERS STANDARD","53030"
"marnot","catnot2","SY(CHINFO09);TX(usrmrk,3,1,2,'15110',0,0,CHBLK,50)","8","O","MARINERS STANDARD","53040"
"mnufea","","SY(CHINFO10)","5","O","MARINERS STANDARD","55010"
"mnufea","catnot1","SY(CHINFO10)","5","O","MARINERS STANDARD","55010"
"mnufea","catnot2","SY(CHINFO11)","5","O","MARINERS STANDARD","55020"
"ownshp","","CS(OWNSHP02)","9","O","DISPLAYBASE","42010"
"plnpos","","SY(PLNPOS01);SY(PLNPOS02,ORIENT);TX(plndat,1,2,2,'15110',4,3,CHBLK,50);","5","O","MARINERS STANDARD","52030"
"positn","","SY(POSITN02);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth1","SY(POSITN02);TX('DR',2,3,2,'15110',-1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth2","SY(POSITN02);TX('EP',2,3,2,'15110',-1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth3","SY(POSITN02);TX('V',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth4","SY(POSITN02);TX('A',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth5","SY(POSITN02);TX('R',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth6","SY(POSITN02);TX('D',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth7","SY(POSITN02);TX('G',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth8","SY(POSITN02);TX('GI',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth9","SY(POSITN02);TX('L',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth10","SY(POSITN02);TX('M',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth11","SY(POSITN02);TX('O',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth12","SY(POSITN02);TX('T',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth13","SY(POSITN02);TX('dG',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth14","SY(POSITN02);TX('dGI',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth15","SY(POSITN02);TX('dO',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"refpnt","","SY(REFPNT02)","7","O","MARINERS OTHER","61050"
"tidcur","","SY(TIDCUR01,ORIENT);SY(TIDCUR03);TX(curstr,2,3,2,'15110',-1,2,CHBLK,50);TX(loctim,3,1,2,'15110',1,-2,CHBLK,50)","7","O","MARINERS STANDARD","53080"
"tidcur","catcur1","SY(TIDCUR01,ORIENT);SY(TIDCUR03);TX('P',2,3,2,'15110',-4,2,CHBLK,50);TX(curstr,2,3,2,'15110',-1,2,CHBLK,50);TX(loctim,3,1,2,'15110',1,-2,CHBLK,50)","7","O","MARINERS STANDARD","53080"
"tidcur","catcur2","SY(TIDCUR02,ORIENT);SY(TIDCUR03);TX('A',2,3,2,'15110',-4,2,CHBLK,50);TX(curstr,2,3,2,'15110',-1,2,CHBLK,50);TX(loctim,3,1,2,'15110',1,-2,CHBLK,50)","7","O","MARINERS STANDARD","53080"
"vessel","","CS(VESSEL02)","9","O","MARINERS STANDARD","54030"
"waypnt","","SY(WAYPNT01);TX(OBJNAM,3,1,3,'15110',1,-1,APLRT,50)","8","O","DISPLAYBASE","42210"

"waypnt","select1","SY(WAYPNT01);TX(OBJNAM,3,1,3,'15110',1,-1,CHBLK,50)","8","O","DISPLAYBASE","42210"
"waypnt","select2","SY(WAYPNT03);TX(OBJNAM,3,1,3,'15110',1,-1,APLRT,50)","8","O","MARINERS STANDARD","52210"
*
* *** ***
* *** end of look-up table ***
* *** ***

11.2 Look-up Table Listing for Object Type Line 'L'

* *** LINES ***
* *** This is the look-up table for line symbolization. ***
* *** For edition 3.4 Preslib, dated January 2008 ******
*
* Each line contains minimum 6 fields:
* 1. field - code of the object class
* 2. field - attribute combination
* 3. field - symbolization instruction
* 4. field - display priority
* 5. field - radar
* 6. field - IMO display category
* 7. field - viewing group (optional)
*
* Each field entry is framed by "" and fields are separated by ','.
*
* Please note, that the entries to this table must be in
* alphabetic order (sorted by the class code).
*
* This table has 2 sections:
*
* - The first section contains symbolization instructions for
* standard S-57 'real world' objects:
* The second section contains symbolization instructions for
* non-standard (class code in lowercase) objects:
*
* default for symbolization failure; must be the first entry to look-up table
"######","","LC(QUESMRK1)","5","O","STANDARD","21010"
*

* *** ***
* *** section one: REAL WORLD CLASSES ***
* *** ***
*
"ASLXIS","","LS(DASH,2,CHMGF)","5","S","STANDARD","26260"
"BERTHS","","LS(SOLD,3,CHGRD);SY(BRTHNO01);TE('Nr %s','OBJNAM',1,2,2,'15110',0,0,CHBLK,29)","5","O","OTHER","32440"
"BRIDGE","","LS(SOLD,5,CHGRD);TX(OBJNAM,3,1,2,'15110',1,0,CHBLK,21);TE('clr
%4.1lf','VERCLR',3,1,2,'15110',1,1,CHBLK,11)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG2","LS(SOLD,5,CHGRD);SY(BRIDGE01);TE('clr cl %4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clr op
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG3","LS(SOLD,5,CHGRD);SY(BRIDGE01);TE('clr cl %4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clr op
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG4","LS(SOLD,5,CHGRD);SY(BRIDGE01);TE('clr cl %4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clr op
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG5","LS(SOLD,5,CHGRD);SY(BRIDGE01);TE('clr cl %4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clr op
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG7","LS(SOLD,5,CHGRD);SY(BRIDGE01);TE('clr cl %4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clr op
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG8","LS(SOLD,5,CHGRD);SY(BRIDGE01);TE('clr cl %4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clr op
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CANALS","","LS(SOLD,1,CHBLK)","2","O","DISPLAYBASE","12420"
"CAUSWY","","LS(SOLD,3,LANDF)","5","O","STANDARD","22010"
"CAUSWY","WATLEV4","LS(DASH,3,LANDF)","5","O","STANDARD","22010"
"CBLOHD","","LS(DASH,4,CHGRD)","8","O","DISPLAYBASE","12210"
"CBLOHD","CONRAD1VERCSA","LS(DASH,4,CHGRD);SY(RACNSP01);TE('sf clr
%4.1lf','VERCSA',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CBLOHD","CONRAD3VERCSA","LS(DASH,4,CHGRD);SY(RACNSP01);TE('sf clr
%4.1lf','VERCSA',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CBLOHD","CONRAD1VERCLR","LS(DASH,4,CHGRD);SY(RACNSP01);TE('clr
%4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"

"CBLOHD","CONRAD3VERCLR","LS(DASH,4,CHGRD);SY(RACNSP01);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CBLOHD","CONRAD1","LS(DASH,4,CHGRD);SY(RACNSP01)","8","O","DISPLAYBASE","12210"
"CBLOHD","CONRAD3","LS(DASH,4,CHGRD);SY(RACNSP01)","8","O","DISPLAYBASE","12210"
"CBLOHD","VERCSA","LS(DASH,4,CHGRD);TE('sf clr %4.1lf','VERCSA',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CBLOHD","VERCLR","LS(DASH,4,CHGRD);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CBLSUB","","LC(CBLSUB06)","3","O","OTHER","34070"
"CBLSUB","CATCBL6","LS(DASH,1,CHMGD)","6","O","STANDARD","24010"
"COALNE","","CS(QUAPOS01)","7","O","DISPLAYBASE","12410"
"COALNE","CATCOA6","LS(DASH,1,CSTLN)","7","O","DISPLAYBASE","12410"
"COALNE","CATCOA7","LS(DASH,1,CSTLN)","7","O","DISPLAYBASE","12410"
"COALNE","CATCOA8","LS(DASH,1,CSTLN)","7","O","DISPLAYBASE","12410"
"COALNE","CATCOA10","LS(DASH,1,CSTLN)","7","O","DISPLAYBASE","12410"
"CONVYR","","LS(DASH,4,CHGRD);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CONVYR","CATCON1CONRAD1","LS(DASH,4,CHGRD);SY(RACNSP01);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CONVYR","CATCON1CONRAD3","LS(DASH,4,CHGRD);SY(RACNSP01);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CONVYR","CATCON2CONRAD1","LS(SOLD,3,CHGRD);SY(RACNSP01);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CONVYR","CATCON2CONRAD3","LS(SOLD,3,CHGRD);SY(RACNSP01);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CONVYR","CATCON1","LS(DASH,4,CHGRD);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CONVYR","CATCON2","LS(SOLD,3,CHGRD);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CONVYR","CONRAD1","LS(DASH,4,CHGRD);SY(RACNSP01);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CONVYR","CONRAD3","LS(DASH,4,CHGRD);SY(RACNSP01);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"DAMCON","","LS(SOLD,4,LANDF)","6","O","STANDARD","22010"
"DAMCON","CATDAM3","LS(SOLD,2,CSTLN)","6","O","DISPLAYBASE","12410"
"DEPARE","","","","","","",""
"DEPCNT","","CS(DEPCNT03)","5","O","OTHER","33020"
"DWRTCL","","LC(DWLDEF01);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25010"
"DWRTCL","CATTRK1TRAFIC1","LC(DWRTCL08);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25010"
"DWRTCL","CATTRK1TRAFIC2","LC(DWRTCL08);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25010"
"DWRTCL","CATTRK1TRAFIC3","LC(DWRTCL08);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25010"
"DWRTCL","CATTRK1TRAFIC4","LC(DWRTCL06);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25010"
"DWRTCL","CATTRK2TRAFIC1","LC(DWRTCL07);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25010"
"DWRTCL","CATTRK2TRAFIC2","LC(DWRTCL07);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25010"
"DWRTCL","CATTRK2TRAFIC3","LC(DWRTCL07);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25010"
"DWRTCL","CATTRK2TRAFIC4","LC(DWRTCL05);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25010"
"DWRTCL","TRAFIC1","LC(DWRTCL07);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25010"
"DWRTCL","TRAFIC2","LC(DWRTCL07);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25010"
"DWRTCL","TRAFIC3","LC(DWRTCL07);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25010"
"DWRTCL","TRAFIC4","LC(DWRTCL05);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25010"
"DYKCON","","LS(SOLD,3,LANDF)","4","O","STANDARD","22010"
"DYKCON","CONRAD1","LS(SOLD,2,CHBLK)","4","O","STANDARD","22210"
"FERYRT","","LC(FERYRT02)","4","O","STANDARD","25030"
"FERYRT","CATFRY1","LC(FERYRT01)","4","O","STANDARD","25030"
"FERYRT","CATFRY2","LC(FERYRT02)","4","O","STANDARD","25030"
"FLODOC","","LS(SOLD,3,CSTLN)","5","O","DISPLAYBASE","12410"
"FNCLNE","","LS(SOLD,1,LANDF)","3","O","OTHER","32220"
"FNCLNE","CONVIS1","LS(SOLD,1,CHBLK)","3","O","STANDARD","22220"
"FORSTC","","LS(SOLD,3,LANDF)","4","O","OTHER","32220"
"FSHFAC","","LS(DASH,2,CHGRD)","4","O","OTHER","34040"
"FSHFAC","CATFIF1","LC(FSHFAC02)","4","O","OTHER","34040"
"GATCON","","LS(SOLD,2,CSTLN)","8","O","DISPLAYBASE","12410"
"GATCON","CATGAT2","LS(SOLD,2,CSTLN)","8","O","DISPLAYBASE","12410"
"GATCON","CATGAT3","LS(SOLD,2,CSTLN);SY(GATCON04)","8","O","DISPLAYBASE","12410"
"GATCON","CATGAT4","LS(SOLD,2,CSTLN);SY(GATCON03)","8","O","DISPLAYBASE","12410"
"GATCON","CATGAT5","LS(SOLD,2,CSTLN)","8","O","DISPLAYBASE","12410"
"LNDARE","","CS(QUAPOS01);TX(OBJNAM,1,1,2,'15110',0,1,CHBLK,26)","8","O","DISPLAYBASE","12010"
"LNDELV","","LS(SOLD,1,LANDF)","4","O","OTHER","32010"
"LNDMRK","","LS(SOLD,1,LANDF)","4","O","OTHER","32220"
"LNDMRK","CONVIS1","LS(SOLD,1,CHBLK)","4","O","STANDARD","22220"
"LOCMAG","","LS(DASH,1,CHMGF);SY(LOCMAG01)","4","S","OTHER","31080"
"M_SREL","","","","","","",""
"MAGVAR","","LS(SOLD,2,CHMGF);SY(MAGVAR51);TE('varn %s','VALMAG',3,1,2,'15110',1,-1,CHBLK,27)","4","O","OTHER","31080"
"MARCUL","","LS(DASH,2,CHGRF)","4","O","STANDARD","26210"
"MORFAC","","LS(SOLD,2,CSTLN)","6","O","DISPLAYBASE","12410"
"MORFAC","CATMOR4","LS(SOLD,2,CSTLN)","6","O","DISPLAYBASE","12410"
"MORFAC","CATMOR6","LS(DASH,1,CHMGF)","6","O","DISPLAYBASE","14010"
"NAVLNE","","LS(DASH,1,CHGRD)","4","O","STANDARD","25010"
"NAVLNE","CATNAV1","LS(DASH,1,CHGRD);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","4","O","STANDARD","25010"
"NAVLNE","CATNAV2","LS(DASH,1,CHGRD);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","4","O","STANDARD","25010"
"NEWOBJ","","LC(NEWOBJ01)","6","S","STANDARD","21020"
"NEWOBJ","SYMINS","CS(SYMINS01)","6","S","STANDARD","21020"
"OBSTRN","","CS(OBSTRN06)","4","O","OTHER","34050"
"OBSTRN","CATOBS8","LS(DASH,1,CSTLN)","4","O","DISPLAYBASE","12410"
"OBSTRN","CATOBS9","LS(DASH,1,CHMGD)","4","O","DISPLAYBASE","12410"
"OBSTRN","CATOBS10","LS(DASH,1,CSTLN)","4","O","DISPLAYBASE","12410"
"OBSTRN","WATLEV7","LS(DASH,1,CSTLN)","4","O","DISPLAYBASE","12410"
"OILBAR","","LS(DASH,1,CHBLK)","4","O","DISPLAYBASE","12410"
"PIPOHD","","LS(SOLD,3,CHGRD);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,-1,CHBLK,11)","8","O","DISPLAYBASE","12210"

"PIPOHD","CONRAD1","LS(SOLD,3,CHGRD);SY(RACNSP01);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,-1,CHBLK,11)","8","O","DISPLAYBASE","12210"
"PIPOHD","CONRAD3","LS(SOLD,3,CHGRD);SY(RACNSP01);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,-1,CHBLK,11)","8","O","DISPLAYBASE","12210"
"PIPSOL","","LC(PIPSOL05)","6","O","OTHER","34070"
"PIPSOL","PRODCT3","LC(PIPSOL06)","6","O","OTHER","34070"
"PIPSOL","CATPIP2","LC(PIPSOL06)","6","O","OTHER","34070"
"PIPSOL","CATPIP3","LC(PIPSOL06)","6","O","OTHER","34070"
"PIPSOL","CATPIP4","LC(PIPSOL06)","6","O","OTHER","34070"
"PIPSOL","CATPIP5","LC(PIPSOL06)","6","O","OTHER","34070"
"PONTON","","LS(SOLD,2,CSTLN)","5","O","DISPLAYBASE","12410"
"RADLNE","","LS(DASH,2,TRFCD);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25040"
"RAILWY","","LS(SOLD,2,LANDF)","4","O","OTHER","32250"
"RAPIDS","","LS(SOLD,3,CHGRD)","3","O","OTHER","32050"
"RCRTCL","","LC(RCRDEF11);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","CATTRK1TRAFIC1","LC(RCRTCL14);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","CATTRK1TRAFIC2","LC(RCRTCL14);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","CATTRK1TRAFIC3","LC(RCRTCL14);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","CATTRK1TRAFIC4","LC(RCRTCL13);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","CATTRK2TRAFIC1","LC(RCRTCL12);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","CATTRK2TRAFIC2","LC(RCRTCL12);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","CATTRK2TRAFIC3","LC(RCRTCL12);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","CATTRK2TRAFIC4","LC(RCRTCL11);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","TRAFIC1","LC(RCRTCL12);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","TRAFIC2","LC(RCRTCL12);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","TRAFIC3","LC(RCRTCL12);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","TRAFIC4","LC(RCRTCL11);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RDOCAL","","LS(DASH,1,TRFCD);SY(RCLDEF01);TE('Nr %s','OBJNAM',3,2,2,'15110',1,-1,CHBLK,21)","6","O","STANDARD","25060"
"RDOCAL","TRAFIC1ORIENT","LS(DASH,1,TRFCD);SY(RDOCAL02,ORIENT);TE('Nr %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch %s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","STANDARD","25060"
"RDOCAL","TRAFIC2ORIENT","LS(DASH,1,TRFCD);SY(RDOCAL02,ORIENT);TE('Nr %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch %s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","STANDARD","25060"
"RDOCAL","TRAFIC3ORIENT","LS(DASH,1,TRFCD);SY(RDOCAL02,ORIENT);TE('Nr %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch %s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","STANDARD","25060"
"RDOCAL","TRAFIC4ORIENT","LS(DASH,1,TRFCD);SY(RDOCAL03,ORIENT);TE('Nr %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch %s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","STANDARD","25060"
"RECTRC","","LC(RECDEF02); TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","CATTRK1TRAFIC1","LC(RECTRC12);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","CATTRK1TRAFIC2","LC(RECTRC12);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","CATTRK1TRAFIC3","LC(RECTRC12);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","CATTRK1TRAFIC4","LC(RECTRC10);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","CATTRK2TRAFIC1","LC(RECTRC11);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","CATTRK2TRAFIC2","LC(RECTRC11);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","CATTRK2TRAFIC3","LC(RECTRC11);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","CATTRK2TRAFIC4","LC(RECTRC09);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","TRAFIC1","LC(RECTRC11);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","TRAFIC2","LC(RECTRC11);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","TRAFIC3","LC(RECTRC11);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","TRAFIC4","LC(RECTRC09);TE('%03.0lf deg','ORIENT',1,1,2,'15110',0,-1,CHBLK,11)","6","O","STANDARD","25020"
"RIVERS","","LS(SOLD,1,CHBLK)","2","O","DISPLAYBASE","12420"
"ROADWY","","LS(SOLD,2,LANDF)","4","O","OTHER","32250"
"RUNWAY","","LS(SOLD,3,LANDF)","6","O","OTHER","32240"
"SBDARE","","LS(SOLD,1,CHGRD);TX(NATSUR,1,2,2,'15110',0,0,CHBLK,25)","4","O","OTHER","34010"
"SLCONS","","CS(SLCONS03)","7","O","DISPLAYBASE","12410"
"SLOTOP","","LS(SOLD,1,LANDF)","4","O","OTHER","32010"
"SLOTOP","CATSLO2CONRAD1","LS(SOLD,1,CHBLK)","4","O","STANDARD","22210"
"SLOTOP","CATSLO6CONRAD1","LS(SOLD,1,CHBLK)","4","O","STANDARD","22210"
"SLOTOP","CATSLO6CONVIS1","LS(SOLD,1,CHBLK)","4","O","STANDARD","22210"
"SLOTOP","CATSLO2","LS(SOLD,1,CHGRD)","4","O","OTHER","32010"
"SLOTOP","CATSLO6","LS(SOLD,1,CHGRD)","4","O","OTHER","32010"
"SNDWAV","","LS(DASH,2,CHGRD);SY(SNDWAV02)","4","O","STANDARD","24010"
"STSLNE","","LS(DASH,1,CHGRF)","3","O","OTHER","36050"
"TIDEWY","","LS(SOLD,1,CHGRF)","3","O","OTHER","32070"
"TSELNE","","LS(SOLD,6,TRFCF)","8","O","STANDARD","25010"
"TSSBND","","LS(DASH,4,TRFCD)","7","O","STANDARD","25010"
"TUNNEL","","LS(DASH,1,CHGRD)","4","O","OTHER","32250"
"TUNNEL","BURDEP0","LS(DASH,2,CHBLK)","4","O","STANDARD","24010"
"VEGATN","","LS(DASH,1,LANDF)","3","O","OTHER","32030"
"WATFAL","","LS(SOLD,3,CHGRF)","3","O","OTHER","32050"
"WATFAL","CONVIS1","LS(SOLD,3,CHWHT)","3","O","OTHER","32050"
"WATTUR","","LS(DASH,1,CHGRD);SY(WATTUR02)","4","O","OTHER","33040"
*
* *** ***
* *** section two: NON-STANDARD CLASSES ***
* *** ***
*
*Note: category "DISPLAYBASE" should not be removed from the display.
*For non-standard classes, all category "MARINERS STANDARD" and "MARINERS OTHER"
*should be drawn when "STANDARD DISPLAY" is drawn, and thereafter may be re-assigned
*to the category of choosen by the mariner.

*
"clrlin","","CS(CLRLIN01)","9","O","MARINERS OTHER","53020"
"dnghlt","","LS(SOLD,3,DNGHL)","8","O","MARINERS STANDARD","53010"
"ebline","","CS(VRMEBL01)","9","O","MARINERS OTHER","61010"
"leglin","","CS(LEGLIN03)","8","O","DISPLAYBASE","42210"
"marfea","","LS(SOLD,2,NINFO);TX(OBJNAM,3,3,2,'15110',0,1,CHBLK,50)","8","O","MARINERS OTHER","53050"
"mnufea","","LS(SOLD,1,ADINF)","5","O","MARINERS OTHER","55010"
"pastrk","","CS(PASTRK01)","3","O","MARINERS STANDARD","52430"
"poslin","","LS(SOLD,1,NINFO);TX(loctim,3,1,2,'15110',0,-1,CHBLK,50)","3","O","MARINERS OTHER","62020"
"poslin","transf2","LS(SOLD,1,NINFO);TX(loctim,3,1,2,'15110',0,-1,CHBLK,50);TX('TPL',3,3,2,'15110',0,1,CHBLK,50)","3","O","MARINERS OTHER","62020"
"rngrng","","LS(SOLD,1,CURSR)","9","O","MARINERS OTHER","61030"
"vrmark","","CS(VRMEBL01)","9","O","MARINERS OTHER","61010"
"wholin","","LS(SOLD,2,NINFO);TX(loctim,3,3,2,'15110',0,1,CHBLK,50);TX(usrmrk,3,1,2,'15110',0,-1,CHBLK,50)","8","O","MARINERS STANDARD","52010"
*
* *** ***
* *** end of look-up table ***
* *** ***

11.3 Look-up Table Listing for Object Type Area 'A'

11.3.1 Look-up Table for areas with symbolized boundaries

* *** AREAS WITH SYMBOLIZED BOUNDARIES ***
* *** This is the look-up table for area symbolization. ***
* *** For edition 3.4 Preslib, dated January 2008 ***
*
* Each line contains minimum 6 fields:
* 1. field - code of the object class
* 2. field - attribute combination
* 3. field - symbolization instruction
* 4. field - display priority
* 5. field - radar
* 6. field - IMO display category
* 7. field - viewing group (optional)
*
* Each field entry is framed by '"' and fields are separated by ','.
*
* Please note, that the entries to this table must be in
* alphabetic order (sorted by the class code).
*
* This table has 2 sections:
*
* - The first section contains symbolization instructions for
* standard S-57 'real world' objects:
* - The second section contains symbolization instructions for
* non-standard (class code in lowercase) objects:
*
* default for symbolization failure; must be the first entry to look-up table
"######","","SY(QUESMRK1);LC(QUESMRK1)","5","S","STANDARD","21010"
*
* *** ***
* *** section one: REAL WORLD CLASSES ***
* *** ***
*
"ACHARE","","SY(ACHARE51);LC(ACHARE51);CS(RESTRN01)","3","S","STANDARD","26220"
"ACHARE","CATACH8","SY(ACHARE02);LS(DASH,2,CHMGF);CS(RESTRN01)","3","S","STANDARD","26220"
"ACHBRT","","SY(ACHBRT07);TE('Nr %s','OBJNAM',3,1,2,'15110',1,0,CHBLK,29);LS(DASH,2,CHMGF)","5","S","STANDARD","26220"
"ADMARE","","LC(ADMARE01)","2","S","OTHER","36050"
"AIRARE","","AP(AIRARE02);LS(SOLD,1,LANDF)","2","S","OTHER","32240"
"AIRARE","CONVIS1","AC(LANDA);AP(AIRARE02);LS(SOLD,1,CHBLK)","2","S","STANDARD","22220"
"ARCSLN","","LC(ARCSLN01)","5","S","STANDARD","26260"
"BERTHS","","SY(BRTHNO01);TE('Nr %s','OBJNAM',3,1,2,'15110',1,0,CHBLK,29)","3","S","OTHER","32440"
"BRIDGE","","TX(OBJNAM,3,1,2,'15110',1,0,CHBLK,21);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"

"BRIDGE","CATBRG2","SY(BRIDGE01);TE('clr cl %4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clr op
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG3","SY(BRIDGE01);TE('clr cl %4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clr op
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG4","SY(BRIDGE01);TE('clr cl %4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clr op
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG5","SY(BRIDGE01);TE('clr cl %4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clr op
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG7","SY(BRIDGE01);TE('clr cl %4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clr op
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG8","SY(BRIDGE01);TE('clr cl %4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clr op
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BUAARE","","AC(CHBRN);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26);LS(SOLD,1,LANDF)","3","S","STANDARD","22240"
"BUISGL","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"BUISGL","FUNCTN33CONVIS1","AC(CHBRN);TX(OBJNAM,1,2,2,'15110',0,0,CHBLK,26);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"BUISGL","FUNCTN33","AC(CHBRN);TX(OBJNAM,1,2,2,'15110',0,0,CHBLK,26);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"BUISGL","CONVIS1","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"CANALS","","AC(DEPVS);LS(SOLD,1,CHBLK)","2","S","DISPLAYBASE","12420"
"CANALS","CONDTN","AC(DEPVS);LS(DASH,1,CHBLK)","2","S","DISPLAYBASE","12420"
"CAUSWY","","AC(CHBRN);LS(SOLD,1,CSTLN)","5","S","STANDARD","22010"
"CAUSWY","WATLEV4","AC(DEPIT);LS(DASH,2,CSTLN)","5","S","STANDARD","22010"
"CBLARE","","SY(CBLARE51);LC(CBLARE51);CS(RESTRN01)","3","S","STANDARD","26230"
"CHKPNT","","SY(POSGEN04)","4","S","OTHER","32410"
"CONVYR","","TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11);LS(SOLD,3,CHGRD)","8","O","DISPLAYBASE","12210"
"CONVYR","CONRAD1","SY(RACNSP01);TE('clr
%4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11);LS(SOLD,3,CHGRD)","8","O","DISPLAYBASE","12210"
"CONVYR","CONRAD3","SY(RACNSP01);TE('clr
%4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11);LS(SOLD,3,CHGRD)","8","O","DISPLAYBASE","12210"
"CONZNE","","LS(DASH,2,CHGRF)","2","S","OTHER","36050"
"COSARE","","LS(DASH,2,CHGRF)","2","S","OTHER","36010"
"CRANES","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32440"
"CRANES","CONVIS1","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"CTNARE","","SY(CTNARE51);LC(CTNARE51)","3","S","STANDARD","26050"
"CTSARE","","SY(INFARE51);LC(CTYARE51)","3","S","STANDARD","26250"
"CUSZNE","","LS(DASH,1,CHGRF)","2","S","OTHER","36020"
"DAMCON","","AC(CHBRN);LS(SOLD,1,LANDF)","3","S","STANDARD","22010"
"DAMCON","CATDAM3","AC(CHBRN);LS(SOLD,2,CSTLN)","6","S","DISPLAYBASE","12410"
"DEPARE","","CS(DEPARE02)","1","S","DISPLAYBASE","13030"
"DEPARE","DRVAL1?DRVAL2?","AC(NODTA);AP(PRTSUR01);LS(SOLD,2,CHGRD)","1","S","DISPLAYBASE","13030"
"DMPGRD","","SY(INFARE51);LC(CTYARE51);CS(RESTRN01)","3","S","STANDARD","26240"
"DOCARE","","AC(DEPVS);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26);LS(SOLD,1,CHBLK)","2","S","DISPLAYBASE","12420"
"DOCARE","CONDTN","AC(DEPVS);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26);LS(DASH,1,CHBLK)","2","S","DISPLAYBASE","12420"
"DRGARE","","CS(DEPARE02)","1","S","DISPLAYBASE","13030"
"DRYDOC","","AC(LANDA);LS(SOLD,1,CSTLN)","4","S","OTHER","32440"
"DWRTPT","","SY(TSLDEF51);SY(DWRTPT51);LC(DWRUTE51);CS(RESTRN01)","4","S","STANDARD","25010"
"DWRTPT","ORIENTTRAFIC1","SY(TSSLPT51,ORIENT);SY(DWRTPT51);LC(DWRUTE51);CS(RESTRN01)","4","S","STANDARD","25010"
"DWRTPT","ORIENTTRAFIC2","SY(TSSLPT51,ORIENT);SY(DWRTPT51);LC(DWRUTE51);CS(RESTRN01)","4","S","STANDARD","25010"
"DWRTPT","ORIENTTRAFIC3","SY(TSSLPT51,ORIENT);SY(DWRTPT51);LC(DWRUTE51);CS(RESTRN01)","4","S","STANDARD","25010"
"DWRTPT","ORIENTTRAFIC4","SY(DWRUTE51,ORIENT);SY(DWRTPT51);LC(DWRUTE51);CS(RESTRN01)","4","S","STANDARD","25010"
"DYKCON","","AC(CHBRN);LS(SOLD,1,LANDF)","3","S","STANDARD","22010"
"EXEZNE","","LS(DASH,2,CHGRF)","2","S","OTHER","36050"
"FAIRWY","","LC(NAVARE51);CS(RESTRN01)","4","S","STANDARD","26050"
"FAIRWY","ORIENTTRAFIC1","SY(FAIRWY51,ORIENT);LC(NAVARE51);CS(RESTRN01)","4","S","STANDARD","26050"
"FAIRWY","ORIENTTRAFIC2","SY(FAIRWY51,ORIENT);LC(NAVARE51);CS(RESTRN01)","4","S","STANDARD","26050"
"FAIRWY","ORIENTTRAFIC3","SY(FAIRWY51,ORIENT);LC(NAVARE51);CS(RESTRN01)","4","S","STANDARD","26050"
"FAIRWY","ORIENTTRAFIC4","SY(FAIRWY52,ORIENT);LC(NAVARE51);CS(RESTRN01)","4","S","STANDARD","26050"
"FERYRT","","SY(FRYARE51);LC(NAVARE51)","3","S","STANDARD","26040"
"FERYRT","CATFRY2","SY(FRYARE52);LC(NAVARE51)","3","S","STANDARD","26040"
"FLODOC","","AC(CHBRN);LS(SOLD,2,CSTLN)","5","S","DISPLAYBASE","12410"
"FORSTC","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"FORSTC","CONVIS1","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"FRPARE","","LS(DASH,2,CHGRF)","2","S","OTHER","36020"
"FSHFAC","","SY(FSHFAC02);LC(NAVARE51)","4","S","OTHER","34040"
"FSHFAC","CATFIF1","SY(FSHFAC03);LC(NAVARE51)","4","S","OTHER","34040"
"FSHFAC","CATFIF2","SY(FSHFAC02);LC(NAVARE51)","4","S","OTHER","34040"
"FSHFAC","CATFIF3","SY(FSHFAC02);LC(NAVARE51)","4","S","OTHER","34040"
"FSHFAC","CATFIF4","SY(FSHFAC02);LC(NAVARE51)","4","S","OTHER","34040"
"FSHGRD","","SY(FSHGRD01);LS(DASH,2,CHGRF)","3","S","STANDARD","26210"
"FSHZNE","","LS(DASH,2,CHGRF)","2","S","OTHER","36040"
"GATCON","","AC(CHBRN);LS(SOLD,2,CSTLN)","8","S","DISPLAYBASE","12410"
"GRIDRN","","LS(DASH,1,CHGRD)","5","S","OTHER","32460"
"HRBARE","","LC(NAVARE51)","2","S","OTHER","36020"
"HRBFAC","","SY(CHINFO07)","4","S","OTHER","32410"
"HRBFAC","CATHAF1","SY(ROLROL01)","4","S","OTHER","32410"
"HRBFAC","CATHAF4","SY(HRBFAC09)","4","S","OTHER","32410"
"HRBFAC","CATHAF5","SY(SMCFAC02)","4","S","OTHER","32410"
"HULKES","","AC(CHBRN);LS(SOLD,2,CSTLN)","5","S","DISPLAYBASE","12410"
"ICEARE","","AC(NODTA);AP(ICEARE04);LS(DASH,1,CHGRD)","3","S","DISPLAYBASE","12410"
"ICNARE","","SY(INFARE51);LC(CTYARE51);CS(RESTRN01)","3","S","STANDARD","26250"
"ISTZNE","","SY(ITZARE51);LC(RESARE51);CS(RESTRN01)","5","S","STANDARD","25010"
"LAKARE","","AC(DEPVS);LS(SOLD,1,CHBLK)","2","S","STANDARD","22010"
"LNDARE","","AC(LANDA);TX(OBJNAM,1,2,3,'15110',-1,-1,CHBLK,26)","1","S","DISPLAYBASE","12010"
"LNDMRK","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32220"

"LNDMRK","CATLMK17FUNCTN33CONVIS1","AC(CHBRN);TX(OBJNAM,1,2,2,'15110',0,0,CHBLK,26);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"LNDMRK","CATLMK17FUNCTN33","AC(CHBRN);TX(OBJNAM,1,2,2,'15110',0,0,CHBLK,26);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"LNDMRK","CONVIS1","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"LNDRGN","","TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26)","3","S","STANDARD","21060"
"LNDRGN","CATLND2","AP(MARSHES1)","3","S","STANDARD","21060"
"LNDRGN","CATLND12","AP(MARSHES1)","3","S","STANDARD","21060"
"LOCMAG","","SY(LOCMAG51);LC(NAVARE51)","4","S","OTHER","31080"
"LOGPON","","SY(FLTHAZ02);LS(DASH,1,CHBLK)","5","S","DISPLAYBASE","12410"
"LOKBSN","","AC(DEPVS);LS(SOLD,1,CHBLK)","2","S","DISPLAYBASE","12420"
"M_ACCY","","","","","",""
"M_COVR","","CS(DATCVR02)","1","S","OTHER","31040"
"M_CSCL","","CS(DATCVR02)","1","S","OTHER","31040"
"M_HOPA","","","","","",""
"M_NPUB","","","","","",""
"M_NSYS","","LC(MARSYS51)","4","S","STANDARD","27040"
"M_NSYS","MARSYS1ORIENT","SY(DIRBOYA1,ORIENT);LC(NAVARE51)","4","S","STANDARD","27040"
"M_NSYS","MARSYS2ORIENT","SY(DIRBOYB1,ORIENT);LC(NAVARE51)","4","S","STANDARD","27040"
"M_NSYS","ORIENT","SY(DIRBOY01,ORIENT);LC(NAVARE51)","4","S","STANDARD","27040"
"M_QUAL","","AP(NODATA03);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC1","AP(DQUALA11);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC2","AP(DQUALA21);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC3","AP(DQUALB01);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC4","AP(DQUALC01);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC5","AP(DQUALD01);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC6","AP(DQUALU01);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_SDAT","","","","","",""
"M_SREL","","","","","",""
"M_VDAT","","","","","",""
"MAGVAR","","SY(MAGVAR51)","4","S","OTHER","31080"
"MARCUL","","AP(MARCUL02);LC(NAVARE51);CS(RESTRN01)","3","S","STANDARD","26210"
"MIPARE","","SY(CTYARE51);LC(CTYARE51);CS(RESTRN01)","4","S","STANDARD","26040"
"MORFAC","","AC(CHBRN);LS(SOLD,1,CHBLK)","6","S","DISPLAYBASE","12410 "
"NEWOBJ","","SY(NEWOBJ01);LS(DASH,2,CHMGD)","6","S","STANDARD","21020"
"NEWOBJ","SYMINS","CS(SYMINS01)","6","S","STANDARD","21020"
"OBSTRN","","CS(OBSTRN06)","4","S","OTHER","34050"
"OBSTRN","CATOBS7VALSOU","SY(FOULGND1);LC(NAVARE51)","4","S","OTHER","34051"
"OBSTRN","CATOBS7","SY(FOULGND1);LC(NAVARE51)","4","S","OTHER","34050"
"OBSTRN","CATOBS8","SY(FLTHAZ02);LS(DASH,1,CSTLN)","4","S","DISPLAYBASE","12410"
"OBSTRN","CATOBS9","SY(ACHARE02);LS(DASH,1,CHMGD)","4","S","DISPLAYBASE","12410"
"OBSTRN","CATOBS10","SY(FLTHAZ02);LS(DASH,1,CSTLN)","4","S","DISPLAYBASE","12410"
"OBSTRN","WATLEV7","SY(FLTHAZ02);LS(DASH,1,CSTLN)","4","S","DISPLAYBASE","12410"
"OFSPLF","","AC(CHBRN);LS(SOLD,4,CSTLN);TE('Prod %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21)","5","O","DISPLAYBASE","12210"
"OSPARE","","SY(CTYARE51);LC(CTYARE51);CS(RESTRN01)","4","S","STANDARD","26040"
"PILBOP","","SY(PILBOP02);LC(CTYARE51)","4","S","STANDARD","28010"
"PIPARE","","SY(INFARE51);LC(PIPARE51);CS(RESTRN01)","3","S","STANDARD","26230"
"PIPARE","CATPIP2","SY(INFARE51);LC(PIPARE61);CS(RESTRN01)","3","S","STANDARD","26230"
"PIPARE","CATPIP3","SY(INFARE51);LC(PIPARE61);CS(RESTRN01)","3","S","STANDARD","26230"
"PIPARE","PRODCT3","SY(INFARE51);LC(PIPARE61);CS(RESTRN01)","3","S","STANDARD","26230"
"PONTON","","AC(CHBRN);LS(SOLD,2,CSTLN)","5","S","DISPLAYBASE","12410"
"PRCARE","","AP(TSSJCT02);SY(PRCARE51);LC(PRCARE51);CS(RESTRN01)","4","S","STANDARD","25010"
"PRDARE","","LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA5CONVIS1","SY(RFNERY11);LS(DASH,1,CHBLK)","4","S","STANDARD","22220"
"PRDARE","CATPRA8CONVIS1","SY(TNKFRM11);LS(DASH,1,CHBLK)","4","S","STANDARD","22220"
"PRDARE","CATPRA9CONVIS1","SY(WNDFRM61);LS(DASH,1,CHBLK)","4","S","STANDARD","22220"
"PRDARE","CATPRA1","SY(QUARRY01);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA5","SY(RFNERY01);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA6","SY(TMBYRD01);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA8","SY(TNKFRM01);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA9","SY(WNDFRM51);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PYLONS","","AC(CHBRN);LS(SOLD,2,CSTLN)","6","S","DISPLAYBASE","12210"
"RADRNG","","LS(DASH,1,TRFCF)","3","S","STANDARD","25040"
"RAPIDS","","AC(CHGRD)","3","S","OTHER","32050"
"RCTLPT","","SY(RTLDEF51)","4","S","STANDARD","25020"
"RCTLPT","ORIENT","SY(RCTLPT52,ORIENT)","4","S","STANDARD","25020"
"RECTRC","","SY(RECDEF51);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENTCATTRK1TRAFIC1","SY(RECTRC58,ORIENT);TE('%03.0lf deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENTCATTRK1TRAFIC2","SY(RECTRC58,ORIENT);TE('%03.0lf deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENTCATTRK1TRAFIC3","SY(RECTRC58,ORIENT);TE('%03.0lf deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENTCATTRK1TRAFIC4","SY(RECTRC56,ORIENT);TE('%03.0lf deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENTCATTRK2TRAFIC1","SY(RECTRC57,ORIENT);TE('%03.0lf deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENTCATTRK2TRAFIC2","SY(RECTRC57,ORIENT);TE('%03.0lf deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENTCATTRK2TRAFIC3","SY(RECTRC57,ORIENT);TE('%03.0lf deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENTCATTRK2TRAFIC4","SY(RECTRC55,ORIENT);TE('%03.0lf deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENTTRAFIC1","SY(RECTRC57,ORIENT);TE('%03.0lf deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"

"RECTRC","ORIENTTRAFIC2","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENTTRAFIC3","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENTTRAFIC4","SY(RECTRC55,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RESARE","","CS(RESARE03)","5","S","STANDARD","26010"
"RESARE","CATREA27","SY(ESSARE01);LC(ESSARE01)","5","S","STANDARD","26010"
"RESARE","CATREA28","SY(PSSARE01);LC(ESSARE01)","5","S","STANDARD","26010"
"RIVERS","","AC(DEPVS);LS(SOLD,1,CHBLK)","2","S","DISPLAYBASE",12420"
"ROADWY","","AC(LANDA);LS(SOLD,1,LANDF)","4","S","OTHER","32250"
"RUNWAY","","AC(CHBRN)","5","S","OTHER","32240"
"RUNWAY","CONVIS1","AC(CHBRN);LS(SOLD,1,CHBLK)","5","S","STANDARD","22220"
"SBDARE","","TX(NATSUR,1,2,2,'15110',0,0,CHBLK,25)","3","O","OTHER","34010"
"SBDARE","WATLEV3NATSUR","TX(NATSUR,1,2,2,'15110',0,0,CHBLK,25);LS(DASH,1,CHGRD)","3","S","OTHER","34010"
"SBDARE","WATLEV4NATSUR9","AP(RCKLDG01);LS(DASH,1,CHGRD)","3","S","OTHER","34010"
"SBDARE","WATLEV4NATSUR11","AP(RCKLDG01);LS(DASH,1,CHGRD)","3","S","OTHER","34010"
"SBDARE","WATLEV4NATSUR14","AP(RCKLDG01);LS(DASH,1,CHGRD)","3","S","OTHER","34010"
"SBDARE","WATLEV4NATSUR","TX(NATSUR,1,2,2,'15110',0,0,CHBLK,25);LS(DASH,1,CHGRD)","3","S","OTHER","34010"
"SEAARE","","TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26)","3","S","STANDARD","21060"
"SILTNK","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"SILTNK","CONVIS1","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"SLCONS","","CS(SLCONS03)","7","S","DISPLAYBASE","12410"
"SLOGRD","","","","","",""
"SLOGRD","CATSLO6","AC(CHGRD);LS(SOLD,1,CHBLK)","3","S","OTHER","32010"
"SMCFAC","","AC(CHBRN);SY(SMCFAC02);LS(SOLD,1,LANDF)","4","S","OTHER","38210"
"SNDWAV","","AP(SNDWAV01);LC(NAVARE51)","4","S","STANDARD","24010"
"SPLARE","","SY(CTYARE51);LC(CTYARE51);CS(RESTRN01)","4","S","STANDARD","26040"
"SUBTLN","","SY(CTYARE51);LC(CTYARE51);CS(RESTRN01)","4","S","STANDARD","26040"
"SWPARE","","SY(SWPARE51);TE('swept to %5.1lf','DRVAL1',1,2,2,'15110',0,1,CHBLK,27);LC(NAVARE51)","4","S","STANDARD","23030"
"T_HMON","","SY(TIDEHT01);LC(TIDINF51)","2","S","OTHER","33050"
"T_NHMN","","SY(TIDEHT01);LC(TIDINF51)","2","S","OTHER","33050"
"T_TIMS","","SY(TIDEHT01);LC(TIDINF51)","2","S","OTHER","33050"
"TS_FEB","","SY(CURDEF01);LC(TIDINF51)","2","S","OTHER","33060"
"TS_FEB","CAT_TS1ORIENT","SY(FLDSTR01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","S","OTHER","33060"
"TS_FEB","CAT_TS2ORIENT","SY(EBBSTR01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","S","OTHER","33060"
"TS_FEB","CAT_TS3ORIENT","SY(CURENT01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","S","OTHER","33060"
"TS_PAD","","SY(TIDSTR01);LC(TIDINF51)","2","S","OTHER","33060"
"TS_PNH","","SY(TIDSTR01);LC(TIDINF51)","2","S","OTHER","33060"
"TS_PRH","","SY(TIDSTR01);LC(TIDINF51)","2","S","OTHER","33060"
"TS_TIS","","SY(TIDSTR01);LC(TIDINF51)","2","S","OTHER","33060"
"TESARE","","LS(DASH,2,CHGRF);CS(RESTRN01)","2","S","OTHER","36050"
"TIDEWY","","LS(DASH,1,CHGRF);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,25)","7","S","OTHER","32070"
"TSEZNE","","AC(TRFCF,3)","4","S","STANDARD","25010"
"TSSCRS","","AP(TSSJCT02);SY(TSSCRS51);CS(RESTRN01)","6","S","STANDARD","25010"
"TSSLPT","","AP(TSSJCT02);SY(CTNARE51);TX(INFORM,1,1,2,'15110',0,-2,CHBLK,24);CS(RESTRN01)","6","S","STANDARD","25010"
"TSSLPT","ORIENT","SY(TSSLPT51,ORIENT);CS(RESTRN01)","6","S","STANDARD","25010"
"TSSRON","","AP(TSSJCT02);SY(TSSRON51);CS(RESTRN01)","6","S","STANDARD","25010"
"TUNNEL","","LS(DASH,1,CHGRD)","4","S","OTHER","32250"
"TUNNEL","BURDEP0","AC(DEPVS);LS(DASH,1,CHBLK)","4","S","STANDARD","24010"
"TWRTPT","","SY(TWRDEF51);LC(CTYARE51)","4","S","STANDARD","25010"
"TWRTPT","ORIENTTRAFIC1","SY(TWRTPT53,ORIENT);LC(CTYARE51)","4","S","STANDARD","25010"
"TWRTPT","ORIENTTRAFIC2","SY(TWRTPT53,ORIENT);LC(CTYARE51)","4","S","STANDARD","25010"
"TWRTPT","ORIENTTRAFIC3","SY(TWRTPT53,ORIENT);LC(CTYARE51)","4","S","STANDARD","25010"
"TWRTPT","ORIENTTRAFIC4","SY(TWRTPT52,ORIENT);LC(CTYARE51)","4","S","STANDARD","25010"
"UNSARE","","AC(NODTA);AP(NODATA03);LS(SOLD,2,CHGRD)","1","S","DISPLAYBASE","11050"
"VEGATN","","","","","","",""
"VEGATN","CATVEG7","AP(VEGATN04);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG21","AP(VEGATN04);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG3","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG4","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG5","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG6","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG13","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG14","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG15","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG16","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG17","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG18","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG19","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG20","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG22","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"WATTUR","","SY(WATTUR02);LS(DASH,1,CHGRD)","4","S","OTHER","33040"
"WEDKLP","","SY(WEDKLP03);LS(DASH,1,CHGRF)","3","O","OTHER","34020"
"WRECKS","","CS(WRECKS04)","4","S","OTHER","34050"
"WRECKS","CATWRK3VALSOU","LC(NAVARE51)","4","S","OTHER","34051"
"WRECKS","CATWRK3","LC(NAVARE51)","4","S","OTHER","34050"
*
* *** ***
* *** section two: NON-STANDARD CLASSES ***
* *** ***
*

*Note: category "DISPLAYBASE" should not be removed from the display.
*For non-standard classes, all category "MARINERS STANDARD" and "MARINERS OTHER"
*should be drawn when "STANDARD DISPLAY" is drawn, and thereafter may be re-assigned
*to the category of choosen by the mariner.
*

"dnghlt","","AC(DNGHL,3);LS(SOLD,3,DNGHL)","8","O","MARINERS STANDARD","53010"
"marfea","","AC(ADINF,3);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,50);LS(SOLD,2,NINFO);LS(SOLD,1,CHBLK);","8","S","MARINERS STANDARD","53050"
"mnufea","","LS(DASH,2,ADINF)","5","S","MARINERS STANDARD","55010"
*
* *** ***
* *** end of look-up table ***
* *** ***

11.3.2 Look-up Table for areas with plain boundaries

* *** AREAS WITH PLAIN BOUNDARIES ***
* *** This is the look-up table for area symbolization. ***
* *** For edition 3.4 Preslib, dated January 2008 ***
*
* Each line contains minimum 6 fields:
* 1. field - code of the object class
* 2. field - attribute combination
* 3. field - symbolization instruction
* 4. field - display priority
* 5. field - radar
* 6. field - IMO display category
* 7. field - viewing group (optional)
*
* Each field entry is framed by '"' and fields are separated by ','.
*
* Please note, that the entries to this table must be in
* alphabetic order (sorted by the class code).
*
* This table has 2 sections:
*
* - The first section contains symbolization instructions for
* standard S-57 'real world' objects:
* The second section contains symbolization instructions for
* non-standard (class code in lowercase) objects:
*
* default for symbolization failure; must be the first entry to look-up table
"######","","SY(QUESMRK1);LS(DASH,1,CHMGD)","5","S","STANDARD","21010"
*
* *** ***
* *** section one: REAL WORLD CLASSES ***
* *** ***
*

"ACHARE","","SY(ACHARE51);LS(DASH,2,CHMGF);CS(RESTRN01)","3","S","STANDARD","26220"
"ACHARE","CATACH8","SY(ACHARE02);LS(DASH,2,CHMGF);CS(RESTRN01)","3","S","STANDARD","26220"
"ACHBRT","","SY(ACHBRT07);TE('Nr %s','OBJNAM',3,1,2,'15110',1,0,CHBLK,29);LS(DASH,2,CHMGF)","5","S","STANDARD","26220"
"ADMARE","","LS(DASH,2,CHGRF)","2","S","OTHER","36050"
"AIRARE","","AP(AIRARE02);LS(SOLD,1,LANDF)","2","S","OTHER","32240"
"AIRARE","CONVIS1","AC(LANDA);AP(AIRARE02);LS(SOLD,1,CHBLK)","2","S","STANDARD","22220"
"ARCSLN","","LC(ARCSLN01)","5","S","STANDARD","26260"
"BERTHS","","SY(BRTHNO01);TE('Nr %s','OBJNAM',3,1,2,'15110',1,0,CHBLK,29)","3","S","OTHER","32440"
"BRIDGE","","TX(OBJNAM,3,1,2,'15110',1,0,CHBLK,21);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG2","SY(BRIDGE01);TE('clr cl %4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clr op %4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG3","SY(BRIDGE01);TE('clr cl %4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clr op %4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG4","SY(BRIDGE01);TE('clr cl %4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clr op %4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"

"BRIDGE","CATBRG5","SY(BRIDGE01);TE('clr cl %4.1lf,'VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clr op
%4.1lf,'VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG7","SY(BRIDGE01);TE('clr cl %4.1lf,'VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clr op
%4.1lf,'VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG8","SY(BRIDGE01);TE('clr cl %4.1lf,'VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clr op
%4.1lf,'VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BUAARE","","AC(CHBRN);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26);LS(SOLD,1,LANDF)","3","S","STANDARD","22240"
"BUISGL","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"BUISGL","FUNCTN33CONVIS1","AC(CHBRN);TX(OBJNAM,1,2,2,'15110',0,0,CHBLK,26);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"BUISGL","FUNCTN33","AC(CHBRN);TX(OBJNAM,1,2,2,'15110',0,0,CHBLK,26);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"BUISGL","CONVIS1","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"CANALS","","AC(DEPVS);LS(SOLD,1,CHBLK)","2","S","DISPLAYBASE","12420"
"CANALS","CONDTN","AC(DEPVS);LS(DASH,1,CHBLK)","2","S","DISPLAYBASE","12420"
"CAUSWY","","AC(CHBRN);LS(SOLD,1,CSTLN)","5","S","STANDARD","22010"
"CAUSWY","WATLEV4","AC(DEPIT);LS(DASH,2,CSTLN)","5","S","STANDARD","22010"
"CBLARE","","SY(CBLARE51);LS(DASH,2,CHMGD);CS(RESTRN01)","3","S","STANDARD","26230"
"CHKPNT","","SY(POSGEN04)","4","S","OTHER","32410"
"CONVYR","","TE('clr %4.1lf,'VERCLR',3,1,2,'15110',1,0,CHBLK,11);LS(SOLD,3,CHGRD)","8","O","DISPLAYBASE","12210"
"CONVYR","CONRAD1","SY(RACNSP01);TE('clr
%4.1lf,'VERCLR',3,1,2,'15110',1,0,CHBLK,11);LS(SOLD,3,CHGRD)","8","O","DISPLAYBASE","12210"
"CONVYR","CONRAD3","SY(RACNSP01);TE('clr
%4.1lf,'VERCLR',3,1,2,'15110',1,0,CHBLK,11);LS(SOLD,3,CHGRD)","8","O","DISPLAYBASE","12210"
"CONZNE","","LS(DASH,2,CHGRF)","2","S","OTHER","36050"
"COSARE","","LS(DASH,2,CHGRF)","2","S","OTHER","36010"
"CRANES","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32440"
"CRANES","CONVIS1","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"CTNARE","","SY(CTNARE51);LS(DASH,2,TRFCD)","3","S","STANDARD","26050"
"CTSARE","","SY(INFARE51);LS(DASH,1,CHMGF)","3","S","STANDARD","26250"
"CUSZNE","","LS(DASH,1,CHGRF)","2","S","OTHER","36020"
"DAMCON","","AC(CHBRN);LS(SOLD,1,LANDF)","3","S","STANDARD","22010"
"DAMCON","CATDAM3","AC(CHBRN);LS(SOLD,2,CSTLN)","6","S","DISPLAYBASE","12410"
"DEPARE","","CS(DEPARE02)","1","S","DISPLAYBASE","13030"
"DEPARE","DRVAL1?DRVAL2?","AC(NODTA);AP(PRTSUR01);LS(SOLD,2,CHGRD)","1","S","DISPLAYBASE","13030"
"DMPGRD","","SY(INFARE51);LS(DASH,1,CHMGD);CS(RESTRN01)","3","S","STANDARD","26240"
"DOCARE","","AC(DEPVS);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26);LS(SOLD,1,CHBLK)","2","S","DISPLAYBASE","12420"
"DOCARE","CONDTN","AC(DEPVS);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26);LS(DASH,1,CHBLK)","2","S","DISPLAYBASE","12420"
"DRGARE","","CS(DEPARE02)","1","S","DISPLAYBASE","13030"
"DRYDOC","","AC(LANDA);LS(SOLD,1,CSTLN)","4","S","OTHER","32440"
"DWRTPT","","SY(TSLDEF51);SY(DWRTPT51);LS(DASH,3,TRFCD);CS(RESTRN01)","4","S","STANDARD","25010"
"DWRTPT","ORIENTTRAFIC1","SY(TSSLPT51,ORIENT);SY(DWRTPT51);LS(DASH,3,TRFCD);CS(RESTRN01)","4","S","STANDARD","25010"
"DWRTPT","ORIENTTRAFIC2","SY(TSSLPT51,ORIENT);SY(DWRTPT51);LS(DASH,3,TRFCD);CS(RESTRN01)","4","S","STANDARD","25010"
"DWRTPT","ORIENTTRAFIC3","SY(TSSLPT51,ORIENT);SY(DWRTPT51);LS(DASH,3,TRFCD);CS(RESTRN01)","4","S","STANDARD","25010"
"DWRTPT","ORIENTTRAFIC4","SY(DWRUTE51,ORIENT);SY(DWRTPT51);LS(DASH,3,TRFCD);CS(RESTRN01)","4","S","STANDARD","25010
"DYKCON","","AC(CHBRN);LS(SOLD,1,LANDF)","3","S","STANDARD","22010"
"EXEZNE","","LS(DASH,2,CHGRF)","2","S","OTHER","36050"
"FAIRWY","","LS(DASH,1,CHGRD);CS(RESTRN01)","4","S","STANDARD","26050"
"FAIRWY","ORIENTTRAFIC1","SY(FAIRWY51,ORIENT);LS(DASH,1,CHGRD);CS(RESTRN01)","4","S","STANDARD","26050"
"FAIRWY","ORIENTTRAFIC2","SY(FAIRWY51,ORIENT);LS(DASH,1,CHGRD);CS(RESTRN01)","4","S","STANDARD","26050"
"FAIRWY","ORIENTTRAFIC3","SY(FAIRWY51,ORIENT);LS(DASH,1,CHGRD);CS(RESTRN01)","4","S","STANDARD","26050"
"FAIRWY","ORIENTTRAFIC4","SY(FAIRWY52,ORIENT);LS(DASH,1,CHGRD);CS(RESTRN01)","4","S","STANDARD","26050"
"FERYRT","","SY(FRYARE51);LS(DASH,2,CHMGD)","3","S","STANDARD","26040"
"FERYRT","CATFRY2","SY(FRYARE52);LS(DASH,2,CHBLK)","3","S","STANDARD","26040"
"FLODOC","","AC(CHBRN);LS(SOLD,2,CSTLN)","5","S","DISPLAYBASE","12410"
"FORSTC","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"FORSTC","CONVIS1","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"FRPARE","","LS(DASH,2,CHGRF)","2","S","OTHER","36020"
"FSHFAC","","AP(FSHHAV02);LS(DASH,1,CHGRD)","4","S","OTHER","34040"
"FSHFAC","CATFIF1","AP(FSHFAC03);LS(DASH,1,CHGRD)","4","S","OTHER","34040"
"FSHFAC","CATFIF2","AP(FSHFAC04);LS(DASH,1,CHGRD)","4","S","OTHER","34040"
"FSHFAC","CATFIF3","AP(FSHFAC04);LS(DASH,1,CHGRD)","4","S","OTHER","34040"
"FSHFAC","CATFIF4","AP(FSHFAC04);LS(DASH,1,CHGRD)","4","S","OTHER","34040"
"FSHGRD","","SY(FSHGRD01);LS(DASH,2,CHGRF)","3","S","STANDARD","26210"
"FSHZNE","","LS(DASH,2,CHGRF)","2","S","OTHER","36040"
"GATCON","","AC(CHBRN);LS(SOLD,2,CSTLN)","8","S","DISPLAYBASE","12410"
"GRIDRN","","LS(DASH,1,CHGRD)","5","S","OTHER","32460"
"HRBARE","","LS(DASH,2,CHGRD)","2","S","OTHER","36020"
"HRBFAC","","SY(CHINFO07)","4","S","OTHER","32410"
"HRBFAC","CATHAF1","SY(ROLROL01)","4","S","OTHER","32410"
"HRBFAC","CATHAF4","SY(HRBFAC09)","4","S","OTHER","32410"
"HRBFAC","CATHAF5","SY(SMCFAC02)","4","S","OTHER","32410"
"HULKES","","AC(CHBRN);LS(SOLD,2,CSTLN)","5","S","DISPLAYBASE","12410"
"ICEARE","","AC(NODTA);AP(ICEARE04);LS(DASH,1,CHGRD)","3","S","DISPLAYBASE","12410"
"ICNARE","","SY(INFARE51);LS(DASH,1,CHMGF);CS(RESTRN01)","3","S","STANDARD","26250"
"ISTZNE","","SY(ITZARE51);LS(DASH,1,TRFCD);CS(RESTRN01)","5","S","STANDARD","25010"
"LAKARE","","AC(DEPVS);LS(SOLD,1,CHBLK)","2","S","STANDARD","22010"
"LNDARE","","AC(LANDA);TX(OBJNAM,1,2,3,'15110',-1,-1,CHBLK,26)","1","S","","12010"
"LNDMRK","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"LNDMRK","CATLMK17FUNCTN33CONVIS1","AC(CHBRN);TX(OBJNAM,1,2,2,'15110',0,0,CHBLK,26);LS(SOLD,1,CHBLK)","4","S","STANDAR
D","22220"
"LNDMRK","CATLMK17FUNCTN33","AC(CHBRN);TX(OBJNAM,1,2,2,'15110',0,0,CHBLK,26);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"LNDMRK","CONVIS1","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"LNDRGN","","TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26)","3","S","STANDARD","21060"
"LNDRGN","CATLND2","AP(MARSHES1)","3","S","STANDARD","21060"
"LNDRGN","CATLND12","AP(MARSHES1)","3","S","STANDARD","21060"

"LOCMAG","","SY(LOCMAG51);LS(DASH,1,CHGRD)","4","S","OTHER","31080"
"LOGPON","","SY(FLTHAZ02);LS(DASH,1,CHBLK)","5","S","DISPLAYBASE","12410"
"LOKBSN","","AC(DEPVS);LS(SOLD,1,CHBLK)","2","S","DISPLAYBASE","12420"
"M_ACCY","","","","","","",""
"M_COVR","","CS(DATCVR02)","1","S","OTHER","31040"
"M_CSCL","","CS(DATCVR02)","1","S","OTHER","31040"
"M_HOPA","","","","","","",""
"M_NPUB","","","","","","",""
"M_NSYS","","LC(MARSYS51)","4","S","STANDARD","27040"
"M_NSYS","MARSYS1ORIENT","SY(DIRBOYA1,ORIENT);LS(DASH,1,CHGRD)","4","S","STANDARD","27040"
"M_NSYS","MARSYS2ORIENT","SY(DIRBOYB1,ORIENT);LS(DASH,1,CHGRD)","4","S","STANDARD","27040"
"M_NSYS","ORIENT","SY(DIRBOY01,ORIENT);LS(DASH,1,CHGRD)","4","S","STANDARD","27040"
"M_QUAL","","AP(NODATA03);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC1","AP(DQUALA11);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC2","AP(DQUALA21);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC3","AP(DQUALB01);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC4","AP(DQUALC01);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC5","AP(DQUALD01);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC6","AP(DQUALU01);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_SDAT","","","","","","",""
"M_SREL","","","","","","",""
"M_VDAT","","","","","","",""
"MAGVAR","","SY(MAGVAR51)","4","S","OTHER","31080"
"MARCUL","","AP(MARCUL02);LS(DASH,1,CHGRD);CS(RESTRN01)","3","S","STANDARD","26210"
"MIPARE","","SY(CTYARE51);LS(DASH,2,CHMGD);CS(RESTRN01)","4","S","STANDARD","26040"
"MORFAC","","AC(CHBRN);LS(SOLD,1,CHBLK)","6","S","DISPLAYBASE","12410"
"NEWOBJ","","SY(NEWOBJ01);LS(DASH,2,CHMGD)","6","S","STANDARD","21020"
"NEWOBJ","SYMINS","CS(SYMINS01)","6","S","STANDARD","21020"
"OBSTRN","","CS(OBSTRN06)","4","S","OTHER","34050"
"OBSTRN","CATOBS7VALSOU","SY(FOULGND1);LS(DASH,1,CHGRD)","4","S","OTHER","34051"
"OBSTRN","CATOBS7","SY(FOULGND1);LS(DASH,1,CHGRD)","4","S","OTHER","34050"
"OBSTRN","CATOBS8","SY(FLTHAZ02);LS(DASH,1,CSTLN)","4","S","DISPLAYBASE","12410"
"OBSTRN","CATOBS9","SY(ACHARE02);LS(DASH,1,CHMGD)","4","S","DISPLAYBASE","12410"
"OBSTRN","CATOBS10","SY(FLTHAZ02);LS(DASH,1,CSTLN)","4","S","DISPLAYBASE","12410"
"OBSTRN","WATLEV7","SY(FLTHAZ02);LS(DASH,1,CSTLN)","4","S","DISPLAYBASE","12410"
"OFSPLF","","AC(CHBRN);LS(SOLD,4,CSTLN);TE('Prod %s',OBJNAM',3,1,2,'15110',1,-1,CHBLK,21)","5","O","DISPLAYBASE","12210"
"OSPARE","","SY(CTYARE51);LS(DASH,2,CHMGD);CS(RESTRN01)","4","S","STANDARD","26040"
"PILBOP","","SY(PILBOP02);LS(DASH,2,TRFCF)","4","S","STANDARD","28010"
"PIPARE","","SY(INFARE51);LS(DASH,2,CHMGD);CS(RESTRN01)","3","S","STANDARD","26230"
"PIPARE","CATPIP2","SY(INFARE51);LS(DASH,2,CHGRD);CS(RESTRN01)","3","S","STANDARD","26230"
"PIPARE","CATPIP3","SY(INFARE51);LS(DASH,2,CHGRD);CS(RESTRN01)","3","S","STANDARD","26230"
"PIPARE","PRODCT3","SY(INFARE51);LS(DASH,2,CHGRD);CS(RESTRN01)","3","S","STANDARD","26230"
"PONTON","","AC(CHBRN);LS(SOLD,2,CSTLN)","5","S","DISPLAYBASE","12410"
"PRCARE","","SY(PRCARE51);LS(DASH,2,TRFCD);CS(RESTRN01)","4","S"," STANDARD","25010"
"PRDARE","","LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA5CONVIS1","SY(RFNERY11);LS(DASH,1,CHBLK)","4","S","STANDARD","22220"
"PRDARE","CATPRA8CONVIS1","SY(TNKFRM11);LS(DASH,1,CHBLK)","4","S","STANDARD","22220"
"PRDARE","CATPRA9CONVIS1","SY(WNDFRM61);LS(DASH,1,CHBLK)","4","S","STANDARD","22220"
"PRDARE","CATPRA1","SY(QUARRY01);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA5","SY(RFNERY01);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA6","SY(TMBYRD01);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA8","SY(TNKFRM01);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA9","SY(WNDFRM51);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PYLONS","","AC(CHBRN);LS(SOLD,2,CSTLN)","6","S","DISPLAYBASE","12210"
"RADRNG","","LS(DASH,1,TRFCF)","3","S","STANDARD","25040"
"RAPIDS","","AC(CHGRD)","3","S","OTHER","32050"
"RCTLPT","","SY(RTLDEF51)","4","S","STANDARD","25020"
"RCTLPT","ORIENT","SY(RCTLPT52,ORIENT)","4","S","STANDARD","25020"
"RECTRC","","SY(RECDEF51);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENTCATTRK1TRAFIC1","SY(RECTRC58,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENTCATTRK1TRAFIC2","SY(RECTRC58,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENTCATTRK1TRAFIC3","SY(RECTRC58,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENTCATTRK1TRAFIC4","SY(RECTRC56,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENTCATTRK2TRAFIC1","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENTCATTRK2TRAFIC2","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENTCATTRK2TRAFIC3","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENTCATTRK2TRAFIC4","SY(RECTRC55,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENTTRAFIC1","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENTTRAFIC2","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENTTRAFIC3","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENTTRAFIC4","SY(RECTRC55,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RESARE","","CS(RESARE03)","5","S","STANDARD","26010"

"RESARE","CATREA27","SY(ESSARE01);LC(ESSARE01)","5","S","STANDARD","26010"
"RESARE","CATREA28","SY(PSSARE01);LC(ESSARE01)","5","S","STANDARD","26010"
"RIVERS","","AC(DEPVS);LS(SOLD,1,CHBLK)","2","S","DISPLAYBASE",”12420”
"ROADWY","","AC(LANDA);LS(SOLD,1,LANDF)","4","S","OTHER","32250"
"RUNWAY","","AC(CHBRN)","5","S","OTHER","32240"
"RUNWAY","CONVIS1","AC(CHBRN);LS(SOLD,1,CHBLK)","5","S","STANDARD","22220"
"SBDARE","","TX(NATSUR,1,2,2,'15110',0,0,CHBLK,25)","3","O","OTHER","34010"
"SBDARE","WATLEV3NATSUR","TX(NATSUR,1,2,2,'15110',0,0,CHBLK,25);LS(DASH,1,CHGRD)","3","S","OTHER","34010"
"SBDARE","WATLEV4NATSUR9","AP(RCKLDG01);LS(DASH,1,CHGRD)","3","S","OTHER","34010"
"SBDARE","WATLEV4NATSUR11","AP(RCKLDG01);LS(DASH,1,CHGRD)","3","S","OTHER","34010"
"SBDARE","WATLEV4NATSUR14","AP(RCKLDG01);LS(DASH,1,CHGRD)","3","S","OTHER","34010"
"SBDARE","WATLEV4NATSUR","TX(NATSUR,1,2,2,'15110',0,0,CHBLK,25);LS(DASH,1,CHGRD)","3","S","OTHER","34010"
"SEAARE","","TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26)","3","S","STANDARD","21060"
"SILTNK","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"SILTNK","CONVIS1","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"SLCONS","","CS(SLCONS03)","7","S","DISPLAYBASE","12410"
"SLOGRD","","","","","","",""
"SLOGRD","CATSLO6","AC(CHGRD)","3","S","OTHER","32010"
"SMCFAC","","AC(CHBRN);SY(SMCFAC02);LS(SOLD,1,LANDF)","4","S","OTHER","38210"
"SNDWAV","","AP(SNDWAV01);LS(DASH,2,CHGRD)","4","S","STANDARD","24010"
"SPLARE","","SY(CTYARE51);LS(DASH,1,CHMGD);CS(RESTRN01)","4","S","STANDARD","26040"
"SUBTLN","","SY(CTYARE51);LS(DASH,1,CHMGD);CS(RESTRN01)","4","S","STANDARD","26040"
"SWPARE","","SY(SWPARE51);TE('swept to %5.1lf','DRVAL1',1,2,2,'15110',0,1,CHBLK,27);LS(DASH,1,CHGRD)","4","S","STANDARD","23030"
"T_HMON","","SY(TIDEHT01);LS(DASH,1,CHGRD)","2","S","OTHER","33050"
"T_NHMN","","SY(TIDEHT01);LS(DASH,1,CHGRD)","2","S","OTHER","33050"
"T_TIMS","","SY(TIDEHT01);LS(DASH,1,CHGRD)","2","S","OTHER","33050"
"TS_FEB","","SY(CURDEF01);LS(DASH,1,CHGRD)","2","S","OTHER","33060"
"TS_FEB","CAT_TS1ORIENT","SY(FLDSTR01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","S","OTHER","33060"
"TS_FEB","CAT_TS2ORIENT","SY(EBBSTR01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","S","OTHER","33060"
"TS_FEB","CAT_TS3ORIENT","SY(CURENT01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","S","OTHER","33060"
"TS_PAD","","SY(TIDSTR01);LS(DASH,1,CHGRD)","2","S","OTHER","33060"
"TS_PNH","","SY(TIDSTR01);LS(DASH,1,CHGRD)","2","S","OTHER","33060"
"TS_PRH","","SY(TIDSTR01);LS(DASH,1,CHGRD)","2","S","OTHER","33060"
"TS_TIS","","SY(TIDSTR01);LS(DASH,1,CHGRD)","2","S","OTHER","33060"
"TESARE","","LS(DASH,2,CHGRF);CS(RESTRN01)","2","S","OTHER","36050"
"TIDEWY","","LS(DASH,1,CHGRF);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,25)","7","S","OTHER","32070"
"TSEZNE","","AC(TRFCF,3)","4","S","STANDARD","25010"
"TSSCRS","","AP(TSSJCT02);SY(TSSCRS51);CS(RESTRN01)","6","S","STANDARD","25010"
"TSSLPT","","SY(CTNARE51);TX(INFORM,1,1,2,'15110',0,-2,CHBLK,24);CS(RESTRN01)","6","S","STANDARD","25010"
"TSSLPT","ORIENT","SY(TSSLPT51,ORIENT);CS(RESTRN01)","6","S","STANDARD","25010"
"TSSRON","","SY(TSSRON51);CS(RESTRN01)","6","S","STANDARD","25010"
"TUNNEL","","LS(DASH,1,CHGRD)","4","S","OTHER","32250"
"TUNNEL","BURDEP0","AC(DEPVS);LS(DASH,1,CHBLK)","4","S","STANDARD","24010"
"TWRTPT","","SY(TWRDEF51);LS(DASH,4,TRFCD)","4","S","STANDARD","25010"
"TWRTPT","ORIENTTRAFIC1","SY(TWRTPT53,ORIENT);LS(DASH,4,TRFCD)","4","S","STANDARD","25010"
"TWRTPT","ORIENTTRAFIC2","SY(TWRTPT53,ORIENT);LS(DASH,4,TRFCD)","4","S","STANDARD","25010"
"TWRTPT","ORIENTTRAFIC3","SY(TWRTPT53,ORIENT);LS(DASH,4,TRFCD)","4","S","STANDARD","25010"
"TWRTPT","ORIENTTRAFIC4","SY(TWRTPT52,ORIENT);LS(DASH,4,TRFCD)","4","S","STANDARD","25010"
"UNSARE","","AC(NODTA);AP(NODATA03);LS(SOLD,2,CHGRD)","1","S","DISPLAYBASE","11050"
"VEGATN","","","","","","",""
"VEGATN","CATVEG7","AP(VEGATN04);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG21","AP(VEGATN04);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG3","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG4","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG5","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG6","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG13","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG14","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG15","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG16","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG17","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG18","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG19","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG20","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG22","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"WATTUR","","SY(WATTUR02);LS(DASH,1,CHGRD)","4","S","OTHER","33040"
"WEDKLP","","SY(WEDKLP03);LS(DASH,1,CHGRF)","3","O","OTHER","34020"
"WRECKS","","CS(WRECKS04)","4","S","OTHER","34050"
"WRECKS","CATWRK3VALSOU","LS(DASH,1,CHBLK)","4","S","OTHER","34051"
"WRECKS","CATWRK3","LS(DASH,1,CHBLK)","4","S","OTHER","34050"
*
* *** ***
* *** section two: NON-STANDARD CLASSES ***
* *** ***
*Note: category "DISPLAYBASE" should not be removed from the display.
*For non-standard classes, all category "MARINERS STANDARD" and "MARINERS OTHER"
*should be drawn when "STANDARD DISPLAY" is drawn, and thereafter may be re-assigned to the category of choosen by the mariner.
*
"dnghlt","","AC(DNGHL,3);LS(SOLD,3,DNGHL)","8","O","MARINERS STANDARD","53010"

"marfea","","AC(ADINF,3);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,50);LS(SOLD,2,NINFO);LS(SOLD,1,CHBLK);","8","S","MARINERS STANDARD","53050"
"mnufea","","LS(DASH,2,ADINF)","5","S","MARINERS STANDARD","55010"
*
* *** ***
* *** end of look-up table ***
* *** ***

Lookup table changes are separately documented. In order to reduce the margin for error the actual lookup tables themselves are now uniquely defined within the .dai file and are no longer replicated in this document.

12. SYMBOLOGY PROCEDURE DIAGRAMSConditional Symbology Procedure (CSP) Diagrams

13.1 Introduction

The CSP diagrams in edition 3.4 of the Presentation Library were provided in Nassi & Shneiderman format. This style of presenting complex data flows has been cited as a potential cause of ECDIS related display issues, therefore the decision has been taken to transform the diagrams into Unified Modeling Language (UML) behavioral activity diagrams.

13.1.1 General

The following pages present UML activity diagrams and narrative descriptions explaining all conditional symbology procedures which have been developed to date.

Some of the diagrams describe the presentation of mariners' navigational objects. Please see Part II of the presentation library for further details and definitions of the mariners' navigational object classes.

13.1.2 UML Constructs

Loops –

Decision points –

Colour coding -

13.1.3 Standards terms and definitions

Ref: OGC Dimensionally-Extended 9 Intersection Model

12.1 Introduction

The following terms and their definitions are used in the CSPs

12.1.1 General Operators

The following pages present program flow charts and narrative descriptions explaining all conditional symbology procedures which have been developed so far. The flow charts are styled according to Nassi & Shneiderman Diagrams (8).

Since the flow charts have been carefully compiled to achieve a safe presentation of objects, manufacturers are advised to follow the programming instructions closely. But, as everybody knows, such procedures add extra complexity to the ECDIS software which in turn can jeopardize the safety of navigation. Therefore, please study the logic of each conditional symbology procedure carefully and report on ambiguities when necessary.

Some of the flow charts describe the presentation of mariners' navigational objects. Please see Part II for further details and definitions of the mariners' navigational object classes.

Operators	Definition
Equal	To be the same in number or amount
Not equal	A statement that two objects are not the same, or do not represent the same value
Less than	an inequality statement that one value is less than another
Less than or equal to	an inequality statement that one value is less than or equal to another
Greater than	an inequality statement that one value is greater than another
Greater than or equal to	an inequality statement that one value is greater than or equal to another
AND	A boolean operator that gives the value one if and only if all the operands are one and otherwise has a value of zero.
OR	A boolean operator that gives the value one if at least one operand (or input) has a value of one, and otherwise has a value of zero.

Spatial Operators

Spatial Operators	Definition
Equals	The two objects have the same boundary and interior.
Disjoint	The boundaries and interiors do not intersect.
Touches	The boundaries intersect but the interiors do not intersect.
Within	Inside a boundary
Overlaps	Extend over so as to cover partly
Crosses	Extend across another geometric primative
Intersects	a single point where two lines meet or cross each other
Contains	Geometry *b* lies in the interior of *a*

Feature Object Attribute Values

Feature Object	Definition

Attribute Values	
Present	An attribute is present either with or without a value
Null	An attribute value has been encoded but the value has not been populated (the HO wants to indicate that the value is unknown)
notNull	The attribute has been populated with an allowable value

Statements

Statement	Definition
If	A conditional statement which determines whether a further statement should be executed.
For	repeat a statement until a statement is met. For the purposes of the checks the statement being met generates the error or warning specified.
Switch	test against a variable if this does not match move on to the next test

13.1.4 CSP arrangement

Each of the following CSP contains;

Title	CSP title used in S-52 lookup tables
Applies to	Lists the S-57 feature objects which the procedure applies to
Spatial Object(s)	Defines the geometric primitives: Point, line and area
Attribute(s) used	Lists all the S-57 feature attributes used in the procedure (and any sub-procedures)
ECDIS User Parameter(s)	Settings that are generated by the end user.
Local Variables	Defines any local variables used within the procedure together with their initial values – also, whether they're required for sub-procedures.
Return Values	Overview of the results returned by the CSP
Remarks	General guide to the procedure saying how it works and what it does

~~12.1.2~~ 13.1.5 List of Conditional Symbology Procedures

~~The following flow charts and narrative descriptions of conditional symbology procedures are presented:~~

(~~12.2.1~~13.2.1)	Clearing line (mariners' navigational object)	CLRLIN01
(~~12.2.2~~13.2.2)	Data coverage, scale boundaries, overscale (S-57)	* DATCVR02

(~~12.2.3~~13.2.3)	Depth area colour fill and dredged area pattern fill (S-57)	DEPARE02
(~~12.2.4~~13.2.4)	Depth contours, including safety contour (S-57)	DEPCNT03
(~~12.2.5~~13.2.5)	Depth value (S-57)	DEPVAL02
(~~12.2.6~~13.2.6)	Leg of planned route (mariners' navigational object)	LEGLIN03
(~~12.2.7~~13.2.7)	Light flares, light sectors & light coverage (S-57)	LIGHTS05
(~~12.2.8~~13.2.8)	Light description text string (S-57)	LITDSN01
(~~12.2.9~~13.2.9	Obstructions and rocks (S-57)	OBSTRN06
(~~12.2.10~~13.2.10)	Own ship (mariners' navigational object)	* OWNSHP02
(~~12.2.11~~13.2.11)	Past track (mariners' navigational object)	PASTRK01
(~~12.2.12~~13.2.12)	Quality (accuracy) of position (S-57)	QUAPOS01
(~~12.2.13~~13.2.13)	Quality of position of line objects (S-57)	QUALIN01
(~~12.2.14~~13.2.14)	Quality of position of point and area objects (S-57)	QUAPNT02
(~~12.2.15~~13.2.15)	Restricted areas - object class RESARE (S-57)	RESARE03
(~~12.2.16~~13.2.16)	Entry procedure for restrictions (S-57)	RESTRN01
(~~12.2.17~~13.2.17)	Restrictions – attribute RESTRN (S-57)	RESCSP02
(~~12.2.18~~13.2.18)	Contour labels, including safety contour (S-57)	SAFCON01
(~~12.2.19~~13.2.19)	Shoreline constructions, including accuracy of position.	SLCONS03
(~~12.2.20~~13.2.20)	Colour fill for depth areas (S-57)	SEABED01
(~~12.2.21~~13.2.21)	Symbolizing soundings, including safety depth (S-57)	SNDFRM03
(~~12.2.22~~13.2.22a)	Entry procedure for symbolizing soundings (S-57)	SOUNDG02
(~~12.2.22~~13.2.22b)	Symbolizing encoded objects specified by IMO	**'SYMINSnn'**
(~~12.2.23~~13.2.23)	Topmarks (S-57)	TOPMAR01
(~~12.2.24~~13.2.24)	Isolated dangers in general that endanger own ship (S-57)	UDWHAZ04

(12.2.25 13.2.25)	Vessel other than own ship (mariners' navigational object)	* VESSEL02
(12.2.26 13.2.26)	Symbolizing VRMs and EBLs (mariners' navigational object)	* VRMEBL02
(12.2.27 13.2.27)	Wrecks (S-57)	WRECKS04

* Procedures marked by an asterisk are in narrative form.

12.1.3 13.1.6 Mariners' selections

The following global parameters carrying mariners' selections are used by the procedures:

SAFETY_DEPTH	- selected safety depth (meters) [IMO PS [3 2]]
SHALLOW_CONTOUR	- selected shallow water contour (meters) (optional)
SAFETY_CONTOUR	- selected safety contour (meters) [IMO PS [3 2]]
DEEP_CONTOUR	- selected deep water contour (meters) (optional)
TWO_SHADES	- flag indicating selection of two depth shades (on/off)
SHALLOW_PATTERN	- flag indicating selection of shallow water highlight (on/off) (optional)
SHIPS_OUTLINE	- flag indicating selection of ship's scale symbol (on/off) [IMO PS [3 2]]
DISTANCE_TAGS	- selected spacing of "distance to run" tags at a route (nm)
TIME_TAGS	- selected spacing of time tags at the pasttrack (min)
FULL_SECTORS	- show full length light sector lines

Please also see 8.3.5 for further information how conditional symbology procedures handle display priority, OVERRADAR flag and display category.

12.1.4 Notes on flow charts:

A box completely separated from an enclosing box indicates a sub-procedure which is to be called at this point.

A box separated from the enclosing box only on the top and left sides indicates a repeating loop.

12.1.5 13.1.7 Shared sub-procedures

Some basic procedures are used in more than one application. For example, SNDFRMnn is called by soundings, wrecks, rocks and obstructions to compose depth values into soundings.

Such shared sub-procedures can only be accessed through a calling procedure; they cannot be called directly from the look-up table. When necessary, an entry procedure is set up solely to give this access; e.g., RESTRNnn is used to give access to shared procedure RESCSPnn.

