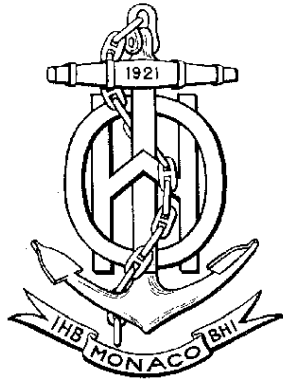


INTERNATIONAL HYDROGRAPHIC ORGANIZATION



IHO ECDIS PRESENTATION LIBRARY

Edition 3.4, January 2008

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

Special Publication No. 52
ANNEX A of APPENDIX 2

published by the
International Hydrographic Bureau
4, quai Antoine I^{er}
B.P. 445 - MC 98011 MONACO Cedex
Principauté de Monaco
Tel : (377) 93.10.81.00
Fax : (377) 93.10.81.40
E-mail: info@ihb.mc
Website: www.iho.int

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.

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

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

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

Page intentionally left blank

CHANGE CONTROL HISTORY & GRACE PERIODS

The history of the previous changes to the C&S Specifications and the Presentation Library is as follows:

Notes: MD stands for IHO Maintenance Document [11]

IA stands for Immediate Amendment

DA stands for Deferred Amendment

1. Colours & Symbols Specifications (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)

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)
- 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 Description of symbolisation methods,
sections 9 & 10 Description of the digital Presentation Library.

TABLES AND SYMBOLISATION PROCEDURES

section 11 Look-up Tables,
section 12 Conditional Symbology Procedures,
section 13 Colour Tables, Viewing Groups and Text Groups,

SYMBOL LIBRARY AND SYMBOL PLOTS

section 14 Symbol Library, description (detailed specifications in Addendum)
section 15 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.

PART II¹:

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-S57 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
- CRT calibration software.

¹ To be superseded by IEC standards 61174, 3rd edition, and 62288, 1st edition, when they are published.

Page intentionally left blank

PART I

USERS' MANUAL

TABLES AND SYMBOLISATION PROCEDURES

SYMBOL LIBRARY AND SYMBOL PLOTS

REFERENCES AND NOTES

Page intentionally left blank

CONTENTS

	Page
1. INTRODUCTION.....	1
1.1 Status of the Presentation Library	1
1.2 S-57 and the Presentation Model for ECDIS	2
1.3 Structure of the Presentation Model for ECDIS	2
1.4 Supply and amendment of the Presentation Library	3
2. BASIC CONCEPT OF A 'DISPLAY GENERATOR' FOR AN ECDIS SYSTEM.....	4
3. THE ELEMENTS OF THE PRESENTATION LIBRARY - AN OVERVIEW	6
3.1 The Colour Coding Scheme	7
3.2 The Library of Symbols, Fill Styles and Line Styles	7
3.3 Symbology Instructions	8
3.4 Conditional Symbology Procedures.....	8
3.5 The Look-Up Tables and other symbolizing instructions.....	9
3.6 Mariners' ECDIS Chart 1 and Colour Differentiation Test diagrams.....	10
3.7 Catalogue of Mariners' Navigational Object Classes	10
3.8 Test Edition of the Presentation Library.....	10
4. DESCRIPTION OF THE COLOUR CODING SYSTEM.....	11
4.1 The Colour Scheme	11
4.2 Notes on the Sections of the Colour Scheme	13
5. THE VECTOR SYMBOL DESCRIPTION LANGUAGE.....	17
5.1 Size and Orientation of a Vector-Symbol.....	19
5.2 Usage of a Complex Line Style	20
5.3 Samples of Formats	22
5.4 Colours and Descriptions for Symbols.....	26
6. THE RASTER-SYMBOL DESCRIPTION FORMAT.....	27
7. DESCRIPTION OF THE SYMBOLOGY INSTRUCTIONS	27
7.1 Symbology Instruction for Text Labels.....	29
7.2 Symbology Instruction for Point Objects.....	34
7.3 Symbology Instruction for Line Objects	35
7.5 Calls to Conditional Symbology Procedures.....	44
8. SOME DETAILS FOR THE DESIGNER OF THE ECDIS DISPLAY GENERATOR.....	46
8.1 Data Consistency Requirements	46
8.2 Display Generator Requirements	46
8.3 How to use the Look-Up Tables	47
8.4 Display of objects depending on date or on display scale.....	56
8.5 IMO presentation nstructions which cannot be handled by Look-up Tables.....	57
8.6 HO-specified display features.....	59
8.7 Displaying of manual and automatic updates and added chart information	61
8.8 Cursor Pick and interface panel display	63
9. SUPPLY AND AMENDMENT OF THE DIGITAL PRESENTATION LIBRARY.....	65
9.1 Amending the digital Presentation Library	65
9.2 Internal Structure of the Transfer File	65
10. DIGITAL PRESENTATION LIBRARY FORMAT DESCRIPTION	66
10.1 Format of the Library Identification Module	67
10.2 Format of the Look-Up Table Entry Module.....	68
10.3 Format of the Symbology Procedure Module	70
10.4 Format of the Colour Table Module	71
10.5 Format of the Pattern Module.....	72
10.6 Format of the Symbol Module	76
10.7 Format of the Complex Linestyle Module	79
11. LOOK-UP TABLE LISTINGS	82

11.1	Look-Up Table Listing for Object Type Point 'P'	82
11.2	Look-up Table Listing for Object Type Line 'L'	97
11.3	Look-up Table Listing for Object Type Area 'A'	102
12.	SYMBOLOLOGY PROCEDURE DIAGRAMS	114
12.1	Introduction	114
12.2	Conditional Symbology Procedures	118
13.	TABLES 204	
13.1	Colour tables	204
13.2	Viewing groups	208
13.3	Text groupings	218
13.4	Abbreviations	218
14.	SYMBOL LIBRARY FOR USE ON ECDIS	Error! Bookmark not defined.
14.1	Introduction	Error! Bookmark not defined.
14.2	Symbol Diagrams	Error! Bookmark not defined.
14.3	Particular Instructions for symbolising points	Error! Bookmark not defined.
14.4	Particular Instructions for symbolising lines	Error! Bookmark not defined.
14.5	Particular Instructions for symbolising areas	Error! Bookmark not defined.
14.6	Examples of symbol diagrams	Error! Bookmark not defined.
15.	ECDIS CHART 1, SYMBOL PLOTS & COLOUR TEST DIAGRAMS	Error! Bookmark not defined.
15.1	Introduction	Error! Bookmark not defined.
15.2	ECDIS Chart 1	Error! Bookmark not defined.
15.3	List of symbol names & meanings arranged numerically	Error! Bookmark not defined.
15.4	Colour Differentiation Test Diagram	Error! Bookmark not defined.
15.5	Plots of symbols arranged alphabetically	Error! Bookmark not defined.
15.6	List of symbol names & meanings arranged alphabetically	Error! Bookmark not defined.
16.	REFERENCES	Error! Bookmark not defined.
18.	CONTENTS OF THE DIGITAL PRESENTATION LIBRARY DISKS AND CD-ROM	Error! Bookmark not defined.
18.1	Digital Presentation Library	Error! Bookmark not defined.
18.2	Test Edition of the Presentation Library	Error! Bookmark not defined.
18.3	Look-up Table sets	Error! Bookmark not defined.
18.4	Colour Tables	Error! Bookmark not defined.
18.5	Symbols, Patterns and Linestyles	Error! Bookmark not defined.
18.6	Program LITDSN – Light Description	Error! Bookmark not defined.
18.7	Official Presentation Library	Error! Bookmark not defined.
18.8	ECDIS Chart 1	Error! Bookmark not defined.
18.9	Colour Differentiation Test Diagram	Error! Bookmark not defined.
19.	USE OF COLOUR CALIBRATION SOFTWARE, DIGITAL CHART 1, & COLOUR TEST DIAGRAM	Error! Bookmark not defined.
19.1	Introduction	Error! Bookmark not defined.
19.2	Software to Convert CIE Colour Coordinates to RGB values for a specific CRT Monitor	Error! Bookmark not defined.
19.3.	Specification for ECDIS Chart 1 and the Colour Test Diagram	Error! Bookmark not defined.
19.4.	Displaying the Colour Test Diagram	Error! Bookmark not defined.
19.5	Grey Scale	Error! Bookmark not defined.

Page intentionally left blank

USER'S MANUAL

1. INTRODUCTION

This manual is intended to explain the IHO ECDIS Presentation Library to the manufacturer, and to help him to use the library. Therefore, it provides the software developer with the information he needs to translate the relatively abstract description of an S-57 [7] object 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 manual 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.

Sections 2 and 3 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 4 onwards.

Note that the Presentation Library does not cover all aspects of the ECDIS display. Therefore the IMO Performance Standards as well as the C&S Specifications and IEC publication 61174 [9] must also be studied. The IHO Test Data Sets (S-64) [13] will also be useful when testing ECDIS software.

1.1 Status 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.

1.2 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) [7]. 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: "The presentation of this information may vary to suit a particular use (e.g., it may be presented either graphically, using symbols, or in 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, how real world information should be displayed for a specific application. ... "

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" [3] and the IHO "Specifications for Chart Content and Display Aspects of ECDIS", IHO Special Publication No.52 [4]. 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.

1.3 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 a programmable structure, which serves as a functional model for the graphic of 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**".

1.4 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. 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 should 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 the look-up tables, colour tables and symbol library.
- .2 the narrative and diagram conditional symbology procedures in Nassi- Shneiderman form, together with symbolizing instructions (in section 8) for special IMO and IHO requirements which are needed to complete the symbolizing of an ENC,
- .3 further information needed for implementing the above in a display generator (in sections 1 to 8).

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

- .1 a 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) [12].
- .2 the 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) [13]. A subscription may be required.

Note that only the contents of 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 The .dai file of the Presentation Library, consisting of look-up tables; symbols; and colour tables.

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

Also note that the "Test Edition Version" of the .dai file 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 9 and 10, and the contents of the files are described in more detail in section 18.

- .2. A "C" program LITDSN for generating light descriptions,
- .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 [2] for paper charts
 - S-57 files containing combinations of foreground and background colours as line and area geometries.
- .4 Colour calibration software.

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

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

The 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 performs the link between the 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 shows 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 the ECDIS manufacturer writes software linking these elements. Please note, that section 8 of this manual gives further details that are of interest to the programmer.

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.

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).

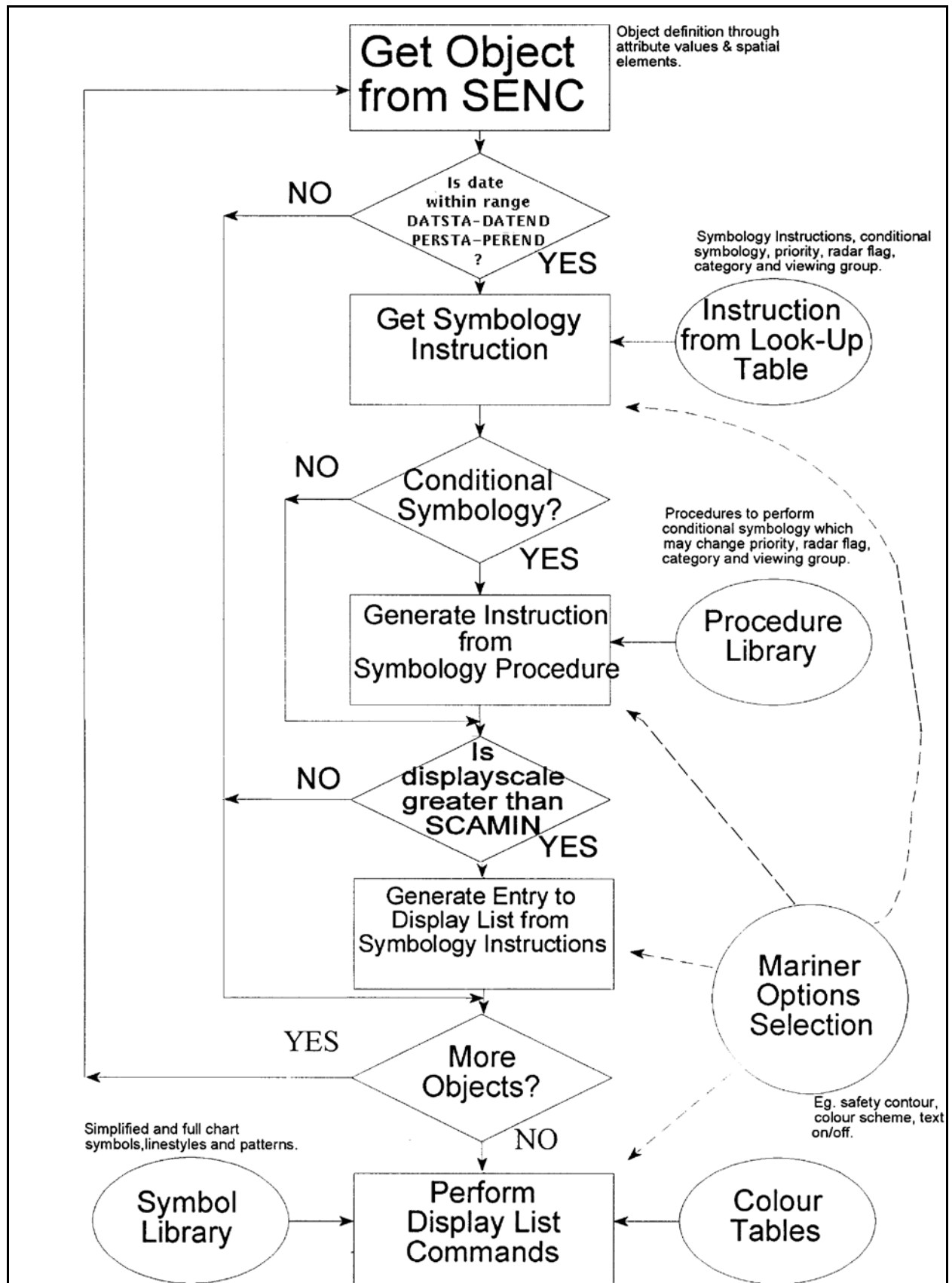


Fig. 1 - Display generator concept

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:

- If he selects, e.g., another safety contour, the display list is 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 DEPART (depth area);
- 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

The Presentation Library consists currently of seven elements:

1. A library of symbols, line styles and fill styles
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)
3. A colour coding scheme which includes the IHO colour tables for day and night time
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.
5. A set of look-up tables that link object description from the SENC database to the appropriate symbology instructions depending on whether:
 - a) 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 circumstances, 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 that 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).
7. A catalogue of navigational object classes that comprise objects that the mariner may add to the chart in accordance with IEC 61174 [9], IEC 62288 [10] and that cannot be defined by means of S-57. (These are specified in Part II of the Presentation Library)

The following sections give a short description of the elements of the Presentation Library.

3.1 The Colour Coding Scheme

The Presentation Library uses a colour scheme, which classifies colours by their usage (see section 4). Each colour usage is represented by a token that is a five-letter code. 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. 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 4 on how to use colour tokens, section 10.4 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.

3.2 The Library of Symbols, Fill Styles and Line Styles

ECDIS manufacturers should also refer to section 3 of the C&SS [5] 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 symbols for point objects which are generally based on the traditional paper chart symbols. 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 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

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 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 symbols should still be used with symbolized boundaries to symbolize the case when the entire display window lies within an area.

See section 7.4 for symbology instructions and 10.5 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 7.3 for symbology instructions and 10.7 for details of the digital format.

3.3 Symbology Instructions

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

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

Currently there are five types of symbology instructions:

- instructions for line objects
- instructions for area objects
- instructions for point objects
- instructions for text labels
- call to conditional symbology procedure

Symbology instructions are explained in section 7.

3.4 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 instruction. Thus decisions are made by the computer while it is creating the presentation of an object, which affect symbolization and perhaps also 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.

The conditional Symbology Procedures are given in section 12.

3.5 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 night.

There are five look-up tables:

- paper chart point symbols
- simplified point symbols
- line symbols
- plain area boundary symbols
- symbolized area boundary symbols

The manufacturer should 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 object 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 processed by the Display Generator of the ECDIS system.

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 11 and in a machine readable format in the .DAI file of edition 3.3. See 8.3, 10.2 and section 11 for further details.

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

Many display features cannot be handled by look-up tables, generally because they are not discrete S-57 objects and fall between the look-up tables and the conditional symbology procedures. Some examples are the scalebar, the ECDIS chart legend, manual correction identifiers, cursor pick etc. These are described in sections 8.5 through 8.8.

3.6 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 [2], is provided in section 15, 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 15.4 for the diagram and 19.4 for its use.

3.7 Catalogue of Mariners' Navigational Object Classes

IEC 61174 [9] and IEC 62288 [10], 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.

3.8 Test Edition of the Presentation Library

The Test Edition is no longer required in IEC 61174 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

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 used by symbology instructions, symbols, line & fill styles and to enter the colour tables (see section 13) where the colours are identified 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 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.

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 Scheme

This section explains the structure of the colour scheme and the usage of the colour tokens. Note that the colour values themselves are listed in the colour tables of section 13.

General Uses

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

Colour Section I / Chart Contents (31 uses)

<u>Token</u>	<u>Colour, day/night</u>	<u>Usage</u>
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)

<u>Token</u>	<u>Colour</u>	<u>Usage</u>
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)

<u>Token</u>	<u>Colour</u>	<u>Usage</u>
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)

<u>Token</u>		<u>Colour</u>	<u>Usage</u>
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)

<u>Token</u>		<u>Colour,day/night</u>	<u>Usage</u>
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)

<u>Token</u>		<u>Colour,day/night</u>	<u>Usage</u>
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)

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 use in combination with every section of the whole colour scheme:

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 was 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 / Chart Contents

The colours in this section are 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.

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 was 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.

SDNG1 - This colour is used for soundings that are deeper than the selected safety depth ("safe" soundings).

SDNG2 - 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 should use this colour.

DEPDW, DEPMO, DEPMS, DEPVS, DEPIB - These are depth shades. The depth zones are:

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

DEPMO: 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** should be used. At night it may be difficult to distinguish between **DEPMD** and **DEPDW**.

4.2.3 Colour Section II / Radar Image Overlay

4.2.3.1 Radar Overlay

The radar image overlay can be generated by using either one intensity or a range of intensities of the radar colour. The colour for high echo intensity (**RADHI**) should be used in case you show only one intensity. 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, there are two ways of doing this:

- 1) Use "pixel swap" transparency, as described in detail in section 7.4.2.
- 2) by mixing the fill and underlying 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 / Mariners' & Navigation Information

This section provides colours for mariners' notes and navigation info. **SCLBR** is used to generate the scalebar. Hand-entered chart corrections are marked by the colour **CHCOR**. 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.

4.2.6 Colour Section V / Ship Symbol & Planned Route

This section groups colours that apply to the ship symbol and objects associated to it. Own ship symbol, course over ground and speed over ground vector are shown in the colour **SHIPS**. The past track of the main position sensor and a secondary position sensor is 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.). The 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 kept 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

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.

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 two-dimensional cartesian coordinates (x,y). The coordinates are within the range of 0 to 32767 units. Each unit represents 0.01 mm. The origin of the coordinates (location 0,0) is on the upper left corner of the two-dimensional space. Thus x-coordinates extend to the right and y-coordinates extend downwards.

Note that vector symbol definitions described by the vector format are transferred within the 'PVCT/SVCT/LVCT'-fields (see section 10). The vector format uses the following 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 parameter 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.

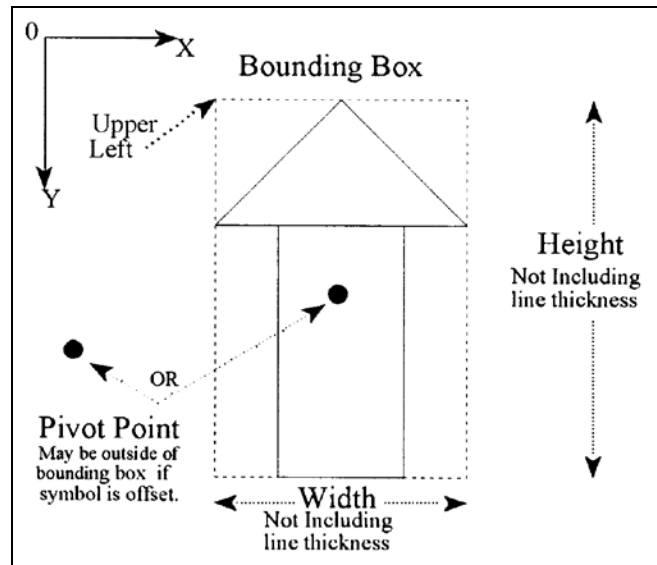
SC**symbol name, orientation**

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.

5.1 Size and Orientation of a Vector-Symbol

For each vector symbol the height and width are given 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 the symbol is placed on the display, 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. For further information about location of the pivot point and the transfer of symbol definitions please see 10.6.

Fig. 2 - Pivot point and symbol information

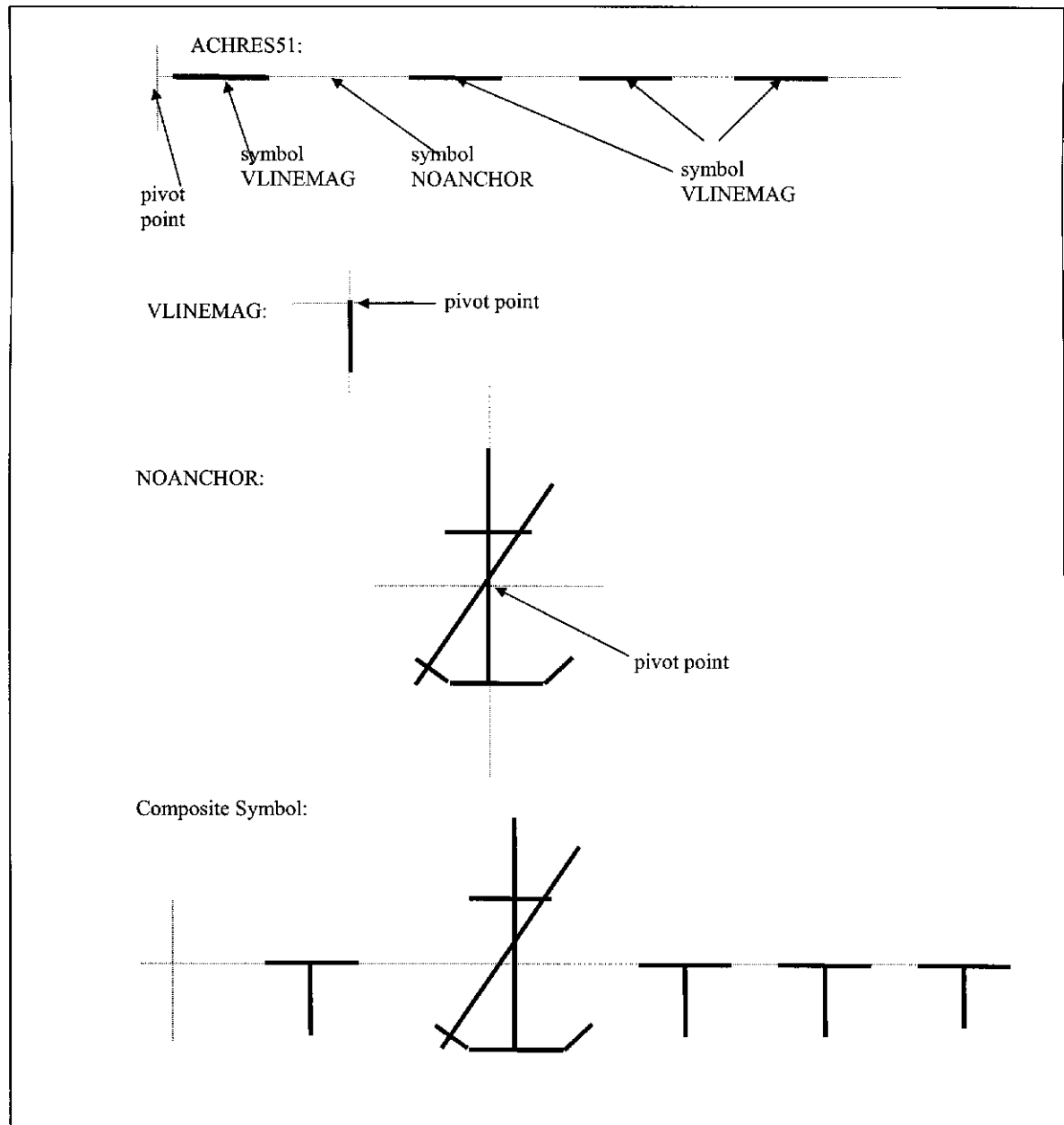
5.2 Usage of a Complex Line Style

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. 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 display.

5.2.2 To symbolize all 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 compose a complex linestyle, 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. 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 shows how the composite symbol is created from the linestyle and the embedded symbols.

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

5.3 Samples of Formats

5.3.1 Sample Definitions 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).

5.3.2 Sample Symbol Library format 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 the complex linestyle achres51.lin LC(ACHRES51) as follows:

Complex Linestyle achres51.lin:

```
LNST      10LS03354NIL
LIND      38ACHRES51001080081002729005030044600572
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;^_

```

(NOTES: The VLINEMAG and NOANCHOR symbols will be imbedded 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;^_

```

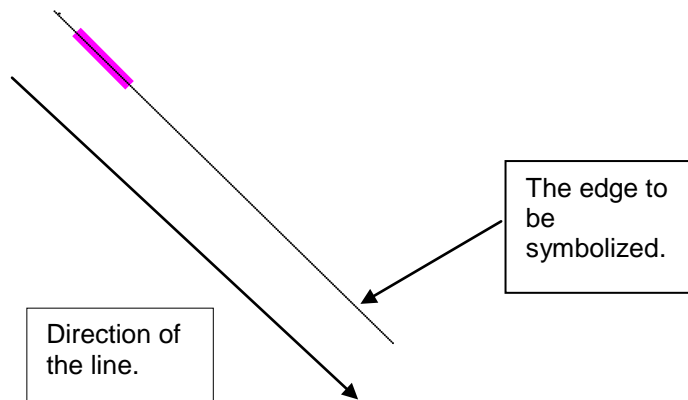
5.3.3 Sample implementation of the composite complex linestyle symbols

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

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

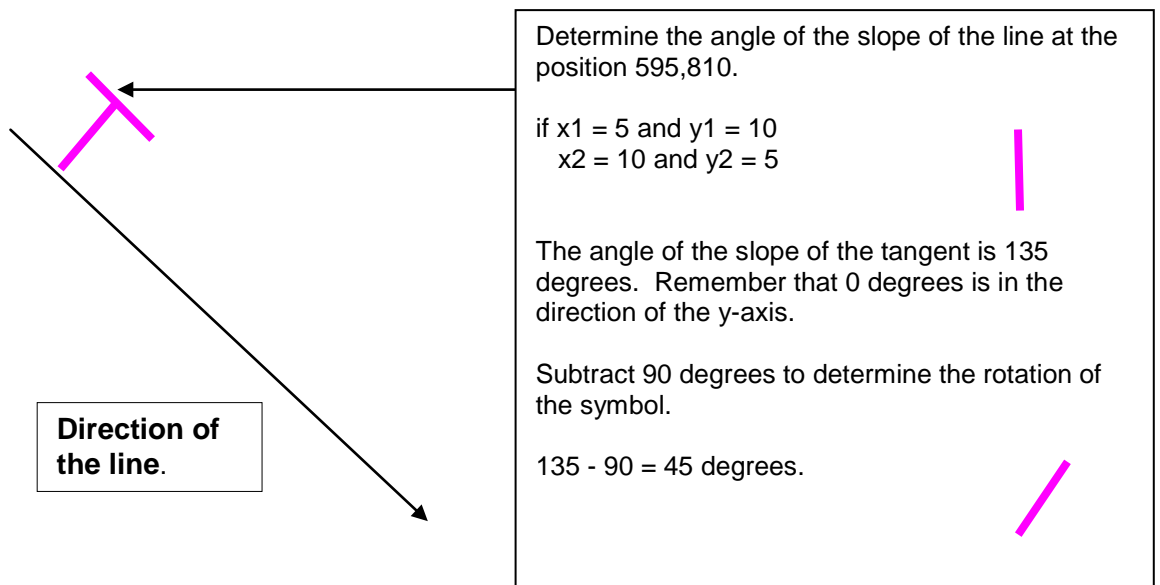
STEP 1: Draw the first straight line segment along the edge of the object.

LVCT 29SPA;SW1;PU446,810;PD747,810;^_



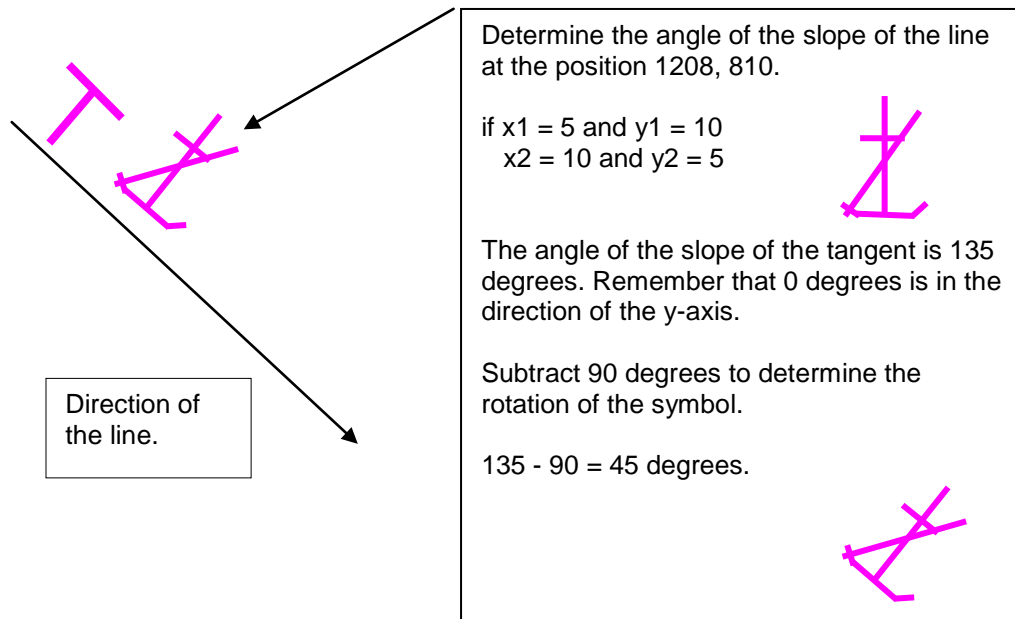
STEP 2: Draw the first LINEMAG symbol at position 595, 810.

LVCT 24PU595,810;SCVLINEMAG,2;^_



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

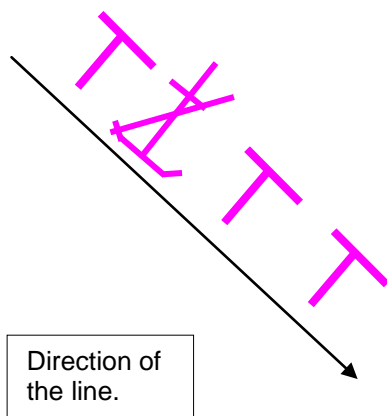
LVCT 25PU1208,810;SCNOANCHOR,2;^_



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

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;^_

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

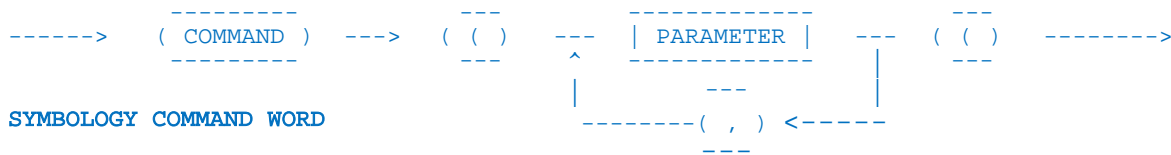
Symbology instructions are used in the look-up table entries to perform the symbolization of objects. Currently there is a choice of five symbology instructions:

- 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".

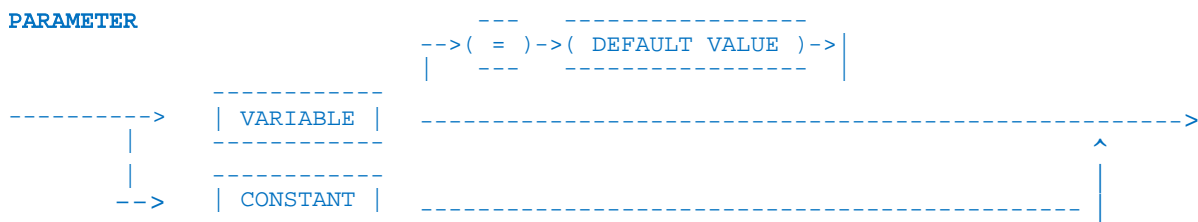
These symbology command words and the symbology instructions formed with them are also used in reading and when necessary revising the word-processed version of the Look-up tables.

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.



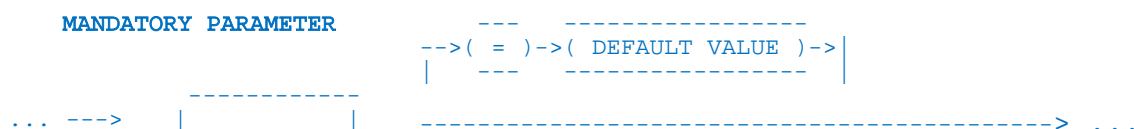
For example, «TSSLPT», «ORIENT», «SY(TSSLPT51,ORIENT) ...» means «orient symbol TSSLPT51 in the direction given by the value of attribute ORIENT.»

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.

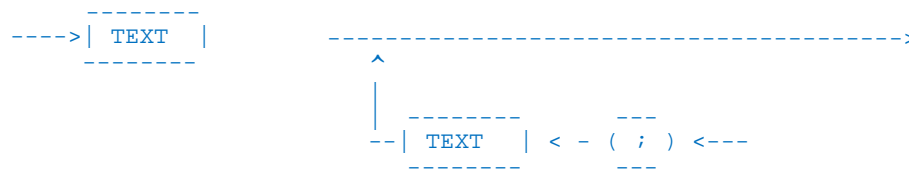
7.1.1 Rotation & Positioning of Text Labels

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

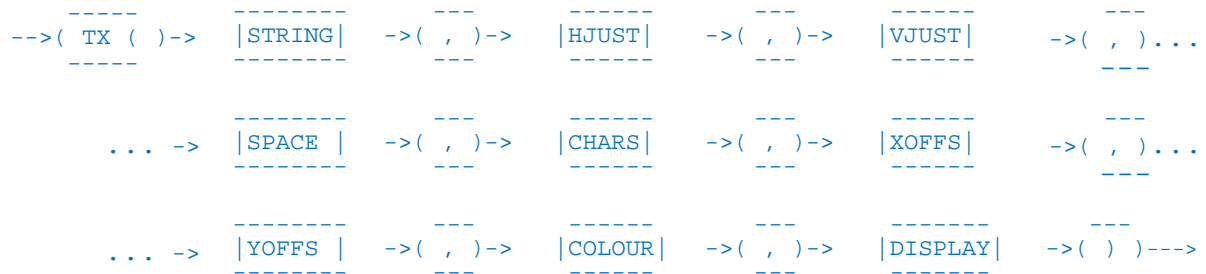
SHOWTEXT instruction (usage: point, line, area objects)



7.1.2.1 TEXT "show text" command word:

Two text command words are used:

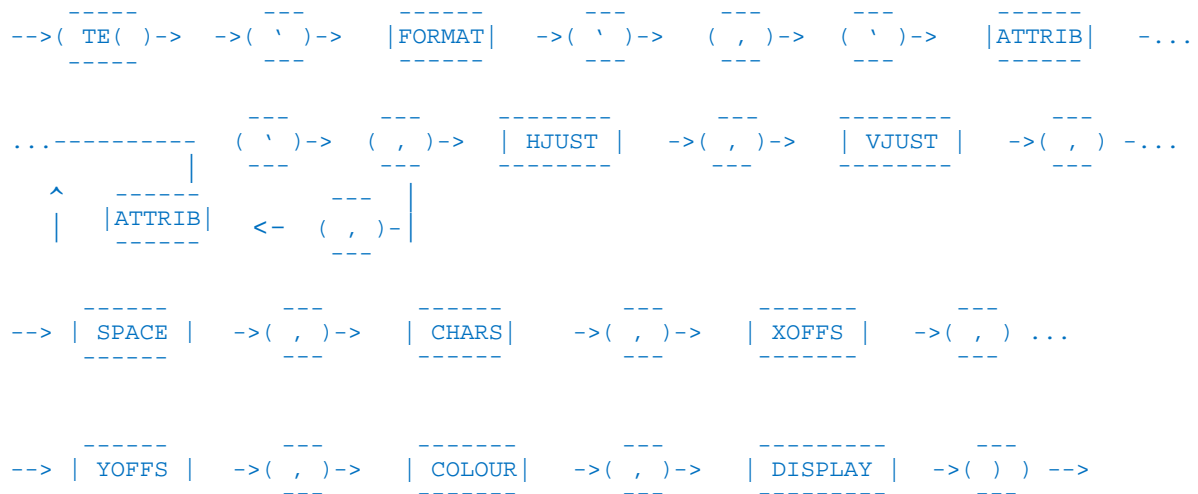
(1.) For purely alphanumeric text, the «TX» command:



(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

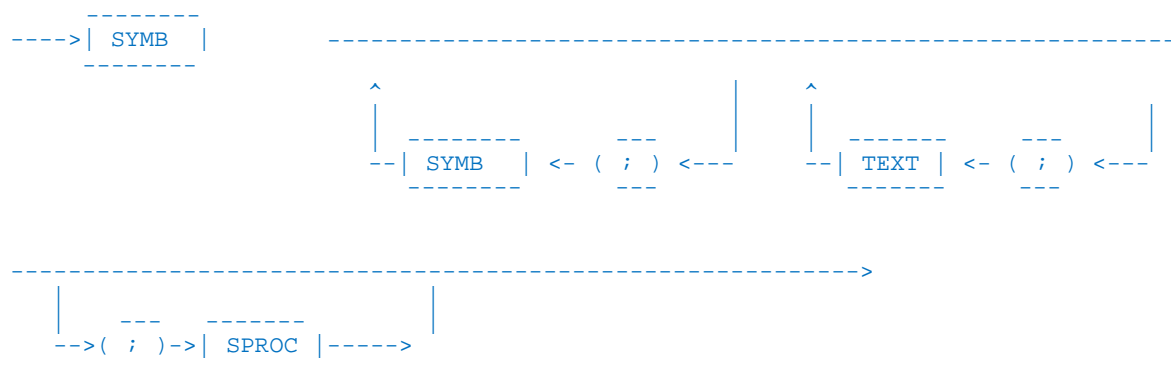
The SHOWPOINT instruction was designed to symbolize point objects. It gets a symbol from the symbol library, places the pivot point of the symbol (see 5.1) or text at the object's position, rotates the symbol if necessary and then displays symbol or text. Note that SHOWPOINT can handle more than one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

```

-----> ( SY( ) -> |SYNAME|
                                     |
                                     ^
                                     |
-----> ( , ) -> | ROTATION | -- |

```

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).

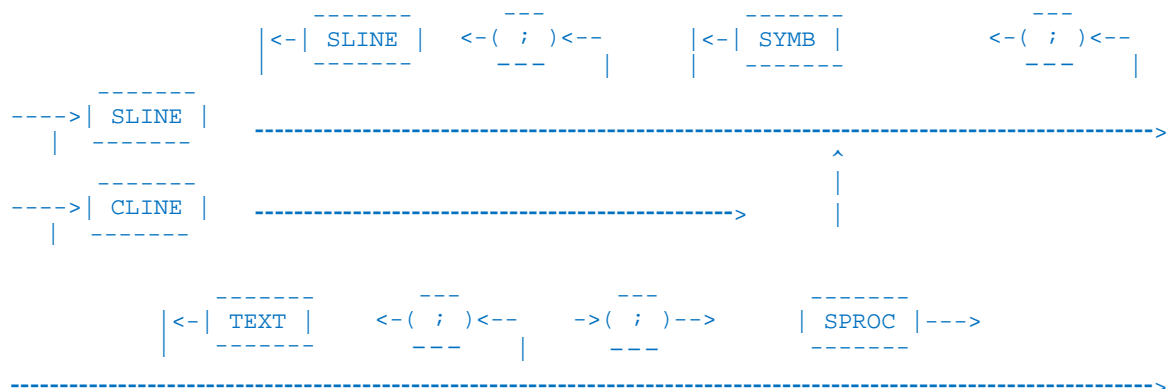
Simple line-styles are used to allow for a variety of basic line-styles without having them defined in the format of complex line-styles. Simple line-styles are based on a solid, dashed or dotted line that can be modified in width and colour. Because of their simplicity they can be 'hard'-coded in the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

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:

```
-->|LS( ) -> |PSTYLE | ->( , )-> |WYDTH | ->( , )-> |COLOUR | - ( ) ) --->
```

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:

```
-->|LC( ) -> |LINNAME| ->( ) ->
    ---          ---          ---
    &
```

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 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.

7.4.1 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. packice)
- 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.

7.4.2 Transparent Fill

A transparent fill can be achieved in two ways:

- 1.) with only a percentage of the pixels having the fill colour (stippled fill);
- 2.) by mixing the fill and underlying colour at each pixel, according to the fill percentage.

Since the second method is not easy to achieve and needs a true colour graphic, the simulation of real transparency by the first method is supported by the Presentation Library. That means e.g. 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% transparency

*	*
*	O

25% transparency

transparency parameter = 0

Transparency parameter = 1

*	O
O	*

50% transparency

*	O
O	O

75% transparency

transparency parameter = 2

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 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 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.

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

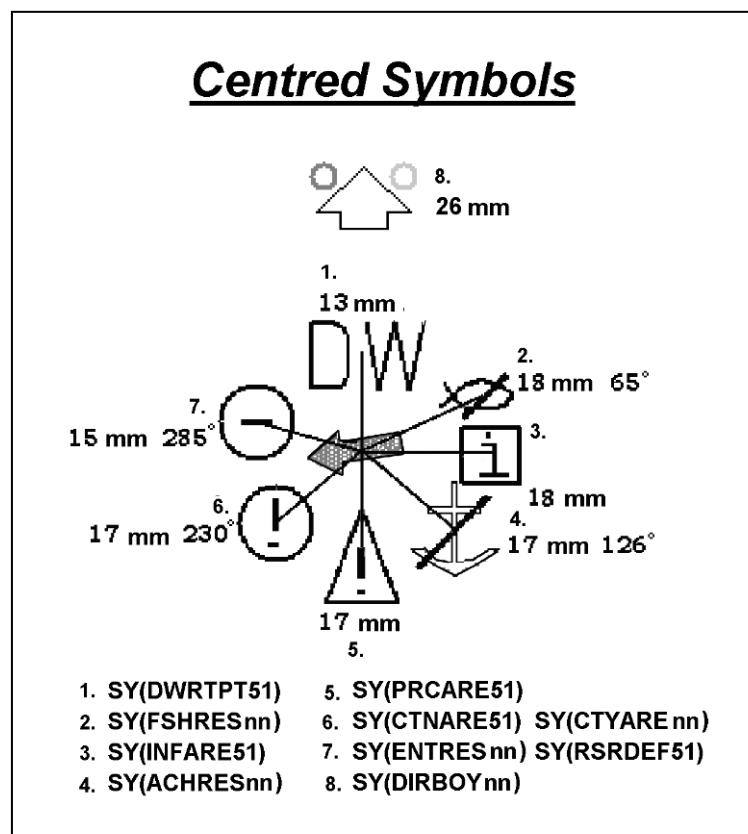
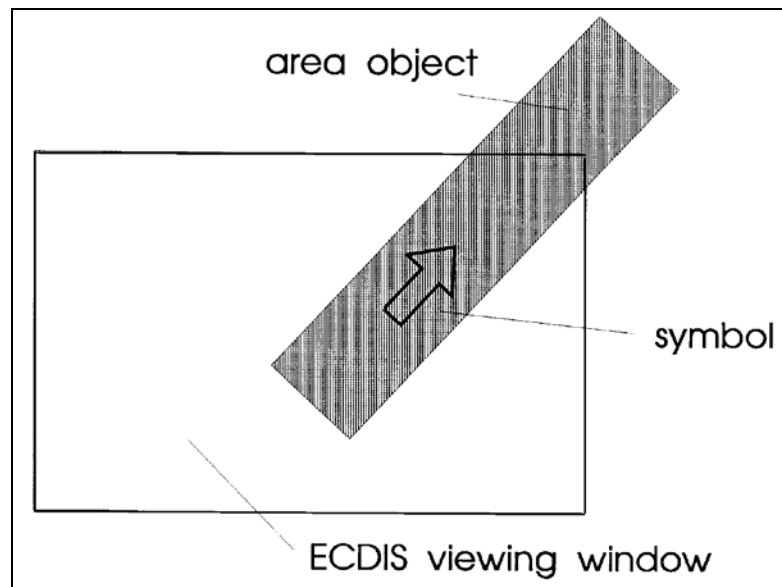


Fig. 4b - Centred symbol

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.

7.4.3.3 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 who uses a ship-centred display to avoid this potentially dangerous situation by keeping any centred area symbols at least 20 mm from the own-ship symbol.

7.4.3.4 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:

$$\text{Area } A = 1/2 \sum_{i=1}^n (X_i Y_{i+1} - X_{i+1} Y_i), \quad \bar{X} = 1/6A \sum_{i=1}^n (X_i + X_{i+1})(X_i Y_{i+1} - X_{i+1} Y_i),$$

$$\bar{Y} = 1/6A \sum_{i=1}^n (Y_i + Y_{i+1})(X_i Y_{i+1} - X_{i+1} Y_i),$$

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

7.4.4 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:



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):

<pre> # # # # # # </pre>	Linear type with constant space = 0	<pre> # # # # # </pre>	staggered type with constant space = 0
-----------------------------------	--	--------------------------------	---

<pre> # # # # # # # # # </pre>	Linear type with constant space > 0	<pre> # # # # # # # # </pre>	staggered type with constant space > 0
--	--	--	---

Linear type with variable spacing

<pre> # # # # # # # # # </pre>	minimum distance (small area / scale	<pre> # # # # # # # # # </pre>	maximum distance (large area / scale
--	---	--	---

Staggered type with variable spacing

<pre> # # # # # # # # </pre>	minimum distance (small area / scale	<pre> # # # # # # # # </pre>	maximum distance (large area / scale
--	---	--	---

The vertical and horizontal distance between pattern symbols is given in the pattern definition (see section 10.5). 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.

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 Area Boundaries

7.4.5.1 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 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 5.2 about the limitations of symbolized linestyles on curved boundaries.

7.4.5.2 Masked Lines

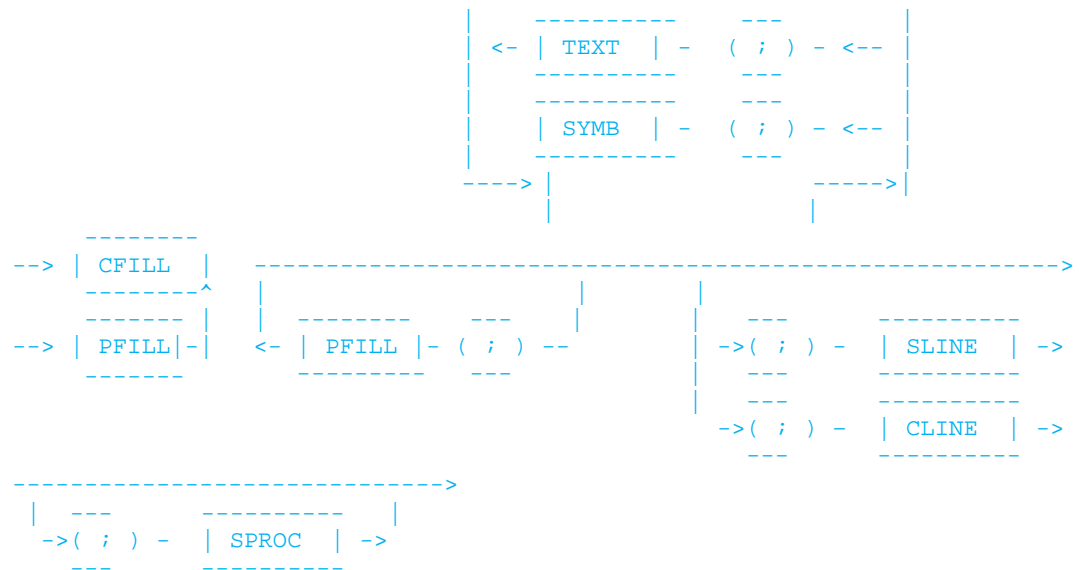
Masked lines (MASK subfield of FSPT field set to {1}) and cell boundary lines (edges encoded with [USAG] = {3}) should not be drawn."

7.4.5.3 (Details of the above)

Note that if an area is 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.

7.4.6 Syntax of the SHOWAREA Instruction

SHOWAREA instruction (usage: area objects)



7.4.7 CFILL 'colour fill' command word



7.4.8 Parameters

COLOUR "area colour" parameter: colour token as described in section 4 and 13.

TRANSPARENCY "area transparency" parameter:

- 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)

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

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

PFILL "pattern fill" command word:

```

-----> ( AP ( ) -> | PATNAME | -----> ( ) )----->
-----
|
-----> ( , )-> | ROTATION | -- ^
-----

```

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 character code of an S-57 attribute can be passed as ROTATION 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:

AC(CHBRN,0) or 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 in bathymetry', no symbol rotation; bordered by a dashed line in 'chart grey', dominant, 0.6 mm width

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

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

7.5 Calls to Conditional Symbology Procedures

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

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»

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

7.5.2 Syntax of a Call to a Conditional Symbology Procedure

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

```

-----
---->|  SPROC  |---->
-----

```

SPROC "symbology procedure call" command word:

```

---
---->(  CS(  )  ->   |  PROCNAME  |   --> (  )  )  ---->
---

```

PROCNAME "symbology procedure name" parameter:

Conditional symbology procedures are named by the object class that is interpreted by the procedure. The name is 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

This section gives program designers some hints which details have to 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 extent.

8.1 Data Consistency Requirements

The quality of the presentation depends very much on the consistency of the data with respect to S-57. 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:

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 Specifications for ENC) they will be treated as members of unknown object classes. There will be no appropriate entry in the look-up tables but even in that case they must be presented on the ECDIS screen in accordance with 8.3.3.7a below. The occurrence of such an object should be recorded during transformation from ENC to SENC as an anomaly and the unknown objects should be displayed as by means of '?'-symbols.

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.

In the perfect world, all mandatory attributes required by S-57 Appendix B1 «ENC Specification» would 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 the data may not always be available and the producer will code the attribute but omit the value to indicate it is 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.

8.2 Display Generator Requirements

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.
- 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.

8.3 How to use the Look-Up Tables

As a fail-safe measure, the first action in drawing the ECDIS display should be to cover the screen with grey NODTA colour fill together with fill pattern NODATA03. Display priority is 0, suppressed by radar, category «displaybase», viewing group is 11050.

8.3.1 Items not in the Look-up Table

A few display requirements of the IMO Performance Standards and the IHO specifications cannot be handled by look-up tables. These are described in section 8.5.

8.3.2 Layout of the Look-Up tables

8.3.2.1 (Details of the above)

The look-up tables specify how object classes are presented graphically on the ECDIS-screen. Each look-up table entry (i.e. look-up table line) contains six fields plus one optional (see section 11, for examples):

- | | | |
|----------|---|-----------------------------|
| 1. field | - | code of the object class |
| 2. field | - | attribute combination |
| 3. field | - | symbolization instruction |
| 4. field | - | display priority |
| 5. field | - | OVERRADAR flag |
| 6. field | - | display category membership |
| 7. field | - | optional viewing group |

8.3.3 Matching to the Look-up Table

8.3.3.1 (Details of the above)

Note that look-up table lines of the same object class must be kept together and the order used 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 is significant (see 8.3.3.3).

8.3.3.2 (Details of the above)

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".

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)

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 attribute A value "i" and attribute B value "j" may be found in the SENC. Only values «i» and «j» will give a match.

Other forms of look-up table line may be used in certain cases:

- (i) No value is given for the attribute value; 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.

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, its 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.

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)

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 called 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 category and/or viewing group.

8.3.3.7a Symbolizing an object of non-ENC object class

If there is no look-up table line 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 '?'-symbol ('QUESMRK1'-symbol, pattern or line style) should be shown as 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.

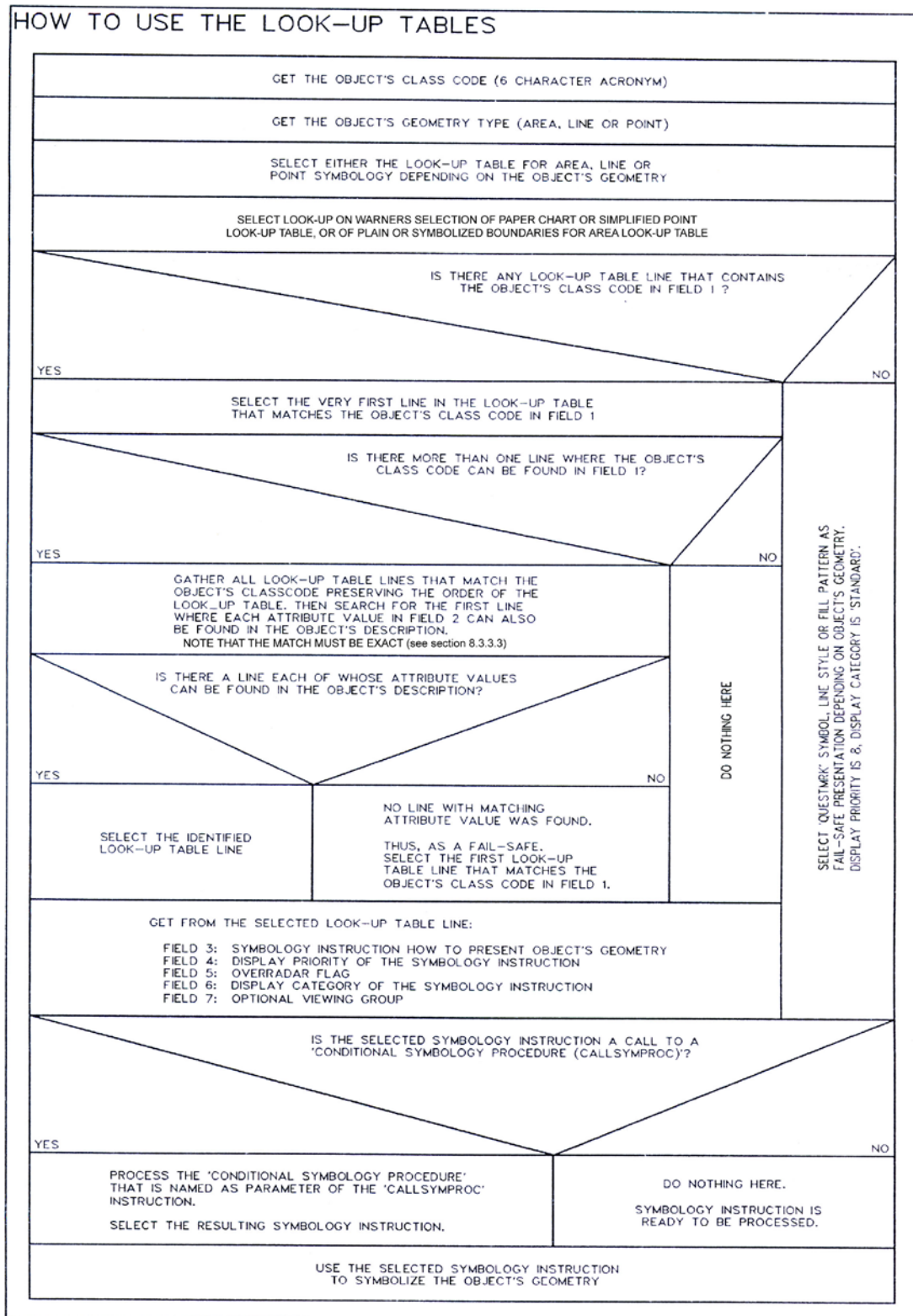
8.3.3.7b Symbolizing an object with non-ENC attributes or non-ENC attribute values

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.

8.3.3.8 (Details of the above)

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)

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 included in the SENC object, this particular command word should be passed over and the rest of the symbology instruction should be completed.

8.3.3.10 'No symbol' - 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. Such objects are not symbolized and they are not shown on the screen. For example, 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. The empty entry into the look-up table is simply for completeness.

8.3.3.11 Presentation of New Object NEWOBJ

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.

8.3.3.11a Default symbol for NEWOBJ

Because 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 appropriate as the default symbolisation. 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 be found under 11.1, 11.2 and 11.3.

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.

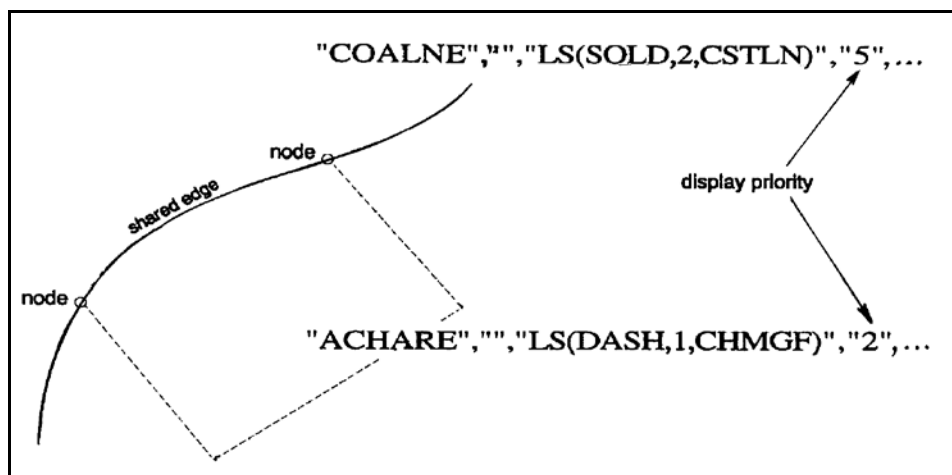
8.3.4 Display Priority, Radar Priority, Display Category, Viewing Group

8.3.4.1 Display Priority

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 presentation scale changes (see 8.4).

Remember, this suppression only applies between line objects, which includes 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 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 that case of buoy, its name, its light flare. These are given offsets in the symbol library to avoid overwriting.

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

no data filled area pattern	priority 0
S-57 group 1 filled areas	priority 1
superimposed areas (e.g. CANALS)	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
hazards (bridge, safety contour)	priority 8
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.

8.3.4.2 'Overradar' layer

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

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 OVERRADAR if field 5 of a look-up table line is empty.

8.3.4.3 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 [3]).

The IMO "display categories" are as follows:

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 [3]).

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

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

Mariners objects

The own-ship symbol and planned route are always required on the route monitoring display by IMO PS 10.5.1, and so must be 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	

8.3.4.4 Viewing 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 13.2 are intended as a framework on which the ECDIS manufacturer can base his own method of providing this capability.

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 13.2 are arranged in numbered groups (e.g. group 26230 consisting of the items pipeline area and cable area) which in turn are arranged in sets (e.g. set 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 [2].

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 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.

8.3.4.5 Display Priority & Display Category in Conditional Symbology Procedures

A conditional symbology procedure is called from the look-up tables (see 7.5). 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 12).

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

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 Display of objects depending on date or on display scale

8.4.1 Date-dependant objects

Some objects, such as seasonal buoys, are only to be displayed over a certain period (PERSTA to PEREND). Other objects, such as a traffic separation scheme, may have a date on which they are introduced (DATSTA) or discontinued (DATEND). Any object with one of the above attributes should not **normally** be displayed outside its effective dates (see figure 1).

However to provide for effective route planning; for look-ahead 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:

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

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 Scale-dependant objects

Some objects (such as intermediate depth contours) may carry the attribute SCAMIN to specify the smallest display scale at which they should 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.

8.5 IMO presentation instructions which cannot be 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.

8.5.3 Scalebar and 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.

8.5.4 North 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.

8.5.5 Graticule:

If the ECDIS shows a graticule (IMO PS [3]) the lines should be one unit wide, CHBLK.

8.5.6 Display mode:

The ECDIS manufacturer should provide the indication of display mode required in the display base by IMO PS [3].

8.5.7 Night-time shallow water indicator:

If the entire water area on the display is of less depth than the safety contour, it will not be possible to detect this problem at night due to the small differences between the depth area shades. 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).

8.5.8 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.

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.

8.6 HO-specified display features

8.6.1 INFORM, etc., National Language

8.6.1.1 (Details of the above)

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. There are a total of five similar universal attributes:

- INFORM + national language NINFOM
- TXTDSC + national language NTXTDS
- PICREP

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 then be able to access the information by cursor-pick. Note that this applies to all SENC objects whether symbolized by look-up table or conditional symbology procedure.

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. Its display priority is 8, overradar, category other, viewing group 31030.

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

8.6.1.2 (Details of the above)

National language information is an optional supplement for ECDIS, and is not covered by the Presentation Library. See S-57 Appendix B1 «ENC Specification» section 3.11 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 (LNAME). 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.

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:

1.	units for depth	DUNI subfield of the DSPM field.
2.	units for height	HUNI subfield of the DSPM field.
Note on 1., 2. – 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 may be stated for the information of unfamiliar users.		
3.	scale of display	Selected by user. (The default display scale is defined by the CSCL).
4.	data 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: due to the way quality is encoded in the ENC, both values (a and b) must be used.		

5. sounding/vertical datum	SDAT and VDAT subfields of the DSPM field or the VERDAT attribute of the M_SDAT object and M_VDAT object. (VERDAT attributes of individual objects must not be used for the legend.)
6. horizontal datum	HDAT subfield of the DSPM field.
7. value of safety depth	Selected by user. Default is 30 metres.
8. value of safety contour	Selected by user. Default is 30 metres.
Note: if the mariner 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 should be quoted.	
9. magnetic 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. date 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. edition 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. chart projection	Projection used for the ECDIS display (e.g., oblique azimuthal).

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.

8.6.4 Light description text strings

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).

8.7 Displaying of manual and automatic updates and added chart information

8.7.1 Manual Updates

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

8.7.1.1 Added 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.

8.7.1.2 Deleted 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 the line symbols LC(CHCRIDnn) and LC(CHCRDELn) should not suppress the underlying line (see section 8.3.4.1).

8.7.1.3 Moved feature:

As for deleted feature, followed by added feature.

8.7.1.4 Modified 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 8.7.1.4 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.

8.7.1.5 Identifying automatic chart corrections on mariners demand

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

8.7.2 Non-HO (non-ENC) chart 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.

8.8 Cursor Pick and interface panel display

8.8.1 **Cursor Pick** < Although this section has been extracted for use in S-100/101, it may be entirely replaced with ideas presented in TSMAD22/DIPWG3-08.4A >>

8.8.1.1 Introduction

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.

8.8.1.2 Interpretation

A plain language explanation of each symbol is included in the Symbol Library and in the Presentation Library section 15. This gives the mariner quick and understandable information which is not always obvious from the object class and attribute information. The manufacturer should 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

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 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.

8.8.1.3.2 (Details of the above)

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

- (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 in the look-up table for symbolizing plus:

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

8.8.1.3.3 (Details of the above)

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.

8.8.1.4 Spatial and meta-objects, collection objects

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.

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

8.8.2.1 (Details of the above)

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.

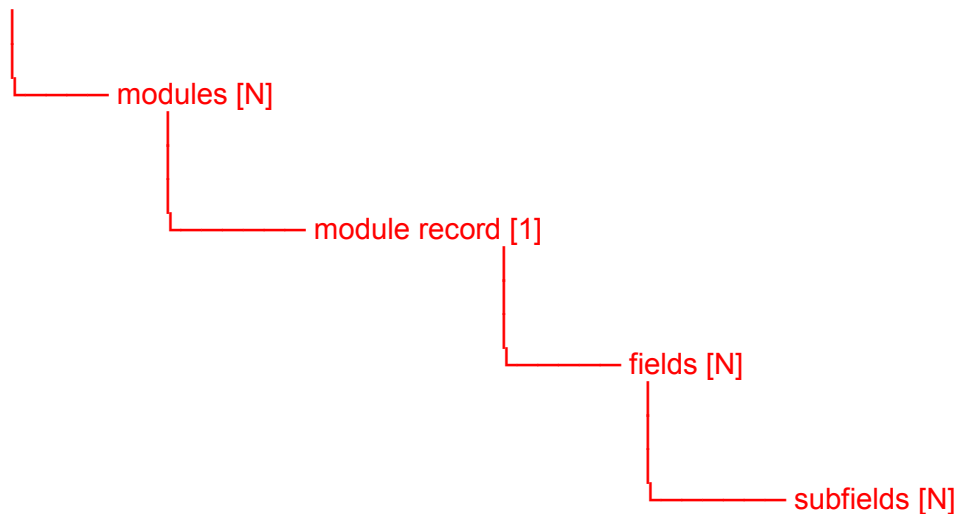
The edition number of the PresLib installed should be available to the mariner on request.

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.

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).

10. 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 "/* ... */".

10.1 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.

10.1.0 'Library Identification' Module

		Module does not repeat.		
--	--	-------------------------	--	--

10.1.1 '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 REVersion 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	*/

10.2 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, for further details).

10.2.0 Look-Up Table Entry Module

	Module does repeat.	
--	---------------------	--

10.2.1 '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 '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 '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 '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 '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	*/

10.3 Format of the Symbology Procedure Module

This section has been deleted because the module has not been developed.

10.4 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).

10.4.0 Colour Table Module

```

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

```

10.4.1 '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'.                                */

```

10.4.2 '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)	*/

10.5 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 7.4.4 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).

10.5.0 Pattern Module

	Module does repeat.	
--	---------------------	--

10.5.1 '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	*/

10.5.2 '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 */

```

10.5.3 '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                                     */

```

10.5.4 '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.                                     */

```

10.5.5 '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. */

10.5.6 'Pattern Vector'- Field (PVCT)

Field does repeat.	Field does not repeat.
Subfield 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.

[illegible]

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.

10.5.8 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 55SAMPLE01VLINCON0050000000005000050001000010000000100001
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 5 for further explanation of the vector symbol description language.

10.6 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).

10.6.0 Symbol Module

```

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

```

10.6.1 '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.                */

```

10.6.2 '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 */

10.6.3 '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).

10.6.4 '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).

10.6.5 '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).

10.6.6 '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 39BCNCAR01R000080001000014000180000000000
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@@@@AAAAAA@@@@▼
SBTM 15@@@@AAAAAA@@@@▼
SBTM 15@@@@AAAAAA@@@@▼
SBTM 15@@@@AAAAAA@@@@▼
SBTM 15@@@@AAAAAA@@@@▼
SBTM 15@@@@@@@@@@@@@@@@▼
SBTM 15@@@@@@@@@@@@@@@@▼
SBTM 15@@@@@@@@AA@@@@@▼
SBTM 15@@@@@@@@AA@@@@@▼
SBTM 15@@@@AAAAAA@@@@▼
SBTM 15@@@@AAAAAA@@@@▼
SBTM 15@@@@AAAAAA@@@@▼
SBTM 15@@@@AAAAAA@@@@▼
SBTM 15@@@@AAAAAA@@@@▼
SBTM 15@@@@AAAAAA@@@@▼
SBTM 15@@@@AAAAAA@@@@▼
```

10.6.8 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 39SAMPLE33V004000040000800008000000100001
SCRF 6ACHBLK
SVCT 15SPA;SW2;PU1,1;▼
SVCT 28PD1000,1,800,800,1,800,1,1;▼
```

See section 5) for further explanation of the vector symbol description language.

10.7 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).

10.7.0 Linestyle Module

```

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

```

10.7.1 '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              */

```

10.7.2 '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;                      */

```

10.7.3 '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).

10.7.4 '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).

10.7.5 '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).

10.7.6 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  38CBLLNE01007500075000200001000075000700
LCRF  6ICHMGD
LVCT  57SPI;PU850,750;SW1;AA900,750,180;PU850,750;AA800,750,180;✓

```

See section 5 for further explanation of the vector symbol description language.

TABLES AND SYMBOLISATION PROCEDURES

11. 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)

The ECDIS should provide all of these and make the 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('bn %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"

[illegible]

```

"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"
"CURRENT",,,,,,
"CURRENT","ORIENTCURVEL","SY(CURRENT01.ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31),"5","O","OTHER","33060"
"CURRENT","ORIENT","SY(CURRENT01.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","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(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"
"LNDLV","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"
 "PIPARE","","SY(CHINFO07)","4","O","STANDARD","26230"
 "PIPSOL","","SY(CHINFO07)","4","O","STANDARD","26230"
 "PRCARE","","SY(PRCARE12)","5","O","STANDARD","25010"
 "PRDARE","","SY(CHINFO07)","4","O","STANDARD","26230"
 "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"

PresLib e3.4 Part I

```

* ***                                     ***
* *** section two: NON-STANDARD CLASSES ***
* ***                                     ***
*

```

```
"cursor","SY(CURSRA01)","8","O","DISPLAYBASE","1010"
"cursor","cursty2","SY(CURSRB01)","8","O","MARINERS OTHER","61040"
"dnght","SY(DNGHLIT)","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('I',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(curst,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(curst,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(curst,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 ***
```

PresLib e3.4 Part I

"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","BOYSH1COLOUR3,4,3","SY(BOYLAT14);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21),"8","O","STANDARD","27010"
 "BOYLAT","BOYSH1COLOUR4,3,4","SY(BOYLAT13);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21),"8","O","STANDARD","27010"
 "BOYLAT","BOYSH2COLOUR3,4,3","SY(BOYLAT24);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21),"8","O","STANDARD","27010"
 "BOYLAT","BOYSH2COLOUR4,3,4","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","BOYSH1COLOUR3","SY(BOYLAT14);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21),"8","O","STANDARD","27010"
 "BOYLAT","BOYSH1COLOUR4","SY(BOYLAT13);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21),"8","O","STANDARD","27010"
 "BOYLAT","BOYSH2COLOUR3","SY(BOYLAT24);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21),"8","O","STANDARD","27010"
 "BOYLAT","BOYSH2COLOUR4","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","CATSPM19BOYSH1","SY(BOYSPP15);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21),"8","O","STANDARD","27010"
 "BOYSPP","CATSPM19BOYSH2","SY(BOYSPP25);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21),"8","O","STANDARD","27010"
 "BOYSPP","CATSPM54BOYSH1","SY(BOYSPP15);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21),"8","O","STANDARD","27010"
 "BOYSPP","CATSPM54BOYSH2","SY(BOYSPP25);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21),"8","O","STANDARD","27010"
 "BOYSPP","CATSPM54BOYSH4","SY(BOYSPP35);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21),"8","O","STANDARD","27010"
 "BOYSPP","CATSPM54BOYSH5","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","BOYSH1","SY(BOYSPP15);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21),"8","O","STANDARD","27010"
 "BOYSPP","BOYSH2","SY(BOYSPP25);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21),"8","O","STANDARD","27010"
 "BOYSPP","BOYSH3","SY(BOYSPP11);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21),"8","O","STANDARD","27010"
 "BOYSPP","BOYSH4","SY(BOYSPP35);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21),"8","O","STANDARD","27010"
 "BOYSPP","BOYSH5","SY(BOYSPP35);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21),"8","O","STANDARD","27010"
 "BOYSPP","BOYSH6","SY(BOYSPP11);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21),"8","O","STANDARD","27010"
 "BOYSPP","BOYSH7","SY(BOYSUP02);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21),"8","O","STANDARD","27010"
 "BOYSPP","BOYSH8","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","","SY(CRANES01)","4","O","OTHER","32440"
"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","","SY(CURRENT01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","5","O","OTHER","33060"
"CURENT","ORIENT","SY(CURRENT01,ORIENT)","5","O","OTHER","33060"
"DAMCON","","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","","SY(CHINFO07)","4","O","OTHER","32410"
"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"
 "LOCMAC", "", "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"
 "PIPAIRE","","SY(CHINFO07)","4","O","STANDARD","26230"
 "PIPSOL","","SY(PRA5CONVIS1)","4","O","STANDARD","22220"
 "PRCARE","","SY(PRCARE12)","5","O","STANDARD","25010"
 "PRDARE","","SY(PRA8CONVIS1)","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","","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","","SY(RSCSTA02)","7","O","OTHER","38030"
 "RTPBCN","","SY(RTPBCN02)","6","O","STANDARD","27210"
 "RUNWAY","","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"
 "SILTNN","","SY(TNKCON02)","4","O","OTHER","32220"
 "SILTNN","CATSIL1CONVIS1","SY(SILBUI11)","4","O","STANDARD","22220"
 "SILTNN","CATSIL2CONVIS1","SY(TNKCON12)","4","O","STANDARD","22220"
 "SILTNN","CATSIL3CONVIS1","SY(TOWERS03)","4","O","STANDARD","22220"
 "SILTNN","CATSIL4CONVIS1","SY(TOWERS12)","4","O","STANDARD","22220"
 "SILTNN","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","","SY(SNDWAV02)","4","O","STANDARD","24010"
"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","","SY(SNDWAV02)","4","O","STANDARD","24010"
"TUNNEL","","SY(SNDWAV02)","4","O","STANDARD","24010"
"UWTROC","","CS(OBSTRN06)","4","O","OTHER","34050"
"VEGATN","","SY(SNDWAV02)","4","O","STANDARD","24010"
"WATFAL","","SY(SNDWAV02)","4","O","STANDARD","24010"
"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 chosen by the mariner.

*

```

"cursor","","SY(CURSRA01)","8","O","DISPLAYBASE","11010"
"cursor","cursty2","SY(CURSRA01)","8","O","MARINERS OTHER","61040"
"dnght","","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"