The following table illustratesexplains these relationships (the suffix 'nn' refers to the current edition of the CSP) :

Object	CSP	Sub-Procedure	

M_COVR(a) M_CSCL(a)S-57 Object (Geometry)	DATCVRnnCSP name	Sub-Procedure name	Notes
M_COVR(a) M_CSCL(a)	DATCVRnn		
DEPARE(a) DRGARE(a)	DEPAREnn	RESCSPnn SEABEDnn SAFCONnn	Note: this sub-procedure also called by RESTRNnn
		SEABEDnn	
DRGARE(a)		SAFCONnn	
DEPARE(l) DEPCNT(l)	DEPCNTnn	SAFCONnn	
DEPCNT(l)			
LIGHTS(p)	LIGHTSnn	LITDSNnn	
OBSTRN(pla) UWTROC(p)	OBSTRNnn	DEPVALnn QUAPNTnn SNDFRMnn UDWHAZnn	Note: this sub-procedure also called by WRECKSnn Note: this sub-procedure also called by QU WRECKSn
		QUAPNTnn	sub-procedure also called by QUAPOS WRECKSn
UWTROC(p)		SNDFRMnn	Note: this sub-procedure also called by SOUNDGnn & WRECKSnn
		UDWHAZnn	Note: this sub-procedure also called by WRECKSnn
LNDARE(pl) COALNE(l)	QUAPOSnn	QUAPNTnn QUALINnn	Note: this sub-procedure also called by OBSTRNnn & WRECKSnn

COALNE(l)		***QUALINnn***	
RESARE(a)	**RESAREnn**		*~~Note:~~ this procedure includes the effect* RESTRN
ACHARE(a) *~~CBLARE(a)~~* *~~DMPGRD(a)~~* *~~DWRTPT(a)~~* *~~FAIRWY(a)~~* *~~ICNARE(a)~~* *~~ISTZNE(a)~~* *~~MARCUL(a)~~* *~~MIPARE(a)~~* *~~OSPARE(a)~~* *~~PIPARE(a)~~* *~~PRCARE(a)~~* *~~SPLARE(a)~~* *~~SUBTLN(a)~~* *~~TESARE(a)~~* *~~TSSCRS(a)~~* *~~TSSLPT(a)~~* *~~TSSRON(a)~~*	**RESTRNnn**	***RESCSPnn***	*~~Note: this~~ sub-procedure also called by* **DEPAREnn**
CBLARE(a)			
DMPGRD(a)			
DWRTPT(a)			
FAIRWY(a)			
ICNARE(a)			
ISTZNE(a)			
MARCUL(a)			
MIPARE(a)			
OSPARE(a)			
PIPARE(a)			
PRCARE(a)			
SPLARE(a)			
SUBTLN(a)			
TESARE(a)			

TSSCRS(a)			
TSSLPT(a)			
TSSRON(a)			
SOUNDG(p)	**SOUNDGnn**	***SNDFRMnn***	sub-procedure also called by **OBSTRN** **WRECKSnn**
WRECKS(pa)	**WRECKSnn**	***DEPVALnn***	sub-procedure also called by **OBSTRN**
		QUAPNTnn	sub-procedure also called by **QUAPOS** **OBSTRNnn**
		SNDFRMnn	sub-procedure also called by **OBSTRN** **SOUNDGnn**
		UDWHAZnn	sub-procedure also called by **OBSTRN**

~~SOUNDG(p)~~	~~**SOUNDGnn**~~	~~***SNDFRMnn***~~	~~Note: this sub-procedure also called by **OBSTRNnn** &~~ ~~**WRECKSnn**~~
~~WRECKS(pa)~~	~~**WRECKSnn**~~	~~***DEPVALnn***~~ ~~***QUAPNTnn***~~	~~Note: this sub-procedure also called by **OBSTRNnn**~~ ~~Note: this sub-procedure also called by **QUAPOSnn** &~~ ~~**OBSTRNnn**~~
		~~***SNDFRMnn***~~	~~Note: this sub-procedure also called by **OBSTRNnn** &~~ ~~**SOUNDGnn**~~
		~~***UDWHAZnn***~~	~~Note: this sub-procedure also called by **OBSTRNnn**~~

12.2 Conditional Symbology Procedures

12.2.1

13.2.01 Conditional Symbology Procedure 'CLRLIN01'

Applies to: Mariners' Navigational Object Class "mariners' clearing line" (clrlin)

(See Part II for details)

Spatial Object(s): Line

Attribute(s) used: "category of mariners' clearing line" (catclr)

User Parameter(s):

Inputs: Object to be symbolized from SENC

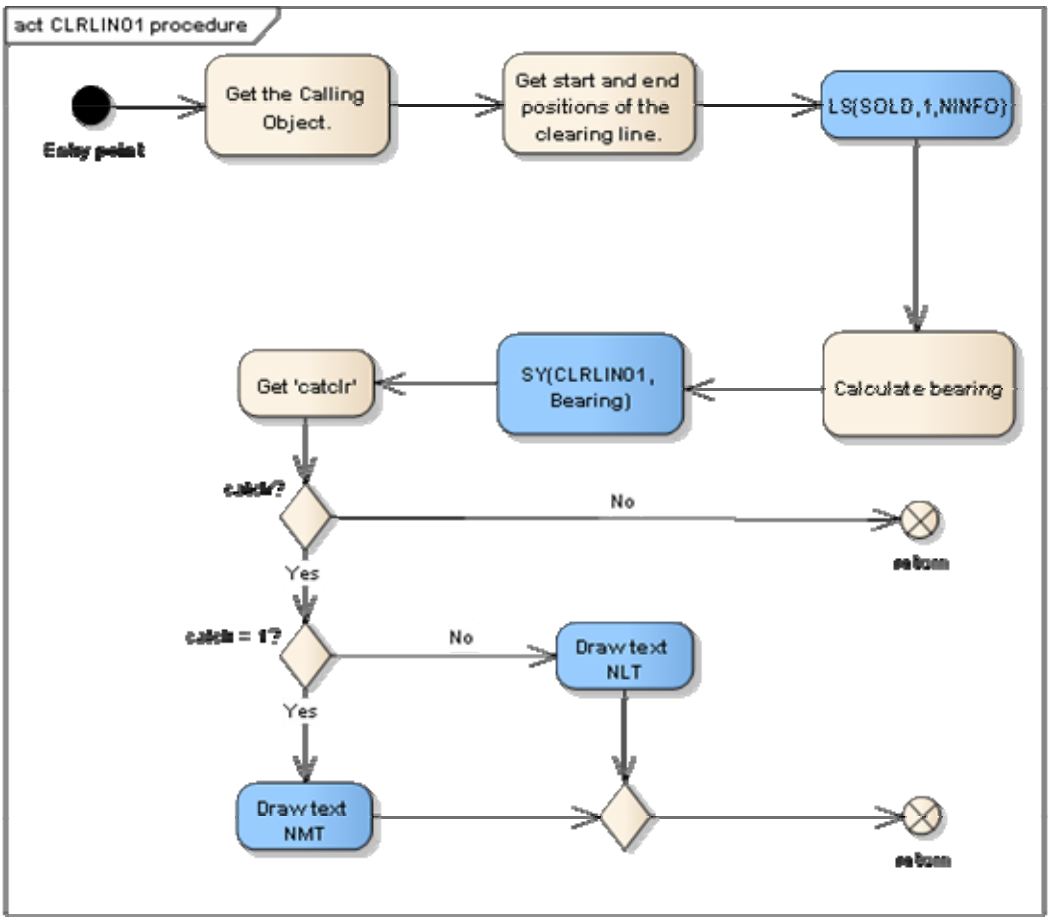
Output Defaults: Display Priority given by look-up table; OVERRADAR priority given by look-up table; Display Category given by look-up table; Viewing Group given by look-up table.

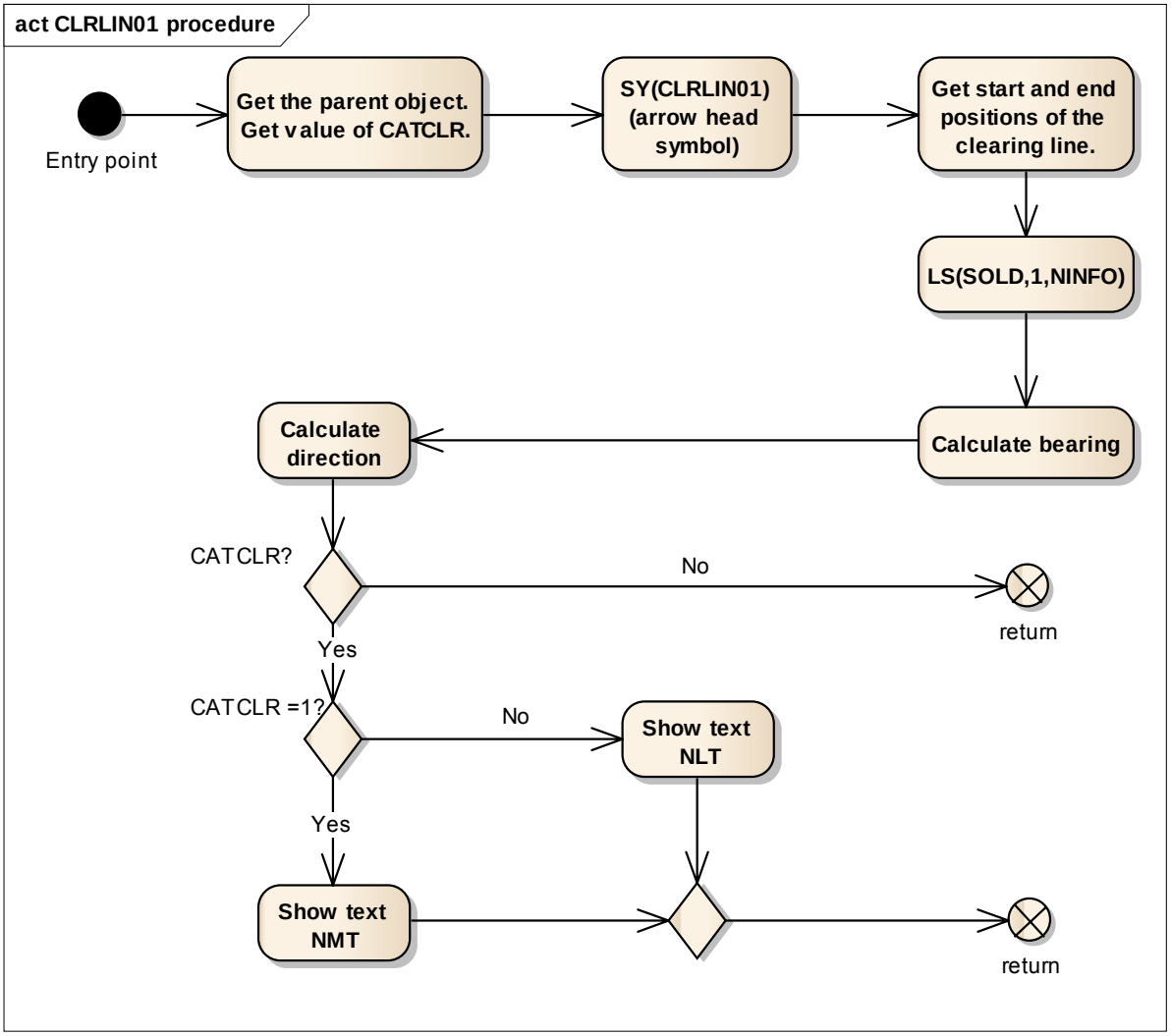
Remarks: A clearing line shows a single arrow head at one of its ends. The direction of the clearing line must be calculated from its line object in order to rotate the arrow head symbol and place it at the correct end. This cannot be achieved with a complex linestyle since linestyle symbols cannot be sized to the length of the clearing line. Instead a linestyle with a repeating pattern of arrow symbols had to be used which does not comply with the required symbolization.

The attribute “category of clearing line” describes the condition associated with the clearing line:

"NMT" means that in order to clear the danger, the bearing of the mark should be " not more than" the indicated value.

"NLT" means the bearing of the mark should not be "not less than" the indicated value.


act CLRLIN01 procedure
Entry point
Get the Calling Object.
Get start and end positions of the clearing line.
LS(SOLD,1,NINFO)
Calculate bearing
SY(CLRLIN01, Bearing)
Get 'catclr'
catclr?
No
Yes
catclr = 1?
No
Draw text NLT
Yes
Draw text NMT



Notes:

Calculate bearing

The bearing is calculated using the co-ordinates of the start and end nodes at either end of the clearing line. The direction of clearing line equates to the calculated bearing. The starting pair of co-ordinates belong to the node at sea, the end co-ordinates belong to the node at the mark.

Line Style

Draw a line to connect the start node with the end node using line style “LS(SOLD, 1, NINFO)”

Calculate direction

Rotate the selected symbol to the calculated direction. Show the selected symbol at the end position.

Show text NLT

Show text 'NLT' plus value of calculated bearing alongside clearing line: font is Sans-serif, non-italic, body size 10, left and bottom justified, colour is 'CHBLK'.

Show text NMT

Show text 'NMT' plus value of calculated bearing alongside clearing line: font is Sans-serif, non-italic, body size 10, left and bottom justified, colour is 'CHBLK'.

~~12.2.2~~

13.2.02 Conditional Symbology Procedure 'DATCVR02'

Applies to: Entire contents of the ENC

Spatial Objects(s): Point, Line, Area

Attribute(s) &: data fields used
Data coverage (M_COVR, CATCVR)
Catalogue directory field (CATD)
Compilation scale (M_CSCL, CSCALE)
Data set parameter field, compilation scale (DSPM, CSCL)
Data set identification field, intended usage (navigational purpose) (DSID, INTU)

Parameter(s): Requirements in IMO and IHO standards and specifications

Defaults: Symbolize "No ENC data"

Remarks: This conditional symbology procedure describes procedures for:

- symbolizingSymbolizing the limit of ENC coverage;
- symbolizingSymbolizing navigational purpose boundaries ("scale boundaries"); and
- indicatingIndicating overscale display. Note that the mandatory meta object M_QUAL, CATZOC is symbolized by the look-up table.

Because the methods adopted by an ECDIS to meet the IMO and IHO requirements listed on the next page will depend on the manufacturer's software, and cannot be described in terms of a flow chart in the same way as other conditional procedures, this procedure is in the form of written notes.

A narrative description of CSP DATCVR02 is given hereafter.

DATCVR02

Procedures for:

- symbolizing the limits of ENC coverage,
- symbolizing navigational purpose boundaries, (chart scale boundaries),
- indicating overscale display.

1. REQUIREMENTS

IMO Performance standards A 19/Res.817:

5.1 An indication is required if the display is at a larger scale than that of the ENC (see 4.1 below).

5.2 An indication is required if larger scale data than that shown on the display is available (see 4.3 below).

App. 2, line 2.7. Chart scale boundaries are part of the standard display (see 3.1 below)

IHO Specifications for ECDIS chart content and display S-52:

3.4a An indication "refer to the official chart" is required if the display includes waters for which no ENC at appropriate scale exists (see 2.1 below).

3.5c If a scale boundary is shown on the display, the information in an overscale area should be identified, and should not be relied on (see 4.2 below).

6.3d A graphical index of the navigational purpose of available data should be shown on demand (see 3.2 below).

2. ENC COVERAGE

S-57 app. B1 - "ENC Product Specification", section 2.2, describes the cell system and the use of object class M_COVR to indicate data coverage. Note that a value of M_COVR, CATCVR=2 does not necessarily indicate "no data", since data could be contained in an overlapping cell.

2.1 Limit of ENC coverage: non-HO data on the display

Since the HO will not issue a data coverage diagram, the ECDIS should compile a graphical index of the HO ENC data available, classified by navigational purpose, and make it available to the mariner.

The end of HO data need not be identified on the display. The appearance of the “No data” colour (NODTA) and fill pattern AP(NODATA03) will indicate the end of data.

If non HO data is shown on the ECDIS display, its boundary should be identified by the linestyle LC(NONHODAT). The display priority is 3; over radar; display base; viewing group 11060. Note that the LC(NONHODAT) is a “one-sided” line and the boundary of the non-HO data must be drawn according to S-57 rules to ensure that the diagonal stroke of the line is on the non-HO data side of the line.

See IHO S-52 Appendix 2, section 2.3.1c, for information on how to symbolize various cases of non-HO data appearing on the ECDIS display.

~~2.2~~

~~No data areas~~

~~To make sure that the mariner is aware of areas where no data exist, the entire screen should always be filled with grey NODTA colour fill together with the fill pattern AP(NODATA03) at the start, before any other information is drawn. The display priority is 0 (allowing non-ENC data to be overdrawn); radar flag suppressed by radar; the category is DISPLAYBASE and the viewing group is 11050.~~

~~An indication that the mariner must refer to the official chart should be given whenever line LC(NONHODAT) appears on the display, or whenever the display is comprised of other than ENC data.~~

~~3. SCALE BOUNDARIES~~

~~"Navigational purpose" is used in S-57 to express the concept of scale (ENC Product Specification 2.1).~~

~~3.1 Chart scale boundaries~~

~~The "chart scale boundaries", where the navigational purpose of the data changes, should be symbolised on the ECDIS display by a simple linestyle LS(SOLD,1,CHGRD). Alternatively linestyle LC(SCLBDYnn) may be used, with the double line (indicating better resolution) on the side of the larger scale data. The display priority is 3; over radar; standard display; viewing group 21030.~~

~~Only the significant changes from one navigational purpose to another should appear as chart scale boundaries; boundaries marking minor changes in compilation scale that lie within the range of a navigational purpose should not be drawn.~~

~~3.2 Graphical index of navigational purpose~~

~~The chart catalogue for official charts may be used as a model for the graphical index of navigational purpose, except that minor changes in compilation scale that lie within the range of a navigational purpose should not be drawn on this index. Only the significant changes from one navigational purpose to another should appear.~~

~~4. OVERSCALE~~

~~Scale is expressed as a fraction, representing: [length of an object on the chart] / [actual length of that object on the ground]. Thus 1/10,000 is twice as large a scale as 1/20,000, because the length of a given object on the chart is twice as long at 1/10,000 scale as at 1/20,000.~~

~~The "Compilation Scale" is the reference for overscale calculation. This is coded in the CSCL subfield of the DSPM field. The object M_CSCL, CSCALE is only used if the compilation scale is different for some part of the data set, and when encoded must also be taken into account. (S-57 App. B1, Ann. A - "Use of the Object Catalogue").~~

~~4.1 Overscale indication.~~

~~The overscale indication is intended to remind the mariner that the size of chart errors is magnified when he increases the display scale. A 1 mm error at compilation scale of 1/20,000 becomes a 1.3 mm error at a display scale of 1/15,000 and a 2 mm error at 1/10,000.~~

The overscale factor should be calculated as [denominator of the compilation scale] / [denominator of the display scale], expressed as, for example "X1.3", or "X2" (using the figures in the example above.) This should be indicated on the same screen as the chart display, and treated as display base. Use colour SCLBR.

This overscale indication is required by IMO PS [3] whenever the display scale exceeds the compilation scale.

Note that if the display is compiled from more than one ENC of the same compilation scale, and if the mariner deliberately chooses to zoom in so that the display scale exceeds the compilation scale, then only the "overscale indication" should be shown. The "overscale pattern" AP(OVERSC01) should not be shown.

4.2 Overscale area at a chart scale boundary

Section 4.1 above dealt with overscale deliberately selected by the mariner. A different overscale situation arises when the ship approaches a scale boundary from a larger to a smaller scale ENC, typically when leaving harbour, as illustrated in figure 7 below. In combining data from the large scale and the small scale ENCs to generate a display at the larger scale, the ECDIS will have "grossly enlarged" the small scale data to the left of the scale boundary on this figure.

In addition to drawing the scale boundaries, the "grossly overscale" part of the display should be identified with pattern AP(OVERSC01), as illustrated. Its display priority is 3; over radar; standard display; viewing group 21030.

In this context, " grossly enlarged" and " grossly overscale" should be taken to mean that the display scale is enlarged/overscale by X2 or more with respect to the compilation scale. For example, at the left edge of figure 7 the display scale of 1/12,500 is X4 the compilation scale of 1/50,000, and so the overscale pattern is required.

Note that in this situation the pattern AP(OVERSC01) should ONLY be shown on the area compiled from the smaller scale ENC. If the area from the larger scale ENC is also overscale, this should be indicated by the "overscale indication" of sub-section 4.1 above. The pattern AP(OVERSC01) should not be shown on the part of the display taken from the larger scale ENC. For example if the display scale of the situation in figure 7 was 1/3,500 the area of compilation scale 1/12,500 would have an overscale indication of X 3.6 but would have no pattern AP(OVERSC01).

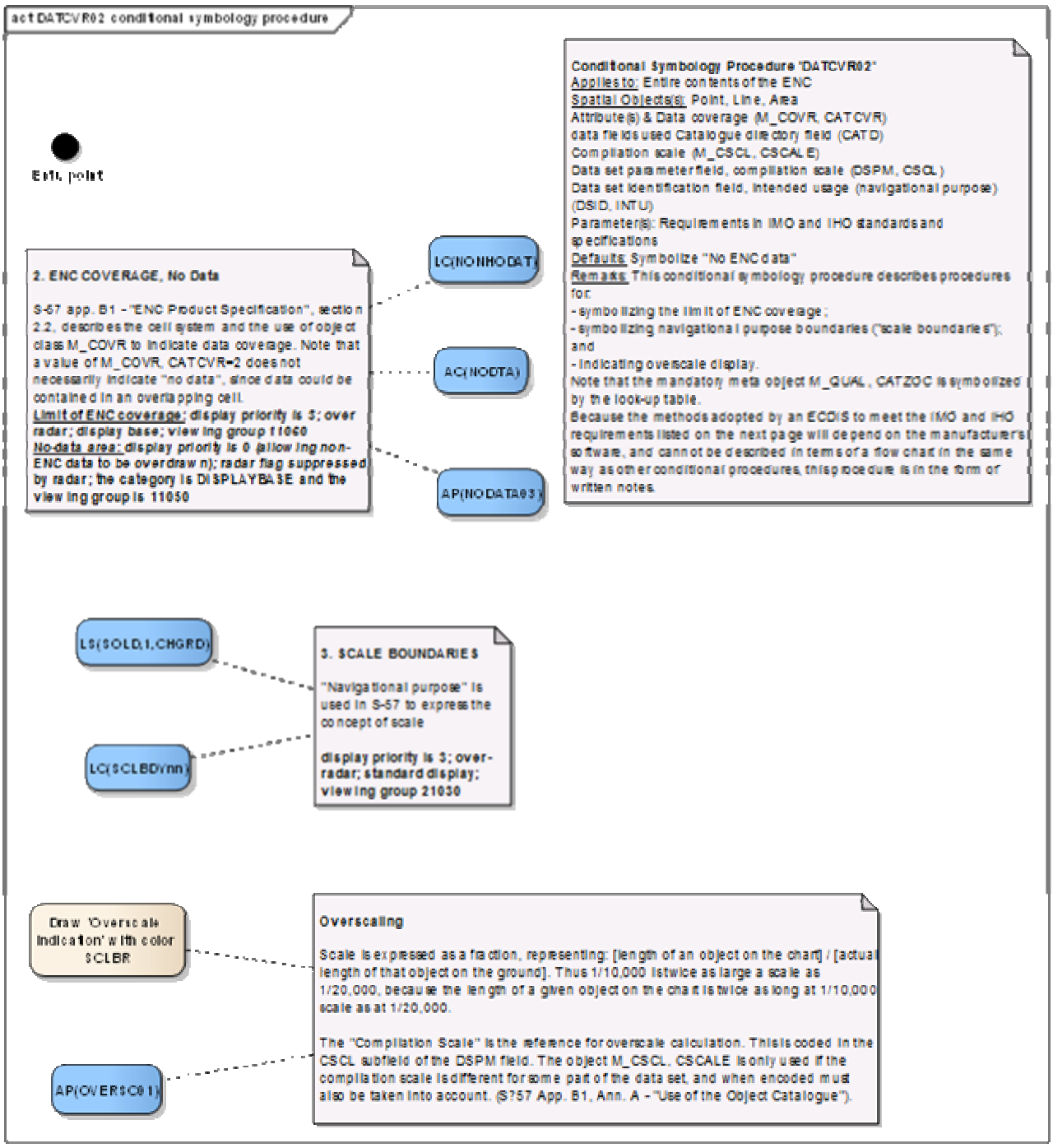
4.3 Larger scale data available

Visualise the opposite situation from that on figure 7. This time, the ship is approaching harbour from the left edge of the figure, displaying an ENC at a compilation scale of 1/50,000. As the display window begins to cover an ENC at a compilation scale of 1/12,500, the ECDIS should indicate that larger scale data will shortly become available, as required by IMO PS [3].

~~**Fig. 7 - data coverage**~~

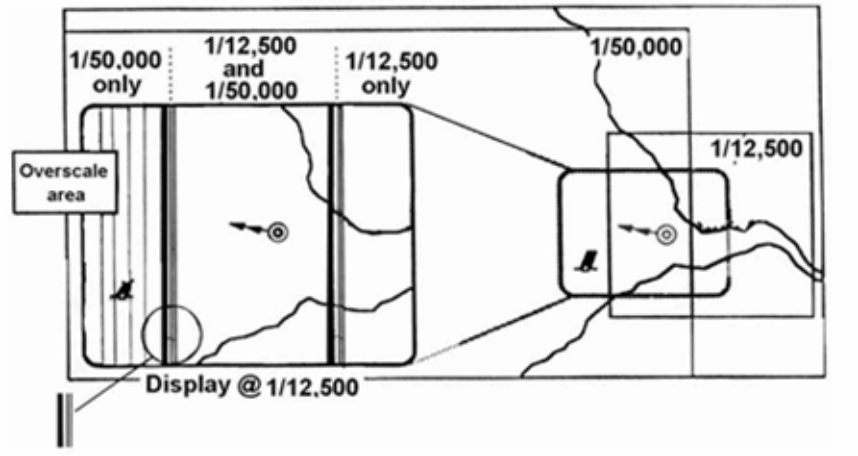
~~(The right hand side of the diagram shows the ENC layout with the screen window overlaid, and the left hand side is enlarged to show the ECDIS display on that screen.)~~

Since in the S-52 document that CSP is described in the narrative, it is not possible to fully describe its logic by UML diagram. So its formalization shall be discussed by the working group


act DATCVR02 conditional symbology procedure
Entry point
Conditional Symbology Procedure 'DATCVR02'
Applies to: Entire contents of the ENC
Spatial Objects(s): Point, Line, Area
Attribute(s) & Data coverage (M_COVR, CATCVR)
data fields used Catalogue directory field (CATD)
Compilation scale (M_CSCL, CSCALE)
Data set parameter field, compilation scale (DSPM, CSCL)
Data set identification field, intended usage (navigational purpose) (DSID, INTU)
Parameter(s): Requirements in IMO and IHO standards and specifications
Defaults: Symbolize "No ENC data"
Remarks: This conditional symbology procedure describes procedures for:
- symbolizing the limit of ENC coverage;
- symbolizing navigational purpose boundaries ("scale boundaries"); and
- indicating overscale display.
Note that the mandatory meta object M_QUAL, CATZOC is symbolized by the look-up table.
Because the methods adopted by an ECDIS to meet the IMO and IHO requirements listed on the next page will depend on the manufacturer's software, and cannot be described in terms of a flow chart in the same way as other conditional procedures, this procedure is in the form of written notes.
2. ENC COVERAGE, No Data
S-57 app. B1 - "ENC Product Specification", section 2.2, describes the cell system and the use of object class M_COVR to indicate data coverage. Note that a value of M_COVR, CATCVR=2 does not necessarily indicate "no data", since data could be contained in an overlapping cell.
Limit of ENC coverage: display priority is 3; over radar; display base; viewing group 11060
No-data area: display priority is 0 (allowing non-ENC data to be overdrawn); radar flag suppressed by radar; the category is DISPLAYBASE and the viewing group is 11050
LC(NONHODAT)
AC(NODTA)
AP(NODATA03)
LS(SOLD,1,CHGRD)
LC(SCLBDYnn)
3. SCALE BOUNDARIES
"Navigational purpose" is used in S-57 to express the concept of scale
display priority is 3; over-radar; standard display; viewing group 21030
Draw 'Overscale indication' with color SCLBR
AP(OVERSC01)
Overscaling
Scale is expressed as a fraction, representing: [length of an object on the chart] / [actual length of that object on the ground]. Thus 1/10,000 is twice as large a scale as 1/20,000, because the length of a given object on the chart is twice as long at 1/10,000 scale as at 1/20,000.
The "Compilation Scale" is the reference for overscale calculation. This is coded in the CSCL subfield of the DSPM field. The object M_CSCL, CSCALE is only used if the compilation scale is different for some part of the data set, and when encoded must also be taken into account. (S?57 App. B1, Ann. A - "Use of the Object Catalogue").

Notes:

LC(NONHODAT)	Since the HO will not issue a data coverage diagram, the ECDIS should compile a graphical index of the HO ENC data available, classified by navigational purpose, and make it available to the mariner. If non-HO data is shown on the ECDIS display, its boundary should be identified by the linestyle LC(NONHODAT). The display priority is 3; over radar; display base; viewing group 11060. Note that the LC(NONHODAT) is a “one-sided” line and the boundary of the non-HO data must be drawn according to S-57 rules to ensure that the diagonal stroke of the line is on the non-HO data side of the line.
AC(NODTA)	The end of HO data need not be identified on the display. The appearance of the “No data” colour (NODTA) and fill pattern AP(NODATA03) will indicate the end of data.
AP(NODATA03)	To make sure that the mariner is aware of areas where no data exist, the entire screen should always be filled with grey NODTA colour fill together with the fill pattern AP(NODATA03) at the start, before any other information is drawn. The display priority is 0 (allowing non-ENC data to be overdrawn); radar flag suppressed by radar; the category is DISPLAYBASE and the viewing group is 11050.
LS(SOLD,1,CHGRD)	The "chart scale boundaries", where the navigational purpose of the data changes, should be symbolised on the ECDIS display by a simple linestyle. Only the significant changes from one navigational purpose to another should appear as chart scale boundaries; boundaries marking minor changes in compilation scale that lie within the range of a navigational purpose should not be drawn.
LC(SCLBDYnn)	Alternatively linestyle LC(SCLBDYnn) may be used, with the double line (indicating better resolution) on the side of the larger scale data. The display priority is 3; over-radar; standard display; viewing group 21030. Draw 'Overscale Indication' with color SCLBR - The overscale factor should be calculated as [denominator of the compilation scale] / [denominator of the display scale], expressed as, for example "X1.3", or "X2" (using the figures in the example above.) This should be indicated on the same screen as the chart display, and treated as display base. Use colour SCLBR. This overscale indication is required by IMO PS [3] whenever the display scale exceeds the compilation scale. Note that if the display is compiled from more than one ENC of the same compilation scale, and if the mariner deliberately chooses to zoom in so that the display scale exceeds the compilation scale, then only the "overscale indication" should be shown. The "overscale pattern" AP(OVERSC01) should not be shown.

AP(OVERSC01)	In addition to drawing the scale boundaries, the "grossly overscale" part of the display should be identified with pattern AP(OVERSC01), as illustrated. Its display priority is 3; over-radar; standard display; viewing group 21030. In this context, " grossly enlarged" and " grossly overscale" should be taken to mean that the display scale is enlarged/overscale by X2 or more with respect to the compilation scale. For example, at the left edge of the picture below the dispay scale of 1/12,500 is X4 the compilation scale of 1/50,000, and so the overscale pattern is required. The pattern AP(OVERSC01) should not be shown on the part of the display taken from the larger scale ENC. 

~~12.2.3~~

13.2.03 Conditional Symbology Procedure 'DEPARE02'

Applies to: S-57 Object Class "depth area" (DEPARE) ~~as an area, not as a line~~

S-57 Object Class "dredged area" (DRGARE)

Spatial Object(s): Area only.

Relation(s) used: Adjacency of DEPARE/DRGARE objects with group 1 objects.

Attribute(s) used: "depth range value 1" (DRVAL1); "depth range value 2" (DRVAL2)

~~Parameter(s): Object to be symbolized from SENC~~

Defaults: Display Priority given by look-up table OVERRADAR priority given by look-up table Display Category given by look-up table Viewing Group given by look-up table

Required ECDIS ~~startup values:~~ SAFETY_CONTOUR. The manufacturer is responsible for setting the SAFETY_CONTOUR to **startup value** 30 metres. This value should stay in operation until the mariner decides to select another safety contour.

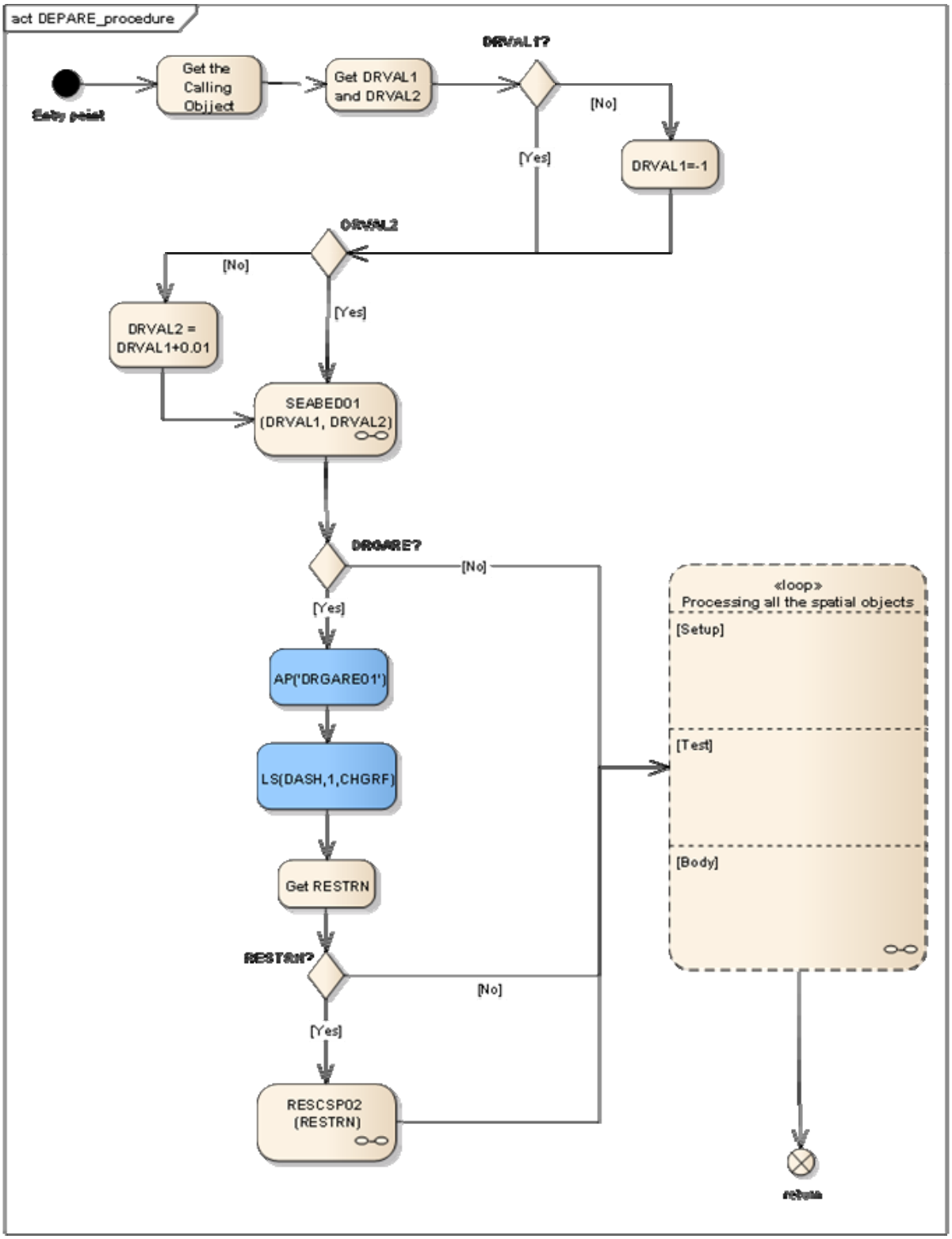
Remarks: An object of the class "depth area" is coloured and covered with fill patterns according to the mariners selections of shallow contour, safety contour and deep contour. This requires a decision making process provided by the sub-procedure "SEABED01" which is called by this symbology procedure. Objects of the class "dredged area" are handled by this routine as well to ensure a consistent symbolization of all areas that represent the surface of the seabed.

The safety contour will be constructed using the edges of the DEPARE and DRGARE objects. The safety contour may be labelled at the request of the mariner using sub-procedure “SAFCON01”.

Based on the safety contour value entered by the mariner (see IMO PS [~~3~~2]), the edges that make up the safety contour must be shown under all circumstances. But, while the mariner is free to enter any safety contour depth value that he thinks is suitable for the safety of his ship, the SENC only contains a limited choice of depth contours. This symbology procedure examines each edge of the DEPARE/DRGARE object to see if it falls between safe and unsafe water. If it does, that edge will represent the safety contour selected, or the next deeper contour if the selected contour is not available. It is highlighted as the safety contour and put in DISPLAYBASE. Note that this procedure will also detect the need for a safety contour at the edge of non-navigable rivers, canals or docks which must have a LNDARE or UNSARE under them, (UOC ~~4.7.6 remark~~4.6.6.3, 4.6.6.5, 4.7.6, 4.7.8, 4.8.1 remarks 2 etc. and 5.4.4 area 5), as well as at another DEPARE/DRGARE edge.

The procedure also checks whether the edge has a ‘QUAPOS’ value indicating unreliable positioning, and if so symbolizes it with a double dashed line.

~~Note: Since edition 3.4, the Presentation Library no longer symbolizes linear depth areas.~~


act DEPARE_procedure
Entry point
Get the Calling Object
Get DRVAL1 and DRVAL2
DRVAL1?
[No]
[Yes]
DRVAL1=-1
DRVAL2
[No]
[Yes]
DRVAL2 = DRVAL1+0.01
SEABED01 (DRVAL1, DRVAL2)
DRGARE?
[No]
[Yes]
AP('DRGARE01')
LS(DASH,1,CHGRF)
Get RESTRN
RESTRN?
[No]
[Yes]
RESCSP02 (RESTRN)
«loop»
Processing all the spatial objects
[Setup]
[Test]
[Body]
return

Notes:

Get the Calling Object	Get the object which is calling this procedure. DEPARE or DRGARE Areas
Get DRVAL1 and DRVAL2	Get the value of the attributes:
	"depth range value 1" (DRVAL1)
	"depth range value 2" (DRVAL2)
	and assign local variables 'DRVAL1' and 'DRVAL2' accordingly.
DRVAL1?	Is the value of the attribute DRVAL1 given?
DRVAL1=-1	Assign local variable 'DRVAL1' =-1
DRVAL2?	Is the value of the attribute DRVAL2 given?
SEABED01 (DRVAL1, DRVAL2)	Perform the symbology sub-procedure to symbolize this area object, see "*13.2.20 Conditional Symbology Procedure SEABED01*"
DRVAL1	**depth range value 1** - input parameter - value of the local variable pass from the main procedure
DRVAL2	**depth range value 2** - input parameter - value of the local variable pass from the main procedure
DRVAL2 = DRVAL1+0.01	Assign local variable 'DRVAL2' = DRVAL1+0.01
DRGARE?	Is the calling object of type DRGARE?
AP('DRGARE01')	Select the Area pattern 'DRGARE01' from the symbol library and draw it on top of the area's colour fill.
LS(DASH,1,CHGRF)	Symbolize the boundary with a dashed line, 1 unit wide colour 'CHGRF'
Get RESTRN	Get the value of the attribute "Restriction" (RESTRN).
RESTRN?	Is the value of the attribute RESTRN given?
RESCSP02 (RESTRN)	Perform the symbology procedure to complete the symbolization of 'DRGARE', see "*13.2.17 Conditional Symbology Procedure RESCSP02*"
RESTRN	- input value
Loop: processing all the spatial objects	See *Figure 4 Loop for all the spatial objects Continuation A and B*

~~12.2.4~~13.2.4 Conditional Symbology Procedure 'DEPCNT03'

Applies to: S-57 Object Class "depth contour" (DEPCNT)

Spatial Object(s): Line

Attribute(s) used: "value of depth contour" (VALDCO)

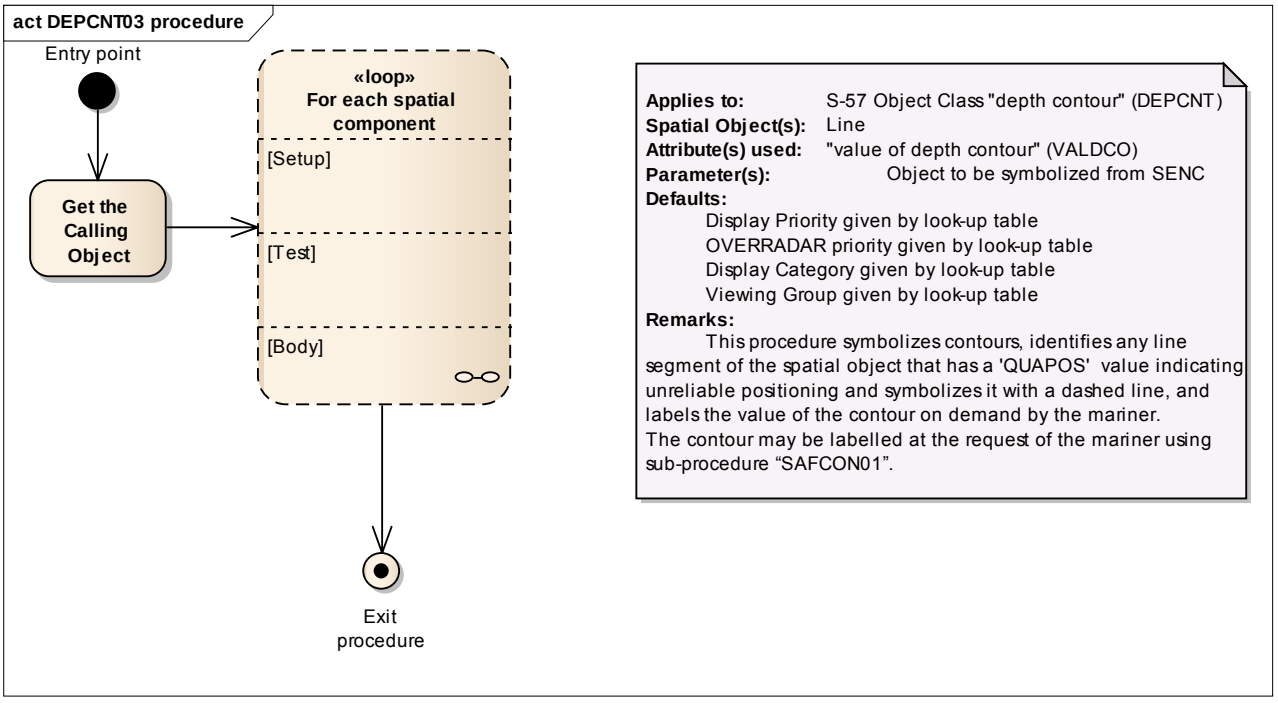
Parameter(s): Object to be symbolized from SENC

Output Defaults: Display Priority given by look-up table,
OVERRADAR priority given by look-up table,
Display Category given by look-up table,
Viewing Group given by look-up table

Remarks: This procedure symbolizes contours, identifies any line segment of the spatial object that has a 'QUAPOS' value indicating unreliable positioning and symbolizes it with a dashed line, and labels the value of the contour on demand by the mariner.
The contour may be labelled at the request of the mariner using sub-procedure "SAFCON01".

Spatial Component line definition

Figure 3 DEPCNT03 procedure

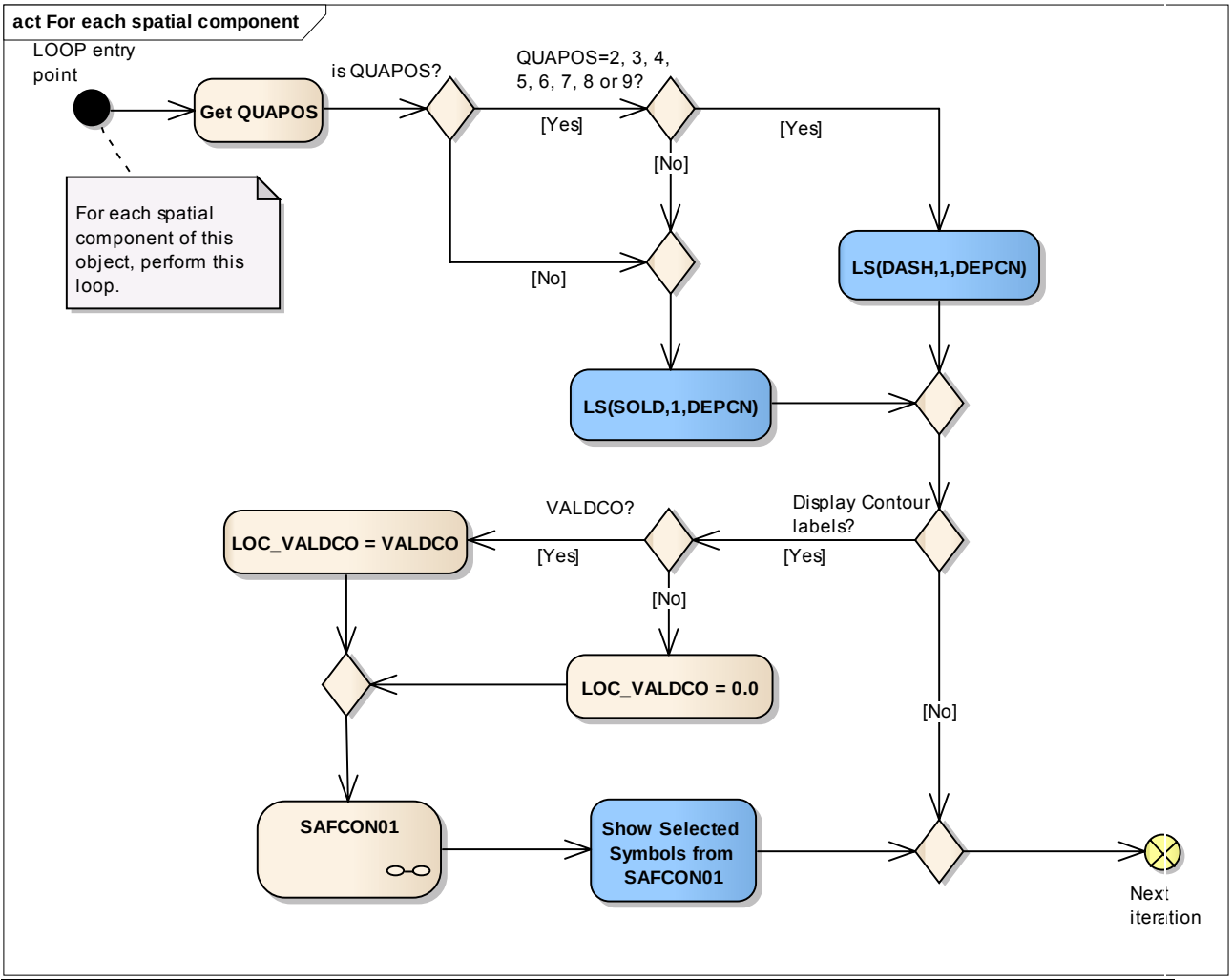


Get the Calling Object	Get the object which is calling this procedure.

Loop: For each spatial component	For each spatial component of the object, perform this loop, see *Figure 6 Loop for each spatial component*

Figure 4 Loop for each spatial component

~~Note: Since edition 3.2, the Presentation Library no longer symbolizes line depth areas.~~



Get QUAPOS	Get the value of the Attribute 'QUAPOS'
QUAPOS?	Is the value of the attribute 'QUAPOS' given?
QUAPOS=2, 3, 4, 5, 6, 7, 8 or 9?	Is the value of QUAPOS equal to: 2, 3, 4, 5, 6, 7, 8 or 9?
LS(DASH,1,DEPCN)	Symbolize the line with a dashed line, 1 unit wide, colour 'DEPCN'.
LS(SOLD,1,DEPCN)	Symbolize the line with a solid line, 1 unit wide, colour 'DEPCN'.
Display Contour labels?	Has the mariner chosen to display contour labels by used of

	selection of viewing group 33022?
VALDCO?	Is the attribute 'VALDCO' given?
LOC_VALDCO = VALDCO	Set the local variable 'LOC_VALDCO' equal to the attribute 'VALDCO'.
LOC_VALDCO = 0.0	Set the local variable 'LOC_VALDCO' equal to 0m. (Fail-safe)
SAFCON01	Perform the symbology procedure 'SAFCON01' to symbolize the contour label. See "*13.2.18 Conditional Symbology Procedure SAFCON01*"
LOC_VALDCO	input parameter
List of Selected Symbols	output parameter
SY(Selected Symbols) from SAFCON01	Draw the symbols that were returned by 'SAFCON01' at the centre of the run-length of the line. Symbols must be displayed upright with respect to the screen borders and not aligned along the contours.
Continue	Go to the next spatial object.

~~12.2.5~~13.2.5 **Conditional Symbology Procedure DEPVAL02**~~(Note that this is a sub-procedure called by procedures OBSTRNnn and WRECKSnn)~~

~~Applies to: All underwater hazards~~
Note that this is a sub-procedure called by procedures OBSTRNnn and WRECKSnn

Applies to: OBSTRN, UWTROC, WRECKS objects called the main procedures OBSTRNnn and WRECKSnn

Spatial Object(s): Point, line, area

Relation(s) used: Common parts of overlapping area objects

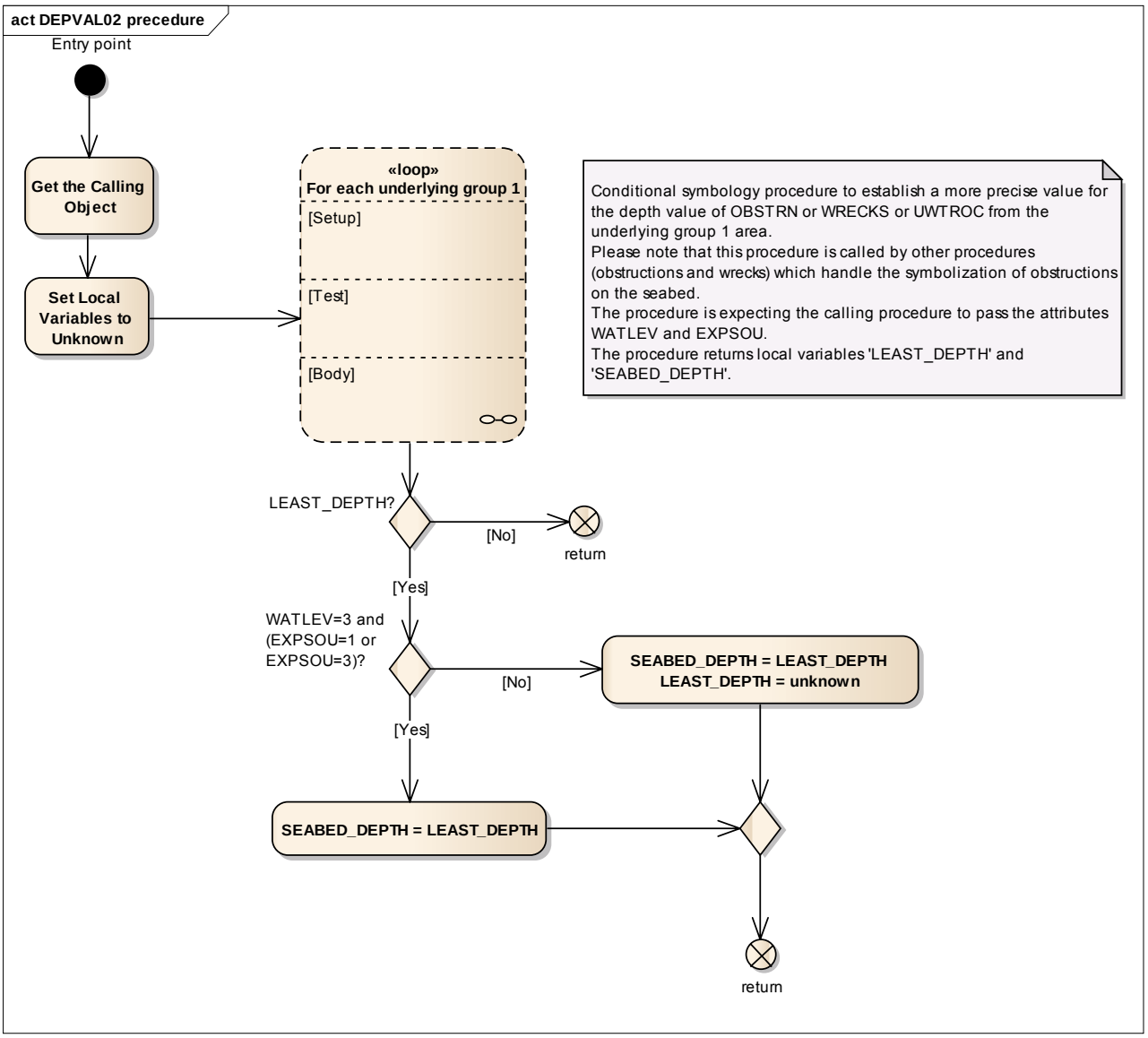
Attribute(s) used: "depth range value" DRVAL1 ;
"water level" (WATLEV) ;
"exposure of sounding" (EXPSOU)

Parameter(s): Object to be symbolized from SENC ~~Underlying~~. Any overlapped DEPARE or UNSARE objects
The procedure returns local variables 'LEAST_DEPTH' and 'SEABED_DEPTH'.

Defaults: Return to main program for defaults

Remarks: If the value of the attribute VALSOU for a wreck, rock or obstruction is missing/unknown, CSP DEPVAL will establish a default 'LEAST DEPTH' from the attribute DRVAL1 of the underlying depth area, and pass it to conditional procedures OBSTRN and WRECKS. However this procedure is not valid if the value of EXPSOU for the object is 2 (object is shoaler than the DRVAL1 of the surrounding depth area), or is unknown. It is also not valid if the value of WATLEV for the object is other than 3 (object is always underwater). In either of these cases the default procedures in conditional procedures OBSTRN and WRECKS are used.

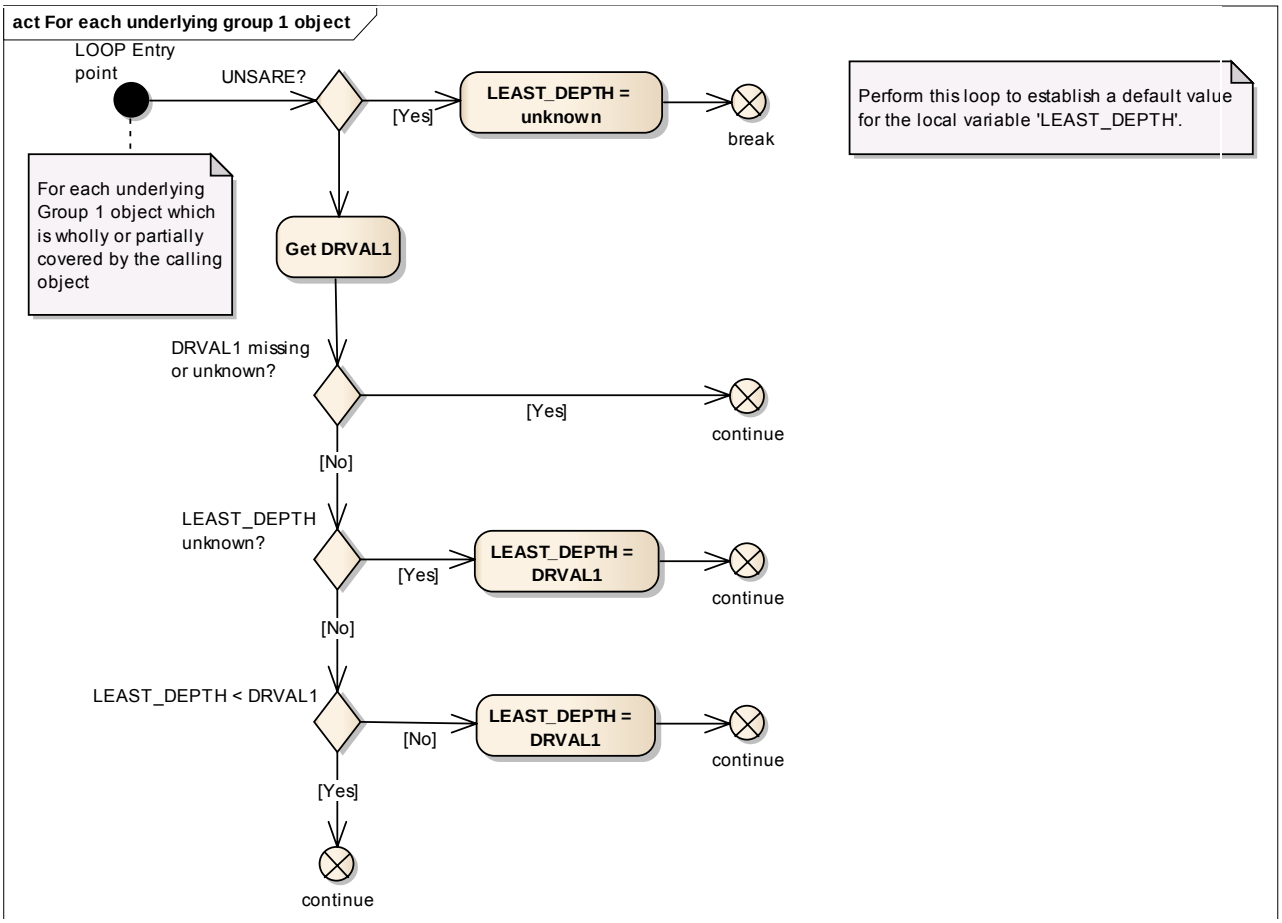
Figure 5 DEPVAL02 sub-procedure



Get the Calling Object	Get the object which is calling this procedure.
Set Local Variables to Unknown	Set the local variable 'LEAST_DEPTH' to unknown. Set the local variable 'SEABED_DEPTH' to unknown.
The loop for each underlying group 1	For each underlying group 1 object which is wholly or partially covered by the calling object, perform this loop to establish a default value for the local variable 'LEAST_DEPTH', see diagram below. See *Figure 8 Loop for each underlying group 1 object*
LEAST_DEPTH?	Does the local variable 'LEAST_DEPTH" have a value?
return	If 'NO', return to the calling procedure with the value of the Local variables 'LEAST_DEPTH'= 'unknown' and 'SEABED_DEPTH'

WATLEV=3 and (EXPSOU=1 or EXPSOU=3)?	Is the attribute value for 'WATLEV' equal to 3 (underwater) and is the attribute value for 'EXPSOU' equal to '1' (within the range of depth of the surrounding depth area) or '3' (deeper than the range of depth of the surrounding depth area)?
SEABED_DEPTH = LEAST_DEPTH	Set 'SEABED_DEPTH'='LEAST_DEPTH'
SEABED_DEPTH = LEAST_DEPTH; LEAST_DEPTH = unknown	Set 'SEABED_DEPTH'='LEAST_DEPTH' Set the local variable 'LEAST_DEPTH' to unknown.
return	Return to the calling procedure with the value of the Local variables 'LEAST_DEPTH' and 'SEABED_DEPTH'

Figure 6 Loop for each underlying group 1 object


act For each underlying group 1 object
LOOP Entry point
UNSARE?
[Yes]
LEAST_DEPTH = unknown
break
Perform this loop to establish a default value for the local variable 'LEAST_DEPTH'.
For each underlying Group 1 object which is wholly or partially covered by the calling object
Get DRVAL1
DRVAL1 missing or unknown?
[Yes]
continue
[No]
LEAST_DEPTH unknown?
[Yes]
LEAST_DEPTH = DRVAL1
continue
[No]
LEAST_DEPTH < DRVAL1
[No]
LEAST_DEPTH = DRVAL1
continue
[Yes]
continue

~~12.2.6~~

UNSARE?	Is the underlying group 1 object of the class 'UNSARE' (unsurveyed area)?
LEAST_DEPTH = unknown	Set the local variable 'LEAST_DEPTH' to unknown.
break	Exit loop.
Get DRVAL1	Get the value of the attribute 'DRVAL1' of the underlying object?
DRVAL1 missing or unknown?	Is the value of the attribute 'DRVAL1' missing or unknown?
LEAST_DEPTH unknown?	Is the value of the local variable 'LEAST_DEPTH' equal to unknown?
LEAST_DEPTH = DRVAL1	Set the value of the local variable 'LEAST_DEPTH' equal to 'DRVAL1'
LEAST_DEPTH < DRVAL1?	Is the value of the local variable 'LEAST_DEPTH' less than the value of 'DRVAL1'?
LEAST_DEPTH = DRVAL1	Set the value of the local variable 'LEAST_DEPTH' equal to 'DRVAL1'.
continue	go to the next found Group 1 object.

13.2.6 Conditional Symbology Procedure LEGLIN03

Applies to: Mariners' Navigational Object Class "Leg" (leglin)

Spatial Object(s): Line

Attribute(s) used: "selection" (select) ; "planned speed" (plnspd)

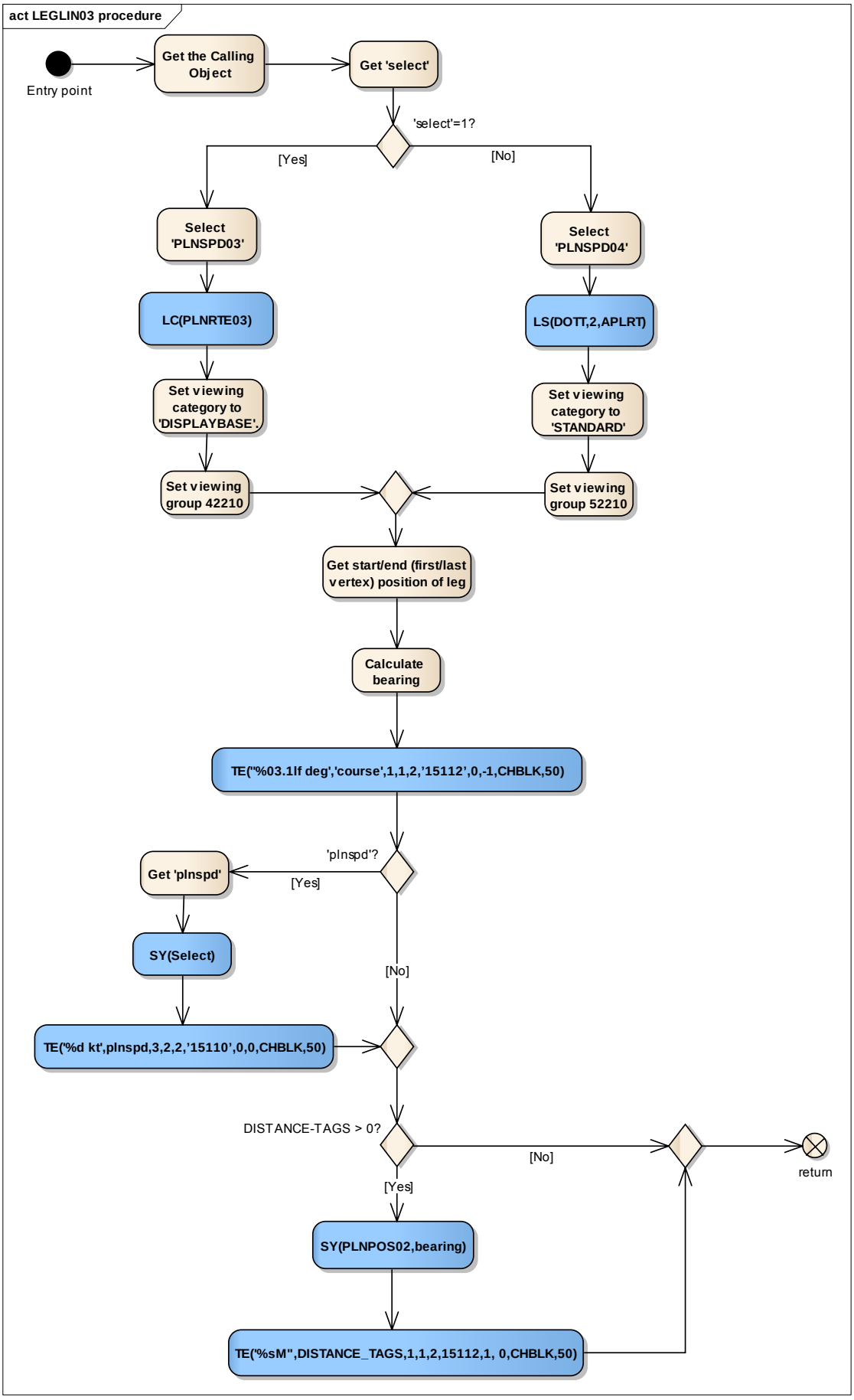
Parameter(s): Object to be symbolized from SENC ; DISTANCE_TAGS value selected by the mariner

Defaults: Display Priority given by look-up table;
OVERRADAR priority given by look-up table;
Display Category given by look-up table;
Viewing Group given by look-up table;

Remarks: The course of a leg is given by its start and end point. Therefore this conditional symbology procedure calculates the course and shows it alongside the leg. It also places the "distance to run" labels and cares for the different presentation of planned & alternate legs.

Note ~~that a~~: A double orange circle symbol SY(WAYPNT11) is provided in the Presentation Library to distinguish the next waypoint from other ~~wayoints~~waypoints. This is illustrated in the ECDIS Chart 1. Should the manufacturer wish to provide the use of this symbol, he should introduce his own software to select the next waypoint and to change the symbol from the single circle "other waypoint" symbol SY(WAYPNT01) to the double circle "next waypoint" symbol SY(WAYPNT11).

Figure 7 LEGLIN03 procedure


act LEGLIN03 procedure
Entry point
Get the Calling Object
Get 'select'
'select'=1?
[Yes]
[No]
Select 'PLNSPD03'
LC(PLNRTE03)
Set viewing category to 'DISPLAYBASE'.
Set viewing group 42210
Select 'PLNSPD04'
LS(DOTT,2,APLRT)
Set viewing category to 'STANDARD'
Set viewing group 52210
Get start/end (first/last vertex) position of leg
Calculate bearing
TE("%03.1lf deg','course',1,1,2,'15112',0,-1,CHBLK,50)
'plnspd'?
[Yes]
Get 'plnspd'
SY(Select)
[No]
TE('%d kt',plnspd,3,2,2,'15110',0,0,CHBLK,50)
DISTANCE-TAGS > 0?
[No]
return
[Yes]
SY(PLNPOS02,bearing)
TE('%sM",DISTANCE_TAGS,1,1,2,15112,1, 0,CHBLK,50)

Get the Calling Object	Get the object which is calling this procedure.	
Get 'select'	Get the value of the object's attribute 'select' (selection).	
'select'=1?	Does the value of the attribute 'select' equal 1 (planned)? (IMO PS 10.4.3 / 10.5.10).	
Select 'PLNSPD03'	Select symbol name 'PLNSPD03'	
LC(PLNRTE03)	Symbolize the line object with a pattern line 'PLNRTE03'.	
Set viewing category to 'DISPLAYBASE'.	**Display Group**	Displaybase
Set viewing group 42210	**Viewing Group**	42210
Select 'PLNSPD04'	Select symbol name 'PLNSPD04'	
LS(DOTT,2,APLRT)	Symbolize the line object with a dot line with 2 units wide, colour 'APLRT'.	
Set viewing category to 'STANDARD'	**Display Group**	STANDARD
Set viewing group 52210	**Viewing Group**	52210
Get start/end (first/last vertex) position of leg		
Calculate bearing	Calculate bearing from start position to end position. Direction of leg equals 'course' to make good.	
TE("%03.1lf deg','course',1,1,2, '15112',0,-1,CHBLK,50)	Draw course to make good as text padded with zeros, with suffix "deg", alongside leg; Font is Sans-Serif, non-italic, body-size 12, left and bottom justified, use colour 'CHBLK'.	
'plnspd'?	Is attribute 'plnspd' (planned speed) given?	
Get 'plnspd'	Get the value of the object's attribute 'plnspd' (planned speed)	
SY(Select)	Draw symbol selected above close to leg.	
TE('%d kt',plnspd,3,2,2,'15110',0, 0, CHBLK,50)	Draw the value of 'plnspd' with suffix "kt" at symbol's position, font is Sans-Serif, body size 10, horizontally and vertically centered, non-italic, use colour 'CHBLK'.	
DISTANCE-TAGS > 0?	Is the value of the 'DISTANCE-TAGS' selected by the mariner greater than zero?	
SY(PLNPOS02,bearing)	Draw symbol 'PLNPOS02' (planned position) with rotation equaled direction of leg. Place symbol at locations on the leg that are spaced according to the value of 'DISTANCE-TAGS' in nautical miles selected by the mariner.	
TE('%sM",DISTANCE_TAGS,1,1,2,15112,1, 0,CHBLK,50)	Draw text with the value of 'DISTANCE-TAGS' in nautical miles selected by the mariner. Place value of distance to run with suffix "M" as text close to the location of the symbol; Font is Sans-Serif, non-italic, body size 12, bottom and left justified, use colour 'CHBLK'.	
return	Symbolization is finished	

~~12.2.7~~13.2.7 Conditional Symbology Procedure ~~'~~LIGHTS05~~'~~

Light flares, light sectors & light coverage (S-57)

Applies to: S-57 Object Class "light" (LIGHTS)

Spatial Object(s): Point

Spatial Relation(s) ~~used~~**:** Point objects at identical location

Attribute(s) used: "colour" (COLOUR) ; "category of light" (CATLIT) ; "sector 1" (SECTR1) ; "sector 2" (SECTR2) ; «orientation» (ORIENT)
"visibility of light" (LITVIS) ; "value of nominal range" (VALNMR)

Parameter(s): Object to be symbolized from SENC

User parameters: Show full length leg lines.

Defaults: Display Priority given by look-up table;
OVERRADAR priority given by look-up table;
Display Category given by look-up table;
Viewing Group given by look-up table

Remarks: A light is one of the most complex S-57 objects. ~~Its presentation~~Presentation depends on whether it is a light on a floating or fixed platform, ~~its~~ range, ~~it's~~ colour ~~and so on~~etc. This conditional symbology procedure derives the correct presentation from these parameters and also generates an area that shows the coverage of the light.

Notes on light sectors:

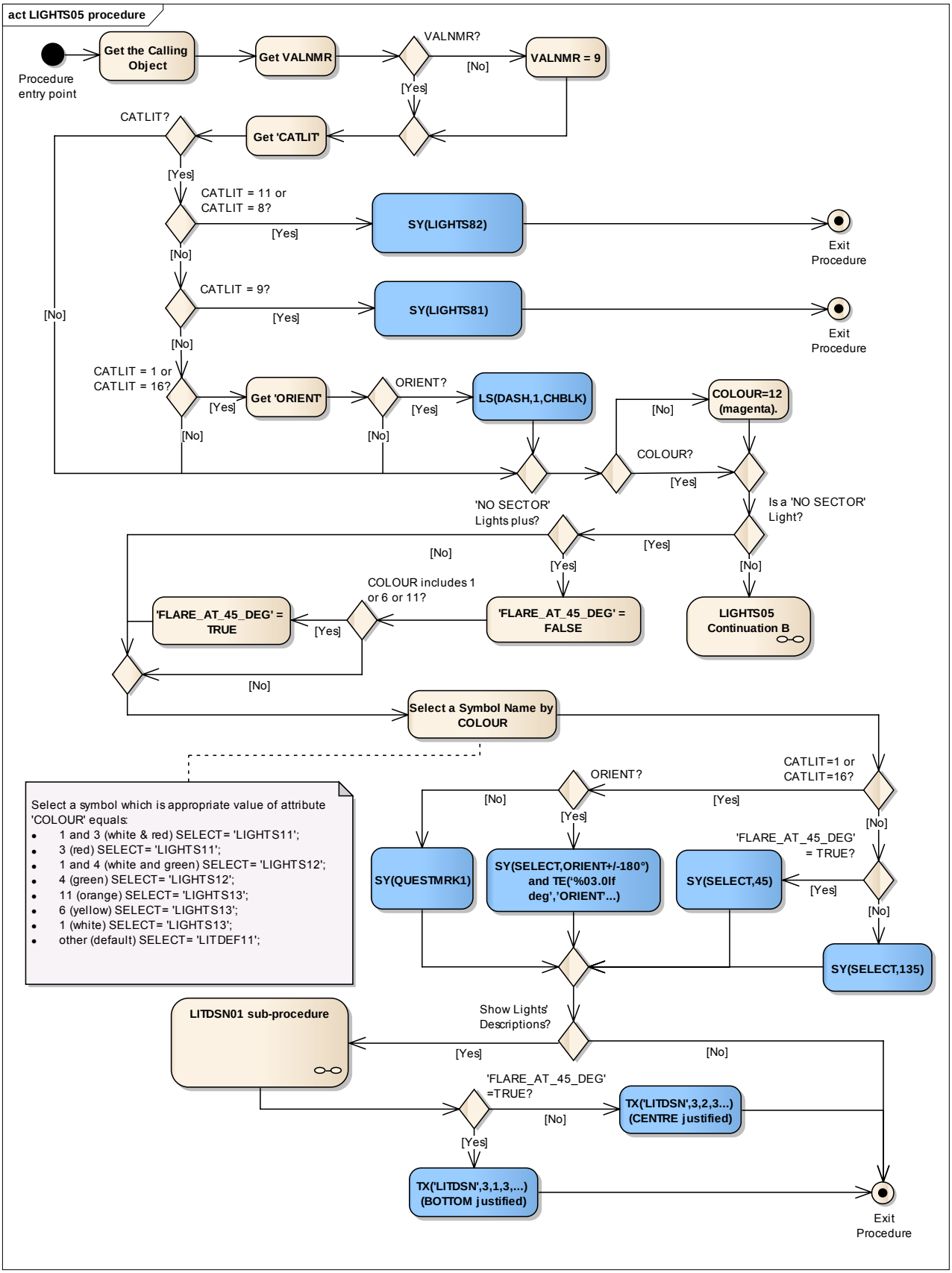
~~1.)~~ The radial leg-lines defining the light sectors are normally drawn to only 25mm from the light to avoid clutter (see continuation B). However, the mariner should be able to select «full light-sector lines» and have the leg-lines extended to the nominal range of the light (VALMAR).

~~2.)~~ Continuation B of this procedure symbolizes the sectors at the light itself. In addition, it should be possible, upon request, for the mariner to be capable of identifying the colour and sector limit lines of the sectors affecting the ship even if the light itself is off the display.

Further note:

The sub-procedure LITDSN, which generates the light description text-string, is provided ~~on the Presentation Library CD as an independent 'C' function. Note that LITDSN does not use the default value for attribute VALNMR generated by CSP LIGHTS.~~as a descriptive narrative in 10.6.3.

Figure 8 LIGHTS05 procedure

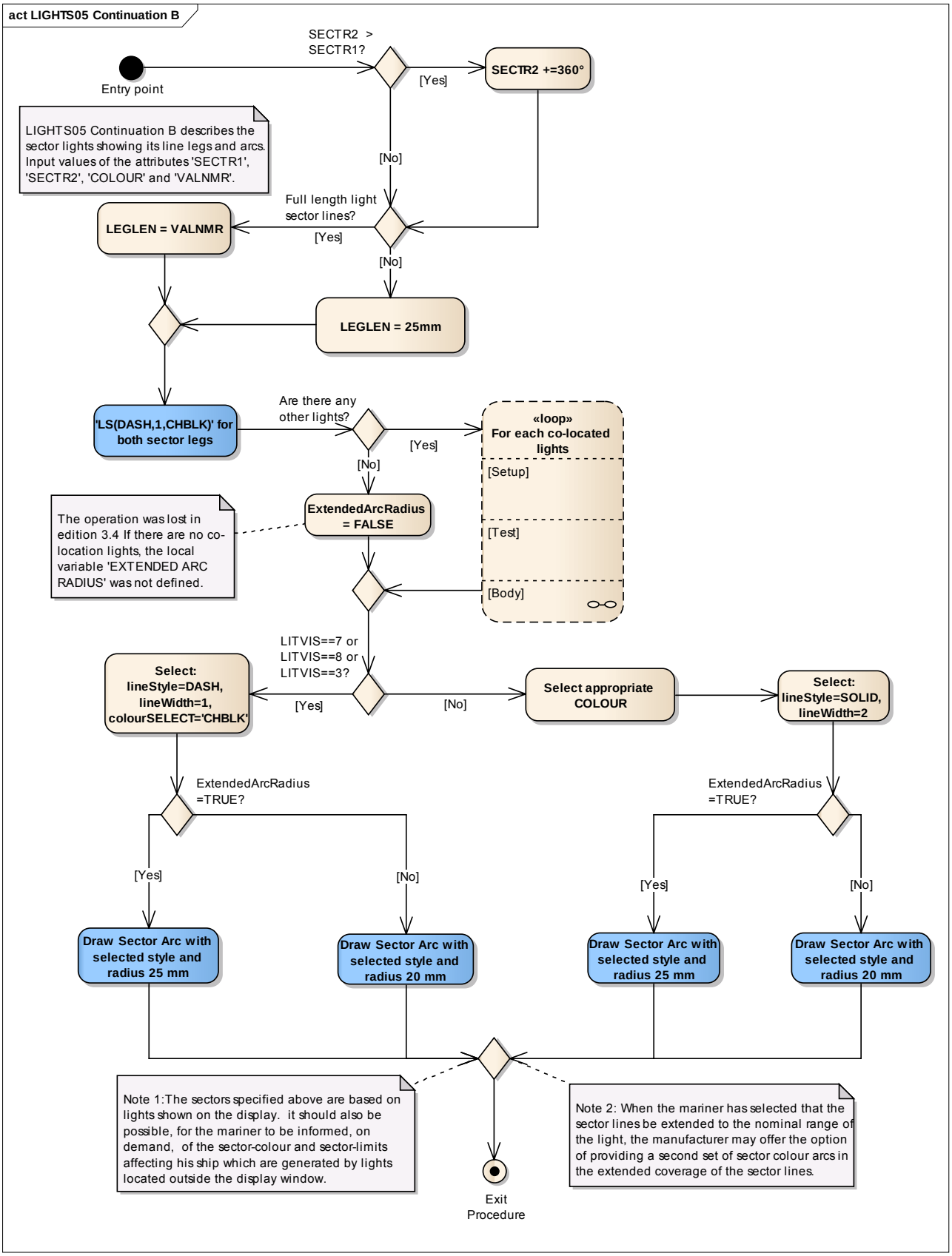

act LIGHTS05 procedure
Procedure entry point
Get the Calling Object
Get VALNMR
VALNMR?
[No]
VALNMR = 9
[Yes]
CATLIT?
Get 'CATLIT'
[Yes]
CATLIT = 11 or CATLIT = 8?
[Yes]
SY(LIGHTS82)
Exit Procedure
[No]
CATLIT = 9?
[Yes]
SY(LIGHTS81)
Exit Procedure
[No]
[No]
CATLIT = 1 or CATLIT = 16?
[Yes]
Get 'ORIENT'
ORIENT?
[Yes]
LS(DASH,1,CHBLK)
[No]
[No]
[No]
COLOUR=12 (magenta).
COLOUR?
[Yes]
'NO SECTOR' Lights plus?
[No]
[Yes]
Is a 'NO SECTOR' Light?
[Yes]
[No]
COLOUR includes 1 or 6 or 11?
'FLARE_AT_45_DEG' = TRUE
[Yes]
'FLARE_AT_45_DEG' = FALSE
LIGHTS05 Continuation B
[No]
Select a Symbol Name by COLOUR
Select a symbol which is appropriate value of attribute 'COLOUR' equals:
1 and 3 (white & red) SELECT= 'LIGHTS11';
3 (red) SELECT= 'LIGHTS11';
1 and 4 (white and green) SELECT= 'LIGHTS12';
4 (green) SELECT= 'LIGHTS12';
11 (orange) SELECT= 'LIGHTS13';
6 (yellow) SELECT= 'LIGHTS13';
1 (white) SELECT= 'LIGHTS13';
other (default) SELECT= 'LITDEF11';
ORIENT?
[No]
[Yes]
CATLIT=1 or CATLIT=16?
[Yes]
[No]
SY(QUESTMRK1)
SY(SELECT,ORIENT+/-180°) and TE('%03.0lf deg','ORIENT'...)
'FLARE_AT_45_DEG' = TRUE?
SY(SELECT,45)
[Yes]
[No]
SY(SELECT,135)
LITDSN01 sub-procedure
Show Lights' Descriptions?
[Yes]
[No]
'FLARE_AT_45_DEG' =TRUE?
[No]
TX('LITDSN',3,2,3...) (CENTRE justified)
[Yes]
TX('LITDSN',3,1,3,...) (BOTTOM justified)
Exit Procedure

Get the Calling Object	Get the object which is calling this procedure.
Get VALNMR	Get the value of the attribute 'VALNMR'.
VALNMR?	Is the attribute 'VALNMR' given?
VALNMR = 9	Set 'VALNMR' equal to '9'
Get 'CATLIT'	Get the value of the attribute 'CATLIT'
CATLIT?	Is the value of the attribute 'CATLIT' (category of light) given?
CATLIT = 11 or CATLIT = 8?	Does the value of the attribute 'CATLIT' equal to 8 (floodlight) or 11 (spotlight)?
SY(LIGHTS82)	Draw symbol 'LIGHTS82' at the calling object's location.
Exit procedure	Finish symbology
CATLIT = 9?	Does the value of the attribute 'CATLIT' equal 9 (strip light)?
SY(LIGHTS81)	Draw symbol 'LIGHTS81' at the calling object's location.
Exit procedure	Finish symbology
CATLIT = 1 or CATLIT = 16?	Does the value of the attribute 'CATLIT' equal 1 (directional) or 16 (moire effect)?
Get 'ORIENT'	Get the value of the attribute 'ORIENT'
ORIENT?	Is the value of the attribute ORIENT' given?
LS(DASH,1,CHBLK)	Draw the direction marked by the light as defined by the attribute 'ORIENT'. Remember that this is the bearing from seaward. It means the start point is at sea and the end point is at the calling object's location. Draw a dashed line equal in length to the value of attribute 'VALNMR' with 1 unit wide and colour ‘CHBLK'.
COLOUR?	Is the attribute 'COLOUR' defined?
COLOUR=12 (magenta).	If ’NO’, assume the value of the colour is '12' (magenta)
Is a 'NO SECTOR' Light?	Are the attributes 'SECTR1' (sector limit one) or 'SECTR2' (sector limit two) values absent or they equal to 0.00 and 360.00 correspondingly in the object which is calling this procedure?
LIGHTS05 Continuation B	If ‘NO’, LIGHTS05 Continuation B describes the sector lights showing its line legs and arcs. Input values of the attributes 'SECTR1', 'SECTR2', 'COLOUR' and 'VALNMR', see *Figure 11*.
'NO SECTOR' Lights plus?	Is there any 'No Sector' lights located at the same point as the calling object?
'FLARE_AT_45_DEG' = FALSE	Set the local variable 'FLARE AT 45 DEGREES' to 'FALSE'
COLOUR includes 1 or 6 or 11?	Does the calling object COLOUR include 1 (white) or 6 (yellow) or 11 (orange)?
'FLARE_AT_45_DEG' = TRUE	Set local variable 'FLARE AT 45 DEGREES' to 'TRUE'
Select a Symbol Name by	Select a symbol name which is appropriate value of attribute

COLOUR	'COLOUR' equals:	
	1 and 3 (white & red)	SELECT= 'LIGHTS11';
	3 (red)	SELECT= 'LIGHTS11';
	1 and 4 (white and green)	SELECT= 'LIGHTS12';
	4 (green)	SELECT= 'LIGHTS12';
	11 (orange)	SELECT= 'LIGHTS13';
	6 (yellow)	SELECT= 'LIGHTS13';
	1 (white)	SELECT= 'LIGHTS13';
	other (default)	SELECT= 'LITDEF11';
CATLIT=1 or CATLIT=16?	Does the value of the attribute 'CATLIT' equal to '1' (directional) or '16' (moire)?	
ORIENT?	Is the value of the attribute ORIENT' given?	
SY(SELECT,ORIENT+/-180°) and TE('%03.0lf deg','ORIENT'...)	Draw the selected symbol at the calling object's location rotated in the direction as defined by the attribute 'ORIENT' +/-180° (ORIENT is direction from seaward), and write the direction from seaward at the light as follows: "TE('%03.0lf deg','ORIENT', 3,3,3, '15110', 3,1, CHELK, 23)"	
SY(QUESTMRK1)	Draw the symbol 'QUESTMRK1' at the calling object's location	
'FLARE_AT_45_DEG' = TRUE?	Is 'FLARE AT 45 DEGREES' set to TRUE?	
SY(SELECT,45)	Draw the selected symbol with a rotation of 45 degrees from upright at the position where the object which was calling the procedure is located.	
SY(SELECT,135)	Draw the selected symbol with a rotation of 135 degrees from upright at the position where the object which was calling the procedure is located.	
Show Lights' Descriptions?	Have the mariner selected viewing of light descriptions? (text group 23).	
LITDSN01 sub-procedure	Pass on to this procedure the attributes: 'CATLIT', 'LITCHR', 'SIGGRP', 'COLOUR', 'SIGPER', 'HEIGHT', 'VALNMR', 'STATUS'. This procedure constructs a text string for the light description. This string is returned as the argument 'LITDSN'. Note: previous version of the presentation library provided c-code that enabled the building of light description text strings for presentation on the ECDIS chart display. Version 4 of the presentation library has now removed the c-code and textual description of how light description should be constructed is provided (See Section 10.6.3) **signalGroup** - **lightCharacteristic** - **lightCategory** - **colour** - **signalPeriod** - **height** - **valueNominalRange** - **status** - **lightDescription** -	

'FLARE_AT_45_DEG' =TRUE?	Is 'FLARE AT 45 DEGREES' set to TRUE?
TX('LITDSN',3,1,3,...) (BOTTOM justified)	Write the returned text string 'LITDSN" as follows: TX('LITDSN', 3,1,3, '15110', 2,-1, CHBLK, 23)
TX('LITDSN',3,2,3...) (CENTRE justified)	Write the returned text string 'LITDSN" as follows: TX('LITDSN', 3,2,3, '15110', 2,0, CHBLK, 23)
Exit procedure	Symbolization is finished

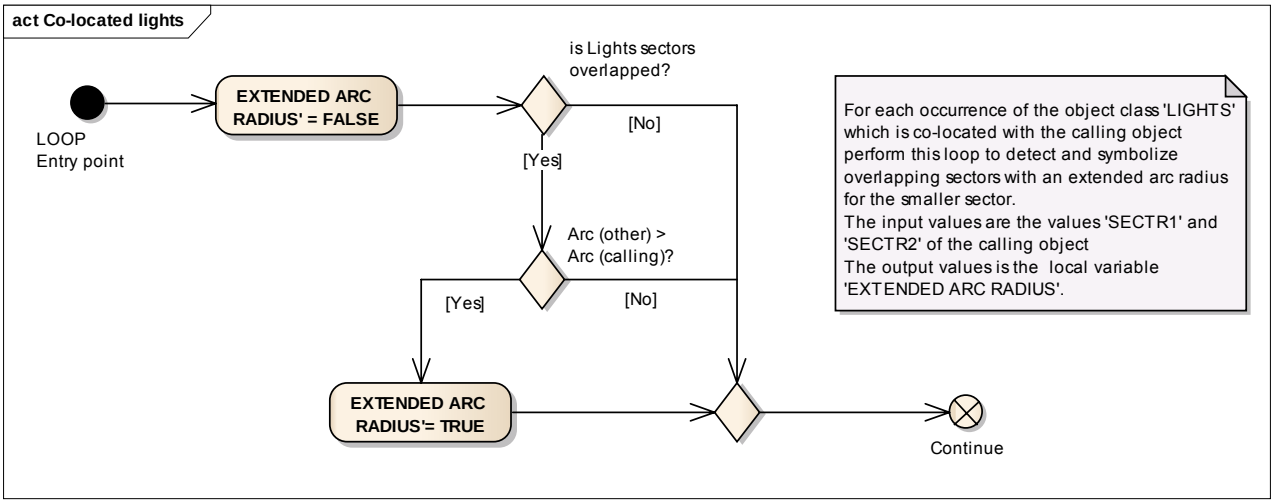
Figure 9 LIGHTS05 Continuation B describes the sector lights showing its line legs and arcs.


act LIGHTS05 Continuation B
Entry point
SECTR2 > SECTR1?
[Yes]
SECTR2 +=360°
[No]
LIGHTS05 Continuation B describes the sector lights showing its line legs and arcs. Input values of the attributes 'SECTR1', 'SECTR2', 'COLOUR' and 'VALNMR'.
Full length light sector lines?
[Yes]
LEGLEN = VALNMR
[No]
LEGLEN = 25mm
'LS(DASH,1,CHBLK)' for both sector legs
Are there any other lights?
[Yes]
«loop» For each co-located lights
[Setup]
[Test]
[Body]
[No]
ExtendedArcRadius = FALSE
The operation was lost in edition 3.4 If there are no co-location lights, the local variable 'EXTENDED ARC RADIUS' was not defined.
LITVIS==7 or LITVIS==8 or LITVIS==3?
[Yes]
Select: lineStyle=DASH, lineWidth=1, colourSELECT='CHBLK'
[No]
Select appropriate COLOUR
Select: lineStyle=SOLID, lineWidth=2
ExtendedArcRadius =TRUE?
[Yes]
[No]
Draw Sector Arc with selected style and radius 25 mm
Draw Sector Arc with selected style and radius 20 mm
ExtendedArcRadius =TRUE?
[Yes]
[No]
Draw Sector Arc with selected style and radius 25 mm
Draw Sector Arc with selected style and radius 20 mm
Note 1:The sectors specified above are based on lights shown on the display. it should also be possible, for the mariner to be informed, on demand, of the sector-colour and sector-limits affecting his ship which are generated by lights located outside the display window.
Note 2: When the mariner has selected that the sector lines be extended to the nominal range of the light, the manufacturer may offer the option of providing a second set of sector colour arcs in the extended coverage of the sector lines.
Exit Procedure

SECTR2 > SECTR1?	The value 'SECTR2' greater than the value of 'SECTR1'?
SECTR2 +=360°	Add 360 degrees to the value of 'SECTR2'.
Full length light sector lines?	Has the mariner selected full length light sector lines?
LEGLEN = VALNMR	Set local variable 'LEGLEN' equal to length (in mm) of VALNMR value in the scale of ECDIS display.
LEGLEN = 25mm	Set the local variable 'LEGLEN' equal to 25mm in the scale of the ECDIS display.
'LS(DASH,1,CHBLK)' for both sector legs	Draw both sector legs by symbology instruction 'LS(DASH, 1, CHBLK)'. Start the legs the position where the light object which was calling the procedure is located. Show the sector legs in the directions which are defined by 'SECTR1' and 'SECTR2'. Do not forget to reverse the sector values (+/- 180 degrees) since the values are given from seaward; Use LEGLEN from the step above. (The LITDSN text string is not used for sector lights because it would cause clatter).
Are there any other lights?	Is there any other 'LIGHTS' object located at the same point as the calling objects?
Loop for each co-located lights	For each occurrence of the object class 'LIGHTS' which is co-located with the calling object perform this loop to detect and symbolize overlapping sectors with an extended arc radius for the smaller sector, see *Figure 12*
ExtendedArcRadius = FALSE	Set the value of local variable 'EXTENDED ARC RADIUS' to 'FALSE' The input values are the values 'SECTR1' and 'SECTR2' of the calling object The output values is the local variable 'EXTENDED ARC RADIUS'.
LITVIS==7 or LITVIS==8 or LITVIS==3?	Does the value of the attribute 'LITVIS' (visibility of light) equal '7' (obscured) or '8' (partially obscured) or '3' (faint)?
Select: lineStyle=DASH, lineWidth=1, colourSELECT='CHBLK'	Select the simple dashed linestyle, 1 units wide, colour 'CHBLK'
ExtendedArcRadius =TRUE?	Is the local variable 'EXTENDED ARC RADIUS' equal to 'TRUE'
Draw Sector Arc with selected style and radius 25 mm	Draw the sector arc: colour, linestyle, line width as selected above. Radius on the display is 25mm.
Draw Sector Arc with selected style and radius 20 mm	Draw the sector arc: colour, linestyle, line width as selected above. Radius on the display is 20 mm.
Select appropriate COLOUR	Select a colour name which is appropriate value of attribute 'COLOUR' equals:

	1 and 3 (white & red)	SELECT= 'LITRD';
	3 (red)	SELECT ='LITRD';
	1 and 4 (white and green)	SELECT ='LITGN';
	4 (green)	SELECT ='LITGN';
	11 (orange)	SELECT ='LITYW';
	6 (yellow)	SELECT ='LITYW';
	1 (white)	SELECT ='LITYW';
	other (default)	SELECT ='CHMGD';
Select: lineStyle=SOLID, lineWidth=2	Select the simple solid linestyle, 2 units wide.	
ExtendedArcRadius =TRUE?	Is the local variable 'EXTENDED ARC RADIUS' equal to 'TRUE'	
Draw Sector Arc with selected style and radius 25 mm	First symbolize the Arc with a solid line, 4 units wide, COLOUR OUTLW; Then symbolize the Arc with the COLOUR, linestyle and linewidth selected above. Radius on the display is 25mm.	
Draw Sector Arc with selected style and radius 20 mm	First symbolize the Arc with a solid line, 4 units wide, COLOUR OUTLW; then symbolize the Arc with the COLOUR, linestyle and linewidth selected above. Radius on the display is 20mm.	
Exit procedure	Symbolization is finished	

Figure 10 Loop for co-located lights objects



LOOP Entry point	
EXTENDED ARC RADIUS' = FALSE	Set local variable 'EXTENDED ARC RADIUS' to FALSE.
is Lights sectors overlapped?	Does the other 'LIGHTS' object overlap the sector of the calling object? ('SECTR1' and/or 'SECTR2' of the other 'LIGHTS' falls between 'SECTR1' and 'SECTR2' of the calling object) or

	('SECTR1' and/or 'SECTR2' of the calling object falls between 'SECTR1' and 'SECTR2' of the other 'LIGHTS' object).
Arc (other) > Arc (calling)?	Is the ARC ('SECTR2' - 'SECTR1') of the other object larger that the sector ARC of the calling object?
EXTENDED ARC RADIUS'= TRUE	Set local variable 'EXTENDED ARC RADIUS' to TRUE.
Continue	Go to next co-located light object.