```

```
"OALNE";"";"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";"";"CS(DEPCNT03)";"5";"O";"OTHER";"33020"
"DEPCNT";"";"CS(DEPCNT03)";"5";"O";"OTHER";"33020"
"DWRTCL";"";"LC(DWLTDEF01);TE('%03.0lf deg','ORIENT';1,1,2,'15110';0,-1,CHBLK,11)";"6";"O";"STANDARD";"25010"
"DWRTCL";"CATTRK1TRAFFIC1";"LC(DWRTCL08);TE('%03.0lf deg','ORIENT';1,1,2,'15110';0,-1,CHBLK,11)";"6";"O";"STANDARD";"25010"
"DWRTCL";"CATTRK1TRAFFIC2";"LC(DWRTCL08);TE('%03.0lf deg','ORIENT';1,1,2,'15110';0,-1,CHBLK,11)";"6";"O";"STANDARD";"25010"
"DWRTCL";"CATTRK1TRAFFIC3";"LC(DWRTCL08);TE('%03.0lf deg','ORIENT';1,1,2,'15110';0,-1,CHBLK,11)";"6";"O";"STANDARD";"25010"
"DWRTCL";"CATTRK1TRAFFIC4";"LC(DWRTCL06);TE('%03.0lf deg','ORIENT';1,1,2,'15110';0,-1,CHBLK,11)";"6";"O";"STANDARD";"25010"
"DWRTCL";"CATTRK2TRAFFIC1";"LC(DWRTCL07);TE('%03.0lf deg','ORIENT';1,1,2,'15110';0,-1,CHBLK,11)";"6";"O";"STANDARD";"25010"
"DWRTCL";"CATTRK2TRAFFIC2";"LC(DWRTCL07);TE('%03.0lf deg','ORIENT';1,1,2,'15110';0,-1,CHBLK,11)";"6";"O";"STANDARD";"25010"
"DWRTCL";"CATTRK2TRAFFIC3";"LC(DWRTCL07);TE('%03.0lf deg','ORIENT';1,1,2,'15110';0,-1,CHBLK,11)";"6";"O";"STANDARD";"25010"
"DWRTCL";"CATTRK2TRAFFIC4";"LC(DWRTCL05);TE('%03.0lf deg','ORIENT';1,1,2,'15110';0,-1,CHBLK,11)";"6";"O";"STANDARD";"25010"
"DWRTCL";"TRAFFIC1";"LC(DWRTCL07);TE('%03.0lf deg','ORIENT';1,1,2,'15110';0,-1,CHBLK,11)";"6";"O";"STANDARD";"25010"
"DWRTCL";"TRAFFIC2";"LC(DWRTCL07);TE('%03.0lf deg','ORIENT';1,1,2,'15110';0,-1,CHBLK,11)";"6";"O";"STANDARD";"25010"
"DWRTCL";"TRAFFIC3";"LC(DWRTCL07);TE('%03.0lf deg','ORIENT';1,1,2,'15110';0,-1,CHBLK,11)";"6";"O";"STANDARD";"25010"
"DWRTCL";"TRAFFIC4";"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";"";"CS(QUAPOS01);TX(OBJNAM,1,1,2,'15110';0,1,CHBLK,26)";"8";"O";"DISPLAYBASE";"12010"
"MAGVAR";"";"LS(SOLD,2,CHMGF);SY(MAGVAR51);TE('varn %s','VALMAG';3,1,2,'15110';1,-1,CHBLK,27)";"4";"O";"OTHER";"31080"
"MARCU";"";"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","PRODUCT3","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"
"TSSELNE","","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(CLRIN01)","9","O","MARINERS OTHER","53020"
"dnghtl","","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"
"rngng","","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 %4.1f',VERCLR,3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)", "8", "O", "DISPLAYBASE", "12210"
 "BRIDGE", "CATBRG2", "SY(BRIDGE01);TE('clr cl %4.1f',VERCCL,3,1,2,'15110',1,0,CHBLK,11);TE('clr op %4.1f',VERCOP,3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)", "8", "O", "DISPLAYBASE", "12210"
 "BRIDGE", "CATBRG3", "SY(BRIDGE01);TE('clr cl %4.1f',VERCCL,3,1,2,'15110',1,0,CHBLK,11);TE('clr op %4.1f',VERCOP,3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)", "8", "O", "DISPLAYBASE", "12210"
 "BRIDGE", "CATBRG4", "SY(BRIDGE01);TE('clr cl %4.1f',VERCCL,3,1,2,'15110',1,0,CHBLK,11);TE('clr op %4.1f',VERCOP,3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)", "8", "O", "DISPLAYBASE", "12210"
 "BRIDGE", "CATBRG5", "SY(BRIDGE01);TE('clr cl %4.1f',VERCCL,3,1,2,'15110',1,0,CHBLK,11);TE('clr op %4.1f',VERCOP,3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)", "8", "O", "DISPLAYBASE", "12210"
 "BRIDGE", "CATBRG7", "SY(BRIDGE01);TE('clr cl %4.1f',VERCCL,3,1,2,'15110',1,0,CHBLK,11);TE('clr op %4.1f',VERCOP,3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)", "8", "O", "DISPLAYBASE", "12210"
 "BRIDGE", "CATBRG8", "SY(BRIDGE01);TE('clr cl %4.1f',VERCCL,3,1,2,'15110',1,0,CHBLK,11);TE('clr op %4.1f',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 %4.1f',VERCLR,3,1,2,'15110',1,0,CHBLK,11);LS(SOLD,3,CHGRD)", "8", "O", "DISPLAYBASE", "12210"
 "CONVYR", "CONRAD1", "SY(RACNSP01);TE('clr %4.1f',VERCLR,3,1,2,'15110',1,0,CHBLK,11);LS(SOLD,3,CHGRD)", "8", "O", "DISPLAYBASE", "12210"
 "CONVYR", "CONRAD3", "SY(RACNSP01);TE('clr %4.1f',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"
 "DWRTPPT", "", "SY(TSLDEF51);SY(DWRTPT51);LC(DWRUTE51);CS(RESTRN01)", "4", "S", "STANDARD", "25010"
 "DWRTPPT", "ORIENTTRAFIC1", "SY(TSSLPT51,ORIENT);SY(DWRTPT51);LC(DWRUTE51);CS(RESTRN01)", "4", "S", "STANDARD", "25010"
 "DWRTPPT", "ORIENTTRAFIC2", "SY(TSSLPT51,ORIENT);SY(DWRTPT51);LC(DWRUTE51);CS(RESTRN01)", "4", "S", "STANDARD", "25010"
 "DWRTPPT", "ORIENTTRAFIC3", "SY(TSSLPT51,ORIENT);SY(DWRTPT51);LC(DWRUTE51);CS(RESTRN01)", "4", "S", "STANDARD", "25010"
 "DWRTPPT", "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"

PresLib e3.4 Part I

"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"
 "PIPAE", "", "SY(INFARE51);LC(PIPAE51);CS(RESTRN01)", "3", "S", "STANDARD", "26230"
 "PIPAE", "CATPIP2", "SY(INFARE51);LC(PIPAE61);CS(RESTRN01)", "3", "S", "STANDARD", "26230"
 "PIPAE", "CATPIP3", "SY(INFARE51);LC(PIPAE61);CS(RESTRN01)", "3", "S", "STANDARD", "26230"
 "PIPAE", "PRODUCT3", "SY(INFARE51);LC(PIPAE61);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", "ORIENTCATTRK1TRAFFIC1", "SY(RECTRC58,ORIENT);TE('%03.0lf deg',ORIENT,3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)", "6", "S", "STANDARD", "25020"
 "RECTRC", "ORIENTCATTRK1TRAFFIC2", "SY(RECTRC58,ORIENT);TE('%03.0lf deg',ORIENT,3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)", "6", "S", "STANDARD", "25020"
 "RECTRC", "ORIENTCATTRK1TRAFFIC3", "SY(RECTRC58,ORIENT);TE('%03.0lf deg',ORIENT,3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)", "6", "S", "STANDARD", "25020"
 "RECTRC", "ORIENTCATTRK1TRAFFIC4", "SY(RECTRC57,ORIENT);TE('%03.0lf deg',ORIENT,3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)", "6", "S", "STANDARD", "25020"
 "RECTRC", "ORIENTCATTRK2TRAFFIC1", "SY(RECTRC57,ORIENT);TE('%03.0lf deg',ORIENT,3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)", "6", "S", "STANDARD", "25020"
 "RECTRC", "ORIENTCATTRK2TRAFFIC2", "SY(RECTRC57,ORIENT);TE('%03.0lf deg',ORIENT,3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)", "6", "S", "STANDARD", "25020"
 "RECTRC", "ORIENTCATTRK2TRAFFIC3", "SY(RECTRC57,ORIENT);TE('%03.0lf deg',ORIENT,3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)", "6", "S", "STANDARD", "25020"
 "RECTRC", "ORIENTCATTRK2TRAFFIC4", "SY(RECTRC55,ORIENT);TE('%03.0lf deg',ORIENT,3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)", "6", "S", "STANDARD", "25020"
 "RECTRC", "ORIENTTRAFFIC1", "SY(RECTRC57,ORIENT);TE('%03.0lf deg',ORIENT,3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)", "6", "S", "STANDARD", "25020"
 "RECTRC", "ORIENTTRAFFIC2", "SY(RECTRC57,ORIENT);TE('%03.0lf deg',ORIENT,3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)", "6", "S", "STANDARD", "25020"
 "RECTRC", "ORIENTTRAFFIC3", "SY(RECTRC57,ORIENT);TE('%03.0lf deg',ORIENT,3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)", "6", "S", "STANDARD", "25020"
 "RECTRC", "ORIENTTRAFFIC4", "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"
 "SILTNN","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
 "SILTNN","CONVIS1","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
 "SLCONS","CS(SLCONS03)","7","S","DISPLAYBASE","12410"
 "SLOGRD","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(CURRENT01,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_PRR","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","ORIENTTRAFFIC1","SY(TWRTPT53,ORIENT);LC(CTYARE51)","4","S","STANDARD","25010"
 "TWRTPT","ORIENTTRAFFIC2","SY(TWRTPT53,ORIENT);LC(CTYARE51)","4","S","STANDARD","25010"
 "TWRTPT","ORIENTTRAFFIC3","SY(TWRTPT53,ORIENT);LC(CTYARE51)","4","S","STANDARD","25010"
 "TWRTPT","ORIENTTRAFFIC4","SY(TWRTPT52,ORIENT);LC(CTYARE51)","4","S","STANDARD","25010"
 "UNSARE","AC(NODTA);AP(NODATA03);LS(SOLD,2,CHGRD)","1","S","DISPLAYBASE","11050"
 "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 chosen 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"
 "BUIISGL", "", "AC(CHBRN);LS(SOLD,1,LANDF)", "4", "S", "OTHER", "32220"
 "BUIISGL", "FUNCTN33CONVIS1", "AC(CHBRN);TX(OBJNAM, 1, 2, 2, '15110', 0, 0, CHBLK, 26);LS(SOLD,1,CHBLK)", "4", "S", "STANDARD", "22220"
 "BUIISGL", "FUNCTN33", "AC(CHBRN);TX(OBJNAM, 1, 2, 2, '15110', 0, 0, CHBLK, 26);LS(SOLD,1,LANDF)", "4", "S", "OTHER", "32220"
 "BUIISGL", "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", "COND TN", "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", "ORIENTTRAFFIC1", "SY(TSSLPT51,ORIENT);SY(DWRTPT51);LS(DASH,3,TRFCD);CS(RESTRN01)", "4", "S", "STANDARD", "25010"
 "DWRTPT", "ORIENTTRAFFIC2", "SY(TSSLPT51,ORIENT);SY(DWRTPT51);LS(DASH,3,TRFCD);CS(RESTRN01)", "4", "S", "STANDARD", "25010"
 "DWRTPT", "ORIENTTRAFFIC3", "SY(TSSLPT51,ORIENT);SY(DWRTPT51);LS(DASH,3,TRFCD);CS(RESTRN01)", "4", "S", "STANDARD", "25010"
 "DWRTPT", "ORIENTTRAFFIC4", "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", "ORIENTTRAFFIC1", "SY(FAIRWY51,ORIENT);LS(DASH,1,CHGRD);CS(RESTRN01)", "4", "S", "STANDARD", "26050"
 "FAIRWY", "ORIENTTRAFFIC2", "SY(FAIRWY51,ORIENT);LS(DASH,1,CHGRD);CS(RESTRN01)", "4", "S", "STANDARD", "26050"
 "FAIRWY", "ORIENTTRAFFIC3", "SY(FAIRWY51,ORIENT);LS(DASH,1,CHGRD);CS(RESTRN01)", "4", "S", "STANDARD", "26050"
 "FAIRWY", "ORIENTTRAFFIC4", "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", "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);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"
"MARCU","AP(MARCU02);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","PRODC3","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", "ORIENTCATTRK1TRAFFIC1", "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", "ORIENTCATTRK1TRAFFIC2", "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", "ORIENTCATTRK1TRAFFIC3", "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", "ORIENTCATTRK1TRAFFIC4", "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", "ORIENTCATTRK2TRAFFIC1", "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", "ORIENTCATTRK2TRAFFIC2", "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", "ORIENTCATTRK2TRAFFIC3", "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", "ORIENTCATTRK2TRAFFIC4", "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", "ORIENTTRAFFIC1", "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", "ORIENTTRAFFIC2", "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", "ORIENTTRAFFIC3", "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", "ORIENTTRAFFIC4", "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"
 "ROADWAY", "", "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", "", "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_NHMON", "", "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(CURRENT01,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","ORIENTTRAFFIC1","SY(TWRTPT53,ORIENT);LS(DASH,4,TRFCD)","4","S","STANDARD","25010"
"TWRTPT","ORIENTTRAFFIC2","SY(TWRTPT53,ORIENT);LS(DASH,4,TRFCD)","4","S","STANDARD","25010"
"TWRTPT","ORIENTTRAFFIC3","SY(TWRTPT53,ORIENT);LS(DASH,4,TRFCD)","4","S","STANDARD","25010"
"TWRTPT","ORIENTTRAFFIC4","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.

*

```

"dnght","","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 ***

* ***

12. SYMBOLOGY PROCEDURE DIAGRAMS

12.1 Introduction

12.1.1 General

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.

12.1.2 List of Procedures

The following flow charts and narrative descriptions of conditional symbology procedures are presented:

(12.2.1)	Clearing line (mariners' navigational object)	CLRLIN01
(12.2.2)	Data coverage, scale boundaries, overscale (S-57)	* DATCVR02
(12.2.3)	Depth area colour fill and dredged area pattern fill (S-57)	DEPARE02
(12.2.4)	Depth contours, including safety contour (S-57)	DEPCNT03
(12.2.5)	Depth value (S-57)	DEPVAL02
(12.2.6)	Leg of planned route (mariners' navigational object)	LEGLIN03
(12.2.7)	Light flares, light sectors & light coverage (S-57)	LIGHTS05
(12.2.8)	Light description text string (S-57)	LITDSN01
(12.2.9)	Obstructions and rocks (S-57)	OBSTRN06
(12.2.10)	Own ship (mariners' navigational object)	* OWNSHP02
(12.2.11)	Past track (mariners' navigational object)	PASTRK01
(12.2.12)	Quality (accuracy) of position (S-57)	QUAPOS01
(12.2.13)	Quality of position of line objects (S-57)	QUALIN01
(12.2.14)	Quality of position of point and area objects (S-57)	QUAPNT02
(12.2.15)	Restricted areas - object class RESARE (S-57)	RESARE03
(12.2.16)	Entry procedure for restrictions (S-57)	RESTRN01
(12.2.17)	Restrictions – attribute RESTRN (S-57)	RESCSP02
(12.2.18)	Contour labels, including safety contour (S-57)	SAFCON01
(12.2.19)	Shoreline constructions, including accuracy of position.	SLCONS03
(12.2.20)	Colour fill for depth areas (S-57)	SEABED01
(12.2.21)	Symbolizing soundings, including safety depth (S-57)	SNDFRM03

(12.2.22a)	Entry procedure for symbolizing soundings (S-57)	SOUNDG02
(12.2.22b)	Symbolizing encoded objects specified by IMO	'SYMINSnn'
(12.2.23)	Topmarks (S-57)	TOPMAR01
(12.2.24)	Isolated dangers in general that endanger own ship (S-57)	UDWHAZ04
(12.2.25)	Vessel other than own ship (mariners' navigational object)	* VESSEL02
(12.2.26)	Symbolizing VRMs and EBLs (mariners' navigational object)	* VRMEBL02
(12.2.27)	Wrecks (S-57)	WRECKS04

* Procedures marked by an asterisk are in narrative form.

12.1.3 Mariners' selections

The following global parameters carrying mariners' selections are used by the procedures:

SAFETY_DEPTH	- selected safety depth (meters) [IMO PS [3]]
SHALLOW_CONTOUR	- selected shallow water contour (meters) (optional)
SAFETY_CONTOUR	- selected safety contour (meters) [IMO PS [3]]
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]]
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 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 illustrates these relationships (the suffix 'nn' refers to the current edition of the CSP) :

Object	CSP	Sub-Procedure	
M_COVR(a) M_CSCL(a)	DATCVRnn		
DEPARE(a) DRGARE(a)	DEPAREnn	RESCSPnn SEABEDnn SAFCONnn	<i>Note: this sub-procedure also called by RESTRNnn</i>
DEPARE(l) DEPCNT(l)	DEPCNTnn	SAFCONnn	
LIGHTS(p)	LIGHTSnn	LITDSnn	
OBSTRN(pla) UWTROC(p)	OBSTRNnn	DEPVALnn QUAPNTnn SNDFRMnn UDWHAZnn	<i>Note: this sub-procedure also called by WRECKSnn</i> <i>Note: this sub-procedure also called by QUAPOSnn & WRECKSn</i> <i>Note: this sub-procedure also called by SOUNDGnn & WRECKSnn</i> <i>Note: this sub-procedure also called by WRECKSnn</i>
LNDARE(pl) COALNE(l)	QUAPOSnn	QUAPNTnn QUALINnn	<i>Note: this sub-procedure also called by OBSTRNnn & WRECKSnn</i>
RESARE(a)	RESAREnn		<i>Note: this procedure includes the effect of RESTRN</i>
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	<i>Note: this sub-procedure also called by DEPAREnn</i>

<i>SOUNDG(p)</i>	<i>SOUNDGnn</i>	<i>SNDFRMnn</i>	<i>Note: this sub-procedure also called by OBSTRNnn & WRECKSnn</i>
<i>WRECKS(pa)</i>	<i>WRECKSnn</i>	<i>DEPVALnn QUAPNTnn SNDFRMnn UDWHAZnn</i>	<i>Note: this sub-procedure also called by OBSTRNnn Note: this sub-procedure also called by QUAPOSnn & OBSTRNnn Note: this sub-procedure also called by OBSTRNnn & SOUNDGnn Note: this sub-procedure also called by OBSTRNnn</i>

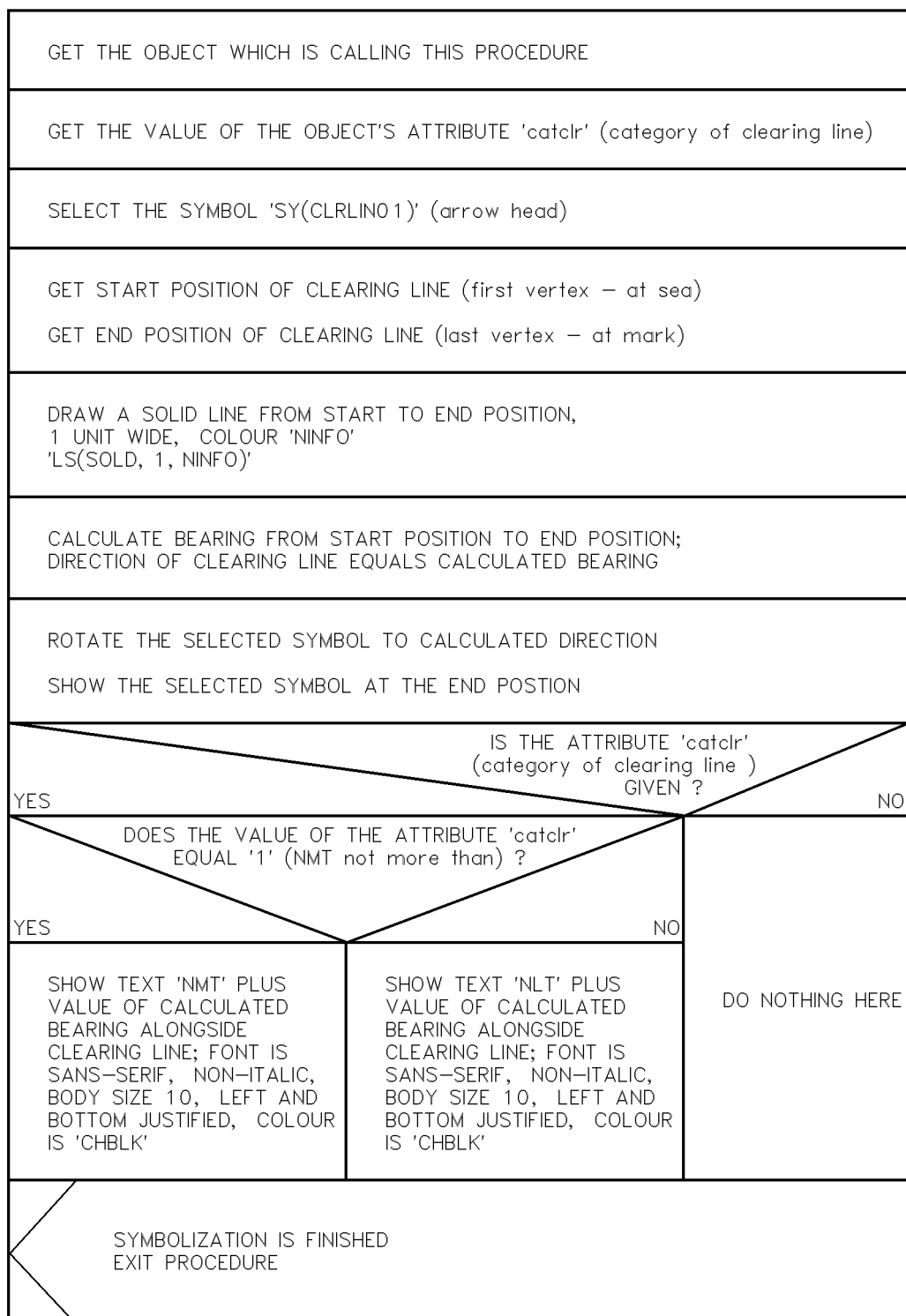
12.2 Conditional Symbology Procedures

12.2.1 Conditional Symbology Procedure 'CLRLIN01'

Applies to:	Mariners' Navigational Object Class "mariners' clearing line" (clrlin)
Spatial Object(s):	Line
Attribute(s) used:	"category of mariners' clearing line" (catclr)
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:	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.

CLRLINO 1

Conditional symbology procedure for symbolization of objects of the class 'clrlin' (mariner's clearing line).



12.2.2 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: <ul style="list-style-type: none"> - 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.

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.

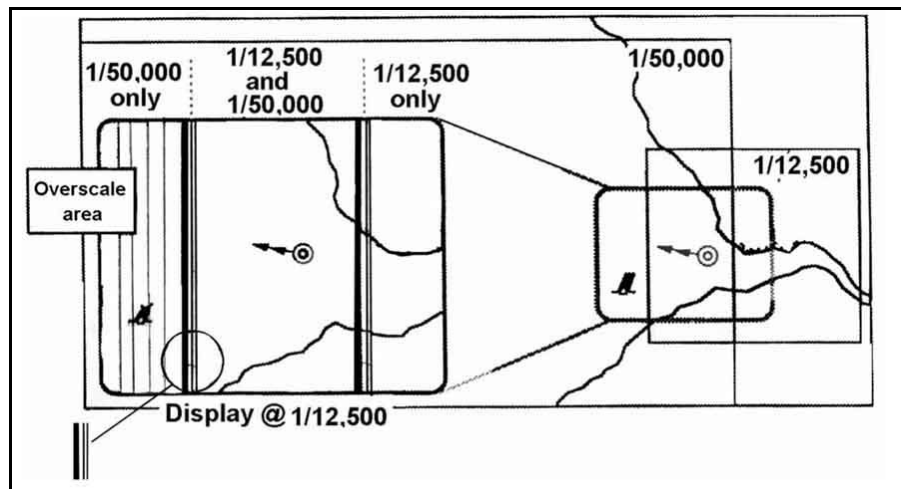
Note that in this situation the pattern AP(OVERSC01) should ONLY be shown on the area compiled from the smaller scale ENC. If the area from the larger scale ENC is also overscale, this should be indicated by the "overscale indication" of sub-section 4.1 above. The pattern AP(OVERSC01) should not be shown 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.)



12.2.3 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

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: The manufacturer is responsible for setting the SAFETY_CONTOUR to **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".

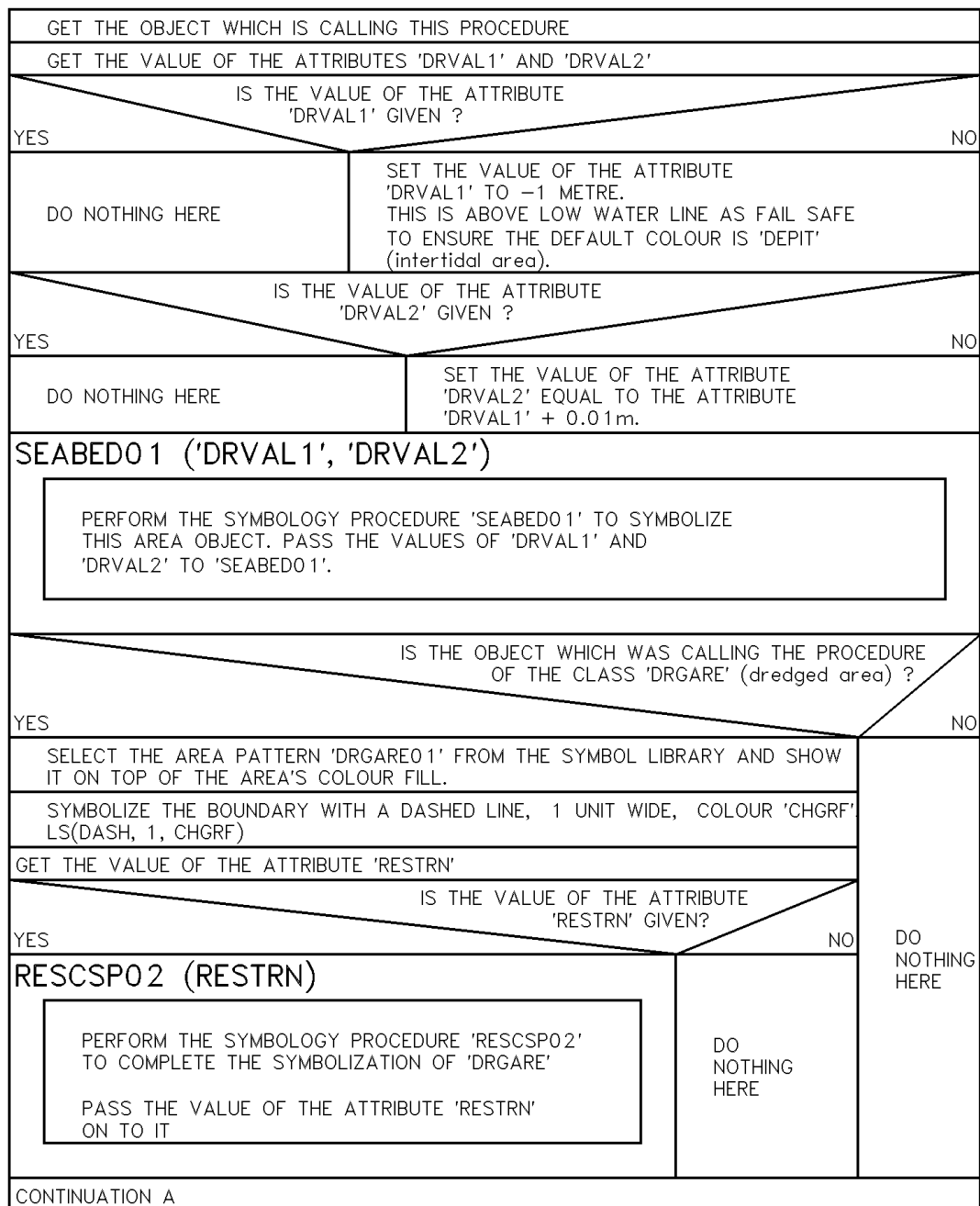
Based on the safety contour value entered by the mariner (see IMO PS [3]), the edges that make up the safety contour must be shown under all circumstances. But, while the mariner is free to enter any safety contour depth value that he thinks is suitable for the safety of his ship, the SENC only contains 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 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.