13.2.08 Conditional Symbology Procedure LITDSN01

Previous versions of the presentation library provided c-code that enabled the building of light description text strings for presentation on the ECDIS chart display. Version 4 of the presentation library has now removed the c-code and a textual description of how light description should be constructed is provided (See Section 10.6.3).

13.2.9 Conditional Symbology Procedure OBSTRN06

12.2.8 Conditional Symbology Procedure 'LITDSN01'

(Note that this is a sub-procedure called by LIGHTS05)

Applies to: S-57 Object Class «lights» (LIGHTS)

Spatial Object(s): Point

Attributes used: CATLIT, COLOUR, HEIGHT, LITCHR, SIGGRP, SIGPER, STATUS, VALNMR

Parameters: Object to be symbolized from SENC

Defaults:

Remarks: In S-57 the light characteristics are held as a series of attributes values. The mariner may wish to see a light description text string displayed on the screen similar to the string commonly found on a paper chart. This conditional procedure, reads the attribute values from the above list of attributes and composes a light description string which can be displayed.

This procedure is provided as a C function which has, as input, the above listed attribute values and as output, the light description.

Note that the procedure does not use the default value for attribute VALNMR generated by CSP LIGHTS. The procedure is included in the digital files of the Presentation Library CD.

A program LITTST, intended for testing LITDSN, is also included.

~~12.2.9 Conditional Symbology Procedure 'OBSTRN06'~~

Applies to: S-57 Object Class "obstruction" (OBSTRN);
S-57 Object Class "under water rock" (UWTROC)

Spatial Object(s): Point, Line, Area.

Attribute(s) used: "value of sounding" (VALSOU);
"water level" (WATLEV);
"exposure of sounding" (EXPSOU);

Parameter(s): Object to be symbolized from SENC

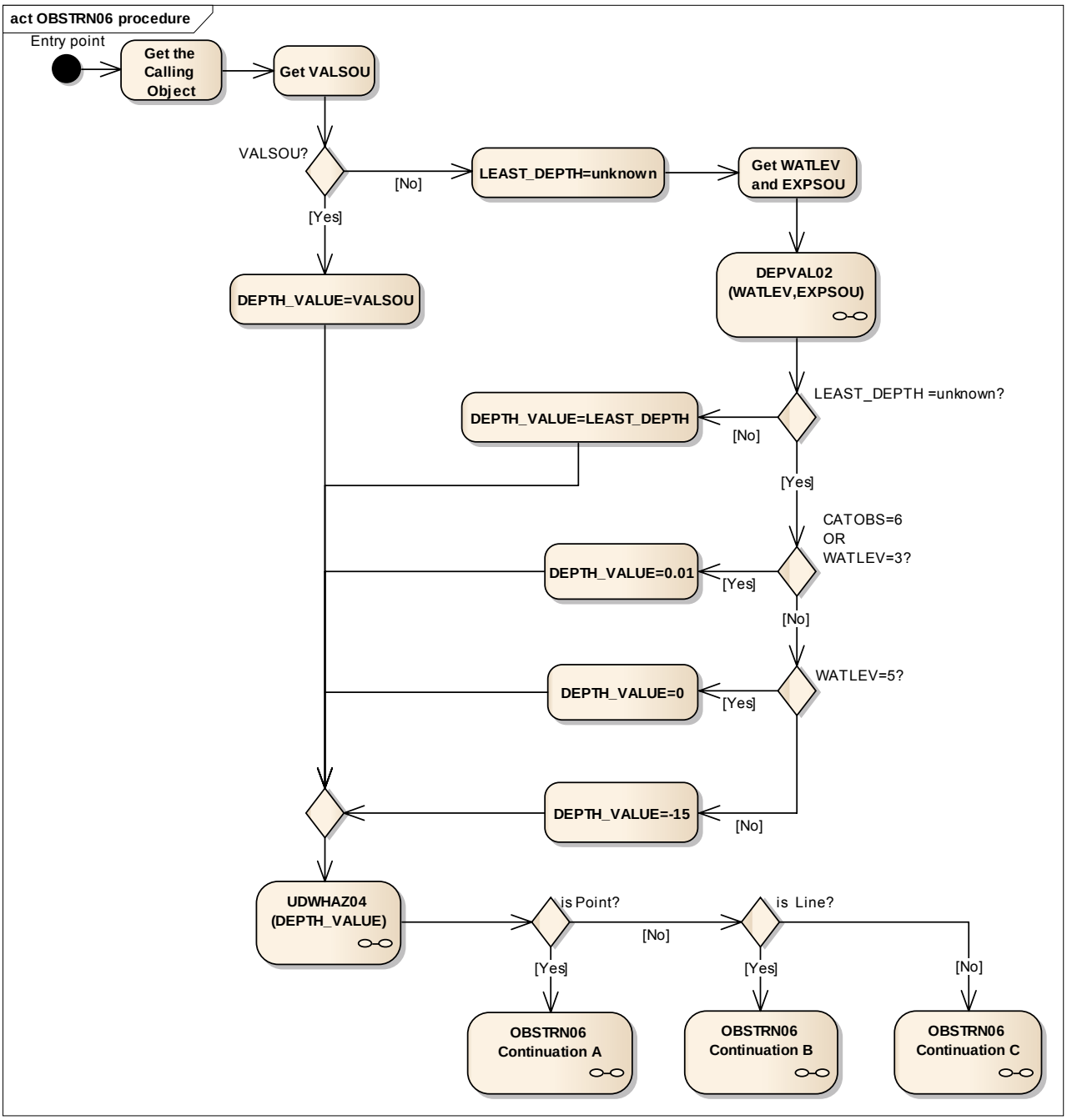
Defaults: Display Priority given by look-up table ; OVERRADAR priority ~~given~~ by look-up table ; Display Category given by look-up table ; Viewing Group given by look-up table ; Area Color fill from underlying 'DEPARE' or 'UNSARE';

Remarks: Obstructions or isolated underwater dangers of depths less than ~~the~~he safety contour which lie within the safe waters defined by the safety contour are to be presented by a specific isolated danger symbol and put in IMO category "DISPLAY BASE" (see IMO Performance Standard for ECDIS [~~3~~2]). This task is performed by the most recent edition of sub-procedure UDWHAZnn which is called by this symbology procedure. Objects of the class "under water rock" are handled by this routine as well to ensure a consistent symbolization of isolated dangers on the seabed.

The current UDWHAZnn also allows the mariner the option of displaying isolated dangers in the waters between the safety contour and the zero metre line.

In the case that the value of attribute VALSOU for this object is unknown, the most recent edition of sub-procedure DEPVALnn is called. This will provide a default 'least_depth' from the DRVAL1 of the underlying depth area on condition that the value of attribute EXPSOU is not 2 (shoaler than the depth area), and the value of attribute WATLEV is 3 (always underwater).

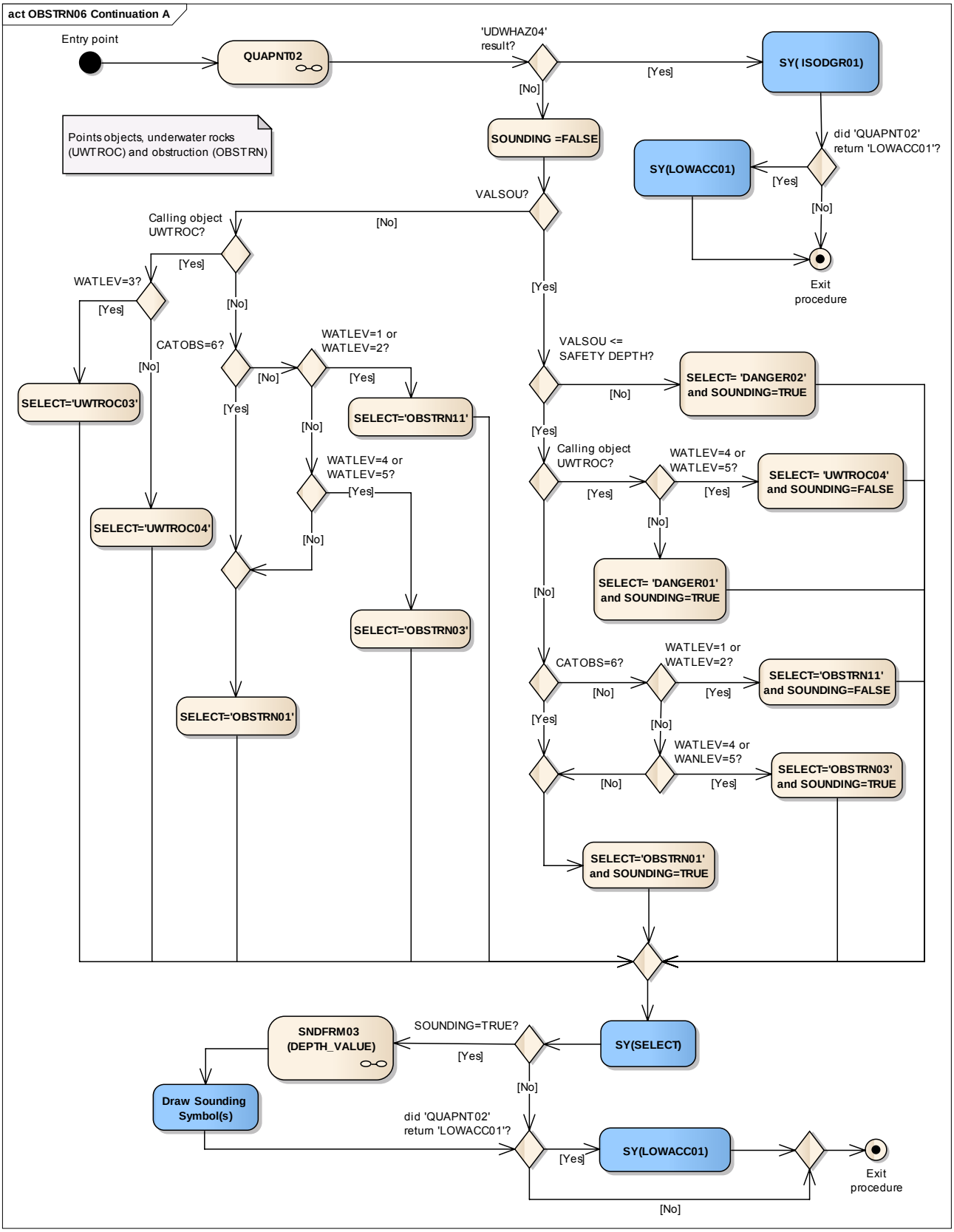
Figure 11 OBSTRN06 procedure



Entry point	
Get the Calling Object	Get the object which is calling this procedure.
Get VALSOU	Get the value of the attribute 'VALSOU' of the calling object
VALSOU?	Is the value of the attribute 'VALSOU' given?
DEPTH_VALUE=VALSOU	Set the local variable 'DEPTH_VALUE' equal to 'VALSOU'.

	Set the viewing group to 34051.
LEAST_DEPTH=unknown	Set the local variable 'LEAST_DEPTH' to <unknown>.
Get WATLEV and EXPSOU	Get the value of the attributes 'WATLEV' and 'EXPSOU' of the calling object.
DEPVAL02 (WATLEV,EXPSOU)	Performs the Symbology Procedure 'DEPVAL02' which returns a value for the local variables 'LEAST_DEPTH' and 'SEABED_DEPTH', see "*13.2.5 Conditional Symbology Procedure DEPVAL02*". Pass attributes 'WATLEV and EXPSOU' on to it. 'SEABED_DEPTH' is returned from "DEPVAL02' but is not used by this procedure.
WATLEV	The input parameter
EXPSOU	The input parameter
LEAST_DEPTH =unknown?	Is the value of the local variable 'LEAST_DEPTH' equal to <unknown>?
DEPTH_VALUE=LEAST_DEPTH	Set the local variable 'DEPTH_VALUE' equal to the local variable 'LEAST_DEPTH'.
CATOBS=6 OR WATLEV=3?	Is the value of 'CATOBS' equal to '6' OR 'WATLEV' equla to '3'?
DEPTH_VALUE=0.01	Set the local variable 'DEPTH_VALUE' = 0.01 to a fail-safe depth based on the value of the attribute 'CATOBS'=6:
WATLEV=5?	Is the value of 'WATLEV' equal to '5'?
DEPTH_VALUE=0	Set the local variable 'DEPTH_VALUE'=0 to a fail-safe depth based on the value of the attribute WATLEV'=5:
DEPTH_VALUE=-15	Set the local variable 'DEPTH_VALUE' to a fail-safe depth based on the value of the attribute WATLEV' or by default, i.e. if 'WATLEV'=4 (covers and uncovers) OR 'WATLEV'=1 OR 'WATLEV'= 2 (always dry) OR 'WATLEV'=' ' (unknown or missing) then 'DEPTH_VALUE'=-15.
UDWHAZ04 (DEPTH_VALUE)	Performs the Symbology Procedure 'UDWHAZ04' which returns a flag indicating whether or not to display the ISOLATED DANGER SYMBOL [IMO PS App.2 1.3] and the selected symbol, see "*13.2.24 Conditional Symbology Procedure UDWHAZ04*". Pass 'DEPTH_VALUE' on to it.
is Point?	Is the object of type point?
OBSTRN06 Continuation A	Point objects, underwater rocks (UWTROC) and obstructions (OBSTRN), see *Figure 14*.
is_Line?	Is the object of type line?
OBSTRN06 Continuation B	Geometry type is line, see *Figure 15*.
OBSTRN06 Continuation C	Geometry type is area, see *Figure 17*.

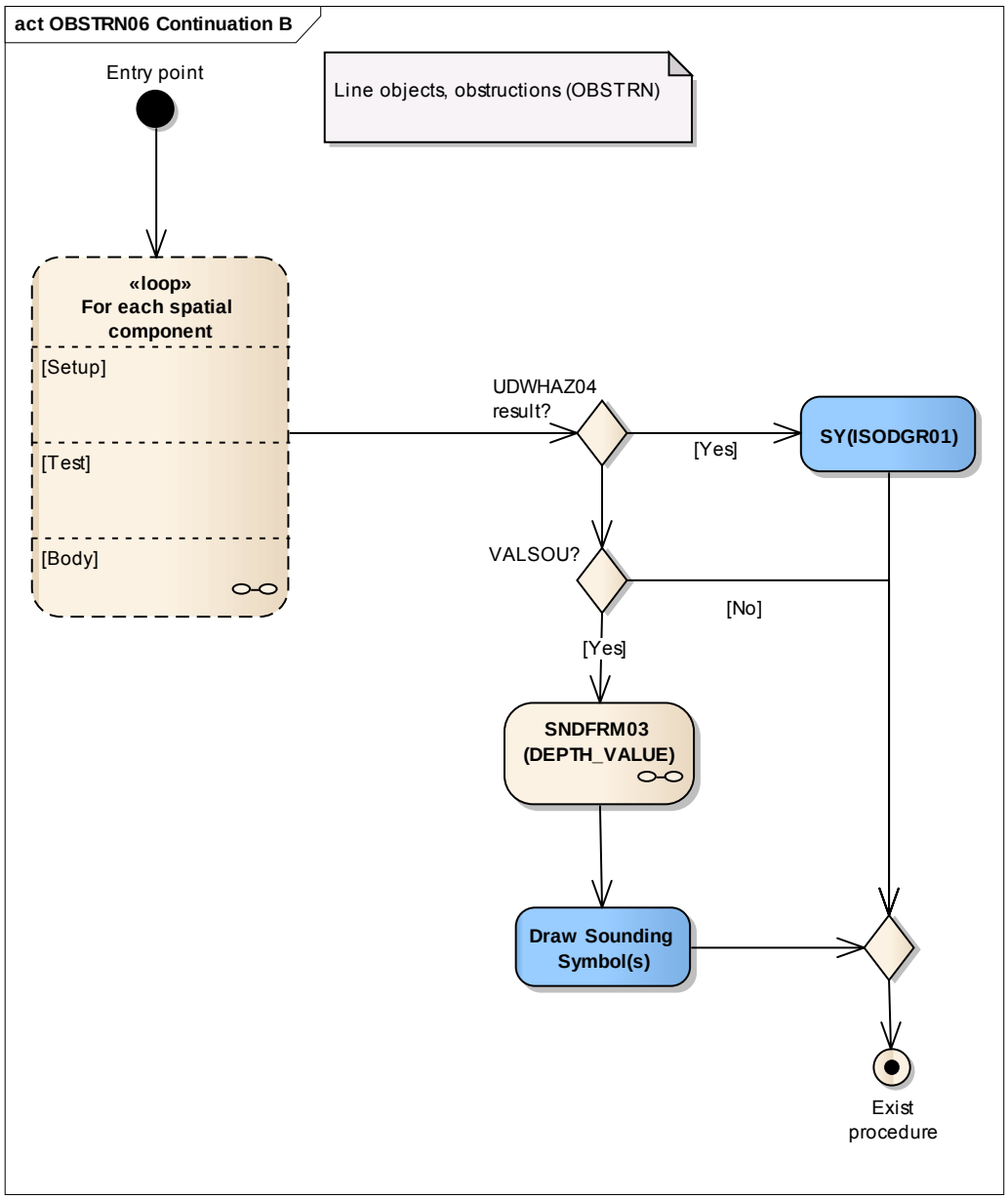
Figure 12 OBSTRN06 Continuation A Points objects, underwater rocks (UWTROC) and obstruction (OBSTRN)


act OBSTRN06 Continuation A
Entry point
QUAPNT02
'UDWHAZ04' result?
[Yes]
SY(ISODGR01)
[No]
SOUNDING =FALSE
Points objects, underwater rocks (UWTROC) and obstruction (OBSTRN)
did 'QUAPNT02' return 'LOWACC01'?
SY(LOWACC01)
[Yes]
[No]
Exit procedure
VALSOU?
[No]
[Yes]
Calling object UWTROC?
[Yes]
[No]
WATLEV=3?
[Yes]
[No]
CATOBS=6?
[No]
[Yes]
WATLEV=1 or WATLEV=2?
[No]
[Yes]
SELECT='UWTROC03'
SELECT='OBSTRN11'
WATLEV=4 or WATLEV=5?
[No]
[Yes]
SELECT='UWTROC04'
SELECT='OBSTRN03'
SELECT='OBSTRN01'
VALSOU <= SAFETY DEPTH?
[No]
[Yes]
SELECT= 'DANGER02' and SOUNDING=TRUE
Calling object UWTROC?
[Yes]
[No]
WATLEV=4 or WATLEV=5?
[Yes]
SELECT= 'UWTROC04' and SOUNDING=FALSE
SELECT= 'DANGER01' and SOUNDING=TRUE
[No]
CATOBS=6?
[No]
[Yes]
WATLEV=1 or WATLEV=2?
[No]
[Yes]
SELECT='OBSTRN11' and SOUNDING=FALSE
WATLEV=4 or WANLEV=5?
[No]
[Yes]
SELECT='OBSTRN03' and SOUNDING=TRUE
SELECT='OBSTRN01' and SOUNDING=TRUE
SY(SELECT)
SOUNDING=TRUE?
[Yes]
SNDFRM03 (DEPTH_VALUE)
Draw Sounding Symbol(s)
[No]
did 'QUAPNT02' return 'LOWACC01'?
[Yes]
SY(LOWACC01)
Exit procedure
[No]

Entry point	
QUAPNT02	Performs the Symbology Procedure 'QUAPNT02' which returns a flag indicating whether or not to display the LOW ACCURACY SYMBOL and returns the selected symbol name 'LOWACC01', see "*13.2.14 Conditional Symbology Procedure QUAPNT02*"
'UDWHAZ04' result?	Has the procedure 'UDWHAZ04' indicated the Isolated Danger Symbol should be shown?
SY(ISODGR01)	Draw the 'ISODGR01' symbol selected by 'UDWHAZ04' at the calling objects location
did 'QUAPNT02' return 'LOWACC01'?	Is the symbol 'LOWACC01' selected by the procedure 'QUAPNT02'?
SY(LOWACC01)	If so indicated by the procedure 'QUAPNT02', draw the returned low accuracy symbol 'LOWACC01' at the calling object's location.
Exit procedure	Symbolization is finished
SOUNDING =FALSE	Set local variable 'SOUNDING' equal to 'FALSE'.
VALSOU?	Is the value of the attribute 'VALSOU' given in the calling object?
VALSOU <= SAFETY DEPTH?	Is the value of the attribute 'VALSOU' less than or equal to SAFETY DEPTH?
SELECT= 'DANGER02' and SOUNDING=TRUE	If 'NO', select symbol name SELECT='DANGER02' and set the local variable 'SOUNDING' equal to TRUE
Calling object UWTROC?	Is the calling object of the class 'UWTROC'?
WATLEV=4 or WATLEV=5?	Is the value of the attribute 'WATLEV' equal to '4' or '5' given in the calling object?
SELECT= 'UWTROC04' and SOUNDING=FALSE	if 'WATLEV'=4 (covers and uncovers) OR 'WATLEV'=5 (awash)then select symbol name SELECT='UWTROC04' and set the local variable 'SOUNDING' equal to FALSE
SELECT= 'DANGER01' and SOUNDING=TRUE	If attribute 'WATLEV' has any value except 4 and 5, <unknown> or missed then select symbol name SELECT='DANGER01' and set the local variable 'SOUNDING' equal to TRUE
CATOBS=6?	Calling object must be of the class 'OBSTRN'. Is the value of the attribute 'CATOBS' equal to '6' given in the calling object?
WATLEV=1 or WATLEV=2?	Is the value of the attribute 'WATLEV' equal to '1' or '2' given in the calling object?
SELECT='OBSTRN11' and SOUNDING=FALSE	Select symbol name SELECT='OBSTRN11' 'if 'WATLEV'=1 (partially submerged of HW) or 2 (always dry). Set the local variable 'SOUNDING' equal to FALSE
WATLEV=4 or WANLEV=5?	Is the value of the attribute 'WATLEV' equal to '4' or '5' given in the calling object?
SELECT='OBSTRN03' and SOUNDING=TRUE	Select symbol name SELECT='OBSTRN03' 'if 'WATLEV'=(covers and uncovers) or 5 (awash). Set the local variable 'SOUNDING' equal to TRUE

SELECT='OBSTRN01' and SOUNDING=TRUE	Select symbol name SELECT='OBSTRN01' and set the local variable 'SOUNDING' equal to TRUE if 'CATOBS' equak to '6' (foul area) or WATLEV no equal to 1,2,4 OR 5.
Calling object UWTROC?	Is the calling object of the class 'UWTROC'?
WATLEV=3?	Is the value of the attribute 'WATLEV' equal to '3' given in the calling object?
SELECT='UWTROC03'	Select symbol name SELECT='UWTROC03'
SELECT='UWTROC04'	Select symbol name SELECT='UWTROC04' by default.
CATOBS=6?	Calling object must be of the class 'OBSTRN'. Is the value of the attribute 'CATOBS' equal to '6' given in the calling object?
WATLEV=1 or WATLEV=2?	If 'NO',is the value of the attribute 'WATLEV' equal to '1' or '2' given in the calling object?
SELECT='OBSTRN11'	Select symbol name SELECT='OBSTRN11' if 'WATLEV'=1 (partially submerged of HW) or 2 (always dry).
WATLEV=4 or WATLEV=5?	Is the value of the attribute 'WATLEV' equal to '4' or '5' given in the calling object?
SELECT='OBSTRN03'	Select symbol name SELECT='OBSTRN03' if 'WATLEV'=4 (covers and uncovers) or 5 (awash).
SELECT='OBSTRN01'	Select symbol name SELECT='OBSTRN01', if 'CATOBS'=6 (foul area) OR WATLEV=no equal to 1,2,4 OR 5.
SY(SELECT)	Draw the selected symbol at the calling object's location.
SOUNDING=TRUE?	is the local variable 'SOUNDING' equal to TRUE
SNDFRM03 (DEPTH_VALUE)	Perform the Symbology Procedure which returns a list of sounding symbols, see "*13.2.21 Conditional Symbology Procedure SNDFRM03*". Pass 'DEPTH_VALUE' on to it. Remember the SOUNDING SYMBOL(S)
Draw Sounding Symbol(s)	Draw the sounding symbol(s) returned from 'SNDFRM03' at the calling object's location.
did 'QUAPNT02' return 'LOWACC01'?	Is the symbol 'LOWACC01' selected by the procedure 'QUAPNT02'?
SY(LOWACC01)	If so indicated by the procedure 'QUAPNT02', draw the returned low accuracy symbol 'LOWACC01' at the calling object's location.
Exit procedure	Symbolization is finished

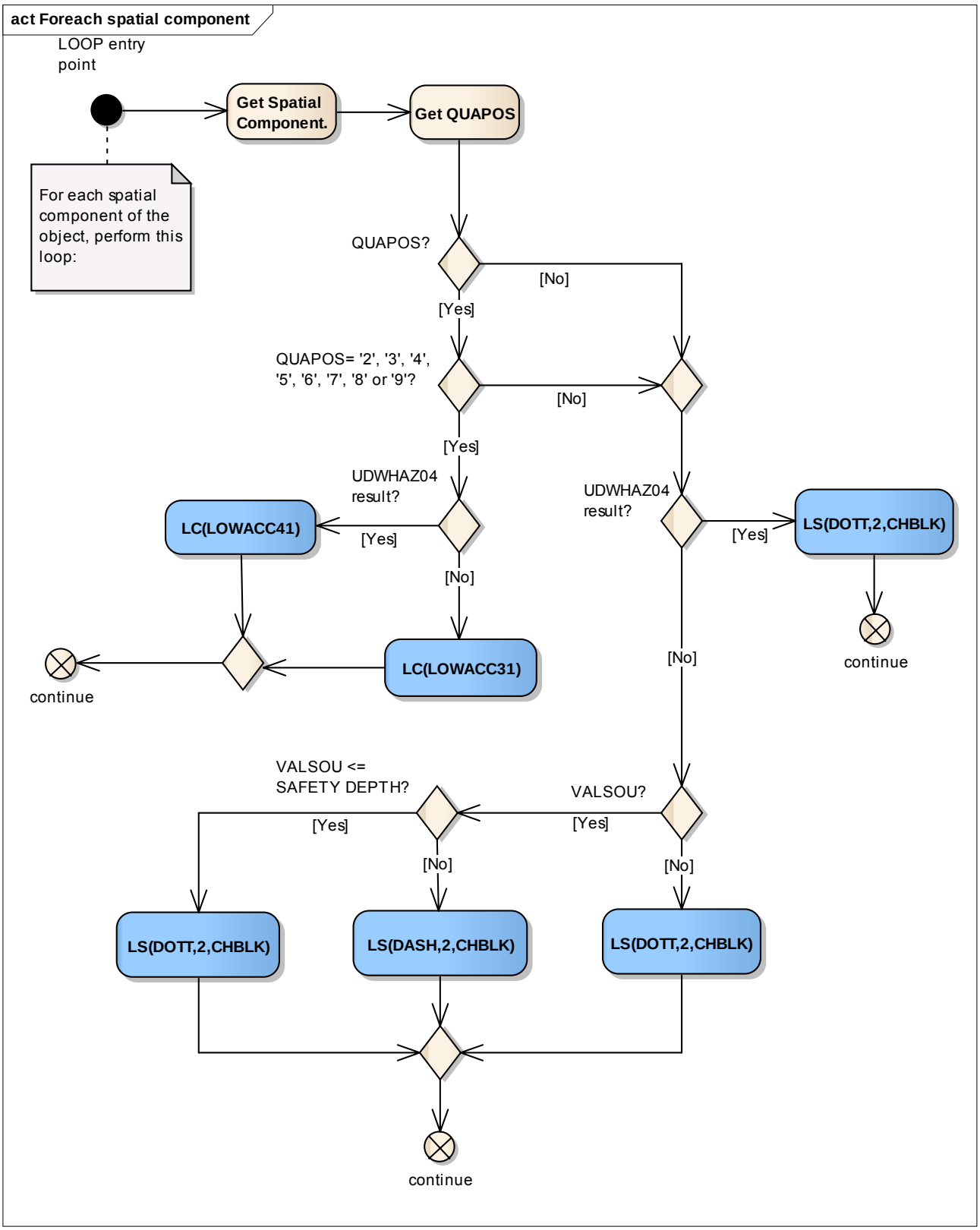
Figure 13 OBSTRN06 Continuation B Line objects, obstructions (OBSTRN)



Entry point	
Loop for each spatial component	Input value is a result of the sub-procedures 'UDWHAZ04', see diagram below, see *Figure 16*
UDWHAZ04 result?	Has the procedure 'UDWHAZ04' indicated the Isolated danger symbol should be shown?
SY(ISODGR01)	Draw isolated danger symbol 'ISODRG01' at the mid point of the line.
VALSOU?	Is the value of the attribute 'VALSOU' given?

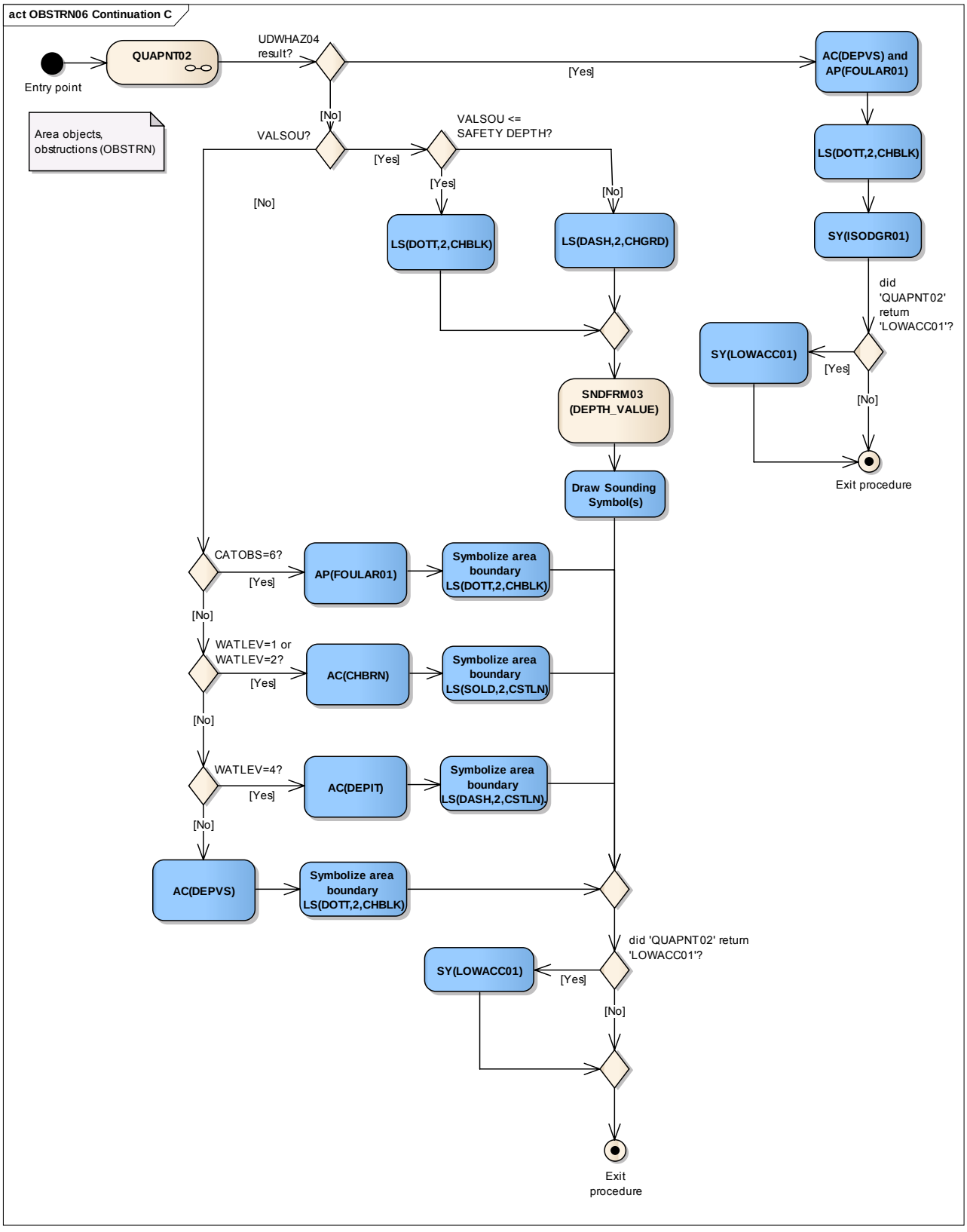
SNDFRM03 (DEPTH_VALUE)	Perform the Symbology Procedure which returns a list of sounding symbols, see *"13.2.21 Conditional Symbology Procedure SNDFRM03"* Pass 'DEPTH_VALUE' on to it. Remember the SOUNDING SYMBOL(S)
Draw Sounding Symbol(s)	Draw the sounding symbol(s) returned from 'SNDFRM03' at the mid point of the line.
Exist procedure	Symbolization is finished

Figure 14 Loop for each spatial component of the object



LOOP entry point	
Get Spatial Component.	Get next spatial component of the calling object.
Get QUAPOS	Get the value of the attribute 'QUAPOS' of the current spatial component
QUAPOS?	Is the value of the attribute 'QUAPOS' given?
QUAPOS= '2', '3', '4', '5', '6', '7', '8' or '9'?	Is the QUAPOS value equal to one of the following values: '2', '3', '4', '5', '6', '7', '8' or '9'?
UDWHAZ04 result?	Has the procedure 'UDWHAZ04' indicated the isolated danger symbol should be shown?
LC(LOWACC41)	Draw the line with a complex line style 'LOWACC41' at the spatial component
LC(LOWACC31)	Draw the line with a complex line style 'LOWACC31' at the spatial component
continue	go to next spatial component of the object
UDWHAZ04 result?	Has the procedure 'UDWHAZ04' indicated the isolated danger symbol should be shown?
LS(DOTT,2,CHBLK)	Draw the line with a dotted line, 2 units wide, colour 'CHBLK' at the spatial component
continue	go to next spatial component of the object
VALSOU?	Is the value of the attribute 'VALSOU' given?
LS(DOTT,2,CHBLK)	If 'NO', draw the line with a dotted line, 2 units wide, colour 'CHBLK' at the spatial component.
VALSOU <= SAFETY DEPTH?	Is the value of the attribute 'VALSOU' less than or equal to SAFETY DEPTH?
LS(DOTT,2,CHBLK)	Draw the line with a dotted line, 2 units wide, colour 'CHBLK' at the spatial component
LS(DASH,2,CHBLK)	Draw the line with a dashed line, 2 units wide, colour 'CHBLK' at the spatial component.
continue	go to next spatial component of the object

Figure 15 OBSTRN06 Continuation C Area objects, obstructions (OBSTRN)



Entry point	
QUAPNT02	Performs the Symbology Procedure 'QUAPNT02' which returns a flag indicating whether or not to display the LOW ACCURACY SYMBOL and returns the selected symbol, see "*13.2.14 Conditional Symbology Procedure QUAPNT02*"
UDWHAZ04 result?	Has the procedure 'UDWHAZ04' indicated the Isolated danger symbol should be shown?
AC(DEPVS) and AP(FOULAR01)	Draw the area object with an opaque colour fill with the colour 'DEPVS', and the area pattern 'FOULAR01'.
LS(DOTT,2,CHBLK)	Draw the area boundary as a dotted line, 2 units wide, in the colour 'CHBLK'.
SY(ISODGR01)	Draw the isolated symbol 'ISODGR01' returned by 'UDWHAZ04' in the centre of the area.
did 'QUAPNT02' return 'LOWACC01'?	Is the symbol 'LOWACC01' selected by the procedure 'QUAPNT02'?
SY(LOWACC01)	If so indicated by the procedure 'QUAPNT02', draw the returned low accuracy symbol 'LOWACC01' in the centre of the area.
Exit procedure	Symbolization is finished
VALSOU?	Is the value of the attribute 'VALSOU' given?
VALSOU <= SAFETY DEPTH?	Is the value of the attribute 'VALSOU' less than or equal to SAFETY DEPTH?
LS(DOTT,2,CHBLK)	Draw the area boundary as a dotted line, 2 units wide, in the colour 'CHBLK'.
LS(DASH,2,CHGRD)	Draw the area boundary as a dashed line, 2 units wide, in the colour 'CHGRD'.
SNDFRM03 (DEPTH_VALUE)	Perform the Symbology Procedure which returns a list of sounding symbols, see "*13.2.21 Conditional Symbology Procedure SNDFRM03*" Pass 'DEPTH_VALUE' on to it. Remember the SOUNDING SYMBOL(S)
Draw Sounding Symbol(s)	Draw the sounding symbol(s) returned from 'SNDFRM03' in the centre of the area
CATOBS=6?	Is the value of attribute 'CATOBS' equal to '6' (foul area)?
AP(FOULAR01)	Draw the area object with the area pattern 'FOULAR01'.
Symbolize area boundary LS(DOTT,2,CHBLK)	If 'CATOBS'=6 (foul area) then symbolize the area boundary as a dotted line, 2 units wide, in the colour 'CHBLK' LS(DOTT, 2, CHBLK).
WATLEV=1 or WATLEV=2?	Is the value of attribute 'WATLEV' equal to '1' (partly submerged at HW) or '2' (always dry)?
AC(CHBRN)	If 'WATLEV'=1 (partly submerged at HW) or 'WATLEV'=2 (always dry) then present the area object with an opaque colour fill with the colour 'CHBRN'
Symbolize area boundary LS(SOLD,2,CSTLN)	If 'WATLEV'=1 (partly submerged at HW) or 'WATLEV'=2 (always dry) then symbolize the area boundary as solid line, 2 units wide, in the colour 'CSTLN' LS(SOLD, 2, CSTLN).

WATLEV=4?	Is the value of attribute 'WATLEV' equal to '4' (covers and uncovers)?
AC(DEPIT)	If WATLEV=4 (covers and uncovers) then select the area object with an opaque colour fill with the colour 'DEPIT'
Symbolize area boundary LS(DASH,2,CSTLN).	If 'WATLEV'=4 (covers and uncovers) then symbolize the area boundary as a dashed line, 2 units wide, in the colour 'CSTLN' LS(DASH, 2, CSTLN).
AC(DEPVS)	If 'WATLEV'=3 (always submerged) or 'WATLEV'=5 (awash) present the area object with an opaque colour fill with the colour 'DEPVS'
Symbolize area boundary LS(DOTT,2,CHBLK)	If 'WATLEV'=3 (always submerged) or 'WATLEV'=5 (awash) symbolize the area boundary as a dotted line, 2 units wide, in the colour 'CHBLK' LS(DOTT, 2, CHBLK).
did 'QUAPNT02' return 'LOWACC01'?	Is the symbol 'LOWACC01' selected by the procedure 'QUAPNT02'?
SY(LOWACC01)	If so indicated by the procedure 'QUAPNT02' Show the returned low accuracy symbol at the centre of the area.
Exit procedure	Symbolization is finished

~~12.2.10~~13.2.10 Conditional Symbology Procedure 'OWNSHP02'

Applies to:	Mariners' Navigational Object Class "own ship" (ownshp)	
Spatial Object(s):	Point	
Attribute(s) used:	ship's length	(shplen)
	ship's breadth	(shpbrd)
	heading	(headng)
	course over ground	(cogcrs)
	course through water	(ctwcrs)
	speed over ground	(sogspd)
	speed through water	(stwspd)
	vector length time-period	(vecper)
	vector stabilization	(vecstb)
	vector time-mark interval	(vecmrk)
Parameter(s):	Object to be symbolized from SENC	
	Object's course and speed, heading	
	Options selected by mariner	
Defaults:	Display Priority given by look-up table	
	OVERRADAR priority given by look-up table	
	Display Category given by look-up table	
	Viewing Group given by look-up table	

Remarks:

1. CONNING POSITION

   1.1 When own-ship is drawn to scale, the conning position must be correctly located in relation to the ship's outline. The conning position then serves as the pivot point for the own-ship symbol, to be located by the ECDIS at the correct latitude, longitude for the conning point, as computed from the positioning system, correcting for antenna offset.

   1.2 In this procedure it is assumed that the heading line, beam bearing line and course and speed vector originate at the conning point. If another point of origin is used, for example to account for the varying position of the ship's turning centre, this must be made clear to the mariner.

2. DISPLAY OPTIONS

   Only the ship symbol is mandatory for an ECDIS. The mariner should be prompted to select from the following additional optional features:

   - display own-ship as:
     1. symbol, or
     2. scaled outline
   - select time period determining vector length for own-ship and other vessel course and speed vectors, (all vectors must be for the same time period),
   - display own-ship vector,
   - select ground or water stabilization for all vectors, and select whether to display the type of stabilization, (by arrowhead),
   - select one-minute or six-minute vector time marks,

- select whether to show a heading line, to the edge of the display window,
- select whether to show a beam bearing line, and if so what length (default: 10mm total length).

A narrative description of CSP **OWNSHP02** is given hereafter.

OWNSHP02

Conditional symbology procedure for symbolizing «own-ship», and for drawing the associated vector, heading line, beam-bearing line.

The own-ship is symbolized in a manner depending on which of a number of options is selected by the mariner:

1. Mandatory selection of ship symbol or ship outline:

1.1 If the mariner has selected one ship symbol, show SY (OWNSHP01) at the ship's position.

1.2 If the mariner has selected ship's outline:

1.2.1 If ship's length (shplen) scaled by the display scale is less than 6mm show SY (OWNSHP01) at the ship's position and display a note saying that the scale is too small to show the ship's outline.

Scale the outline symbol for own-ship, SY (OWNSHP05) by ships length and breadth (shplen, shpbrd) and display scale, and mark on it the known location of the conning position with a small dot. Show the scaled symbol at the correct position for the conning position. Rotate the symbol to the value of ships heading (headng).

2. Option to show course and speed vector

2.1 Get mariner's selection of the time-period (vecper) which determines vector length. Note that the time period selected for own-ship should apply to all other vectors.

2.2 Starting at the pivot point of the own-ship symbol or own-ship scaled representation, draw a line scaled by the vector period (vecper) and ships speed (sogspd or stwspd) in the direction given by the course (cogcrs or ctwcrs). Linestyle is LS(SOLD,2,SHIPS).

3. Option to draw vector stabilization

3.1 For ground stabilization (ownshp,vecstb1,...): place SY(VECGND01) at the end of the vector, replacing the last time mark. Rotate the symbol in the direction given by (cogcrs).

3.2 For water stabilization (ownshp, vecstb2,...): place SY(VECWTR01) at the end of the vector, replacing the last time mark. Rotate the symbol in the direction given by (ctwcrs).

4. Option to show time marks on vector

4.1 One-minute marks selected (ownshp, vecmrk1,...): place SY(OSPSIX02) at every six-minute mark, and SY(OSPONE02) at every remaining one-minute mark. Rotate all symbols in the direction given by (cogcrs or ctwcrs).

4.2 Only six-minute marks selected (ownshp, vecmrk2,...): place SY(OSPSIX02) at every six-minute mark. Rotate all symbols in the direction given by (cogcrs or ctwcrs).

5. Option to show heading line

If heading line selected: starting at the pivot point of the own-ship symbol or the scaled own-ship representation, draw the heading line in the direction given by (headng), to the edge of the display window. Linestyle is LS(SOLD,1,SHIPS).

6. Option to show beam bearing line

If beam-bearing line selected: centred on the pivot point of the own-ship symbol or the scaled own-ship representation, draw a line at 90 degrees to the heading line (headng + 90°). Length to be as selected by the mariner, with a default of 10mm total. Linestyle is LS(SOLD,1,SHIPS).

~~12.2.11~~13.2.11 Conditional Symbology Procedure ~~'~~PASTRK01~~'~~

Applies to: Mariners' Navigational Object Class "past track" (pastrk)

Spatial Object(s): Line

Attribute(s) used: "category of past track" (catpst)

Parameter(s): Object to be symbolized from SENC
TIME_TAGS (min) value selected by the mariner

Defaults: Display Priority given by look-up table, OVERRADAR priority given by look-up table, Display Category given by look-up table, Viewing Group given by look-up table

Remarks: This conditional symbology procedure was designed to allow the mariner to select time labels on the past track (see IMO Performance Standards for ECDIS [~~3~~2]). The procedure also cares for the presentation of primary and secondary past track.

The manufacturer should define his own data class (spatial primitive) in x,y,t (position and time) in order to represent 'pastrk'.

~~12.2.12~~13.2.12 Conditional Symbology Procedure '~~QUAPOS01~~'

Applies to: S-57 Object Class "land area" (LNDARE), as point and line;
S-57 Object Class ~~«~~"coast line~~»~~" (COALNE), line only;

Spatial Object(s): Point, Line

Attribute(s) used: Spatial attribute QUAPOS

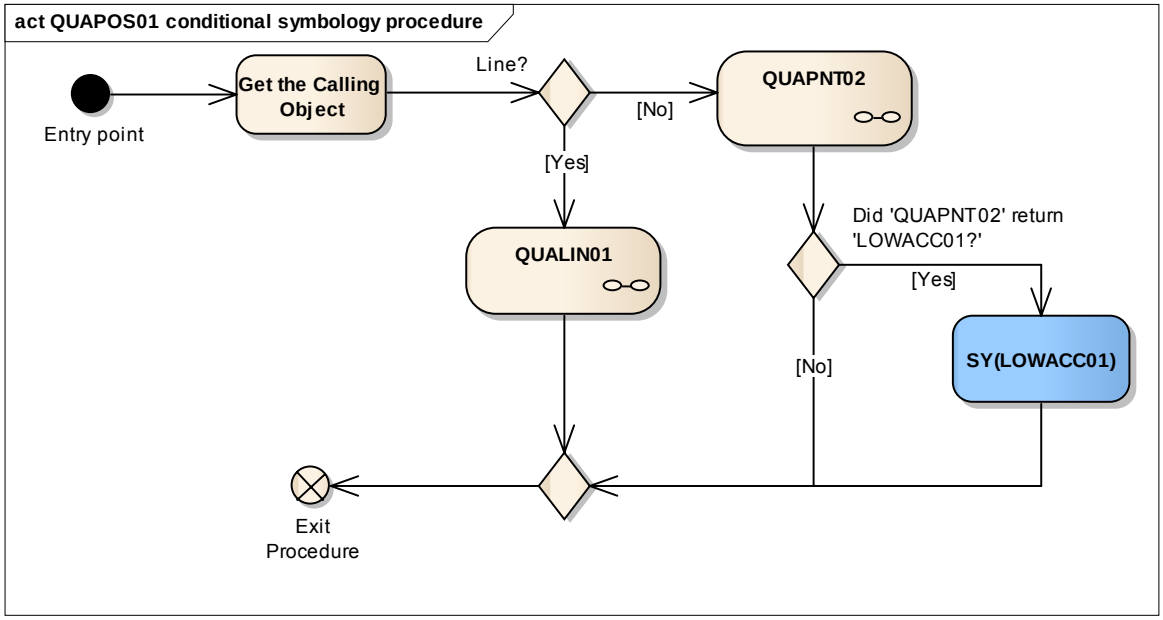
Parameter(s): Object to be ~~symbolised~~symbolized from SENC

User Parameters: Show low accuracy symbol.

Defaults: Symbolization given by the look-up table;
Display Priority given by ~~look~~look-up table;
OVERRADAR priority given by look-up table;
Display Category given by look-up table;
Viewing Group given by look-up table

Remarks: The attribute QUAPOS, which identifies low positional accuracy, is attached to the spatial object, not the feature object. This procedure passes the object to procedure QUALINnn or QUAPNTnn, which ~~traces back to~~examines the spatial ~~object, retrieves any QUAPOS~~ attributes, and returns the appropriate symbolization to QUAPOSnn.

Figure 16 QUAPOS01 procedure



Entry point	
Get the Calling Object	Get the object which is calling this procedure.
Line?	Is the calling object of type line?
QUALIN01	Perform the symbology procedure 'QUALIN01' which symbolizes lines based on the spatial object's attribute 'QUAPOS' , see "*13.2.13 Conditional Symbology Procedure*

	QUALIN01”
Calling Object	- input parameter
QUAPNT02	Perform the symbology procedure 'QUAPNT02' which returns a flag indicating whether or not to display the low accuracy symbol and returns the selected symbol 'LOWACC01', see “*13.2.14 Conditional Symbology Procedure QUAPNT02*”
Calling Object	- input parameter
LOWACC01	- output parameter
Did 'QUAPNT02' return 'LOWACC01?'	Is the symbol 'LOWACC01' selected by the procedure 'QUAPNT02'?
SY(LOWACC01)	Draw the low accuracy symbol 'LOWACC01' if so indicated by the procedure 'QUAPNT02' at the calling object's location.
Exit Procedure	return to the calling procedure

~~12.2.13~~13.2.13 Conditional Symbology Procedure ~~'QUALINnn'~~QUALIN01

(Note that this is called as a sub-procedure by QUAPOSnn).

Applies to: S-57 Object Class land area (LNDARE) as line;
S-57 Object Class coastline (COALNE) line only.

Spatial ~~Object~~primitive(s): Line;

Spatial operations: Separate a line into its component edges.

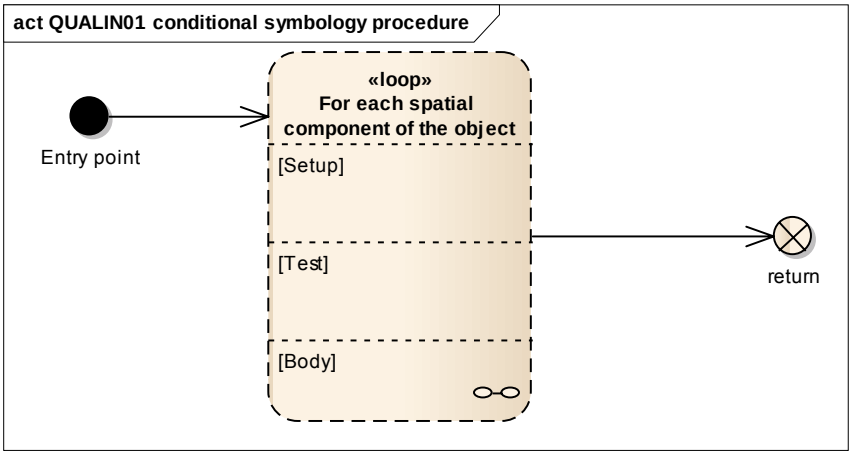
Attribute(s) used: ~~spatial~~ Spatial attribute QUAPOS

Parameter(s): Object to be symbolised from SENC.

Defaults: Display Priority given by look-up table;
OVERRADAR priority given by look-up table;
Display Category given by look-up table;
Viewing Group given by look-up table;

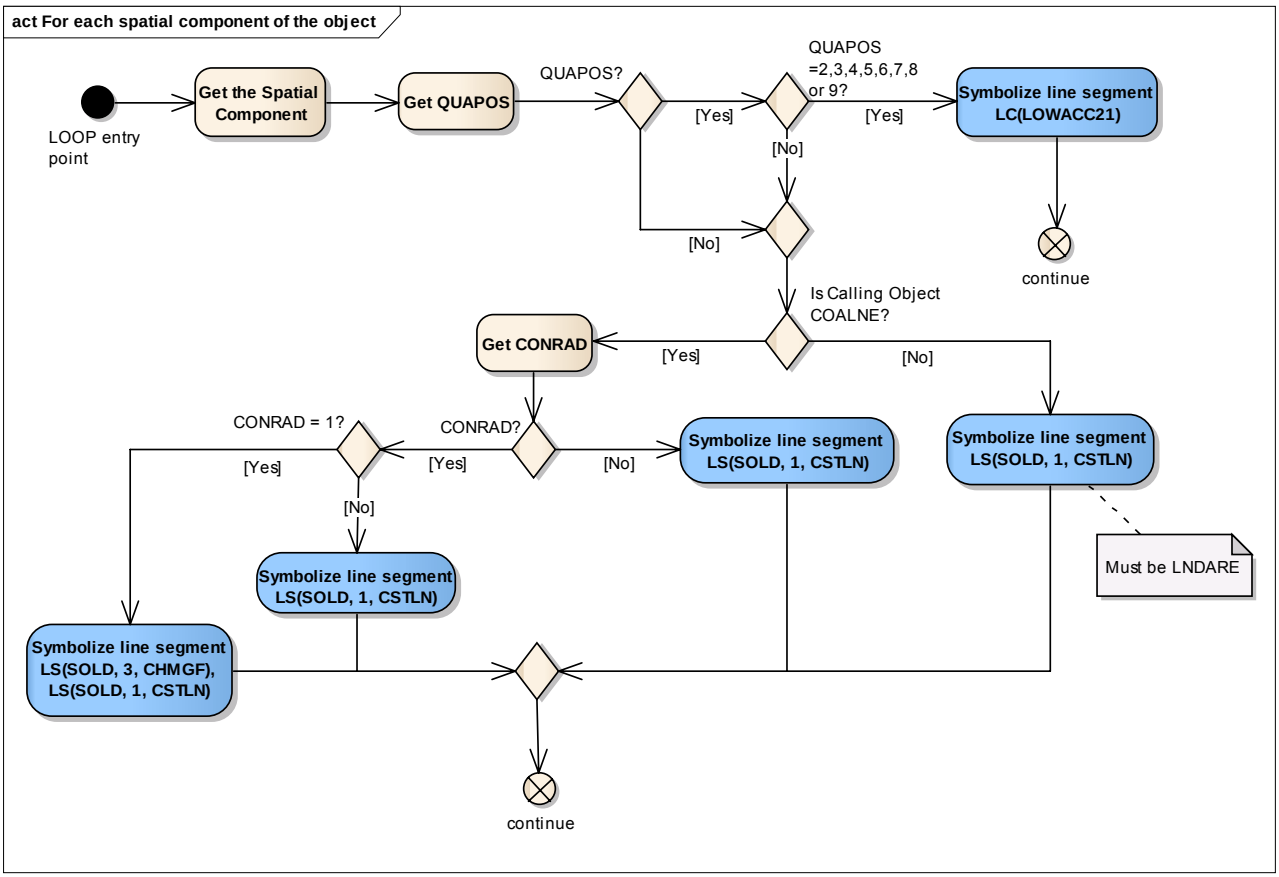
Remarks: The attribute QUAPOS, which identifies low positional accuracy, is attached only to the spatial component(s) of an object. A line object may be composed of more than one spatial ~~object.~~ components. This procedure looks at each of the spatial ~~objects~~components, and symbolizes the line according to the positional accuracy.

Figure 17 QUALIN01 sub-procedure



Entry point	
Loop for each spatial component of the object	Loop for each spatial component of the object, see *Figure 20*.
return	Return to the calling procedure.

Figure 18 Loop for each spatial component of the object



LOOP entry point	
Get the Spatial Component	Get the next spatial component (edge) of the calling object.
Get QUAPOS	Get the value of the attribute 'QUAPOS' of the current spatial component
QUAPOS?	Is the value of the attribute 'QUAPOS' given?
QUAPOS =2,3,4,5,6,7,8 or 9?	Is the QUAPOS value equal to one of the following values: '2', '3', '4', '5', '6', '7', '8' or '9'?
Symbolize line segment LC(LOWACC21)	Symbolize the line segment (edge) with patter line 'LOWACC21'.
continue	go to the next spatial component of the calling object
Is Calling Object COALNE?	Is the calling objects of class COALNE?
Get CONRAD	Get the value of the attribute 'CONRAD' of the calling object
CONRAD?	Is the value of the attribute 'CONRAD' given in the calling object?
CONRAD = 1?	Does the value of the attribute 'CONRAD' equal '1' (radar consp.)?
Symbolize line segment LS(SOLD, 3, CHMGF),	Symbolize the line segment (edge) with a solid line, 3 units wide, colour 'CHMGF' and symbolize the same line segment

LS(SOLD, 1, CSTLN)	(edge) with a solid line, 1 unit wide, colour 'CSTLN'
Symbolize line segment LS(SOLD, 1, CSTLN)	Symbolize the line segment (edge) with a solid line, 1 unit wide, colour 'CSTLN' in other cases.
continue	go to the next spatial component of the calling object

~~12.2.14~~13.2.14 Conditional Symbology Procedure ~~'QUAPNTnn'~~QUAPNT02

Quality of position of point and area objects (S-57) Conditional Symbology Procedure for additional symbology for point and area objects when positional accuracy is low. (Note that this is called as a sub-procedure by QUAPOSnn, WRECKSnn).

Applies to: S-57 Object Class "land area" (LNDARE) as point;
S-57 Object Class "wrecks" (WRECKS) as point and area.

Spatial Object(s): Point, Area.

Attribute(s) used: ~~spatial~~ Spatial attribute QUAPOS

Parameter(s): Object to be ~~symbolised~~symbolized from SENC.

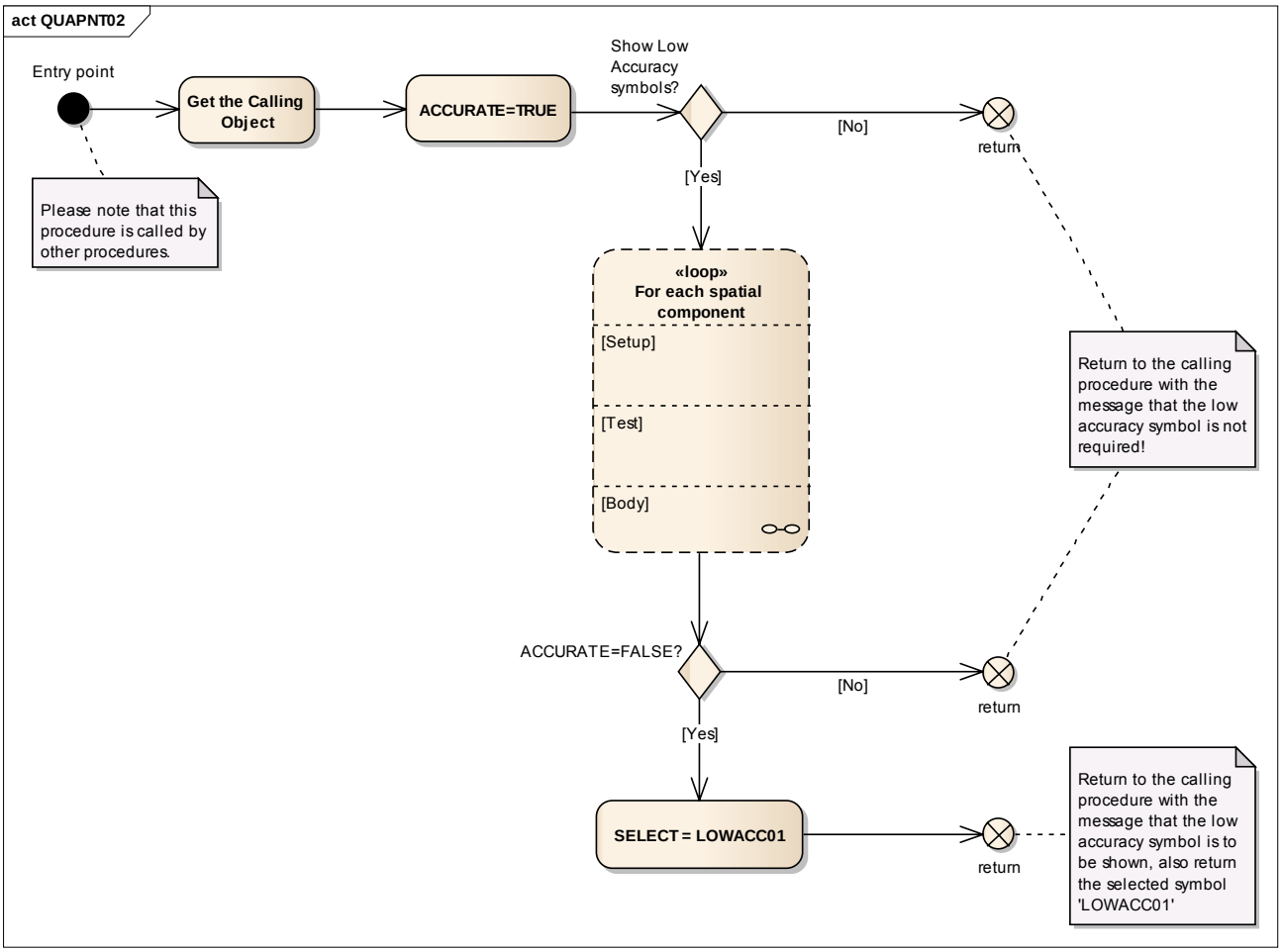
User Parameters: View low accuracy symbols.

Defaults: Symbolization given by the look-up table; Display Priority given by ~~look~~-up table; OVERRADAR priority given by look-up table; Display Category given by look-up table; Viewing Group given by look-up table

Remarks: The attribute QUAPOS, which identifies low positional accuracy, is attached only to the spatial component(s) of an object.

This procedure checks whether the mariner has requested that the symbol SY(LOWACC01) is to be shown; retrieves any QUAPOS attributes; and returns the appropriate symbols to the calling procedure.

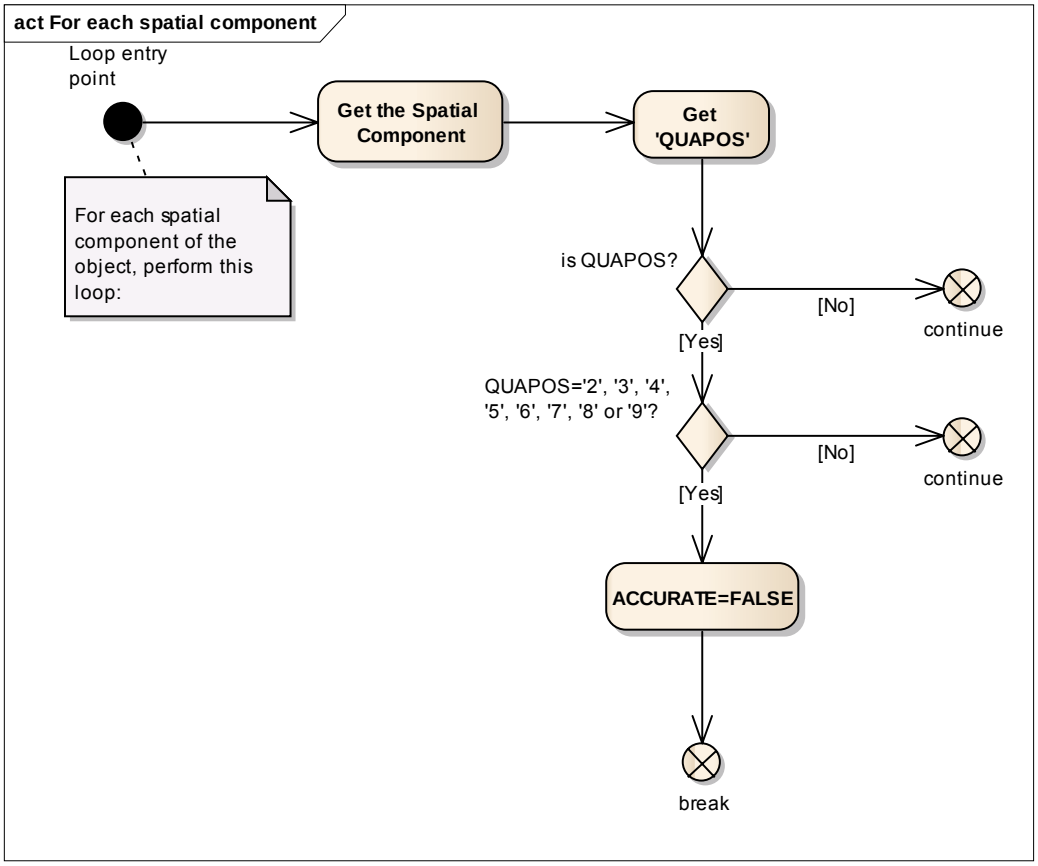
Figure 19 QUAPNT02 sub-procedure



Entry point	
Get the Calling Object	Get the object which is calling this procedure.
ACCURATE=TRUE	Set local variable 'ACCURATE' to TRUE.
Show Low Accuracy symbols?	Has the mariner chosen to view the low accuracy symbols (LOWACC01) (i.e. viewing group equals 31011)?
return	If 'NO', Return to the calling procedure with the message that the low accuracy symbol is not required!
Loop for each spatial component	For each spatial component of the object perform this loop, see *Figure 22*.
ACCURATE=FALSE?	Is the local variable 'ACCURATE' set to 'FALSE?
return	If 'NO', Return to the calling procedure with the message that the low accuracy symbol is not required.
SELECT = LOWACC01	Select the 'Low Accuracy' symbol 'LOWACC01' Return to the calling procedure.
return	Return to the calling procedure with the message that the low accuracy symbol is to be shown, also return the selected

	symbol

Figure 20 Loop for each spatial component



Loop entry point	
Get the Spatial Component	Get the next spatial component of the calling object.
Get 'QUAPOS'	Get the value of the attribute 'QUAPOS' for the examined spatial object
is QUAPOS?	Is the value of the attribute 'QUAPOS' given?
continue	If 'NO', Go to the next spatial component of the calling object.
QUAPOS='2', '3', '4', '5', '6', '7', '8' or '9'?	Does the value of the attribute 'QUAPOS' equal '2', '3', '4', '5', '6', '7', '8' or '9'?
continue	If 'NO', Go to the next spatial component of the calling object.
ACCURATE=FALSE	Set local variable 'ACCURATE'='FALSE'.
break	Stop loop by spatial components

~~12.2.15~~13.2.15 Conditional Symbology Procedure ~~'RESARENnn'~~RESARE03

~~Applies to: S-57 objects of class Restricted Area (RESARE)~~

~~Spatial Object(s): Area~~

Applies to: S-57 objects of class Restricted Area (RESARE)

Spatial Object(s): Area

Attribute(s) used: CATREA, RESTRN (List-type)

User Parameters used: "Symbolized Area Boundaries".

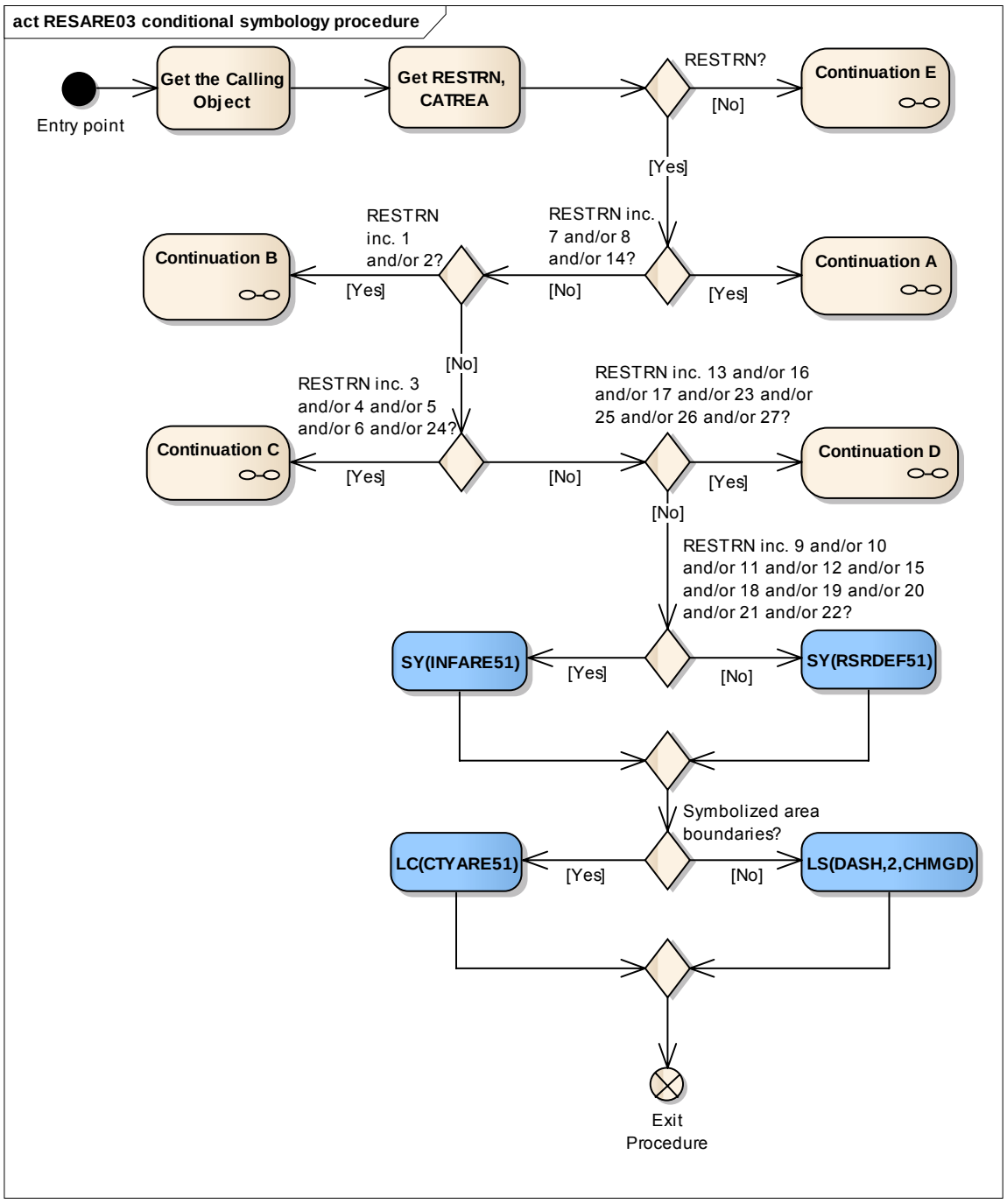
Defaults: Display priority given by look-up table;
OVERRADAR priority given by look-up table;
Display category given by look-up table;
Viewing group given by look-up table.

Remarks: A list-type attribute is used because an area of the object class RESARE may have more than one category attribute (CATREA). For example an inshore traffic zone might also have fishing and anchoring prohibition and a prohibited area might also be a bird sanctuary or a mine field.

This conditional procedure is set up to ensure that the categories of most importance to safe navigation are prominently symbolized, and to pass on all given information with minimum clutter. Only the most significant restriction is symbolized, and an indication of further limitations is given by a subscript "!" or "i". Further details are given under conditional symbology procedure RESTRNnn

Other object classes ~~affected by~~with attribute RESTRN are handled by conditional symbology procedure RESTRNnn.

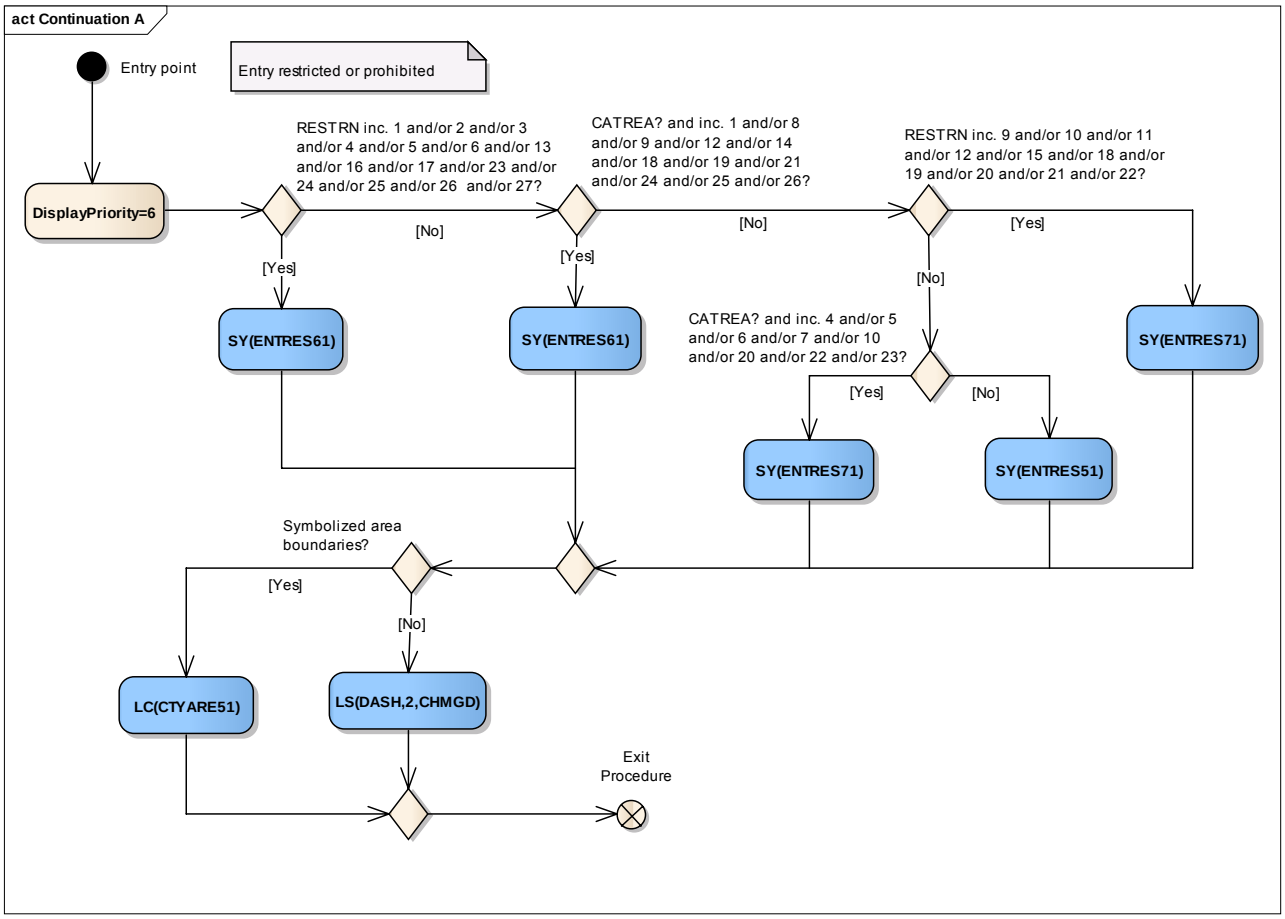
Figure 21 RESARE03 procedure



Entry point	
Get the Calling Object	Get the object which called this procedure.
Get RESTRN, CATREA	Get the values of the attributes RESTRN (restriction) and CATREA (category of restricted area) from the calling object
RESTRN?	Is the attribute 'RESTRN' given?
Continuation E	If 'NO', RESARE03 Continuation E , see *Figure 28*.

RESTRN inc. 7 and/or 8 and/or 14?	Does the value of the attribute 'RESTRN' include at least one of the following values: '7' (entry prohibited); '8' (entry restricted); '14' (area to be avoided)?
Continuation A	RESARE03 Continuation A, see *Figure 24*.
RESTRN inc. 1 and/or 2?	Does the value of the attribute 'RESTRN' include '1' (anchoring prohibited) and/or '2' (anchoring restricted)?
Continuation B	RESARE03 Continuation B, see *Figure 25*.
RESTRN inc. 3 and/or 4 and/or 5 and/or 6 and/or 24?	Does the value of the attribute 'RESTRN' include at least one of the following values: '3' (fishing prohibited) ; '4' (fishing restricted) ; '5' (trawling prohibited); '6' (trawling restricted); '24' (dragging prohibited)?
Continuation C	RESARE03 Continuation C, see *Figure 26*.
RESTRN inc. 13 and/or 16 and/or 17 and/or 23 and/or 25 and/or 26 and/or 27?	Does the value of the attribute 'RESTRN' include at least one of the following values: '13' (no wake area) ; '16' (discharging prohibited) ; '17' (discharging restricted) ; '23' (lightering prohibited); '25' (stopping prohibited); '26' (landing prohibited); '27' (speed restricted)?
Continuation D	RESARE03 Continuation D, see *Figure 27*.
RESTRN inc. 9 and/or 10 and/or 11 and/or 12 and/or 15 and/or 18 and/or 19 and/or 20 and/or 21 and/or 22?	Does the value of the attribute 'RESTRN' include at least one of the following values: '9' (dredging prohibited); '10' (dredging restricted); '11' (diving prohibited); '12' (diving restricted); '15' (construction prohibited); '18' (development prohibited); '19' (development restricted); '20' (drilling prohibited); '21' (drilling restricted); '22' (removing artifacts prohibited)?
SY(INFARE51)	Draw the symbol 'INFARE51' in the centre of the visible part of the calling object area.
SY(RSRDEF51)	Draw the symbol 'RSRDEF51' in the centre of the visible part of the calling object area.
Symbolized Area Boundaries?	Has the mariner selected symbolized area boundaries?
LC(CTYARE51)	Symbolize area boundary with the line pattern 'CTYARE51'.
LS(DASH,2,CHMGD)	Symbolize area boundary with the dash line with width 2 and color 'CHMGD'.
Exit Procedure	Symbolization is finished.