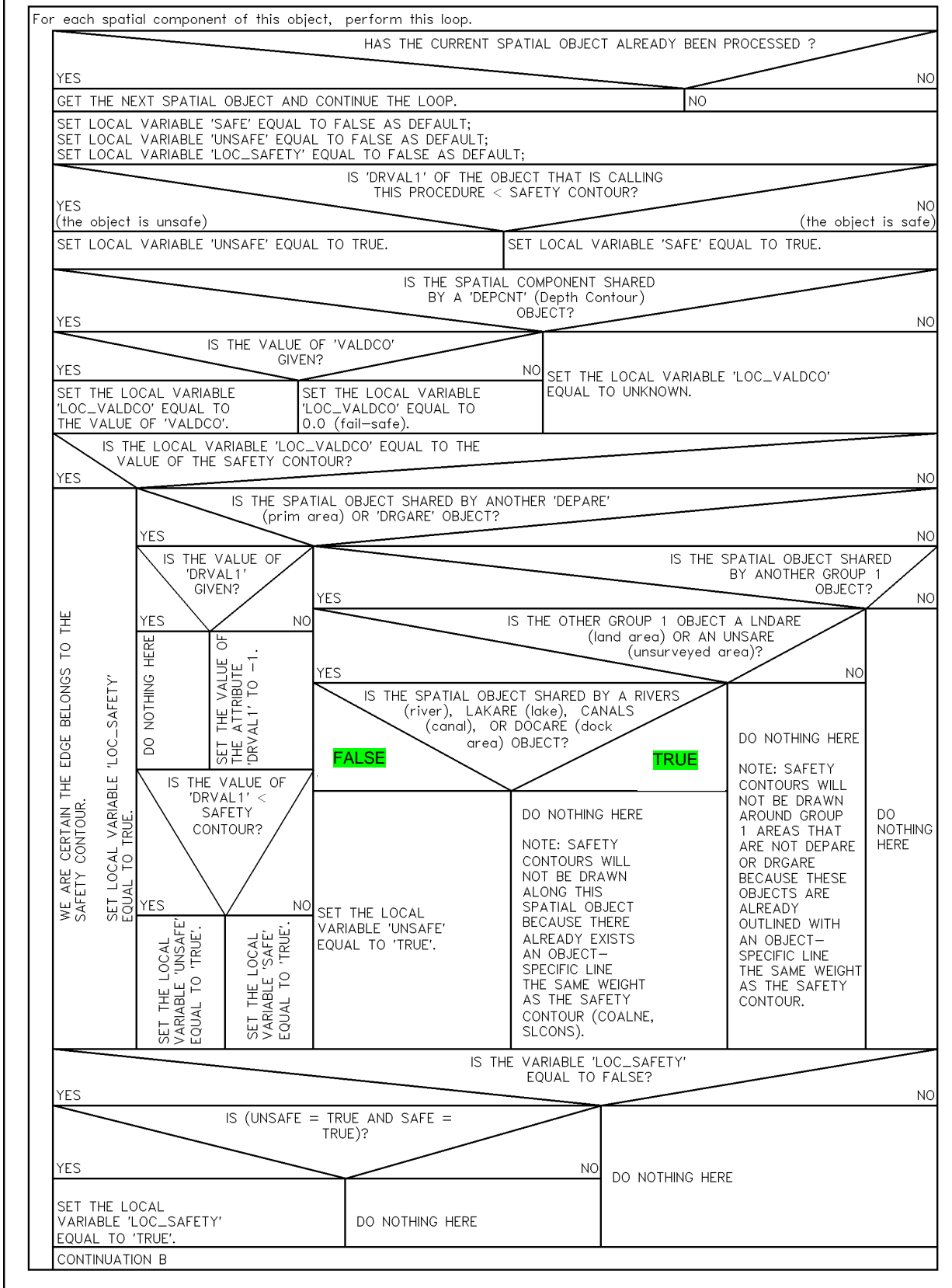
DEPARE02

Conditional symbology procedure for symbolization of objects of the classes 'DEPARE' (Depth Area) and 'DRGARE' (Dredged Area)

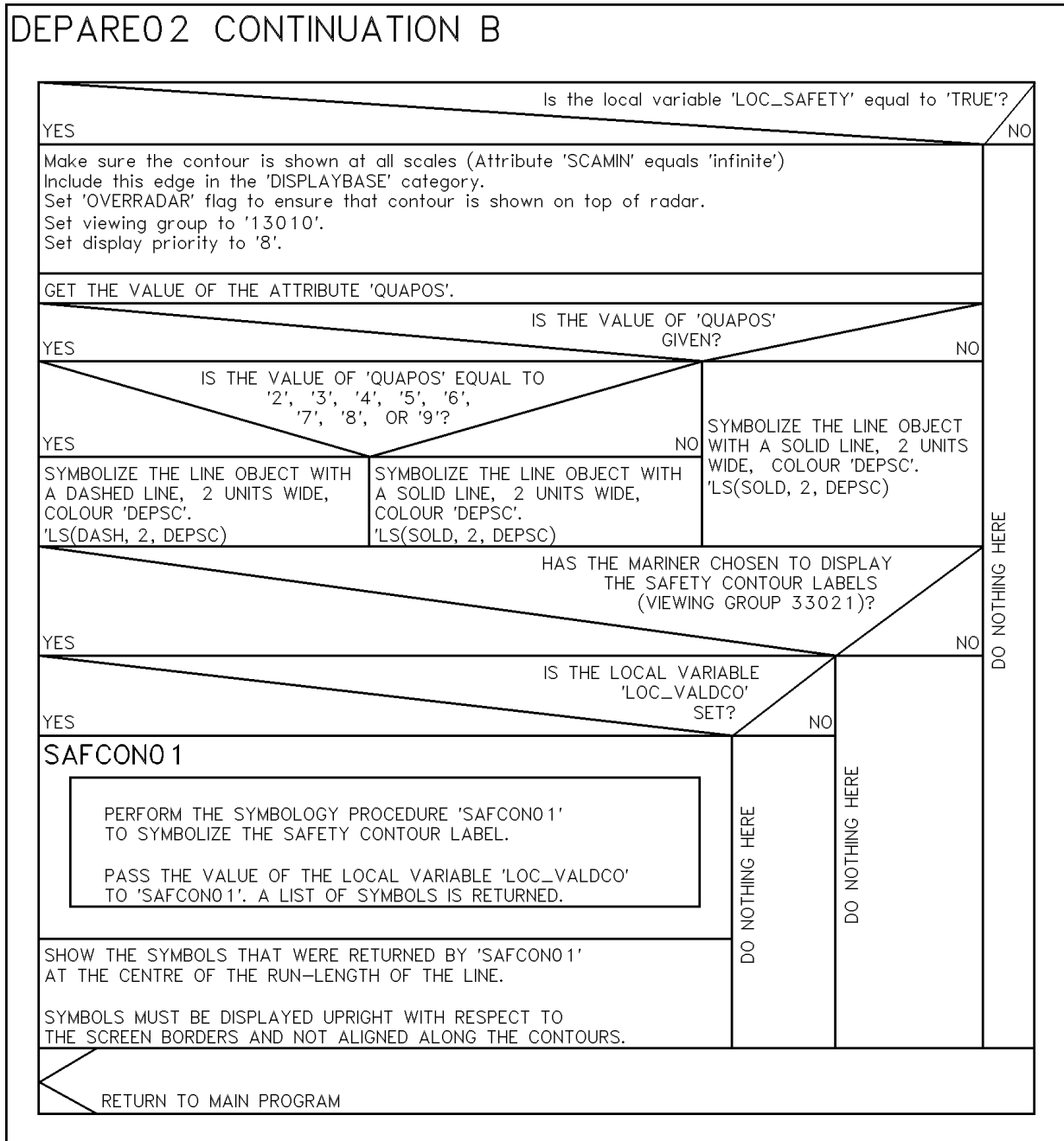


DEPARE02 CONTINUATION A

NOTE: IN ORDER TO MAKE THIS ALGORITHM EFFICIENT, THE MANUFACTURER SHOULD KEEP TRACK OF WHICH SPATIAL OBJECTS HAVE ALREADY BEEN PROCESSED TO ELIMINATE THE NEED FOR TESTING LINES MORE THAN ONCE.



DEPARE02 CONTINUATION B



12.2.4 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

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

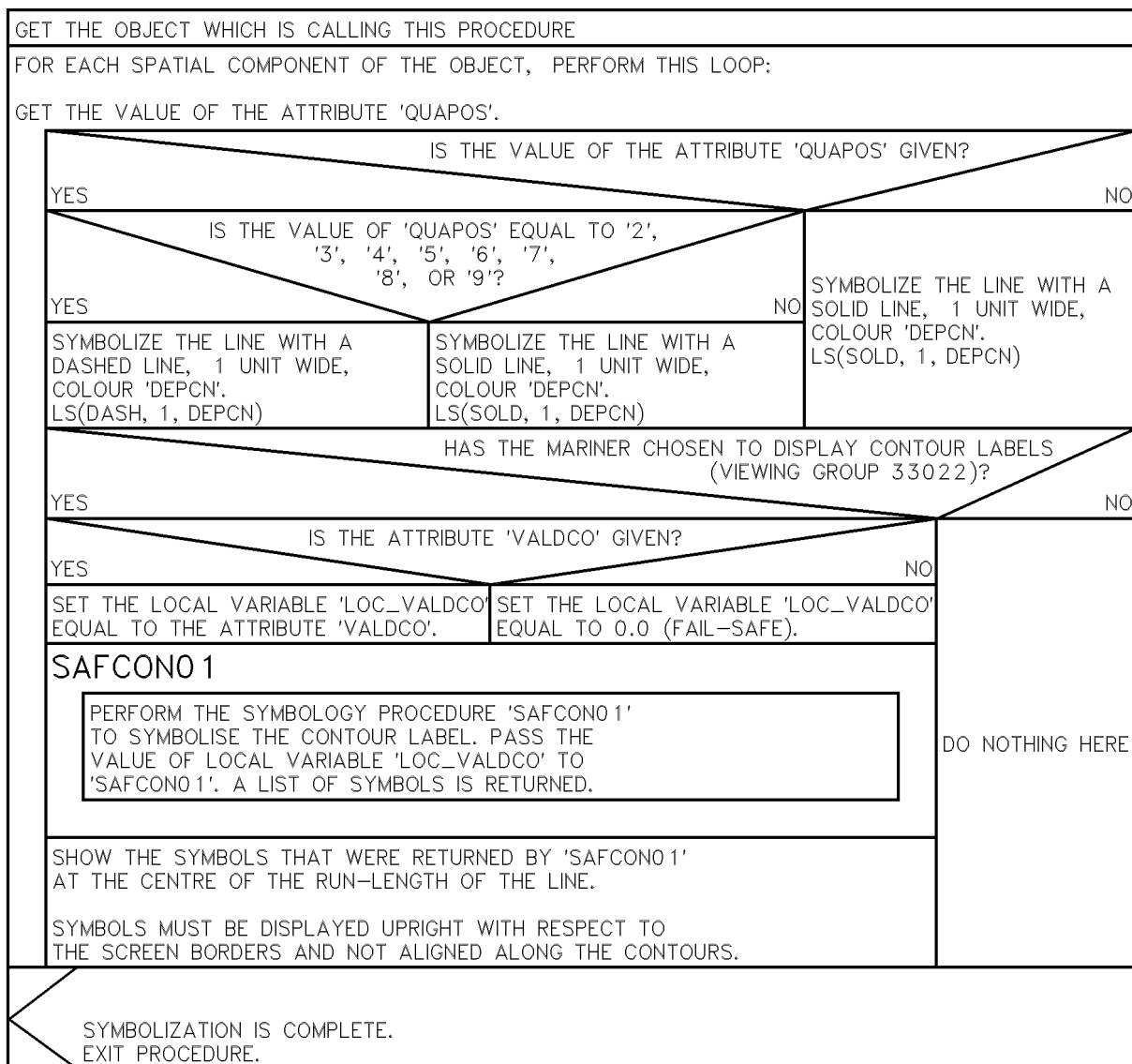
Remarks This procedure symbolizes contours, identifies any line segment of the spatial object that has a 'QUAPOS' value indicating unreliable positioning and symbolizes it with a dashed line, and labels the value of the contour on demand by the mariner.

The contour may be labelled at the request of the mariner using sub-procedure "SAFCON01".

Note: Since edition 3.2, the Presentation Library no longer symbolizes line depth areas.

DEPCNT03

Conditional symbology procedure for symbolizing objects of the class depth contour (DEPCNT).



12.2.5 Conditional Symbology Procedure DEPVAL02

(Note that this is a sub-procedure called by procedures OBSTRNnn and WRECKSnn)

Applies to:	All underwater hazards
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 DEPARE or UNSARE objects
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.

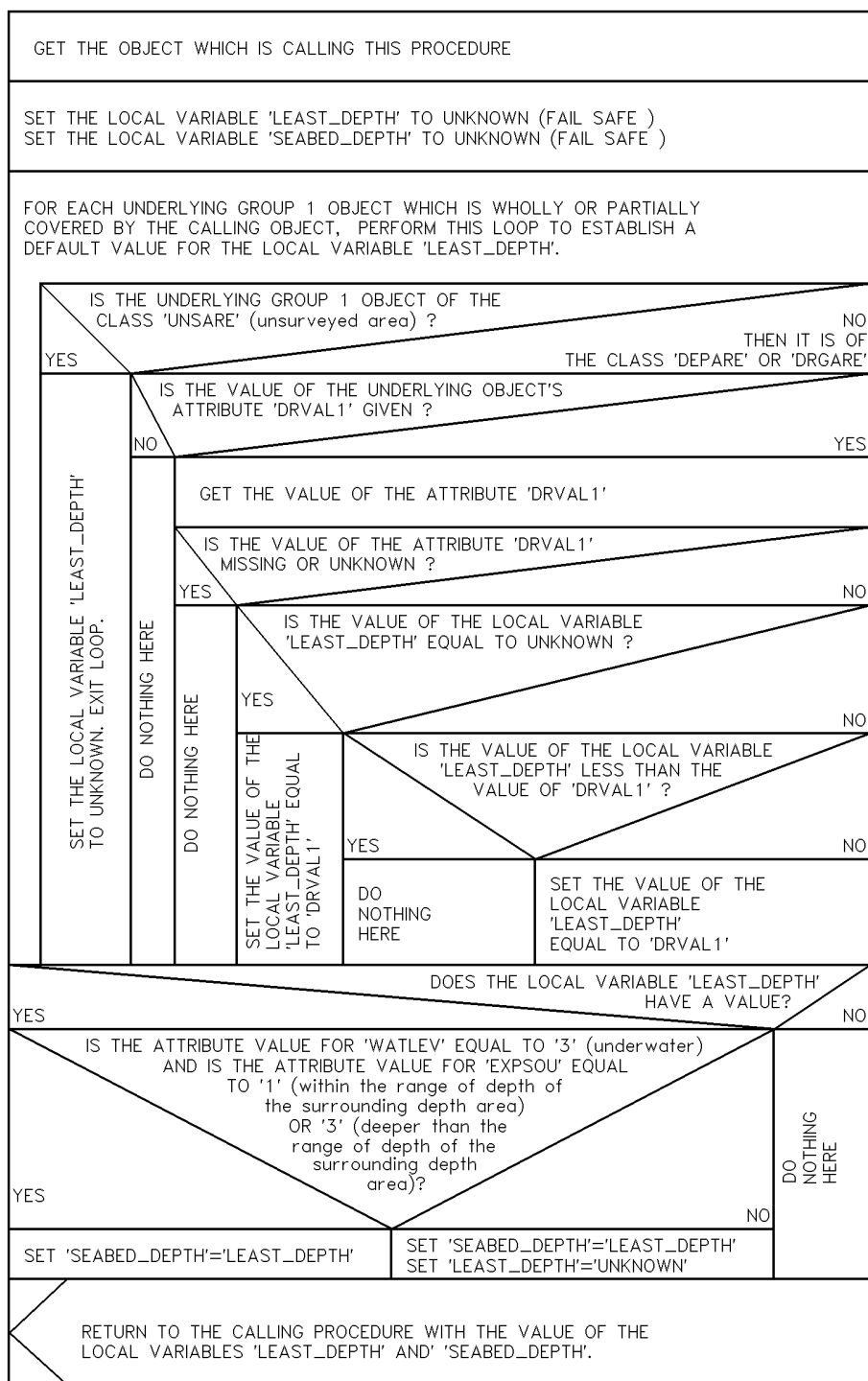
DEPVAL02

Conditional symbology procedure to establish a more precise value for the depth value of OBSTRN or WRECKS or UWTRC from the underlying group 1 area.

Please note that this procedure is called by other procedures (obstructions and wrecks) which handle the symbolization of obstructions on the seabed.

The procedure is expecting the calling procedure to pass the attributes WATLEV and EXPSOU.

The procedure returns local variables 'LEAST_DEPTH' and 'SEABED_DEPTH'.



12.2.6 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.

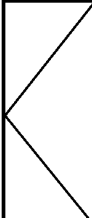
Note that a double orange circle symbol SY(WAYPNT11) is provided in the Presentation Library to distinguish the next waypoint from other waypoints. This is illustrated in the ECDIS Chart 1. Should the manufacturer wish to provide the use of this symbol, he should introduce his own software to select 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).

LEGLINO 3

Conditional symbology procedure for symbolization of objects of the class 'leglin' (leg).

GET THE OBJECT WHICH IS CALLING THIS PROCEDURE	
GET THE VALUE OF THE OBJECT'S ATTRIBUTE 'select' (selection)	
DOES THE VALUE OF THE ATTRIBUTE 'select' EQUAL '1' (planned)? (IMO PS 10.4.3/10.5.10)	
YES	NO
SELECT COLOUR 'PLRTE'	SELECT COLOUR 'APLRT'
SELECT SYMBOL 'SY(PLNSPD03)'	SELECT SYMBOL 'SY(PLNSPD04)'
SYMBOLIZE THE LEG WITH THE COMPLEX LINSTYLE 'LC(PLNRTE03)'	SYMBOLIZE THE LEG WITH A DOTTED LINE, 2 UNITS WIDE, COLOUR 'APLRT' 'LS(DOTT, 2, APLRT)'
SET VIEWING CATEGORY TO 'DISPLAYBASE'	SET VIEWING CATEGORY TO 'STANDARD'
SET VIEWING GROUP TO '42210'	SET VIEWING GROUP TO '52210'
GET START POSITION OF LEG (first vertex) GET END POSITION OF LEG (last vertex)	
CALCULATE BEARING FROM START POSITION TO END POSITION DIRECTION OF LEG EQUALS COURSE TO MAKE GOOD	
SHOW COURSE TO MAKE GOOD AS TEXT, PADDED WITH ZEROES, WITH SUFFIX "deg". ALONGSIDE LEG; FONT IS SANS-SERIF, NON-ITALIC, BODY SIZE 12, LEFT AND BOTTOM JUSTIFIED, USE COLOUR 'CHBLK'	
Continuation A	

LEGLIN03 Continuation A

IS ATTRIBUTE 'plnsdp' (planned speed) GIVEN ?	
YES	NO
GET THE VALUE OF THE OBJECT'S ATTRIBUTE 'plnsdp' (planned speed)	DO NOTHING HERE
PLACE SYMBOL SELECTED ABOVE CLOSE TO THE LEG SHOW VALUE OF 'plnsdp' WITH SUFFIX "kt", AT SYMBOL'S POSITION; FONT IS SANS-SERIF, BODY SIZE 10, HORIZONTALLY AND VERTICALLY CENTERED, NON-ITALIC, USE COLOUR 'CHBLK'	
IS THE VALUE OF 'DISTANCE-TAGS' SELECTED BY THE MARINER GREATER THAN ZERO ?	
YES	NO
SELECT SYMBOL 'PLNPOS02' (planned position) ROTATE SYMBOL TO 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 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'	DO NOTHING HERE
 SYMBOLIZATION IS FINISHED EXIT PROCEDURE	

12.2.7 Conditional Symbology Procedure 'LIGHTS05'

Applies to:	S-57 Object Class "light" (LIGHTS)
Spatial Object(s):	Point
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
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 depends on whether it is a light on a floating or fixed platform, its range, it's colour and so on. 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:

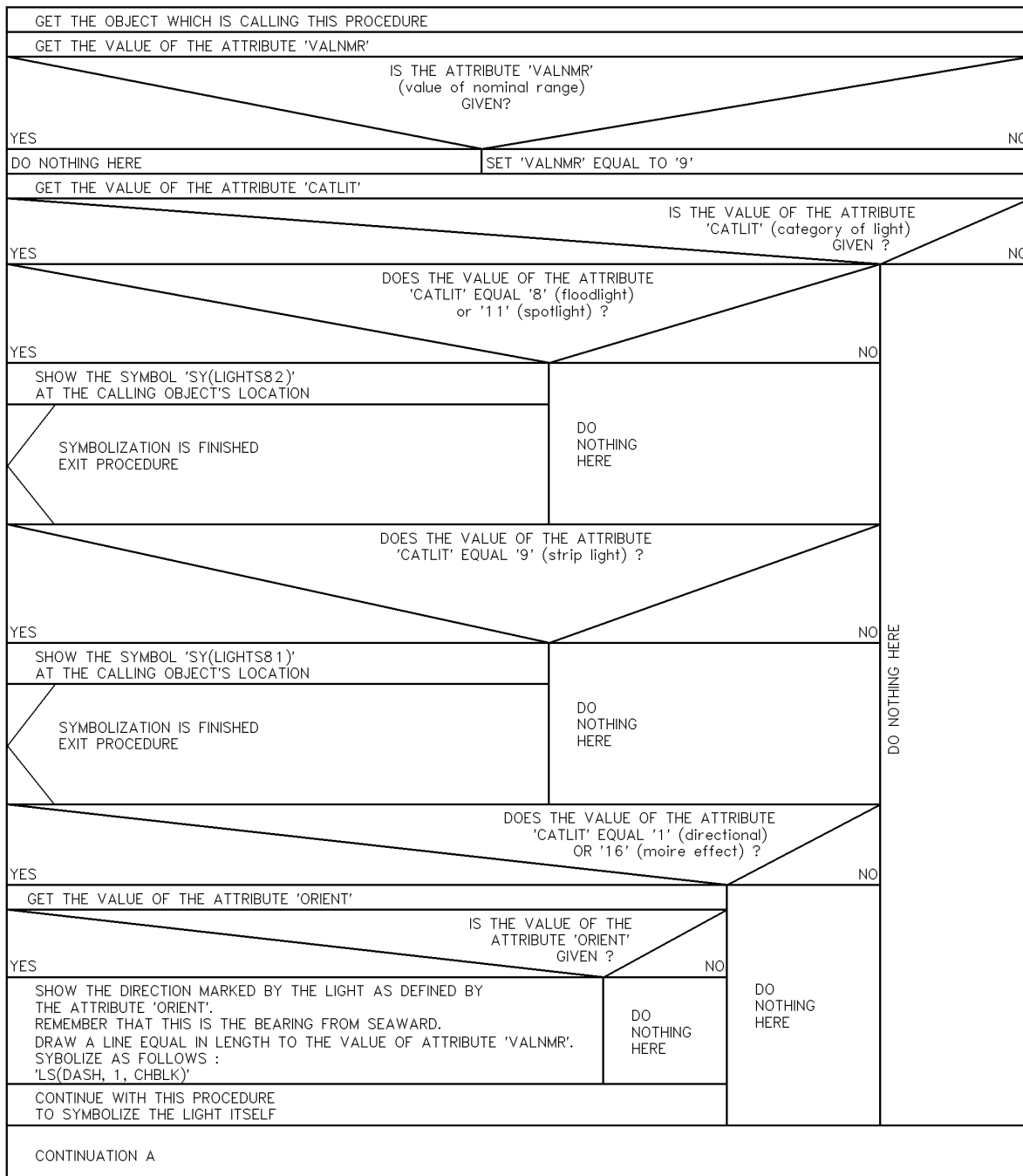
- 1.) The radial leg-lines defining the light sectors are normally drawn to only 25mm from the light to avoid clutter (see continuation B). However, the mariner should be able to select «full light-sector lines» and have the leg-lines extended to the nominal range of the light (VALMAR).
- 2.) Continuation 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.

LIGHTS05

Conditional symbology procedure for symbolization
of objects of the class 'lights'.



LIGHTS05 Continuation A

True		IS THE ATTRIBUTE 'COLOUR' DEFINED?		False	
GET THE VALUE OF THE ATTRIBUTE 'COLOUR'			ASSUME THE VALUE OF THE COLOUR IS '12' (magenta)		
True		IS THE ATTRIBUTE 'SECTR1' (sector 1) OR 'SECTR2' (sector 2) ABSENT (not given)?		False	
True		IS THERE ANY 'NO SECTOR' LIGHTS LOCATED AT THE SAME POINT AS THE CALLING OBJECT?		False	
SET THE LOCAL VARIABLE 'FLARE AT 45 DEGREES' TO 'FALSE'			DO NOTHING HERE		
DOES THE COLOUR OF THE CALLING OBJECT INCLUDE '1'(white) OR '6'(yellow) OR '11'(orange)?					
True					
SET LOCAL VARIABLE 'FLARE AT 45 DEGREES' TO 'TRUE'			DO NOTHING HERE		
SELECT A SYMBOL WHICH IS APPROPRIATE. VALUE OF ATTRIBUTE 'COLOUR' EQUALS ...					
'1' AND '3' (white & red)		SELECT 'SY(LIGHTS11)'			
'3' (red)		SELECT 'SY(LIGHTS11)'			
'1' AND '4' (white & green)		SELECT 'SY(LIGHTS12)'			
'4' (green)		SELECT 'SY(LIGHTS12)'			
'11' (orange)		SELECT 'SY(LIGHTS13)'			
'6' (yellow)		SELECT 'SY(LIGHTS13)'			
'1' (white)		SELECT 'SY(LIGHTS13)'			
other (default)		SELECT 'SY(LITDEF11)'			
True		DOES THE VALUE OF THE ATTRIBUTE 'CATLIT' EQUAL '1' (directional) OR '16' (moire)?		False	
True		IS THE VALUE OF THE ATTRIBUTE 'ORIENT' GIVEN ?		False	
True		IS 'FLARE AT 45 DEGREES' SET TO 'TRUE'?		False	
SHOW THE SELECTED SYMBOL AT THE CALLING OBJECT'S LOCATION, ROTATED IN THE DIRECTION AS DEFINED BY THE ATTRIBUTE 'ORIENT', AND WRITE THE DIRECTION FROM SEAWARD AT THE LIGHT AS FOLLOWS: "TE('003.0° deg', 'ORIENT', 3, 3, '15110', 3, 1, CHBLK, 23)"		SELECT THE SYMBOL 'SY(QUESMRK1)'		SHOW THE SELECTED SYMBOL WITH A ROTATION OF 45 DEGREES FROM UPRIGHT AT THE POSITION WHERE THE LIGHT OBJECT WHICH WAS CALLING THE PROCEDURE IS LOCATED	
		SHOW THE SYMBOL AT THE CALLING OBJECT'S LOCATION		SHOW THE SELECTED SYMBOL WITH A ROTATION OF 135 DEGREES FROM UPRIGHT AT THE POSITION WHERE THE LIGHT OBJECT WHICH WAS CALLING THE PROCEDURE IS LOCATED	
HAS THE MARINER SELECTED VIEWING OF LIGHT DESCRIPTIONS ? (TEXT GROUP 23)					
True		False			
LITDSN01			DO NOTHING HERE		
PASS ON TO THIS PROCEDURE THE ATTRIBUTES : 'CATLIT', 'LITCHR', 'SIGGRP', 'COLOUR', 'SIGPER', 'HEIGHT', 'VALNMR', 'STATUS'. THIS PROCEDURE CONSTRUCTS A TEXT STRING FOR THE LIGHT DISCRIPTION, THIS STRING IS RETURNED AS THE ARGUMENT 'LITDSN'.					
IS 'FLARE AT 45 DEGREES' SET TO 'TRUE' ?					
True			False		
WRITE THE RETURNED TEXT STRING 'LITDSN' AS FOLLOWS : TX('LITDSN', 3, 1, 3, '15110', 2, -1, CHBLK, 23)			WRITE THE RETURNED TEXT STRING 'LITDSN' AS FOLLOWS : TX('LITDSN', 3, 2, 3, '15110', 2, 0, CHBLK, 23)		
EXIT PROCEDURE SYMBOLIZATION IS FINISHED					
CONTINUATION B					

DO
NOTHING
HERE

LIGHTS05 Continuation B

IS THE VALUE OF THE ATTRIBUTE 'SECTR1' GIVEN ?		YES	NO
DO NOTHING HERE		ASSUME IT'S AN ALL-ROUND LIGHT (fall-safe); SET THE VALUE OF 'SECTR1' TO 0 DEGREES; SET THE VALUE OF 'SECTR2' TO 0 DEGREES	
IS THE LIGHT OBJECT AN ALL-ROUND LIGHT (difference between value of 'SECTR1' and 'SECTR2' equals zero degrees)?		YES	NO
SELECT A SYMBOL WHICH IS APPROPRIATE. VALUE OF ATTRIBUTE 'COLOUR' EQUALS ...		MAKE SURE THAT THE VALUE OF 'SECTR2' IS GREATER THAN THE VALUE OF 'SECTR1'; IF NOT, ADD 360 DEGREES TO THE VALUE OF 'SECTR2'.	
'1' and '3' (white & red) '3' (red) '1' and '4' (white & green) '4' (green) '11' (orange) '6' (yellow) '1' (white) other (default)		HAS THE MARINER SELECTED FULL LENGTH LIGHT SECTOR LINES ?	
SELECT 'SY(LIGHTS11)' SELECT 'SY(LIGHTS11)' SELECT 'SY(LIGHTS12)' SELECT 'SY(LIGHTS12)' SELECT 'SY(LIGHTS13)' SELECT 'SY(LIGHTS13)' SELECT 'SY(LIGHTS13)' SELECT 'SY(LIGHTS13)' SELECT 'SY(LITDEF11)'		YES	NO
SHOW THE SELECTED SYMBOL WITH A ROTATION OF 135 DEGREES FROM UPRIGHT AT THE CALLING OBJECT'S LOCATION		'LELEN' = 'VALNR'	
HAS THE MARINER SELECTED VIEWING OF LIGHT DESCRIPTIONS ? (TEXT GROUP 23)		'LELEN' = 25mm ON THE DISPLAY	
YES	NO		
LITDSNO 1		SHOW BOTH SECTOR LEGS; 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; SELECT 'LS(DASH, 1, CHBLK)'	
PASS ON TO THIS PROCEDURE THE ATTRIBUTES : 'CATLIT', 'LITCHR', 'SIGGRP', 'COLOUR', 'SIGPER', 'HEIGHT', 'VALNR', 'STATUS'.		USE LELEN FROM THE STEP ABOVE.	
THIS PROCEDURE CONSTRUCTS A TEXT STRING FOR THE LIGHT DESCRIPTION. THIS STRING IS RETURNED AS THE ARGUMENT 'LITDSN'.		(THE LITDSN TEXT STRING IS NOT USED FOR SECTOR LIGHTS BECAUSE IT WOULD CAUSE CLUTTER.)	
WRITE THE RETURNED TEXT STRING 'LITDSN' AS FOLLOWS : 'TX(LITDSN, 3, 2, 3, '15110', 2, 0, CHBLK, 23)'			
SYMBOLIZATION IS FINISHED EXIT PROCEDURE			
IS THERE ANY OTHER 'LIGHTS' OBJECT LOCATED AT THE SAME POINT AS THE CALLING OBJECT?			
YES			
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			
SET LOCAL VARIABLE 'EXTENDED ARC RADIUS' TO 'FALSE'			
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)			
YES			
IS THE ARC ('SECTR2'-'SECTR1') OF THE OTHER OBJECT LARGER THAN THE SECTOR ARC OF THE CALLING OBJECT?			
YES			
SET LOCAL VARIABLE 'EXTENDED ARC RADIUS' TO 'TRUE'			
DO NOTHING HERE			
DOES THE VALUE OF THE ATTRIBUTE 'LITVIS' (visibility of light) EQUAL '7' (obscured) OR '8' (partially obscured) OR '3' (faint)			
YES			
SELECT THE SIMPLE DASHED LIFESTYLE 1 UNIT WIDE, COLOUR 'CHBLK': 'LS(DASH, 1, CHBLK)'			
IS THE LOCAL VARIABLE 'EXTENDED ARC RADIUS' SET TO 'TRUE'?			
YES			
SELECT A FILL COLOUR WHICH IS APPROPRIATE. VALUE OF ATTRIBUTE 'COLOUR' EQUALS ...			
'1' AND '3' (white & red) '3' (red) '1' AND '4' (white & green) '4' (green) '11' (orange) '6' (yellow) '1' (white) other (default)			
SELECT 'AC(LITRD)' SELECT 'AC(LITRD)' SELECT 'AC(LITGN)' SELECT 'AC(LITGN)' SELECT 'AC(LITYW)' SELECT 'AC(LITYW)' SELECT 'AC(LITYW)' SELECT 'AC(LITYW)' SELECT 'AC(CHMGD)'			
SELECT THE SIMPLE SOLID LIFESTYLE, 2 UNITS WIDE, COLOUR AS SELECTED ABOVE			
IS THE LOCAL VARIABLE 'EXTENDED ARC RADIUS' SET TO 'TRUE'?			
YES			
FIRST SYMBOLIZE THE ARC WITH A SOLID LINE, 4 UNITS WIDE, COLOUR OUTLW THEN SYMBOLIZE THE ARC WITH THE COLOUR, LIFESTYLE AND LINE WIDTH SELECTED ABOVE. RADIUS ON THE DISPLAY IS 25mm.			
FIRST SYMBOLIZE THE ARC WITH A SOLID LINE, 4 UNITS WIDE, COLOUR OUTLW THEN SYMBOLIZE THE ARC WITH THE COLOUR, LIFESTYLE AND LINE WIDTH SELECTED ABOVE. RADIUS ON THE DISPLAY IS 20mm.			
SHOW THE SECTOR ARC: COLOUR, LIFESTYLE AND LINE WIDTH AS SELECTED ABOVE. RADIUS ON THE DISPLAY IS 25mm.			
SHOW THE SECTOR ARC: COLOUR, LIFESTYLE AND LINE WIDTH AS SELECTED ABOVE. RADIUS ON THE DISPLAY IS 20mm.			
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-colours 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.			
SYMBOLIZATION IS FINISHED EXIT PROCEDURE			

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.

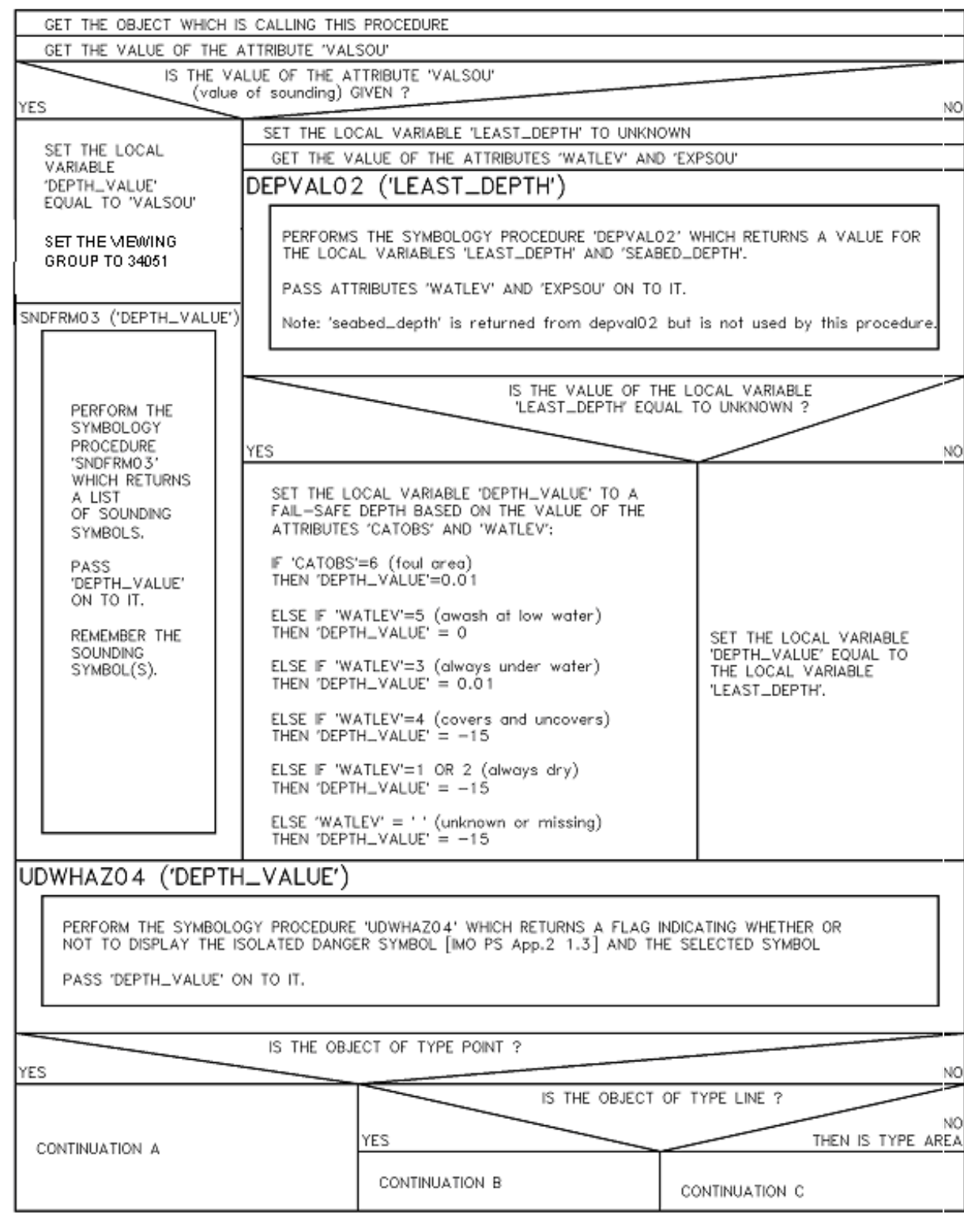
A program LITTST, intended for testing LITDSN, is also included.

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:	<p>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 and put in IMO category "DISPLAY BASE" (see IMO Performance Standard for ECDIS [3]). 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.</p> <p>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.</p> <p>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).</p>

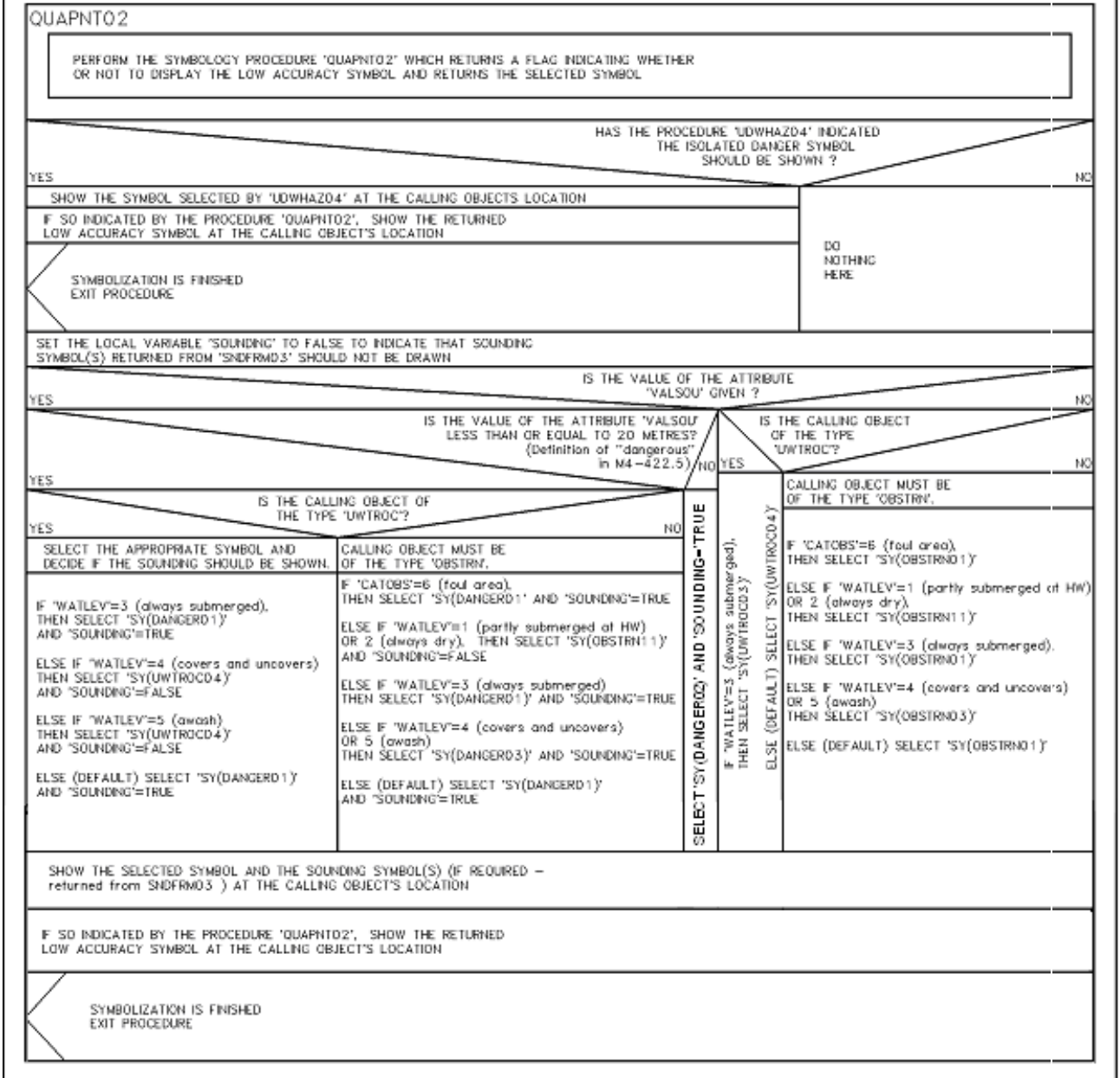
OBSTRN06

Conditional symbology procedure for symbolizing objects of the class obstruction (OBSTRN) and underwater rock (UWTROC).



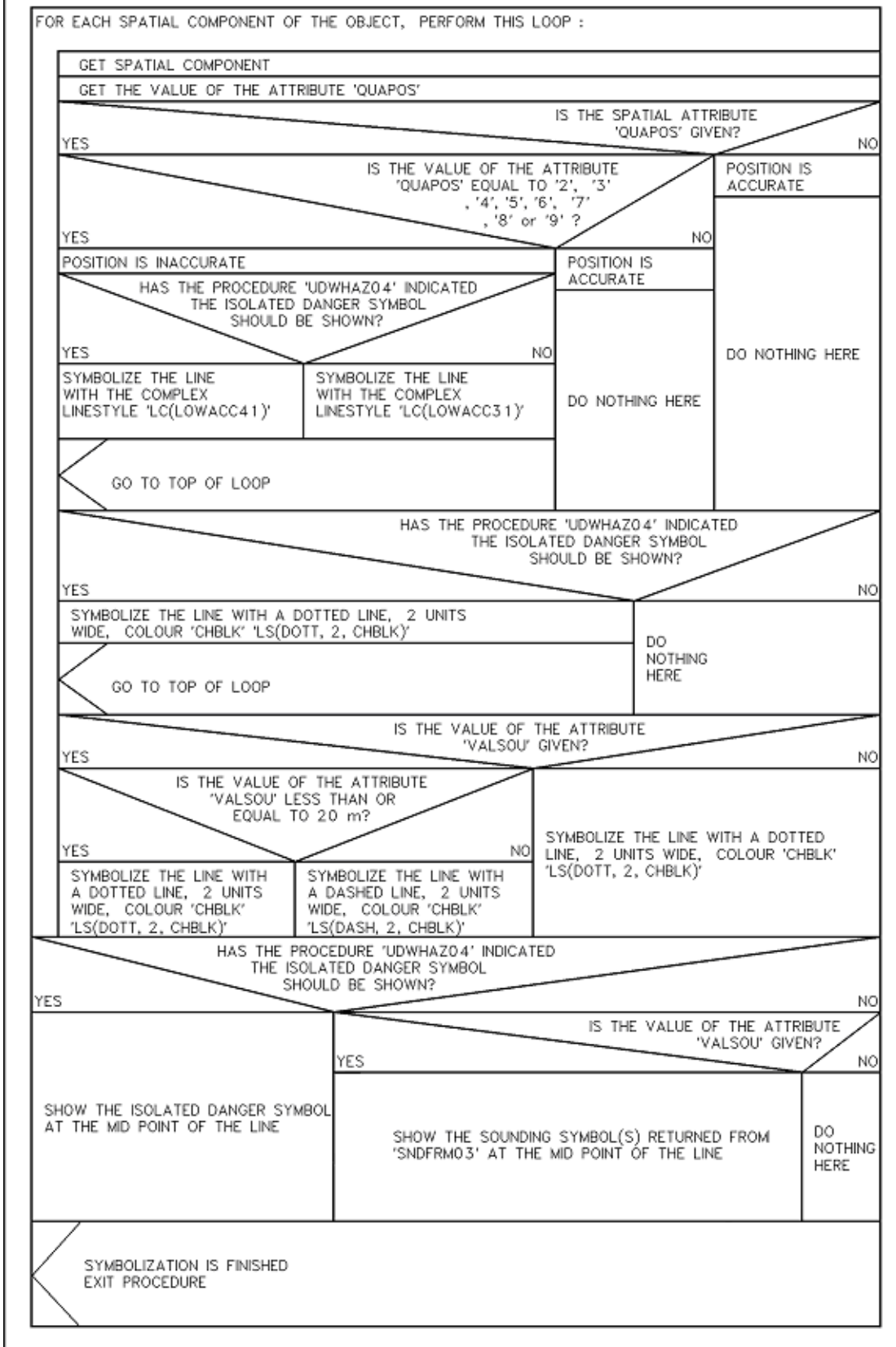
OBSTRN06 Continuation A

Point objects, underwater rocks (UWTROC) and obstructions (OBSTRN)



OBSTRN06 Continuation B

Line objects, obstructions (OBSTRN)

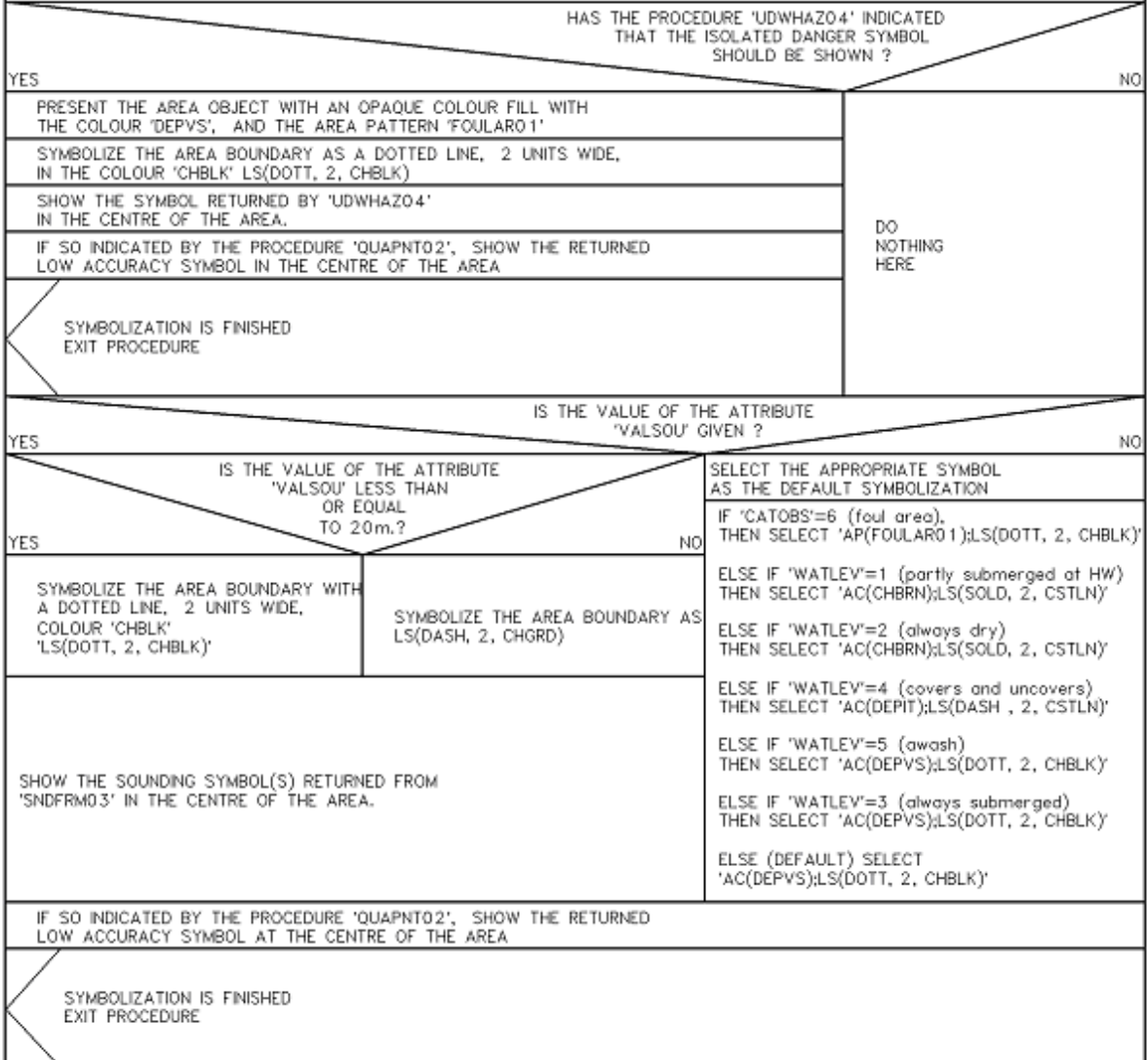


OBSTRN06 Continuation C

Area objects, obstructions (OBSTRN)

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



12.2.10 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 (stwsdpd)
 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.
 - 1.2.2 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 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

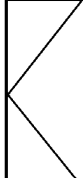
Defaults: Display Priority given by look-up table
OVERRADAR priority given by look-up table
Display Category given by look-up table
Viewing Group given by look-up table

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]). 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'.