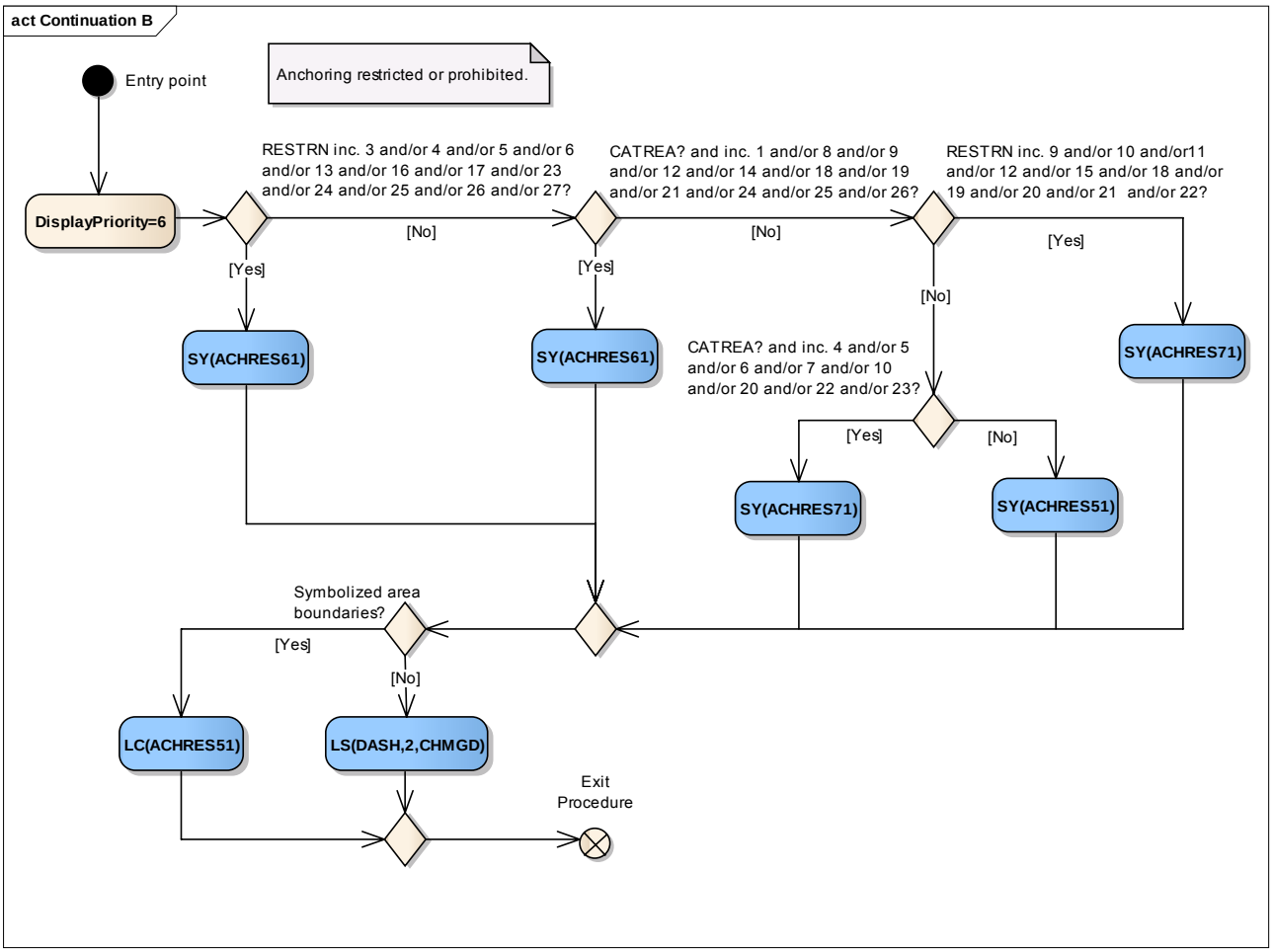
Figure 22 Continuation A Entry restricted or prohibited



Entry point	
DisplayPriority=6	Set display priority equal to 6 for the follow-up symbolization.
RESTRN inc. 1 and/or 2 and/or 3 and/or 4 and/or 5 and/or 6 and/or 13 and/or 16 and/or 17 and/or 23 and/or 24 and/or 25 and/or 26 and/or 27?	Does the value of the attribute 'RESTRN' include at least one of the following values: '1' (anchoring prohibited); '2' (anchoring restricted); '3' (fishing prohibited); '4' (fishing restricted); '5' (trawling prohibited); '6' (trawling restricted); '13' (no wake area); '16' (discharging prohibited); '17' (discharging restricted); '23' (lightering prohibited); '24' (dragging prohibited); '25' (stopping prohibited); '26' (landing prohibited) ; '27' (speed restricted)?
SY(ENTRES61)	Draw the symbol 'ENTRES61' in the center of the visible part of the calling object area.
CATREA? and inc. 1 and/or 8 and/or 9 and/or 12 and/or 14 and/or 18 and/or 19 and/or 21 and/or 24 and/or 25 and/or 26?	Is the value of the attribute 'CATREA' given and does it include at least one of the following values: '1' (offshore safety zone); '8' (degaussing area); '9' (military area); '12' (navigation aid safety zone); '14' (minefield); '18' (swimming area); '19' (waiting area); '21' (dredging area); '24' (no wake area); '25' (swinging area); '26' (water skiing area)?
SY(ENTRES61)	Draw the symbol 'ENTRES61' in the center of the visible part

	of the calling object area.
RESTRN inc. 9 and/or 10 and/or 11 and/or 12 and/or 15 and/or 18 and/or 19 and/or 20 and/or 21 and/or 22?	Does the value of the attribute 'RESTRN' include at least one of the following values: '9' (dredging prohibited); '10' (dredging restricted); '11' (diving prohibited); '12' (diving restricted); '15' (construction prohibited); '18' (development prohibited); '19' (development restricted); '20' (drilling prohibited); '21' (drilling restricted); '22' (removing artefacts prohibited)?
SY(ENTRES71)	Draw the symbol 'ENTRES71' in the center of the visible part of the calling object area.
CATREA? and inc. 4 and/or 5 and/or 6 and/or 7 and/or 10 and/or 20 and/or 22 and/or 23?	Is the value of the attribute 'CATREA' given and does it include at least one of the following values: '4' (nature reserve); '5' (bird sanctuary); '6' (game preserve); '7' (seal sanctuary); '10' (historic wreck); '20' (research area); '22' (fish sanctuary); '23' (ecological reserve)?
SY(ENTRES71)	Draw the symbol 'ENTRES71' in the center of the visible part of the calling object area.
SY(ENTRES51)	Draw the symbol 'ENTRES51' in the center of the visible part of the calling object area.
Symbolized area boundaries?	Has mariner selected Symbolized Area Boundaries?
LC(CTYARE51)	Symbolize area boundary with the pattern line 'CTYARE51'
LS(DASH,2,CHMGD)	Symbolize area boundary with the dash line with the width '2' and color 'CHMGD'.
Exit Procedure	Symbolization is finished.

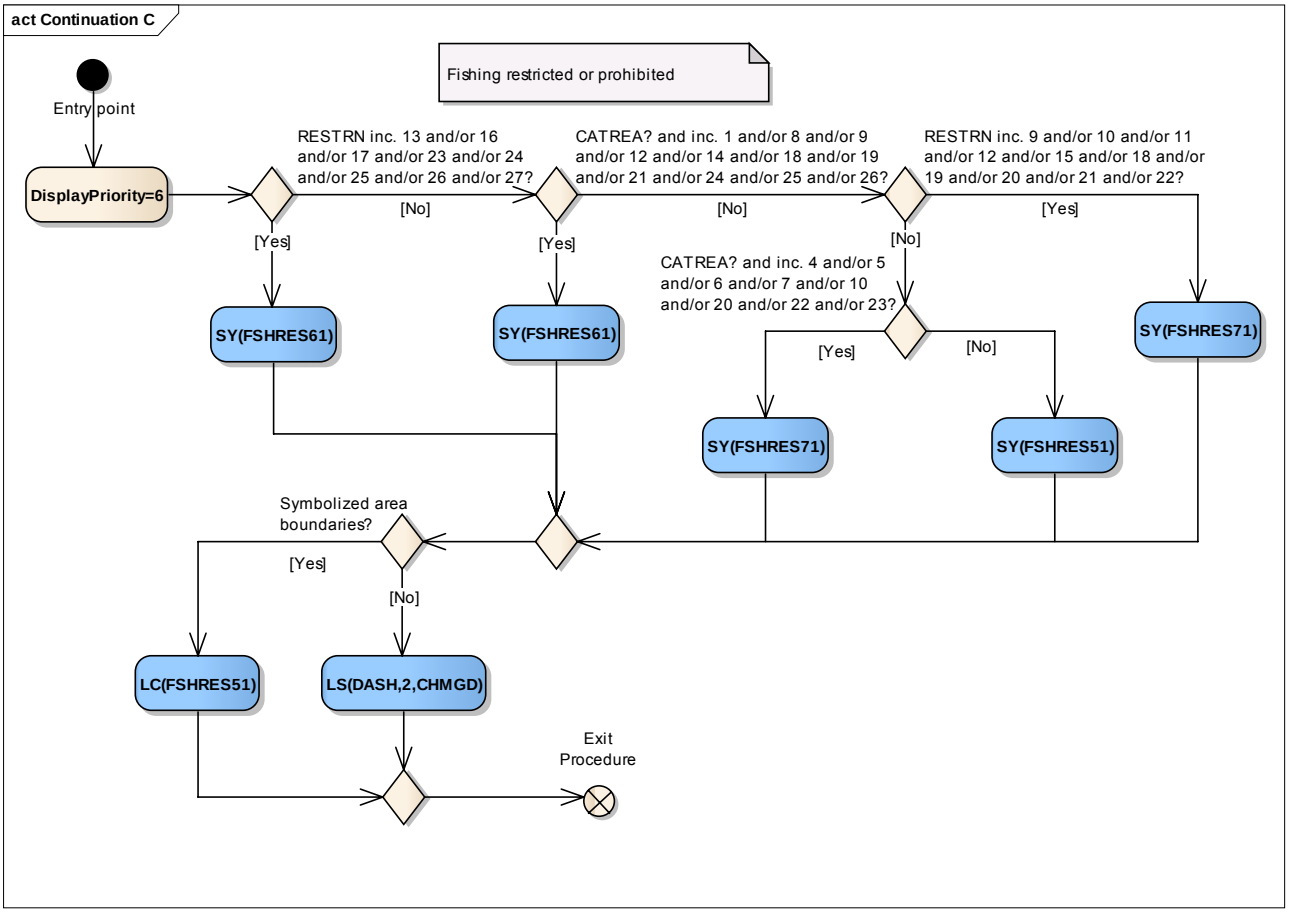
Figure 23 Continuation B Anchoring restricted or prohibited.



Entry point	
DisplayPriority=6	Set display priority equal to 6 for the follow-up symbolization.
RESTRN inc. 3 and/or 4 and/or 5 and/or 6 and/or 13 and/or 16 and/or 17 and/or 23 and/or 24 and/or 25 and/or 26 and/or 27?	Does the value of the attribute 'RESTRN' include at least one of the following values: '3' (fishing prohibited); '4' (fishing restricted); '5' (trawling prohibited); '6' (trawling restricted); '13' (no wake area); '16' (discharging prohibited); '17' (discharging restricted); '23' (lightering prohibited); '24' (dragging prohibited); '25' (stopping prohibited); '26' (landing prohibited); '27' (speed restricted)?
SY(ACHRES61)	Draw the symbol 'ACHRES61' in the center of the visible part of the calling object area.
CATREA? and inc. 1 and/or 8 and/or 9 and/or 12 and/or 14 and/or 18 and/or 19 and/or 21 and/or 24 and/or 25 and/or 26?	Is the value of the attribute 'CATREA' given and does it include at least one of the following values: '1' (offshore safety zone); '8' (degaussing area); '9' (military area); '12' (navigation aid safety zone); '14' (minefield); '18' (swimming area); '19' (waiting area); '21' (dredging area); '24' (no wake area); '25' (swinging area); '26' (water skiing area)?
SY(ACHRES61)	Draw the symbol 'ACHRES61' in the center of the visible part

	of the calling object area.
RESTRN inc. 9 and/or 10 and/or11 and/or 12 and/or 15 and/or 18 and/or 19 and/or 20 and/or 21 and/or 22?	Does the value of the attribute 'RESTRN' include at least one of the following values: '9' (dredging prohibited); '10' (dredging restricted); '11' (diving prohibited); '12' (diving restricted); '15' (construction prohibited); '18' (development prohibited); '19' (development restricted); '20' (drilling prohibited); '21' (drilling restricted) ; '22' (removing artefacts prohibited)?
SY(ACHRES71)	Draw the symbol 'ACHRES71' in the center of the visible part of the calling object area.
CATREA? and inc. 4 and/or 5 and/or 6 and/or 7 and/or 10 and/or 20 and/or 22 and/or 23?	Is the value of the attribute 'CATREA' given and does it include at least one of the following values: '4' (nature reserve); '5' (bird sanctuary); '6' (game preserve); '7' (seal sanctuary); '10' (historic wreck); '20' (research area); '22' (fish sanctuary); '23' (ecological reserve)?
SY(ACHRES71)	Draw the symbol 'ACHRES71' in the center of the visible part of the calling object area.
SY(ACHRES51)	Draw the symbol 'ACHRES51' in the center of the visible part of the calling object area.
Symbolized Area Boundaries?	Has mariner selected Symbolized Area Boundaries?
LC(ACHRES51)	Symbolize area boundary with the pattern line 'ACHRES51'
LS(DASH,2,CHMGD)	Symbolize area boundary with the dash line with the width '2' and the color 'CHMGD'.
Exit Procedure	Symbolization is finished.

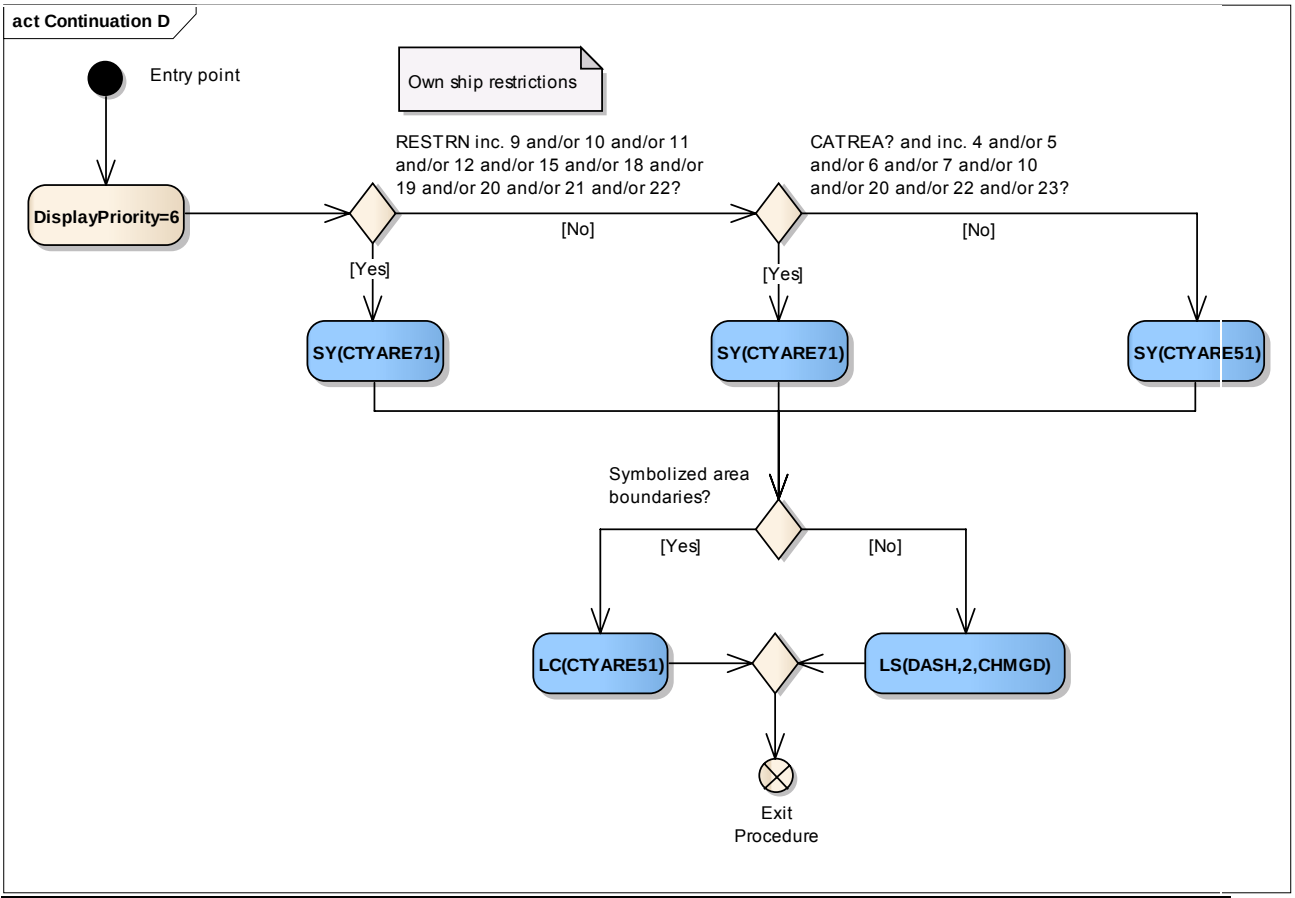
Figure 24 Continuation C Fishing restricted or prohibited



Entry point	
DisplayPriority=6	Set display priority equal to 6 for the follow-up symbolization.
RESTRN inc. 13 and/or 16 and/or 17 and/or 23 and/or 24 and/or 25 and/or 26 and/or 27?	Does the value of the attribute 'RESTRN' include at least one of the following values: '13' (no wake area); '16' (discharging prohibited); '17' (discharging restricted); '23' (lightering prohibited); '24' (dragging prohibited); '25' (stopping prohibited); '26' (landing prohibited); '27' (speed restricted)?
SY(FSHRES61)	Draw the symbol 'FSHRES61' in the center of the visible part of the calling object area.
CATREA? and inc. 1 and/or 8 and/or 9 and/or 12 and/or 14 and/or 18 and/or 19 and/or 21 and/or 24 and/or 25 and/or 26?	Is the value of the attribute 'CATREA' given and does it include at least one of the following values: '1' (offshore safety zone); '8' (degaussing area); '9' (military area); '12' (navigation aid safety zone); '14' (minefield); '18' (swimming area); '19' (waiting area); '21' (dredging area); '24' (no wake area); '25' (swinging area); '26' (water skiing area)?
SY(FSHRES61)	Draw the symbol 'FSHRES61' in the center of the visible part of the calling object area.

RESTRN inc. 9 and/or 10 and/or 11 and/or 12 and/or 15 and/or 18 and/or 19 and/or 20 and/or 21 and/or 22?	Does the value of the attribute 'RESTRN' include at least one of the following values: '9' (dredging prohibited); '10' (dredging restricted); '11' (diving prohibited); '12' (diving restricted); '15' (construction prohibited); '18' (development prohibited); '19' (development restricted); '20' (drilling prohibited); '21' (drilling restricted); '22' (removing artifacts prohibited)?
SY(FSHRES71)	Draw the symbol 'FSHRES71' in the center of the visible part of the calling object area.
CATREA? and inc. 4 and/or 5 and/or 6 and/or 7 and/or 10 and/or 20 and/or 22 and/or 23?	Is the value of the attribute 'CATREA' given and does it include at least one of the following values: '4' (nature reserve); '5' (bird sanctuary); '6' (game preserve); '7' (seal sanctuary); '10' (historic wreck); '20' (research area); '22' (fish sanctuary); '23' (ecological reserve)?
SY(FSHRES71)	Draw the symbol 'FSHRES71' in the center of the visible part of the calling object area.
SY(FSHRES51)	Draw the symbol 'FSHRES51' in the center of the visible part of the calling object area.
Symbolized area boundaries?	Has mariner selected Symbolized Area Boundaries?
LC(FSHRES51)	Symbolize area boundary with the pattern line 'FSHRES51'
LS(DASH,2,CHMGD)	Symbolize area boundary with the dash line with the width '2' and the color 'CHMGD'.
Exit Procedure	Symbolization is finished.

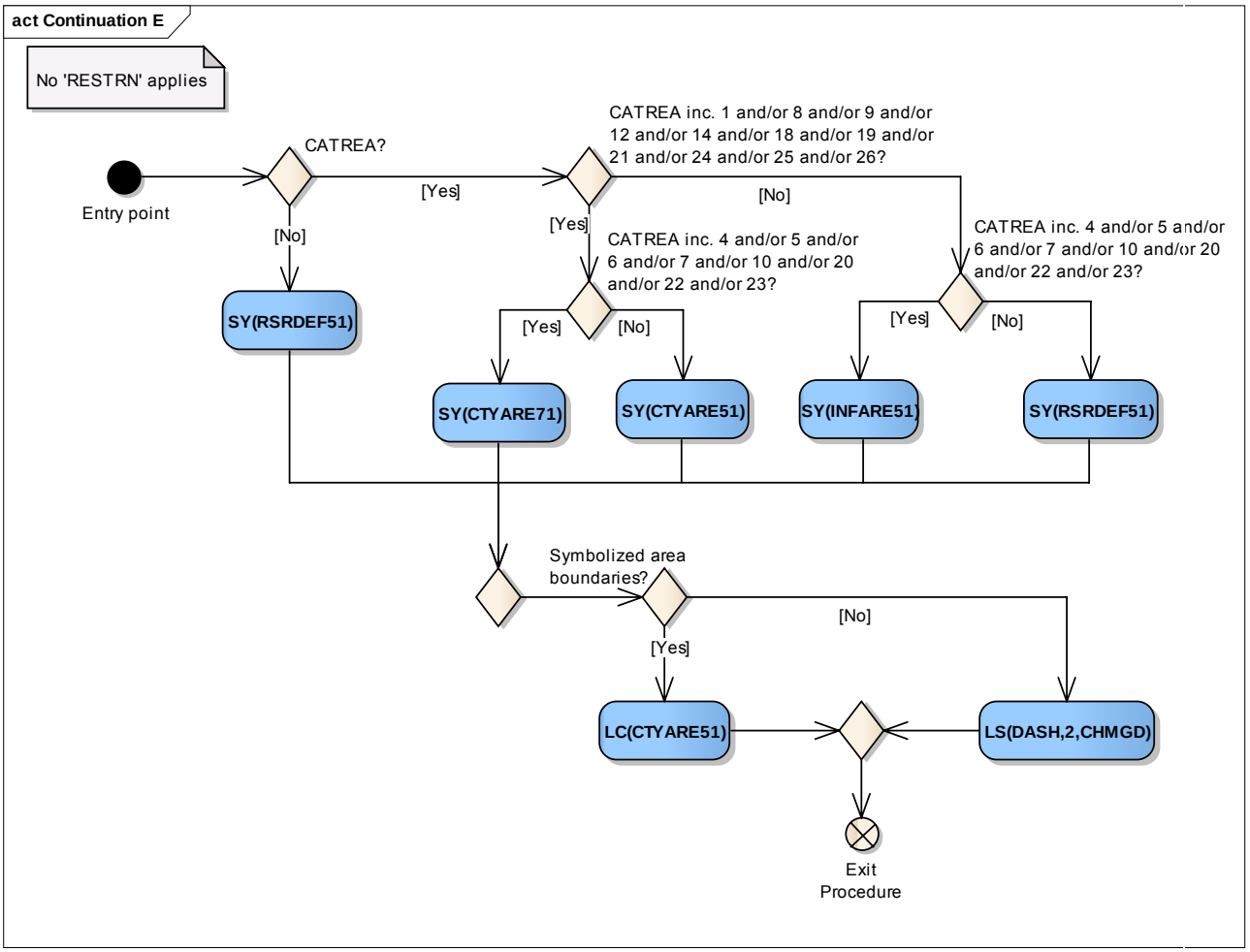
Figure 25 Continuation D Own ship restrictions



Entry point	
DisplayPriority=6	Set display priority equal to 6 for the follow-up symbolization.
RESTRN inc. 9 and/or 10 and/or 11 and/or 12 and/or 15 and/or 18 and/or 19 and/or 20 and/or 21 and/or 22?	Does the value of the attribute 'RESTRN' include at least one of the following values: '9' (dredging prohibited); '10' (dredging restricted); '11' (diving prohibited); '12' (diving restricted); '15' (construction prohibited); '18' (development prohibited); '19' (development restricted); '20' (drilling prohibited); '21' (drilling restricted); '22' (removing artefacts prohibited)?
SY(CTYARE71)	Draw the symbol 'CTYARE71' in the center of the visible part of the calling object area.
CATREA? and inc. 4 and/or 5 and/or 6 and/or 7 and/or 10 and/or 20 and/or 22 and/or 23?	Is the value of the attribute 'CATREA' given and does it include at least one of the following values: '4' (nature reserve); '5' (bird sanctuary); '6' (game preserve); '7' (seal sanctuary); '10' (historic wreck); '20' (research area); '22' (fish sanctuary); '23' (ecological reserve)?
SY(CTYARE71)	Draw the symbol 'CTYARE71' in the center of the visible part of the calling object area.
SY(CTYARE51)	Draw the symbol 'CTYARE51' in the center of the visible part of the calling object area.
Symbolized Area Boundaries?	Has mariner selected Symbolized Area Boundaries?

LC(CTYARE51)	Symbolize area boundary with the pattern line 'CTYARE51'
LS(DASH,2,CHMGD)	Symbolize area boundary with the dash line with the width '2' and the color 'CHMGD'.
Exit Procedure	Symbolization is finished.

Figure 26 Continuation E No 'RESTRN' applies



Entry point	
CATREA?	Is the attribute 'CATREA' given?
SY(RSRDEF51)	No value of 'RESTRN' or 'CATREA' was given. Draw the symbol 'RSRDEF51' in the center of the visible part of the calling object area.
CATREA inc. 1; 8; 9; 12; 14; 18; 19; 21; 24; 25; 26?	Is the value of the attribute 'CATREA' given and does it include at least one of the following values: '1' (offshore safety zone); '8' (degaussing area); '9' (military area); '12' (navigation aid safety zone); '14' (minefield); '18' (swimming

	area); '19' (waiting area); '21' (dredging area); '24' (no wake area); '25' (swinging area); '26' (water skiing area)?
CATREA inc. 4; 5; 6; 7; 10; 20; 22; 23?	Does the value of the attribute 'CATREA' include at least one of the following values: '4' (nature area); '5' (bird sanctuary); '6' (game preserve); '7' (seal sanctuary); '10' (historic wreck); '20' (research area); '22' (fish sanctuary); '23' (ecological reserve)?
SY(CTYARE71)	Draw the symbol 'CTYARE71' in the center of the visible part of the calling object area.
SY(CTYARE51)	Draw the symbol 'CTYARE51' in the center of the visible part of the calling object area.
CATREA inc. 4; 5; 6; 7; 10; 20; 22; 23?	Does the value of the attribute 'CATREA' include at least one of the following values: '4' (nature area); '5' (bird sanctuary); '6' (game preserve); '7' (seal sanctuary); '10' (historic wreck); '20' (research area); '22' (fish sanctuary); '23' (ecological reserve)?
SY(INFARE51)	Draw the symbol 'INFARE51' in the center of the visible part of the calling object area.
SY(RSRDEF51)	An unrecognized value of 'CATREA" was given. Draw the symbol 'RSRDEF51' in the center of the visible part of the calling object area.
Symbolized area boundaries?	Has mariner selected Symbolized Area Boundaries?
LC(CTYARE51)	Symbolize area boundary with the pattern line 'CTYARE51'
LS(DASH,2,CHMGD)	Symbolize area boundary with the dash line with the width '2' and the color 'CHMGD'.
Exit Procedure	Symbolization is finished

~~12.2.16~~13.2.16 Conditional Symbology Procedure ~~'RESTRNnn'~~RESTRN01

Applies to: The following S-57 Object Class objects, but only when they carry the attribute RESTRN:

TSSLPT, TSSRON, TSSCRS, DWRTPT, PRCARE, ISTZNE;FAIRWAY, DRGARE, ACHARE; CBLARE, PIPARE, DMPGRD, MARCUL; OSPARE, SUBTLN, SPLARE, MIPARE, ICNARE; TESARE.

Spatial Object(s): Area

Attribute(s) used: CATREA, RESTRN (used by sub procedure RESCSPnn)

User Parameter(s): ~~Object to be symbolized from ENC.~~ Symbolize Area Boundaries (used by sub procedure RESCSPnn)

Defaults: ~~Symbolization given by the look-up table~~Display Priority given by look-up table; OVERRADAR priority given by look-up table; Display Category given by look-up table; Viewing Group given by look-up table.

Remarks: Objects subject to RESTRNnn are actually symbolised in sub-process RESCSPnn, since the latter ~~can~~is also be accessed from other conditional symbology procedures. RESTRNnn merely acts as a ~~«~~"signpost~~»~~" for RESCSPnn.

Object class RESARE is symbolised for the effect of attribute RESTRN in a separate conditional symbology procedure called RESAREnn.

Since many of the areas concerned cover shipping channels, the number of symbols used is minimised to reduce clutter. To do this, values of RESTRN are ranked for significance as follows:

"Traffic Restriction" values of RESTRN:

~~(1)~~ RESTRN 7,8: entry prohibited or restricted

RESTRN 14: IMO designated «area to be avoided» part of a TSS

~~(2)~~ RESTRN 1,2: anchoring prohibited or restricted

~~(3)~~ RESTRN 3,4,5,6: fishing or trawling prohibited or restricted

~~(4)~~ "Other Restriction" values of RESTRN are:

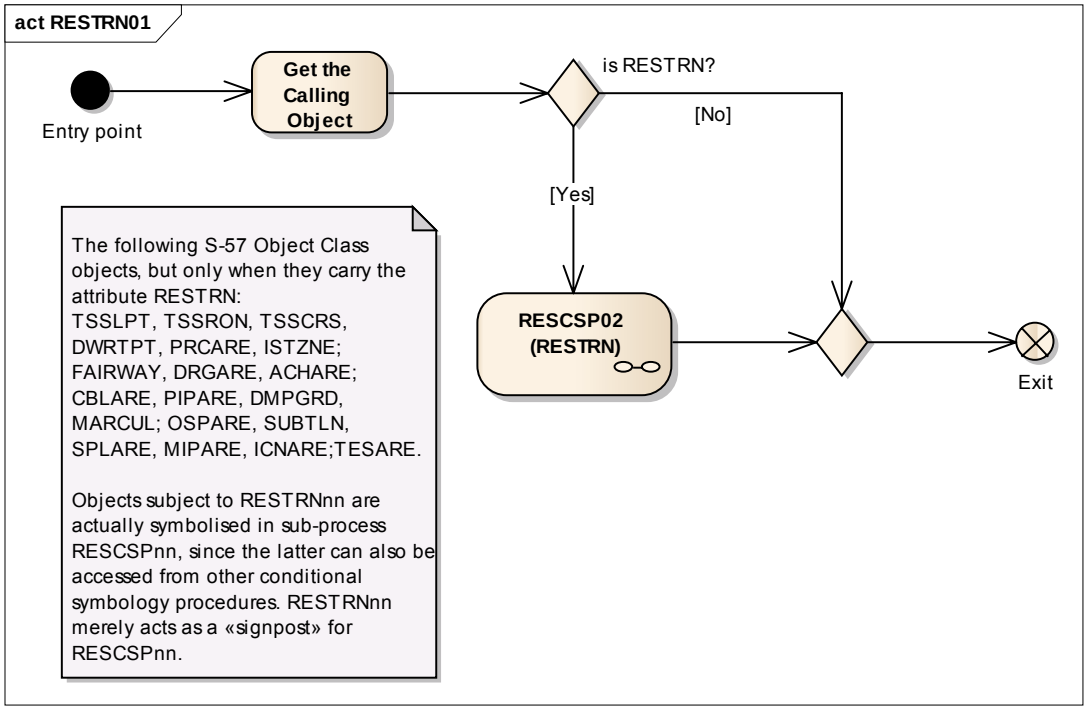
RESTRN 9,10: dredging prohibited or restricted,

RESTRN 11, 12: diving prohibited or restricted,

RESTRN 13: no wake area.

Note: ~~unlike~~ Unlike all other originators of conditional symbology procedures, RESTRN is an attribute, not an object class. It is therefore not possible to provide viewing groups for the restrictions it imposes without creating undesirable complications in the procedure.

Figure 27 RESTRN01 procedure



Entry point	
Get the Calling Object	Get the object which is calling this procedure
is RESTRN?	Is the attribute 'RESTRN' present and is the value given?
RESCSP02 (RESTRN)	The sub-procedure to draw symbology of restrictions in the area, see " *13.2.17 Conditional Symbology Procedure RESCSP02*"
RESTRN	Input parameter – value of RESTRN attribute of the calling object
Exit	Symbolization for 'RESTRN' finished.

~~12.2.17~~13.2.17 Conditional Symbology Procedure ~~'RESCSPnn'~~RESCSP02

~~(~~**Note that this is called as a sub-procedure by DEPAREnn and RESTRNnn**~~)~~

Applies to: Applies to the following S-57 Object Classes, but only when they carry the attribute **RESTRN:** TSSLPT, TSSRON, TSSCRS, DWRTPT, PRCARE, ISTZNE; FAIRWAY, DRGARE, ACHARE; CBLARE, PIPARE, DMPGRD, MARCUL; OSPARE, SUBTLN, SPLARE, MIPARE, ICNARE; TESARE;

Spatial Object(s): Area

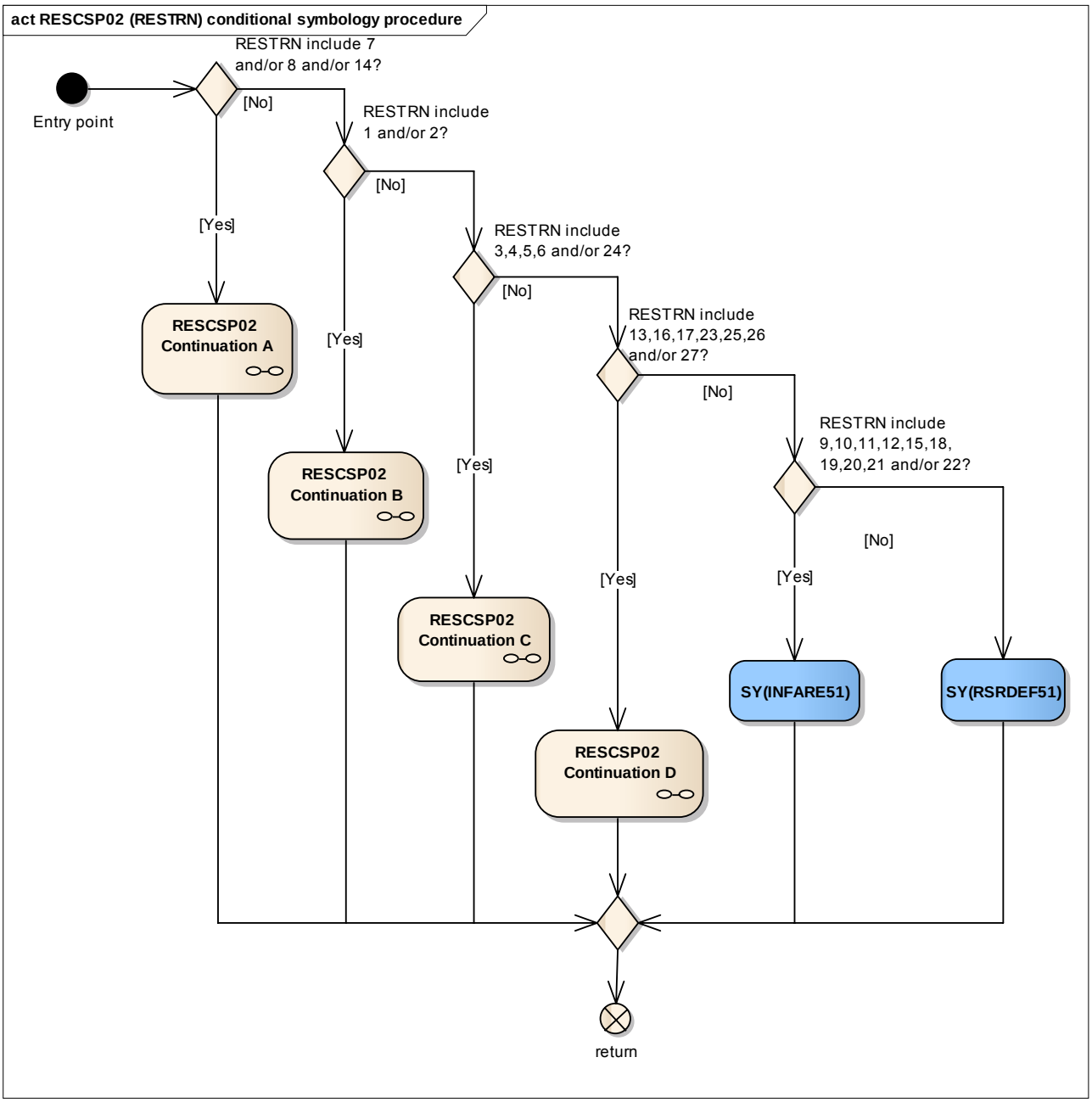
Parameter(s): Object to be symbolised from ENC.

Attribute(s) used: The attribute 'RESTRN' value is passed on to this procedure by the calling procedure.

Defaults: Symbolization given by the look-up table ;
Display Priority given by look-up table ;
OVERRADAR priority given by look-up table ;
Display Category given by look-up table ;
Viewing Group given by look-up table.

Remarks: See procedure RESTRNnn

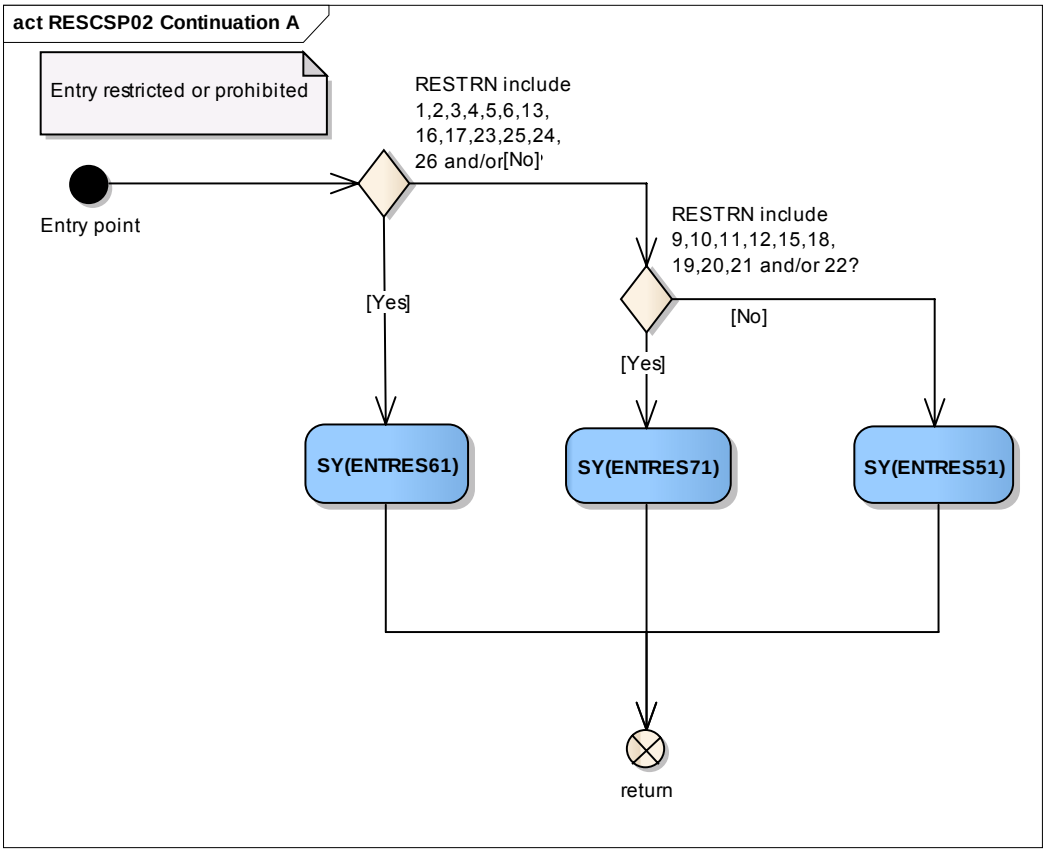
Figure 28 RESCSP02 (RESTRN) sub-procedure



Entry point	
RESTRN include 7 and/or 8 and/or 14?	Does the value of the attribute RESTRN include at least one of the following values: '7' (entry prohibited); '8' (entry restricted); '14' (area to be avoided)?
RESCSP02 Continuation A	RESCSP02 Continuation A, see *Figure 31*
RESTRN include 1; 2?	Does the value of the attribute RESTRN include at least one of the following values: '1' (anchoring prohibited); '2' (anchoring restricted) ?

RESCSP02 Continuation B	RESCSP02 Continuation B, see *Figure 32*
RESTRN include 3,4,5,6; 24?	Does the value of the attribute RESTRN include at least one of the following values: '3' (fishing prohibited); '4' (fishing restricted); '5' (trawling prohibited); '6' (trawling restricted); '24' (dragging prohibited)?
RESCSP02 Continuation C	RESCSP02 Continuation C, see *Figure 33*
RESTRN include 13,16,17,23,25,26; 27?	Does the value of the attribute RESTRN include at least one of the following values: '13' (no wake area); '16' (discharging prohibited); '17' (discharging restricted); '23' (lightering prohibited); '25' (stopping prohibited); '26' (landing prohibited); '27' (speed restricted)?
RESCSP02 Continuation D	RESCSP02 Continuation D, see *Figure 34*
RESTRN include 9,10,11,12,15,18, 19,20,21; 22?	Does the value of the attribute RESTRN include at least one of the following values: '9' (dredging prohibited); '10' (dredging restricted); '11' (diving prohibited); '12' (diving restricted); '15' (construction prohibited); '18' (development prohibited); '19' (development restricted); '20' (drilling prohibited); '21' (drilling restricted); '22' (removing artifacts prohibited)?
SY(INFARE51)	Draw the symbol 'INFARE51' in the center of the visible part of the calling object area.
SY(RSRDEF51)	An unknown value of 'RESTRN' was given. Draw the symbol 'RSRDEF51' in the center of the visible part of the calling object area.
return	Return to the calling procedure.

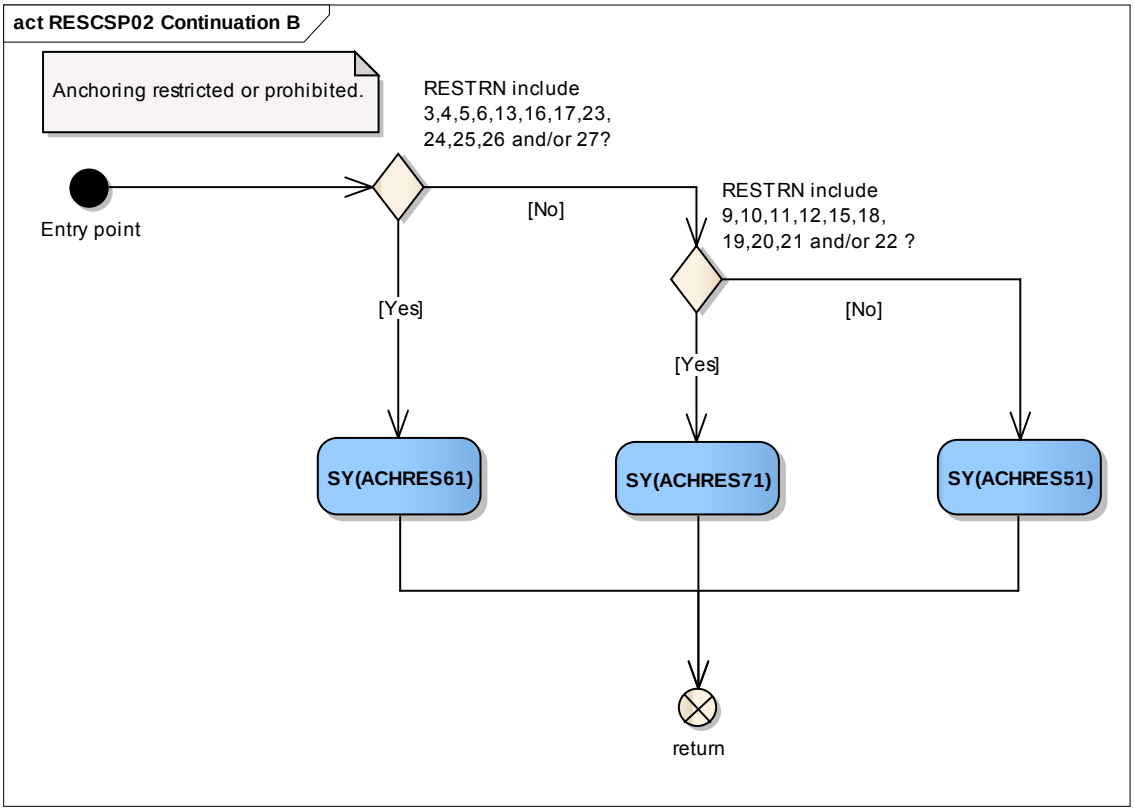
Figure 29 RESCSP02 Continuation A Entry restricted or prohibited



Entry point	
RESTRN include 1,2,3,4,5,6,13, 16,17,23,25,24, 26; 27?	Does the value of the attribute RESTRN include at least one of the following values: '1' (anchoring prohibited); '2' (anchoring restricted); '3' (fishing prohibited); '4' (fishing restricted); '5' (trawling prohibited); '6' (trawling restricted); '13' (no wake area); '16' (discharging prohibited); '17' (discharging restricted); '23' (lightering prohibited); '25' (stopping prohibited); '24' (dragging prohibited); '26' (landing prohibited); '27' (speed restricted)?
SY(ENTRES61)	Draw the symbol 'ENTRES61' in the center of the visible part of the calling object area.
RESTRN include 9,10,11,12,15,18, 19,20,21; 22?	Does the value of the attribute RESTRN include at least one of the following values: '9' (dredging prohibited); '10' (dredging restricted); '11' (diving prohibited); '12' (diving restricted); '15' (construction prohibited); '18' (development prohibited); '19' (development restricted); '20' (drilling prohibited); '21' (drilling restricted); '22' (removing artifacts prohibited)?
SY(ENTRES71)	Draw the symbol 'ENTRES71' in the center of the visible part of the calling object area.

SY(ENTRES51)	Draw the symbol 'ENTRES51' in the center of the visible part of the calling object area.
return	Return to the calling procedure

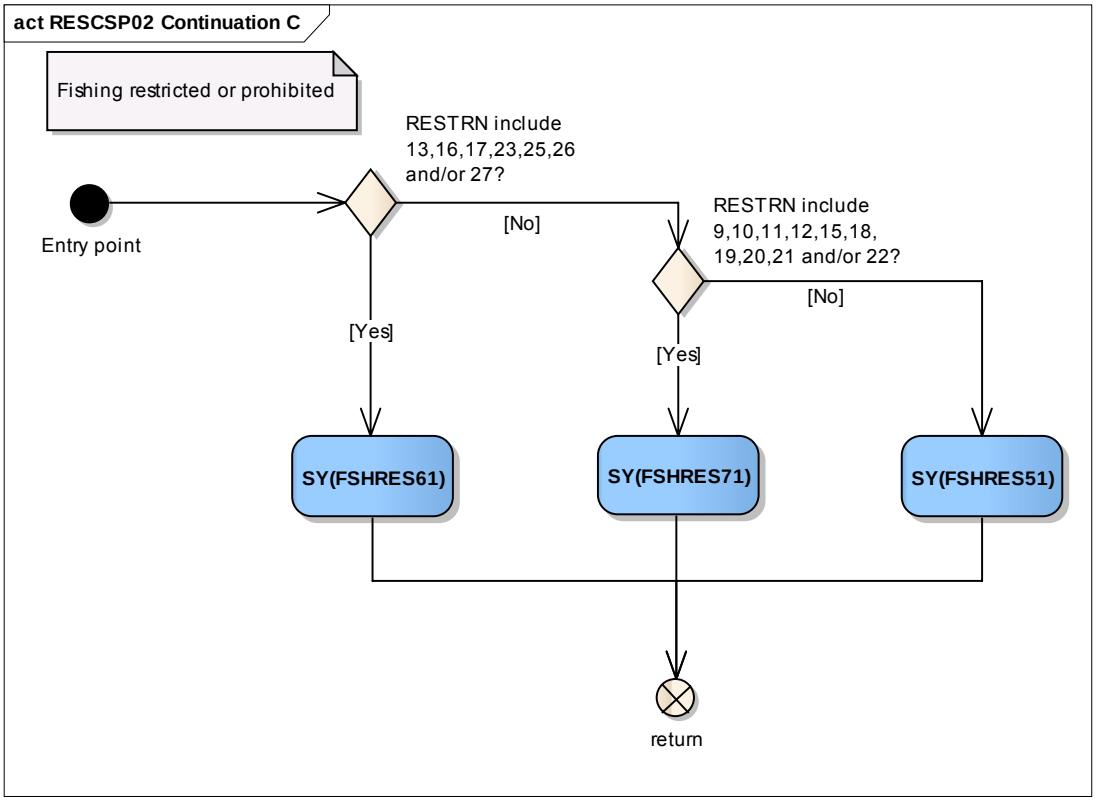
Figure 30 RESCSP02 Continuation B Anchoring restricted or prohibited.



Entry point	
RESTRN include 3,4,5,6,13,16,17,23, 24,25,26; 27?	Does the value of the attribute RESTRN include at least one of the following values: '3' (fishing prohibited); '4' (fishing restricted); '5' (trawling prohibited); '6' (trawling restricted); '13' (no wake area); '16' (discharging prohibited); '17' (discharging restricted); '23' (lightering prohibited); '24' (dragging prohibited); '25' (stopping prohibited); '26' (landing prohibited); '27' (speed restricted)?
SY(ACHRES61)	Draw the symbol 'ACHRES61' in the center of the visible part of the calling object area.
RESTRN include 9,10,11,12,15,18, 19,20,21; 22 ?	Does the value of the attribute RESTRN include at least one of the following values: '9' (dredging prohibited); '10' (dredging restricted); '11' (diving prohibited); '12' (diving restricted); '15' (construction prohibited); '18' (development prohibited); '19' (development restricted); '20' (drilling prohibited); '21' (drilling restricted); '22' (removing artifacts prohibited)?

SY(ACHRES71)	Draw the symbol 'ACHRES71' in the center of the visible part of the calling object area.
SY(ACHRES51)	Draw the symbol 'ACHRES51' in the center of the visible part of the calling object area.
return	Return to the calling procedure

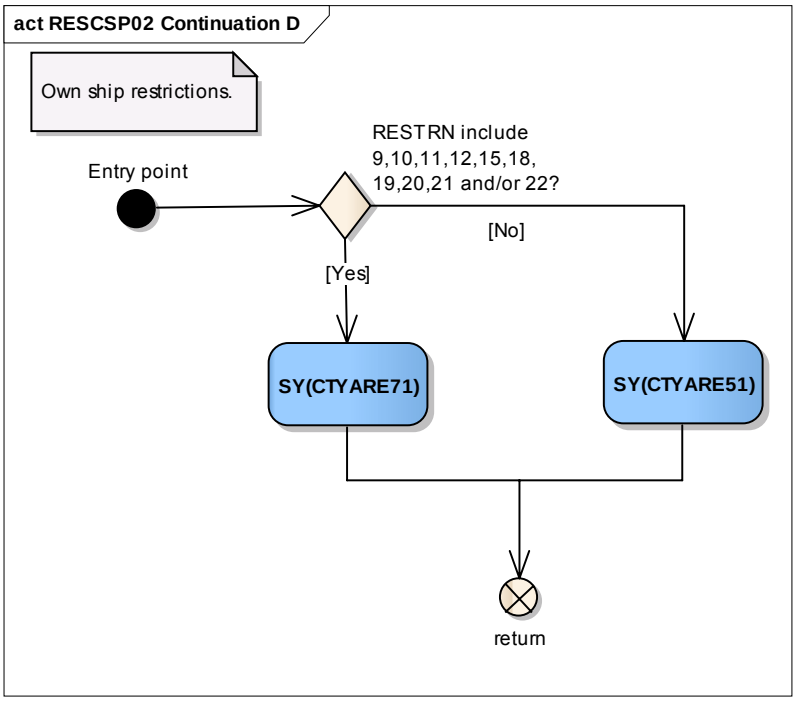
Figure 31 RESCSP02 Continuation C Fishing restricted or prohibited



Entry point	
RESTRN include 13,16,17,23,25,26; 27?	Does the value of the attribute RESTRN include at least one of the following values: '13' (no wake area); '16' (discharging prohibited); '17' (discharging restricted); '23' (lightering prohibited); '25' (stopping prohibited); '26' (landing prohibited); '27' (speed restricted)?
SY(FSHRES61)	Draw the symbol 'FSHRES61' in the center of the visible part of the calling object area.
RESTRN include 9,10,11,12,15,18, 19,20,21; 22?	Does the value of the attribute RESTRN include at least one of the following values: '9' (dredging prohibited); '10' (dredging restricted); '11' (diving prohibited); '12' (diving restricted); '15' (construction prohibited); '18' (development prohibited); '19' (development restricted); '20' (drilling prohibited); '21' (drilling restricted); '22' (removing artifacts prohibited)?

SY(FSHRES71)	Draw the symbol 'FSHRES71' in the center of the visible part of the calling object area.
SY(FSHRES51)	Draw the symbol 'FSHRES51' in the center of the visible part of the calling object area.
return	Return to the calling procedure

Figure 32 RESCSP02 Continuation D Own ship restrictions.



Entry point	
RESTRN include 9,10,11,12,15,18, 19,20,21; 22?	Does the value of the attribute RESTRN include at least one of the following values: '9' (dredging prohibited); '10' (dredging restricted); '11' (diving prohibited); '12' (diving restricted); '15' (construction prohibited); '18' (development prohibited); '19' (development restricted); '20' (drilling prohibited); '21' (drilling restricted); '22' (removing artifacts prohibited)?
SY(CTYARE71)	Draw the symbol 'CTYARE71' in the center of the visible part of the calling object area.
SY(CTYARE51)	Draw the symbol 'CTYARE51' in the center of the visible part of the calling object area.
return	Return to the calling procedure

~~12.2.18~~ 13.2.18 Conditional Symbology Procedure ~~'SAFCONnn'~~SAFCON01

~~(~~Note that this is called as a sub-procedure by DEPAREnn and DEPCNTnn~~)~~

Applies to: ~~Edges~~symbolize edges that are part of the safety contour and depth contours.

Spatial Object(s): Line

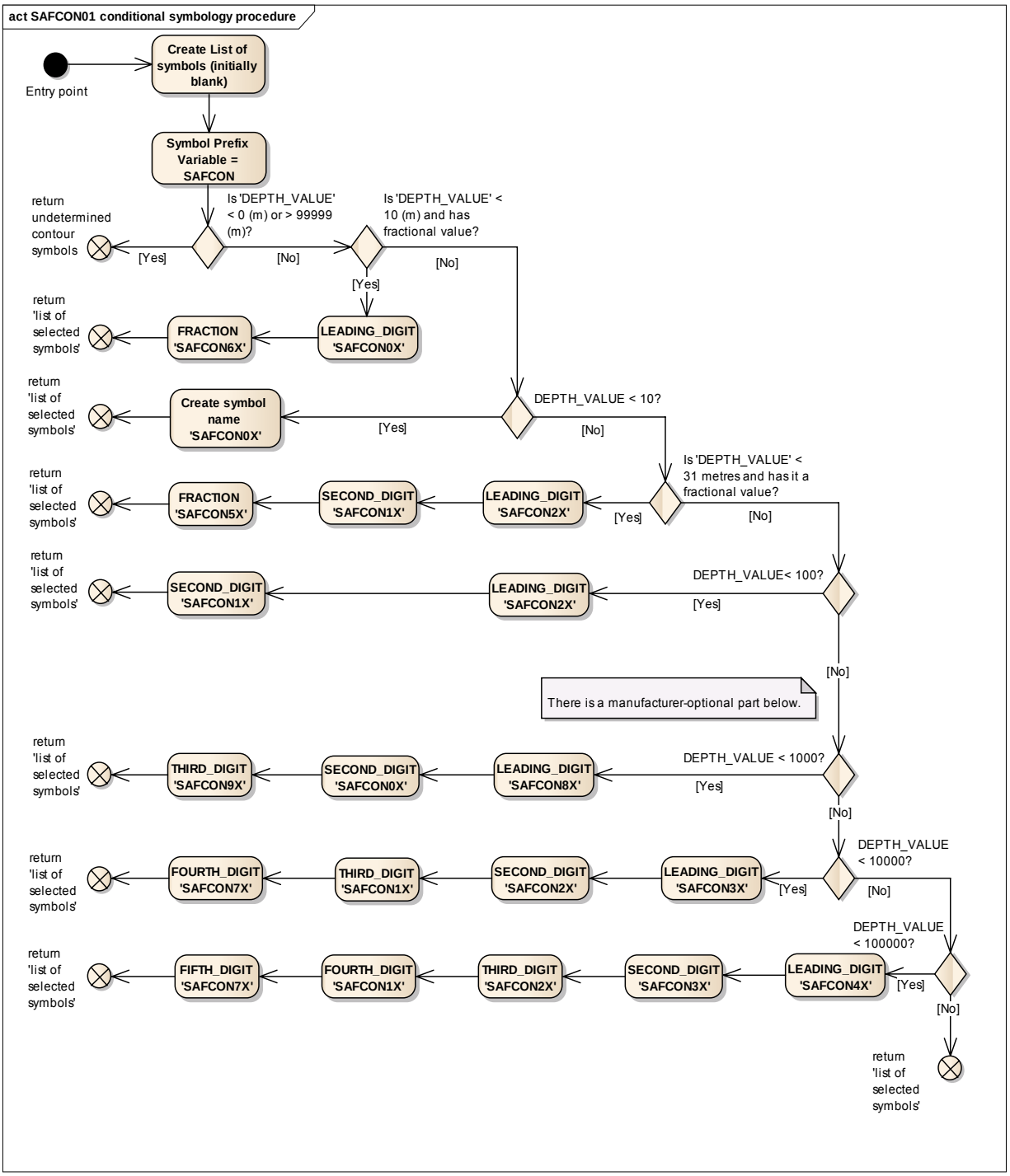
~~Parameter(s): The depth value of the contour to be displayed.~~

Parameter(s): Input parameter is the local variable 'DEPTH_VALUE' passed from the called procedure. A list of symbols is returned.

Remarks: This conditional procedure will create a list of symbols name selected that will be displayed at the ~~position~~mid-point of the ~~contour label~~edge.

Note: ~~Continuation A of this procedure, which symbolises~~ The contours symbolization of 100 ~~metres~~meters and deeper~~,~~ is manufacturer-optional. The symbols required are contained in the digital version of the Symbol Library, but are not contained in the man-readable version.

Figure 33 SAFCON01 sub-procedure



Entry point	
Create List of symbols (initially blank)	Create a 'list of symbols' to be presented at the position of the contour label. This list is initially blank.
Symbol Prefix Variable = SAFCON	Set the symbol prefix variable to 'SAFCON'.

Is 'DEPTH_VALUE' < 0 (m) or > 99999 (m)?	Is 'DEPTH_VALUE' < 0 or 'DEPTH_VALUE' > 99999 metres?
return undetermined contour symbols	Return to the calling procedure with empty 'list of symbols'
Is 'DEPTH_VALUE' < 10 (m) and has fractional value?	Is 'DEPTH_VALUE' < 10 m and 'DEPTH_VALUE' has the fractional part?
LEADING_DIGIT 'SAFCON0X'	Isolate 'LEADING_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '00' + 'LEADING_DIGIT' to 'SYMBOL_PREFIX' (e.g. 3.6 metres - isolate '3' and create 'SAFCON03'). Add this symbol name to the 'list of symbols' to be presented.
FRACTION 'SAFCON6X'	Isolate 'FRACTION' of 'DEPTH_VALUE' and multiply by 10. Truncate all digits after the decimal. Do not round up. Create symbol name by adding '60' + 'FRACTION' to 'SYMBOL_PREFIX'. Add this symbol name to the 'list of symbols' to be presented.
return 'list of selected symbols'	Return to the calling procedure 'list of symbols'
DEPTH_VALUE < 10?	Is 'DEPTH_VALUE' < 10 metres?
Create symbol name 'SAFCON0X'	Create symbol name by adding '00' + 'DEPTH_VALUE' to 'SYMBOL_PREFIX'. Add this symbol name to the 'list of symbols' to be presented.
return 'list of selected symbols'	Return to the calling procedure 'list of symbols'
Is 'DEPTH_VALUE' < 31 metres and has it a fractional value?	(Note: common practice in hydrography is to show fractions of a depth value up to 30 metres depth).
LEADING_DIGIT 'SAFCON2X'	Isolate 'LEADING_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '20' + 'LEADING_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the 'list of symbols' to be presented.
SECOND_DIGIT 'SAFCON1X'	Isolate 'SECOND_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '10' + 'SECOND_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the 'list of symbols' to be presented.
FRACTION 'SAFCON5X'	Isolate 'FRACTION' of 'DEPTH_VALUE' and multiply by 10. Truncate all digits after the decimal. Do not round up. Create symbol name by adding '50' + 'FRACTION' to 'SYMBOL_PREFIX'. Add this symbol name to the 'list of symbols' to be presented.
return 'list of selected symbols'	Return to the calling procedure 'list of symbols'
DEPTH_VALUE< 100?	Is 'DEPTH_VALUE' < 100 metres?

LEADING_DIGIT 'SAFCON2X'	Isolate 'LEADING_DIGIT' of 'DEPTH_VALUE'/ Create symbol name by adding '20' + 'LEADING_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the 'list of symbols' to be presented.
SECOND_DIGIT 'SAFCON1X'	Isolate 'SECOND_DIGIT' of 'DEPTH_VALUE'. Create symbol nmae by adding '10' + 'SECOND_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the 'list of symbols' to be presented.
return 'list of selected symbols'	Return to the calling procedure ‘list of symbols’
Note: the following routine is manufacturer-optional.	
DEPTH_VALUE < 1000?	Is 'DEPTH_VALUE' < 1000 metres?
LEADING_DIGIT 'SAFCON8X'	Isolate 'LEADING_DIGIT' of 'DEPTH_VALUE'/ Create symbol name by adding '80' + 'LEADING_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the 'list of symbols' to be presented.
SECOND_DIGIT 'SAFCON0X'	Isolate 'SECOND_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '00' + 'SECOND_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the 'list of symbols' to be presented.
THIRD_DIGIT 'SAFCON9X'	Isolate 'THIRD_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '90' + 'THIRD_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the 'list of symbols' to be presented.
return 'list of selected symbols'	Return to the calling procedure ‘list of symbols’
DEPTH_VALUE < 10000?	Is 'DEPTH_VALUE' < 10000 metres?
LEADING_DIGIT 'SAFCON3X'	Isolate 'LEADING_DIGIT' of 'DEPTH_VALUE'/ Create symbol name by adding '30' + 'LEADING_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the 'list of symbols' to be presented.
SECOND_DIGIT 'SAFCON2X'	Isolate 'SECOND_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '20' + 'SECOND_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the 'list of symbols' to be presented.
THIRD_DIGIT 'SAFCON1X'	Isolate 'THIRD_DIGIT' of 'DEPTH_VALUE'. Create symbol nmae by adding '10' + 'THIRD_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the 'list of symbols' to be presented.
FOURTH_DIGIT 'SAFCON7X'	Isolate 'FOURTH_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '70' + 'FOURTH_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the 'list of symbols' to be presented.
return 'list of selected symbols'	Return to the calling procedure ‘list of symbols’

DEPTH_VALUE < 100000?	Is 'DEPTH_VALUE' < 10000 metres?
LEADING_DIGIT 'SAFCON4X'	Isolate 'LEADING_DIGIT' of 'DEPTH_VALUE'/ Create symbol name by adding '40' + 'LEADING_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the 'list of symbols' to be presented.
SECOND_DIGIT 'SAFCON3X'	Isolate 'SECOND_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '30' + 'SECOND_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the 'list of symbols' to be presented.
THIRD_DIGIT 'SAFCON2X'	Isolate 'THIRD_DIGIT' of 'DEPTH_VALUE'. Create symbol nmae by adding '20' + THIRD_DIGIT to 'SYMBOL_PREFIX'. Add this symbol name to the 'list of symbols' to be presented.
FOURTH_DIGIT 'SAFCON1X'	Isolate 'FOURTH_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '10' + 'FOURTH_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the 'list of symbols' to be presented.
FIFTH_DIGIT 'SAFCON7X'	Isolate 'FIFTH_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '70' + 'FIFTH_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the 'list of symbols' to be presented.
return 'list of selected symbols'	Return to the calling procedure ‘list of symbols’

~~12.2.19~~13.2.19 Conditional Symbology Procedure ~~'SLCONSnn'~~SLCONS03

Applies to: S-57 Object Class "shoreline construction" (SLCONS)

Spatial Object(s): Point, Line, Area

Attribute(s) used: S57 Spatial attribute QUAPOS

User Parameter(s): ~~Object to be symbolised from SENC~~ None.

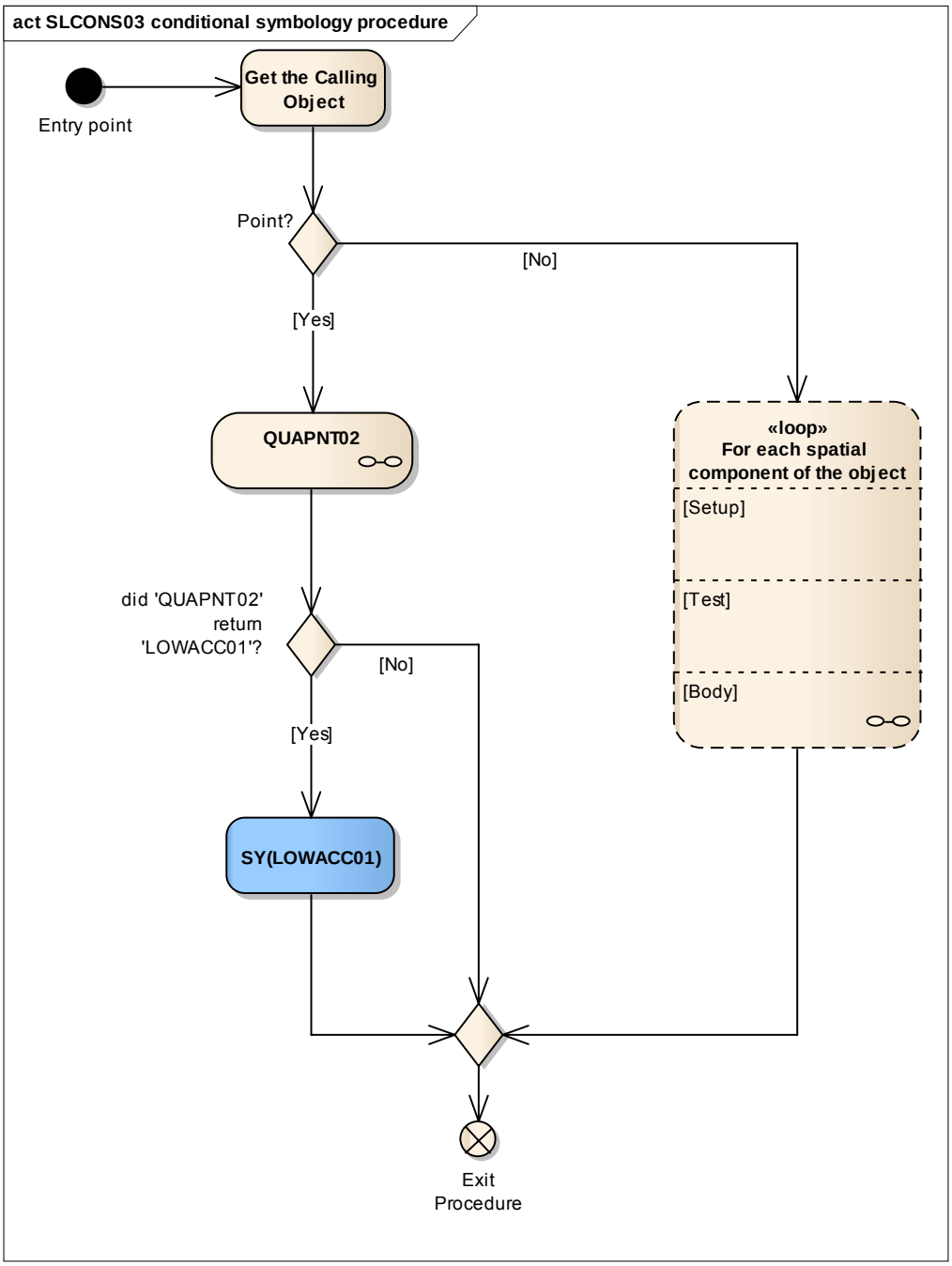
Defaults: Display Priority given by look-up table; OVERRADAR priority given by look-up table; Display Category given by look-up table; Viewing Group given by look-up table. Note these parameters may vary depending on the feature's geometric primitive.

Remarks: Shoreline construction objects which have a QUAPOS attribute on their spatial component indicating that their position is unreliable are symbolized by a special linestyle in the place of the varied linestyles normally used. Otherwise this procedure applies the normal symbolization.

Needs more description of how the procedure is formed, how the diagrams fit together and the <<loop>> construct…This symbolization is over and above what's in the existing lookup (i.e it give s asymbol + SY(SLCONS03)

Note: This procedure does not offer the option of removing the low accuracy symbol from a point object.

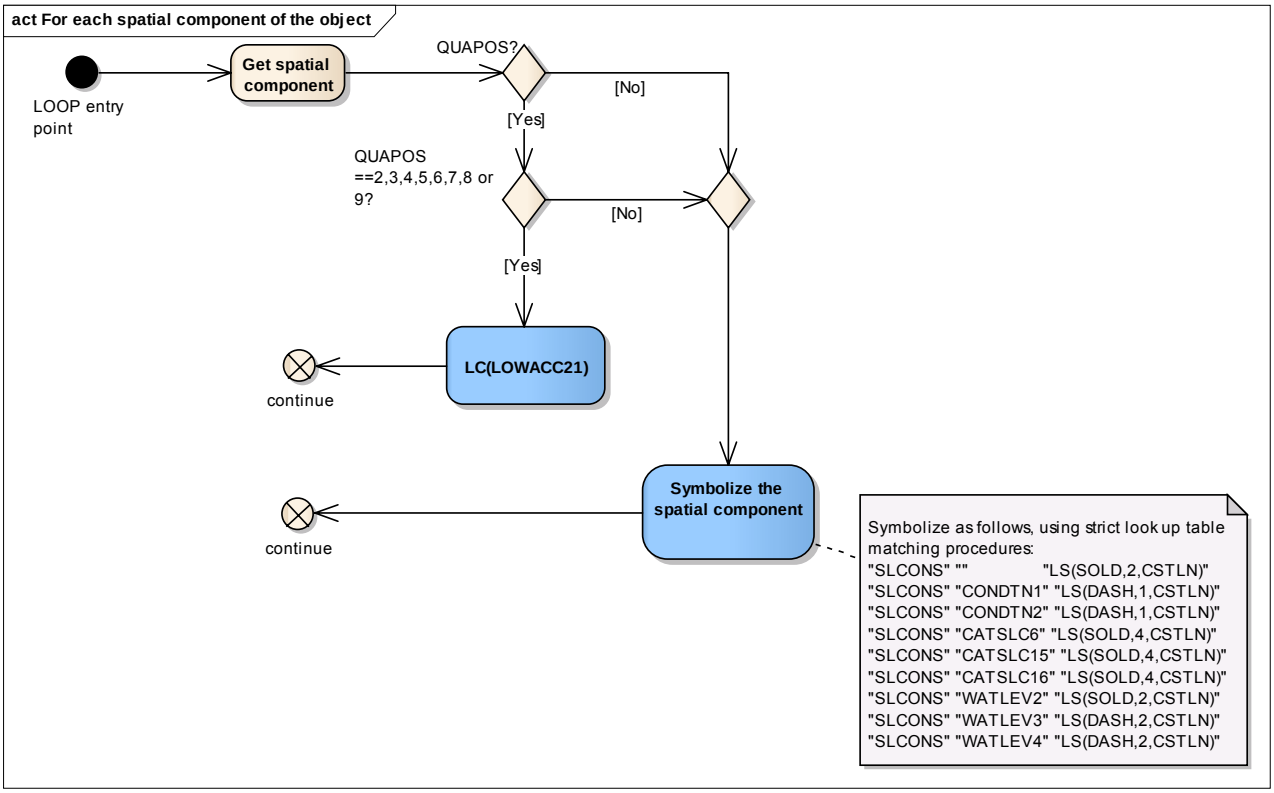
Figure 34 SLCONS03 procedure



Entry point	
Get the Calling Object	Get the object which is calling this procedure.
Point?	Is the object type Point?
QUAPNT02	Perform the symbology procedure 'QUAPNT02' which returns a flag indicating whether or not to display the low accuracy symbol and returns the selected symbol 'LOWACC01'

Calling Object	Input parameter
LOWACC01	Output parameter
did 'QUAPNT02' return 'LOWACC01'?	Is the symbol 'LOWACC01' selected by the procedure 'QUAPNT02'?
SY(LOWACC01)	If so indicated by the procedure 'QUAPNT02', draw the returned low accuracy symbol 'LOWACC01' at the calling object's location.
Loop for each spatial component of the object	Loop for each spatial component of area or line object which is calling the procedure, see *Figure 37*
Exit Procedure	Symbolization is finished

Figure 35 Loop for each spatial component of area and line SLCONS object



LOOP entry point	
Get spatial component	Get the next spatial component of the calling object.
QUAPOS?	Is the value of the QUAPOS given?
QUAPOS ==2,3,4,5,6,7,8 or 9?	Is the value of QUAPOS equal to: 2, 3, 4, 5, 6, 7, 8 or 9?
LC(LOWACC21)	Draw spatial component with line pattern 'LOWACC21'

Symbolize the spatial component	Symbolize the spatial component with as follows, using strict look up table matching procedures: "SLCONS" "" "LS(SOLD,2,CSTLN)" "SLCONS" "CONDTN1" "LS(DASH,1,CSTLN)" "SLCONS" "CONDTN2" "LS(DASH,1,CSTLN)" "SLCONS" "CATSLC6" "LS(SOLD,4,CSTLN)" "SLCONS" "CATSLC15" "LS(SOLD,4,CSTLN)" "SLCONS" "CATSLC16" "LS(SOLD,4,CSTLN)" "SLCONS" "WATLEV2" "LS(SOLD,2,CSTLN)" "SLCONS" "WATLEV3" "LS(DASH,2,CSTLN)" "SLCONS" "WATLEV4" "LS(DASH,2,CSTLN)"
continue	go to next spatial component of the object

~~12.2.20~~13.2.20 Conditional Symbology Procedure ~~'SEABEDnn'~~SEABED01

(Note that this is a sub-procedure called by DEPAREnn)

Applies to: Symbolization of areas that form the seabed

Remarks: This conditional procedure will create a Colour fill for depth areas (S-57)

Spatial Object(s): Area

Parameter(s):

~~Parameter(s):~~ DRVAL1 (minimum depth) passed from calling procedure

DRVAL2 (maximum depth) passed from calling procedure

SHALLOW_CONTOUR depth value selected by the mariner

SAFETY_CONTOUR depth value selected by the mariner

DEEP_CONTOUR depth value selected by the mariner

Required User parameters: The following ECDIS user parameters are required in the procedure. The manufacturer is responsible for setting default values as shown in square brackets.:

SHALLOW_CONTOUR = 2.0 [2 metres] (referred to as “SHC” in the diagrams).

DEEP_CONTOUR = 30.0 [30 metres]

SAFETY_CONTOUR = 30.0 [30 metres] (referred to as “SFC” in the diagrams)

TWO_SHADES [default = on] - flag selected by the mariner (TWO_SHADES 'on' draws 2 depth area colour shades, 'off' draws 4)

SHALLOW_PATTERN = [default = off] - flag selected by the mariner («optional»)

~~Required ECDIS startup values:~~ ~~The manufacturer is responsible for setting the following initial values:~~

~~SHALLOW_CONTOUR = 2.0 [meter]~~
~~DEEP_CONTOUR = 30.0 [meter]~~
~~SAFETY_CONTOUR = 30.0 [meter]~~
~~TWO_SHADES = on~~
~~SHALLOW_PATTERN = off~~

~~These~~The default values should stay in operation until the mariner decides to select other parameters.

~~Remarks: An area object that is part of the seabed is coloured as necessary according to the mariners selection of:~~

~~a. TWO DEPTH SHADES:~~

~~deep/safe water depth shade~~
~~***(safety contour)***~~
~~shallow/unsafe water depth shade~~

~~b. FOUR DEPTH SHADES:~~

~~deep water depth shade~~
~~*(deep contour)*~~
~~medium deep water depth shade~~
~~***(safety contour)***~~
~~medium shallow water depth shade~~
~~*(shallow contour)*~~
~~very shallow water depth shade~~

~~This requires a decision making process provided by this conditional symbology procedure. Note that this procedure is called as a sub-procedure by other conditional symbology procedures.~~

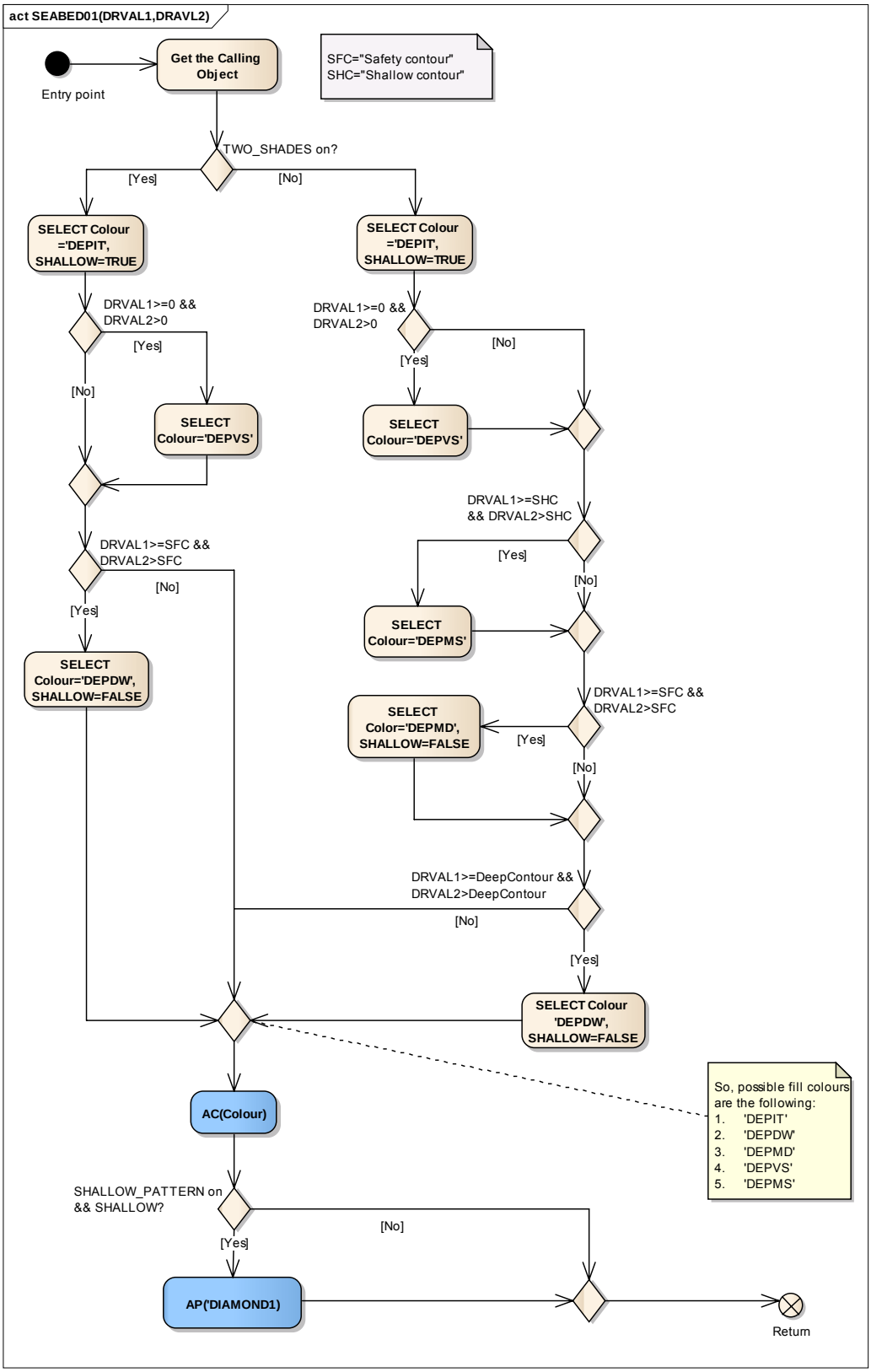
Note: The requirement to show four depth shades is not mandatory. ~~Also,~~ However the requirement to ~~show~~for ECDIS to have the ability to display the shallow pattern is ~~not~~now mandatory. ~~However, both these features are strongly recommended.~~

In addition the following local variables are used by the procedure:

COLOUR

SHALLOW

Figure 36 SEABED01(DRVAL1,DRAVL2) sub-procedure


act SEABED01(DRVAL1,DRAVL2)
Entry point
Get the Calling Object
SFC="Safety contour"
SHC="Shallow contour"
TWO_SHADES on?
[Yes]
[No]
SELECT Colour ='DEPIT', SHALLOW=TRUE
SELECT Colour ='DEPIT', SHALLOW=TRUE
DRVAL1>=0 && DRVAL2>0
[Yes]
[No]
SELECT Colour='DEPVS'
DRVAL1>=0 && DRVAL2>0
[Yes]
[No]
SELECT Colour='DEPVS'
DRVAL1>=SHC && DRVAL2>SHC
[Yes]
[No]
SELECT Colour='DEPMS'
DRVAL1>=SFC && DRVAL2>SFC
[Yes]
[No]
SELECT Color='DEPMD', SHALLOW=FALSE
DRVAL1>=SFC && DRVAL2>SFC
[No]
[Yes]
SELECT Colour='DEPDW', SHALLOW=FALSE
DRVAL1>=DeepContour && DRVAL2>DeepContour
[No]
[Yes]
SELECT Colour 'DEPDW', SHALLOW=FALSE
So, possible fill colours are the following:
1. 'DEPIT'
2. 'DEPDW'
3. 'DEPMD'
4. 'DEPVS'
5. 'DEPMS'
AC(Colour)
SHALLOW_PATTERN on && SHALLOW?
[Yes]
[No]
AP('DIAMOND1)
Return

Entry point	
Get the Calling Object	Get the object which is calling main procedure DEPARE01 and input parameters DRVAL1 and DRVAL2
TWO_SHADES on?	Has the mariner selected the 'two-colour shading' for depth zones?
SELECT Colour ='DEPIT', SHALLOW=TRUE	Select colour name 'DEPIT' (intertidal area) and set local variable SHALLOW=TRUE
DRVAL1>=0 && DRVAL2>0	Is 'DRVAL1'>=0 metres (low water line) and is 'DRVAL2'>0 metres?
SELECT Colour='DEPVS'	Select colour name 'DEPVS'
DRVAL1>=SFC && DRVAL2>SFC	Is 'DRVAL1' greater than or equal to the value of the 'SAFETY CONTOUR' as selected by the mariner and is 'DRVAL2' greater than the value of the 'SAFETY CONTOUR'?
SELECT Colour='DEPDW', SHALLOW=FALSE	Select colour name 'DEPDW' and set local variable SHALLOW=FALSE
SELECT Colour ='DEPIT', SHALLOW=TRUE	Select colour name 'DEPIT' (intertidal area) and set local variable SHALLOW=TRUE
DRVAL1>=0 && DRVAL2>0	Is 'DRVAL1'>=0 metres (low water line) and is 'DRVAL2'>0 metres?
SELECT Colour='DEPVS'	Select colour name 'DEPVS'
DRVAL1>=SHC && DRVAL2>SHC	Is 'DRVAL1' greater than or equal to the value of the 'SHALLOW CONTOUR' as selected by the mariner and is 'DRVAL2' greater than the value of the 'SHALLOW CONTOUR'?
SELECT Colour='DEPMS'	Select colour name 'DEPMS'
DRVAL1>=SFC && DRVAL2>SFC	Is 'DRVAL1' greater than or equal to the value of the 'SAFETY CONTOUR' as selected by the mariner and is 'DRVAL2' greater than the value of the 'SAFETY CONTOUR'?
SELECT Color='DEPMD', SHALLOW=FALSE	Select colour name 'DEPMD' and set local variable SHALLOW=FALSE
DRVAL1>=DeepContour && DRVAL2>DeepContour	Is 'DRVAL1' greater than or equal to the value of the 'Deep Contour' as selected by the mariner and is 'DRVAL2' greater than the value of the 'Deep Contour'?
SELECT Colour 'DEPDW', SHALLOW=FALSE	Select colour name 'DEPDW' and set local variable SHALLOW=FALSE
AC(Colour)	Draw the area object with an opaque colour fill. Use the colour which was selected last.
SHALLOW_PATTERN on && SHALLOW?	Has the mariner decided to make shallow areas more prominent? 'SHALLOW_PATTERN' on and is 'SHALLOW' set to true?
AP('DIAMOND1)	Draw the fill pattern 'DIAMOND1' from the symbol library and show it on top of the area's colour fill.

Return	Return to the calling procedure

~~12.2.21~~13.2.21 Conditional Symbology Procedure ~~'SNDFRMnn'~~SNDFRM03

Applies to: Symbolization of depth values. (Note that this is a sub-procedure called by SOUNDGnn, OBSTRNnn, and WRECKSnn). It formats the passed value into a sounding form.

Spatial Object(s): Point

Parameter(s):

DEPTH_VALUE passed from calling procedure:

QUASOU and QUAPOS (if set)

Required ECDIS parameters: SAFETY_DEPTH selected by the mariner

The manufacturer is responsible for setting the SAFETY_DEPTH to 30 meters (see also conditional symbology procedures "DEPARENn" and "DEPCNTnn"). This value should stay in operation until the mariner decides to select another safety depth.

Remarks: Soundings differ from plain text because they have to be readable under all circumstances and their digits are placed according to special rules and according to the location of the feature object. This conditional symbology procedure accesses a set of carefully designed sounding symbols provided by the symbol library and compiles them into sounding labels. It also symbolizes swept depth and special symbols representing low reliability as indicated by attributes QUASOU and QUAPOS.

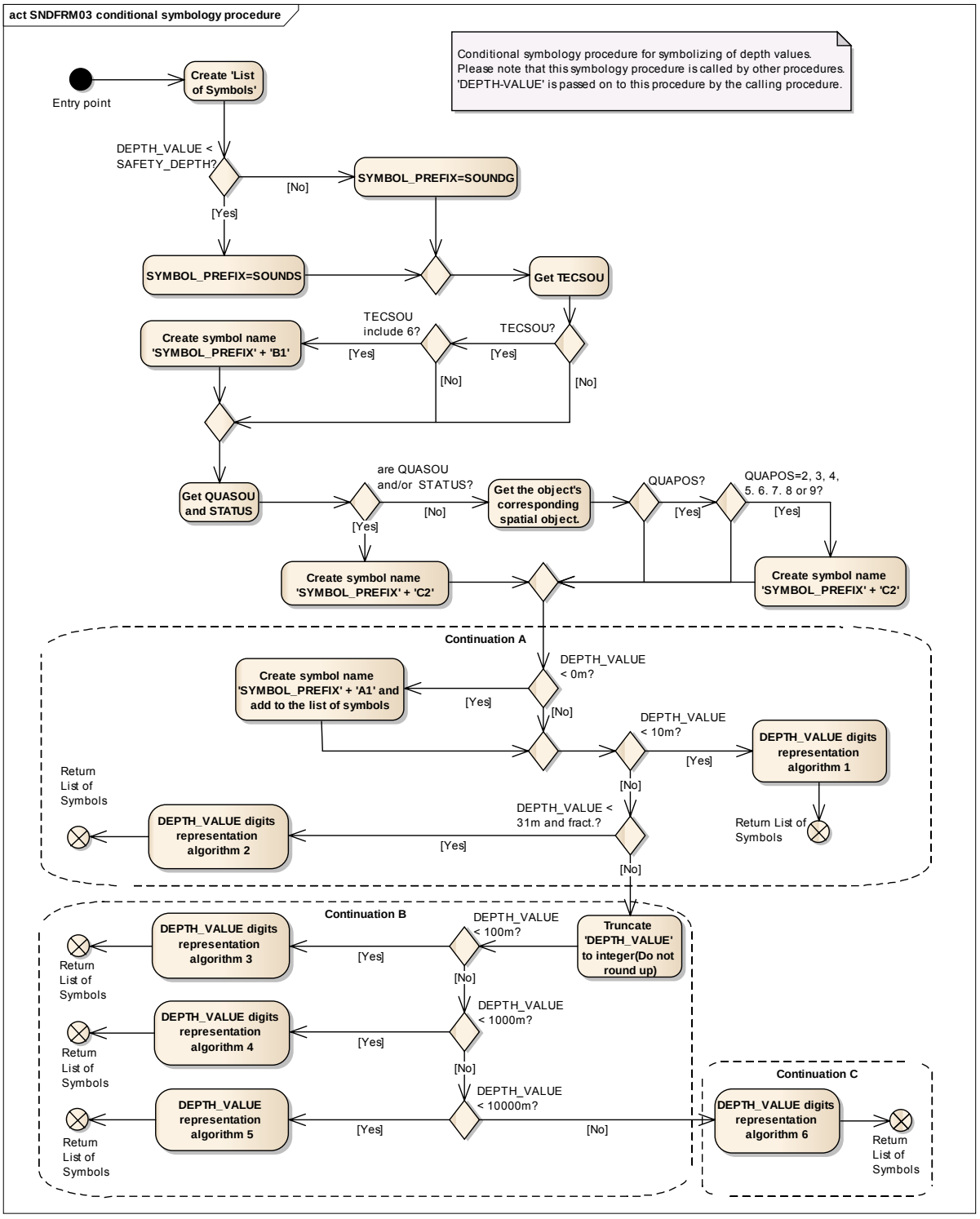

act SNDFRM03 conditional symbology procedure
Conditional symbology procedure for symbolizing of depth values.
Please note that this symbology procedure is called by other procedures.
'DEPTH-VALUE' is passed on to this procedure by the calling procedure.
Entry point
Create 'List of Symbols'
DEPTH_VALUE < SAFETY_DEPTH?
[No]
[Yes]
SYMBOL_PREFIX=SOUNDG
SYMBOL_PREFIX=SOUNDS
Get TECSOU
TECSOU? [Yes] [No]
TECSOU include 6? [Yes] [No]
Create symbol name 'SYMBOL_PREFIX' + 'B1'
Get QUASOU and STATUS
are QUASOU and/or STATUS? [Yes] [No]
Get the object's corresponding spatial object.
QUAPOS? [Yes]
QUAPOS=2, 3, 4, 5. 6. 7. 8 or 9? [Yes]
Create symbol name 'SYMBOL_PREFIX' + 'C2'
Create symbol name 'SYMBOL_PREFIX' + 'C2'
Continuation A
DEPTH_VALUE < 0m? [Yes] [No]
Create symbol name 'SYMBOL_PREFIX' + 'A1' and add to the list of symbols
DEPTH_VALUE < 10m? [Yes] [No]
DEPTH_VALUE digits representation algorithm 1
Return List of Symbols
DEPTH_VALUE < 31m and fract.? [Yes] [No]
DEPTH_VALUE digits representation algorithm 2
Return List of Symbols
Continuation B
DEPTH_VALUE < 100m? [Yes] [No]
DEPTH_VALUE digits representation algorithm 3
Truncate 'DEPTH_VALUE' to integer(Do not round up)
Return List of Symbols
DEPTH_VALUE < 1000m? [Yes] [No]
DEPTH_VALUE digits representation algorithm 4
Return List of Symbols
DEPTH_VALUE < 10000m? [Yes] [No]
DEPTH_VALUE representation algorithm 5
Return List of Symbols
Continuation C
DEPTH_VALUE digits representation algorithm 6
Return List of Symbols

Diagram "SNDFRM03 conditional symbology procedure" elements explanation:

[Insert proper explanation of how the sounding symbols are assembled.]

sounding digits (or continuation)…	**Depth Value**	**Key**
A_N	Depth < 10m	A=0 N=6
AB_N	Depth < 31m with fraction	A=2 B=1 N=5
AB	Depth <100m without fraction	A=2 B=1
ABC	Depth < 1,000m	A=8 B=0 C=9
A,BCD	Depth < 10,000	A=3 B=2 C=1 D=7
AB,CDE	Depth < 100,000	A=4 B=3 C=2 D=1 E=7

13.2.21 Conditional Symbology Procedure SNDFRM03

(Note that this is a sub-procedure called by SOUNDGnn, OBSTRNnn, and WRECKSnn)

Applies to: Symbolization of depth values. It formats the passed value into a sounding form.

Spatial Object(s): 3D Edge

Parameter(s):

DEPTH_VALUE passed from calling procedure;

QUAPOS of the spatial objects and QUASOU, TECSOU and STATUS of the object that are calling the main procedure

~~Applies to: Symbolization of depth values~~**Required ECDIS parameters:**

~~Spatial Object(s): Point~~

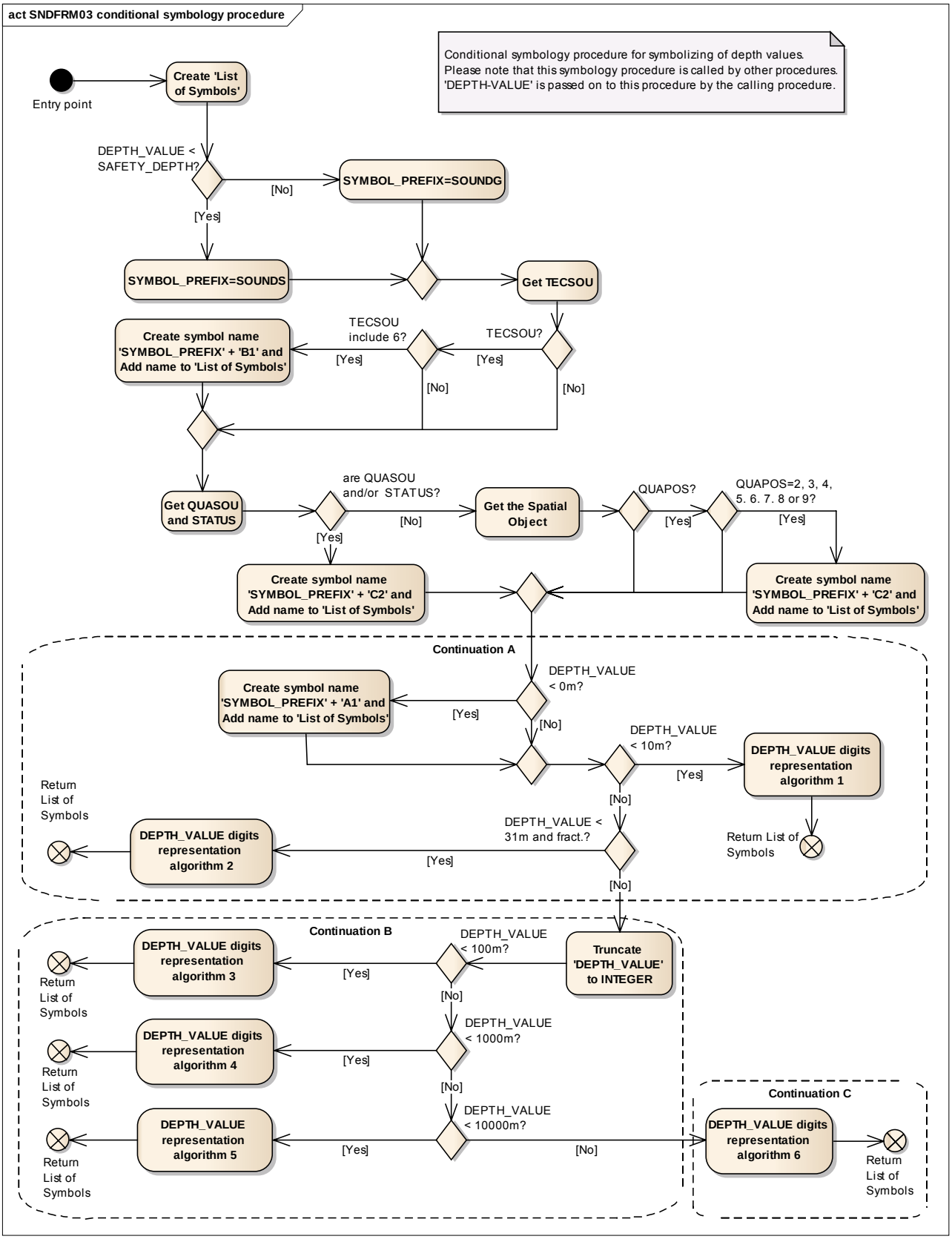
~~Parameter(s): DEPTH_VALUE passed from calling procedure~~SAFETY_DEPTH selected by the mariner

~~Required ECDIS~~

~~startup values:~~The manufacturer is responsible for setting the SAFETY_DEPTH to 30 meters (see also conditional symbology procedures "DEPAREnn" and "DEPCNTnn"). This value should stay in operation until the mariner decides to select another safety depth.

Remarks: Soundings differ from plain text because they have to be readable under all circumstances and their digits are placed according to special rules and according to the location of the feature object. This conditional symbology procedure accesses a set of carefully designed sounding symbols provided by the symbol library and ~~composes~~compiles them ~~to~~into sounding labels. It also symbolizes swept depth and ~~it also symbolizes for~~special symbols representing low reliability as indicated by attributes QUASOU, TECSOU, STATUS and QUAPOS.

Figure 37 SNDFRM03 sub-procedure


act SNDFRM03 conditional symbology procedure
Conditional symbology procedure for symbolizing of depth values.
Please note that this symbology procedure is called by other procedures.
'DEPTH-VALUE' is passed on to this procedure by the calling procedure.
Entry point
Create 'List of Symbols'
DEPTH_VALUE < SAFETY_DEPTH?
[No]
SYMBOL_PREFIX=SOUNDG
[Yes]
SYMBOL_PREFIX=SOUNDS
Get TECSOU
TECSOU include 6?
TECSOU?
[Yes]
[Yes]
[No]
[No]
Create symbol name 'SYMBOL_PREFIX' + 'B1' and Add name to 'List of Symbols'
Get QUASOU and STATUS
are QUASOU and/or STATUS?
[No]
[Yes]
Get the Spatial Object
QUAPOS?
[Yes]
QUAPOS=2, 3, 4, 5. 6. 7. 8 or 9?
[Yes]
Create symbol name 'SYMBOL_PREFIX' + 'C2' and Add name to 'List of Symbols'
Create symbol name 'SYMBOL_PREFIX' + 'C2' and Add name to 'List of Symbols'
Continuation A
DEPTH_VALUE < 0m?
Create symbol name 'SYMBOL_PREFIX' + 'A1' and Add name to 'List of Symbols'
[Yes]
[No]
DEPTH_VALUE < 10m?
[Yes]
DEPTH_VALUE digits representation algorithm 1
Return List of Symbols
[No]
DEPTH_VALUE < 31m and fract.?
[Yes]
DEPTH_VALUE digits representation algorithm 2
Return List of Symbols
[No]
Continuation B
DEPTH_VALUE < 100m?
Truncate 'DEPTH_VALUE' to INTEGER
[Yes]
DEPTH_VALUE digits representation algorithm 3
Return List of Symbols
[No]
DEPTH_VALUE < 1000m?
[Yes]
DEPTH_VALUE digits representation algorithm 4
Return List of Symbols
[No]
DEPTH_VALUE < 10000m?
[Yes]
DEPTH_VALUE representation algorithm 5
Return List of Symbols
[No]
Continuation C
DEPTH_VALUE digits representation algorithm 6
Return List of Symbols

Entry point	
Create 'List of Symbols'	Create 'List of Symbols' to be presented at the position of the sounding. This list is initially blank.
DEPTH_VALUE <= SAFETY_DEPTH?	Is the DEPTH_VALUE equal or LESS than the value of 'SAFETY_DEPTH' that was selected by the mariner?
SYMBOL_PREFIX=SOUNDS	Set local variable 'SYMBOL_PREFIX' to 'SOUNDS' (SOUNDing - Shallow). (Note: all sounding symbols with dominant colour have that prefix). [IMO PS 3.7]
SYMBOL_PREFIX=SOUNDG	Set local variable 'SYMBOL_PREFIX' to 'SOUNDG'. (SOUNDing - General) (Note: all sounding symbols with faint colour have that prefix).
Get TECSOU	Get the value of the calling object's attribute 'TECSOU'
TECSOU?	Is the value of the attribute 'TECSOU' given?
TECSOU include 6?	Does the attribute 'TECSOU' include 6 (swept depth)?
Create symbol name 'SYMBOL_PREFIX' + 'B1' and Add name to 'List of Symbols'	Create symbol name: 'SYMBOL_PREFIX' + 'B1' (i.e. 'SOUNDSB1' or 'SOUNDGB1'). Add this symbol name to the list of symbols to be presented
Get QUASOU and STATUS	Get the value of the object's attributes 'QUASOU' and 'STATUS'. (Attribute 'QUAPOS' is on the spatial object).
are QUASOU and/or STATUS?	Is the value of 'QUASOU' given and does it include '3','4','5','8' or '9' AND/OR Is the value of 'STATUS' given and does it include '18' (uncertain sounding)?
Create symbol name 'SYMBOL_PREFIX' + 'C2' and Add name to 'List of Symbols'	Create symbol name: 'SYMBOL_PREFIX' + 'C2' (i.e. SOUNDSC2' or 'SOUNDGC2'). Add this symbol to the 'List of symbols' to be presented.
Get the Spatial Object	Get the corresponding spatial object of the calling object.
QUAPOS?	Is the value od the attribute 'QUAPOS' given?
QUAPOS=2, 3, 4, 5, 6, 7, 8 or 9?	Does the spatial object have attribute 'QUAPOS' equal to 2, 3, 4, 5, 6, 7, 8 or 9?
Create symbol name 'SYMBOL_PREFIX' + 'C2' and Add name to 'List of Symbols'	Create symbol name: 'SYMBOL_PREFIX' + 'C2' (i.e. SOUNDSC2' or 'SOUNDGC2'). Add this symbol to the 'List of symbols' to be presented.
Continuation A	Continuation A in according to PresLib 3.4
DEPTH_VALUE < 0m?	Is 'DEPTH_VALUE' less than zero meters?

Create symbol name 'SYMBOL_PREFIX' + 'A1' and Add name to 'List of Symbols'	Create symbol name: 'SYMBOL_PREFIX' + 'A1' (i.e. SOUNDSA1'). Add this symbol to the 'List of symbols' to be presented.
DEPTH_VALUE < 10m?	Is 'DEPTH_VALUE' less than 10 meters?
DEPTH_VALUE digits representation algorithm 1	Isolate 'LEADING_DIGIT' of 'DEPTH_VALUE'. Set 'LEADING_DIGIT' to positive value. Create symbol name by adding '10' + 'LEADING_DIGIT' to 'SYMBOL_PREFIX' (e.g. 3.6 metres - isolate the '3' and create either 'SOUNDS13' or 'SOUNDG13'). Add this symbol name to the list of symbols to be presented. Isolate 'FRACTION' of 'DEPTH_VALUE' and multiply by 10. Truncate all digits after the decimal. Do not round up. Create symbol name by adding '50' + 'FRACTION' to 'SYMBOL_PREFIX' (e.g. 3.6 metres - isolate the '6' and create either 'SOUNDS56' or 'SOUNDG56'). Add this symbol name to the list of symbols to be presented.
Return List of Symbols	Return to the calling procedure with the 'List of Symbols' which were selected.
DEPTH_VALUE < 31m and fract.?	Is 'DEPTH_VALUE' less than 31 m and has it a fractional value? (Note: common practice in hydrography is to show fractions of a depth value up to 30 metres depth)
DEPTH_VALUE digits representation algorithm 2	Isolate 'LEADING_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '20' + 'LEADING_DIGIT' to 'SYMBOL_PREFIX' (e.g. 26.7 metres - isolate the '2' and create either 'SOUNDS22' or 'SOUNDG22'). Add this symbol name to the list of symbols to be presented. Isolate 'SECOND_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '10' + 'SECOND_DIGIT' to 'SYMBOL_PREFIX' (e.g. 26.7 metres - isolate the '6' and create either 'SOUNDS16' or 'SOUNDG16'). Add this symbol name to the list of symbols to be presented. Isolate 'FRACTION' of 'DEPTH_VALUE' and multiply by 10. Truncate all digits after the decimal. Do not round up. Create symbol name by adding '50' + 'FRACTION' to 'SYMBOL_PREFIX' (e.g. 26.7 metres - isolate the '7' and create either 'SOUNDS57' or 'SOUNDG57').

	Add this symbol name to the list of symbols to be presented.
Return List of Symbols	Return to the calling procedure with the 'List of Symbols' which were selected.
Continuation B	Continuation B in according to PresLib 3.4
Truncate 'DEPTH_VALUE' to INTEGER	Truncate 'DEPTH_VALUE' to integer. Do not round up
DEPTH_VALUE < 100m?	Is 'DEPTH_VALUE' less than 100 meters?
DEPTH_VALUE digits representation algorithm 3	Isolate 'LEADING_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '10' + 'LEADING_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the list of symbols to be presented. Isolate 'SECOND_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '00' + 'SECOND_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the list of symbols to be presented.
Return List of Symbols	Return to the calling procedure with the 'List of Symbols' which were selected.
DEPTH_VALUE < 1000m?	Is 'DEPTH_VALUE' less than 1000 meters?
DEPTH_VALUE digits representation algorithm 4	Isolate 'LEADING_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '20' + 'LEADING_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the list of symbols to be presented. Isolate 'SECOND_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '10' + 'SECOND_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the list of symbols to be presented. Isolate 'LAST_DIGIT' of 'DEPTH_VALUE'. Truncate all digits after the decimal. Do not round up. Create symbol name by adding '00' + 'LAST_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the list of symbols to be presented.
Return List of Symbols	Return to the calling procedure with the 'List of Symbols' which were selected.
DEPTH_VALUE < 10000m?	Is 'DEPTH_VALUE' less than 10 000 meters?

DEPTH_VALUE representation algorithm 5	Isolate 'LEADING_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '20' + 'LEADING_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the list of symbols to be presented. Isolate 'SECOND_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '10' + 'SECOND_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the list of symbols to be presented. Isolate 'THIRD_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '00' + 'THIRD_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the list of symbols to be presented. Isolate 'LAST_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '40' + 'LAST_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the list of symbols to be presented.
Return List of Symbols	Return to the calling procedure with the 'List of Symbols' which were selected.
Continuation C	Continuation C in according to PresLib 3.4
DEPTH_VALUE digits representation algorithm 6	Isolate 'LEADING_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '30' + 'LEADING_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the list of symbols to be presented. Isolate 'SECOND_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '20' + 'SECOND_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the list of symbols to be presented. Isolate 'THIRD_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '10' + 'THIRD_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the list of symbols to be presented. Isolate 'FOURTH_DIGIT' of 'DEPTH_VALUE'. Create symbol name by adding '00' + 'FOURTH_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the list of symbols to be presented.

	Isolate 'LAST_DIGIT' of 'DEPTH_VALUE'. Truncate all digits after the decimal. Do not round up. Create symbol name by adding '40' + 'LAST_DIGIT' to 'SYMBOL_PREFIX'. Add this symbol name to the list of symbols to be presented.
Return List of Symbols	Return to the calling procedure with the 'List of Symbols' which were selected.

12.2.22a Conditional Symbology Procedure ~~'SOUNDGnn'~~SOUNDG02

Applies to: S-57 Object Class "soundings" (SOUNDG)

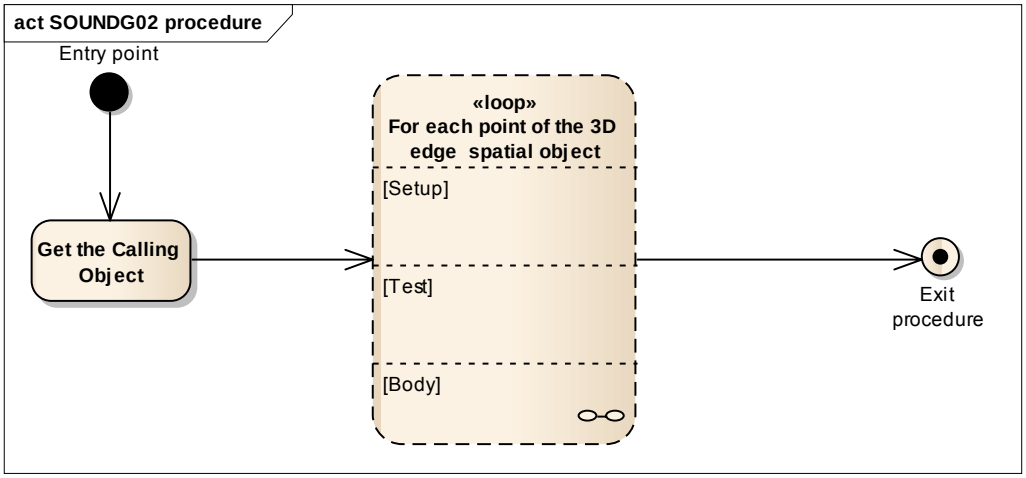
Spatial Object(s): ~~Point~~ 3D Edge (the array of points with three coordinates)

~~Attribute(s) used: depth values from sounding array~~
ECDIS Parameter(s): ~~Object to be symbolized from SENC~~

Defaults: Display Priority given by look-up table;
OVERRADAR priority given by look-up table;
Display Category given by look-up table;
Viewing group given by look-up table.

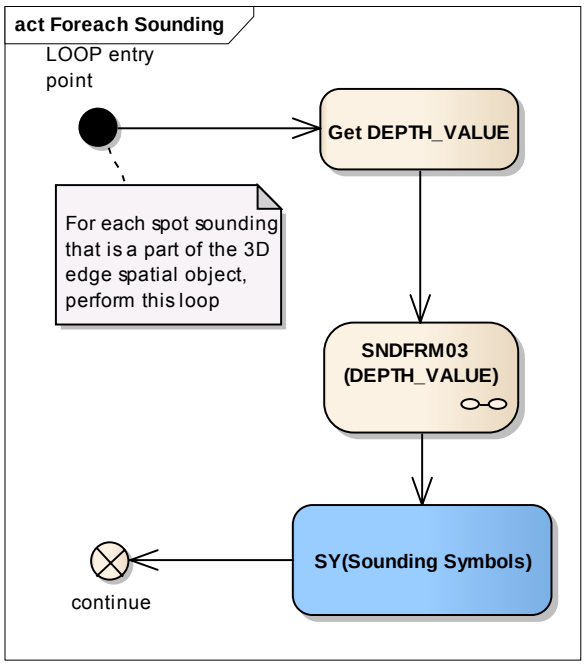
Remarks: In S-57 soundings are elements of sounding arrays rather than individual objects. Thus this conditional symbology procedure examines ~~each~~ach sounding of a sounding array one by one. To symbolize the depth values it calls the procedure SNDFRMnn which in turn translates the depth values into a set of symbols to be shown at the soundings position.

Figure 38 SOUNDG02 procedure



Entry point	
Get the Calling Object	Get the object SOUNDG which is calling this procedure.
Loop for each point of the 3D edge spatial object	Loop for each spot sounding that is point (vertex) of the 3D edge spatial object, perform this loop, see *Figure 40*
Exit procedure	Symbolization is finished

Figure 39 Loop for each Spot Sounding



LOOP entry point	
Get DEPTH_VALUE	Get the depth value of the spot sounding from 3D edge spatial object that is currently examined.
SNDFRM03 (DEPTH_VALUE)	Perform the Symbology Procedure 'SNDFRM03' to select symbols to draw the depth value, see "*13.2.21 Conditional Symbology Procedure SNDFRM03*" Pass the depth value on to 'SNDFRM03'; attributes of spatial objects and the calling object. A list of symbols is returned, see
DEPTH_VALUE	Input parameter
Sounding Symbols List	Output parameter
SY(Sounding Symbols)	Draw the symbols which were selected by 'SNDFRM03'. Place them at the position which is given by the currently examined spot sounding.
continue	Go to the next point of the 3D Edge spatial object.

~~12.2.22~~13.2.22b **Conditional Symbology Procedure 'SYMINS01'**

Applies to: S-57 (Edition 3.1.1) Object Class "New Object" (NEWOBJ)

Spatial Object(s): Point, Line, Area

Attribute used: "Symbol Instruction" (SYMINS)

Parameter(s): Object to be symbolized from SENC

Defaults: Display Priority given by look-up table, OVERRADAR priority given by look-up table, Display Category given by look-up table, Viewing Group given by look-up table, Area colour fill from underlying DEPARE or UNSARE

Remarks: The 'New Object' feature object class has been included in order to cater for possible future requirements of the IMO that affects safety of navigation which cannot adequately be encoded by any existing object class. It must not be used unless approved by the Transfer Standard Maintenance and Application Development Working Group (TSMAD) and the Colours and Symbols Maintenance Working Group (CSMWG) and issued as an ENC Encoding Bulletin.

~~Parameter(s): Object to be symbolized from SENC~~

13.2.23 Conditional Symbology Procedure TOPMAR01

Applies to: S-57 Object Class "top mark" (TOPMAR)

Spatial Object(s): Point

Relation(s) used: Point objects at identical location

Attribute(s) used: "shape of topmark" (TOPSHP)

Parameter(s): Object to be symbolized from SENC

Defaults: Display Priority given by look-up table
OVERRADAR priority given by look-up table
Display Category given by look-up table
Viewing Group given by look-up table. This procedure is only used in traditional symbology – the simplified symbology does not have separate topmark display.

~~Area colour fill from underlying DEPARE or UNSARE~~

~~Remarks: The 'New Object' feature object class has been included in order to cater for possible future requirements of the IMO that affects safety of navigation which cannot adequately be encoded by any existing object class. It must not be used unless approved by the Transfer Standard Maintenance and Application Development Working Group (TSMAD) and the Colours and Symbols Maintenance Working Group (CSMWG) and issued as an ENC Encoding Bulletin.~~

~~12.2.23 Conditional Symbology Procedure 'TOPMARnn'~~

~~Applies to: S-57 Object Class "top mark" (TOPMAR)~~

~~Spatial Object(s): Point~~

~~Relation(s) used: Point objects at identical location~~

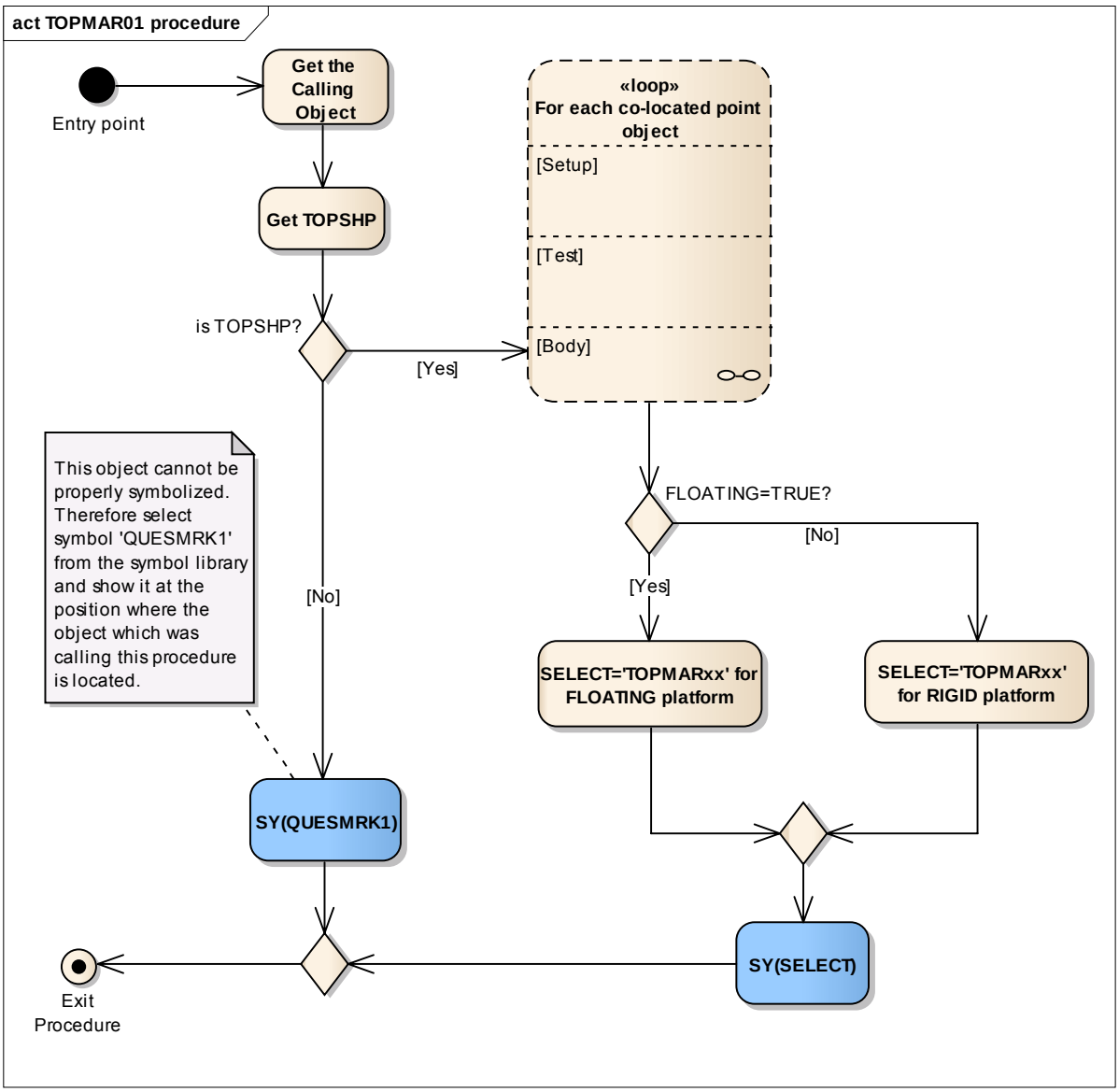
~~Attribute(s) used: "shape of topmark" (TOPSHP)~~

~~Parameter(s): Object to be symbolized from SENC~~

~~Defaults: Display Priority given by look-up table~~
~~OVERRADAR priority given by look-up table~~
~~Display Category given by look-up table~~
~~Viewing Group given by look-up table~~

Remarks: Topmark objects are to be symbolized through consideration of their platforms e.g. a buoy. Therefore this conditional symbology procedure searches for platforms by looking for other objects that are located at the same position.. Based on the finding whether the platform is rigid or floating, the respective upright or sloping symbol is selected and presented at the objects location. Buoy symbols and topmark symbols have been carefully designed to fit to each other when combined at the same position. The result is a composed symbol that looks like the traditional symbols the mariner is used to.

Figure 40 TOPMAR01 procedure



Entry point	
Get the Calling Object	Get the object which is calling the procedure.
Get TOPSHP	Get the value of the object's attribute 'TOPSHP' (shape of topmark).
is TOPSHP?	Is the attribute 'TOPSHP' defined?
Loop for each co-located point object	Loop for each point object which is located at the same position as the object which is calling this procedure, see *Figure 43*. The value of local variable 'FLOATING' is returned
FLOATING=TRUE?	Is the object with a topmark sitting on top of a floating platform ('FLOATING' equals 'TRUE')?
SELECT='TOPMARxx' for	Select appropriate symbol name in depends on the attribute

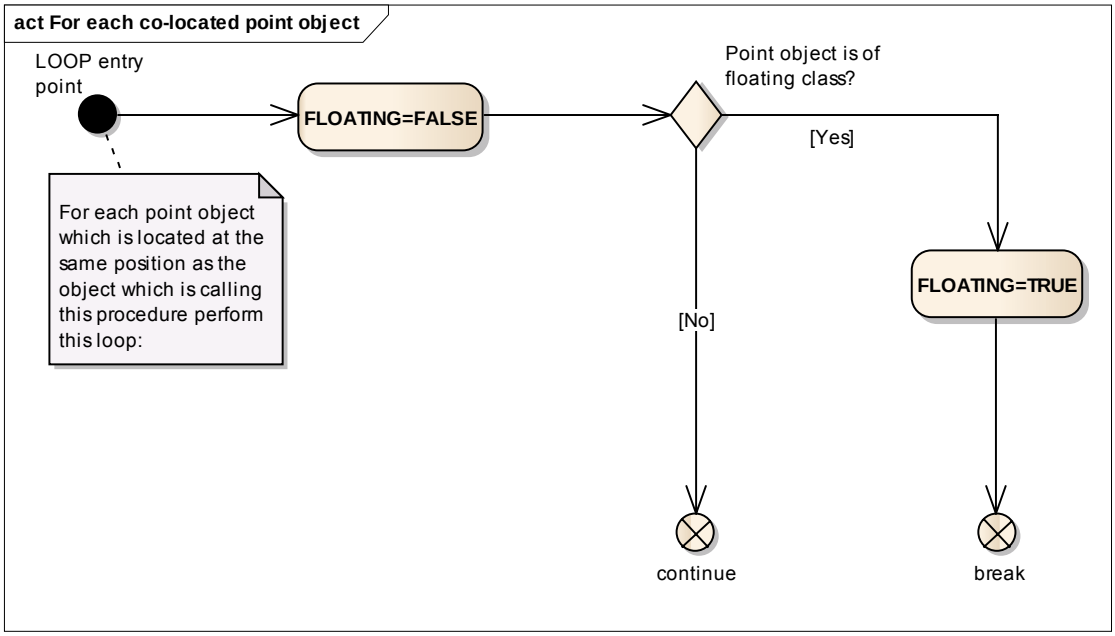
FLOATING platform	'TOPSHP' value for floating platform a buoys, light float or Light vessel, see table below
SELECT='TOPMARxx' for RIGID platform	Select appropriate symbol name in depends on the attribute 'TOPSHP' value for rigid platform a beacons, day marks or land marks or etc. see table below

TOPSHP Value	FLOATING Symbol Name	RIGID Symbol Name
1	TOPMAR02	TOPMAR22
2	TOPMAR04	TOPMAR24
3	TOPMAR10	TOPMAR30
4	TOPMAR12	TOPMAR32
5	TOPMAR13	TOPMAR33
6	TOPMAR14	TOPMAR34
7	TOPMAR65	TOPMAR85
8	TOPMAR17	TOPMAR86
9	TOPMAR16	TOPMAR36
10	TOPMAR08	TOPMAR28
11	TOPMAR07	TOPMAR27
12	TOPMAR14	TOPMAR14
13	TOPMAR05	TOPMAR25
14	TOPMAR06	TOPMAR26
15	TMARDEF2	TOPMAR88
16	TMARDEF2	TOPMAR87
17	TMARDEF2	TMARDEF1
18	TOPMAR10	TOPMAR30
19	TOPMAR13	TOPMAR33
20	TOPMAR14	TOPMAR34
21	TOPMAR13	TOPMAR33
22	TOPMAR14	TOPMAR34
23	TOPMAR14	TOPMAR34
24	TOPMAR02	TOPMAR22
25	TOPMAR04	TOPMAR24
26	TOPMAR10	TOPMAR30
27	TOPMAR17	TOPMAR86
28	TOPMAR18	TOPMAR89
29	TOPMAR02	TOPMAR22
30	TOPMAR17	TOPMAR86
31	TOPMAR14	TOPMAR14
32	TOPMAR10	TOPMAR30

33	TMARDEF2	TMARDEF1
Default	TMARDEF2	TMARDEF1

SY(SELECT)	Draw the selected symbol at the calling object's location.
SY(QUESMRK1)	This object cannot be properly symbolized therefore draw symbol 'QUESMRK1' from the symbol library at the position where the object which was calling this procedure is located.
Exit Procedure	Symbolization is finished

Figure 41 Loop for each co-located point object



LOOP entry point	
FLOATING=FALSE	Set the local variable 'FLOATING' equal to FALSE as default value. it means there is one of the following object of the rigid platform or nothing: 'BCN...', 'BRIDGE', 'BUISGL','DAYMAR', 'LNDMRK', 'MORFAC without CATMOR=7', 'OFSPLF', 'PILPNT', 'SLCONS', 'CRANES', 'FLODOC', 'FORSTC', 'FSHFAC', 'HULKES', 'PONTON', 'OBSTRN', 'PYLONS', 'SILTNK' and 'WRECKS'.
Point object is of floating class?	Is the point object of a class which represents a floating platform ('LITFLT', 'LITVES', 'BOY...' or MORFAC with CATMOR=7)?
FLOATING=TRUE	Set the local variable 'FLOATING' equal to TRUE. it means there is one of the following object at the calling object's location: 'LITFLT', 'LITVES', 'BOY...' or MORFAC with CATMOR=7
break	Stop examining point objects at the same location.

continue	Get The Next Point Object

~~12.2.24~~

13.2.24 Conditional Symbology Procedure ~~'UDWHAZnn'~~UDWHAZ04

~~(Note that this is called as a sub-procedure called by OBSTRNnn and WRECKSnn)~~

Applies to: Underwater hazards of all kinds encoded by S-57 Object Class: “obstruction” (OBSTRN), “underwater rock” (UWTROC) and “wreck” (WRECKS).

Spatial Object(s): Point, Line, Area

~~Relation(s)~~**Spatial Operations used:** adjacency, intersection or coverage of areas and areas with line; location of point objects within areas

Attribute(s) used: "depth range value1" (DRVAL1); water level effect (WATLEV)

ECDIS Parameter(s): ~~«depth range value2» (DRVAL2)~~
~~Object to be symbolized from SENC~~

SAFETY_CONTOUR (SFC) depth value selected by the mariner;

DEPTH_VALUE passed in by calling procedure.

~~Defaults:~~ ~~Display Priority given by look-up table~~
~~OVERRADAR priority given by look-up table~~
~~Display Category given by look-up table~~
~~Viewing Group given by look-up table~~

~~Required ECDIS~~

SHOW_ISOLATED_DANGERS_IN_SHALLOW_WATERS (sub procedure?).

~~startup values:~~The manufacturer is responsible for setting the SAFETY_CONTOUR to 30 meters (see also conditional symbology procedure “DEPAREnn”). This value should stay in operation until the mariner decides to select another safety contour.

Defaults: Display Priority given by look-up table;
OVERRADAR priority given by look-up table;
Display Category given by look-up table;
Viewing Group given by look-up table.

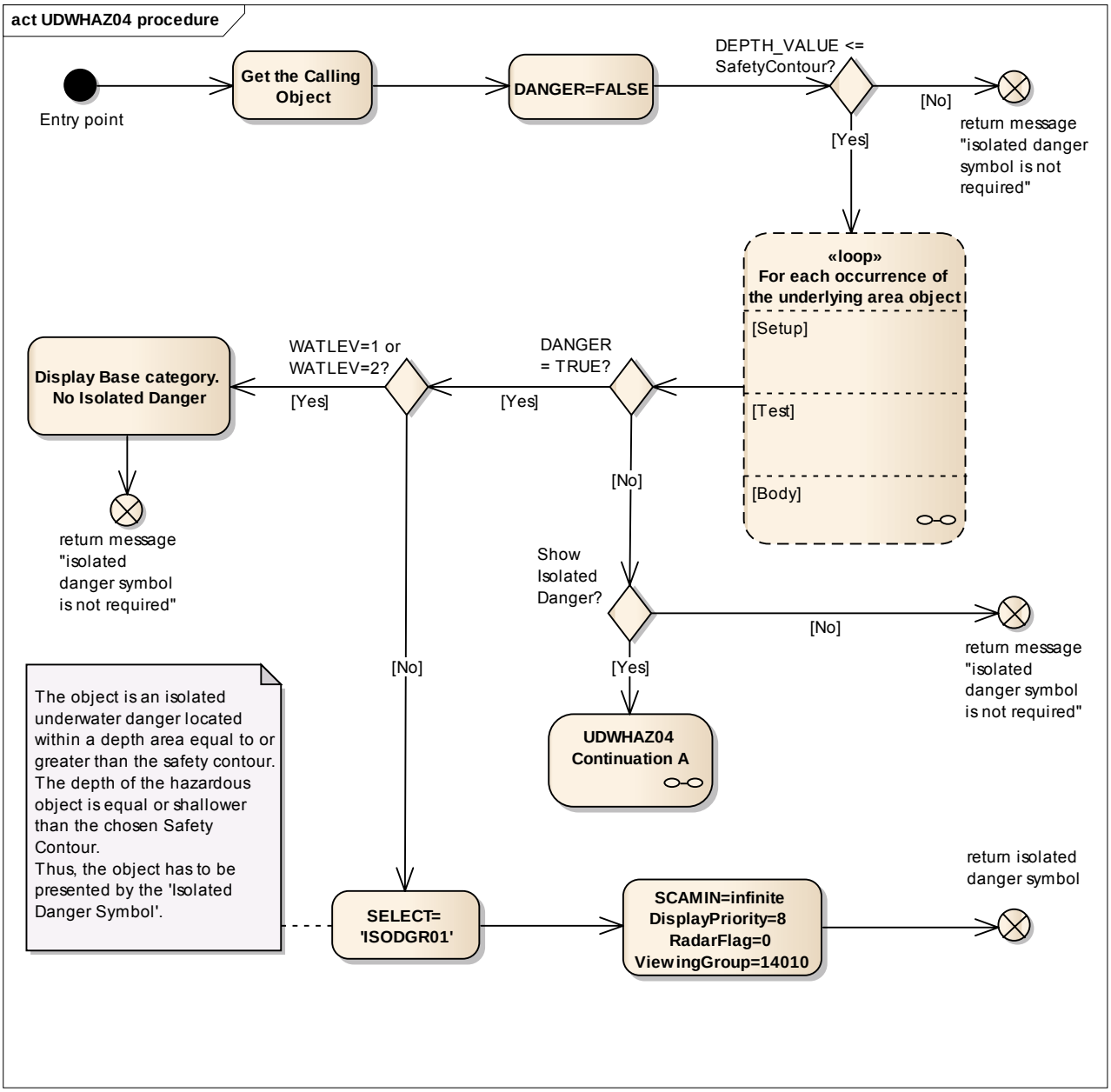
~~Remarks:~~ **Remarks:** This procedure covers “Isolated dangers in general that endanger own ship (S-57)” (def?) (Note that this is a sub procedure called by OBSTRNnn and WRECKSnn). Obstructions or isolated underwater dangers of

depths less than the safety contour which lie within the safe waters defined by the safety contour are to be presented by a specific isolated danger symbol as hazardous objects ~~and~~. They are then put in IMO category “DISPLAY BASE” (see IMO Performance Standards for ECDIS [~~3~~]). ~~This task is performed by this conditional symbology procedure.~~2]).

In addition, if the mariner selects the option "show isolated dangers in shallow water", this procedure will highlight with the isolated danger symbol all rocks, wrecks, obstructions, which lie in 'unsafe' shallow waters between the safety contour and the drying line, putting them in IMO category STANDARD. This option is provided in case the mariner is forced by circumstances to navigate in waters shallower than the safety contour shown on the display (for example, if the safety contour should default to a value much deeper than that preferred by the mariner).

Note: In this procedure the term “safety contour” refers to the safety contour selected by the mariner, as distinct from the safety contour shown on the display (which may be a default value).

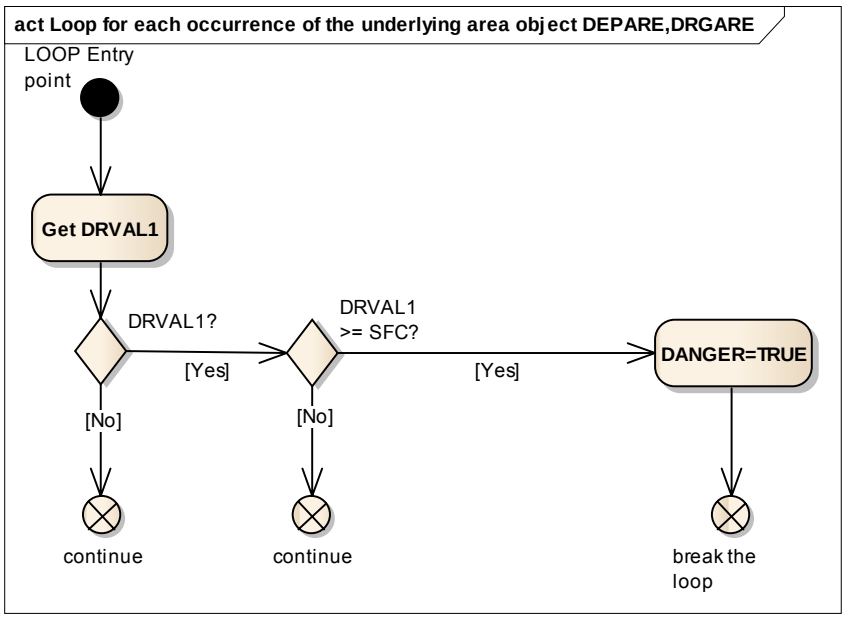
Figure 42 UDWHAZ04 sub-procedure



Entry point	
Get the Calling Object	Get the object which is calling this procedure
DANGER=FALSE	Set the local variable 'DANGER', which will indicate is the object is an isolated danger or not, to 'FALSE'.
DEPTH_VALUE <= SafetyContour?	Is 'DEPTH_VALUE' less than or equal to the value of the Safety Contour (SFC) selected by the mariner?
return message "isolated danger symbol is not required"	If 'NO', return to the calling procedure with the message that Isolated Danger Symbol is not required.

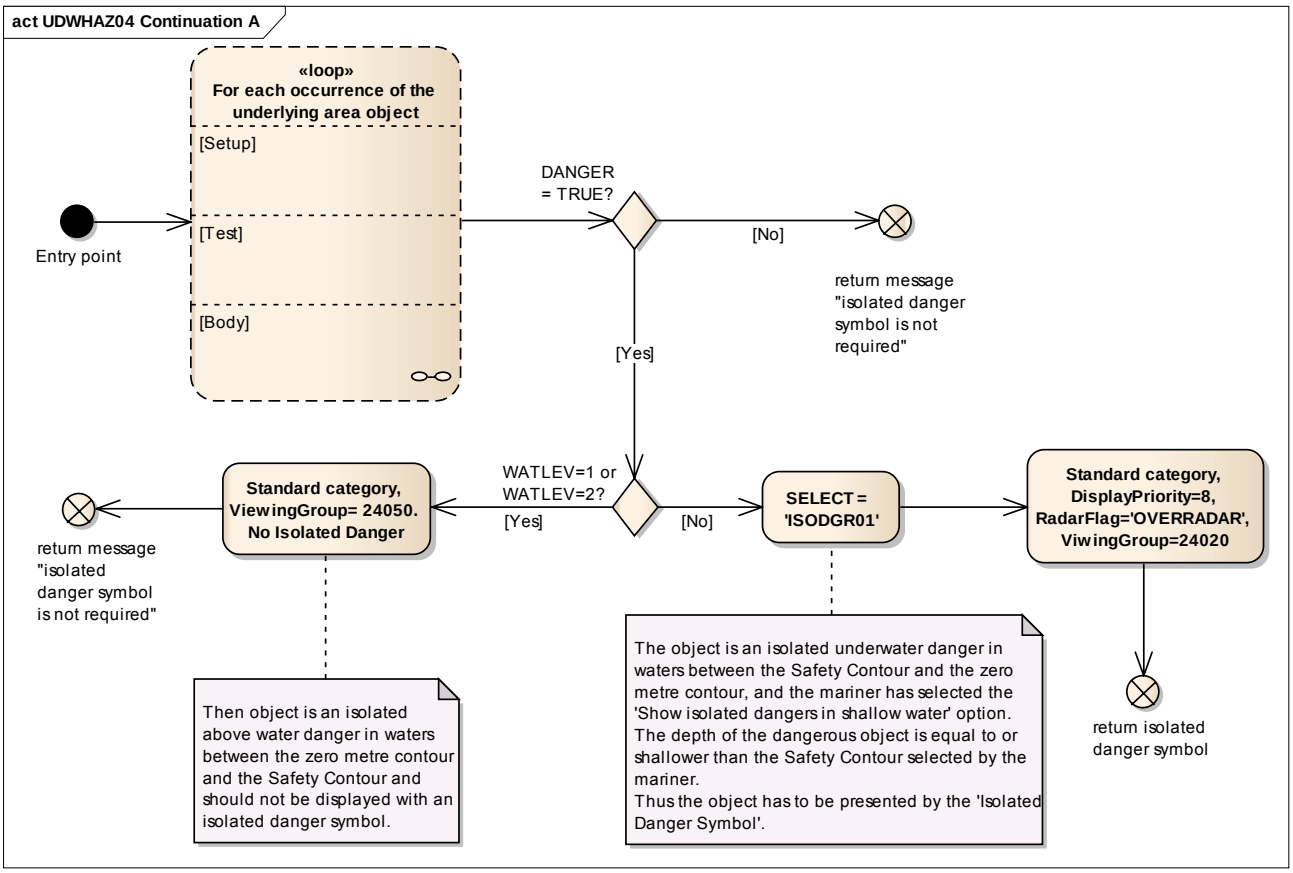
Loop for each occurrence of the underlying area object DEPARE, DRGARE	For each occurrence of the object classes 'DEPARE' and 'DRGARE' which intersects or includes the location of this object, perform this loop to find out if it deeper than the Safety Contour. If so, it changes local variable 'DANGER' to TRUE, see *Figure 45*	
DANGER = TRUE?	Is the local variable DANGER equal to TRUE?	
WATLEV=1 or WATLEV=2?	Is the value of attribute 'WATLEV' 1 or 2 in the calling object?	
Display Base category, No Isolated Danger	Object is an isolated above water danger, and is in ownship safe water and should be 'DISPLAYBASE' with no isolated danger symbol. Set presentation parameters of the calling object	
	Display Group	DISPLAYBASE
	Viewing Group	14050
return message "isolated danger symbol is not required"	Return to the calling procedure with the message that Isolated Danger Symbol is not required.	
SELECT= 'ISODGR01'	Select symbol name 'ISODGR01' The object is an isolated underwater danger located within a depth area equal to or greater than the safety contour. The depth of the hazardous object is equal or shallower than the chosen Safety Contour. Thus, the object has to be presented by the 'Isolated Danger Symbol'.	
SCAMIN=infinite DisplayPriority=8 RadarFlag=0 ViewingGroup=14010	Set SCAMIN (minimum scale) attribute to infinite.	
	Display Group	DISPLAYBASE
	Display Priority	8
	OVERRADAR	'O'
	Viewing Group	14010
return isolated danger symbol	Return to the calling procedure with the message that Isolated Danger Symbol is to be drawn. Also return the selected symbol name and presentation parameters.	
Show Isolated Danger?	Is the mariner selected show Isolated Danger in shallow water option?	
return message "isolated danger symbol is not required"	If 'NO', return to the calling procedure with the message that Isolated Danger Symbol is not required.	
UDWHAZ04 Continuation A	UDWHAZ04 Continuation A, see *Figure 46*	

Figure 43 Loop for each occurrence of the underlying area object DEPARE, DRGARE



LOOP Entry point	
Get DRVAL1	Get the attribute DRVAL1 value of the examined object 'DEPARE' or 'DRGARE'.
DRVAL1?	Is there explicit value of DRVAL1?
continue	If there is no explicit value, go to the next object because we consider, empty DRVAL1 is always less SAFETY_CONTOUR
DRVAL1 >= SFC?	Is the value of the attribute 'DRVAL1' greater than or equal to the value of the SAFETY_CONTOUR?
continue	If 'NO', get the next object DEPARE or DRGARE which intersects or includes the location of the calling object.
DANGER=TRUE	Set value of the local variable DANGER equal to TRUE.
break the loop	Stop examining area objects. End loop.

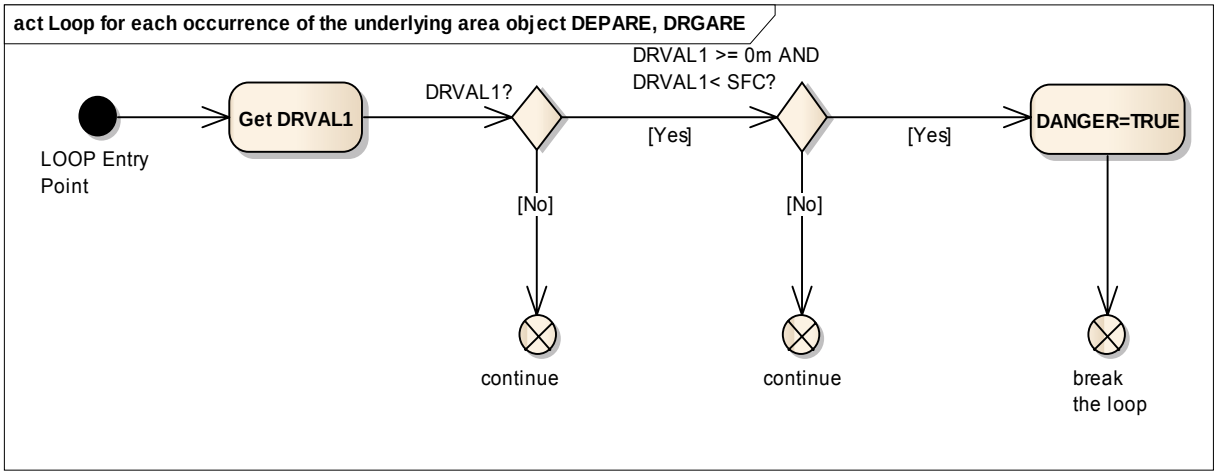
Figure 44 UDWHAZ04 Continuation A



Entry point		
Loop for each occurrence of the underlying area object	For each occurrence of the object classes 'DEPARE' and 'DRGARE' which intersects or includes the location of this object, perform this loop to find out if it lies between the zero metre contour and the Safety Contour, see *Figure 47*	
DANGER = TRUE?	Is the local variable DANGER equal TRUE?	
return message "isolated danger symbol is not required"	If 'NO', return to the calling procedure with the message that Isolated Danger Symbol is not required.	
WATLEV=1 or WATLEV=2?	Is the value of attribute 'WATLEV' 1 or 2 in the calling object?	
Standard category, ViewingGroup= 24050. No Isolated Danger	Object is an isolated above water danger in waters between the zero metre contour and the Safety Contour and should not be displayed with an isolated danger symbol. Set presentation parameters of the calling object	
	Display Group	STANDARD
	Viewing Group	24050
return message "isolated danger symbol is not required"	Return to the calling procedure with the message that Isolated Danger Symbol is not required.	

SELECT = 'ISODGR01'	Select symbol name 'ISODGR01'. The object is an isolated underwater danger in waters between the Safety Contour and the zero metre contour, and the mariner has selected the 'Show isolated dangers in shallow water' option. The depth of the dangerous object is equal to or shallower than the Safety Contour selected by the mariner. Thus the object has to be presented by the 'Isolated Danger Symbol'.	
Standard category, DisplayPriority=8, RadarFlag='OVERRADAR', ViwingGroup=24020	Set presentation parameters of the calling object :	
	Display Group	STANDARD
	Display Priority	8
	OVERRADAR	'O'
	Viewing Group	24020
return isolated danger symbol	Return to the calling procedure with the message that Isolated Danger Symbol is to be drawn. Also return the selected symbol name and presentation parameters.	

Figure 45 Loop for each occurrence of the underlying area object DEPARE, DRGARE



~~12.2.25~~

LOOP Entry Point	
Get DRVAL1	Get the attribute DRVAL1 value of the examined object 'DEPARE' or 'DRGARE'.
DRVAL1?	Is there explicit value of DRVAL1?
continue	If there is no explicit value, go to the next area object
DRVAL1 >= 0m AND DRVAL1 < SFC?	Is the value of the attribute 'DRVAL1' greater than or equal to the ZERO metre contour and less than the Safety Contour?
continue	If there is no, go to the next area object
DANGER=TRUE	Object is an isolated danger. Set local variable 'DANGER' to TRUE.
break the loop	Stop examining area objects. End loop.

13.2.25 Conditional Symbology Procedure 'VESSELnn'

Applies to: Mariners' Navigational Object Class "vessel other than own-ship" (vessel)

Spatial Object(s): Point

Attribute(s) used: course over ground (cogcrs)
course through water (ctwcrs)
speed over ground (sogspd)
speed through water (stwspd)
heading (headng)
vessel report source (vesrce)
vessel status (vestat)
vector length time-period (vecper)
vector stabilization (vecstb)
vector time-mark interval (vecmrk)

Parameter(s): Object to be symbolized from SENC, Object's position, course and speed, heading, Options selected by mariner

Defaults: Display Priority given by look-up table, OVERRADAR priority given by look-up table, Display Category given by look-up table, Viewing Group given by look-up table

Remarks: The mariner should be prompted to select from the following options:

- ARPA target or AIS report (overall decision or vessel by vessel) (vesrce)
- *time-period determining vector-length for all vectors (vecper)
- whether to show a vector (overall or vessel by vessel) (vestat)
- *whether to symbolize vector stabilization (vecstb)
- *whether to show one-minute or six-minute vector time marks (vecmrk)

* Note that the same vector parameters should be used for own-ship and all vessel vectors.

Note also that the IMO guidelines require that the heading always be shown for activated, selected or dangerous AIS targets.

Manufacturers are reminded that, as applies to other parts of the Presentation Library, they are not required to follow this procedure in detail so long as the resulting display looks the same (Presentation Library section 1.1)

References: IEC 61174 [97]
IEC 62288 [108]

A narrative description of **VESSELnn** is given hereafter.

VESSEL02

Conditional symbology procedure for symbolizing «other vessels» than own-ship, and for drawing the associated vectors and heading lines.

The «other vessel» is symbolized in a manner depending on whether the source is ARPA or AIS, and on which other options are selected by the mariner:

1. Show vessel symbol only:

1.1 ARPA target selected (vessel, vesrce1): show SY (ARPATG01) at the position indicated.

1.2 AIS 'sleeping target' selected - (vessel, vesrce2, vestat2, headng): show SY(AISSLP01) «sleeping target» at the position indicated and rotate the symbol in the direction given by (headng).

1.3 AIS 'lost' target (vessel, vesrce2, vestat5, headng): show SY(AISLST01) at the position indicated and rotate the symbol in the direction given by the last (headng) report.

2. Show vessel symbol, heading line and course and speed vector:

(Note that the time period which determines the scaling of vector length must be the same for all vectors.)

ARPA

2.1.1 ARPA target selected (vessel, vesrcel, vecper,...): show SY(ARPATG01) at the position indicated.

2.1.2 (There is no heading line from ARPA).

2.1.3 Vector, starting at the pivot point of the vessel symbol, draw a line scaled by the vector period (vecper) and the speed (sogspd or stwspd), in the direction given by the course (cogcrs or ctwcrs). (The vector period is selected by the mariner). Linestyle is LS(SOLD,2,ARPAT).

AIS

2.2.1 AIS target selected (vessel, vesrce2, vestat1 or 3 or 4, vecper,...) :

Symbolise the vessel as follows:

vestat1 ('activated') show SY(AISVES01) 'activated AIS target'
vestat3 ('selected) show SY(AISSEL01) 'selected AIS target' *
vestat4 ('dangerous') show SY(AISDGR01) 'dangerous AIS target'**

Rotate the symbol in the direction given by (headng)

* (detailed information for a 'selected AIS target' is shown in a separate data display area.)

**(the 'dangerous AIS target' is coloured red. If the signal from a dangerous target is lost show a flashing lost target symbol until this alarm is acknowledged.)

2.2.2 Heading line and turn indications: starting at the bow (apex of the vessel symbol) draw a line 50mm in length in the direction given by (headng). Linestyle is

LS(SOLD,1,ARPAT). If available, show the direction of a turn indication at the end of the heading line: SY(AISTRN01) for a turn to starboard, SY(AISTRN02) for a turn to port.

2.2.3 Vector: starting at the pivot point of the vessel symbol draw a line scaled by the vector period (vecper) selected by the mariner and the speed (sogspd) in the direction given by the course (cogcrs). Linestyle is LS(DASH,2,ARPAT. Alternatively, a path predictor may be provided using the same linestyle. (Note that the course and speed vector and heading, plus the direction and rate of turn if available, are always drawn for activated AIS targets.)

3. Show vector stabilization for ARPA

3.1 For ground stabilization (vessel, vecstb1,...): place SY(VECGND21) at the end of the vector**,** replacing the last time mark. Rotate the symbol in the direction given by (cogcrs).

3.2 For water stabilization (vessel, vecstb2,...): place SY(VECWTR21) at the end of the vector, replacing the last time mark. Rotate the symbol in the direction given by (ctwcrs).

4. Show time marks on vector

4.1 ARPA target selected (vessel, vesrcel,...):

4.1.1 One-minute marks selected (vessel, vesrce1 ,vecmrk1,...): place SY(ARPSIX01) at every sixth minute mark, and SY(ARPONE01) at every remaining one-minute mark. Rotate all symbols in the direction given by (cogcrs or ctwcrs).

4.1.2 Only six-minute marks selected (vessel, vecmrk2,...): place SY(ARPSIX01) at every six-minute mark. Rotate in the direction given by (cogcrs or ctwcrs).

4.2 *(Note that there are no time marks on AIS vectors)*

~~12.2.26~~13.2.26 Conditional Symbology Procedure VRMEBLnn

Applies to: Mariners' Navigational Object Class "variable range mark " (vrmark)
Mariners' Navigational Object Class «electronic bearing line» (ebline).

Spatial Object(s): Line

Attribute(s) used: none

Parameter(s): Object to be symbolized from SENC, Options selected by mariner

Defaults: Display Priority given by look-up table, OVERRADAR priority given by look-up table, Display Category given by look-up table, Viewing Group given by look-up table

Remarks: This conditional symbology procedure symbolizes the three cases of range circle, bearing line and range/bearing line. VRM's and EBL's can be ship-centred or freely movable.

Reference: ~~IEC 61174, Annex E, Section 3 (Edition 2, 2001)~~ IEC 61174 [7]

A narrative description of **VRMEBLnn** is given hereafter.

VRMEBL02

Conditional symbology procedure to symbolize VRM's and EBL's.

The three features under the general heading of VRM/EBL are drawn as follows:

1. Variable Range ~~Marker~~Markers (VRM):

1.1 ~~The~~ VRM's may be either:
- a. Centred on own-ship, or
- b. Freely movable, with centre-point marked by SY(EBLVRM11).

1.2 Draw the ring at a range in nautical miles (NM) selected by the mariner.

1.3 The linestyle should be as selected by the mariner, either:
- a. LC(ERBLNA01) 'long-dash', or
- b. a second long-dash ring distinguished by a different line style of dashes as required by IEC ~~61174.~~61174 [7]. Linestyle to be provided by the manufacturer.

2. Electronic Bearing ~~Line~~Lines

2.1 ~~The~~ EBL's may be either:
- a. Originating at own-ship, or
- b. Freely movable with point of origin marked by SY(EBLVRM11).

2.2 Draw the line at a bearing in degrees from true north selected by the mariner. Draw to the edge of the display, or to a range selected by the mariner.

2.3 The linestyle should be LC(ERBLNA01).

3. Electronic Range and Bearing ~~Line~~Lines

3.1 The ~~ERBL~~ERBLs may be either:
- a. Originating at own-ship, or
- b Freely movable with point of origin marked by SY(EBLVRM11).

3.2 Draw the bearing line at a bearing in degrees from true north selected by the mariner. Draw to the edge of the display, or to a range selected by the mariner.

3.3 The linestyle should be LC(ERBLNA01).

3.4 Place the range marker at a range in nautical miles (NM) selected by the mariner.

3.5 Use SY(ERBLTIK1) to symbolize the range mark on the bearing line.

3.6 Rotate the symbol to the direction indicated by the bearing line.

~~12.2.27~~13.2.27 Conditional Symbology Procedure ~~'WRECKSnn'~~WRECKS04

Applies to: S-57 Object Class "wrecks" (WRECKS)

Spatial Object(s): Point, Area

Attribute(s) used: "value of sounding" (VALSOU); "category of wreck" (CATWRK); "water level" (WATLEV); "exposition of sounding" (EXPSOU)

User Parameter(s): ~~Object to be symbolized from SENC~~

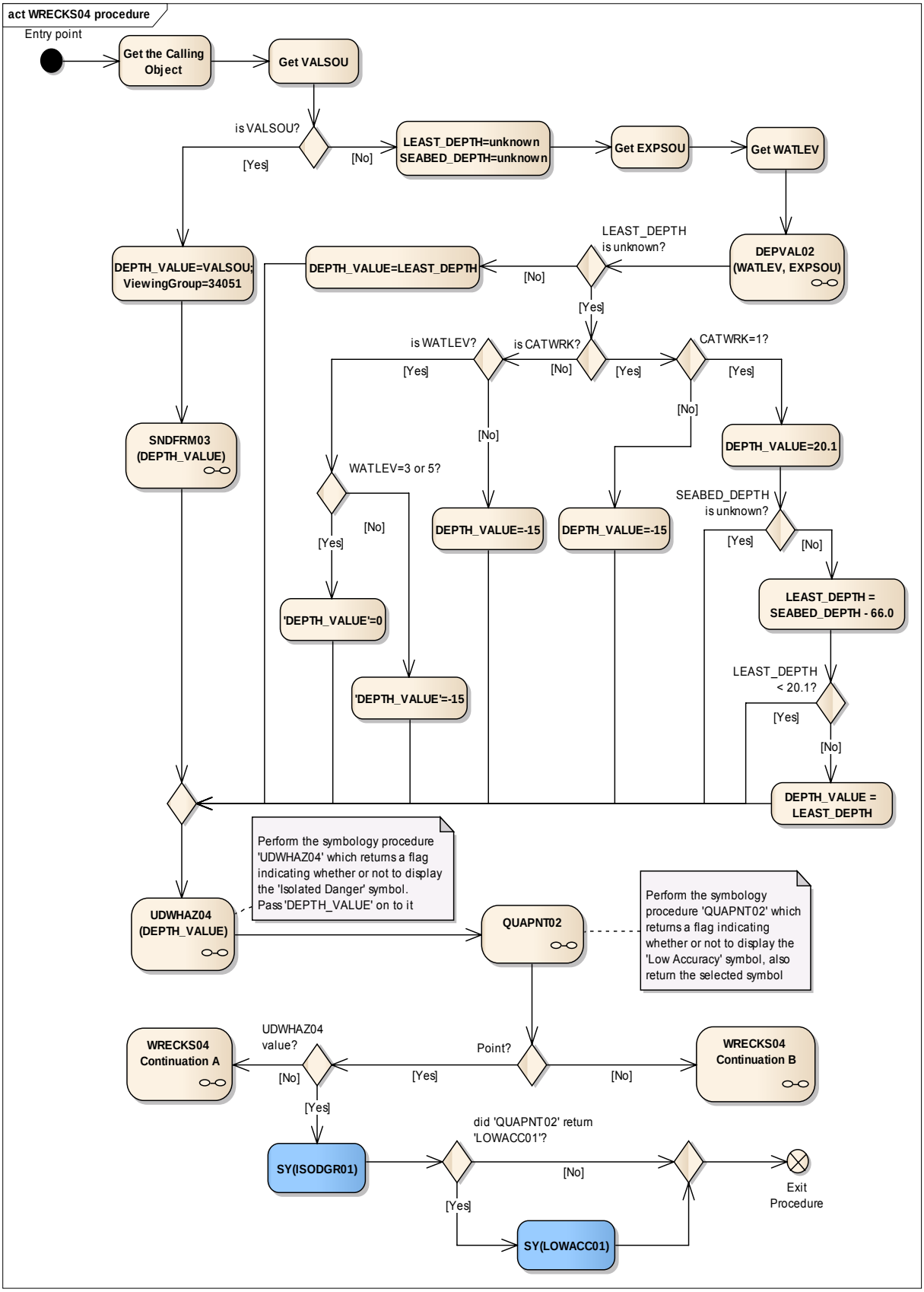
Defaults: Display Priority given by look-up table;
OVERRADAR priority given by look-up table;
Display Category given by look-up table;
Viewing Group given by look-up table;
Area colour fill from underlying DEPARE or UNSARE.

Remarks: Wrecks of depths less than the safety contour which lie within the safe waters defined by the safety contour are to be presented by a specific isolated danger symbol and put in IMO category “DISPLAY BASE” (see IMO Performance Standards for ECDIS [~~3~~2]). This task is performed by the sub-procedure “UDWHAZnn” which is called by this symbology procedure.

CSP "~~UDWHAZ~~UDWHAZnn" also allows the mariner the option of displaying isolated dangers in the waters between the safety contour and the zero metre line.

In the case that the value of attribute VALSOU for the wreck is unknown, sub-procedure "~~DEPVAL'~~DEPVALnn” is called. This will provide ~~as default~~a return value for 'LEAST_DEPTH', the default for which is the DRVAL1 of the underlying depth area, but only on condition that the value of attribute EXPSOU is not 2 (shoaler than the depth area) or unknown, and the value of attribute WATLEV is 3 (always underwater). For the case that a wreck of unknown VALSOU lies in deep water, sub-procedure 'DEPVAL' also provides the DRVAL1 of the underlying depth area as the 'SEABED_DEPTH' for use in calculating a 'safe clearance depth' over the wreck in accordance with IHO publication M-4 appendix to specification B-422.7.

Figure 46 WRECKS04 procedure

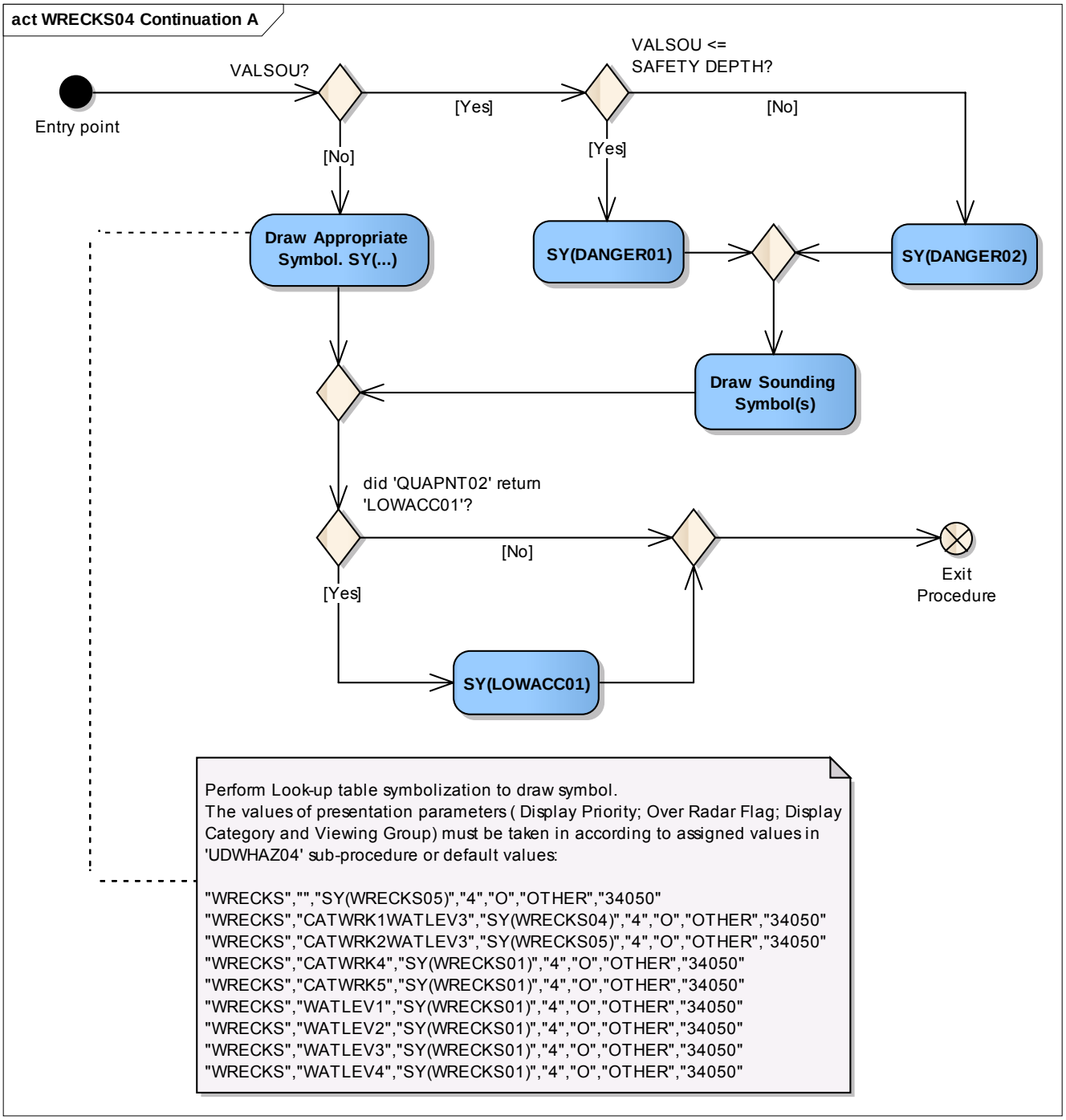


Entry point	

Get the Calling Object	Get the object which is calling this procedure.
Get VALSOU	Get the value of the attribute 'VALSOU' from the calling object.
is VALSOU?	Is the explicit value of the attribute 'VALSOU (value of sounding) given?
DEPTH_VALUE=VALSOU; **ViewingGroup=34051**	Set the local variable 'DEPTH_VALUE' equal to 'VALSOU' Set the viewing group to 34051 for all presentation objects if it is not changed by 'UDWHAZ04' sub-procedure.
SNDFRM03 (DEPTH_VALUE) **DEPTH_VALUE**	Perform the symbology procedure 'SNDFRM03' which symbolizes depth values. Pass 'DEPTH_VALUE' on to it. A list of symbols is returned. Remember the Sounding Symbol(s) - input parameter
LEAST_DEPTH=unknown **SEABED_DEPTH=unknown**	Set the local variable 'LEAST_DEPTH' to unknown. Set the local variable 'SEABED_DEPTH' to unknown.
Get EXPSOU	Get the value of the attribute 'EXPSOU'.
Get WATLEV	Get the value of the attribute 'WATLEV'.
DEPVAL02 (WATLEV, EXPSOU) **WATLEV** **EXPSOU** **LEAST_DEPTH** **SEABED_DEPTH**	Performs the symbology procedure 'DEPVAL02' which returns a value for the local variables 'LEAST_DEPTH' and 'SEABED_DEPTH'. Pass attributes 'WATLEV' and 'EXPSOU' on to it. - input parameter - input parameter - output parameter - output parameter
LEAST_DEPTH is unknown?	Is the value of the attribute 'LEAST_DEPTH' equal to <unknown>?
DEPTH_VALUE=LEAST_DEPTH	If there is 'No', set the local variable 'DEPTH_VALUE' equal to the local variable 'LEAST_DEPTH'.
is CATWRK?	Is the value of the attribute 'CATWRK' given?
CATWRK=1?	Does the value of the attribute 'CATWRK' = 1 (non-dangerous wreck)?
DEPTH_VALUE=-15	If 'CATWRK' is not equal '1', set value of the local variable 'DEPTH_VALUE' equal to '-15'
DEPTH_VALUE=20.1	Set value of the local variable 'DEPTH_VALUE' equal to '20.1'
SEABED_DEPTH is unknown?	Is the local variable 'SEABED_DEPTH' equal to <unknown>?
LEAST_DEPTH = SEABED_DEPTH - 66.0	If there is 'No', Set the local variable 'LEAST_DEPTH' equal to 'SEABED_DEPTH' - 66.0
LEAST_DEPTH < 20.1?	Is the local variable 'LEAST_DEPTH' less then 20.1?
DEPTH_VALUE = LEAST_DEPTH	If there is 'No', set the local variable 'DEPTH_VALUE' equal to 'LEAST_DEPTH'
is WATLEV?	Is the value of the attribute 'WATLEV' given?
DEPTH_VALUE=-15	IF 'WATLEV' is unknown/undefined, set value of the

	local variable 'DEPTH_VALUE' equal to '-15'
WATLEV=3 or 5?	Is the attribute 'WATLEV' value equal to 3 (always underwater) or 5 (awash of low water)? Else 'WATLEV' is equal to other values.
'DEPTH_VALUE'=0	IF 'WATLEV'='3' (always underwater) or 'WATLEV'='5' (... at low water), set the local variable 'DEPTH_VALUE' equal to '0'
'DEPTH_VALUE'=-15	If 'WATLEV' is not equal 3 or 5, set value of the local variable 'DEPTH_VALUE' equal to '-15'
UDWHAZ04 ('DEPTH_VALUE') **DEPTH_VALUE** **'Isolated Danger Symbol'**	Perform the symbology procedure 'UDWHAZ04' which returns a flag indicating whether or not to draw the 'Isolated Danger Symbol and the selected symbol, see "*13.2.24 Conditional Symbology Procedure UDWHAZ04*". input parameter.Pass 'DEPTH_VALUE' on to it. output parameter selected symbol name 'ISODGR01'. output parameter list of the parameters presentation of the symbol.
QUAPNT02 **'Low Accuracy Symbol'**	Perform the symbology procedure 'QUAPNT02' which returns a flag indicating whether or not to display the low accuracy symbol and returns the selected symbol 'LOWACC01' - output parameter selected symbol name 'LOWACC01'.
Point?	Is the object of type point?
UDWHAZ04 value?	Has the procedure 'UDWHAZ04' indicated that the isolated danger symbol should be drawn?
SY(ISODGR01)	Draw the selected symbol 'ISODGR01' at the calling object's location.
did 'QUAPNT02' return 'LOWACC01'?	Is the symbol 'LOWACC01' selected by the procedure 'QUAPNT02'?
SY(LOWACC01)	If so indicated by the procedure 'QUAPNT02', draw the returned low accuracy symbol 'LOWACC01' at the calling object's location.
WRECKS04 Continuation A	Symbolization of point objects "wreck" (WRECKS) without 'Isolated Danger Symbol', see *Figure 49* Pass the list of selected symbols from SNDFRM03 and QUAPNT02 sub-procedures, values of 'VALSOU' attribute if they are.
WRECKS04 Continuation B	Area objects, wrecks (WRECKS), see *Figure 50* Pass the list of selected symbols from 'UDWHAZ04', 'SNDFRM03' and 'QUAPNT02' sup-procedures, values of 'VALSOU' attribute if they are.
Exit Procedure	Symbolization is finished.

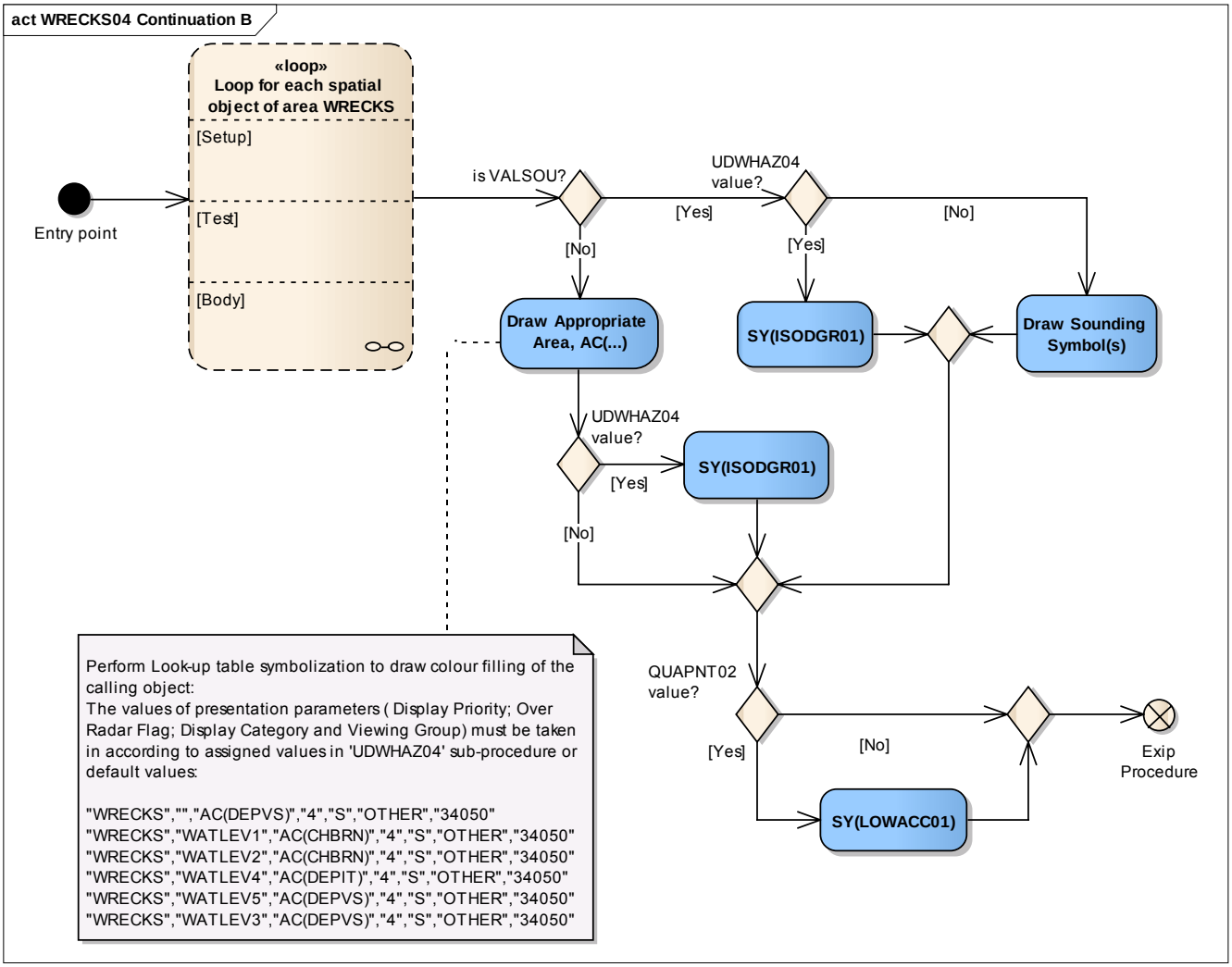
Figure 47 WRECKS04 Continuation A



Entry point	
VALSOU?	Is the value of the attribute VALSOU given?
VALSOU <= SAFETY DEPTH?	Is the value of the attribute 'VALSOU' less than or equal to SAFETY DEPTH?
SY(DANGER01)	Draw the symbol 'DANGER01' at the calling object's location.
SY(DANGER02)	Draw the symbol 'DANGER02' at the calling object's location.
Draw Sounding Symbol(s)	Draw the sounding symbol(s) returned from 'SNDFRM03' on top at the calling object's location.