PASTRK01

Conditional symbology procedure for symbolization of objects of the class 'pastrk' (past track)

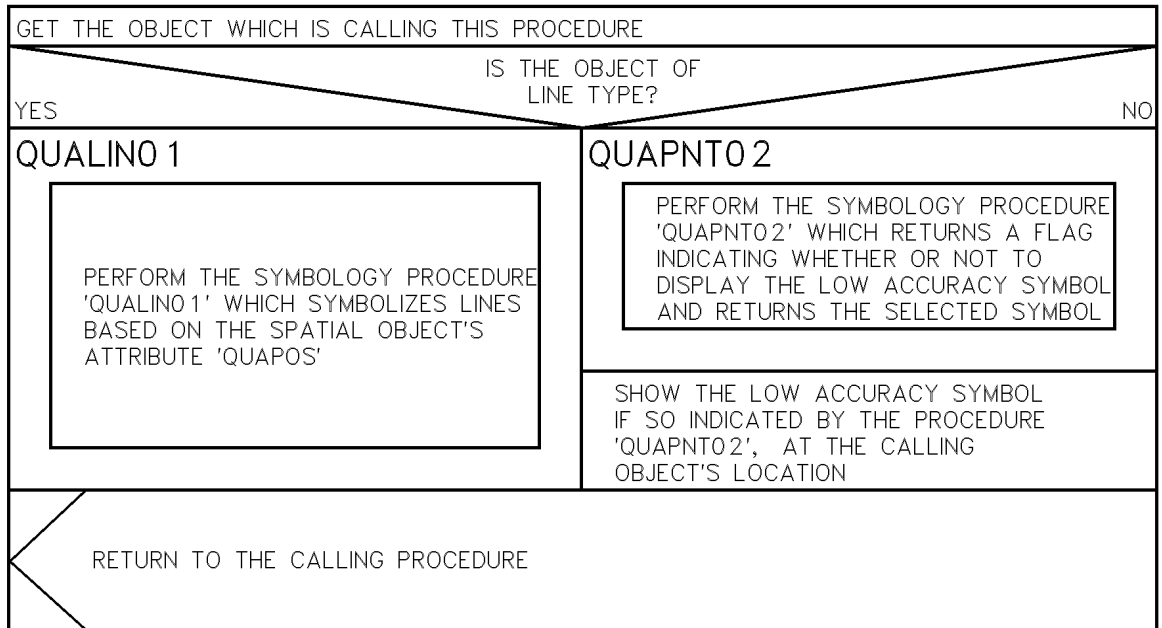
GET THE OBJECT WHICH IS CALLING THIS PROCEDURE	
GET THE VALUE OF THE OBJECT'S ATTRIBUTE 'catpst' (category of pasttrack)	
DOES THE VALUE OF THE ATTRIBUTE 'catpst' EQUAL '1' (primary pasttrack) ?	
YES	NO
SYMBOLIZE THE PRIMARY PAST TRACK WITH A SOLID LINE, 2 UNITS WIDE, COLOUR 'PSTRK' 'LS(SOLD, 2, PSTRK)'	SYMBOLIZE THE SECONDARY PAST TRACK WITH A SOLID LINE, 1 UNIT WIDE, COLOUR 'SYTRK' 'LS(SOLD, 1, SYTRK)'
SELECT SYMBOL 'SY(PASTRK01)'	SELECT SYMBOL 'SY(PASTRK02)'
SET CATEGORY TO 'STANDARD'	SET CATEGORY TO 'STANDARD'
SET VIEWING GROUP TO '52430'	SET VIEWING GROUP TO '52460'
IS THE VALUE OF THE 'TIME-TAGS' ENTERED BY THE MARINER GREATER THAN ZERO ?	
YES	NO
<p>PLACE A COPY OF THE SELECTED SYMBOL AT EACH RECORDED POSITION OF THE PAST TRACK WHERE THE RECORDED TIME IS A MULTIPLE OF 'TIME-TAGS'.</p> <p>ROTATE THE SYMBOL TO THE ORIENTATION OF THE RESPECTIVE PAST TRACK SECTION.</p> <p>PLACE A TEXT LABEL WITH PREFIX "I" AT THE SYMBOL'S POSITION SHOWING THE RECORDED TIME IN INTEGER MINUTES (hhmm OR mm). USE THE COLOUR 'CHBLK'. FONT IS SANS-SERIF, NON-ITALIC, CHARACTER WEIGHT IS 'MEDIUM', BODY SIZE 10</p> <p>[IMO PS 10.5.11.1]</p>	DO NOTHING HERE
 <p>SYMBOLIZATION IS FINISHED EXIT PROCEDURE</p>	

12.2.12 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 from SENC
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:	<p>The attribute QUAPOS, which identifies low positional accuracy, is attached to the spatial object, not the feature object</p> <p>This procedure passes the object to procedure QUALINnn or QUAPNTnn, which traces back to the spatial object, retrieves any QUAPOS attributes, and returns the appropriate symbolization to QUAPOSnn.</p>

QUAPOS0 1

Conditional Symbology Procedure to apply spatial attribute 'QUAPOS' to 'LNDARE' and 'COALNE'.



12.2.13 Conditional Symbology Procedure 'QUALINnn'

(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(s): Line

Attribute(s) used: spatial attribute QUAPOS

Parameter(s): Object to be symbolised from SENC.

Defaults: Display Priority given by look-up table

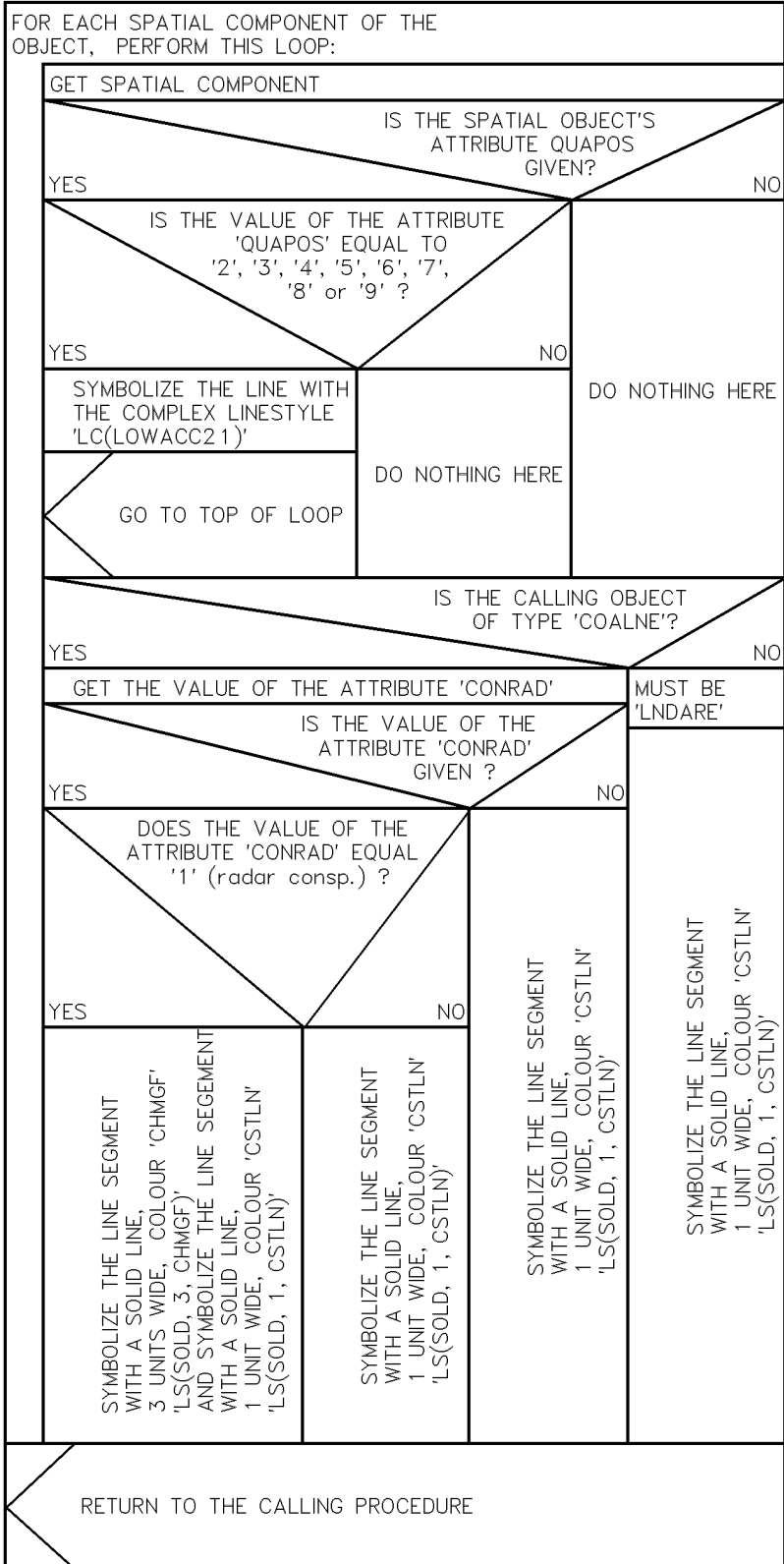
OVERRADAR priority given by look-up table
Display Category given by look-up table
Viewing Group given by look-up table

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. This procedure looks at each of the spatial objects, and symbolizes the line according to the positional accuracy.

QUALINO 1

Conditional Symbology Procedure for the symbology of line objects when positional accuracy is low.
Please note that this procedure is called by other procedures.



12.2.14 Conditional Symbology Procedure 'QUAPNTnn'

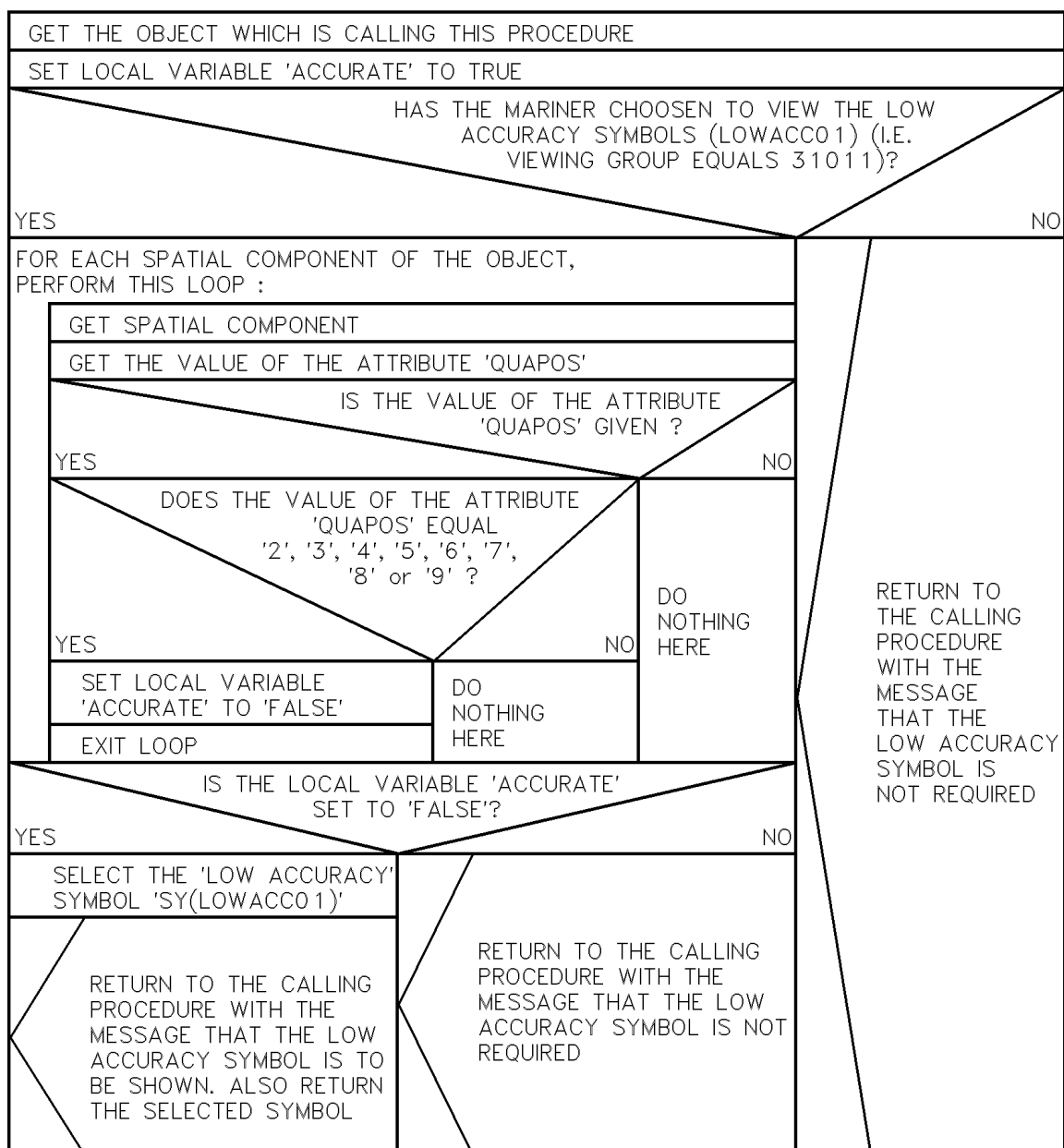
(Note that this is called as a sub-procedure by QUAPOSnn, WRECKSnn).

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 attribute QUAPOS
Parameter(s):	Object to be symbolised from SENC.
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:	<p>The attribute QUAPOS, which identifies low positional accuracy, is attached only to the spatial component(s) of an object.</p> <p>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.</p>

QUAPNT02

Conditional Symbology Procedure for additional symbolgy
for point and area objects when positional accuracy is low.

Please note that this procedure is called by other procedures.



12.2.15 Conditional Symbology Procedure 'RESAREnn'

Applies to: S-57 objects of class Restricted Area (RESARE)

Spatial Object(s): Area

Attribute(s) used CATREA, RESTRN (List-type)

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

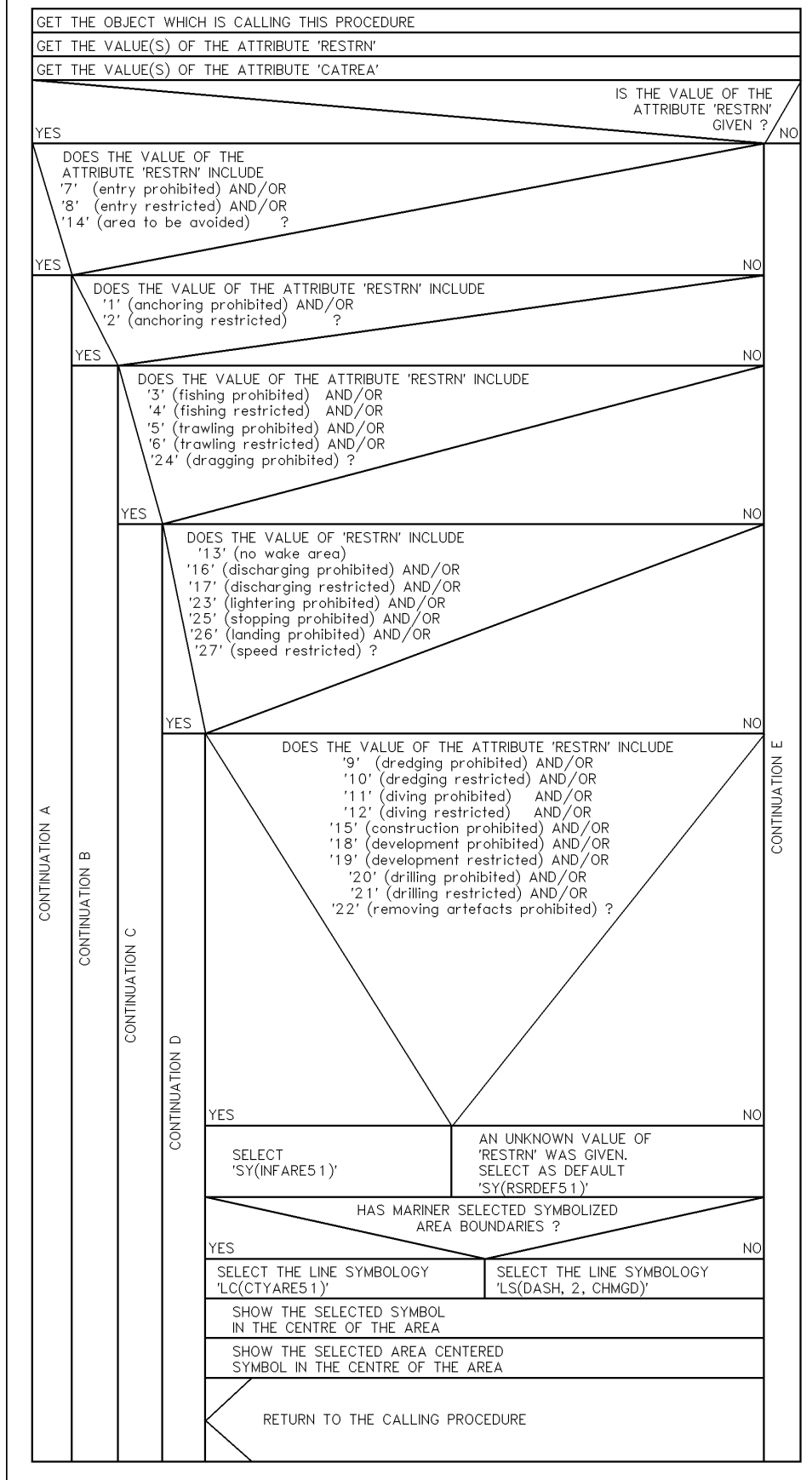
Remarks: A list-type attribute is used because an area of the object class RESARE may have more than one category (CATREA). For example an inshore traffic zone might also have fishing and anchoring prohibition and a prohibited area might also be a bird sanctuary or a mine field.

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 attribute RESTRN are handled by conditional symbology procedure RESTRNnn.

RESARE03

Conditional symbology procedure for all objects RESARE.



RESARE03 Continuation A

Entry Restricted or prohibited

		DOES THE VALUE OF THE ATTRIBUTE 'RESTRN' INCLUDE '1' (anchoring prohibited) AND/OR '2' (anchoring restricted) AND/OR '3' (fishing prohibited) AND/OR '4' (fishing restricted) AND/OR '5' (trawling prohibited) AND/OR '6' (trawling restricted) AND/OR '13' (no wake area) AND/OR '16' (discharging prohibited) AND/OR '17' (discharging restricted) AND/OR '23' (lightering prohibited) AND/OR '24' (dragging prohibited) AND/OR '25' (stopping prohibited) AND/OR '26' (landing prohibited) AND/OR '27' (speed restricted) ?		YES	NO
		IS THE VALUE OF THE ATTRIBUTE 'CATREA' GIVEN AND DOES IT INCLUDE '1' (offshore safety zone) and/or '8' (degaussing area) and/or '9' (military area) and/or '12' (navigation aid safety zone) and/or '14' (minefield) and/or '18' (swimming area) and/or '19' (waiting area) and/or '21' (dredging area) and/or '24' (no wake area) and/or '25' (swinging area) and/or '26' (water skiing area) ?		YES	NO
SELECT THE AREA CENTERED SYMBOL 'SY(ENTRES6 1)'		DOES THE VALUE OF THE ATTRIBUTE 'RESTRN' INCLUDE '9' (dredging prohibited) AND/OR '10' (dredging restricted) AND/OR '11' (diving prohibited) AND/OR '12' (diving restricted) AND/OR '15' (construction prohibited) AND/OR '18' (development prohibited) AND/OR '19' (development restricted) AND/OR '20' (drilling prohibited) AND/OR '21' (drilling restricted) AND/OR '22' (removing artefacts prohibited) ?		YES	NO
	SELECT THE AREA CENTERED SYMBOL 'SY(ENTRES7 1)'	IS THE VALUE OF THE ATTRIBUTE 'CATREA' GIVEN AND DOES IT INCLUDE '4' (nature reserve) AND/OR '5' (bird sanctuary) AND/OR '6' (game preserve) AND/OR '7' (seal sanctuary) AND/OR '10' (historic wreck) AND/OR '20' (research area) AND/OR '22' (fish sanctuary) AND/OR '23' (ecological reserve) ?		YES	NO
		SELECT THE AREA CENTERED SYMBOL 'SY(ENTRES7 1)'	SELECT THE AREA CENTERED SYMBOL 'SY(ENTRES5 1)'		
	HAS MARINER SELECTED SYMBOLIZED AREA BOUNDARIES ?				
YES		NO			
SELECT THE LINE SYMBOLOGY 'LC(CTYARE51)'			SELECT THE LINE SYMBOLOGY 'LS(DASH, 2, CHMGD)'		
SET DISPLAY PRIORITY = 6					
SYMBOLIZE AREA BOUNDARY WITH THE LINE SYMBOLOGY SELECTED ABOVE					
SHOW THE SELECTED AREA CENTERED SYMBOL IN THE CENTRE OF THE AREA					
SYMBOLIZATION IS FINISHED EXIT PROCEDURE					

RESARE03 Continuation B

Anchoring restricted or prohibited

		DOES THE VALUE OF THE ATTRIBUTE 'RESTRN' INCLUDE '3' (fishing prohibited) AND/OR '4' (fishing restricted) AND/OR '5' (trawling prohibited) AND/OR '6' (trawling restricted) AND/OR '13' (no wake area) AND/OR '16' (discharging prohibited) AND/OR '17' (discharging restricted) AND/OR '23' (lightering prohibited) AND/OR '24' (dragging prohibited) AND/OR '25' (stopping prohibited) AND/OR '26' (landing prohibited) AND/OR '27' (speed restricted) ?	
		YES	NO
		IS THE VALUE OF THE ATTRIBUTE 'CATREA' GIVEN AND DOES IT INCLUDE '1' (offshore safety zone) and/or '8' (degaussing area) and/or '9' (military area) and/or '12' (navigation aid safety zone) and/or '14' (minefield) and/or '18' (swimming area) and/or '19' (waiting area) and/or '21' (dredging area) and/or '24' (no wake area) and/or '25' (swinging area) and/or '26' (water skiing area) ?	
		YES	NO
SELECT THE AREA CENTERED SYMBOL 'SY(ACHRES61)'	DOES THE VALUE OF THE ATTRIBUTE 'RESTRN' INCLUDE '9' (dredging prohibited) AND/OR '10' (dredging restricted) AND/OR '11' (diving prohibited) AND/OR '12' (diving restricted) AND/OR '15' (construction prohibited) AND/OR '18' (development prohibited) AND/OR '19' (development restricted) AND/OR '20' (drilling prohibited) AND/OR '21' (drilling restricted) AND/OR '22' (removing artefacts prohibited) ?		
	YES	NO	
	IS THE VALUE OF THE ATTRIBUTE 'CATREA' GIVEN AND DOES IT INCLUDE '4' (nature reserve) AND/OR '5' (bird sanctuary) AND/OR '6' (game preserve) AND/OR '7' (seal sanctuary) AND/OR '10' (historic wreck) AND/OR '20' (research area) AND/OR '22' (fish sanctuary) AND/OR '23' (ecological reserve) ?		
	YES	NO	
	SELECT THE AREA CENTERED SYMBOL 'SY(ACHRES71)'	SELECT THE AREA CENTERED SYMBOL 'SY(ACHRES51)'	
HAS MARINER SELECTED SYMBOLIZED AREA BOUNDARIES ?			
YES		NO	
SELECT THE LINE SYMBOLOGY 'LC(ACHRES51)'		SELECT THE LINE SYMBOLOGY 'LS(DASH, 2, CHMGD)'	
SET DISPLAY PRIORITY = 6			
SYMBOLIZE AREA BOUNDARY WITH THE LINE SYMBOLOGY SELECTED ABOVE			
SHOW THE SELECTED AREA CENTERED SYMBOL IN THE CENTRE OF THE AREA			
SYMBOLIZATION IS FINISHED EXIT PROCEDURE			

RESARE03 Continuation C

Fishing restricted or prohibited

		DOES THE VALUE OF THE ATTRIBUTE 'RESTRN' INCLUDE '13' (no wake area) AND/OR '16' (discharging prohibited) AND/OR '17' (discharging restricted) AND/OR '23' (lightering prohibited) AND/OR '24' (dragging prohibited) AND/OR '25' (stopping prohibited) AND/OR '26' (landing prohibited) AND/OR '27' (speed restricted) ?	
		YES	NO
		IS THE VALUE OF THE ATTRIBUTE 'CATREA' GIVEN AND DOES IT INCLUDE '1' (offshore safety zone) and/or '8' (degaussing area) and/or '9' (military area) and/or '12' (navigation aid safety zone) and/or '14' (minefield) and/or '18' (swimming area) and/or '19' (waiting area) and/or '21' (dredging area) and/or '24' (no wake area) and/or '25' (swinging area) and/or '26' (water skiing area) ?	
		YES	NO
SELECT THE AREA CENTERED SYMBOL 'SY(FSHRES6 1)'	SELECT THE AREA CENTERED SYMBOL 'SY(FSHRES6 1)'	DOES THE VALUE OF THE ATTRIBUTE 'RESTRN' INCLUDE '9' (dredging prohibited) AND/OR '10' (dredging restricted) AND/OR '11' (diving prohibited) AND/OR '12' (diving restricted) AND/OR '15' (construction prohibited) AND/OR '18' (development prohibited) AND/OR '19' (development restricted) AND/OR '20' (drilling prohibited) AND/OR '21' (drilling restricted) AND/OR '22' (removing artefacts prohibited) ?	
		YES	NO
		IS THE VALUE OF THE ATTRIBUTE 'CATREA' GIVEN AND DOES IT INCLUDE '4' (nature reserve) AND/OR '5' (bird sanctuary) AND/OR '6' (game preserve) AND/OR '7' (seal sanctuary) AND/OR '10' (historic wreck) AND/OR '20' (research area) AND/OR '22' (fish sanctuary) AND/OR '23' (ecological reserve) ?	
		YES	NO
		SELECT THE AREA CENTERED SYMBOL 'SY(FSHRES7 1)'	SELECT THE AREA CENTERED SYMBOL 'SY(FSHRES5 1)'
HAS MARINER SELECTED SYMBOLIZED AREA BOUNDARIES ?			
YES		NO	
SELECT THE LINE SYMBOLOGY 'LC(FSHRES5 1)'		SELECT THE LINE SYMBOLOGY 'LS(DASH, 2, CHMGD)'	
SET DISPLAY PRIORITY = 6			
SYMBOLIZE AREA BOUNDARY WITH THE LINE SYMBOLOGY SELECTED ABOVE			
SHOW THE SELECTED CENTERED ARE SYMBOL IN THE CENTRE OF THE AREA			
SYMBOLIZATION IS FINISHED EXIT PROCEDURE			