Draw Appropriate Symbol. SY(...)	Perform Look-up table symbolization to draw symbol. The values of presentation parameters (Display Priority; Over Radar Flag; Display Category and Viewing Group) must be taken in according to assigned values in 'UDWHAZ04' sub-procedure or default values: "WRECKS","","SY(WRECKS05)","4","O","OTHER","34050" "WRECKS","CATWRK1WATLEV3","SY(WRECKS04)","4","O","OTHER","34050" "WRECKS","CATWRK2WATLEV3","SY(WRECKS05)","4","O","OTHER","34050" "WRECKS","CATWRK4","SY(WRECKS01)","4","O","OTHER","34050" "WRECKS","CATWRK5","SY(WRECKS01)","4","O","OTHER","34050" "WRECKS","WATLEV1","SY(WRECKS01)","4","O","OTHER","34050" "WRECKS","WATLEV2","SY(WRECKS01)","4","O","OTHER","34050" "WRECKS","WATLEV3","SY(WRECKS01)","4","O","OTHER","34050" "WRECKS","WATLEV4","SY(WRECKS01)","4","O","OTHER","34050"
did 'QUAPNT02' return 'LOWACC01'?	Is the symbol 'LOWACC01' selected by the procedure 'QUAPNT02'?
SY(LOWACC01)	If so indicated by the procedure 'QUAPNT02', draw the returned low accuracy symbol 'LOWACC01' at the calling object's location.
Exit Procedure	Symbolization is Finished

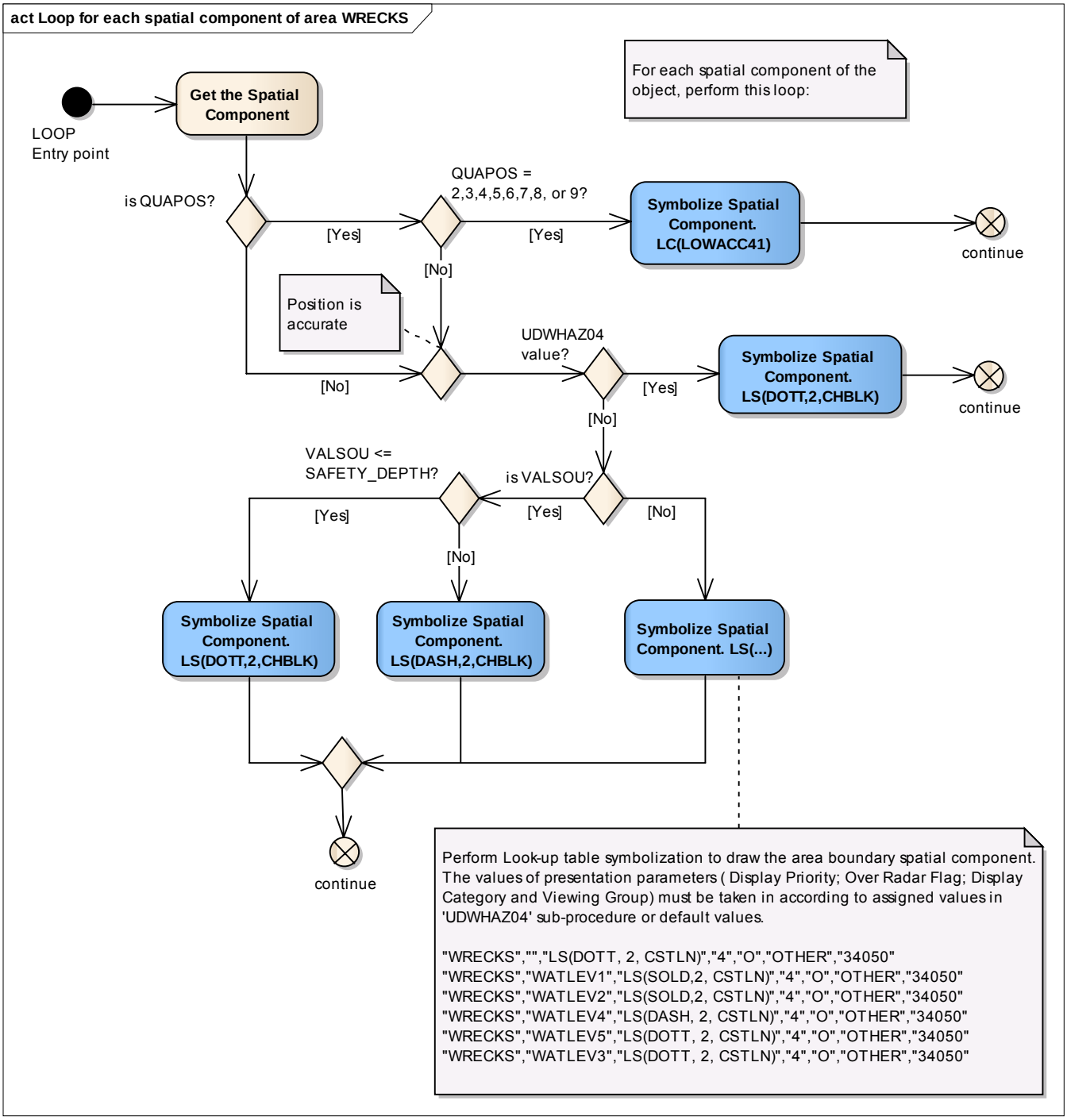
Figure 48. WRECKS04 Continuation B



Entry point	
Loop for each spatial object of area WRECKS	See *Figure 51*
is VALSOU?	Is the value of the attribute 'VALSOU' given?
UDWHAZ04 value?	Has the procedure 'UDWHAZ04' indicated that the isolated danger symbol should be shown?
SY(ISODGR01)	Draw the isolated symbol 'ISODGR01' returned by 'UDWHAZ04' in the centre of the area.
Draw Sounding Symbol(s)	Draw the sounding symbol(s) returned from 'SNDFRM03' at the centre of the area

Draw Appropriate Area, AC(...)	If there is 'VALSOU' value, perform Look-up table symbolization to draw colour filling of the calling object. The values of presentation parameters (Display Priority; Over Radar Flag; Display Category and Viewing Group) must be taken in according to assigned values in 'UDWHAZ04' sub-procedure or default values: "WRECKS","","AC(DEPVS)","4","S","OTHER","34050" "WRECKS","WATLEV1","AC(CHBRN)","4","S","OTHER","34050" "WRECKS","WATLEV2","AC(CHBRN)","4","S","OTHER","34050" "WRECKS","WATLEV4","AC(DEPIT)","4","S","OTHER","34050" "WRECKS","WATLEV5","AC(DEPVS)","4","S","OTHER","34050" "WRECKS","WATLEV3","AC(DEPVS)","4","S","OTHER","34050"
UDWHAZ04 value?	Has the procedure 'UDWHAZ04 indicated that the isolated danger symbol should be shown?
SY(ISODGR01)	Draw the selected symbol 'ISODGR01' returned by the 'UDWHAZ04' in the centre of the area.
QUAPNT02 value?	Has the procedure 'QUAPNT02' indicated that the quality of position symbol should be shown?
SY(LOWACC01)	Draw the selected symbol 'LOWACC01' returned by 'QUAPNT02' in the centre of the area.
Exip Procedure	Symbolization is finished

Figure 49 Loop for each spatial component of area WRECKS



LOOP Entry point	
Get the Spatial Component	Get the next spatial object (edge) of the calling object.
is QUAPOS?	Is the spatial attribute 'QUAPOS' given?
QUAPOS = 2,3,4,5,6,7,8, or 9?	Is the value of the 'QUAPOS' 2, 3, 4, 5, 6, 7, 8, or 9?
Symbolize Spatial Component. LC(LOWACC41)	Symbolize the area boundary spatial component with 'LC(LOWACC41)'
continue	Go to the next spatial component.

UDWHAZ04 value?	Has the procedure 'UDWHAZ04' indicated that the isolated danger symbol should be shown?
Symbolize Spatial Component. LS(DOTT,2,CHBLK)	Symbolize the area boundary spatial component with a dotted line, 2 units wide, colour 'CHBLK'
continue	go to the next spatial component.
is VALSOU?	Is the value of the attribute 'VALSOU' given?
VALSOU <= SAFETY_DEPTH?	Is the value of the attribute 'VALSOU' less than or equal to SAFETY_DEPTH?
Symbolize Spatial Component. LS(DASH,2,CHBLK)	If there is 'No' Symbolize the area boundary spatial component with a dashed line, 2 units wide, colour 'CHBLK'
Symbolize Spatial Component. LS(DOTT,2,CHBLK)	Symbolize the area boundary spatial component with a dotted line, 2 units wide, colour 'CHBLK'
Symbolize Spatial Component. LS(...)	If there is no 'VALSOU' value , perform Look-up table symbolization to draw the area boundary spatial component. The values of presentation parameters (Display Priority; Over Radar Flag; Display Category and Viewing Group) must be taken in according to assigned values in 'UDWHAZ04' sub-procedure or default values. "WRECKS","","LS(DOTT, 2, CSTLN)","4","O","OTHER","34050" "WRECKS","WATLEV1","LS(SOLD,2, CSTLN)","4","O","OTHER","34050" "WRECKS","WATLEV2","LS(SOLD,2, CSTLN)","4","O","OTHER","34050" "WRECKS","WATLEV4","LS(DASH, 2, CSTLN)","4","O","OTHER","34050" "WRECKS","WATLEV5","LS(DOTT, 2, CSTLN)","4","O","OTHER","34050" "WRECKS","WATLEV3","LS(DOTT, 2, CSTLN)","4","O","OTHER","34050"
continue	go to the next spatial component.

~~13. TABLES~~

Tables

~~13.1~~14.1 Colour ~~tables~~Tables

The ~~following pages list the~~ colour tables ~~which have been~~are designed for different conditions of ambient illumination on the bridge.

The colours are defined in CIE (Commission Internationale de l'Eclairage) values. The ECDIS manufacturer is responsible for computing the correct RGB values for the monitor he uses, from CIE values, as described in annex B of the C&S Specifications. A program for the conversion of CIE into RGB values for ~~CRT~~ monitors is provided on the Presentation Library CD (see section 19).

ECDIS manufacturers should refer to section ~~4~~7 of the Colour and Symbol Specifications for details for the design and use of the colour tables. ~~Please see also section 4 of this manual for further explanation of the colour scheme and use of colour token.~~

There are 63 colours in these tables. With the addition of the transparent colour (TRNSP) there are 64 colour tokens.

Colour Table: **DAY**

Token	Colour	X	Y	LUMINANCE
NODTA	grey	0.2800	0.3100	40.000
CURSR	orange	0.5000	0.4000	32.000
CHBLK	black	0.2800	0.3100	0.000
CHGRD	grey	0.2800	0.3100	10.000
CHGRF	grey	0.2800	0.3100	25.000
CHRED	red	0.4800	0.3000	25.000
CHGRN	green	0.3100	0.5600	60.000
CHYLW	yellow	0.4100	0.4900	70.000
CHMGD	magenta	0.3000	0.1700	20.000
CHMGF	magenta	0.2800	0.2400	48.000
CHBRN	brown	0.3900	0.4300	30.000
CHWHT	white	0.2800	0.3100	80.000
SCLBR	orange	0.5000	0.4000	32.000
CHCOR	orange	0.5000	0.4000	32.000
LITRD	red	0.4800	0.3000	25.000
LITGN	green	0.3100	0.5600	60.000
LITYW	yellow	0.4100	0.4900	70.000
ISDNG	magenta	0.3000	0.1700	20.000
DNGHL	red	0.4800	0.3000	25.000
TRFCD	magenta	0.3000	0.1700	20.000
TRFCF	magenta	0.2800	0.2400	48.000
LANDA	brown	0.3500	0.3900	50.000
LANDF	brown	0.4500	0.4200	15.000
CSTLN	grey	0.2800	0.3100	10.000
SNDG1	grey	0.2800	0.3100	25.000
SNDG2	black	0.2800	0.3100	0.000
DEPSC	grey	0.2800	0.3100	10.000
DEPCN	grey	0.2800	0.3100	25.000
DEPDW	white	0.2800	0.3100	80.000
DEPMD	pale_blue	0.2600	0.2900	65.000
DEPMS	light_blue	0.2300	0.2500	55.000
DEPVS	medium_blue	0.2100	0.2200	45.000
DEPIT	yellow-green	0.2600	0.3600	35.000
RADHI	green	0.3100	0.5600	60.000
RADLO	green	0.3100	0.5600	20.000
ARPAT	blue-green	0.2600	0.4200	30.000
NINFO	orange	0.5000	0.4000	32.000
RESBL	blue	0.1800	0.1500	22.000
ADINF	yellow	0.4100	0.4900	35.000
RESGR	grey	0.2800	0.3100	25.000
SHIPS	black	0.2800	0.3100	0.000
PSTRK	black	0.2800	0.3100	0.000
SYTRK	grey	0.2800	0.3100	25.000
PLRTE	red	0.5800	0.3500	18.000
APLRT	orange	0.5000	0.4000	32.000
UINFD	black	0.2800	0.3100	0.000
UINFF	grey	0.2800	0.3100	10.000
UIBCK	white	0.2800	0.3100	80.000
UIAFD	medium_blue	0.2100	0.2200	45.000
UINFR	red	0.4800	0.3000	25.000
UINFG	green	0.3100	0.5600	60.000
UINFO	orange	0.5000	0.4000	32.000
UINFB	blue	0.1800	0.1500	22.000
UINFM	magenta	0.3000	0.1700	20.000
UIBDR	grey	0.2800	0.3100	10.000
UIAFF	brown	0.3500	0.3900	50.000
OUTLW	black	0.2800	0.3100	0.000
OUTLL	brown	0.4500	0.4200	15.000
RES01	grey	0.2800	0.3100	25.000
RES02	grey	0.2800	0.3100	25.000
RES03	grey	0.2800	0.3100	25.000
BKAJ1	grey	0.2800	0.3100	0.600
BKAJ2	grey	0.2800	0.3100	1.600

Colour Table: **DUSK**

Token	Colour	X	Y	LUMINANCE
NODTA	grey	0.2800	0.3100	7.000
CURSR	orange	0.5000	0.4000	10.000
CHBLK	grey	0.2800	0.3100	20.000
CHGRD	grey	0.2800	0.3100	20.000
CHGRF	grey	0.2800	0.3100	10.000
CHRED	red	0.4800	0.3000	10.000
CHGRN	green	0.3100	0.5600	20.000
CHYLW	yellow	0.4100	0.4900	24.000
CHMGD	magenta	0.2800	0.2400	18.000
CHMGF	magenta	0.3000	0.1700	7.000
CHBRN	brown	0.3900	0.4300	8.000
CHWHT	white	0.2800	0.3100	36.000
SCLBR	orange	0.5000	0.4000	10.000
CHCOR	orange	0.5000	0.4000	10.000
LITRD	red	0.4800	0.3000	10.000
LITGN	green	0.3100	0.5600	20.000
LITYW	yellow	0.4100	0.4900	24.000
ISDNG	magenta	0.2800	0.2400	18.000
DNGHL	red	0.4800	0.3000	10.000
TRFCD	magenta	0.2800	0.2400	18.000
TRFCF	magenta	0.3000	0.1700	7.000
LANDA	brown	0.3500	0.3900	5.000
LANDF	brown	0.4500	0.4200	12.000
CSTLN	grey	0.2800	0.3100	20.000
SNDG1	grey	0.2800	0.3100	10.000
SNDG2	white	0.2800	0.3100	36.000
DEPSC	grey	0.2800	0.3100	20.000
DEPCN	grey	0.2800	0.3100	10.000
DEPDW	black	0.2800	0.3100	0.000
DEPMD	dark_blue	0.2500	0.2900	1.000
DEPMS	medium_blue	0.2300	0.2500	3.000
DEPVS	light_blue	0.2100	0.2200	5.000
DEPIT	yellow green	0.2600	0.3600	6.000
RADHI	green	0.3100	0.5600	20.000
RADLO	green	0.3100	0.5600	7.000
ARPAT	green	0.2600	0.4200	17.000
NINFO	orange	0.5000	0.4000	10.000
RESBL	blue	0.1800	0.1500	10.000
ADINF	yellow	0.4100	0.4900	12.000
RESGR	grey	0.2800	0.3100	20.000
SHIPS	white	0.2800	0.3100	36.000
PSTRK	white	0.2800	0.3100	36.000
SYTRK	grey	0.2800	0.3100	10.000
PLRTE	red	0.5800	0.3500	8.000
APLRT	orange	0.5000	0.4000	10.000
UINFD	white	0.2800	0.3100	36.000
UINFF	grey	0.2800	0.3100	20.000
UIBCK	black	0.2800	0.3100	0.000
UIAFD	light_blue	0.2100	0.2200	5.000
UINFR	red	0.4800	0.3000	10.000
UINFG	green	0.3100	0.5600	20.000
UINFO	orange	0.5000	0.4000	10.000
UINFB	blue	0.1800	0.1500	10.000
UINFM	magenta	0.2800	0.2400	18.000
UIBDR	grey	0.2800	0.3100	20.000
UIAFF	brown	0.4500	0.4200	12.000
OUTLW	black	0.2800	0.3100	0.000
OUTLL	brown	0.3500	0.3900	5.000
RES01	grey	0.2800	0.3100	10.000
RES02	grey	0.2800	0.3100	10.000
RES03	grey	0.2800	0.3100	10.000
BKAJ1	black	0.2800	0.3100	0.000
BKAJ2	grey	0.2800	0.3100	0.720

Colour Table: **NIGHT**

Token	Colour	X	Y	LUMINANCE
NODTA	grey	0.2800	0.3100	1.200
CURSR	orange	0.5000	0.4000	1.250

CHBLK	grey	0.2800	0.3100	2.500	
CHGRD	grey	0.2800	0.3100	2.500	
CHGRF	grey	0.2800	0.3100	1.250	
CHRED	red	0.4800	0.3000	1.250	
CHGRN	green	0.3100	0.5600	2.500	
CHYLW	yellow	0.4100	0.4900	3.000	
CHMGD	magenta	0.3000	0.1700	2.000	
CHMGF	magenta	0.3000	0.1700	2.000	
CHBRN	brown	0.3900	0.4300	1.300	
CHWHT	white	0.2800	0.3100	5.000	
SCLBR	orange	0.5000	0.4000	1.250	
CHCOR	orange	0.5000	0.4000	1.250	
LITRD	red	0.4800	0.3000	1.250	
LITGN	green	0.3100	0.5600	2.500	
LITYW	yellow	0.4100	0.4900	3.000	
ISDNG	magenta	0.3000	0.1700	2.000	
DNGHL	red	0.4800	0.3000	1.250	
TRFCD	magenta	0.3000	0.1700	2.000	
TRFCF	magenta	0.3000	0.1700	2.000	
LANDA	brown	0.3500	0.3900	0.800	
LANDF	brown	0.4500	0.4200	1.600	
CSTLN	grey	0.2800	0.3100	2.500	
SNDG1	grey	0.2800	0.3100	1.250	
SNDG2	white	0.2800	0.3100	5.000	
DEPSC	grey	0.2800	0.3100	2.500	
DEPCN	grey	0.2800	0.3100	1.250	
DEPDW	black	0.2800	0.3100	0.000	
DEPMD	dark_blue	0.2500	0.2900	0.200	
DEPMS	medium blue		0.2300	0.2500	0.400
DEPVS	light blue	0.2100	0.2200	0.800	
DEPIT	yellow green		0.2600	0.3600	1.200
RADHI	green	0.3100	0.5600	2.500	
RADLO	green	0.3100	0.5600	0.800	
ARPAT	blue green	0.2600	0.4200	1.750	
NINFO	orange	0.5000	0.4000	1.250	
RESBL	blue	0.1800	0.1500	1.250	
ADINF	yellow	0.4100	0.4900	1.500	
RESGR	grey	0.2800	0.3100	1.250	
SHIPS	white	0.2800	0.3100	5.000	
PSTRK	white	0.2800	0.3100	5.000	
SYTRK	grey	0.2800	0.3100	1.250	
PLRTE	red	0.5800	0.3500	0.900	
APLRT	orange	0.5000	0.4000	1.250	
UINFD	white	0.2800	0.3100	5.000	
UINFF	grey	0.2800	0.3100	2.500	
UIBCK	black	0.2800	0.3100	0.000	
UIAFD	light-blue	0.2100	0.2200	0.800	
UINFR	red	0.4800	0.3000	1.250	
UINFG	green	0.3100	0.5600	2.500	
UINFO	orange	0.5000	0.4000	1.250	
UINFB	blue	0.1800	0.1500	1.250	
UINFM	magenta	0.3000	0.1700	2.000	
UIBDR	grey	0.2800	0.3100	2.500	
UIAFF	brown	0.4500	0.4200	3.200	
OUTLW	black	0.2800	0.3100	0.000	
OUTLL	brown	0.3500	0.3900	0.800	
RES01	grey	0.2800	0.3100	1.250	
RES02	grey	0.2800	0.3100	1.250	
RES03	grey	0.2800	0.3100	1.250	
BKAJ1	black	0.2800	0.3100	0.000	
BKAJ2	grey	0.2800	0.3100	0.100	

~~13.2~~ 14.2 Viewing ~~groups~~Group Layers

~~The use of~~Numbering scheme for viewing groups ~~is explained in 8.3.4.4.~~**~~NUMBERING SCHEME FOR VIEWING GROUPS~~** *(Mariners' information in italics)*

DISPLAY BASE	STANDARD DISPLAY	OTHER INFORMATION
00000-09999 reserved for administrative purposes		
10000 reserved *40000 reserved*	20000 reserved *50000 reserved*	30000 reserved *60000 reserved*
11000 A,B information about the chart display *41000 tools*	21000 A,B 51000 tool	31000 A,B *61000 tools*
12000 C, D, E, F land features *42000 own ship, planned route*	22000 C, D, E, F *52000 own ship etc*	32000 C, D, E, F *62000 own ship etc*
13000 H, I depths & currents *43000 mariners' features*	23000 H,I *53000 mariners' features*	33000 H,I *63000 mariners' features*
14000 J,K,L obstructions, pipelines *44000 other vessels*	24000 J,K,L *54000 other vessels*	34000 J,K,L *64000 other ~~vesselS~~vessels*
15000 M traffic,routes *45000 manufacturers' features*	25000 M *55000 manufacturers' features*	35000 M *65000 ~~mfrs'~~manufacturers' features*
16000 N special areas *46000 mariners' assignments*	26000 N *56000 mariners' assignments*	36000 N *66000 mariners' assignments*
17000 P,Q,R,S buoys, beacons, lights, radar	27000 P,Q,R,S *57000 reserved*	37000 P,Q,R,S *67000 reserved*

47000 reserved for mariners' information		
18000 T,U services & small craft facilities *48000 reserved for mariners' information*	28000 T,U *58000 reserved*	38000 T,U *68000 reserved*
19000-19999 reserved *49000-49999 reserved*	29000-29999 reserved *59000-59999 reserved*	39000-39999 reserved *69000-69999 reserved*
70000-99999 reserved for future use.		

DISPLAY BASE	STANDARD DISPLAY	OTHER INFORMATION
16000 N special areas *46000 mariners' assignments*	26000 N *56000 mariners' assignments*	36000 N *66000 mariners' assgnts*
17000 P,Q,R,S buoys, beacons, lights, radar *47000 reserved for mariners' information*	27000 P,Q,R,S *57000 reserved*	37000 P,Q,R,S *67000 reserved*
18000 T,U services & small craft facilities *48000 reserved for mariners' information*	28000 T,U *58000 reserved*	38000 T,U *68000 reserved*
19000-19999 reserved *49000-49999 reserved*	29000-29999 reserved *59000-59999 reserved*	39000-39999 reserved *69000-69999 reserved*
70000-99999 reserved for future use.		

NotesNote:

1. These viewing groups reflect the display category, but they do not set it. Display Category is set by field 6 of the look-up table.

2. Gaps between sets and groups arehave been left deliberately to allow for future expansion. "na" means that a particular set or group is not yet assigned (not "populated").

CHART INFORMATION - DISPLAY BASE

RESERVED	
10000-10999	Reserved for chart information
A, B	CHART FURNITURE
11000	Information about the Chart Display
11010 11020	cursor [symbol SY(CURSRA01)] na (not assigned)
11030	scalebar, latitude scale [SY(SCALEB10),SY(SCALEB11)]
11040	north arrow [SY(NORTHAR1)]
11050	no data [colour NODTA, AP(NODATA03)], unsurveyed (UNSARE), incompletely surveyed area
11060	Non-HO data boundary LC(NONHODAT)
C, D, E, F	TOPOGRAPHY AND INFRASTRUCTURE
12000	Land area
12010	land area (LANDARE)
12200	Dangers above water
12210	bridge (BRIDGE), pylon (PYLONS), overhead cable (CBLOHD), conveyor (CONVYR), overhead pipeline (PIPOHD), offshore platform (OFSPLF)
12400	Shoreline
12410	coastline (COALNE), ice shelf, glacier (ICEARE), shoreline construction (SLCONS), tie-up wall, dolphin (MORFAC), gate (GATCON, pile (PILPNT), crib, wellhead, ice boom (OBSTRN), floating dock (FLODOC), hulk (HULKES), pontoon (PONTON), oilboom (OILBAR), log boom (LOGPON), flood barrage (DAMCON, CATDAM3)
12420	dock (DOCARE), lock (LOKBSN), canal (CANALS), river (RIVERS)
H, I	HYDROGRAPHY
13000	Safety Contour
13010	safety contour (from conditional symbology procedure DEPCNT03)
13020	na
13030	depth area (DEPARE), dredged area (DRGARE),
J, K, L	SUBSEA FEATURES
14000	Dangers under water
14010	isolated underwater dangers in water deeper than the displayed safety contour (rocks, wrecks, obstructions, mooring cables from conditional symbology procedure)
M	TRACKS AND ROUTES
15000-15999	na (not assigned)
N	SPECIAL AREAS
16000-16999	na (not assigned)
P, Q, R, S	AIDS TO NAVIGATION
17000-17999	na (not assigned)
T, U	SERVICES
18000-18999	na (not assigned)
RESERVED	
19000-19999	Reserved for chart information

~~(Note:~~ The groupings ~~below~~ are given ~~solely~~ to illustrate the contents of the Display Base. All objects of this category should be permanently retained on the ECDIS display.~~)~~

RESERVED	
10000-10999	Reserved for chart information
A, B	INFORMATION ABOUT THE CHART DISPLAY
11000	Information about the Chart Display
11010 11020	cursor [symbol SY(CURSRA01)] na (not assigned)
11030	scalebar, latitude scale [SY(SCALEB10),SY(SCALEB11)]
11040	north arrow [SY(NORTHAR1)]
11050	no data [colour NODTA, AP(NODATA03)], unsurveyed (UNSARE), incompletely surveyed area
11060	Non-HO data boundary LC(NONHODAT)
C, D, E, F	NATURAL & MAN-MADE FEATURES, PORT FEATURES
12000	Land area
12010	land area (LANDARE)
12200	Dangers above water
12210	bridge (BRIDGE), pylon (PYLONS), overhead cable (CBLOHD), conveyor (CONVYR), overhead pipeline (PIPOHD), offshore platform (OFSPLF)
12400	Shoreline
12410	coastline (COALNE), ice shelf, glacier (ICEARE), shoreline construction (SLCONS), tie-up wall, dolphin (MORFAC), gate (GATCON, pile (PILPNT), crib, wellhead, ice boom (OBSTRN), floating dock (FLODOC), hulk (HULKES), pontoon (PONTON), oilboom (OILBAR), log boom (LOGPON), flood barrage (DAMCON, CATDAM3)
12420	dock (DOCARE), lock (LOKBSN), canal (CANALS), river (RIVERS)
H, I	DEPTHS, CURRENTS ETC
13000	Safety Contour
13010	safety contour (from conditional symbology procedure DEPCNT03)
13020	na
13030	depth area (DEPARE), dredged area (DRGARE),
J, K, L	SEABED, OBSTRUCTIONS, PIPELINES
14000	Dangers under water
14010	isolated underwater dangers in water deeper than the displayed safety contour (rocks, wrecks, obstructions, mooring cables from conditional symbology procedure)
M	TRAFFIC ROUTES
15000-15999	na (not assigned)
N	SPECIAL AREAS
16000-16999	na (not assigned)
P, Q, R, S	BUOYS & BEACONS, LIGHTS, FOG SIGNALS, RADAR
17000-17999	na (not assigned)
T, U	SERVICES & SMALL CRAFT FACILITIES
18000-18999	na (not assigned)
RESERVED	
19000-19999	Reserved for chart information

CHART INFORMATION - STANDARD DISPLAY

RESERVED	
20000	Reserved for chart information
A, B	INFORMATION ABOUT THE CHART DISPLAY
21000	Information about the Chart Display
21010	Unknown object (magenta question mark)
21020	Generic Object (NEWOBJ01)
21030	Chart scale boundary, overscale data [AP(OVERSCO1)]
21040	Na
21050	Na
21060	Place-holder for geographic names (LNDRGN, SEAARE)
C, D, E, F	NATURAL & MAN-MADE FEATURES, PORT FEATURES
22000	Major Coastal Features
22010	Riverbank (RIVBNK), lake (LAKARE), lakeshore (LAKSHR), sloping ground (SLOGRD), slope top (SLOTOP), dyke (DYKCON), causeway (CAUSWY), dam (DAMCON),
22200	Conspicuous landmarks:
22210	Radar conspicuous object - (any object with attribute CONRAD 1)
22220	Visually conspicuous object (any object with attribute CONVIS 1)
22230	Na
22240	Built up area (BUAARE)
H, I	DEPTHS, CURRENTS, etc.
23000	Depths
23010	Area of depth less than the safety contour (DIAMON01 pattern)
23020	Na
23030	Swept area (SWPARE)
J, K, L	SEABED, OBSTRUCTIONS, PIPELINES
24000	Seabed dangers
24010	Mooring cables (MORFAC, CATMOR6), (CBLSUB, CATCBL6), tunnel on Seabed (TUNNEL, BURDEP=0), sandwaves (SNDWAV)
M	TRAFFIC ROUTES
25000	Routes and Tracks
25010	Leading line, clearing line (NAVLNE), traffic lane (TSSLPT), deep water route (DWRTPT), traffic separation area (TSEZNE), traffic separation line (TSELNE), traffic roundabout (TSSRON), traffic crossing (TSSCRS), precautionary area (PRCARE), traffic separation scheme boundary (TSSBND), deep water route centre line (DWRTCL), two way route part (TWRTPT), inshore traffic zone (ISTZNE).
25020	Recommended track (RECTRC), recommended traffic lane (RCTLPT), recommended route centreline (RCRTCL)
25030	Ferry route (FERYRT)
25040	Radar line (RADLNE), limit of shore radar (RADRNG)
25060	Radio calling in point (RDOCAL)

N	SPECIAL AREAS
26000	Restricted and Cautionary Areas
26010	Restricted area (RESARE)
26020	Na
26030	Na
26040	Ferry route area (FERYRT), submarine transit lane (SUBTLN), military practice area (MIPARE), sea plane landing area (SPLARE), offshore production area (OSPARE)
26050	Caution area (CTNARE), fairway (FAIRWY)
26200	Information Areas. Protected Areas
26210	Fishing ground (FSHGRD), marine farm (MARCUL),
26220	Anchorage area (ACHARE), anchor berth (ACHBRT),
26230	Pipeline area (PIPARE), cable area (CBLARE)
26240	Dumping ground (DMPGRD),
26250	Cargo transhipment (CTSARE), incineration (ICNARE)
26260	Archipelagic sea lane (ASLXIS, ARCSLN)
P, Q, R, S	BUOYS & BEACONS, LIGHTS, FOG SIGNALS, RADAR
27000	Buoys, Beacons, Topmarks, Lights, Fog Signals
27010	Buoy (BOYxxx), light float (LITFLT), mooring buoy (MORFAC, CATMOR7)
27011	Light vessel (LITVES)
27020	Beacon (BCNxxx)
27025	Daymark (DAYMAR)
27030	Na
27040	Direction of buoyage IALA buoyage regions (M_NSYS)
27050	topmarks (TOPMAR) - for paper chart symbols
27060	Na
27070	light (LIGHTS),
27080	fog signal (FOGSIG), retro-reflector (RETRFL)
27200	Radar
27210	racon (RTPBCN)
27220	na
27230	radar reflector (RADRFL)
T, U	SERVICES & SMALL CRAFT FACILITIES
28000	Services
28010	pilot boarding point (PILBOP)
28020	signal station, traffic (SISTAT), sig. stn. warning (SISTAW)
RESERVED	
29000	reserved for chart information

OTHER CHART INFORMATION

RESERVED	
30000	reserved for chart information
A, B	INFORMATION ABOUT THE CHART DISPLAY
31000	Information about the Chart Display
31010	accuracy of data (MPCCY), survey reliability (M_SREL), survey source (M_SSOR)

	quality of data (M_QUAL)
31011	symbol LOWACC01, identifying low accuracy data, applied to the spatial object of point and area wrecks, rocks and obstructions and to point land areas
31020	nautical publication (M_NPUB)
31030	information from attributes INFORM, TXTDSC, PICREP
31040	data scale and coverage (M_CSCL, M_COVR)
31050	na
31060	na
31070	na
31080	magnetic variation (MAGVAR), local magnetic anomaly (LOCMAG)
C, D, E, F	NATURAL & MAN-MADE FEATURES, PORT FEATURES
32000	Natural Features
32010	dunes , hills (SLOGRD), ridge, clifftop (SLOTOP), contours and elevation (LNDELV)
32020	na
32030	trees , vegetation, mangrove (VEGATN), marsh (LNDRGN)
32040	na
32050	river (RIVERS) or lake (LAKARE); also rapids (RAPIDS), waterfall (WATFAL)
32060	Na
32070	tideway (TIDWAY), saltpan (SLTPAN)
32080	na
32200	Shore Structures
32210	na
32220	any of the following not classified as CONVIS1 (conspicuous): landmark (LNDMRK), building (BUISGL), tank, silo, water tower (SILTNK)cairn (CAIRNS), wall (FNCLNE), fort (FORSTC)
32230	na
32240	airport (AIRARE), runway (RUNWAY)
32250	railway (RAILWY), road (ROADWY), tunnel (TUNNEL), control point (CTRPNT)
32260	na
32270	quarry, refinery, power station, tank farm, wind farm, factory, timber yard (PRDARE)
32280	na
32400	Port Features
32410	harbour type (HRBFAC), customs check point (CHKPNT) [note: "small craft facilities" (SMCFAC) is in group 38210]
32420	na
32430	distance mark (DISMAR)
32440	berthing facility (such as wharf) (BRTFAC), berth number (BERTHS), mooring facility (such as bollard) (MORFAC), , gate (such as lock gate) (GATCON) , dry dock (DRYDOC), crane (CRANES)
32450	na
32460	gridiron (GRIDRN),
H, I	DEPTHS, CURRENTS ETC
33000	Depths, Currents, Tide rips, etc
33010	Soundings (SOUNDG)
33020	depth contours (DEPCNT) other than the safety contour, line depth area (DEPARE)

33021	label for the safety contour
33022	label for contours other than the safety contour
33030	na
33040	water turbulence (WATTUR)
33050	tidal information (T_HMON, T_NHM, T_TIMS)
33060	current and tidal stream information (CURENT, TS_FEB, TS_PAD, TS_PNH, TS_PRH, TS_TIS)
J, K, L	SEABED, OBSTRUCTIONS, PIPELINES
34000	Seabed Information: rocks, wrecks & obstructions, pipes & cables
34010	nature of seabed (SBDARE)
34020	spring (SPRING), sea weed (WEDKLP)
34030	na
34040	fish haven (FSHHAV), fishing stakes, etc. (FSHFAC)
34050	rocks (UWTROC), wrecks (WRECKS), obstructions (OBSTRN), which are not a danger to own-ship's navigation (these are all Display Base if a danger to own-ship)
34051	non-dangerous rocks (UWTROC), wrecks (WRECKS) and obstructions (OBSTRN) which have a VALSOU attribute and are not a danger to own-ship's navigation (these objects are all Display Base if a danger to own-ship)
34060	na
34070	submarine cable (CBLSUB), submarine pipeline (PIPSOL)
M	TRAFFIC ROUTES
35000	Routes
35010	na
N	SPECIAL AREAS
36000	Administrative Areas, (by cursor enquiry)
36010	continental shelf (COSARE),
36020	harbour area (HRBARE) free port area (FRPARE), customs zone (CUSZNE)
36030	na
36040	fishery zone (FSHZNE)
36050	contiguous zone (CONZNE), exclusive economic zone (EXEZNE), national territorial area (NATARE), territorial sea (TESARE), territorial sea baseline (STSLNE), administration area (ADMARE)
P, Q, R, S	BUOYS & BEACONS, LIGHTS, FOG SIGNALS, RADAR
37000-37999	na
T, U	SERVICES & SMALL CRAFT FACILITIES
38000	Services
38010	radar station (RADSTA), radio station (RDOSTA)
38020	na
38030	coastguard station (CGUSTA), rescue station (RSCSTA)
38200	Small craft facilities
38210	small craft facilities (SMCFAC)
RESERVED	
39000	reserved for chart information

MARINERS' INFORMATION - DISPLAY BASE

RESERVED	
40000	Reserved for mariners' information
TOOLS	
41000-41999	na
OWN-SHIP, PLANNED ROUTES, PAST TRACKS	
42000	Own ship
42010	Own ship (ownship), symbol or scaled version, together with heading line, beam bearing line and course and speed vector
42200	Selected Planned Route
42210	legline (leglin, select 1), way points (waypnt, select 1)
42220	Course to make good for selected leglines
MARINERS' FEATURES	
43000	na
OTHER VESSELS	
44000	na
MANUFACTURERS' FEATURES	
45000-45999	Manufacturers' Features
MARINERS' ASSIGNMENTS TO DISPLAY BASE	
46000-46999	Mariners' and manufacturers' objects assigned to Display Base by the mariner
RESERVED	
47000-49999	reserved for mariners' information

MARINERS' INFORMATION - STANDARD DISPLAY

RESERVED	
50000	reserved for mariners' information
TOOLS	
51000-51999	na
OWN-SHIP, PLANNED ROUTES, PAST TRACKS	
52000	Notations on Selected Planned Route
52010	wheel-over line (wholin), selected route
52020	course to make good on leglines (leglin, select 1) of selected route
52030	planned position (pinpos), distance to go, and other notations on selected planned route
52200	Alternate Planned Route
52210	leglin (leglin, select 2), waypoint (waypnt, select 2) of alternate planned route
52220	na
52230	wheel-over line (wholin), alternate route
52240	other notations, alternate route
52400	Past Track
52410	event (events)
52420	na
52430	primary past track (pastrk, catpst 1)

52440	notations on primary past track
52450	na
52460	secondary past track (pastrk catpst 2)
MARINERS' FEATURES	
53000	Mariners' features
53010	danger highlight (dnghlt)
53020	clearing line (clrlin)
53030	mariners' information note (marnot catnot 1)
53040	mariners' cautionary note (marnot catnot 2)
53050	mariners' feature (marfea)
53060	na
53070	na
53080	tidal current observed (tidcur, catcur 2), tidal current predicted (tidcur, catcur 1)
OTHER VESSELS	
54000	Other Ships
54010	other ships (vessels) from radar
54020	notations on other ships (acqsta)
54030	other ships from other sources or undefined sources

MANUFACTURERS' FEATURES	
55000	Manufacturers’ Features
55010	manufacturers' feature (mnufea, catnot 1)
55020	manufacturers' feature (mnufea, catnot 2)
MARINERS' ASSIGNMENTS TO STANDARD DISPLAY	
56000-66999	Mariners' and manufacturers' Objects Assigned to Standard Display by the Mariner
RESERVED	
57000-59999	reserved for mariners’ information

OTHER MARINERS' INFORMATION

RESERVED	
60000	reserved for mariners’ information
TOOLS	
61000	Tools
61010	electronic bearing line (ebline), variable range marker (vrmark)
61020	na
61030	range rings (rngrng)
61040	cursor, style B (cursor, cursty2)
61050	cursor reference point (refpnt)
OWN-SHIP, PLANNED ROUTES, PAST TRACKS	
62000	Position fixes
62010	position fix (positn)
62020	position line (poslin)

MARINERS' FEATURES	
63000-63999	na
OTHER VESSELS	
64000-64999	na
MANUFACTURERS' FEATURES	
65000-65999	Manufacturers' Features
MARINERS' ASSIGNMENTS TO OTHER INFORMATION	
66000-66999	Mariners' and manufacturers' objects assigned to other information by the mariner
RESERVED	
67000-69999	reserved for mariners' information

~~**EXAMPLE**~~

14.3 ECDIS Viewing Group Implimentation

For standardization of the ECDIS Human Machine Interface (HMI) and to facilitate generic training of Mariners as a minimum the following viewing group layers must be implemented to control display of charted objects. An ECDIS may provide more display on/off controls than are available in this table, but OEMs must use the viewing group layer names contained in this table.

Example
The table has viewing group layer "depth contour, currents and magnetics". A manufacturer may subdivide this layer into "depth contours", "depth contour labels", "currents" and "magnetics"

~~The following is an example of how the above viewing groups might be implemented in an ECDIS:~~

~~Over group~~**Viewing Group Layer**	~~content~~**Name of viewing group layer in the ECDIS**	~~viewing~~**Viewing groups included**
1	Display Base	10000 - 19999, 40000 - 49999
Standard display ~~chart~~:		
2	~~unknown~~Unknown ~~object~~Object	21010
3	~~chart data coverage~~Chart Data Coverage	21020 - 21060
4	~~land~~Land ~~features~~Features	22010 - 22260
5	~~area~~Area of ~~depth less than safety contour~~Depth Less Than Safety Contour	23010
6	~~water and seabed features~~Water And Seabed Features	23020 - 24010
7	~~traffic~~Traffic ~~routes~~Routes	25010 - 25040
8	~~cautionary~~Cautionary ~~areas~~Areas	26010 - 26050
9	~~information~~Information ~~areas~~Areas	26210 - 26270
10	~~buoys~~Buoys & ~~beacons~~Beacons	27010 - 27050
11	Lights	27070
12	~~fog~~Fog ~~signals~~Signals	27080
13	~~radar~~Radar	27210 - 27230
14	~~services (pilot, signal stns~~Services (Pilot, Signal Stns)	28010 - 28020

~~Standard display - mariners' features:~~		
~~15~~	~~notations on planned route~~	~~52010 - 52030~~
~~16~~	~~alternate planned route~~	~~52210 - 52240~~
~~17~~	~~past track~~	~~52410 - 52440~~
~~18~~	~~secondary past track~~	~~52460~~
~~19~~	~~mariners' features~~	~~53010 - 53080~~
~~20~~	~~other vessels~~	~~54010 - 54030~~
~~21~~	~~manufacturers' features~~	~~55010 - 55020~~
~~22~~	~~mariners' assignments to std. display~~	~~56000 - 56999~~
Other ~~chart information:~~		
~~23~~15	~~information about chart data~~Information About Chart Data	31010 - 31070
~~24~~16	~~land~~Land ~~features~~Features	32010 - 32460
~~25~~17	Soundings	33010
~~26~~18	~~depth contours, currents~~Depth Contours, Currents, ~~magnetics~~Magnetics	33020 - 33060 & 31080
~~27~~19	~~seabed~~Seabed and ~~obstructions~~Obstructions	34010 - 34070
~~28~~20	~~services and small craft facilities~~Services and Small Craft Facilities	38010 - 38210
~~Other mariners' information:~~		
~~29~~	~~tools for chartwork~~	~~61010 - 61050~~
~~30~~	~~position fixes~~	~~62010 - 62020~~
~~31~~	~~other vessels, mariners' & mfrs' features (not assigned at present).~~	

~~13.3 Text groupings~~

~~The text groupings are:~~

~~00-10 reserved for future assignment by IHO.~~

14.4 Text Groupings

~~10 Important Text~~

~~11 vertical clearance of bridges, overhead cable, pipe or conveyor (BRIDGE, CBLOHD, PIPOHD, CONVYR, VERCSA, VERCLR, VERCCL, VERCOP), bearing of navline, recommended route, deep water route centreline line, recommended track (NAVLNE, RCRTCL, DWRTCL, RECTRC, ORIENT), name and communications channel of radio calling in point (RDOCAL, OBJNAM, COMCHA).~~

~~20 Other text~~

~~21 names for position reporting:~~

~~name or number (OBJNAM) of buoys (BOYxxx), beacons(BCNxxx), daymarks (DAYMAR), light vessel, light float (LITVES, LITFLT), offshore platform (OFSPLF)~~

~~22 na (not allocated)~~

Value of Text Group	Text Group Description	S-57 Object and Attribute Acronyms
00-10	reserved for future assignment by IHO.	
Important Text		
10		
11	Vertical Clearance of Bridges	BRIDGE, VERCLR, VERCCL VERCOP, VERCSA
	Vertical Clearance of Overhead Cable	CBLOHD, VERCLR
	Vertical Clearance of Overhead Pipeline	PIPOHD, VERCLR
	Vertical Clearance of Conveyor	CONVYR, VERCLR
	Bearing of Navline	NAVLNE, ORIENT
	Recommended Route	RCRTCL
	Deep Water Route Centreline Line	DWRTCL
	Recommended Track	RECTRC
	Name and Communications Channel of Radio Calling-In Point	RDOCAL, OBJNAM, COMCHA
Other Text		
20		
21	Name or Number of Buoys	BOYxxx, OBJNAM
	Name or Number of Beacons	BCNxxx, OBJNAM
	Name or Number Daymarks	DAYMAR, OBJNAM
	Name or Number Light Vessel	LITVES, OBJNAM
	Name or Number Light Float	LITFLT, OBJNAM
	Name or Number Offshore Platform	OFSPLF, OBJNAM
22	Na (Not Allocated)	
23	Light Description String	
24	Additional Notes on Chart Data	INFORM, TXTDSC
25	Nature of Seabed	SBDARE, NATSUR
26	Geographic Names	LNDRGN, OBJNAM
		SEAARE, OBJNAM
		ACHARE, CATACH
27	Value of Magnetic Variation	MAGVAR, VALMAG
	Value of Swept Depth	SWPARE, DRVAL1
28	Height of Islet Or Land Feature	LNDARE,HEIGHT

29	Berth Number	BERTHS, OBJNAM ACHBRT, OBJNAM
30	Na	
*31	National Language Text	NOBJNM, NINFOM, NTXTDS
32-49	Reserved For IHO	
50-69	Mariners' Text, Including Planned Speed Etc.	
70-79	Manufacturer's Text	
80-99	Future Requirements (AIS Etc.)	

~~23 light description string~~
~~24 note on chart data (INFORM) or nautical publication (TXTDSC)~~
~~25 nature of seabed (NATSUR of SBDARE)~~
~~26 geographic names (OBJNAM of SEAARE, LNDRGN etc.)~~
~~27 value of: magnetic variation (VALMAG of MAGVAR); swept depth (DRVAL1 of SWPARE)~~
~~28 height of islet or land feature~~
~~29 berth number (OBJNAM of BERTHS, ACHBRT)~~
~~30 na~~
~~*31 national language text (NOBJNM, NINFOM, NTXTDS)~~

~~32-49 reserved for IHO~~

14.5 ECDIS Text Group Implimentation

~~50-69 mariners' text, including planned speed etc.~~
To enable the Mariner to make selections regaring the text visable in the chart display the ECDIS must use the individual text groups collected under text group layer.

~~70-79 manufacturer's text~~
For standardization of the ECDIS Human Machine Interface (HMI) and to facilitate generic training of Mariners as a minimum the following text group layers must be implemented to control the display of text. An ECDIS may provide more textual on/off controls than are available in this table, but OEMs must use the names of text group layer contained in this table.

~~80-99 future requirements (AIS etc.)~~
An example of more detailed selections;
The table has text group layer "Other text". An OEM may wish to subdivide this category into "names", "light description" and "other".

Text Group Layer	Name of text group layer in the ECDIS HMI	Text groups included
1	Important text	10 - 19
2	Other text	20 - 31

NOTE: * National text is a supplementary option for ECDIS. If used, the style should be similar to that of the Presentation Library.

~~13.4~~ 14.6 Abbreviations

The following abbreviations are used on the ECDIS display:

~~13.4.1~~14.6.1 'TE' text command abbreviations

The following abbreviations are used with the "TE" command word:

Prefixes:	Suffixes	'C' Format Command
bn = beacon (INT1) by = buoy clr = overhead clearance clr cl = clearance closed clr op = clearance open sf clr = safe clearance No = number (INT1) Plt = pilot Prod = offshore production (INT1) LtV = light vessel Varn = magnetic variation ch = communication channel NMT= not more than "CLEARING BEARING" NLT = not less than "CLEARING BEARING"	kn = knots (INT1) deg = degrees	% = instruction follows, %s = text string, %d = integer number, %n.mlf = floating point number with n characters (including the deci-mal), m of which come after the deci-mal point.

The meanings of the above prefixes and suffixes must be available to the mariner.

~~13.4.2 Light description Abbreviations~~

~~Dir directional~~
~~Aero aeronautical~~

~~F fixed~~
~~Fl flashing~~
~~LFl long-flashing~~
~~Q quick-flashing~~
~~VQ very quick-flashing~~
~~UQ ultra quick-flashing~~
~~Iso isophased~~
~~Oc occulting~~
~~IQ interrupted quick-flashing~~
~~IVQ interrupted very quick-flashing~~
~~IUQ interrupted ultra quick-flashing~~
~~Mo morse~~
~~FFl fixed and flashing~~
~~Fl+LFl flash/long-flash~~
~~AlOc Fl alternating occulting/flashing~~
~~FLFl fixed/long-flash~~
~~AlOc alternating occulting~~
~~AlLFl alternating long-flash~~
~~AlFl alternating flash~~
~~Al group alternating~~
~~Q+LFl quick-flash plus long-flash~~
~~VQ+LFl very quick-flash plus long-flash~~
~~UQ+LFl ultra quick-flash plus long-flash~~
~~Al alternating~~
~~AlF Fl alternating fixed and flashing~~

~~W White~~
~~R Red~~
~~G Green~~
~~Y Yellow~~

~~occas occasional~~
~~temp temporary~~
~~priv private~~
~~exting extinguished~~

~~m metres~~
~~M nautical miles~~

~~**13.4.3**~~

14.6.3 Nature of seabed abbreviations ('TX')

The following abbreviations ~~may be used~~ for values of NATSUR - nature of seabed:

~~NATSUR 1, mud M~~ ~~NATSUR 2, clay Cy~~ ~~NATSUR 3, silt Si~~ ~~NATSUR 4, sand S~~ ~~NATSUR 5, stones St~~ ~~NATSUR 6, gravel G~~ ~~NATSUR 7, pebbles P~~	~~NATSUR 8, cobbles Cb~~ ~~NATSUR 9, rock R~~ ~~NATSUR 11, lava R~~ ~~NATSUR 14, coral Co~~ ~~NATSUR 17, shells Sh~~ ~~NATSUR 18, boulder R~~

Attribute ID	Description	ECDIS Abbreviation
1	mud	M
2	clay	Cy
3	silt	Si
4	sand	S
5	stones	St
6	gravel	G
7	pebbles	P
8	cobbles	Cb
9	rock	R
11	lava	R
14	coral	Co
17	shells	Sh
18	boulder	R

To ~~write out on the display "Mud Sand Gravel", for example, causes much more clutter than writing "M S G".~~ reduce undue clutter in the ECDIS chart display, it is recommended that ECDIS manufacturers ~~are encouraged to~~ use the abbreviations ~~both on the chart display and when providing cursor-pick information.~~of the NATSUR attribute.

The ~~meanings~~description of the ECDIS abbreviations in ~~13.4.2~~14.4.2 and ~~13.4.3~~14.4.3 must be made available to the mariner via the pick report.

~~S-52 Presentation Library, Appendix 2, Annex A, Part I~~
~~SYMBOL_LIBRARY_AND SYMBOL_PLOTS~~

Light Description abbreviations

See section 10.6.3 for details.

~~14. SYMBOL LIBRARY FOR USE ON~~Symbol Library for use on ECDIS

~~14.1~~15.1 Introduction

This 'hard-copy' Symbol Library (Addendum) is a paper based human-readable translation of the digital Symbol Library in the .DAI file of the PresLib ed 3.4 (2008). The digital symbol library was previously the only source of the IHO ECDIS symbols since the first publication of the Presentation Library in 1992. From the publication of ed. 3.3 of the PresLib. this 'hard-copy' becomes the official version and takes priority over the digital version in the case of any discrepancies.

This section gives a description of the diagrams followed by examples for a point / centered area symbol, a linestyle symbol and an area pattern symbol.
Approximately 600 individual diagrams of the symbols are contained in the Addendum to the Presentation Library.

Note: For a general discussion of the use of symbols on ECDIS see C&SS section 3. For further technical information see PresLib section 5 and sections ~~7.2 7.4.~~9.2-9.4.

~~14.2~~15.2 Symbol Diagrams

~~14.2.1~~15.2.1 Description of the symbol diagrams

~~**Symbol name** - The name of the symbol is the name used for the call up in the lookup table, conditional procedure or PresLib Manual.. The symbol of a pattern is the base unit of the pattern which fills an area. Point symbols are identified by the suffix 'SY', complex linestyles by 'LC' and area patterns by 'AP'.~~

~~**Reference number (RN)** - The reference number is used to link the numbered symbols on the pages of digital ECDIS Chart 1 (tiff format) to the diagram in the Symbol Library which specifies their exact size, shape and colour.~~

~~**Symbol Explanation** - This short and simple description of the symbol meaning is used in the response to cursor picking on an object since it gives the mariner quick an understandable information which is not always obvious from the object class and attribute information.~~

~~**Look up table affected *** - This entry indicates the look up table in which the symbol is used.~~

~~**Called by CSP etc.** - This entry indicates a reference, whether and what CSP or other procedure calls this symbol to be drawn.~~

~~**Bounding Box ****~~ ~~- The box which exactly encloses the symbol (it is tangential to the extremities of the symbol) and whose upper left corner is the origin for the coordinates which describe the symbol. The column number (x-coordinate) is positive to the right and the row number (y-coordinate) is positive downwards. (See PresLib section 5, fig.2.)~~

~~**Pivot Point**~~ ~~In drawing the symbol on the display the pivot point is placed on the actual geographic position of the object being symbolized. Usually the pivot point is plotted on the diagrams, but it is not shown when it falls outside the area covered by the diagram.~~

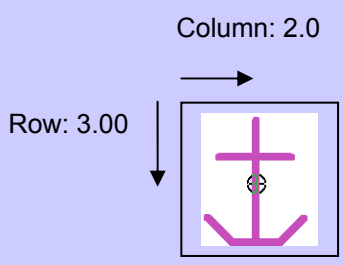
~~For symbols which are rotated by the ORIENT attribute (such as the traffic arrows, e.g. SY(TSSLPT51)), the symbol is rotated about the pivot point. For symbols which are offset (such as SY(ACHRESnn)), the pivot point is offset from the bounding box in such a way as to avoid overwriting the symbol on the master object or any other slave symbol surrounding it. (See PresLib section 7.4.3.2, fig. 4a.)~~

~~**Pivot Point Column / Row**~~ ~~- This values in **millimetres** give the position of the pivot point of the symbol relative to the top left corner of the bounding box. Column number (horizontal, x coordinate) is positive to the right and row number (vertical, y coordinate) is positive downwards.~~

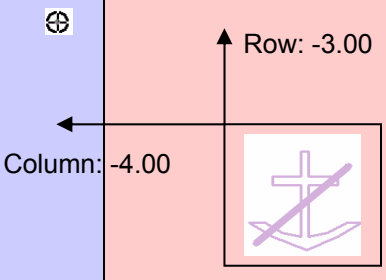
Symbol name	The name of the symbol is the name used for the call up in the lookup table, conditional procedure or PresLib Manual.. The symbol of a pattern is the base unit of the pattern which fills an area. Point symbols are identified by the suffix 'SY', complex linestyles by 'LC' and area patterns by 'AP'.
Reference number (RN)	The reference number is used to link the numbered symbols on the pages of digital ECDIS Chart 1 (tiff format) to the diagram in the Symbol Library which specifies their exact size, shape and colour
Symbol Explanation	This short and simple description of the symbol meaning is used in the response to cursor picking on an object since it gives the mariner quick an understandable information which is not always obvious from the object class and attribute information
Look up table affected *	This entry indicates the look up table in which the symbol is used.
Called by CSP etc.	This entry indicates a reference,

	other procedure calls this symbol to be	
Bounding Box **	The box which exactly encloses the	

	the extremities of the symbol) and whose upper left corner is the origin for the coordinates which describe the symbol. The column number (x-coordinate) is positive to the right and the row number (y-coordinate) is positive downwards. (See PresLib section 8, fig.2.)
Pivot Point	In drawing the symbol on the display the pivot point is placed on the actual geographic position of the object being symbolized. Usually the pivot point is plotted on the diagrams, but it is not shown when it falls outside the area covered by the diagram. For symbols which are rotated by the ORIENT attribute (such as the traffic arrows, e.g. SY(TSSLPT51)), the symbol is rotated about the pivot point. For symbols which are offset (such as SY(ACHRESnn)), the pivot point is offset from the bounding box in such a way as to avoid overwriting the symbol on the master object or any other slave symbol surrounding it. (See PresLib section 8.5.1, fig. 4b.)
Pivot Point Column / Row	This values in **millimetres** give the position of the pivot point of the symbol relative to the top left corner of the bounding box. Column number (horizontal, x coordinate) is positive to the right and row number (vertical, y coordinate) is positive downwards.



Example: Pivot point outside of the bounding box

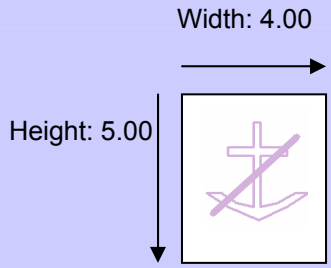


Example: Pivot p

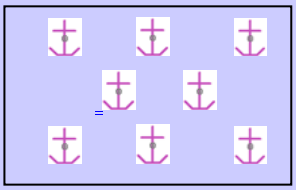
~~Example: Pivot point inside of the~~

~~Example: Pivot point outside of the bounding box~~

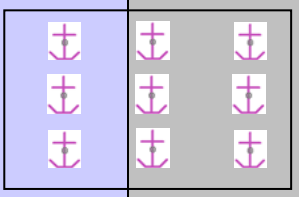
Width / Height of Bounding Box	This values in millimeter give the size of the Bounding Box.



Symbol colours	This entry gives the colour tokens which are used on this symbol and an example of the colour using the Day colour table.
Pattern	This entry gives a pattern name if there is a specific pattern used for filling any area of the symbol.
Pattern Type	Fill patterns use widely spaced symbols. These symbols may be drawn either **staggered** or **linear**.

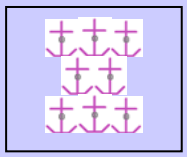


Example: **staggered**

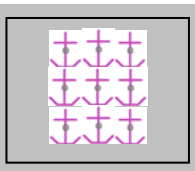


Example: **li**

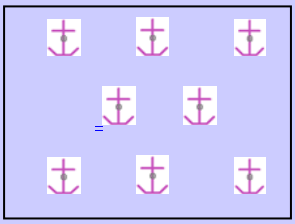
Pattern Spacing	This entry gives the type of spacing between drawn symbols. The symbols can be drawn with **constant** or **scale dependent spacing**. The related values are given in **Maximum / Minimum Distance**. For Ed. 3.3 as well as for all preceding editions of the PresLib all pattern symbols are drawn with **constant** spacing.



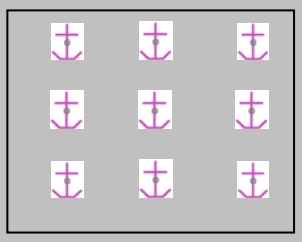
Staggered with **constant** space=0



Linear w



Staggered with **constant** space>0



Llinear w

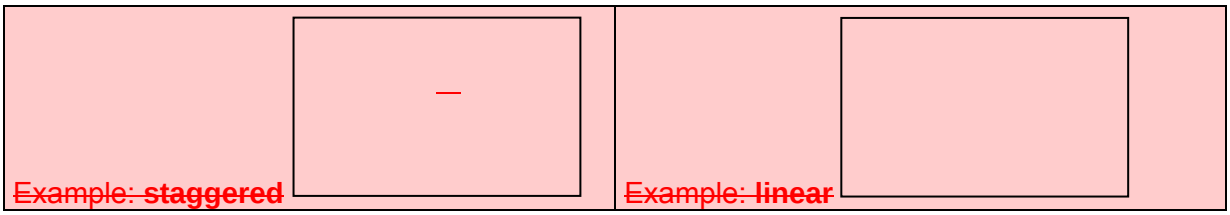
Minimum Distance	This value gives the minimum vertical and horizontal distance between the symbols (including pivot point) drawn, in **millimetres**.
Maximum Distance	This value gives the maximum vertical and horizontal distance between the symbols (including pivot point) drawn, in **millimetres**. This value is only valid in case of **Pattern Spacing** type **scale dependent spacing**.
Comments ***	This entry gives any comments for meaning, implementation and use of the symbol, which are not covered by the other description items.
Example on ENC	This field may contain examples of this symbol on an ECDIS display.
References	This entry gives a reference to the corresponding S-57 Objects and the INT 1 [1] descriptions.

~~**Width / Height of Bounding Box** - This values in millimeter give the size of the Bounding Box.~~

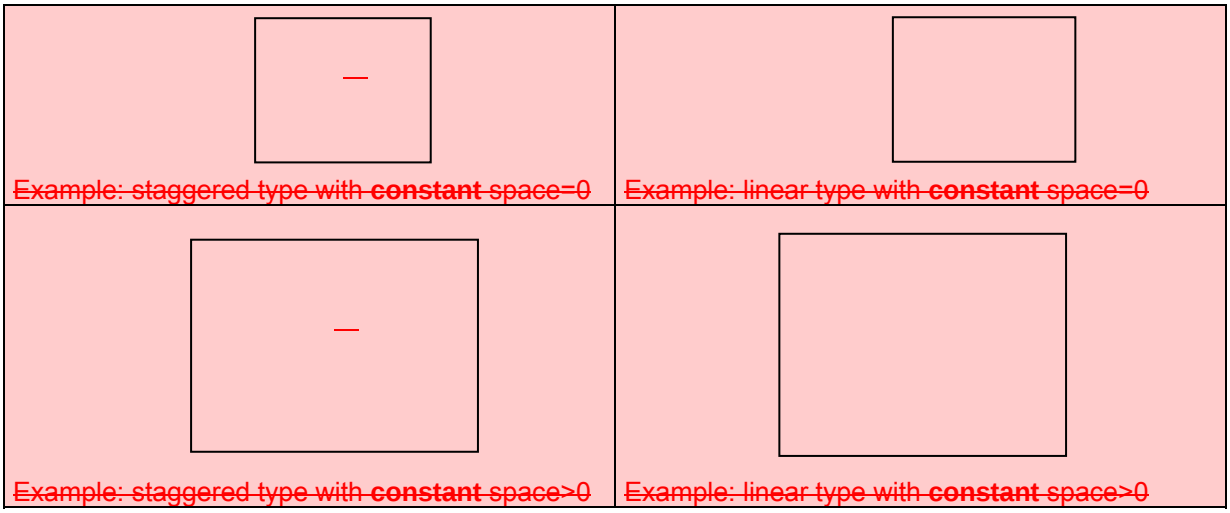
~~**Symbol colours** - This entry gives the colour tokens which are used on this symbol and an example of the colour using the Day colour table.~~

~~**Pattern** - This entry gives a pattern name if there is a specific pattern used for filling any area of the symbol.~~

Pattern Type - Fill patterns use widely spaced symbols. These symbols may be drawn either **staggered** or **linear**.



Pattern Spacing - This entry gives the type of spacing between drawn symbols. The symbols can be drawn with **constant** or **scale dependent spacing**. The related values are given in **Maximum / Minimum Distance**. For Ed. 3.3 as well as for all preceding editions of the PresLib all pattern symbols are drawn with **constant** spacing.



Minimum Distance - This value gives the minimum vertical and horizontal distance between the symbols (including pivot point) drawn, in **millimetres**.

Maximum Distance - This value gives the maximum vertical and horizontal distance between the symbols (including pivot point) drawn, in **millimetres**. This value is only valid in case of **Pattern Spacing** type **scale dependent spacing**.

Comments *** - This entry gives any comments for meaning, implementation and use of the symbol, which are not covered by the other description items.

Example on ENC - This field may contain examples of this symbol on an ECDIS display.

~~**References** - This entry gives a reference to the corresponding S-57 Objects and the INT 1 descriptions.~~

~~**14.2.2**~~

15.2.2 Notes on the ~~above~~symbol descriptions

* **'N/A'** under 'look-up table affected' means "Not Applicable".

** **'Bounding box'**: in order to show the details clearly, many of the diagrams are enlarged over the true size, by as much as ten times for small symbols, with the result that the edges of the symbol sometimes overflow the bounding box (see for example symbol SY(BUISGL11)). This does not invalidate the drawing instructions.

*** **'Comments'**:If an area is "transparent filled" the description means percentage given applies to the transparent part. Example: 75% transparency means that of four adjacent pixels, three are transparent.

~~14.2.3 Notes~~15.2.3 Instructions on the symbol diagrams

'Line Weight', as used in the symbol descriptions, is equivalent to "line width". It is derived from the following requirement for screen resolution given in S-52, section 8(c) and repeated in IEC ~~61174,~~61174 [7], clause 5.8.2:

> "*Minimum lines per mm (L) is given by L = 864/s, where s is the smaller dimension of the chart display area (e.g. for the minimum chart area, s = 270 mm and the resolution is L = 3.20 lines per mm, giving a "Picture Unit" size of 0.312 mm).*"

The term 'Picture Unit' used above is the general form of the earlier concept of pixels of about 0.3 mm size. Hence a Line weight of 0.3 mm represents a line or dot of one-pixel width; a line weight of 0.6 mm represents a two-pixel line or four-pixel dot, and so on (see further discussion of the relationship between pixels and symbol size in C&S Specs 3.1.5).

~~14.3~~15.3 ~~Particular~~ Instructions for ~~symbolising points~~Symbolising Points

~~14.3.1~~15.3.1 Reference to PresLib Manual

Please read section ~~7,~~9, particularly:

- ~~7.2.3.2~~9.2 on symbol rotation (note particularly "Symbols with no rotation should always be drawn upright with respect to the screen borders"). Contour labels should also be drawn upright, for ease of reading, not aligned with the direction of the contour as on the paper chart.
- ~~7.4.3.1~~9.4 and ~~7.4.3.2~~9.2 on area symbolisation by a centred symbol, and symbol offsets.

~~14.4~~15.4 ~~Particular~~ Instructions for ~~symbolising lines~~Symbolising Lines

~~14.4.1~~15.4.1 Reference to PresLib Manual

Linestyles symbolise (a) line objects such as routes and (b) area boundaries. There are two types of line styles, simple linestyles and complex linestyles. Please read sections 5 and 7, particularly:

~~5.2~~8.2	on the usage of complex linestyles,
~~7.3~~9.3	on line symbology in general,
~~7.3.5~~9.3	on the "predefined line style", i.e. the simple linestyles.

~~14.4.2~~15.4.2 Direction of drawing the line

Some complex linestyles are 'directional', either to indicate the direction of traffic in a route or to define the inside of an area by the foot of 'T' or 'V' symbols built into the line.

Whereas point symbols and centred area symbols may be oriented by means of the ORIENT attribute, directional linestyle symbols are always oriented in the direction of the digitised line they represent.

It is essential that the direction of drawing lines coincides with the direction of digitising of the line in the ENC (that is in the direction of a one way traffic route or track, or clockwise around an area).

Examples are given in the following table using LC(DWRTCL07) and LC(ENTRES51):

Linestyle	~~direction~~Direction of digitising	~~direction~~Direction of symbol
DWRTCL07~~"~~ ~~"~~	090 deg~~.~~	arrow points 090 deg., as illustrated
	180 deg	arrow points 180 deg.
	270 deg	arrow points 270 deg.
ENTRES51~~"~~ ~~"~~	090 deg	'T' points 180 deg, as illustrated
	180 deg	'T' points 270 deg.
	270 deg	'T' points ~~360~~0 deg.

~~14.4.3~~15.4.3 Laying out the symbols along the line

The pivot point determines the spacing between individual symbols of the complex linestyle ~~symbols along the line is determined by the pivot point~~. The pivot point of the first line symbol should be placed on the start of the line and the pivot point of each successive symbol should be placed on the end of the preceding symbol (see section ~~5.2, figure 3a~~82).

~~14.4.4~~15.4.4 Curved ~~lines~~Lines

In order to fit all digitised lines (including curved lines), the complex linestyle is designed to bend around curves (for example, in order to symbolise the boundary of a circular anchorage area.) If the curve is too sharp for the ECDIS to follow the digitised line exactly for part, or all, of the run-length of the line, the linestyle should default to a dashed line of the same colour and lineweight as the original linestlye symbol (see section ~~5.2.2~~8.2).

~~14.4.5~~15.4.5 Symbols or ~~text~~Text for ~~lines~~Lines

The pivot point of symbols or text associated with a line should be located at the midpoint of the run-length of the line (see section 7.3).

~~14.5~~15.5 ~~Particular~~ Instructions for symbolising areas

~~14.5.1~~15.5.1 Reference to Preslib Manual

Areas are symbolised (a) by boundary linestyles (if the look-up table for symbolized boundaries is used); (b) by centred symbols; (c) by colour fill; or (d) by special area fill patterns. Please read section ~~7.4.~~8.4.

~~14.5.2~~15.5.2 Centred Symbols for areas

The pivot point of centred symbols should be located at or near the centre of gravity of the area displayed. Please read section ~~7.4.3~~8.5 for details.

~~14.5.3~~15.5.3 Pattern spacing for area fill patterns

It is critically important to maintain the correct spacing between the symbols of certain area fill patterns. For example too wide a spacing between the grey dots of AP(DRGARE01) will effectively make the pattern invisible, while too close a spacing will cause clutter. Another example: the difference between the open spacing of the grey dashes of AP(PRTSUR) and the closely spaced dashes of AP(NODATA03) symbolizes the difference between a partly surveyed area with little data and an unsurveyed area with no data at all.

~~The ECDIS Chart 1 gives examples of how the different area patterns should appear on an ECDIS display.~~

~~14.6~~15.6 Examples of ~~symbol diagrams~~Symbol Diagrams

Examples for a **point symbol** SY(ACHARE51), a **line symbol** LC(ACHARE51) and a **area symbol** AP(RCKLDG01) are given below:

a) **Point ~~symbol~~Symbol**

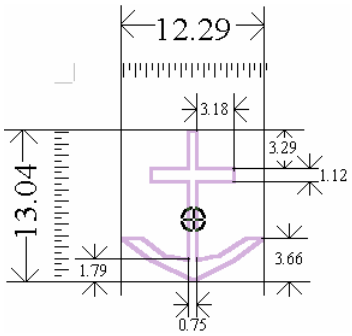
Symbol Name:	SY(**ACHARE51**)	RN:	2

Symbol Explanation: anchorage area

Look up table affected: area symbols with plain boundaries
area symbols with symbolized boundaries

Pivot Point Column: 6.29
Pivot Point Row: 7.79

Width of Bounding Box: 12.29
Height of Bounding Box: 13.04

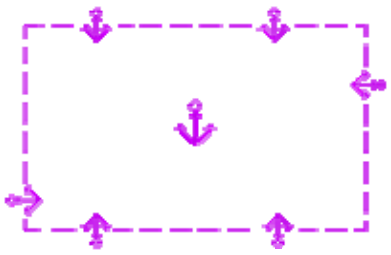


Symbol Colours: CHMGF

Comments: Line weight 0.3 mm

Examples on ENC: N/A

References:

S-57	INT 1	
ACHARE (centred symbol)	IN 12.1-9	(IN 12.1) 

b) **Line ~~symbol~~Symbol**

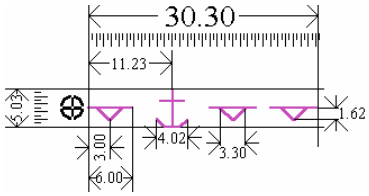
Symbol Name:	LC(**ACHARE51**)	RN: 469

Symbol Explanation: boundary of an anchorage area

Look up table affected: area symbols with symbolized boundaries

Pivot Point Column: -1.98
Pivot Point Row: 2.42

Width of Bounding Box: 30.30
Height of Bounding Box: 5.03



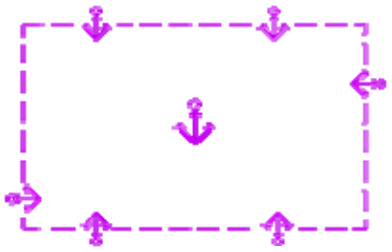
Symbol Colours: CHMGD

Comments: Line weight 0.3 mm;
Anchor symbol dimensions like point symbol **ACHARE02**

Examples on ENC: N/A

References:

S-57	INT 1	
ACHARE	IN 12.1-9;	(IN 12.1)



c) **Area ~~symbol~~Symbol**

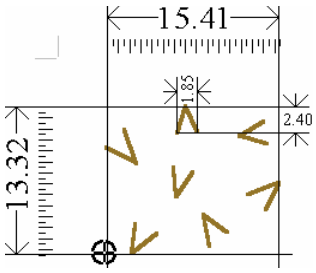
Symbol Name:	AP(**RCKLDG01**)	RN: 464

Symbol Explanation: rock or coral drying ledges

Look up table affected: area symbols with plain boundaries
area symbols with symbolized boundaries

Pivot Point Column: -0.06
Pivot Point Row: 13.38

Width of Bounding Box: 15.41
Height of Bounding Box: 13.32



Symbol Colours: LANDF

Pattern Type: Linear
Pattern Spacing: Constant

Minimum Distance: 0.00
Maximum Distance: 0.00

Comments: Line weight 0.3 mm
The seven “v” symbols in the box illustrated should form a continuous uniform pattern over the area of the object being symbolized.

Examples on ENC: N/A

References:

S-57	INT 1	
SBDARE	IJ 1-11;30-39,	

15. ECDIS CHART 1, SYMBOL PLOTS & COLOUR TEST DIAGRAMS

ECDIS Chart 1, Symbol Plots & Colour Test Diagrams

~~15.1~~16.1 Introduction

This section of the Presentation Library contains the following:

The ECDIS Chart 1 and its indexing list of symbol names and meanings arranged numerically, together with the colour differentiation test diagrams, are intended for the mariner's use. The use of the Colour Differentiation Test Diagrams is described in section ~~19.4.~~18

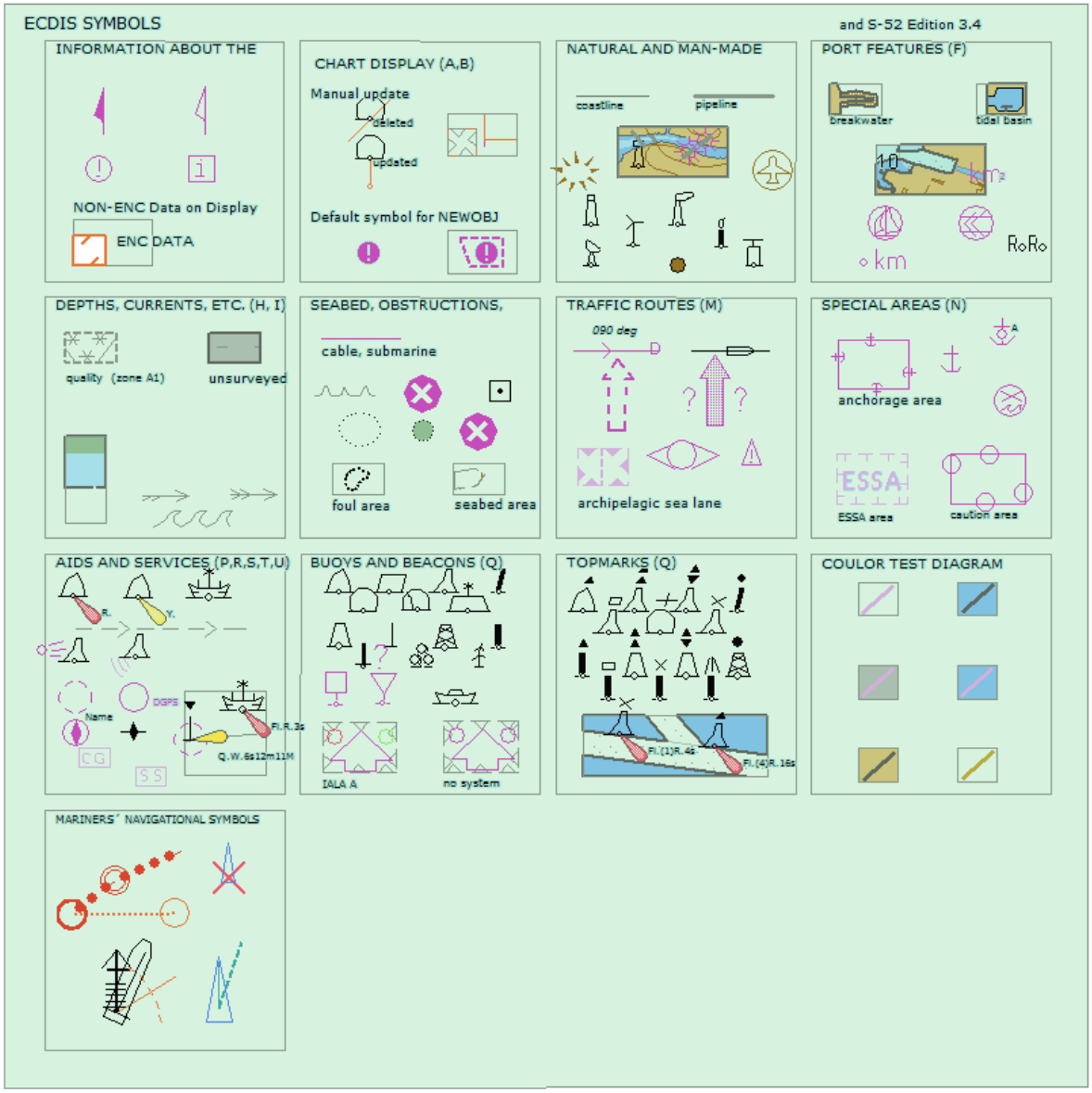
The plot of symbols arranged alphabetically and its indexing list of symbol names and meanings arranged alphabetically are intended for the manufacturer's use.

Note that because colour printing and copying is not completely true to the original, this hard-copy version does not accurately represent the colour requirements of the IHO Colour and symbol Specifications. The ECDIS should be colour calibrated as described in Annex B to the C&S Specifications.

In addition, symbol size may change in copying. To ensure correct size, all symbols illustrated should be scaled by the factor required to make symbol CHKSYM01 measure 5mm by 5mm.

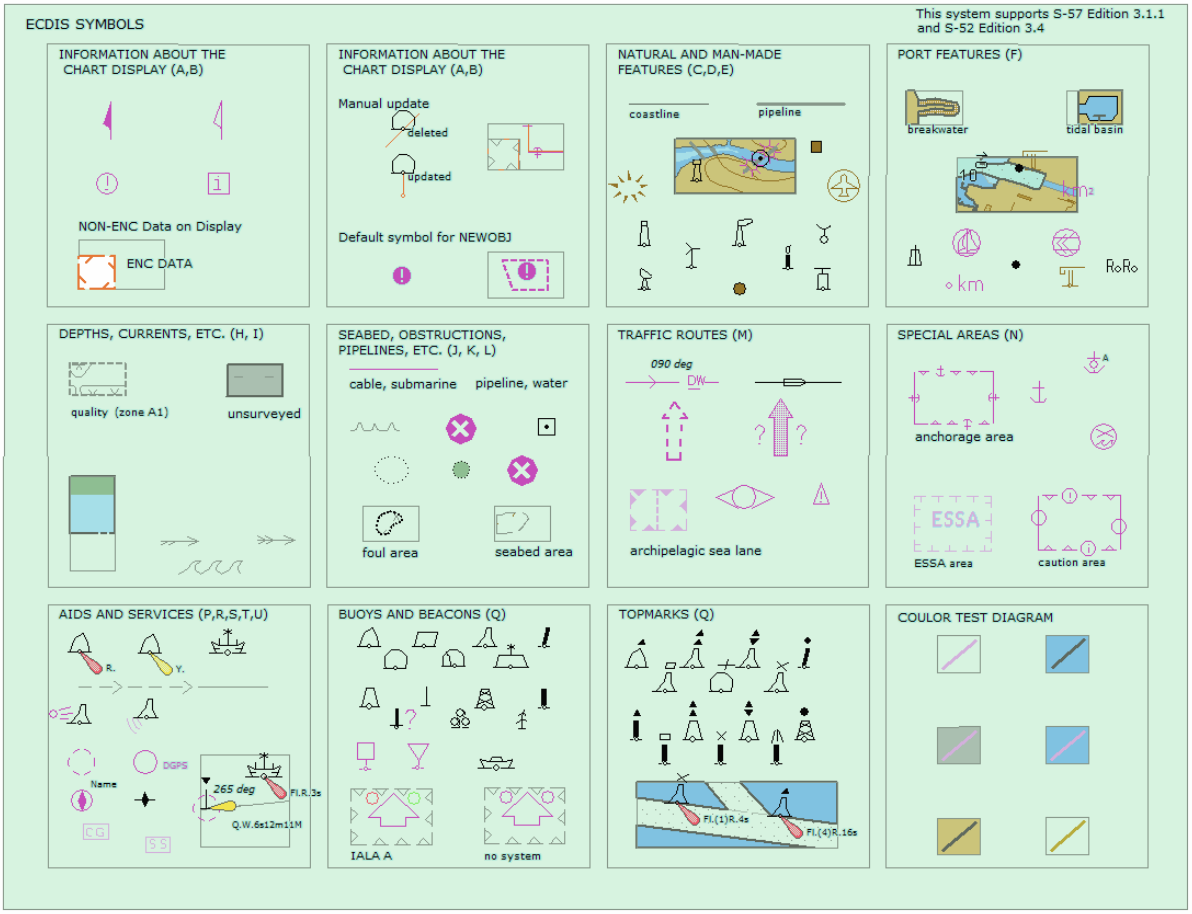
~~15.2~~16.2 ECDIS Chart 1

ECDIS Chart 1 Index including Mariners' Navigational Symbols



Note that the printed version of Mariner' Navigational Symbols is included in this document for reasons of completeness. Because IEC 62288 [~~3~~8] is the ruling standard for these symbols, the cell AAC1XMS.000 containing Mariner' Navigational Symbols as special objects is no longer included in the S-52, Appendix 2 package.

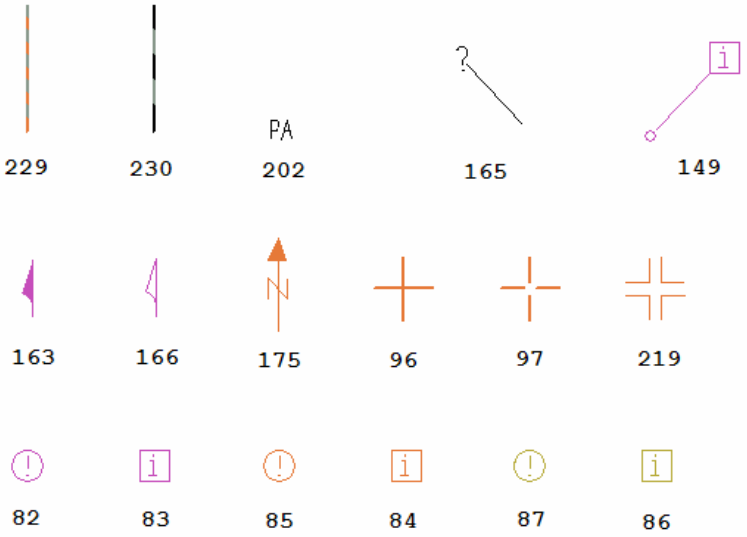
ECDIS Chart 1 Index excluding Mariners' Navigational Symbols



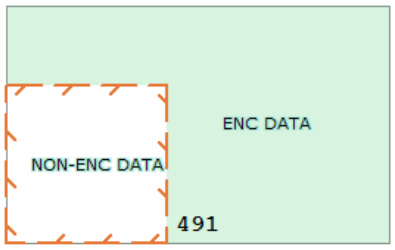
INFORMATION ABOUT THE CHART DISPLAY (A,B)

This system supports S-57 Edition 3.1.1

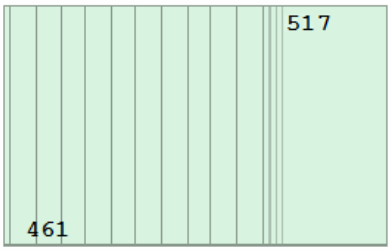
and S-52 Edition 3.4



NON-ENC Data on Display



Over scale part of a Display



INFORMATION ABOUT THE CHART DISPLAY (A,B)

This system supports S-57 Edition 3.1.1
and S-52 Edition 3.4

Test symbol for size checking

88

Test symbol for color checking

523

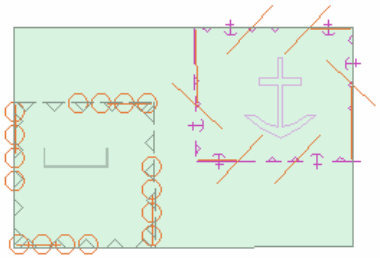
Manual update

78 deleted

79 updated

474

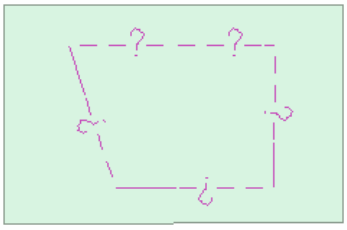
475



No symbol exists in the symbol library

204

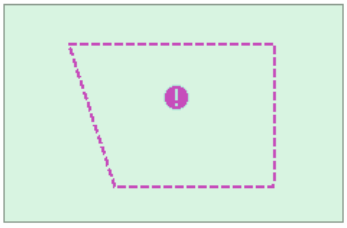
463



Default symbol for NEWOBJ

585

588



NATURAL AND MAN-MADE FEATURES (C,D,E)

This system supports S-57 Edition 3.1.1 and S-52 Edition 3.4

clr 20.0

coastline, surveyed

coastline, unsurveyed

river, stream

land elevation

vegetation

road

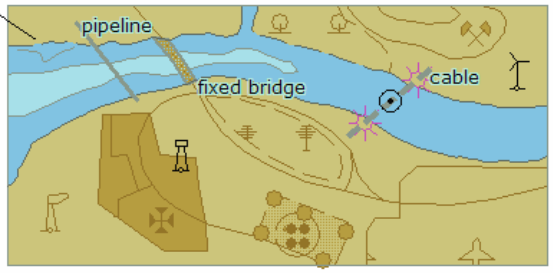
pipeline, overhead

cable, overhead

clr 7.0

fixed bridge

413 414 144 145 195



206 name 65 72 73 7 63

193 194 66 69 111 112 67 70 68 69

407 409 408 411 80 81 125 126 169 170

439 440 435 436 173 174 207 208 410 412

113 114 373 374 231 234 130 131 199 128

375 376 222 223 437 438 203

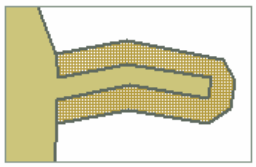
PORT FEATURES (F)

This system supports S-57 Edition 3.1.1
and S-52 Edition 3.4

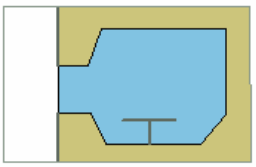
shorline construction

lock gate

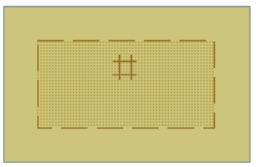
dam



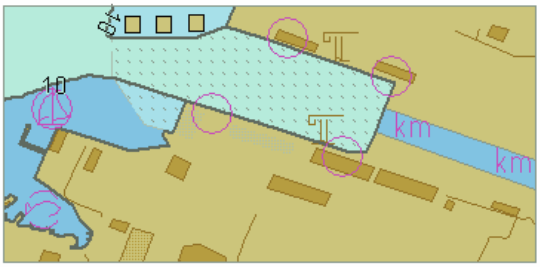
breakwater

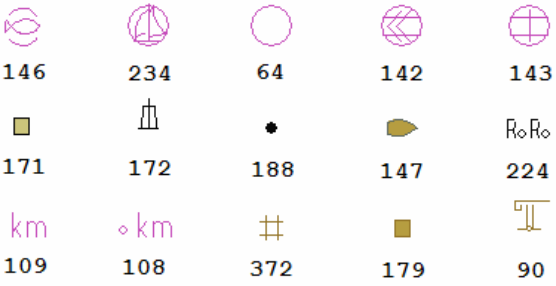


tidal basin



timber yard

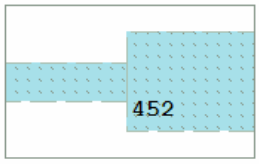




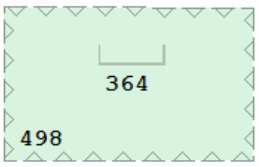
This system supports S-57 Edition 3.1.1

and S-52 Edition 3.4

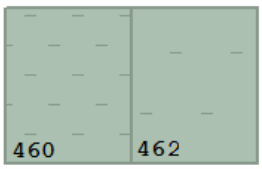
DEPTHS, CURRENTS, ETC. (H, I)



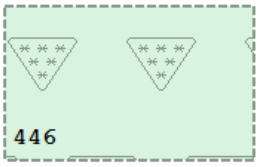
dredged area



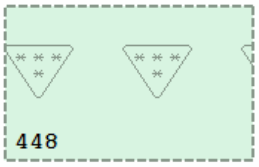
swept area



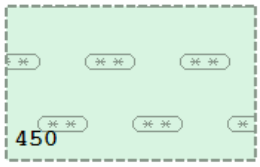
unsurveyed incompletely surveyed



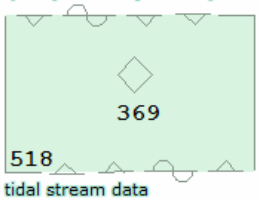
quality of data (zone A1)



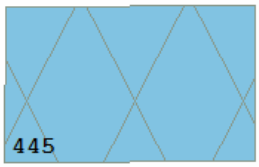
quality of data (zone B)



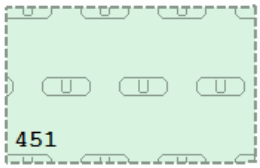
quality of data (zone D)



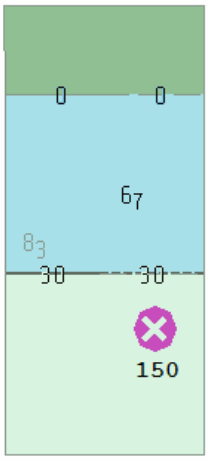
tidal stream data



area of depth less
than safety contour

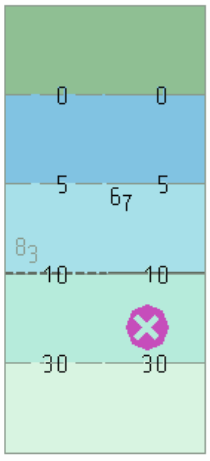


quality of data (zone u)



low
accuracy

low
accuracy

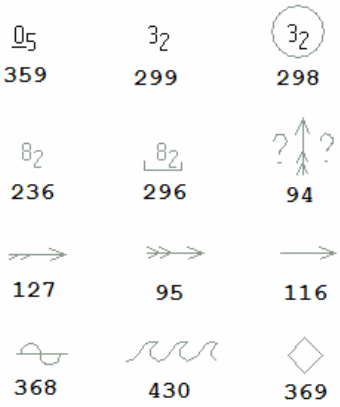


drying line

shallow contour

safety contour

deep contour



2 or 4 colours for symbolizing of depth areas

This system supports S-57 Edition 3.1.1

and S-52 Edition 3.4

SEABED, OBSTRUCTIONS, PIPELINES, ETC. (J, K, L)

489
fishing facility

473
cable, submarine

501
pipeline, oil

502
pipeline, water

obstruction line

danger line

496
danger line, low accuracy

441 442 443 162 180 44

434 235 363 132 136 135 168 138 137

150 98 99 525 177 178 526 426 424

453
foul area

details unknown
area of wrecks or obstructions

464 456
seabed area

136 498
fishing facility

465 498
sand waves

118 180 516
restricted area

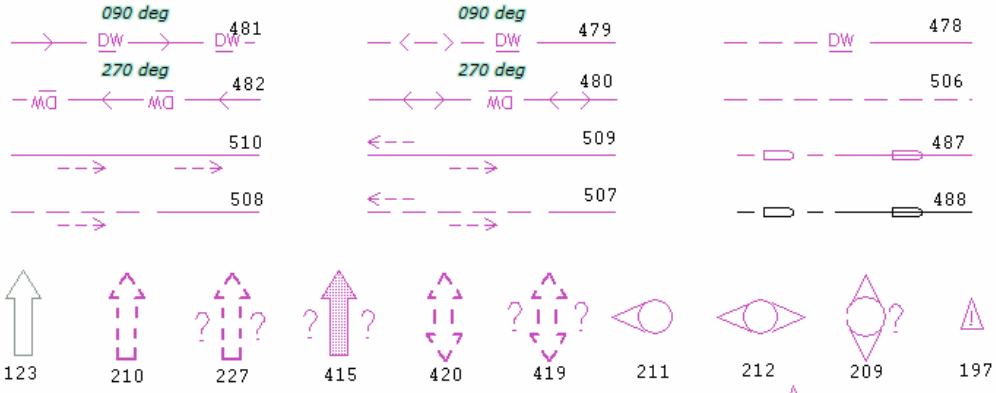
76 472
cable area

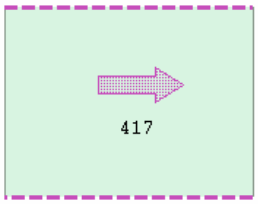
148 499
pipe area, oil

148 500
pipe area, water

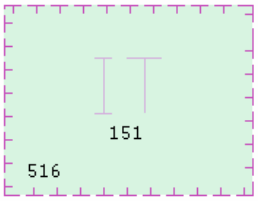
TRAFFIC ROUTES (M)

This system supports S-57 Edition 3.1.1
and S-52 Edition 3.4

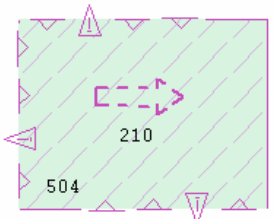




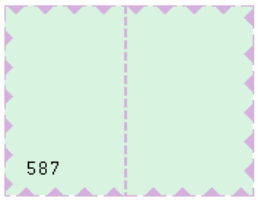
traffic separation scheme



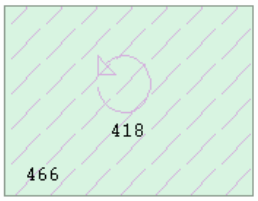
inshore traffic zone



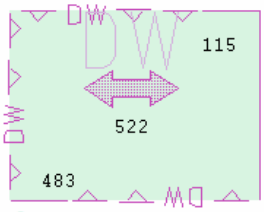
precautionary area



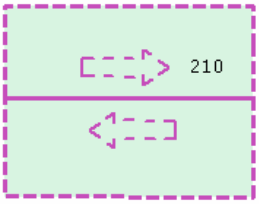
archipelagic sea lane



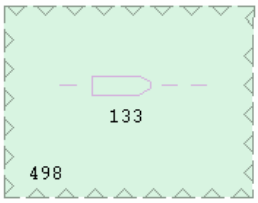
seabed area



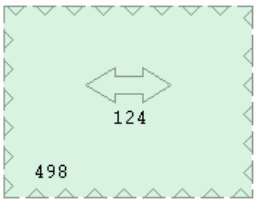
deep water route part



two-way route part



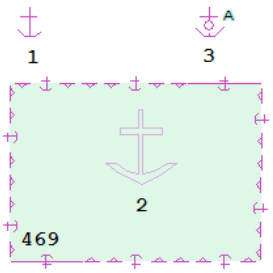
ferry route



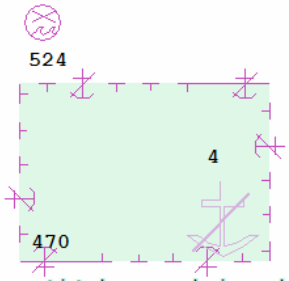
fairway

This system supports S-57 Edition 3.1.1
and S-52 Edition 3.4

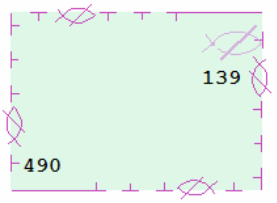
SPECIAL AREAS (N)



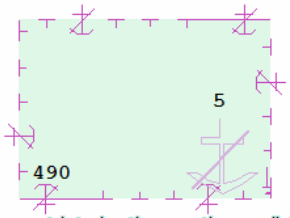
anchorage area



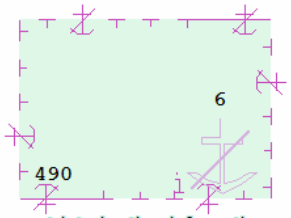
restricted area, anchoring prohibited



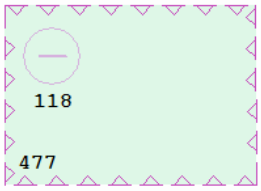
restricted area, fishing prohibited



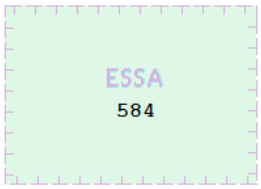
restricted, other caution available



restricted, other information available

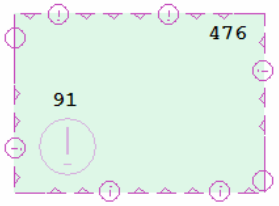


restricted, entry prohibited



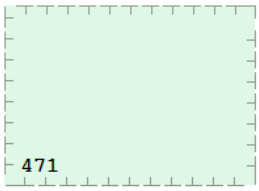
ESSA area

PSSA area

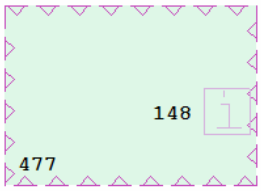


caution area

military practice area



administration area

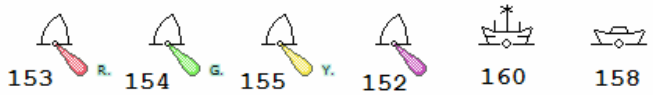


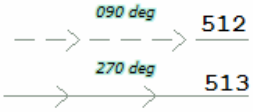
cargo transhipment area

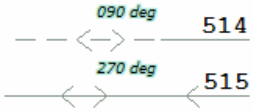
This system supports S-57 Edition 3.1.1
and S-52 Edition 3.4

AIDS AND SERVICES (P,R,S,T,U)

P - lights and recommended tracks



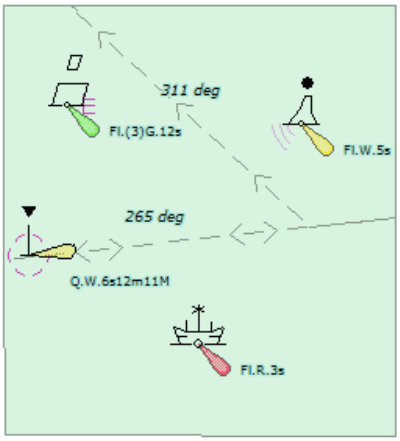


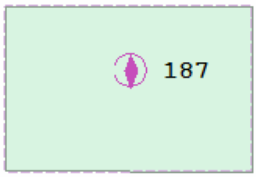


R - fog signals

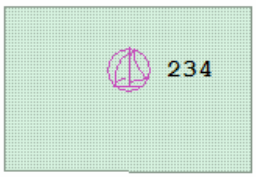
S - radio, radar

T - services





pilot boarding place

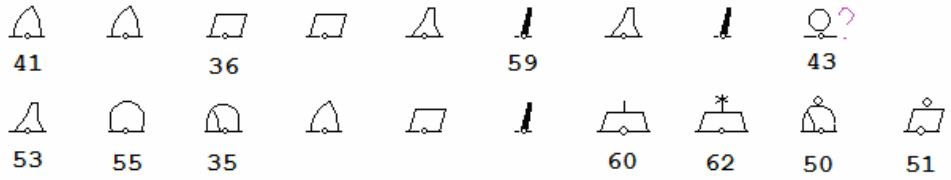


yacht harbour/marina

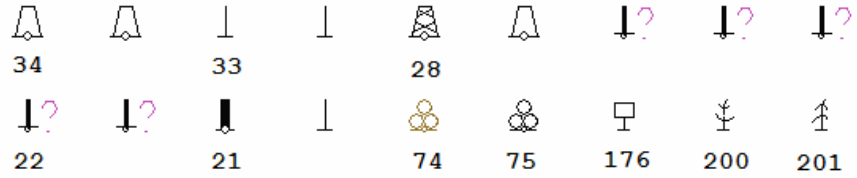
BUOYS AND BEACONS (Q)

This system supports S-57 Edition 3.1.1
and S-52 Edition 3.4

Buoys



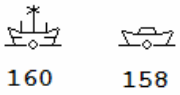
Beacons

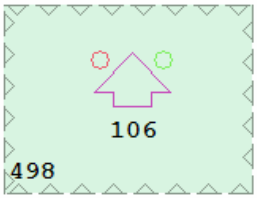


Daymarks

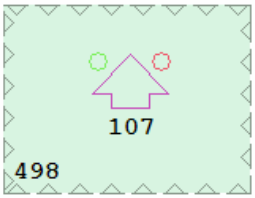
Navigational system of marks

Light float and light vessel

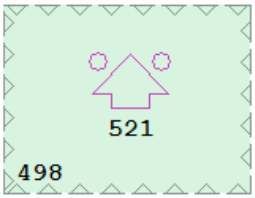




IALA A



IALA B

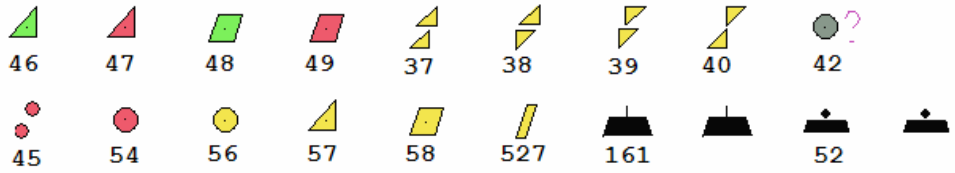


no or other system

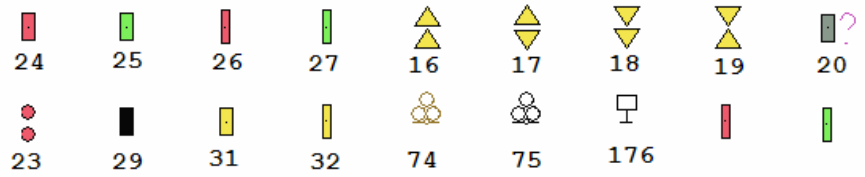
BUOYS AND BEACONS (Q)

This system supports S-57 Edition 3.1.1
and S-52 Edition 3.4

Buoys

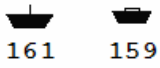


Beacons

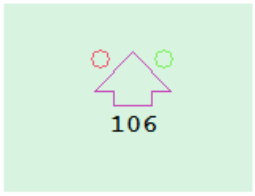


Daymarks

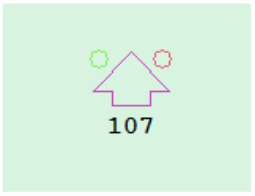
Light float and light vessel



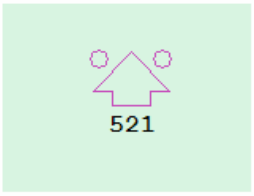
Navigational system of marks



IALA A



IALA B



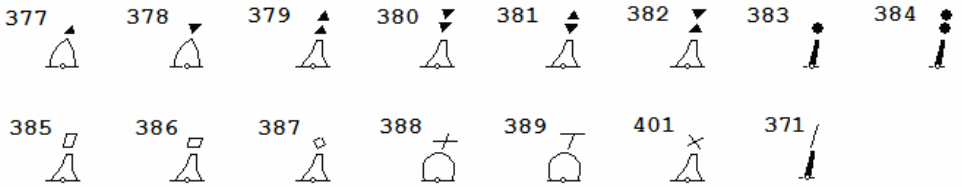
no or other system

TOPMARKS (Q)

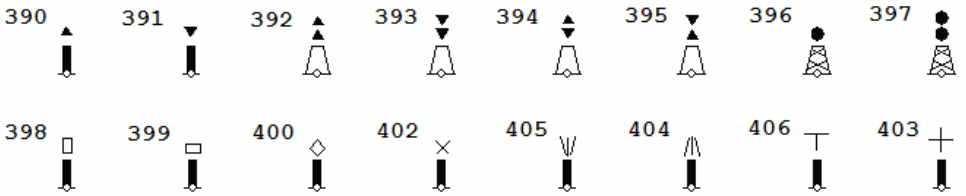
This system supports S-57 Edition 3.1.1

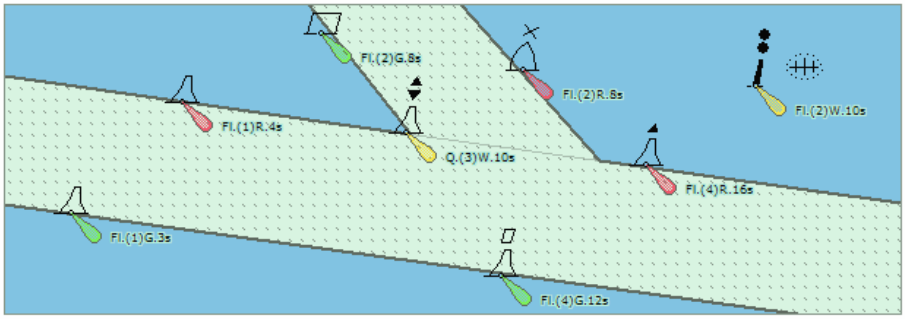
and S-52 Edition 3.4

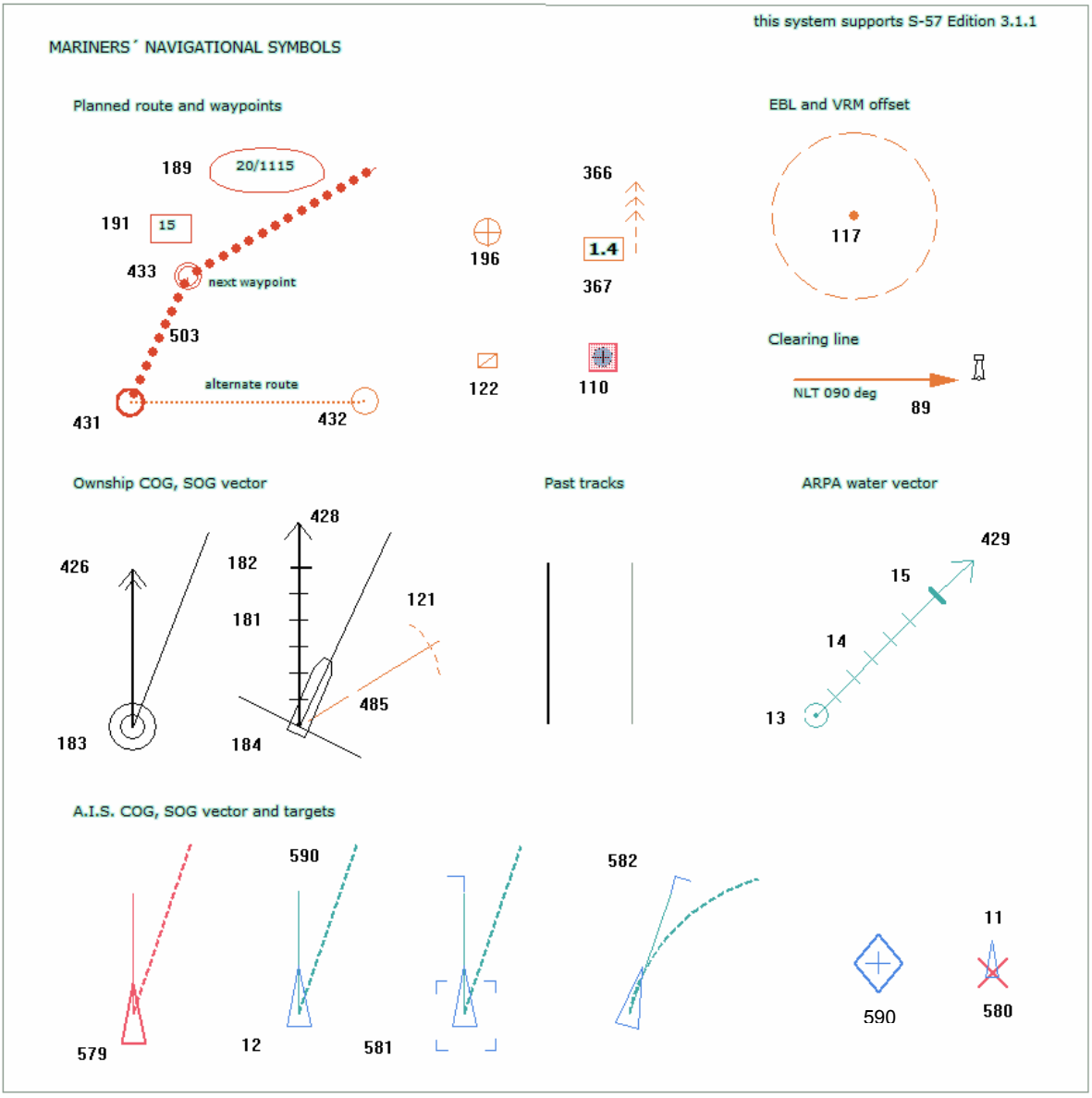
Buoys Topmarks



Beacon topmarks







Note that this depiction of selected ECDIS Mariner's Navigational Symbols are included in these specifications for convenience of reference, by courtesy of IEC, who are the authority for them under IEC 62288 [~~3~~8]. The digital version of Chart 1 does no longer include the cell AAC1XMS.000 which presented the above symbols as collected here in preceeding versions of the Presentation Library.

15.3 List of symbol names & meanings arranged numerically

Point symbols & centred area symbols (SY)

1. SY(ACHARE02)	CHMGD	anchorage area as a point at small scale, or anchor points of mooring trot at large scale
2. SY(ACHARE51)	CHMGF	anchorage area
3. SY(ACHBRT07)	CHMGD	designated anchor berth for a single vessel
4. SY(ACHRES51)	CHMGF	area where anchoring is prohibited or restricted
5. SY(ACHRES61)	CHMGF CHMGD	area where anchoring is prohibited or restricted, with other cautions
6. SY(ACHRES71)	CHMGF CHMGD	area where anchoring is prohibited or restricted, with other information
7. SY(AIRARE02)	LANDF	symbol for airport as a point
8. (deleted)		
9. (deleted)		
10. (deleted)		
11. SY(AISSLP01)	ARPAT	sleeping AIS target
12. SY(AISVES01)	ARPAT	active AIS target showing vector and/or heading
13. SY(ARPATG01)	ARPAT	ARPA target
14. SY(ARPONE01)	ARPAT	one minute mark on ARPA vector
15. SY(ARPSIX01)	ARPAT	six minute mark on ARPA vector
16. SY(BCNCAR01)	CHYLW OUTLW	cardinal beacon, north, simplified
17. SY(BCNCAR02)	CHYLW OUTLW	cardinal beacon, east, simplified
18. SY(BCNCAR03)	CHYLW OUTLW	cardinal beacon, south, simplified
19. SY(BCNCAR04)	CHYLW OUTLW	cardinal beacon, west, simplified
20. SY(BCNDEF13)	CHMGD CHGRD OUTLW	default symbol for a beacon, simplified
21. SY(BCNGEN01)	CHBLK	beacon in general, paper chart
22. SY(BCNGEN03)	CHMGD CHBLK	default symbol for beacon, paper chart
23. SY(BCNISD21)	CHRED OUTLW	isolated danger beacon, simplified
24. SY(BCNLAT15)	CHRED OUTLW	major lateral beacon, red, simplified
25. SY(BCNLAT16)	CHGRN OUTLW	major lateral beacon, green, simplified
26. SY(BCNLAT21)	CHRED OUTLW	minor lateral beacon, red, simplified
27. SY(BCNLAT22)	CHGRN OUTLW	minor lateral beacon, green, simplified
28. SY(BCNLTC01)	CHBLK	lattice beacon, paper chart
29. SY(BCNSAW13)	CHBLK DEPVS OUTLW	major safe water beacon, simplified
30. SY(BCNSAW21)	CHBLK DEPVS OUTLW	minor safe water beacon, simplified
31. SY(BCNSPP13)	CHYLW OUTLW	major special purpose beacon, simplified
32. SY(BCNSPP21)	CHYLW OUTLW	minor special purpose beacon, simplified
33. SY(BCNSTK02)	CHBLK	minor, stake or pole beacon, paper chart
34. SY(BCNTOW01)	CHBLK	beacon tower, paper chart
35. SY(BOYBAR01)	CHBLK	barrel buoy, paper chart
36. SY(BOYCAN01)	CHBLK	can buoy, paper chart
37. SY(BOYCAR01)	CHYLW OUTLW	cardinal buoy, north, simplified
38. SY(BOYCAR02)	CHYLW OUTLW	cardinal buoy, east, simplified
39. SY(BOYCAR03)	CHYLW OUTLW	cardinal buoy, south, simplified
40. SY(BOYCAR04)	CHYLW OUTLW	cardinal buoy, west, simplified
41. SY(BOYCON01)	CHBLK	conical buoy, paper chart
42. SY(BOYDEF03)	CHMGD CHGRD OUTLW	default symbol for buoy, simplified
43. SY(BOYGEN03)	CHMGD CHBLK	default symbol for buoy, paper chart
44. SY(BOYINB01)	CHBLK	installation buoy, paper chart
45. SY(BOYISD12)	OUTLW CHRED	isolated danger buoy, simplified

46. SY(BOYLAT13)	CHGRN OUTLW	conical lateral buoy, green, simplified
47. SY(BOYLAT14)	CHRED OUTLW	conical lateral buoy, red, simplified
48. SY(BOYLAT23)	CHGRN OUTLW	can shape lateral buoy, green, simplified
49. SY(BOYLAT24)	CHRED OUTLW	can shape lateral buoy, red, simplified
50. SY(BOYMOR01)	CHBLK	mooring buoy, barrel shape, paper-chart
51. SY(BOYMOR03)	CHBLK	mooring buoy, can shape, paper chart
52. SY(BOYMOR11)	CHBLK	installation buoy and mooring buoy, simplified
53. SY(BOYPIL01)	CHBLK	pillar buoy, paper chart
54. SY(BOYSAW12)	CHRED OUTLW	safe water buoy, simplified
55. SY(BOYSPH01)	CHBLK	spherical buoy, paper chart
56. SY(BOYSPP11)	CHYLW OUTLW	special purpose buoy, spherical or barrel shaped, or default symbol for special purpose buoy, simplified
57. SY(BOYSPP15)	CHYLW OUTLW	special purpose TSS buoy marking the starboard side of the traffic lane, simplified
58. SY(BOYSPP25)	CHYLW OUTLW	special purpose TSS buoy marking the port side of the traffic lane, simplified
59. SY(BOYSPR01)	CHBLK	spar buoy, paper chart
60. SY(BOYSUP01)	CHBLK	super buoy, paper chart
61. SY(BOYSUP02)	CHBLK	super buoy ODAS & LANBY, simplified
62. SY(BOYSUP03)	CHBLK	LANBY, super buoy, paper chart
63. SY(BRIDGE01)	CHMGD	symbol for opening bridge
64. SY(BRTHNO01)	CHMGD	berth number symbol
65. SY(BUAARE02)	LANDF	built-up area
66. SY(BUIREL01)	LANDF	non-conspicuous religious building, Christian
67. SY(BUIREL04)	LANDF	non-conspicuous religious building, non-Christian
68. SY(BUIREL05)	LANDF	mosque or minaret
69. SY(BUIREL13)	CHBLK	conspicuous religious building, Christian
70. SY(BUIREL14)	CHBLK	conspicuous religious building, non-Christian
71. SY(BUIREL15)	CHBLK	conspicuous mosque or minaret
72. SY(BUISGL01)	LANDF CHBRN	single building
73. SY(BUISGL11)	LANDF CHBLK	conspicuous single building
74. SY(CAIRNS01)	LANDF	Cairn
75. SY(CAIRNS11)	CHBLK	conspicuous cairn
76. SY(CBLARE51)	CHMGF	cable area
77. SY(CGUSTA02)	LANDF CHWHT CHMGF	coastguard station
78. SY(CHCRDEL1)	CHCOR	this object has been manually deleted or modified
79. SY(CHCRID01)	CHCOR	this object has been manually updated
80. SY(CHIMNY01)	LANDF	Chimney
81. SY(CHIMNY11)	CHBLK	conspicuous chimney
82. SY(CHINFO06)	CHMGD	HO caution note
83. SY(CHINFO07)	CHMGD	HO information note
84. SY(CHINFO08)	NINFO	mariner's information note
85. SY(CHINFO09)	NINFO	mariners caution note
86. SY(CHINFO10)	ADINF	manufacturer's information note
87. SY(CHINFO11)	ADINF	manufacturer's caution note
88. SY(CHKSYM01)	CHBLK OUTLW	test symbol for checking symbol sizes, should measure 5mm by 5mm
89. SY(CLRLIN01)	NINFO	arrow head for mariner's clearing line
90. SY(CRANES01)	LANDF	Cranes
91. SY(CTNARE51)	TRFCF	caution area, a specific caution note applies
92. SY(CTYARE51)	TRFCF	cautionary area (e.g. ferry area) navigate with caution
93. SY(CTYARE71)	TRFCF CHMGD	cautionary area with further information

94. SY(CURDEF01)	CHGRD	current or tidal stream whose direction is not known
95. SY(CURENT01)	CHGRD	non-tidal current
96. SY(CURSRA01)	CURSR	ordinary cursor
97. SY(CURSRB01)	CURSR	cursor with open centre
98. SY(DANGER01)	CHBLK DEPVS	underwater hazard with a defined depth
99. SY(DANGER02)	CHBLK	underwater hazard with depth greater than 20 metres
100. SY(DAYSQR01)	CHMGD	square or rectangular daymark, simplified
101. SY(DAYSQR21)	CHMGD	square or rectangular daymark, paper chart
102. SY(DAYTRI01)	CHMGD	triangular daymark, point up, simplified
103. SY(DAYTRI05)	CHMGD	triangular daymark, point down, simplified
104. SY(DAYTRI21)	CHMGD	triangular daymark, point up, paper chart
105. SY(DAYTRI25)	CHMGD	triangular daymark, point down, paper chart
106. SY(DIRBOYA1)	CHMGD CHRED CHGRN	direction and color of buoyage for approaching harbour in IALA region A (red to port)
107. SY(DIRBOYB1)	CHMGD CHGRN CHRED	direction and color of buoyage for approaching harbour in IALA region B (green to port)
108. SY(DISMAR03)	CHMGD	distance mark
109. SY(DISMAR04)	CHMGD	distance point with no mark
110. SY(DNGHILIT)	DNGHL	transparent danger highlight for mariner's use
111. SY(DOMES001)	LANDF	Dome
112. SY(DOMES011)	CHBLK	conspicuous dome
113. SY(DSHAER01)	LANDF	dish aerial
114. SY(DSHAER11)	CHBLK	conspicuous dish aerial
115. SY(DWRTPT51)	TRFCF	part of deep water route
116. SY(EBBSTR01)	CHGRD	ebb stream, rate at spring tides
117. SY(EBLVRM11)	NINFO	point of origin for an offset EBL or VRM
118. SY(ENTRES51)	TRFCF	area where entry is prohibited or restricted or to be avoided
119. SY(ENTRES61)	TRFCF CHMGD	area where entry is prohibited or restricted or to be avoided, with other cautions
120. SY(ENTRES71)	TRFCF CHMGD	area where entry is prohibited or restricted or to be avoided, with other information
121. SY(ERBLTIK1)	NINFO	range mark for an ERBL
122. SY(EVENTS02)	NINFO	mariner's event mark
123. SY(FAIRWY51)	CHGRD	fairway with one-way traffic in direction indicated
124. SY(FAIRWY52)	CHGRD	fairway with two-way traffic
125. SY(FLASTK01)	LANDF	flare stack
126. SY(FLASTK11)	CHBLK	conspicuous flare stack
127. SY(FLDSTR01)	CHGRD	flood stream, rate at spring tides
128. SY(FLGSTF01)	LANDF	flagstaff, flagpole
129. SY(FOGSIG01)	CHMGF	fog signal
130. SY(FORSTC01)	LANDF	fortified structure
131. SY(FORSTC11)	CHBLK	conspicuous fortified structure
132. SY(FOULGND1)	CHGRD	foul area of seabed safe for navigation but not for anchoring
133. SY(FRYARE51)	CHMGF	ferry area
134. SY(FRYARE52)	CHBLK	cable ferry area
135. SY(FSHFAC02)	CHGRD	fish trap, fish weir, tunny net
136. SY(FSHFAC03)	CHGRD	fish stakes
137. SY(FSHGRD01)	CHGRD	fishing ground
138. SY(FSHHAV01)	CHGRD	fish haven
139. SY(FSHRES51)	CHMGF	area where fishing or trawling is prohibited or restricted
140. SY(FSHRES61)	CHMGF CHMGD	area where fishing or trawling is prohibited or restricted, with other cautions

141. SY(FSHRES71)	CHMGF CHMGD	area where fishing or trawling is prohibited or restricted, with other information
142. SY(GATCON03)	TRFCD	navigable lock gate
143. SY(GATCON04)	TRFCD	non-navigable lock gate
144. SY(HILTOP01)	LANDF	hill or mountain top
145. SY(HILTOP11)	CHBLK	conspicuous hill or mountain top
146. SY(HRBFAC09)	CHMGD	fishing harbour
147. SY(HULKES01)	CSTLN CHBRN	Hulk
148. SY(INFARE51)	CHMGF	area with minor restrictions or information notices
149. SY(INFORM01)	CHMGD	this object has additional information available by cursor query
150. SY(ISODGR01)	ISDNG	isolated underwater danger of depth less than the mariner's selected safety contour
151. SY(ITZARE51)	CHMGF	area of inshore traffic
152. SY(LITDEF11)	CHMGD OUTLW	light flare
153. SY(LIGHTS11)	LITRD OUTLW	light flare, red
154. SY(LIGHTS12)	LITGN OUTLW	light flare, green
155. SY(LIGHTS13)	LITYW OUTLW	light flare, white or yellow
156. SY(LIGHTS81)	CHMGD	strip light
157. SY(LIGHTS82)	CHMGD	Floodlight
158. SY(LITFLT01)	CHBLK	light float, paper chart
159. SY(LITFLT02)	CHBLK	light float, simplified
160. SY(LITVES01)	CHBLK	light vessel, paper chart
161. SY(LITVES02)	CHBLK	light vessel, simplified
162. SY(LNDARE01)	LANDA CSTLN	land as a point at small scale
163. SY(LOCMAG01)	CHMGD	cursor pick site for a magnetic anomaly at a point or along a line
164. SY(LOCMAG51)	CHMGF	cursor pick site for a magnetic anomaly over an area
165. SY(LOWACC01)	CHBLK	point feature or area of low accuracy
166. SY(MAGVAR01)	CHMGD	cursor pick site for magnetic variation at a point
167. SY(MAGVAR51)	CHMGF	cursor pick site for magnetic variation along a line or over an area
168. SY(MARCUL02)	CHGRD	fish farm
169. SY(MONUMT02)	LANDF	Monument
170. SY(MONUMT12)	CHBLK	conspicuous monument
171. SY(MORFAC03)	LANDA CHBLK	mooring dolphin
172. SY(MORFAC04)	CHBLK	deviation mooring dolphin
173. SY(MSTCON04)	LANDF	Mast
174. SY(MSTCON14)	CHBLK	conspicuous mast
175. SY(NORTHAR1)	SCLBR	north arrow
176. SY(NOTBRD11)	CHBLK	conspicuous notice board
177. SY(OBSTRN01)	DEPVS CHBLK	obstruction, depth not stated
178. SY(OBSTRN02)	CHBLK	obstruction in the intertidal area
179. SY(OBSTRN11)	CSTLN LANDA	obstruction in the water which is always above water level
180. SY(OFSPLF01)	CHBLK	offshore platform
181. SY(OSPONE02)	SHIPS	one minute mark for ownship vector
182. SY(OSPSIX02)	SHIPS	six minute mark for ownship vector
183. SY(OWNSHP01)	SHIPS	own ship symbol, constant size
184. SY(OWNSHP05)	SHIPS	own ship drawn to scale with conning position marked
185. SY(PASTRK01)	PSTRK	time mark on past track
186. SY(PASTRK02)	SYTRK	time mark on secondary past track
187. SY(PILBOP02)	CHMGD	pilot boarding place
188. SY(PILPNT02)	CHBLK	pile or bollard
189. SY(PLNPOS01)	PLRTE	surrounding ellipse for arrival date and time at planned position

190. SY(PLNPOS02)	PLRTE	cross line for planned position
191. SY(PLNSPD03)	PLRTE	box for speed to make good, planned route
192. SY(PLNSPD04)	APLRT	box for speed to make good, alternate route
193. SY(POSGEN01)	LANDF	position of a point feature
194. SY(POSGEN03)	CHBLK	position of a conspicuous point feature
195. SY(POSGEN04)	CHBLK	position of an elevation or control point
196. SY(POSITN02)	NINFO	own ship position fix
197. SY(PRCARE12)	TRFCD	point symbol for traffic precautionary area
198. SY(PRCARE51)	TRFCD	traffic precautionary area
199. SY(PRDINS02)	LANDF CHBRN	mine, quarry
200. SY(PRICKE03)	CHBLK	withy, port hand, paper chart
201. SY(PRICKE04)	CHBLK	withy, starboard hand, paper chart
202. SY(QUAPOS01)	CHBLK	position approximate
203. SY(QUARRY01)	LANDF	Quarry
204. SY(QUESMRK1)	CHMGD	object which is not sufficiently described to be symbolized, or for which no symbol exists in the symbol library
205. SY(RACNSP01)	CHMGD	symbol indicating this object is radar conspicuous
206. SY(RADRFL03)	CHMGD	radar reflector
207. SY(RASCAN01)	LANDF	radar scanner
208. SY(RASCAN11)	CHBLK	Conspicuous radar scanner
209. SY(RCLDEF01)	CHMGD	radio calling-in point whose direction is not known
210. SY(RCTLPT52)	TRFCD	Recommended traffic direction between parts of a traffic separation scheme, or for ships not needing a deep water route
211. SY(RDOCAL02)	TRFCD	radio calling-in point for traffic in one direction only
212. SY(RDOCAL03)	TRFCD	radio calling-in point for traffic in both directions
213. SY(RDOSTA02)	CHMGD	radio station
214. SY(RECDEF51)	CHGRD	Recommended track as an area, direction not defined in data
215. SY(RECTRC55)	CHGRD	Recommended two-way track as an area, not based on fixed marks
216. SY(RECTRC56)	CHGRD	Recommended two-way track as an area, based on fixed marks
217. SY(RECTRC57)	CHGRD	Recommended one-way track as an area, not based on fixed marks
218. SY(RECTRC58)	CHGRD	Recommended one-way track as an area, based on fixed marks
219. SY(REFPNT02)	NINFO	reference point, 'ghost cursor' (user interface)
220. SY(RETRFL01)	CHMGD	retro reflector, paper chart
221. SY(RETRFL02)	CHMGD	retro reflector, simplified
222. SY(RFNERY01)	LANDF	Refinery
223. SY(RFNERY11)	CHBLK	Conspicuous refinery
224. SY(ROLROL01)	CHBLK	RoRo terminal
225. SY(RSCSTA02)	CHBLK	rescue station
226. SY(RSRDEF51)	TRFCF CHMGD	area in which undefined restrictions exist
227. SY(RTLDEF51)	TRFCD CHMGD	Recommended route between parts of a traffic separation scheme, or for ships not needing a deep water route, with the direction not specified in the data
228. SY(RTPBCN02)	CHMGD	radar transponder beacon
229. SY(SCALEB10)	SCLBR CHGRD	one mile scalebar for display scales larger than 1/80,000
230. SY(SCALEB11)	SNDG2 SNDG1	10 mile latitude scale for display scales smaller than 1/80,000
231. SY(SILBUI01)	LANDF CHBRN	Silo
232. SY(SILBUI11)	LANDF CHBLK	Conspicuous silo
233. SY(SISTAT02)	CHWHT LANDF CHMGF	signal station
234. SY(SMCFAC02)	CHMGD	yacht harbour, marina
235. SY(SNDWAV02)	CHGRD	sand waves

~~236. SY(SOUNDG00)~~	~~SNDG1~~	~~deep soundings, greater than safety depth~~
~~237. SY(SOUNDG01)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~238. SY(SOUNDG02)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~239. SY(SOUNDG03)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~240. SY(SOUNDG04)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~241. SY(SOUNDG05)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~242. SY(SOUNDG06)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~243. SY(SOUNDG07)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~244. SY(SOUNDG08)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~245. SY(SOUNDG09)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~246. SY(SOUNDG10)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~247. SY(SOUNDG11)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~248. SY(SOUNDG12)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~249. SY(SOUNDG13)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~250. SY(SOUNDG14)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~251. SY(SOUNDG15)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~252. SY(SOUNDG16)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~253. SY(SOUNDG17)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~254. SY(SOUNDG18)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~255. SY(SOUNDG19)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~256. SY(SOUNDG20)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~257. SY(SOUNDG21)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~258. SY(SOUNDG22)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~259. SY(SOUNDG23)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~260. SY(SOUNDG24)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~261. SY(SOUNDG25)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~262. SY(SOUNDG26)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~263. SY(SOUNDG27)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~264. SY(SOUNDG28)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~265. SY(SOUNDG29)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~266. SY(SOUNDG30)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~267. SY(SOUNDG31)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~268. SY(SOUNDG32)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~269. SY(SOUNDG33)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~270. SY(SOUNDG34)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~271. SY(SOUNDG35)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~272. SY(SOUNDG36)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~273. SY(SOUNDG37)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~274. SY(SOUNDG38)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~275. SY(SOUNDG39)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~276. SY(SOUNDG40)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~277. SY(SOUNDG41)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~278. SY(SOUNDG42)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~279. SY(SOUNDG43)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~280. SY(SOUNDG44)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~281. SY(SOUNDG45)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~282. SY(SOUNDG46)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~283. SY(SOUNDG47)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~284. SY(SOUNDG48)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~285. SY(SOUNDG49)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~

~~286. SY(SOUNDG50)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~287. SY(SOUNDG51)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~288. SY(SOUNDG52)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~289. SY(SOUNDG53)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~290. SY(SOUNDG54)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~291. SY(SOUNDG55)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~292. SY(SOUNDG56)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~293. SY(SOUNDG57)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~294. SY(SOUNDG58)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~295. SY(SOUNDG59)~~	~~SNDG1~~	~~for deep soundings, greater than safety depth~~
~~296. SY(SOUNDGB1)~~	~~SNDG1~~	~~symbol for swept sounding, used for deep soundings greater than safety depth~~
~~297. (deleted)~~		
~~298. SY(SOUNDGC2)~~	~~SNDG1~~	~~sounding of low accuracy~~
~~299. SY(SOUNDS00)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~300. SY(SOUNDS01)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~301. SY(SOUNDS02)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~302. SY(SOUNDS03)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~303. SY(SOUNDS04)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~304. SY(SOUNDS05)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~305. SY(SOUNDS06)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~306. SY(SOUNDS07)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~307. SY(SOUNDS08)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~308. SY(SOUNDS09)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~309. SY(SOUNDS10)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~310. SY(SOUNDS11)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~311. SY(SOUNDS12)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~312. SY(SOUNDS13)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~313. SY(SOUNDS14)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~314. SY(SOUNDS15)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~315. SY(SOUNDS16)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~316. SY(SOUNDS17)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~317. SY(SOUNDS18)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~318. SY(SOUNDS19)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~319. SY(SOUNDS20)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~320. SY(SOUNDS21)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~321. SY(SOUNDS22)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~322. SY(SOUNDS23)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~323. SY(SOUNDS24)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~324. SY(SOUNDS25)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~325. SY(SOUNDS26)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~326. SY(SOUNDS27)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~327. SY(SOUNDS28)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~328. SY(SOUNDS29)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~329. SY(SOUNDS30)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~330. SY(SOUNDS31)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~331. SY(SOUNDS32)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~332. SY(SOUNDS33)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~333. SY(SOUNDS34)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~334. SY(SOUNDS35)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~335. SY(SOUNDS36)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~

336. SY(SOUNDS37)	SNDG2	shallow soundings, less than or equal to the safety depth
337. SY(SOUNDS38)	SNDG2	shallow soundings, less than or equal to the safety depth
338. SY(SOUNDS39)	SNDG2	shallow soundings, less than or equal to the safety depth
339. SY(SOUNDS40)	SNDG2	shallow soundings, less than or equal to the safety depth
340. SY(SOUNDS41)	SNDG2	shallow soundings, less than or equal to the safety depth
341. SY(SOUNDS42)	SNDG2	shallow soundings, less than or equal to the safety depth
342. SY(SOUNDS43)	SNDG2	shallow soundings, less than or equal to the safety depth
343. SY(SOUNDS44)	SNDG2	shallow soundings, less than or equal to the safety depth
344. SY(SOUNDS45)	SNDG2	shallow soundings, less than or equal to the safety depth
345. SY(SOUNDS46)	SNDG2	shallow soundings, less than or equal to the safety depth
346. SY(SOUNDS47)	SNDG2	shallow soundings, less than or equal to the safety depth
347. SY(SOUNDS48)	SNDG2	shallow soundings, less than or equal to the safety depth
348. SY(SOUNDS49)	SNDG2	shallow soundings, less than or equal to the safety depth
349. SY(SOUNDS50)	SNDG2	shallow soundings, less than or equal to the safety depth
350. SY(SOUNDS51)	SNDG2	shallow soundings, less than or equal to the safety depth
351. SY(SOUNDS52)	SNDG2	shallow soundings, less than or equal to the safety depth
352. SY(SOUNDS53)	SNDG2	shallow soundings, less than or equal to the safety depth
353. SY(SOUNDS54)	SNDG2	shallow soundings, less than or equal to the safety depth
354. SY(SOUNDS55)	SNDG2	shallow soundings, less than or equal to the safety depth
355. SY(SOUNDS56)	SNDG2	shallow soundings, less than or equal to the safety depth
356. SY(SOUNDS57)	SNDG2	shallow soundings, less than or equal to the safety depth
357. SY(SOUNDS58)	SNDG2	shallow soundings, less than or equal to the safety depth
358. SY(SOUNDS59)	SNDG2	shallow soundings, less than or equal to the safety depth
359. SY(SOUNDSA1)	SNDG2	symbol for drying height, used for shallow soundings, less than or equal to safety depth
360. SY(SOUNDSB1)	SNDG2	symbol for swept sounding, used for shallow soundings, less than or equal to safety depth
361. (deleted)		
362. SY(SOUNDSC2)	SNDG1	sounding of low accuracy
363. SY(SPRING02)	CHGRD	Spring
364. SY(SWPARE51)	CHGRF	swept area
365. SY(TIDCUR01)	NINFO	predicted tidal stream or current direction
366. SY(TIDCUR02)	NINFO	actual tidal stream or current direction
367. SY(TIDCUR03)	NINFO	box for current strength
368. SY(TIDEHT01)	CHGRD	point for which tide height information is available
369. SY(TIDSTR01)	CHGRD	point or area for which a tidal stream table is available
370. SY(TMARDEF1)	CHBLK	topmark for beacons, flag or other shape, paper chart
371. SY(TMARDEF2)	CHBLK	topmark for buoys, flag or other shape, paper chart
372. SY(TMBYRD01)	LANDF	timber yard
373. SY(TNKCON02)	LANDF	Tank
374. SY(TNKCON12)	CHBLK	Conspicuous tank
375. SY(TNKFRM01)	LANDF	tank farm
376. SY(TNKFRM11)	CHBLK	Conspicuous tank farm
377. SY(TOPMAR02)	CHBLK	topmark for buoys, cone point up, paper chart
378. SY(TOPMAR04)	CHBLK	topmark for buoys, cone point down, paper chart
379. SY(TOPMAR05)	CHBLK	topmark for buoys, 2 cones point upward, paper chart
380. SY(TOPMAR06)	CHBLK	topmark for buoys, 2 cones point downward, paper chart
381. SY(TOPMAR07)	CHBLK	topmark for buoys, 2 cones base to base, paper chart
382. SY(TOPMAR08)	CHBLK	topmark for buoys, 2 cones point to point, paper chart
383. SY(TOPMAR10)	CHBLK	topmark for buoys, sphere, paper chart
384. SY(TOPMAR12)	CHBLK	topmark for buoys, 2 spheres, paper chart

385. SY(TOPMAR13)	CHBLK	topmark for buoys, cylinder, paper-chart
386. SY(TOPMAR14)	CHBLK	topmark for buoys, board, paper-chart
387. SY(TOPMAR16)	CHBLK	topmark for buoys, cube point up, paper-chart
388. SY(TOPMAR17)	CHBLK	topmark for buoys, flag or other shape, paper-chart
389. SY(TOPMAR18)	CHBLK	topmark for buoys, T-Shape, paper-chart
390. SY(TOPMAR22)	CHBLK	topmark for beacons, cone point up, paper-chart
391. SY(TOPMAR24)	CHBLK	topmark for beacons, cone point down, paper-chart
392. SY(TOPMAR25)	CHBLK	topmark for beacons, 2 cones point upward, paper-chart
393. SY(TOPMAR26)	CHBLK	topmark for beacons, 2 cones point downward, paper-chart
394. SY(TOPMAR27)	CHBLK	topmark for beacons, 2 cones base to base, paper-chart
395. SY(TOPMAR28)	CHBLK	topmark for beacons, 2 cones point to point, paper-chart
396. SY(TOPMAR30)	CHBLK	topmark for beacons, sphere, paper-chart
397. SY(TOPMAR32)	CHBLK	topmark for beacons, 2 spheres, paper-chart
398. SY(TOPMAR33)	CHBLK	topmark for beacons, cylinder, paper-chart
399. SY(TOPMAR34)	CHBLK	topmark for beacons, board, paper-chart
400. SY(TOPMAR36)	CHBLK	topmark for beacons, cube point up, paper-chart
401. SY(TOPMAR65)	CHBLK	topmark for buoys, x-shape, paper-chart
402. SY(TOPMAR85)	CHBLK	topmark for beacons, x-shape, paper-chart
403. SY(TOPMAR86)	CHBLK	topmark for beacons, upright cross, paper-chart
404. SY(TOPMAR87)	CHBLK	topmark for beacons, besom point down, paper-chart
405. SY(TOPMAR88)	CHBLK	topmark for beacons, besom point up, paper-chart
406. SY(TOPMAR89)	CHBLK	topmark for beacons, T-shape, paper-chart
407. SY(TOWERS01)	LANDF	Tower
408. SY(TOWERS02)	LANDF	water tower
409. SY(TOWERS03)	CHBLK	Conspicuous tower
410. SY(TOWERS05)	LANDF	radio, television tower
411. SY(TOWERS12)	CHBLK	Conspicuous water tower
412. SY(TOWERS15)	CHBLK	Conspicuous radio, television tower
413. SY(TREPNT04)	LANDF	general symbol for a tree
414. SY(TREPNT05)	LANDF	Mangrove
415. SY(TSLDEF51)	TRFCD CHMGD	one way lane of a traffic separation scheme, with the direction not defined in the data
416. SY(TSSCRS51)	TRFCF	traffic crossing area
417. SY(TSSLPT51)	TRFCD	traffic direction in a one way lane of a traffic separation scheme
418. SY(TSSRON51)	TRFCF	traffic roundabout
419. SY(TWRDEF51)	TRFCD CHMGD	two-way route of a traffic separation scheme, with the direction not defined in the data
420. SY(TWRTPT52)	TRFCD	reciprocal traffic directions in a two-way route of a traffic separation scheme
421. SY(TWRTPT53)	TRFCD	single traffic direction in a two-way route part of a traffic separation scheme
422. (deleted)		
423. (deleted)		
424. SY(UWTROC03)	DEPVS CHBLK	dangerous underwater rock of uncertain depth
425. SY(UWTROC04)	CHBLK	rock which covers and uncovers or is awash at low water
426. SY(VECGND01)	SHIPS	arrowhead for own ship vector for course and speed over the ground
427. SY(VECGND21)	ARPAT	arrowhead for ARPA or AIS vector for course and speed over the ground
428. SY(VECWTR01)	SHIPS	arrowhead for own ship vector for course and speed through the water
429. SY(VECWTR21)	ARPAT	arrowhead for ARPA vector for course and speed through the water

430. SY(WATTUR02)	CHGRD	overfalls, eddies and breakers
431. SY(WAYPNT01)	PLRTE	waypoint on planned route
432. SY(WAYPNT03)	APLRT	waypoint on alternate planned route
433. SY(WAYPNT11)	PLRTE	next waypoint on planned route
434. SY(WEDKLP03)	CHGRD	weed, kelp
435. SY(WIMCON01)	LANDF	Windmotor
436. SY(WIMCON11)	CHBLK	Conspicuous windmotor
437. SY(WNDFRM51)	LANDF	wind generator farm
438. SY(WNDFRM61)	CHBLK	Conspicuous wind generator farm
439. SY(WNDMIL02)	LANDF	Windmill
440. SY(WNDMIL12)	CHBLK	Conspicuous windmill
441. SY(WRECKS01)	CHGRD	wreck showing any portion of hull or superstructure at level of chart datum
442. SY(WRECKS04)	CHBLK	non-dangerous wreck, depth unknown
443. SY(WRECKS05)	DEPVS CHBLK	dangerous wreck, depth unknown

Area pattern symbols (AP)

444. AP(AIRARE02)	LANDF	pattern of symbols for an airport area
445. AP(DIAMOND1)	DEPCN	area of depth less than the safety contour
446. AP(DQUALA11)	CHGRD	pattern of symbols for a chart of 5m accuracy with full seafloor coverage
447. AP(DQUALA21)	CHGRD	pattern of symbols for a chart with 20m accuracy with full seafloor coverage
448. AP(DQUALB01)	CHGRD	pattern of symbols for a chart with 50m accuracy from standard survey based on lines of continuous soundings
449. AP(DQUALC01)	CHGRD	pattern of symbols for a low accuracy or incomplete chart
450. AP(DQUALD01)	CHGRD	pattern of symbols for an unreliable chart
451. AP(DQUALU01)	CHGRD	pattern of symbols for a chart with quality not assessed
452. AP(DRGARE01)	CHGRD	dredged area
453. AP(FOULAR01)	CHGRD	foul area, not safe for navigation
454. AP(FSHFAC03)	CHGRD	pattern of symbols for an area with fishing stakes
455. AP(FSHFAC04)	CHGRD	pattern of symbols for an area with fish traps, fish weirs, tunny nets
456. AP(FSHHAV02)	CHGRD	pattern of symbols for a fish haven
457. AP(ICEARE04)	CHGRD	continuous pattern for an ice area (glacier, etc.)
458. AP(MARCUL02)	CHGRD	pattern of symbols for a marine farm
459. AP(MARSHES1)	CHBRN	pattern of symbols for a marsh
460. AP(NODATA03)	CHGRD	area of no chart data
461. AP(OVERSC01)	CHGRD	overscale part of a display containing data from more than one navigation purpose
462. AP(PRTSUR01)	CHGRD	incompletely surveyed area
463. AP(QUESMRK1)	CHMGD	pattern of symbols for an area which is not sufficiently described to be symbolized, or for which no symbol exists in the symbol library
464. AP(RCKLDG01)	LANDF	rock or coral drying ledges
465. AP(SNDWAV01)	CHGRD	pattern of symbols for sand waves
466. AP(TSSJCT02)	TRFCF	precautionary area or a traffic separation scheme crossing or roundabout
467. AP(VEGATN03)	LANDF	pattern of symbols for wooded areas
468. AP(VEGATN04)	LANDF	pattern of symbols for mangroves

Complex linestyles

469. LC(ACHARE51)	CHMGD	boundary of an anchorage area
470. LC(ACHRES51)	CHMGD	boundary of an area where anchoring is prohibited or restricted
471. LC(ADMARE01)	CHGRD	jurisdiction boundary
472. LC(CBLARE51)	CHMGD	boundary of a submarine cable area
473. LC(CBLSUB06)	CHMGD	submarine cable
474. LC(CHCRDEL1)	CHCOR	this line has been deleted by a manual update
475. LC(CHCRID01)	CHCOR	this line has been manually updated
476. LC(CTNARE51)	CHMGD	boundary of area with a specific caution
477. LC(CTYARE51)	CHMGD	boundary of area to be navigated with caution
478. LC(DWLDEF01)	TRFCD	deep water route centreline, direction not defined in the data
479. LC(DWRTCL05)	TRFCD	two-way deep water route centreline, not based on fixed marks
480. LC(DWRTCL06)	TRFCD	two-way deep water route centreline, based on fixed marks
481. LC(DWRTCL07)	TRFCD	one-way deep water route centreline, not based on fixed marks
482. LC(DWRTCL08)	TRFCD	one-way deep water route centreline, based on fixed marks
483. LC(DWRUTE51)	TRFCD	boundary of a deep water route
484. LC(ENTRES51)	CHMGD	boundary of an area where entry is prohibited or restricted
485. LC(ERBLNA01)	NINFO	electronic range/bearing line, dash
486. (deleted)		
487. LC(FERYRT01)	CHMGD	ferry route
488. LC(FERYRT02)	CHBLK	cable ferry route
489. LC(FSHFAC02)	CHGRD	fishing stakes
490. LC(FSHRES51)	CHMGD	boundary of an area where trawling or fishing is prohibited or restricted
491. LC(NONHODAT)	NINFO	boundary of non-HO data
492. LC(LOWACC01)	DEPSC	safety contour of low accuracy in position
493. LC(LOWACC11)	DEPCN	contour of low accuracy in position
494. LC(LOWACC21)	CSTLN	coastline or shoreline construction of low accuracy in position
495. LC(LOWACC31)	CHGRD	area of wrecks or obstructions of low accuracy
496. LC(LOWACC41)	CHBLK	danger line of low accuracy surrounding a foul area
497. LC(MARSYS51)	CHGRD	boundary between IALA-A and IALA-B systems of lateral buoys and beacons
498. LC(NAVARE51)	CHGRD	boundary of a navigation feature such as a fairway, magnetic anomaly, etc.
499. LC(PIPARE51)	CHMGD	boundary of a submarine pipeline area with potentially dangerous contents
500. LC(PIPARE61)	CHGRD	boundary of a submarine pipeline area with generally non-dangerous contents
501. LC(PIPSOL05)	CHMGD	oil, gas pipeline, submerged or on land
502. LC(PIPSOL06)	CHGRD	water pipeline, sewer, etc.
503. LC(PLNRTE03)	PLRTE	planned route for own ship
504. LC(PRCARE51)	CHMGD	boundary of a precautionary area
505. LC(QUESMRK1)	CHMGD	object which is not sufficiently described to be symbolized, or for which no symbol exists in the symbol library
506. LC(RCRDEF11)	TRFCD	regulated recommended route centreline, details not defined
507. LC(RCRTCL11)	TRFCD	regulated two-way recommended route centreline, not based on fixed marks
508. LC(RCRTCL12)	TRFCD	regulated one-way recommended route centreline, not based on fixed marks
509. LC(RCRTCL13)	TRFCD	regulated two-way recommended route centreline, based on fixed marks
510. LC(RCRTCL14)	TRFCD	Regulated one-way recommended route centreline, based on fixed marks

511. LC(RECDEF02)	CHGRD	non-regulated recommended track, direction not defined in data
512. LC(RECTRC09)	CHGRD	non-regulated recommended two-way track, not based on fixed marks
513. LC(RECTRC10)	CHGRD	non-regulated recommended two-way track, based on fixed marks
514. LC(RECTRC11)	CHGRD	non-regulated recommended one-way track, not based on fixed marks
515. LC(RECTRC12)	CHGRD	non-regulated recommended one-way track, based on fixed marks
516. LC(RESARE51)	CHMGD	boundary of a restricted area
517. LC (SCLBDY51)	CHGRF	chart scale boundary, the double line indicates the larger scale
518. LC(TIDINF51)	CHGRD	boundary of an area for which there is tidal information
519. (deleted)		
520. (deleted)		

Symbols added since Edition 3.0

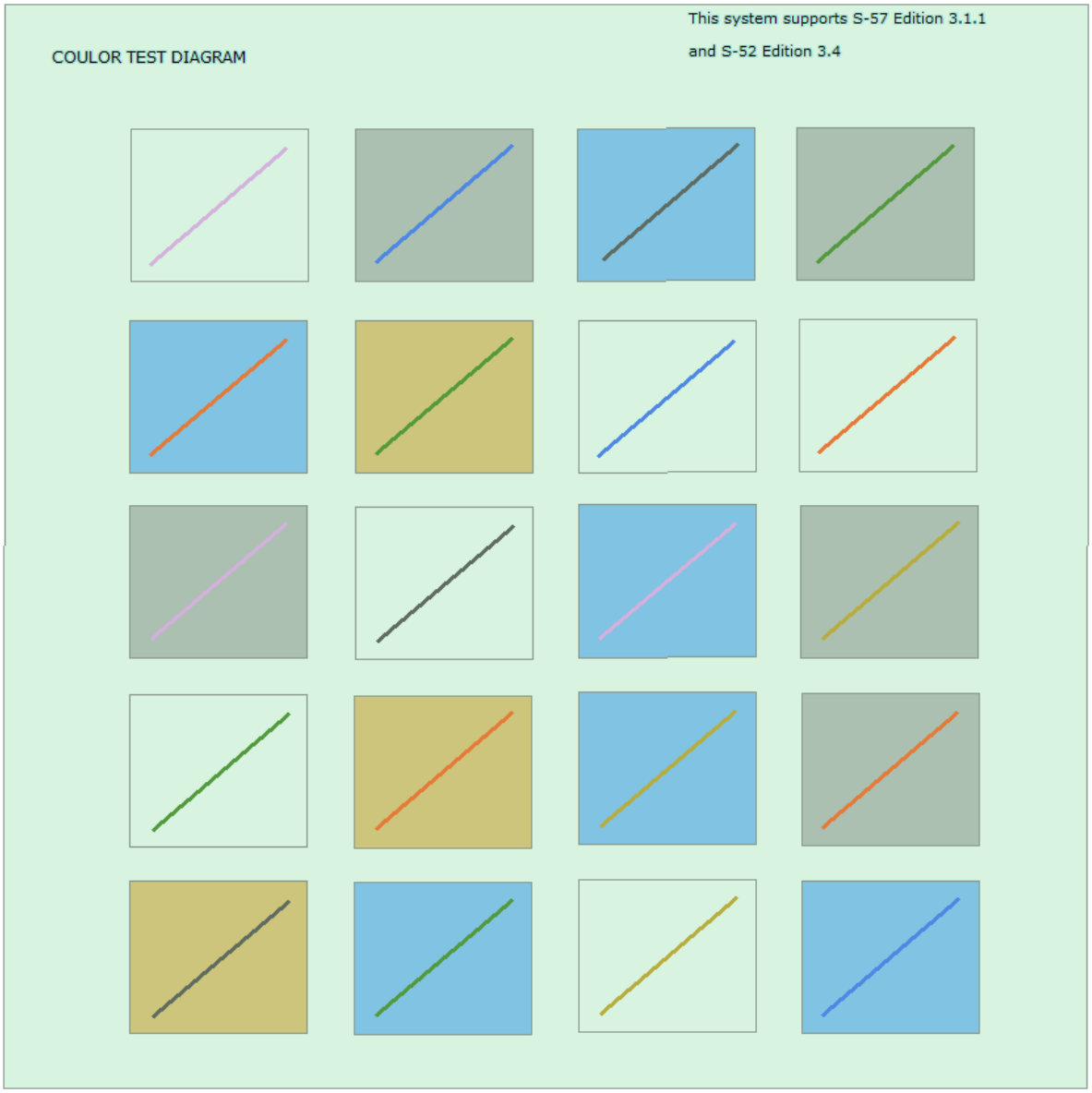
521. SY(DIRBOY01)	CHMGD	direction of buoyage
522. SY(DWRUTE51)	TRFCD	reciprocal traffic directions in a two-way part of a deep-water route
523. SY(BLKADJ01)	BKAJ1 BKAJ2	Symbol for checking and adjusting the brightness and contrast
524. SY(FLTHAZ02)	CHMGD	floating hazard to navigation
525. SY(DANGER03)	DEPIT CHBLK	underwater hazard which covers and uncovers
526 SY(OBSTRN03)	DEPIT CHBLK	obstruction which covers and uncovers
527. SY(BOYSPP35)	CHYLW OUTLW	special purpose ice buoy or spar or pillar shaped buoy, simplified
528. SY(SAFCON00)	DEPDW SNDG2	contour label
529. SY(SAFCON01)	DEPDW SNDG2	contour label
530. SY(SAFCON02)	DEPDW SNDG2	contour label
531. SY(SAFCON03)	DEPDW SNDG2	contour label
532. SY(SAFCON04)	DEPDW SNDG2	contour label
533. SY(SAFCON05)	DEPDW SNDG2	contour label
534. SY(SAFCON06)	DEPDW SNDG2	contour label
535. SY(SAFCON07)	DEPDW SNDG2	contour label
536. SY(SAFCON08)	DEPDW SNDG2	contour label
537. SY(SAFCON09)	DEPDW SNDG2	contour label
538. SY(SAFCON10)	DEPDW SNDG2	contour label
539. SY(SAFCON11)	DEPDW SNDG2	contour label
540. SY(SAFCON12)	DEPDW SNDG2	contour label
541. SY(SAFCON13)	DEPDW SNDG2	contour label
542. SY(SAFCON14)	DEPDW SNDG2	contour label
543. SY(SAFCON15)	DEPDW SNDG2	contour label
544. SY(SAFCON16)	DEPDW SNDG2	contour label
545. SY(SAFCON17)	DEPDW SNDG2	contour label
546. SY(SAFCON18)	DEPDW SNDG2	contour label
547. SY(SAFCON19)	DEPDW SNDG2	contour label
548. SY(SAFCON20)	DEPDW SNDG2	contour label
549. SY(SAFCON21)	DEPDW SNDG2	contour label
550. SY(SAFCON22)	DEPDW SNDG2	contour label
551. SY(SAFCON23)	DEPDW SNDG2	contour label
552. SY(SAFCON24)	DEPDW SNDG2	contour label
553. SY(SAFCON25)	DEPDW SNDG2	contour label

554. SY(SAFCON26)	DEPDW SNDG2	contour label
555. SY(SAFCON27)	DEPDW SNDG2	contour label
556. SY(SAFCON28)	DEPDW SNDG2	contour label
557. SY(SAFCON29)	DEPDW SNDG2	contour label
558. SY(SAFCON50)	DEPDW SNDG2	contour label
559. SY(SAFCON51)	DEPDW SNDG2	contour label
560. SY(SAFCON52)	DEPDW SNDG2	contour label
561. SY(SAFCON53)	DEPDW SNDG2	contour label
562. SY(SAFCON54)	DEPDW SNDG2	contour label
563. SY(SAFCON55)	DEPDW SNDG2	contour label
564. SY(SAFCON56)	DEPDW SNDG2	contour label
565. SY(SAFCON57)	DEPDW SNDG2	contour label
566. SY(SAFCON58)	DEPDW SNDG2	contour label
567. SY(SAFCON59)	DEPDW SNDG2	contour label
568. SY(SAFCON60)	DEPDW SNDG2	contour label
569. SY(SAFCON61)	DEPDW SNDG2	contour label
570. SY(SAFCON62)	DEPDW SNDG2	contour label
571. SY(SAFCON63)	DEPDW SNDG2	contour label
572. SY(SAFCON64)	DEPDW SNDG2	contour label
573. SY(SAFCON65)	DEPDW SNDG2	contour label
574. SY(SAFCON66)	DEPDW SNDG2	contour label
575. SY(SAFCON67)	DEPDW SNDG2	contour label
576. SY(SAFCON68)	DEPDW SNDG2	contour label
577. SY(SAFCON69)	DEPDW SNDG2	contour label
579. SY(AISDGR01)	DNGHL	dangerous AIS target
580. SY(AISLST01)	RESBLU	lost AIS target
581. SY(AISSEL01)	RESBLU	selected AIS target
582. SY(AISTRN01)	RESBLU	AIS target turning to starboard
583. SY(AISTRN02)	RESBLU	AIS target turning to port
584. SY(ESSARE01)	CHMGF	envirnomentally sensitive sea area
585. SY(NEWOBJ01)	CHMGD	new object
586. SY(PSSARE01)	CHMGF	particularly sensitive sea area
587. LC(ARCSLN01)	CHMGF	boundary of archipelagic sea lane
588. LC(NEWOBJ01)	CHMGD	new object
589. SY(**DRFSTA01**)	CHMGD	DGPS Base station
590. SY(AISATN01)	RESBLU	AIS based aid to navigation

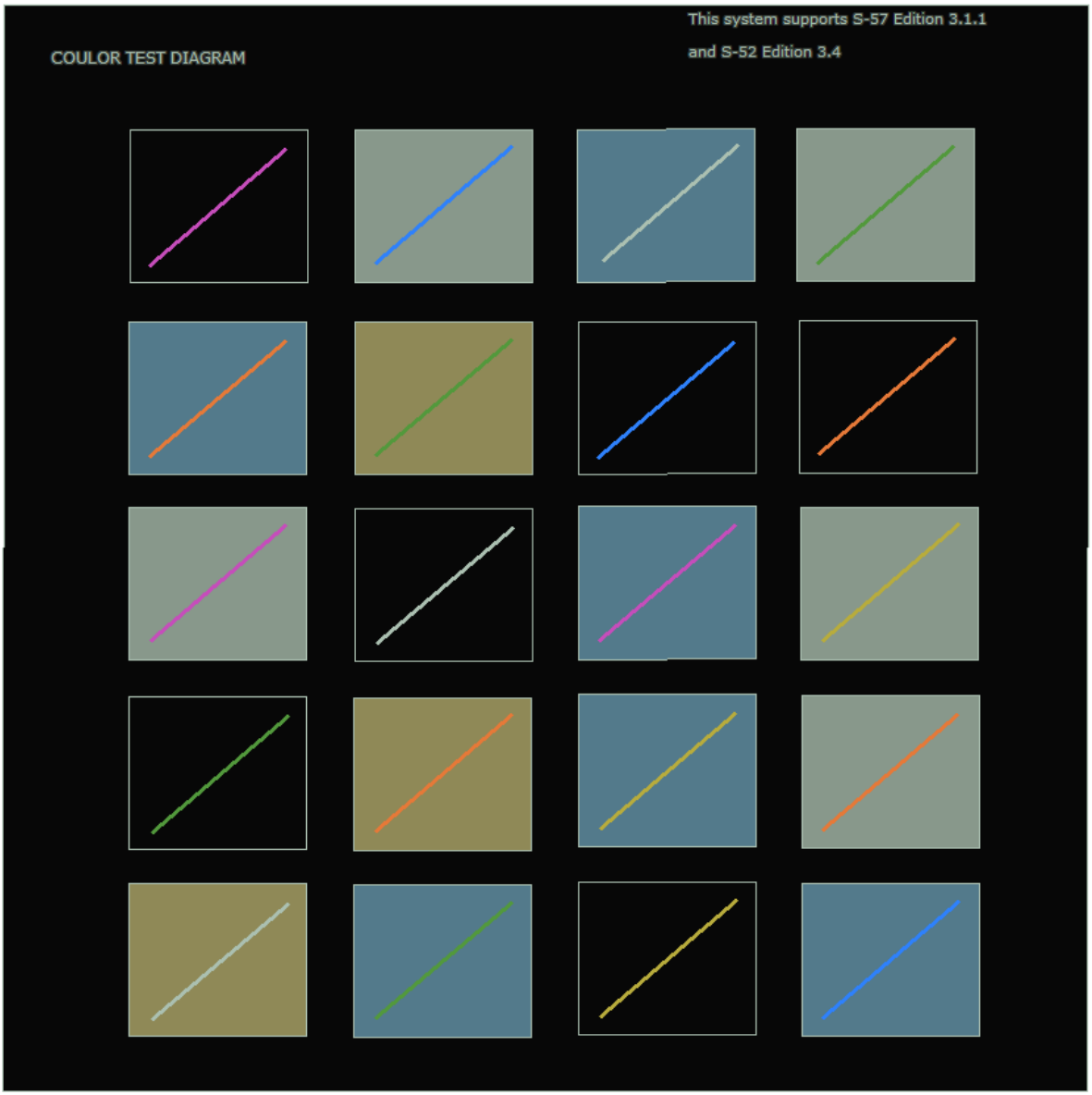
~~15.4~~16.3 Colour Differentiation Test Diagram

The following diagram is required in "Day" and "Dusk" colours so that the mariner can verify that his ECDIS display monitor has the colour differentiation capability needed to distinguish between the various colour-coded areas, lines and point symbols of the ECDIS display. The diagrams will not be true to colour unless they are projected on a calibrated monitor and are generated in a manner which correctly reproduces the colour tokens of the PresLib, as described in section 19.4. Section 19.4 also describes the use of these diagrams.

~~15.4.1~~16.3.1 Day



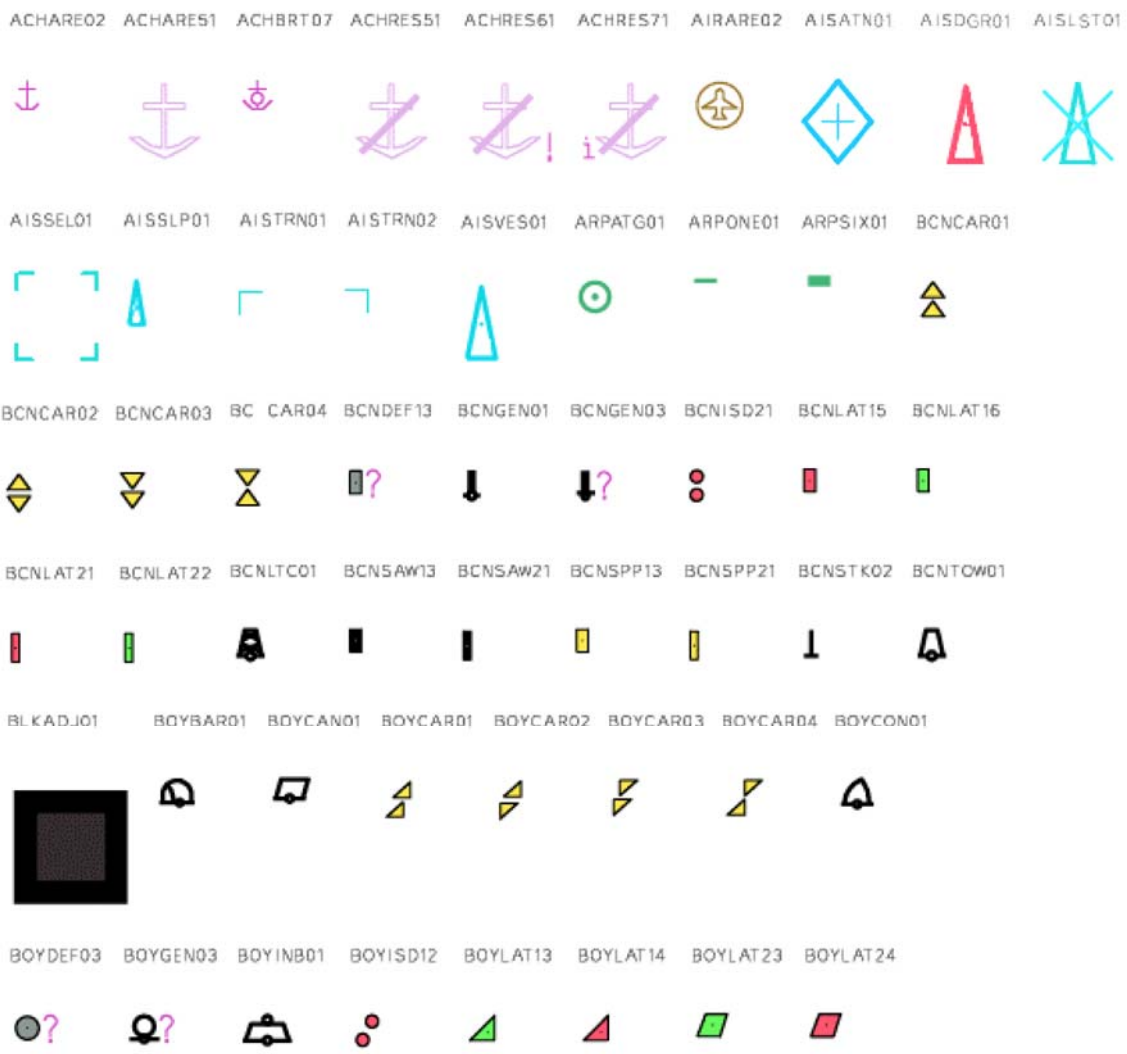
~~15.4.2~~16.3.2 Dusk



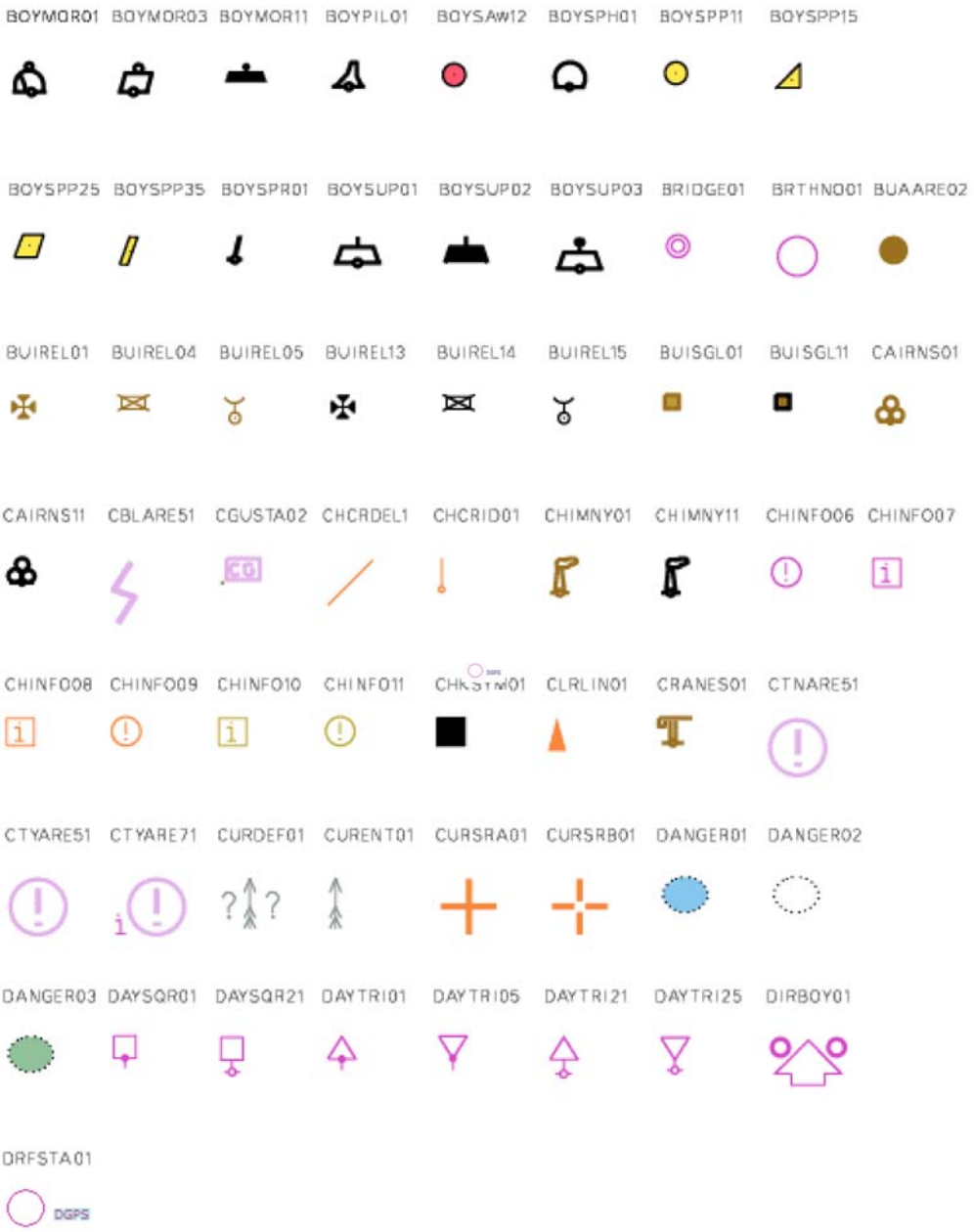
15.5 Plots of symbols arranged alphabetically

16.4 Plots of Symbols Arranged Alphabetically

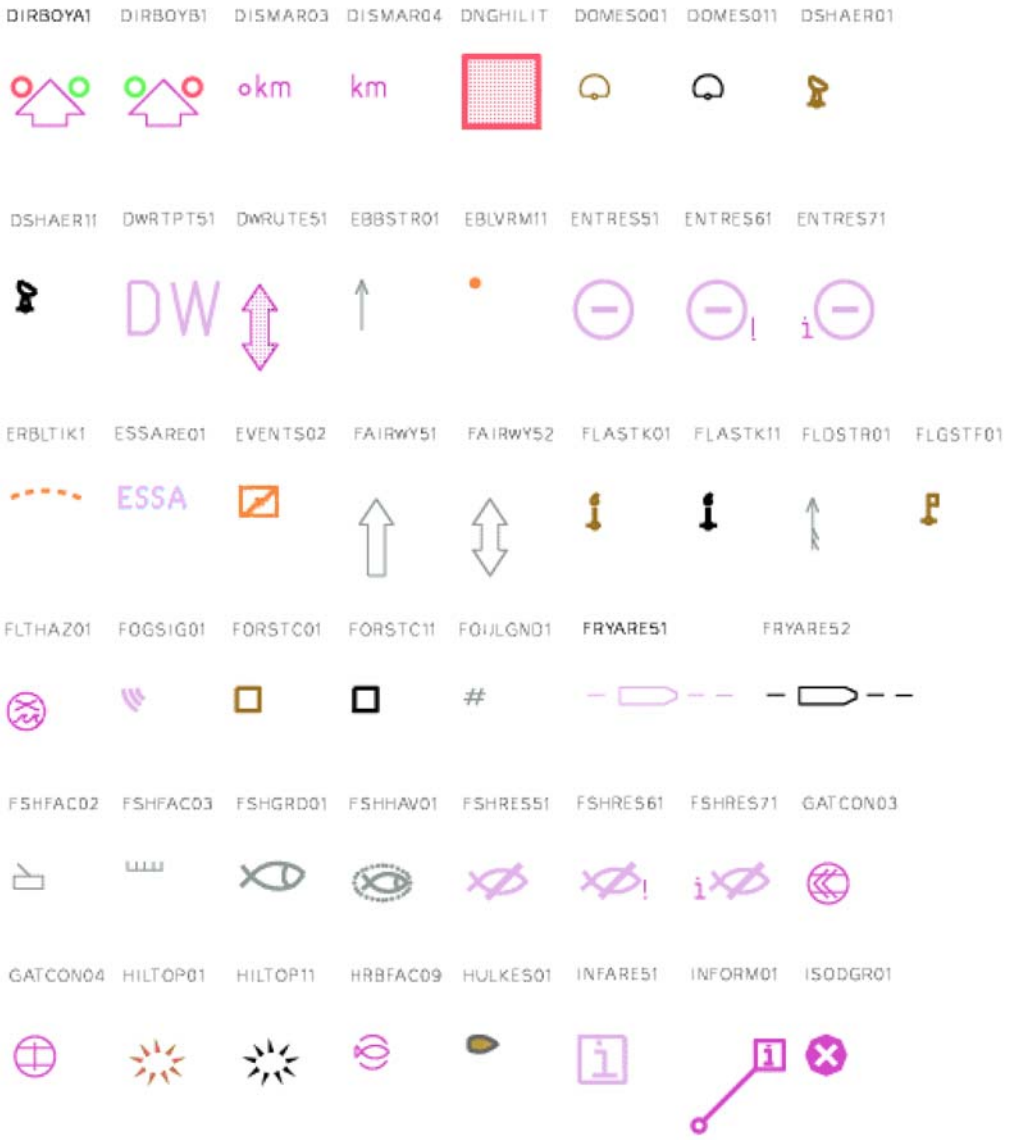
Point symbols and centred areas symbols (SY)



Point symbols and centred areas symbols (SY)

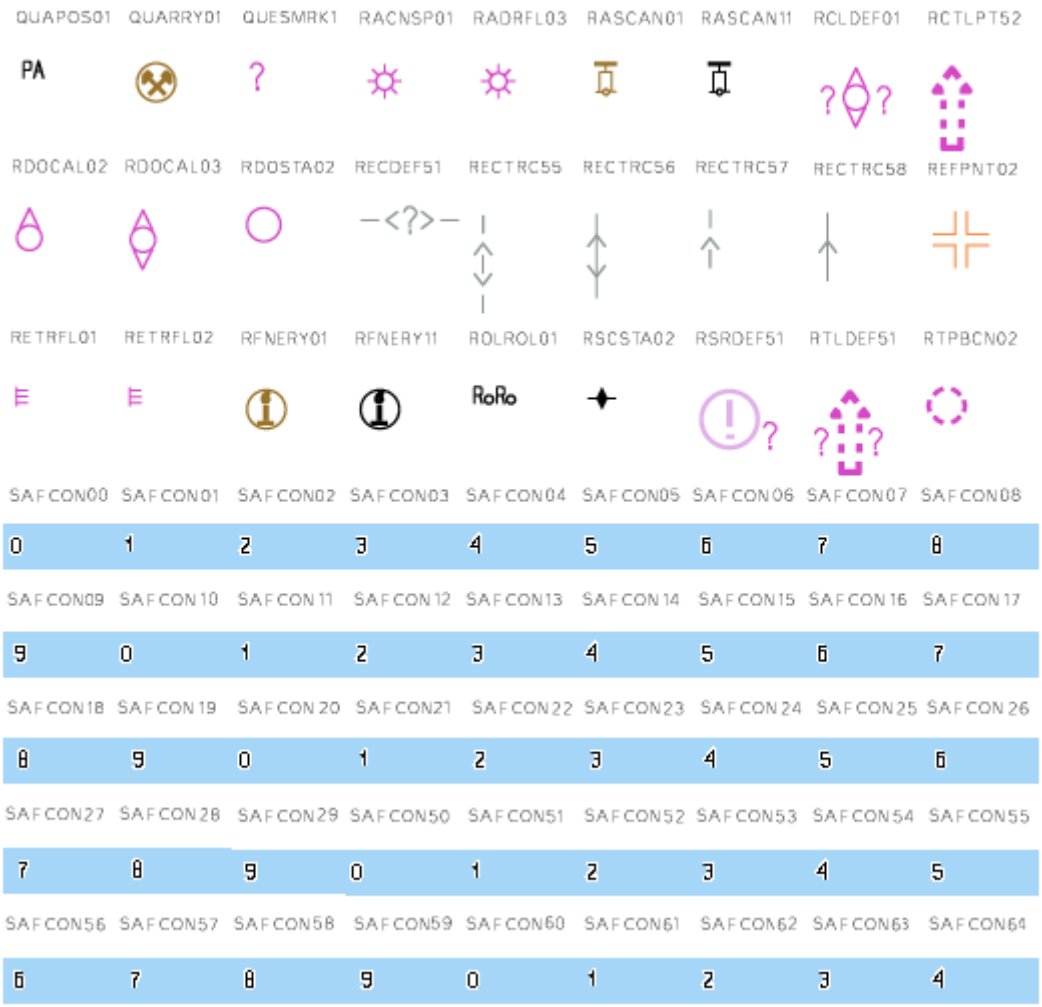


Point symbols and centred areas symbols (SY)

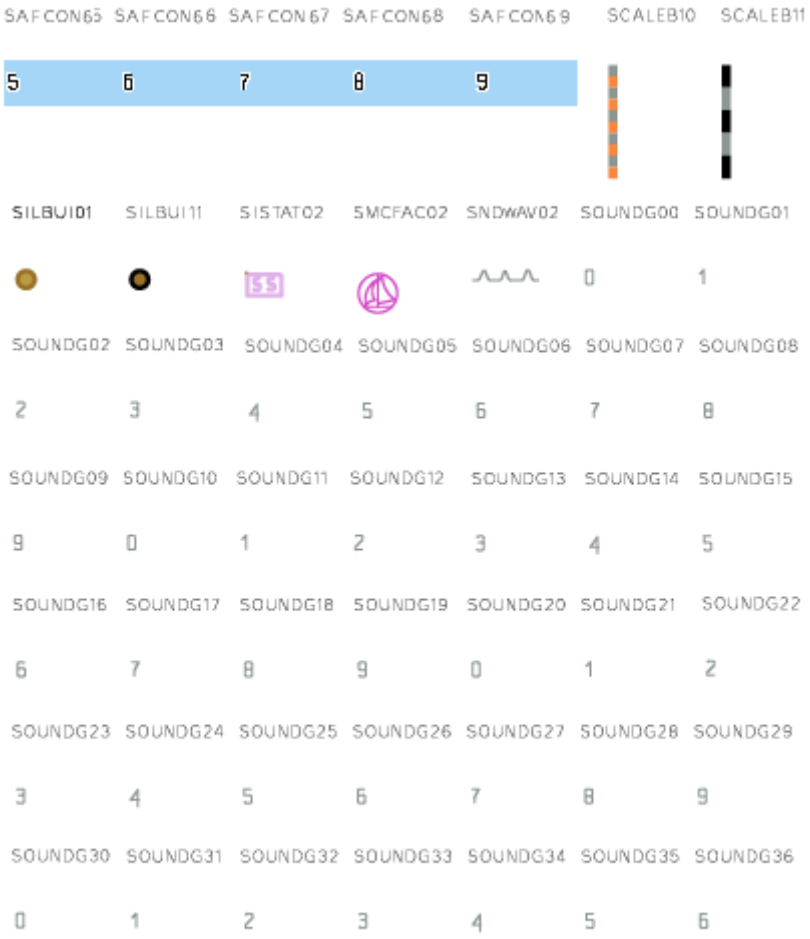


Point symbols and centred areas symbols (SY)

Point symbols and centred areas symbols (SY)



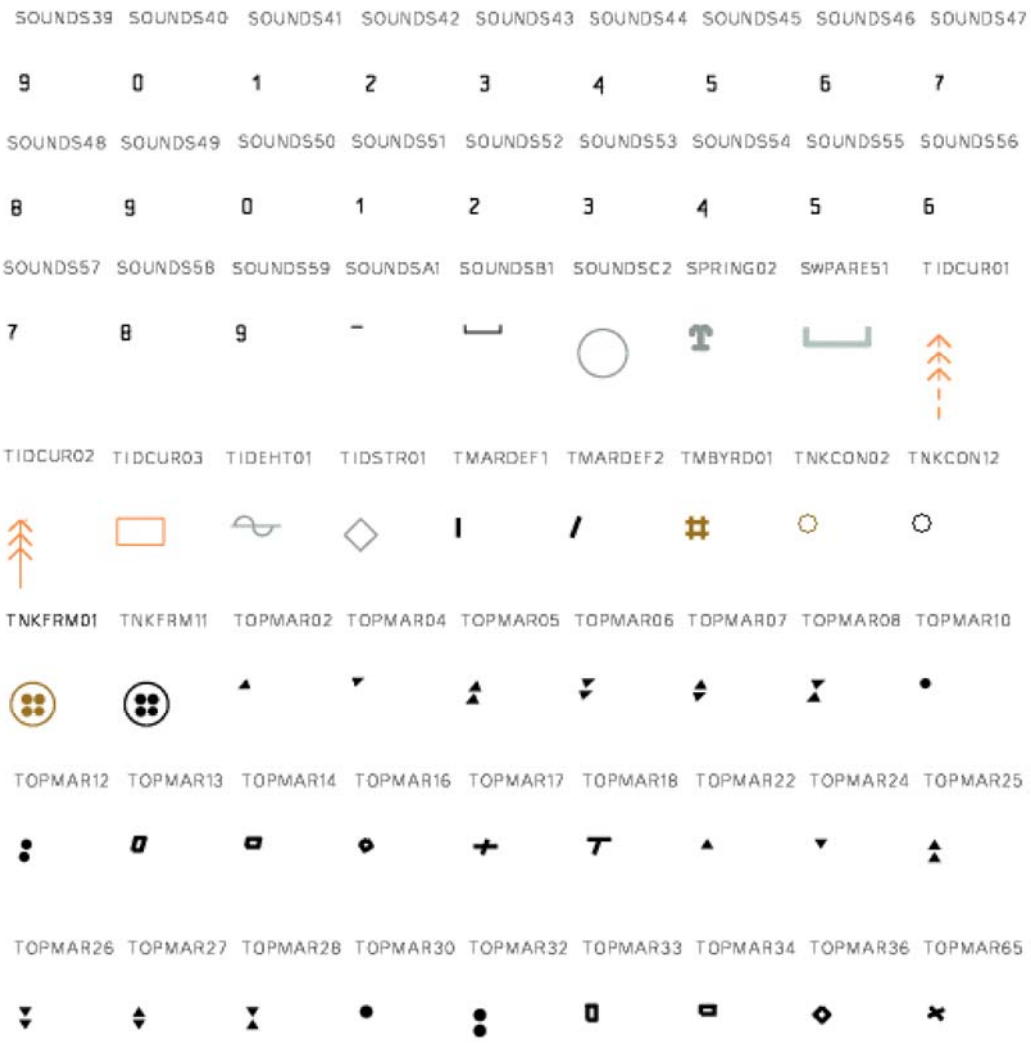
Point symbols and centred areas symbols (SY)



Point symbols and centred areas symbols (SY)

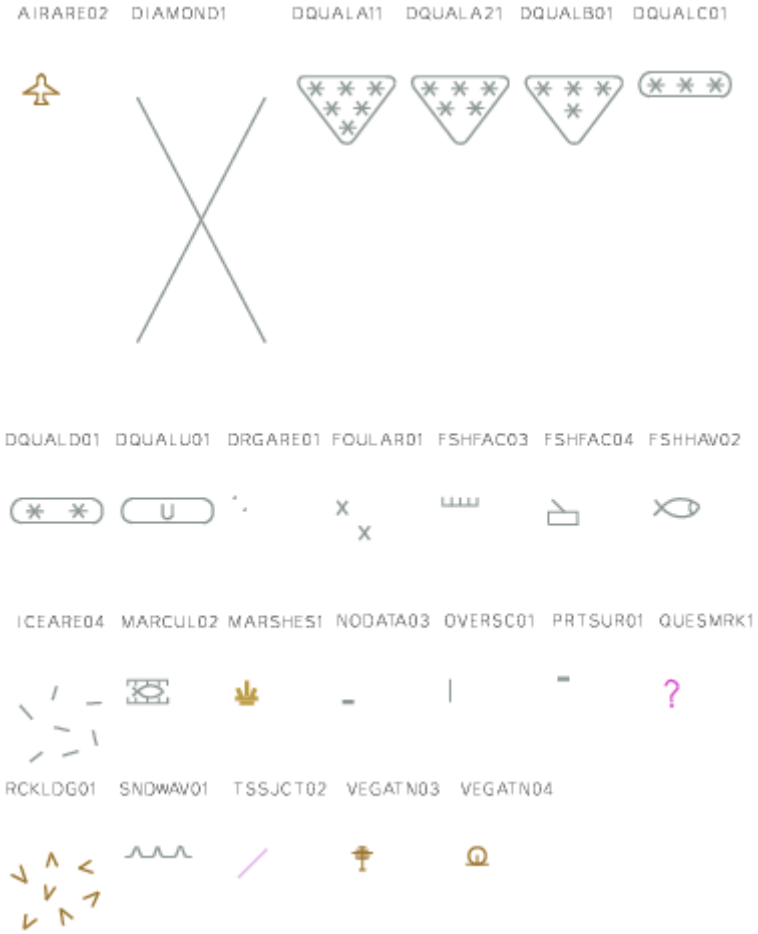
SOUNDG37	SOUNDG38	SOUNDG39	SOUNDG40	SOUNDG41	SOUNDG42	SOUNDG43	SOUNDG44
7	8	9	0	1	2	3	4
SOUNDG45	SOUNDG46	SOUNDG47	SOUNDG48	SOUNDG49	SOUNDG50	SOUNDG51	SOUNDG52
5	6	7	8	9	0	1	2
SOUNDG53	SOUNDG54	SOUNDG55	SOUNDG56	SOUNDG57	SOUNDG58	SOUNDG59	SOUNDGB1
3	4	5	6	7	8	9	⌴
SOUNDGC2	SOUNDS00	SOUNDS01	SOUNDS02	SOUNDS03	SOUNDS04	SOUNDS05	SOUNDS06
◯	0	1	2	3	4	5	6
SOUNDS07	SOUNDS08	SOUNDS09	SOUNDS10	SOUNDS11	SOUNDS12	SOUNDS13	SOUNDS14
7	8	9	0	1	2	3	4
SOUNDS15	SOUNDS16	SOUNDS17	SOUNDS18	SOUNDS19	SOUNDS20	SOUNDS21	SOUNDS22
5	6	7	8	9	0	1	2
SOUNDS23	SOUNDS24	SOUNDS25	SOUNDS26	SOUNDS27	SOUNDS28	SOUNDS29	SOUNDS30
3	4	5	6	7	8	9	0
SOUNDS31	SOUNDS32	SOUNDS33	SOUNDS34	SOUNDS35	SOUNDS36	SOUNDS37	SOUNDS38
1	2	3	4	5	6	7	8

Point symbols and centred areas symbols (SY)

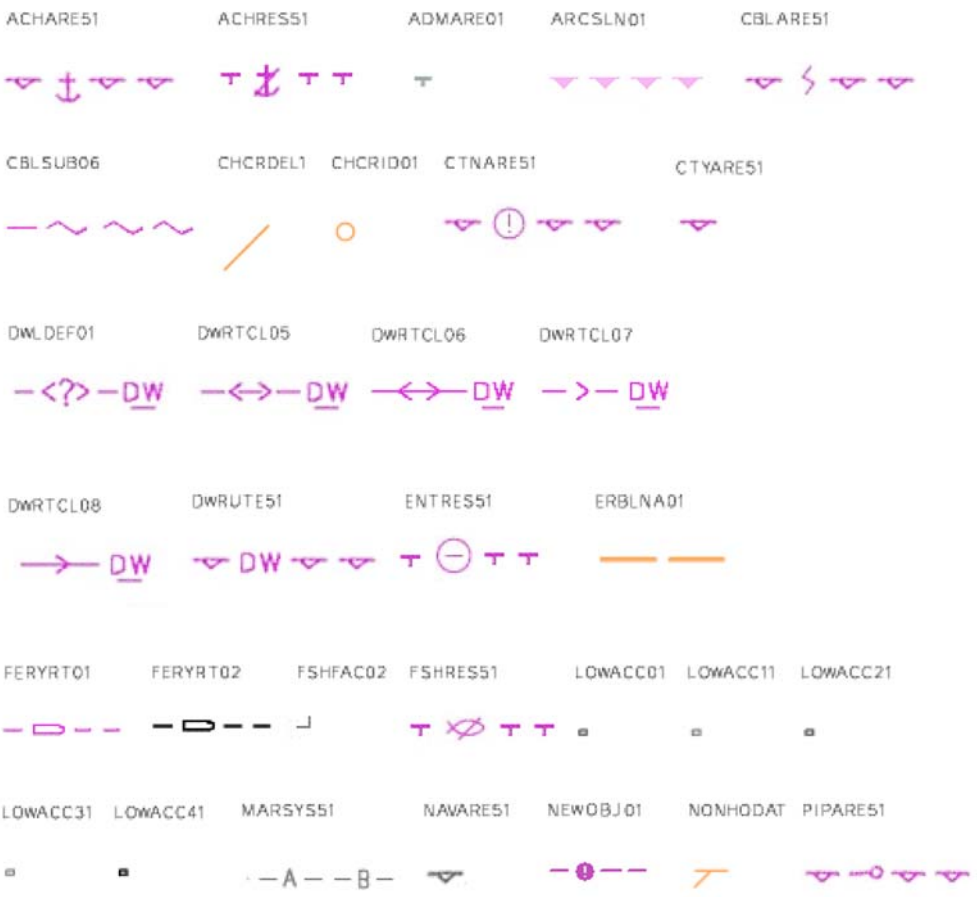


Point symbols and centred areas symbols (SY)

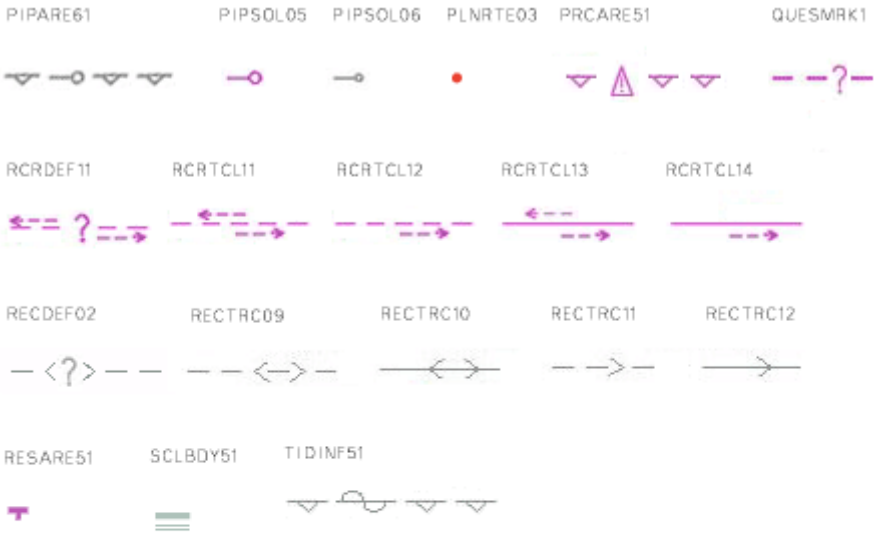
Area patterns (AP)



Complex linestyles (LC)



Complex linestyles (LC)



15.6 List of symbol names & meanings arranged alphabetically

Point symbols & centred area symbols (SY)

1. SY(ACHARE02)	CHMGD	anchorage area as a point at small scale, or anchor points of mooring trot at large scale
2. SY(ACHARE51)	CHMGF	anchorage area
3. SY(ACHBRT07)	CHMGD	designated anchor berth for a single vessel
4. SY(ACHRES51)	CHMGF	area where anchoring is prohibited or restricted
5. SY(ACHRES61)	CHMGF CHMGD	area where anchoring is prohibited or restricted, with other cautions
6. SY(ACHRES71)	CHMGF CHMGD	area where anchoring is prohibited or restricted, with other information
7. SY(AIRARE02)	LANDF	symbol for airport as a point
8. (deleted)		
9. (deleted)		
10. (deleted)		
579. SY(AISDGR01)	DNGHL	dangerous AIS target
590. SY(AISATN01)	RESBLU	AIS based aid to navigation
580. SY(AISLST01)	RESBLU	lost AIS target
581. SY(AISSEL01)	RESBLU	selected AIS target
11. SY(AISSLP01)	RESBLU	sleeping AIS target
582. SY(AISTRN01)	RESBLU	AIS target turning to starboard
583. SY(AISTRN02)	RESBLU	AIS target turning to port
12. SY(AISVES01)	RESBLU	active AIS target showing vector and/or heading
13. SY(ARPATG01)	ARPAT	ARPA target
14. SY(ARPONE01)	ARPAT	one minute mark on ARPA vector
15. SY(ARPSIX01)	ARPAT	six minute mark on ARPA vector
16. SY(BCNCAR01)	CHYLW OUTLW	cardinal beacon, north, simplified
17. SY(BCNCAR02)	CHYLW OUTLW	cardinal beacon, east, simplified
18. SY(BCNCAR03)	CHYLW OUTLW	cardinal beacon, south, simplified
19. SY(BCNCAR04)	CHYLW OUTLW	cardinal beacon, west, simplified
20. SY(BCNDEF13)	CHMGD CHGRD OUTLW	default symbol for a beacon, simplified
21. SY(BCNGEN01)	CHBLK	beacon in general, paper-chart
22. SY(BCNGEN03)	CHMGD CHBLK	default symbol for beacon, paper chart
23. SY(BCNISD21)	OUTLW CHRED	isolated danger beacon, simplified
24. SY(BCNLAT15)	CHRED OUTLW	major lateral beacon, red, simplified
25. SY(BCNLAT16)	CHGRN OUTLW	major lateral beacon, green, simplified
26. SY(BCNLAT21)	CHRED OUTLW	minor lateral beacon, red, simplified
27. SY(BCNLAT22)	CHGRN OUTLW	minor lateral beacon, green, simplified
28. SY(BCNLTC01)	CHBLK	lattice beacon, paper chart
29. SY(BCNSAW13)	CHBLK DEPVS OUTLW	major safe water beacon, simplified
30. SY(BCNSAW21)	OUTLW CHBLK DEPVS	minor safe water beacon, simplified
31. SY(BCNSPP13)	CHYLW OUTLW	major special purpose beacon, simplified
32. SY(BCNSPP21)	CHYLW OUTLW	minor special purpose beacon, simplified
33. SY(BCNSTK02)	CHBLK	minor, stake or pole beacon, paper chart
34. SY(BCNTOW01)	CHBLK	beacon tower, paper-chart
523. SY(BLKADJ01)	BKAJ1 BKAJ2	symbol for checking and adjusting the brightness and contrast
35. SY(BOYBAR01)	CHBLK	barrel buoy, paper chart
36. SY(BOYCAN01)	CHBLK	can buoy, paper chart
39. SY(BOYCAR03)	CHYLW OUTLW	cardinal buoy, south, simplified

40. SY(BOYCAR04)	CHYLW OUTLW	cardinal buoy, west, simplified
41. SY(BOYCON01)	CHBLK	conical buoy, paper chart
42. SY(BOYDEF03)	CHMGD CHGRD OUTLW	default symbol for buoy, simplified
43. SY(BOYGEN03)	CHMGD CHBLK	default symbol for buoy, paper chart
44. SY(BOYINB01)	CHBLK	installation buoy, paper chart
45. SY(BOYISD12)	OUTLW CHRED	isolated danger buoy, simplified
46. SY(BOYLAT13)	CHGRN OUTLW	conical lateral buoy, green, simplified
47. SY(BOYLAT14)	CHRED OUTLW	conical lateral buoy, red, simplified
48. SY(BOYLAT23)	CHGRN OUTLW	can shape lateral buoy, green, simplified
49. SY(BOYLAT24)	CHRED OUTLW	can shape lateral buoy, red, simplified
50. SY(BOYMOR01)	CHBLK	mooring buoy, barrel shape, paper chart
51. SY(BOYMOR03)	CHBLK	mooring buoy, can shape, paper chart
52. SY(BOYMOR11)	CHBLK	installation buoy and mooring buoy, simplified
53. SY(BOYPIL01)	CHBLK	pillar buoy, paper chart
54. SY(BOYSAW12)	CHRED OUTLW	safe water buoy, simplified
55. SY(BOYSPH01)	CHBLK	spherical buoy, paper chart
56. SY(BOYSPP11)	CHYLW OUTLW	special purpose buoy, spherical or barrel shaped, or default symbol for special purpose buoy, simplified
57. SY(BOYSPP15)	CHYLW OUTLW	special purpose TSS buoy marking the starboard side of the traffic lane, simplified
58. SY(BOYSPP25)	CHYLW OUTLW	special purpose TSS buoy marking the port side of the traffic lane, simplified
527. SY(BOYSPP35)	CHYLW OUTLW	special purpose ice buoy or spar or pillar shaped buoy, simplified
59. SY(BOYSPR01)	CHBLK	spar buoy, paper chart
60. SY(BOYSUP01)	CHBLK	super buoy, paper chart
61. SY(BOYSUP02)	CHBLK	super buoy ODAS & LANBY, simplified
62. SY(BOYSUP03)	CHBLK	LANBY, super buoy, paper chart
63. SY(BRIDGE01)	CHMGD	symbol for opening bridge
64. SY(BRTHNO01)	CHMGD	berth number symbol
65. SY(BUAARE02)	LANDF	built up area
66. SY(BUIREL01)	LANDF	non conspicuous religious building, Christian
67. SY(BUIREL04)	LANDF	non conspicuous religious building, non Christian
68. SY(BUIREL05)	LANDF	mosque or minaret
69. SY(BUIREL13)	CHBLK	Conspicuous religious building, Christian
70. SY(BUIREL14)	CHBLK	Conspicuous religious building, non-Christian
71. SY(BUIREL15)	CHBLK	Conspicuous mosque or minaret
72. SY(BUISGL01)	LANDF CHBRN	single building
73. SY(BUISGL11)	LANDF CHBLK	Conspicuous single building
74. SY(CAIRNS01)	LANDF	Cairn
75. SY(CAIRNS11)	CHBLK	Conspicuous cairn
76. SY(CBLARE51)	CHMGF	cable area
77. SY(CGUSTA02)	LANDF CHWHT CHMGF	Coastguard station
78. SY(CHCRDEL1)	CHCOR	this object has been manually deleted or modified
79. SY(CHCRID01)	CHCOR	this object has been manually updated
80. SY(CHIMNY01)	LANDF	Chimney
81. SY(CHIMNY11)	CHBLK	Conspicuous chimney
82. SY(CHINFO06)	CHMGD	HO caution note
83. SY(CHINFO07)	CHMGD	HO information note
84. SY(CHINFO08)	NINFO	mariner's information note
85. SY(CHINFO09)	NINFO	mariners caution note
86. SY(CHINFO10)	ADINF	Manufacturer's information note

87. SY(CHINFO11)	ADINF	Manufacturer's caution note
88. SY(CHKSYM01)	CHBLK OUTLW	test symbol for checking symbol sizes, should measure 5mm by 5mm
89. SY(CLRLIN01)	NINFO	arrow head for mariner's clearing line
90. SY(CRANES01)	LANDF	Cranes
91. SY(CTNARE51)	TRFCF	caution area, a specific caution note applies
92. SY(CTYARE51)	TRFCF	cautionary area (e.g. ferry area) navigate with caution
93. SY(CTYARE71)	TRFCF CHMGD	cautionary area with further information
94. SY(CURDEF01)	CHGRD	current or tidal stream whose direction is not known
95. SY(CURENT01)	CHGRD	non-tidal current
96. SY(CURSRA01)	CURSR	ordinary cursor
97. SY(CURSRB01)	CURSR	cursor with open center
98. SY(DANGER01)	CHBLK DEPVS	Underwater hazard with a defined depth
99. SY(DANGER02)	CHBLK	Underwater hazard with depth greater than 20 metres
525. SY(DANGER03)	DEPIT CHBLK	Underwater hazard which covers and uncovers
100. SY(DAYSQR01)	CHMGD	square or rectangular daymark, simplified
101. SY(DAYSQR21)	CHMGD	square or rectangular daymark, paper chart
102. SY(DAYTRI01)	CHMGD	triangular daymark, point up, simplified
103. SY(DAYTRI05)	CHMGD	triangular daymark, point down, simplified
104. SY(DAYTRI21)	CHMGD	triangular daymark, point up, paper chart
105. SY(DAYTRI25)	CHMGD	triangular daymark, point down, paper chart
589. SY(**DRFSTA01**)	CHMGD	DGPS Base station
521. SY(DIRBOY01)	CHMGD	direction of buoyage
106. SY(DIRBOYA1)	CHMGD CHRED CHGRN	direction and color of buoyage for approaching harbour in IALA region A (red to port)
107. SY(DIRBOYB1)	CHMGD CHGRN CHRED	direction and color of buoyage for approaching harbour in IALA region B (green to port)
108. SY(DISMAR03)	CHMGD	distance mark
109. SY(DISMAR04)	CHMGD	distance point with no mark
110. SY(DNGHILIT)	DNGHL	Transparent danger highlight for mariner's use
111. SY(DOMES001)	LANDF	Dome
112. SY(DOMES011)	CHBLK	Conspicuous dome
113. SY(DSHAER01)	LANDF	dish aerial
114. SY(DSHAER11)	CHBLK	Conspicuous dish aerial
115. SY(DWRTPT51)	TRFCF	part of deep water route
522. SY(DWRUTE51)	TRFCD	reciprocal traffic directions in a two-way part of a deep-water route
116. SY(EBBSTR01)	CHGRD	ebb stream, rate at spring tides
117. SY(EBLVRM11)	NINFO	point of origin for an offset EBL or VRM
118. SY(ENTRES51)	TRFCF	area where entry is prohibited or restricted or to be avoided
119. SY(ENTRES61)	TRFCF CHMGD	area where entry is prohibited or restricted or to be avoided, with other cautions
120. SY(ENTRES71)	TRFCF CHMGD	area where entry is prohibited or restricted or to be avoided, with other information
121. SY(ERBLTIK1)	NINFO	Range mark for an ERBL
584. SY(ESSARE01)	CHMGF	Environmentally sensitive sea area
122. SY(EVENTS02)	NINFO	Mariner's event mark
123. SY(FAIRWY51)	CHGRD	Fairway with one-way traffic in direction indicated
124. SY(FAIRWY52)	CHGRD	Fairway with two-way traffic
125. SY(FLASTK01)	LANDF	flare stack
126. SY(FLASTK11)	CHBLK	Conspicuous flare stack
127. SY(FLDSTR01)	CHGRD	flood stream, rate at spring tides

128. SY(FLGSTF01)	LANDF	Flagstaff, flagpole
524. SY(FLTHAZ02)	CHMGD	Floating hazard to navigation
129. SY(FOGSIG01)	CHMGF	fog signal
130. SY(FORSTC01)	LANDF	Fortified structure
131. SY(FORSTC11)	CHBLK	Conspicuous fortified structure
132. SY(FOULGND1)	CHGRD	foul area of seabed safe for navigation but not for anchoring
133. SY(FRYARE51)	CHMGF	ferry area
134. SY(FRYARE52)	CHBLK	cable ferry area
135. SY(FSHFAC02)	CHGRD	fish trap, fish weir, tunny net
136. SY(FSHFAC03)	CHGRD	fish stakes
137. SY(FSHGRD01)	CHGRD	fishing ground
138. SY(FSHHAV01)	CHGRD	fish haven
139. SY(FSHRES51)	CHMGF	area where fishing or trawling is prohibited or restricted
140. SY(FSHRES61)	CHMGF CHMGD	area where fishing or trawling is prohibited or restricted, with other cautions
141. SY(FSHRES71)	CHMGF CHMGD	area where fishing or trawling is prohibited or restricted, with other information
142. SY(GATCON03)	TRFCD	Navigable lock gate
143. SY(GATCON04)	TRFCD	non-navigable lock gate
144. SY(HILTOP01)	LANDF	hill or mountain top
145. SY(HILTOP11)	CHBLK	Conspicuous hill or mountain top
146. SY(HRBFAC09)	CHMGD	fishing harbour
147. SY(HULKES01)	CSTLN CHBRN	Hulk
148. SY(INFARE51)	CHMGF	area with minor restrictions or information notices
149. SY(INFORM01)	CHMGD	this object has additional information available by cursor query
150. SY(ISODGR01)	ISDNG	isolated underwater danger of depth less than the safety contour
151. SY(ITZARE51)	CHMGF	area of inshore traffic
152. SY(LITDEF11)	CHMGD OUTLW	light flare
153. SY(LIGHTS11)	LITRD OUTLW	light flare, red
154. SY(LIGHTS12)	LITGN OUTLW	light flare, green
155. SY(LIGHTS13)	LITYW OUTLW	light flare, white or yellow
156. SY(LIGHTS81)	CHMGD	strip light
157. SY(LIGHTS82)	CHMGD	Floodlight
158. SY(LITFLT01)	CHBLK	light float, paper chart
159. SY(LITFLT02)	CHBLK	light float, simplified
160. SY(LITVES01)	CHBLK	light vessel, paper chart
161. SY(LITVES02)	CHBLK	light vessel, simplified
162. SY(LNDARE01)	LANDA CSTLN	land as a point at small scale
163. SY(LOCMAG01)	CHMGD	cursor pick site for a magnetic anomaly at a point or along a line
164. SY(LOCMAG51)	CHMGF	cursor pick site for a magnetic anomaly over an area
165. SY(LOWACC01)	CHBLK	point feature or area of low accuracy
166. SY(MAGVAR01)	CHMGD	cursor pick site for magnetic variation at a point
167. SY(MAGVAR51)	CHMGF	cursor pick site for magnetic variation along a line or over an area
168. SY(MARCUL02)	CHGRD	fish farm
169. SY(MONUMT02)	LANDF	Monument
170. SY(MONUMT12)	CHBLK	Conspicuous monument
171. SY(MORFAC03)	LANDA CHBLK	mooring dolphin
172. SY(MORFAC04)	CHBLK	deviation mooring dolphin
173. SY(MSTCON04)	LANDF	Mast

174. SY(MSTCON14)	CHBLK	Conspicuous mast
585. SY(NEWOBJ01)	CHMGD	new object
175. SY(NORTHAR1)	SCLBR	north arrow
176. SY(NOTBRD11)	CHBLK	conspicuous notice board
177. SY(OBSTRN01)	DEPVS CHBLK	obstruction, depth not stated
178. SY(OBSTRN02)	CHBLK	obstruction in the intertidal area
526 SY(OBSTRN03)	DEPIT CHBLK	obstruction which covers and uncovers
179. SY(OBSTRN11)	CSTLN LANDA	obstruction in the water which is always above water level
180. SY(OFSPLF01)	CHBLK	offshore platform
181. SY(OSPONE02)	SHIPS	one minute mark for ownship vector
182. SY(OSPSIX02)	SHIPS	six minute mark for ownship vector
183. SY(OWNSHP01)	SHIPS	own ship symbol, constant size
184. SY(OWNSHP05)	SHIPS	own ship drawn to scale with conning position marked
185. SY(PASTRK01)	PSTRK	time mark on past track
186. SY(PASTRK02)	SYTRK	time mark on secondary past track
187. SY(PILBOP02)	CHMGD	pilot boarding place
188. SY(PILPNT02)	CHBLK	pile or bollard
189. SY(PLNPOS01)	PLRTE	surrounding ellipse for arrival date and time at planned position
190. SY(PLNPOS02)	PLRTE	cross line for planned position
191. SY(PLNSPD03)	PLRTE	box for speed to make good, planned route
192. SY(PLNSPD04)	APLRT	box for speed to make good, alternate route
193. SY(POSGEN01)	LANDF	position of a point feature
194. SY(POSGEN03)	CHBLK	position of a conspicuous point feature
195. SY(POSGEN04)	CHBLK	position of an elevation or control point
196. SY(POSITN02)	NINFO	own ship position fix
197. SY(PRCARE12)	TRFCD	point symbol for traffic precautionary area
198. SY(PRCARE51)	TRFCD	traffic precautionary area
199. SY(PRDINS02)	LANDF CHBRN	mine, quarry
200. SY(PRICKE03)	CHBLK	withy, port-hand, paper-chart
201. SY(PRICKE04)	CHBLK	withy, starboard-hand, paper-chart
586. SY(PSSARE01)	CHMGF	particularly sensitive sea area
202. SY(QUAPOS01)	CHBLK	position approximate
203. SY(QUARRY01)	LANDF	Quarry
204. SY(QUESMRK1)	CHMGD	object which is not sufficiently described to be symbolized, or for which no symbol exists in the symbol library
205. SY(RACNSP01)	CHMGD	symbol indicating this object is radar conspicuous
206. SY(RADRFL03)	CHMGD	radar reflector
207. SY(RASCAN01)	LANDF	radar scanner
208. SY(RASCAN11)	CHBLK	conspicuous radar scanner
209. SY(RCLDEF01)	CHMGD	radio calling-in point whose direction is not known
210. SY(RCTLPT52)	TRFCD	recommended traffic direction between parts of a traffic separation scheme, or for ships not needing a deep water route
211. SY(RDOCAL02)	TRFCD	radio calling-in point for traffic in one direction only
212. SY(RDOCAL03)	TRFCD	radio calling-in point for traffic in both directions
213. SY(RDOSTA02)	CHMGD	radio station
214. SY(RECDEF51)	CHGRD	Recommended track as an area, direction not defined in data
215. SY(RECTRC55)	CHGRD	Recommended two-way track as an area, not based on fixed marks
216. SY(RECTRC56)	CHGRD	Recommended two-way track as an area, based on fixed marks
217. SY(RECTRC57)	CHGRD	Recommended one-way track as an area, not based on fixed marks
218. SY(RECTRC58)	CHGRD	Recommended one-way track as an area, based on fixed

		marks
219. SY(REFPNT02)	NINFO	reference point, 'ghost cursor' (user interface)
220. SY(RETRFL01)	CHMGD	retro reflector, paper chart
221. SY(RETRFL02)	CHMGD	retro reflector, simplified
222. SY(RFNERY01)	LANDF	Refinery
223. SY(RFNERY11)	CHBLK	Conspicuous refinery
224. SY(ROLROL01)	CHBLK	RoRo terminal
225. SY(RSCSTA02)	CHBLK	rescue station
226. SY(RSRDEF51)	TRFCF CHMGD	area in which undefined restrictions exist
227. SY(RTLDEF51)	TRFCD CHMGD	Recommended route between parts of a traffic separation scheme, or for ships not needing a deep water route, with the direction not specified in the data
228. SY(RTPBCN02)	CHMGD	radar transponder beacon
528. SY(SAFCON00)	DEPDW SNDG2	contour label
529. SY(SAFCON01)	DEPDW SNDG2	contour label
530. SY(SAFCON02)	DEPDW SNDG2	contour label
531. SY(SAFCON03)	DEPDW SNDG2	contour label
532. SY(SAFCON04)	DEPDW SNDG2	contour label
533. SY(SAFCON05)	DEPDW SNDG2	contour label
534. SY(SAFCON06)	DEPDW SNDG2	contour label
535. SY(SAFCON07)	DEPDW SNDG2	contour label
536. SY(SAFCON08)	DEPDW SNDG2	contour label
537. SY(SAFCON09)	DEPDW SNDG2	contour label
538. SY(SAFCON10)	DEPDW SNDG2	contour label
539. SY(SAFCON11)	DEPDW SNDG2	contour label
540. SY(SAFCON12)	DEPDW SNDG2	contour label
541. SY(SAFCON13)	DEPDW SNDG2	contour label
542. SY(SAFCON14)	DEPDW SNDG2	contour label
543. SY(SAFCON15)	DEPDW SNDG2	contour label
544. SY(SAFCON16)	DEPDW SNDG2	contour label
545. SY(SAFCON17)	DEPDW SNDG2	contour label
546. SY(SAFCON18)	DEPDW SNDG2	contour label
547. SY(SAFCON19)	DEPDW SNDG2	contour label
548. SY(SAFCON20)	DEPDW SNDG2	contour label
549. SY(SAFCON21)	DEPDW SNDG2	contour label
550. SY(SAFCON22)	DEPDW SNDG2	contour label
551. SY(SAFCON23)	DEPDW SNDG2	contour label
552. SY(SAFCON24)	DEPDW SNDG2	contour label
553. SY(SAFCON25)	DEPDW SNDG2	contour label
554. SY(SAFCON26)	DEPDW SNDG2	contour label
555. SY(SAFCON27)	DEPDW SNDG2	contour label
556. SY(SAFCON28)	DEPDW SNDG2	contour label
557. SY(SAFCON29)	DEPDW SNDG2	contour label
558. SY(SAFCON50)	DEPDW SNDG2	contour label
559. SY(SAFCON51)	DEPDW SNDG2	contour label
560. SY(SAFCON52)	DEPDW SNDG2	contour label
561. SY(SAFCON53)	DEPDW SNDG2	contour label
562. SY(SAFCON54)	DEPDW SNDG2	contour label
563. SY(SAFCON55)	DEPDW SNDG2	contour label
564. SY(SAFCON56)	DEPDW SNDG2	contour label
565. SY(SAFCON57)	DEPDW SNDG2	contour label

566. SY(SAFCON58)	DEPDW SNDG2	contour label
567. SY(SAFCON59)	DEPDW SNDG2	contour label
568. SY(SAFCON60)	DEPDW SNDG2	contour label
569. SY(SAFCON61)	DEPDW SNDG2	contour label
570. SY(SAFCON62)	DEPDW SNDG2	contour label
571. SY(SAFCON63)	DEPDW SNDG2	contour label
572. SY(SAFCON64)	DEPDW SNDG2	contour label
573. SY(SAFCON65)	DEPDW SNDG2	contour label
574. SY(SAFCON66)	DEPDW SNDG2	contour label
575. SY(SAFCON67)	DEPDW SNDG2	contour label
576. SY(SAFCON68)	DEPDW SNDG2	contour label
577. SY(SAFCON69)	DEPDW SNDG2	contour label
229. SY(SCALEB10)	SCLBR CHGRD	one mile scalebar for display scales larger than 1/80,000
230. SY(SCALEB11)	SNDG2 SNDG1	10 mile latitude scale for display scales smaller than 1/80,000
231. SY(SILBUI01)	LANDF CHBRN	Silo
232. SY(SILBUI11)	LANDF CHBLK	Conspicuous silo
233. SY(SISTAT02)	CHWHT LANDF CHMGF	signal station
234. SY(SMCFAC02)	CHMGD	yacht harbour, marina
235. SY(SNDWAV02)	CHGRD	sand waves
236. SY(SOUNDG00)	SNDG1	deep soundings, greater than safety depth
237. SY(SOUNDG01)	SNDG1	for deep soundings, greater than safety depth
238. SY(SOUNDG02)	SNDG1	for deep soundings, greater than safety depth
239. SY(SOUNDG03)	SNDG1	for deep soundings, greater than safety depth
240. SY(SOUNDG04)	SNDG1	for deep soundings, greater than safety depth
241. SY(SOUNDG05)	SNDG1	for deep soundings, greater than safety depth
242. SY(SOUNDG06)	SNDG1	for deep soundings, greater than safety depth
243. SY(SOUNDG07)	SNDG1	for deep soundings, greater than safety depth
244. SY(SOUNDG08)	SNDG1	for deep soundings, greater than safety depth
245. SY(SOUNDG09)	SNDG1	for deep soundings, greater than safety depth
246. SY(SOUNDG10)	SNDG1	for deep soundings, greater than safety depth
247. SY(SOUNDG11)	SNDG1	for deep soundings, greater than safety depth
248. SY(SOUNDG12)	SNDG1	for deep soundings, greater than safety depth
249. SY(SOUNDG13)	SNDG1	for deep soundings, greater than safety depth
250. SY(SOUNDG14)	SNDG1	for deep soundings, greater than safety depth
251. SY(SOUNDG15)	SNDG1	for deep soundings, greater than safety depth
252. SY(SOUNDG16)	SNDG1	for deep soundings, greater than safety depth
253. SY(SOUNDG17)	SNDG1	for deep soundings, greater than safety depth
254. SY(SOUNDG18)	SNDG1	for deep soundings, greater than safety depth
255. SY(SOUNDG19)	SNDG1	for deep soundings, greater than safety depth
256. SY(SOUNDG20)	SNDG1	for deep soundings, greater than safety depth
257. SY(SOUNDG21)	SNDG1	for deep soundings, greater than safety depth
258. SY(SOUNDG22)	SNDG1	for deep soundings, greater than safety depth
259. SY(SOUNDG23)	SNDG1	for deep soundings, greater than safety depth
260. SY(SOUNDG24)	SNDG1	for deep soundings, greater than safety depth
261. SY(SOUNDG25)	SNDG1	for deep soundings, greater than safety depth
262. SY(SOUNDG26)	SNDG1	for deep soundings, greater than safety depth
263. SY(SOUNDG27)	SNDG1	for deep soundings, greater than safety depth
264. SY(SOUNDG28)	SNDG1	for deep soundings, greater than safety depth
265. SY(SOUNDG29)	SNDG1	for deep soundings, greater than safety depth
266. SY(SOUNDG30)	SNDG1	for deep soundings, greater than safety depth

267. SY(SOUNDG31)	SNDG1	for deep soundings, greater than safety depth
268. SY(SOUNDG32)	SNDG1	for deep soundings, greater than safety depth
269. SY(SOUNDG33)	SNDG1	for deep soundings, greater than safety depth
270. SY(SOUNDG34)	SNDG1	for deep soundings, greater than safety depth
271. SY(SOUNDG35)	SNDG1	for deep soundings, greater than safety depth
272. SY(SOUNDG36)	SNDG1	for deep soundings, greater than safety depth
273. SY(SOUNDG37)	SNDG1	for deep soundings, greater than safety depth
274. SY(SOUNDG38)	SNDG1	for deep soundings, greater than safety depth
275. SY(SOUNDG39)	SNDG1	for deep soundings, greater than safety depth
276. SY(SOUNDG40)	SNDG1	for deep soundings, greater than safety depth
277. SY(SOUNDG41)	SNDG1	for deep soundings, greater than safety depth
278. SY(SOUNDG42)	SNDG1	for deep soundings, greater than safety depth
279. SY(SOUNDG43)	SNDG1	for deep soundings, greater than safety depth
280. SY(SOUNDG44)	SNDG1	for deep soundings, greater than safety depth
281. SY(SOUNDG45)	SNDG1	for deep soundings, greater than safety depth
282. SY(SOUNDG46)	SNDG1	for deep soundings, greater than safety depth
283. SY(SOUNDG47)	SNDG1	for deep soundings, greater than safety depth
284. SY(SOUNDG48)	SNDG1	for deep soundings, greater than safety depth
285. SY(SOUNDG49)	SNDG1	for deep soundings, greater than safety depth
286. SY(SOUNDG50)	SNDG1	for deep soundings, greater than safety depth
287. SY(SOUNDG51)	SNDG1	for deep soundings, greater than safety depth
288. SY(SOUNDG52)	SNDG1	for deep soundings, greater than safety depth
289. SY(SOUNDG53)	SNDG1	for deep soundings, greater than safety depth
290. SY(SOUNDG54)	SNDG1	for deep soundings, greater than safety depth
291. SY(SOUNDG55)	SNDG1	for deep soundings, greater than safety depth
292. SY(SOUNDG56)	SNDG1	for deep soundings, greater than safety depth
293. SY(SOUNDG57)	SNDG1	for deep soundings, greater than safety depth
294. SY(SOUNDG58)	SNDG1	for deep soundings, greater than safety depth
295. SY(SOUNDG59)	SNDG1	for deep soundings, greater than safety depth
296. SY(SOUNDGB1)	SNDG1	symbol for swept sounding, used for deep soundings greater than safety depth
297. (deleted)		
298. SY(SOUNDGC2)	SNDG1	sounding of low accuracy
299. SY(SOUNDS00)	SNDG2	shallow soundings, less than or equal to the safety depth
300. SY(SOUNDS01)	SNDG2	shallow soundings, less than or equal to the safety depth
301. SY(SOUNDS02)	SNDG2	shallow soundings, less than or equal to the safety depth
302. SY(SOUNDS03)	SNDG2	shallow soundings, less than or equal to the safety depth
303. SY(SOUNDS04)	SNDG2	shallow soundings, less than or equal to the safety depth
304. SY(SOUNDS05)	SNDG2	shallow soundings, less than or equal to the safety depth
305. SY(SOUNDS06)	SNDG2	shallow soundings, less than or equal to the safety depth
306. SY(SOUNDS07)	SNDG2	shallow soundings, less than or equal to the safety depth
307. SY(SOUNDS08)	SNDG2	shallow soundings, less than or equal to the safety depth
308. SY(SOUNDS09)	SNDG2	shallow soundings, less than or equal to the safety depth
309. SY(SOUNDS10)	SNDG2	shallow soundings, less than or equal to the safety depth
310. SY(SOUNDS11)	SNDG2	shallow soundings, less than or equal to the safety depth
311. SY(SOUNDS12)	SNDG2	shallow soundings, less than or equal to the safety depth
312. SY(SOUNDS13)	SNDG2	shallow soundings, less than or equal to the safety depth
313. SY(SOUNDS14)	SNDG2	shallow soundings, less than or equal to the safety depth
314. SY(SOUNDS15)	SNDG2	shallow soundings, less than or equal to the safety depth
315. SY(SOUNDS16)	SNDG2	shallow soundings, less than or equal to the safety depth
316. SY(SOUNDS17)	SNDG2	shallow soundings, less than or equal to the safety depth

~~317. SY(SOUNDS18)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~318. SY(SOUNDS19)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~319. SY(SOUNDS20)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~320. SY(SOUNDS21)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~321. SY(SOUNDS22)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~322. SY(SOUNDS23)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~323. SY(SOUNDS24)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~324. SY(SOUNDS25)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~325. SY(SOUNDS26)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~326. SY(SOUNDS27)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~327. SY(SOUNDS28)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~328. SY(SOUNDS29)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~329. SY(SOUNDS30)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~330. SY(SOUNDS31)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~331. SY(SOUNDS32)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~332. SY(SOUNDS33)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~333. SY(SOUNDS34)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~334. SY(SOUNDS35)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~335. SY(SOUNDS36)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~336. SY(SOUNDS37)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~337. SY(SOUNDS38)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~338. SY(SOUNDS39)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~339. SY(SOUNDS40)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~340. SY(SOUNDS41)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~341. SY(SOUNDS42)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~342. SY(SOUNDS43)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~343. SY(SOUNDS44)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~344. SY(SOUNDS45)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~345. SY(SOUNDS46)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~346. SY(SOUNDS47)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~347. SY(SOUNDS48)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~348. SY(SOUNDS49)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~349. SY(SOUNDS50)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~350. SY(SOUNDS51)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~351. SY(SOUNDS52)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~352. SY(SOUNDS53)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~353. SY(SOUNDS54)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~354. SY(SOUNDS55)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~355. SY(SOUNDS56)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~356. SY(SOUNDS57)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~357. SY(SOUNDS58)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~358. SY(SOUNDS59)~~	~~SNDG2~~	~~shallow soundings, less than or equal to the safety depth~~
~~359. SY(SOUNDSA1)~~	~~SNDG2~~	~~symbol for drying height, used for shallow soundings, less than or equal to safety depth~~
~~360. SY(SOUNDSB1)~~	~~SNDG2~~	~~symbol for swept sounding, used for shallow soundings, less than or equal to safety depth~~
~~361. (deleted)~~		
~~362. SY(SOUNDSC2)~~	~~SNDG1~~	~~sounding of low accuracy~~
~~363. SY(SPRING02)~~	~~CHGRD~~	~~Spring~~
~~364. SY(SWPARE51)~~	~~CHGRF~~	~~swept area~~
~~365. SY(TIDCUR01)~~	~~NINFO~~	~~predicted tidal stream or current direction~~

366. SY(TIDCUR02)	NINFO	actual tidal stream or current direction
367. SY(TIDCUR03)	NINFO	box for current strength
368. SY(TIDEHT01)	CHGRD	point for which tide height information is available
369. SY(TIDSTR01)	CHGRD	point or area for which a tidal stream table is available
370. SY(TMARDEF1)	CHBLK	topmark for beacons, flag or other shape, paper-chart
371. SY(TMARDEF2)	CHBLK	topmark for buoys, flag or other shape, paper-chart
372. SY(TMBYRD01)	LANDF	timber yard
373. SY(TNKCON02)	LANDF	Tank
374. SY(TNKCON12)	CHBLK	conspicuous tank
375. SY(TNKFRM01)	LANDF	Tank farm
376. SY(TNKFRM11)	CHBLK	conspicuous tank farm
377. SY(TOPMAR02)	CHBLK	topmark for buoys, cone point up, paper-chart
378. SY(TOPMAR04)	CHBLK	topmark for buoys, cone point down, paper-chart
379. SY(TOPMAR05)	CHBLK	topmark for buoys, 2 cones point upward, paper-chart
380. SY(TOPMAR06)	CHBLK	topmark for buoys, 2 cones point downward, paper-chart
381. SY(TOPMAR07)	CHBLK	topmark for buoys, 2 cones base to base, paper-chart
382. SY(TOPMAR08)	CHBLK	topmark for buoys, 2 cones point to point, paper-chart
383. SY(TOPMAR10)	CHBLK	topmark for buoys, sphere, paper-chart
384. SY(TOPMAR12)	CHBLK	topmark for buoys, 2 spheres, paper-chart
385. SY(TOPMAR13)	CHBLK	topmark for buoys, cylinder, paper-chart
386. SY(TOPMAR14)	CHBLK	topmark for buoys, board, paper-chart
387. SY(TOPMAR16)	CHBLK	topmark for buoys, cube point up, paper-chart
388. SY(TOPMAR17)	CHBLK	topmark for buoys, flag or other shape, paper-chart
389. SY(TOPMAR18)	CHBLK	topmark for buoys, T-Shape, paper-chart
390. SY(TOPMAR22)	CHBLK	topmark for beacons, cone point up, paper-chart
391. SY(TOPMAR24)	CHBLK	topmark for beacons, cone point down, paper-chart
392. SY(TOPMAR25)	CHBLK	topmark for beacons, 2 cones point upward, paper-chart
393. SY(TOPMAR26)	CHBLK	topmark for beacons, 2 cones point downward, paper-chart
394. SY(TOPMAR27)	CHBLK	topmark for beacons, 2 cones base to base, paper-chart
395. SY(TOPMAR28)	CHBLK	topmark for beacons, 2 cones point to point, paper-chart
396. SY(TOPMAR30)	CHBLK	topmark for beacons, sphere, paper-chart
397. SY(TOPMAR32)	CHBLK	topmark for beacons, 2 spheres, paper-chart
398. SY(TOPMAR33)	CHBLK	topmark for beacons, cylinder, paper-chart
399. SY(TOPMAR34)	CHBLK	topmark for beacons, board, paper-chart
400. SY(TOPMAR36)	CHBLK	topmark for beacons, cube point up, paper-chart
401. SY(TOPMAR65)	CHBLK	topmark for buoys, x-shape, paper-chart
402. SY(TOPMAR85)	CHBLK	topmark for beacons, x-shape, paper-chart
403. SY(TOPMAR86)	CHBLK	topmark for beacons, upright cross, paper-chart
404. SY(TOPMAR87)	CHBLK	topmark for beacons, besom point down, paper-chart
405. SY(TOPMAR88)	CHBLK	topmark for beacons, besom point up, paper-chart
406. SY(TOPMAR89)	CHBLK	topmark for beacons, T-shape, paper-chart
407. SY(TOWERS01)	LANDF	Tower
408. SY(TOWERS02)	LANDF	water tower
409. SY(TOWERS03)	CHBLK	conspicuous tower
410. SY(TOWERS05)	LANDF	radio, television tower
411. SY(TOWERS12)	CHBLK	conspicuous water tower
412. SY(TOWERS15)	CHBLK	conspicuous radio, television tower
413. SY(TREPNT04)	LANDF	general symbol for a tree
414. SY(TREPNT05)	LANDF	Mangrove
415. SY(TSLDEF51)	TRFCD CHMGD	one-way lane of a traffic separation scheme, with the direction not defined in the data

416. SY(TSSCRS51)	TRFCF	traffic crossing area
417. SY(TSSLPT51)	TRFCD	traffic direction in a one way lane of a traffic separation scheme
418. SY(TSSRON51)	TRFCF	traffic roundabout
419. SY(TWRDEF51)	TRFCD CHMGD	two way route of a traffic separation scheme, with the direction not defined in the data
420. SY(TWRTPT52)	TRFCD	reciprocal traffic directions in a two way route of a traffic separation scheme
421. SY(TWRTPT53)	TRFCD	single traffic direction in a two way route part of a traffic separation scheme
422. (deleted)		
423. (deleted)		
424. SY(UWTROC03)	DEPVS CHBLK	dangerous underwater rock of uncertain depth
425. SY(UWTROC04)	CHBLK	Rock which covers and uncovers or is awash at low water
426. SY(VECGND01)	SHIPS	arrowhead for own ship vector for course and speed over the ground
427. SY(VECGND21)	ARPAT	arrowhead for ARPA or AIS vector for course and speed over the ground
428. SY(VECWTR01)	SHIPS	arrowhead for own ship vector for course and speed through the water
429. SY(VECWTR21)	ARPAT	arrowhead for ARPA vector for course and speed through the water
430. SY(WATTUR02)	CHGRD	overfalls, eddies and breakers
431. SY(WAYPNT01)	PLRTE	waypoint on planned route
432. SY(WAYPNT03)	APLRT	waypoint on alternate planned route
433. SY(WAYPNT11)	PLRTE	next waypoint on planned route
434. SY(WEDKLP03)	CHGRD	weed, kelp
435. SY(WIMCON01)	LANDF	Windmotor
436. SY(WIMCON11)	CHBLK	conspicuous windmotor
437. SY(WNDFRM51)	LANDF	wind generator farm
438. SY(WNDFRM61)	CHBLK	conspicuous wind generator farm
439. SY(WNDMIL02)	LANDF	Windmill
440. SY(WNDMIL12)	CHBLK	conspicuous windmill
441. SY(WRECKS01)	CHGRD	wreck showing any portion of hull or superstructure at level of chart datum
442. SY(WRECKS04)	CHBLK	Non dangerous wreck, depth unknown
443. SY(WRECKS05)	DEPVS CHBLK	dangerous wreck, depth unknown

Area pattern symbols (AP)

444. AP(AIRARE02)	LANDF	pattern of symbols for an airport area
445. AP(DIAMOND1)	DEPCN	area of depth less than the safety contour
446. AP(DQUALA11)	CHGRD	pattern of symbols for a chart of 5m accuracy with full seafloor coverage
447. AP(DQUALA21)	CHGRD	pattern of symbols for a chart with 20m accuracy with full seafloor coverage
448. AP(DQUALB01)	CHGRD	pattern of symbols for a chart with 50m accuracy from standard survey based on lines of continuous soundings
449. AP(DQUALC01)	CHGRD	pattern of symbols for a low accuracy or incomplete chart
450. AP(DQUALD01)	CHGRD	pattern of symbols for an unreliable chart
451. AP(DQUALU01)	CHGRD	pattern of symbols for a chart with quality not assessed
452. AP(DRGARE01)	CHGRD	dredged area
453. AP(FOULAR01)	CHGRD	foul area, not safe for navigation
454. AP(FSHFAC03)	CHGRD	pattern of symbols for an area with fishing stakes

455. AP(FSHFAC04)	CHGRD	pattern of symbols for an area with fish traps, fish weirs, tunny nets
456. AP(FSHHAV02)	CHGRD	pattern of symbols for a fish haven
457. AP(ICEARE04)	CHGRD	continuous pattern for an ice area (glacier, etc.)
458. AP(MARCUL02)	CHGRD	pattern of symbols for a marine farm
459. AP(MARSHES1)	CHBRN	pattern of symbols for a marsh
460. AP(NODATA03)	CHGRD	area of no chart data
461. AP(OVERSC01)	CHGRD	overscale part of a display containing data from more than one navigation purpose
462. AP(PRTSUR01)	CHGRD	incompletely surveyed area
463. AP(QUESMRK1)	CHMGD	pattern of symbols for an area which is not sufficiently described to be symbolized, or for which no symbol exists in the symbol library
464. AP(RCKLDG01)	LANDF	rock or coral drying ledges
465. AP(SNDWAV01)	CHGRD	pattern of symbols for sand waves
466. AP(TSSJCT02)	TRFCF	precautionary area or a traffic separation scheme crossing or roundabout
467. AP(VEGATN03)	LANDF	pattern of symbols for wooded areas
468. AP(VEGATN04)	LANDF	pattern of symbols for mangroves

Complex linestyles

469. LC(ACHARE51)	CHMGD	boundary of an anchorage area
470. LC(ACHRES51)	CHMGD	boundary of an area where anchoring is prohibited or restricted
471. LC(ADMARE01)	CHGRD	jurisdiction boundary
587. LC(ARCSLN01)	CHMGF	boundary of archipelagic sea lane
472. LC(CBLARE51)	CHMGD	boundary of a submarine cable area
473. LC(CBLSUB06)	CHMGD	submarine cable
474. LC(CHCRDEL1)	CHCOR	this line has been deleted by a manual update
475. LC(CHCRID01)	CHCOR	this line has been manually updated
476. LC(CTNARE51)	CHMGD	boundary of area with a specific caution
477. LC(CTYARE51)	CHMGD	boundary of area to be navigated with caution
478. LC(DWLDEF01)	TRFCD	deep water route centreline, direction not defined in the data
479. LC(DWRTCL05)	TRFCD	two-way deep water route centreline, not based on fixed marks
480. LC(DWRTCL06)	TRFCD	two-way deep water route centreline, based on fixed marks
481. LC(DWRTCL07)	TRFCD	one-way deep water route centreline, not based on fixed marks
482. LC(DWRTCL08)	TRFCD	one-way deep water route centreline, based on fixed marks-marks
483. LC(DWRUTE51)	TRFCD	boundary of a deep water route
484. LC(ENTRES51)	CHMGD	boundary of an area where entry is prohibited or restricted
485. LC(ERBLNA01)	NINFO	electronic range/bearing line, dash
486. (deleted)		
487. LC(FERYRT01)	CHMGD	ferry route
488. LC(FERYRT02)	CHBLK	cable ferry route
489. LC(FSHFAC02)	CHGRD	fishing stakes
490. LC(FSHRES51)	CHMGD	boundary of an area where trawling or fishing is prohibited or restricted
491. LC(NONHODAT)	NINFO	boundary of non-HO data
492. LC(LOWACC01)	DEPSC	safety contour of low accuracy in position
493. LC(LOWACC11)	DEPCN	contour of low accuracy in position
494. LC(LOWACC21)	CSTLN	coastline or shoreline construction of low accuracy in position
495. LC(LOWACC31)	CHGRD	area of wrecks or obstructions of low accuracy
496. LC(LOWACC41)	CHBLK	danger line of low accuracy surrounding a foul area

497. LC(MARSYS51)	CHGRD	boundary between IALA A and IALA B systems of lateral buoys and beacons
498. LC(NAVARE51)	CHGRD	boundary of a navigation feature such as a fairway, magnetic anomaly, etc.
588. LC(NEWOBJ01)	CHMGD	new object
499. LC(PIPARE51)	CHMGD	boundary of a submarine pipeline area with potentially dangerous contents
500. LC(PIPARE61)	CHGRD	boundary of a submarine pipeline area with generally non-dangerous contents
501. LC(PIPSOL05)	CHMGD	oil, gas pipeline, submerged or on land
502. LC(PIPSOL06)	CHGRD	water pipeline, sewer, etc.
503. LC(PLNRTE03)	PLRTE	planned route for own ship
504. LC(PRCARE51)	CHMGD	boundary of a precautionary area
505. LC(QUESMRK1)	CHMGD	object which is not sufficiently described to be symbolized, or for which no symbol exists in the symbol library
506. LC(RCRDEF11)	TRFCD	regulated recommended route centreline, details not defined
507. LC(RCRTCL11)	TRFCD	regulated two-way recommended route centreline, not based on fixed marks
508. LC(RCRTCL12)	TRFCD	regulated one-way recommended route centreline, not based on fixed marks
509. LC(RCRTCL13)	TRFCD	regulated two-way recommended route centreline, based on fixed marks
510. LC(RCRTCL14)	TRFCD	regulated one-way recommended route centreline, based on fixed marks
511. LC(RECDEF02)	CHGRD	non-regulated recommended track, direction not defined in data
512. LC(RECTRC09)	CHGRD	non--regulated recommended two--way track, not based on fixed marks
513. LC(RECTRC10)	CHGRD	non--regulated recommended two--way track, based on fixed-marks marks
514. LC(RECTRC11)	CHGRD	non-regulated recommended one-way track, not based on fixed marks
515. LC(RECTRC12)	CHGRD	non-regulated recommended one-way track, based on fixed marks
516. LC(RESARE51)	CHMGD	boundary of a restricted area
517. LC (SCLBDY51)	CHGRF	chart scale boundary, the double line indicates the larger scale
518. LC(TIDINF51)	CHGRD	boundary of an area for which there is tidal information
519. (deleted)		
520. (deleted)		

REFERENCES AND NOTES

16. REFERENCES

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[12] International Hydrographic Organization: ECDIS Test Data Set, International Hydrographic Bureau, Monaco. (Special Publication No.64, (Current Edition)

[13] International Hydrographic Organization: Maintenance Section under (www.iho.int > Publications > Download List)

17. GLOSSARY This glossary explains some of the terms used with special meanings in the**Contents of the Digital Presentation Library**. For strict definitions of ECDIS terminology in general, see also appendix 1 to IHO S-32. **Disks and**

Colour Token:	A five letter, self-evident code describing the usage of a colour. The day and night colours which are identified by the token are given in the colour tables (in CIE coordinates). Note that several colour tokens may share the same colour.
complex line styles:	Lines that are themselves symbols, or that have symbols interlaced. Examples of a line as a symbol are a submerged pipeline LC(PIPSOL05), or the T T T lines indicating the inside of an area LC(ENTRES51). A simple or complex line may have a symbol interlaced, such as an anchor for anchorage area LC(ACHARE51).
Conditional Symbology Procedure:	A decision making procedure used to link an object class to a symbol in cases where the symbol depends on circumstances (e.g. whether a wreck is symbolized as an "isolated danger" depends on its relationship to the safety contour chosen by the mariner) or where symbolization is complex (e.g. light sector).
Display Category:	IMO PS [3] establish three categories for SENC objects: Display base: vital info, always on the display. Standard display: important objects, default display. Other: all other objects in the SENC.
Display Generator:	Software written by the ECDIS manufacturer to take an object from the SENC, assign a symbol and colour to it, and present it appropriately on the display, using the tables and procedures provided in the Presentation Library.
Display Priority:	Hierarchy to decide which line or point symbol is to be shown when two objects overlap. Priority 2 overwrites 1.
ECDIS Chart 1:	An ECDIS version of chart 1, including all symbols, line styles and colour coding used for chart presentation. Intended for the mariner to both familiarize himself with ECDIS and to look up specific symbols. The manufacturer should program the look-up of symbols drawn from the Presentation Library, including certain diagrams which are copied from INT 1 [2].
Exchange Set:	Newly provided copy of all or part of the Presentation Library.
Geometric Primitive:	A plain point, a plain line, a plain area as defined in geometry (i.e. without any meaning attached).

Look-up Table:	a table that links SENC objects to area, point symbol and line representation on ECDIS, and provides display

	priorities, radar flag, IMO category and optional viewing groups.
"No symbol" Object:	In some cases, the database contains information that is not intended for display. (An example might be a general area such as 'Great Australian Bight' which would be available for an answer to cursor interrogation of the sea area.)
Opaque fill:	The background is completely filled with the colour fill. (e.g. depth area). The point and line SENC features may be overwritten. The raw RADAR image is a special case of opaque fill which overwrites all other features expect those with "priority over radar" (OVERRADAR).
Pattern fill:	A method of identifying areas by large, faintly coloured symbols well spaced out across the area. A pattern spacing algorithm ensures that the pattern symbols are visible without being so dense as to cause clutter. Used to ensure pattern symbols are always visible at any display scale.
Pivot Point:	The pivot point is the point around which the symbol gets scaled and rotated. When the symbol is placed in the world space, the symbol's pivot point is positioned exactly on the object's position and all elements of the symbol are geometrically related to that position.
Radar priority:	IMO PS [3] require that radar can be switched off with a "single action control" in order to see SENC and mariners info clearly. However certain other info, such as planned route, safety contour, coastline should always be written over the radar.
Radar Transparency:	A method of varying the transparency of radar in a continuous progression from no radar to a totally opaque radar overlay, by merging the radar colour with the colour of the object it overlays at each pixel.
Raster format symbol:	A symbol described in screen pixels. The size increases as the screen dimension increases without additional pixels. Raster symbols look sharper and are consistent, but they have to be re-defined in order to change size or orientation.
SCAMIN:	The smallest scale at which an object is displayed (e.g. a minor light, SCAMIN of 1:50,000, would not be displayed at a scale of 1:75,000).
simple line styles:	Solid lines, dots and dashes.
Symbol Size:	The size is specified in normalized units of 0.01 mm. The minimum dimension is always more than 4 mm. This size

	applies to display on a standard minimum screen specified in PC&SS [5] and S-52 [4]. The size should be enlarged in proportion to increase in side length for larger screens.
Symbology Instruction:	A machine readable symbolization order used in look-up tables to link object classes to symbols, in straight forward cases (e.g. pilot boarding place)
Text label:	Includes for example, light descriptions, place names etc.
TFT:	Thin film transistor (relates to LCD display technology).
Transfer, Exchange:	These words are used as verbs or nouns to mean "provide" or "carry information".
Transparent fill:	A method of identifying areas by covering a given percentage of each 4 pixel square with the fill colour, leaving the remainder "transparent". Used to ensure the information underneath shows through.
Unknown Object:	If an object class is not listed in the look-up table, the ECDIS should advice the mariner that an unknown object exists in the display area, and symbolize all such objects with '?'.
Vector format symbol:	A symbol described in vector coordinates. The orientation of vector symbols can be changed by software.

18. CONTENTS OF THE DIGITAL PRESENTATION LIBRARY DISKS AND CD-ROM

Note that fromFrom edition 3.3 onwards the word-processed version is the "official" version of the Presentation Library. The digital version in .dai format described in this section is provided as a manufacturer's option for edition 3.4, but may not be provided for succeeding editions.4.0. However the S-57 format Colour Differentiation Test Diagram file will continue to be provided so that this diagram can be displayed using the ECDIS colour tables, as described in 19.4, in order to test the colour differentiation capability of the display screen.

Please see README file on individual disks for file/data extraction and specific contents.

18.117.1 Digital Presentation Library

The optional digital Presentation Library is supplied in ".dai" format, the name on the disk being PSLBmm_n.dai, where mm_n is the edition number. This file is formatted in accordance with the description given in section 1012 and contains look-up tables, colour tables and symbol descriptions. This file may not be up-dated and may not be available for future editions.

18.217.2 Test Edition of the Presentation Library

The ECDIS is no longer required to receive amendments to the Presentation Library at sea. Consequently, the Test Edition is no longer required.

~~18.3~~17.3 Look-up Table sets

The digital form of the look-up tables are included in the above-described PSLBmm_n.dai file. This file may not be up-dated and may not be available for future editions.

~~18.4~~17.4 Colour Tables

The CIE colour tables are included in the above-described PSLBmm_n.dai file. This file may not be up-dated and may not be available for future editions.

~~18.5~~17.5 Symbols, Patterns and Linestyles

The official symbols, patterns and linestyles are provided in the PSLBmm_n.dai file. This file may not be up-dated and may not be available for future editions.

~~18.6 Program LITDSN – Light Description~~

~~The Presentation Library CD also contains a "C" function for the conditional symbology procedure LITDSN, which generates a light description in the form seen on the paper chart, and a "C" program "LITTST.C" to test the input and output of this function. This will continue to be provided.~~

~~18.7~~Official Presentation Library

The official Presentation Library, in the form of a word processed file, is contained on the Presentation Library CD. The content of the Presentation Library is given in section ~~1.1.~~4.

~~18.8~~

17.7 ECDIS Chart 1

An ECDIS Chart 1 is available for use by the mariner, off-line, as described in "Colour & Symbol Specifications for ECDIS" section 3.1.4. This is in section ~~15.2~~17.2 of the Presentation Library as graphics files on the Presentation Library CD.

In addition to the above, the digital Presentation Library contains a set of 13 pseudo S-57 files named AANC1XXX.000 ("N" is the navigational purpose), with AGEN code 1810. These cells carry the representation of the ECDIS Chart 1 as a collection of all symbols coded as NEWOBJ using the SYMINS attribute and similarly arranged as INT1 [~~2~~1] for paper charts.

Detailed specifications for these diagrams and their use are given in section 19 of the Presentation Library.

~~18.9~~ 17.8 Colour Differentiation Test Diagram

A Colour Differentiation Test Diagram is provided to enable the mariner to check the colour performance of his ECDIS screeen, off-line, as described in "Colour & Symbol Specifications for ECDIS" section 5.2.5. It is illustrated in section ~~15.4.~~16 and fully described in sections ~~19.3~~18.3 and ~~19.4.~~18.4.

~~19. USE OF COLOUR CALIBRATION SOFTWARE, DIGITAL CHART 1, & COLOUR TEST DIAGRAM~~
Use of Colour Calibration Software, Digital Chart 1, & Colour Test Diagram

~~(Note: this was Part III of PresLib editions earlier than 3.3)~~

~~19.1~~ 18.1 Introduction

The digital part of the IHO ECDIS Presentation Library carries supplementary features intended to aid the manufacturer in implementing the IHO Colour & Symbol Specifications (C&SS), and the mariner in using them. These consist of:

A. Software to convert CIE to RGB colour coordinates, following colour calibration of the CRT monitor to be used for the ECDIS display. (Note that this applies only to CRT calibration. LCD calibration is still under development.)

B. An ECDIS Chart 1, as pseudo S-57 files, to help familiarise the mariner with the colour and symbol coding used by ECDIS and to aid in picking the appropriate symbol for manual chart correction. (Note that the digital version of the ECDIS Chart 1 described here will be available in edition 3.3 of the Presentation Library, but may not be updated in the future. The ECDIS Chart 1 is also presented in section ~~15.2~~16.2 of the word-processed Presentation Library.)

C. A Colour Differentiation Test Diagram, as an S-57 file, to enable the mariner to test whether his screen is still capable of differentiating the main colours used in ECDIS, and also to assist him in setting the brightness and contrast controls. (This digital version of the colour differentiation test diagram should be supplied with the ECDIS because the diagrams are intended to test

whether an aging ECDIS screen is still capable of showing colour differences clearly.)

~~19.2~~ 18.2 Software to Convert CIE Colour Coordinates to RGB values for a specific CRT Monitor

~~19.2.1~~18.2.1 Introduction

This software is intended for processing:

(a) the initial CIE to RGB calibration described in section 4.1.6 and Annex B section 1 of the C&SS, and

(b) the calibration verification described in section 5.2.3 and Annex B section 4 of the C&SS

The software is provided to avoid every user having to code the algorithms given in Annex B. Other equivalent software may be used if preferred.

~~19.2.2~~18.2.2 CIE~~2~~ to RGB Calibration Routine

See section B 6.0 of Annex B to the C&SS.

~~19.2.3 CHECKXYL~~ 18.2.3 CHECK XYL Calibration Verification Utility

See section B 6.1 of Annex B to the C&SS.

~~19.2.4~~18.2.4 Software Files

The software files are to be found on the Presentation Library CD-Rom. See README file on CD-Rom for details.

Note: the 'get-started' RGB colour tables have been deleted.

~~19.3.~~18.3. Specification for ECDIS Chart 1 and the Colour Test Diagram

~~19.3.1~~18.3.1 Definition (for this specification only)

A "display" means a Chart 1 data cell displayed so as to fill all of the standard ECDIS display area.

~~19.3.2~~18.3.2 Description and purpose

The ECDIS Chart 1 and the Colour Differentiation Test are diagrams for use by the mariner which are provided in the form of ENC-like S-57 files, using the SYMINS attribute of the generic object NEWOBJ introduced by the Supplement No. 1 of S-57 Edition 3.1.1.

The ECDIS chart 1 is intended to familiarise the mariner with the symbology used on ECDIS. He should be able to display each cell, and by cursor-pick get a read-out of the meaning of any symbol shown.

The Colour Differentiation Test diagram is intended for display using the day or dusk colour tables so that the mariner can check that the ECDIS monitor is providing adequate colour performance. It is also used in type-approval testing. Instructions for its use are given in section ~~19.4~~18.4 of the Presentation Library.

~~19.3.3~~18.3.3 Mode of use

These diagrams are supplementary features of the ECDIS, intended for use off-line or during route planning. Because they occupy the entire display and also require a special look-up table they should not be used during route monitoring. If the mariner needs to find the meaning of a symbol during route monitoring, he should use cursor-picking.

The operation of these diagrams is not subject to the draw-speed requirements of route monitoring.

~~19.3.4~~18.3.4 Content and ~~encoding~~Encoding

The Chart 1 / Colour Test package consists of the thirteen S-57 cell files described below. The S-57 files of the ECDIS Chart 1 consists of eleven detail cells and an the index cell. The detail cells contain all of the symbols used on ECDIS, excluding Mariners' Navigational Objects, plus some explanatory diagrams. They are organised in displays that follow the classification used for INT 1 [1] for the paper chart (e.g. the first display is "AB - Information about the chart display.") Note that the symbols for mariners navigational objects are no longer under IHO responsibility since they have moved to ~~IE~~IEC 62288 [~~3~~8] and are therefore no longer part of the digital version of Chart 1. A selection of Mariners navigational objects however are still depicted under paragraph 15 of this document.

The S-57 file of the Colour Differentiation Test Diagram consists of one display cell (C1WOO) containing twenty squares, each with a different background/foreground colour combination.

The cells are identified as follows:

cell code	INT 1	Name	comp. Scale	"N"
C1AB1	AB	information about the chart display	1/14 000	5
C1AB2	AB	information about the chart display	1/14 000	5
C1CDE	CDE	natural and man-made features	1/14 000	5
C1FOO	F	port features		
C1HIO	HI	depths, currents etc.	1/14 000	5
C1JKL	JKL	seabed, obstructions, pipelines etc.	1/14 000	5
C1MOO	M	traffic routes	1/14 000	5
C1NOO	N	special areas	1/14 000	5
C1PRS	PQRSTU	aids and services	1/14 000	5
C1QO1	Q	paper chart buoys and beacons	1/14 000	5
C1QO2	Q	topmarks	1/14 000	5
C1WOO	-	colour differentiation test diagram	1/14 000	5
C1XOO	-	index covering all of above detail cells excluding Mariners navigational objects	1/42 000	4

The file name uses the IHO Producer Code (AA), followed by the navigational purpose and the individual cell code given above. Revision will be by new edition (see section ~~3.6~~19.3.6 below), and so the update number is always ".000". An example of a full file name is:

"AA5C1AB1.000"

Spatially, the "harbour" scale Chart 1 detail cells ("N"=5) are laid out in a 3 x 3 matrix with the Colour Test display cell below (to the south), and all are covered by the index cell on the "approach" scale ("N"=4). They are located in the West African desert at 15 degrees north, 5 degrees west, where there should be no danger of their being called up as real chart cells (unless river traffic on the R. Niger above Timbuktu increases drastically.)

The EN Application Profiles of S-57 Appendix B1 are used, with arbitrary values entered for certain items (such as vertical datum) which do not apply to Chart 1. (This is done to minimise the changes to ECDIS software needed in order to process these special purpose Chart 1 files in an ECDIS.)

The IHO agency code (1810) is used in the AGEN sub-field of the DSID field, and the PRSP field is given the value {3} to distinguish it from the values used for the ENC Product Specification.

~~19.3.6~~18.3.6 Revisions

Revisions will be made by whole file replacement, ie by issuing a new edition, as indicated in the EDTN sub-field of the DSID field.

~~19.3.7~~18.3.7 Packaging

The pseudo S-57 data files are part of the Digital Presentation Library.

~~19.3.8~~18.3.8 Presentation

The Chart 1 files are symbolized by the NEWOBJ look up table entries triggered by the SYMINS attribute of the generic object NEWOBJ introduced by the supplement No. 1 of S-57 Edition 3.1.1.

The README files give some specific mariner settings, such as safety contour, that are required to give the correct display.

The Chart 1 and Colour Test diagram cells should be displayed full-screen (270 x 270 mm., or preferably 350 x 270 mm), i.e. at or larger than the compilation scale. Otherwise features such as centred symbols may not be correctly illustrated.

The mariner should be able to cursor-pick on any symbol on the Chart 1 display and get a text read-out of the symbol meaning (LXPO field of the symbol library).

~~19.4.~~18.4 Displaying the Colour Test Diagram

~~19.4.1~~18.4.1 Introduction; providing the diagram

The colour generating capability of any type of display screen will deteriorate with age and the Colour Differentiation Test diagram is provided to enable the mariner to verify that his display screen still retains the colour differentiation capability needed to distinguish between the various colour-coded areas, lines and point symbols of the ECDIS display.

The diagram will not be true to colour unless it is projected on a calibrated monitor and is generated using the colour tables of section ~~13.1.~~15.1.

Two methods of providing the diagram are:

a) Use the S-57 format file labelled "C1WOO" containing the Colour Differentiation Test Diagram, which is included on the Presentation Library distribution CD. This file should be drawn so that the extent of the imaginary chart data covers the entire ECDIS display. Because the file uses pseudo-S-57 cartographic objects it must be displayed using the special look-up provided for the digital ECDIS Chart 1.

b) Use the graphics file illustrated in section ~~15.4~~17.3 as a model. Based on this model reproduce the same pattern of rectangles and lines on the screen, but present them in the correct colours using the colour tokens given immediately below and the colour tables of section ~~13.1.~~15.1.

The diagram consists of twenty numbered squares extending over the whole of a 350x270 mm (approx) screen. Each square is coloured with one of the four main background area shades (such as shallow water blue, DEPVS), and each carries a two-pixel wide diagonal line in one of the important line or symbol foreground colours (such as planned route red, PLRTE). These are arranged as follows:

Four main background colours:

DEPVS	(shallow water blue)	squares 3, 5, 11, 15, 18, 20.
DEPDW	(deep water, white or black)	squares 1, 7, 8, 10, 13, 19.
LANDA	(land colour)	squares 6, 14, 17.
NODTA	(no data shade: radar, navigation safety lines and chartwork should be visible on the no-data part of a display)	squares 2, 4, 9, 12, 16.

Six important foreground colours:

DEPSC	(safety contour grey)	squares 3, 10, 17.
NINFO	(orange, mariner's information)	squares 5, 8, 14, 16.
ADINF	(yellow, manufacturer's information)	squares 12, 15, 19.
TRFCD	(magenta, traffic lanes and area boundaries)	squares 1, 9, 11.
RADLO	(the lower luminance radar green)	squares 4, 6, 13, 18.
RESBL	(blue, provisionally reserved for traffic info from transponder, VTS etc.)	squares 2, 7, 20.

Note: Remember that a tif, .pdf or other source will not be true to colour unless it has been specifically modified to access the colour tokens and colour tables used by the ECDIS.

Although originally designed for use on CRTs, this test should be extended to LCD and other screens.

~~19.4.2~~18.4.2 Using the diagram

The Colour Test should be applied on the day and dusk colour tables.

Before the Colour Test diagram is used, the black-adjust symbol SY(BLKADJ) should be brought up on the screen and the contrast and brightness controls (or equivalent controls for an LCD) should be adjusted as follows:

- 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, ie 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.

~~19.5~~18.5 Grey Scale

A grey scale may be used by CRT technicians to detect differential gun ageing from the colour fringes that will be seen if this occurs. It should also be applicable to other types of monitor.

It can also be used as a more sensitive method of setting the controls, in order to avoid losing information at night. The controls should be set so that the black strip is just visible.

Eight grey strips are recommended, spaced logarithmically between the minimum and the maximum luminance for each of the five mandatory colour tables. A thin strip of background colour between each strip will avoid the appearance of ridging at strip junctions.

Supply and Amendment of the Digital Presentation Library

The word-processed version of the Presentation Library is the "official" version. A limited digital version in .dai format is provided on the CD-ROM containing the word-processed Presentation Library as a manufacturer's option for edition 4.0, but may not be provided for succeeding editions. This digital version consists of look-up tables; symbols; and colour tables and is supplied in ASCII format in the .dai file.

The edition number appears in the LBID line at the start of the .dai file where it is coded digitally and also spelled out in plain language.

19.1 Amending the digital Presentation Library

(See also Colour & Symbol Specifications sections 1.2.3 and 1.2.4)

Amendments to the Presentation Library, if available, will be posted on the IHO website (www.iho.shom.fr > Publications > Download List).

An immediate amendment (but not a deferred amendment) will change the edition number of the Presentation Library.

The edition number of the PresLib installed should be available to the mariner on request.

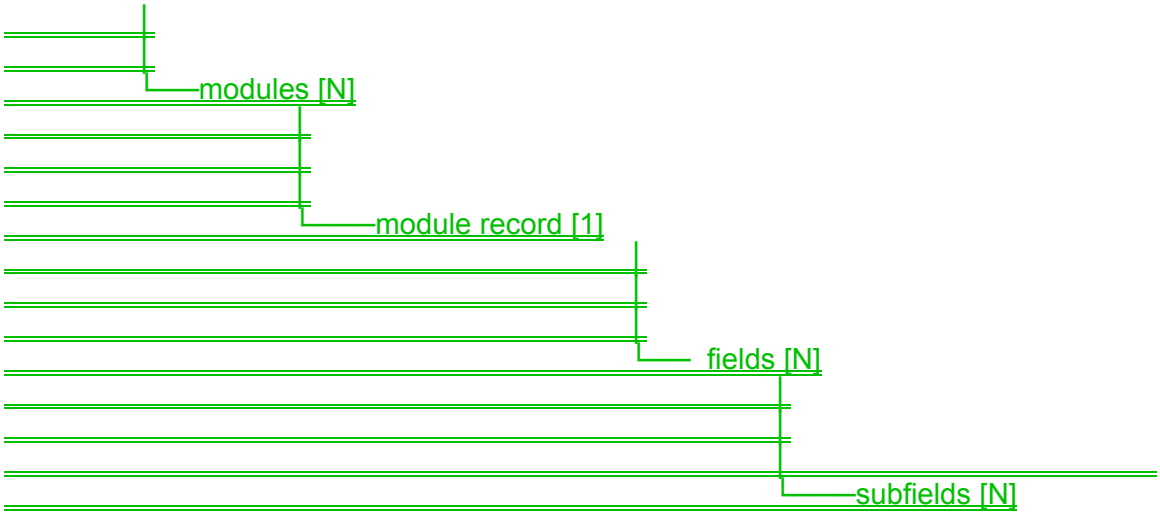
19.2 Internal Structure of the Transfer File

The PSLBmm_n.dai file has a particular internal structure. In the format description (see section 12), several constructs (modules, fields, etc.) are used to convey colour tables, look-up tables, symbols, patterns and linestyles.

The transfer file is formed of one or more modules. Each module is formed of one module record. Each module record is formed of one or more fields which in turn is formed of one or more subfields.

This structure is explained below:

PSLBmm_n.dai (module group)



The lowest level construct, the subfield, must only contain one elementary data item, for example, one colour coordinate or one symbology instruction. Formatted subfields, such as the subfields that contain the vector image definitions, must be further resolved by an application program. In this specification, subfields are not divisible.

The field tag is a unique 4 character field type which links an instance of a field type in a data record to the data descriptive record that defines the syntax of that field type.

The subfield label is a 4 character label, present only in the data descriptive record of a file, required to identify the subfields within a field type. A label preceded by an "*" signifies that that subfield, and any subsequent ones, repeat within the field. This, therefore, indicates the presence of an array or table, for which the subfield labels provide the column headings.

Subfield data type codes uses data types as follows:

- **A** signifies character data,
- **I** signifies implicit point representation (integer),
- **R** signifies explicit point representation (real or float),

An extent of X(n) indicates a fixed length subfield of length n. An extent of X(1/15) indicates a variable length subfield terminated by the delimiter "1/15" (that is ASCII 1F hexa-decimal or 31 decimal).

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Legend:	
Insertion	
~~Deletion~~	
~~Moved from~~	
Moved to	
Style change	
Format change	
~~Moved deletion~~	
Inserted cell	
Deleted cell	
Moved cell	
Split/Merged cell	
Padding cell	

Statistics:	
	Count
Insertions	5432
Deletions	8090
Moved from	121
Moved to	121
Style change	0
Format changed	0
Total changes	13764