RESARE03 Continuation D

Own ship restrictions

DOES THE VALUE OF THE ATTRIBUTE 'RESTRN' INCLUDE '9' (dredging prohibited) AND/OR '10' (dredging restricted) AND/OR '11' (diving prohibited) AND/OR '12' (diving restricted) AND/OR '15' (construction prohibited) AND/OR '18' (development prohibited) AND/OR '19' (development restricted) AND/OR '20' (drilling prohibited) AND/OR '21' (drilling restricted) AND/OR '22' (removing artefacts prohibited) ?		YES	
		NO	
SELECT THE AREA CENTERED SYMBOL 'SY(CTYARE71)'	IS THE VALUE OF THE ATTRIBUTE 'CATREA' GIVEN AND DOES IT INCLUDE '4' (nature reserve) AND/OR '5' (bird sanctuary) AND/OR '6' (game preserve) AND/OR '7' (seal sanctuary) AND/OR '10' (historic wreck) AND/OR '20' (research area) AND/OR '22' (fish sanctuary) AND/OR '23' (ecological reserve) ?		NO
	YES	NO	
SELECT THE AREA CENTERED SYMBOL 'SY(CTYARE71)'		SELECT THE AREA CENTERED SYMBOL 'SY(CTYARE51)'	
HAS MARINER SELECTED SYMBOLIZED AREA BOUNDARIES ?			
YES		NO	
SELECT THE LINE SYMBOLOGY 'LC(CTYARE51)'		SELECT THE LINE SYMBOLOGY 'LS(DASH, 2, CHMGD)'	
SET DISPLAY PRIORITY = 6			
SHOW THE SELECTED CENTERED ARE SYMBOL IN THE CENTRE OF THE AREA			
SYMBOLIZE AREA BOUNDARY WITH THE LINE SYMBOLOGY SELECTED ABOVE			
SYMBOLIZATION IS FINISHED EXIT PROCEDURE			

RESARE03 Continuation E

No 'RESTRN' applies

IS THE VALUE OF THE ATTRIBUTE 'CATREA' GIVEN ?	
YES	NO
IS THE VALUE OF THE ATTRIBUTE 'CATREA' GIVEN AND DOES IT INCLUDE '1' (offshore safety zone) and/or '8' (degaussing area) and/or '9' (military area) and/or '12' (navigation aid safety zone) and/or '14' (minefield) and/or '18' (swimming area) and/or '19' (waiting area) and/or '21' (dredging area) and/or '24' (no wake area) and/or '25' (swinging area) and/or '26' (water skiing area) ?	
YES	NO
DOES THE VALUE OF THE ATTRIBUTE 'CATREA' INCLUDE '4' (nature area) AND/OR '5' (bird sanctuary) AND/OR '6' (game preserve) AND/OR '7' (seal sanctuary) AND/OR '10' (historic wreck) AND/OR '20' (research area) AND/OR '22' (fish sanctuary) AND/OR '23' (ecological reserve) ?	DOES THE VALUE OF THE ATTRIBUTE 'CATREA' INCLUDE '4' (nature area) AND/OR '5' (bird sanctuary) AND/OR '6' (game preserve) AND/OR '7' (seal sanctuary) AND/OR '10' (historic wreck) AND/OR '20' (research area) AND/OR '22' (fish sanctuary) AND/OR '23' (ecological reserve) ?
YES	NO
SELECT THE AREA CENTERED SYMBOL 'SY(CTYARE71)'	SELECT THE AREA CENTERED SYMBOL 'SY(CTYARE51)'
YES	NO
SELECT THE AREA CENTERED SYMBOL 'SY(INFARE51)'	AN UNRECOGNIZED VALUE OF 'CATREA' WAS GIVEN SELECT AS DEFAULT THE AREA CENTERED SYMBOL 'SY(RSRDEF51)'
HAS MARINER SELECTED SYMBOLIZED AREA BOUNDARIES ?	
YES	NO
SELECT THE LINE SYMBOLOGY 'LC(CTYARE51)'	SELECT THE LINE SYMBOLOGY 'LS(DASH, 2, CHMGD)'
SYMBOLIZE AREA BOUNDARY WITH THE LINE SYMBOLOGY SELECTED ABOVE	
SHOW THE SELECTED AREA CENTERED SYMBOL IN THE CENTRE OF THE AREA	
<div style="border-left: 2px solid black; height: 20px; width: 20px; margin-left: 10px;"></div> SYMBOLIZATION IS FINISHED EXIT PROCEDURE	

12.2.16 Conditional Symbology Procedure 'RESTRNnn'

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

Parameter(s): Object to be symbolized from ENC.

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 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:

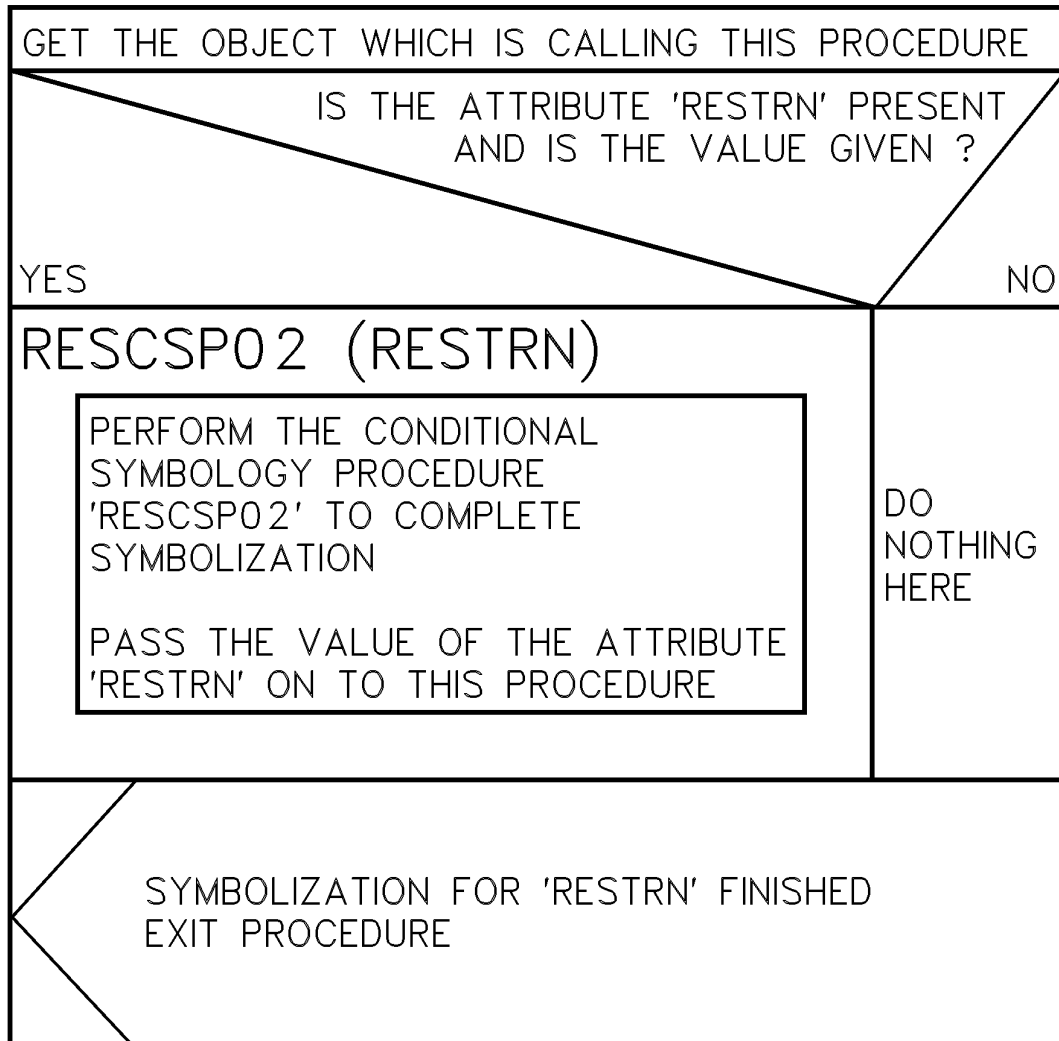
“Traffic Restriction” values of RESTRN:

- (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 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.

RESTRN0 1

Conditional symbology procedure for all objects having the attribute 'RESTRN'.



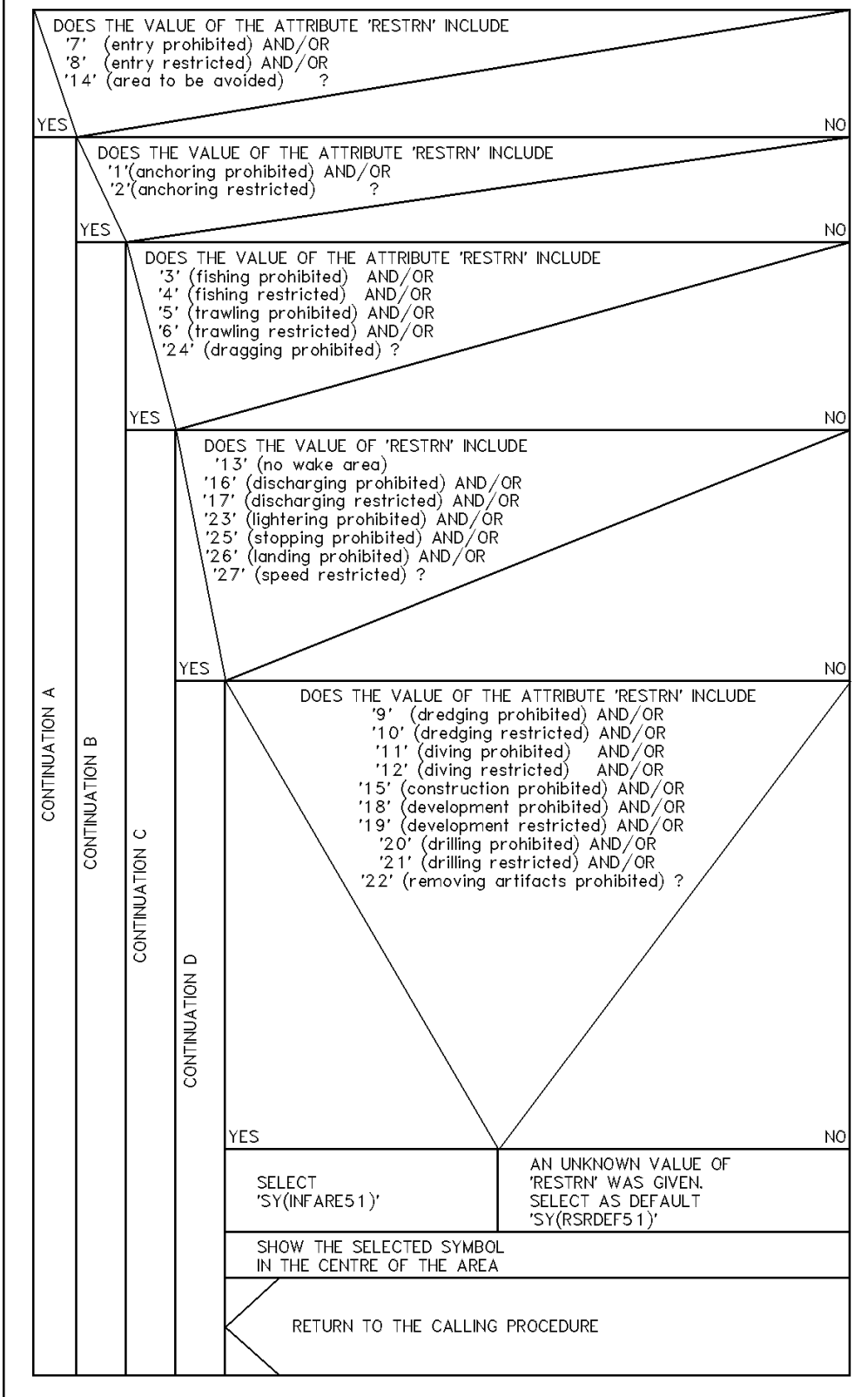
12.2.17 Conditional Symbology Procedure 'RESCSPnn'

(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.
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

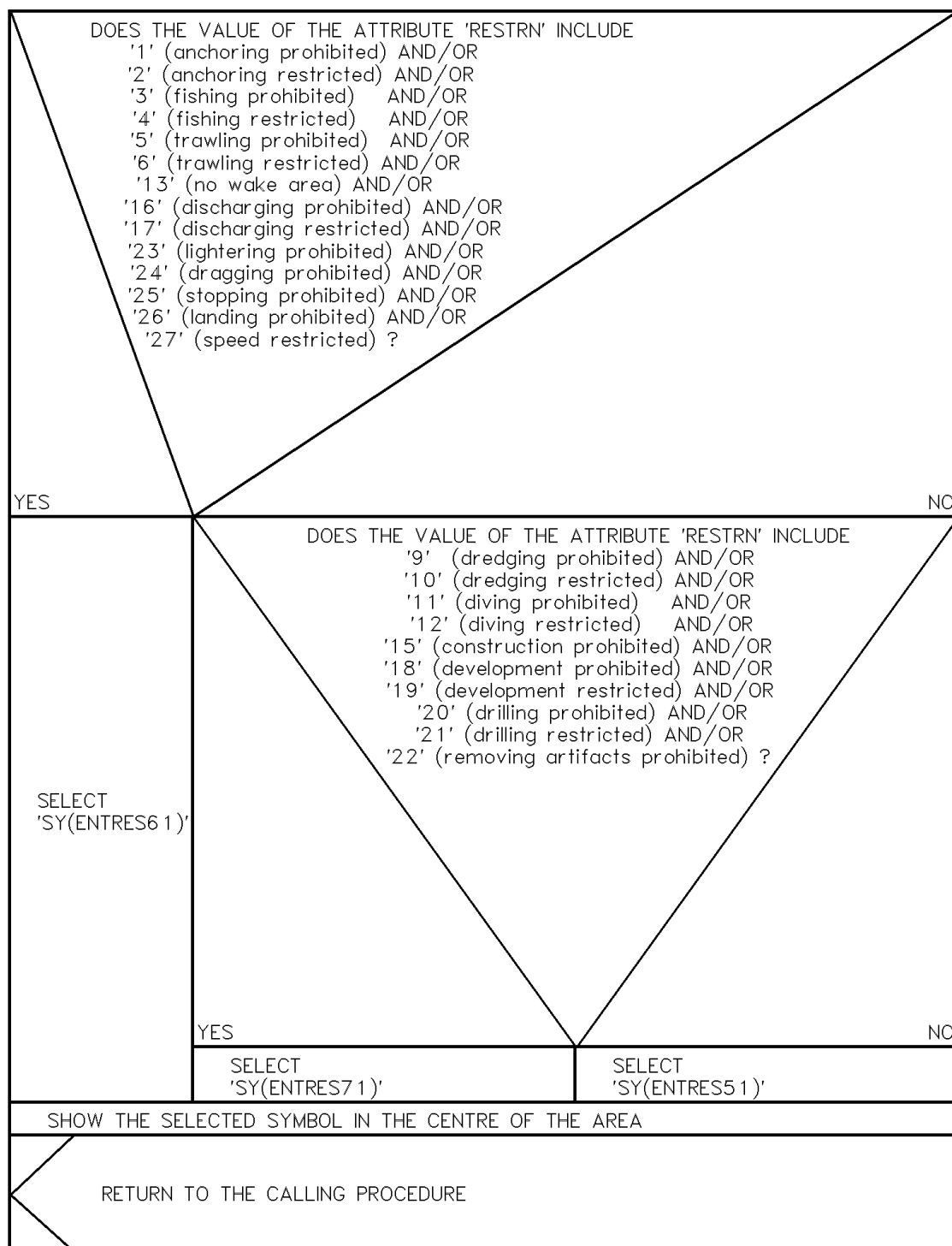
RESCSP02 (RESTRN)

Conditional symbology procedure for all objects having the attribute 'RESTRN'.
Please note that this symbology procedure is called by other procedures.
'RESTRN' is passed on to this procedure by the calling procedure.



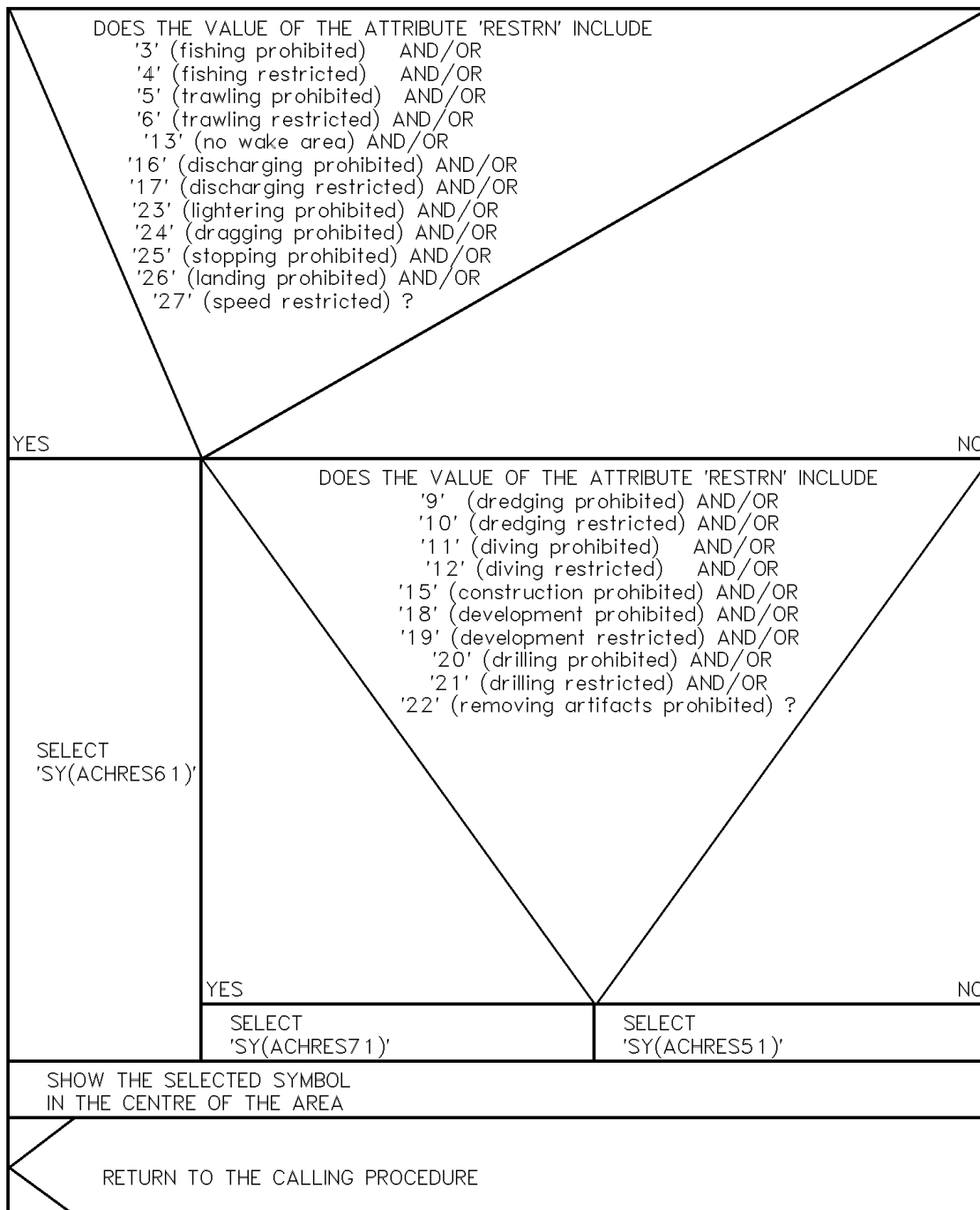
RESCSP02 Continuation A

Entry restricted or prohibited



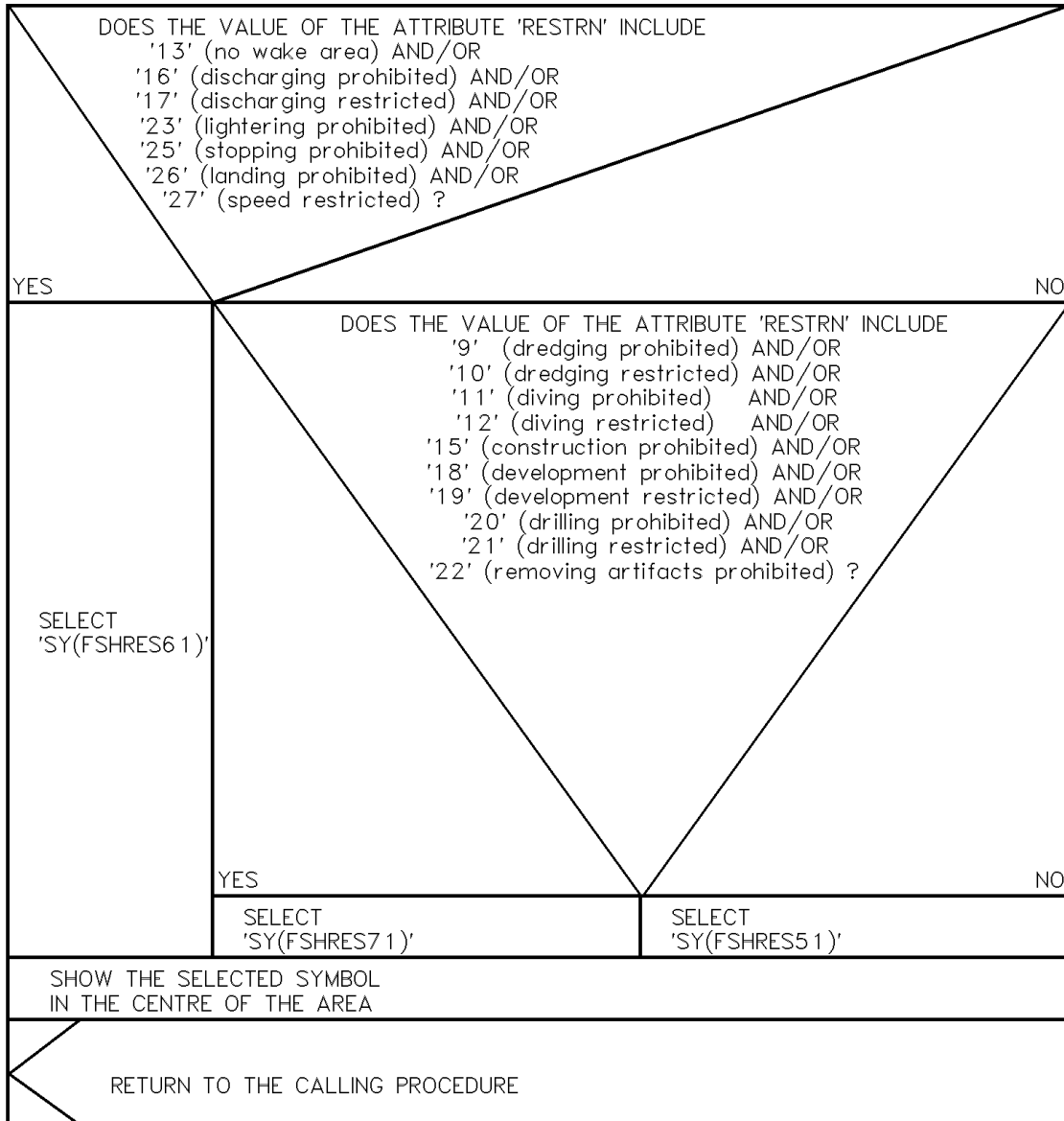
RESCSP02 Continuation B

Anchoring restricted or prohibited



RESCSP02 Continuation C

Fishing restricted or prohibited



RESCSP02 Continuation D

Own ship restrictions

<p>DOES THE VALUE OF THE ATTRIBUTE 'RESTRN' INCLUDE</p> <p>'9' (dredging prohibited) AND/OR</p> <p>'10' (dredging restricted) AND/OR</p> <p>'11' (diving prohibited) AND/OR</p> <p>'12' (diving restricted) AND/OR</p> <p>'15' (construction prohibited) AND/OR</p> <p>'18' (development prohibited) AND/OR</p> <p>'19' (development restricted) AND/OR</p> <p>'20' (drilling prohibited) AND/OR</p> <p>'21' (drilling restricted) AND/OR</p> <p>'22' (stealing artifacts prohibited) ?</p>	
YES	NO
SELECT 'SY(CTYARE71)'	SELECT 'SY(CTYARE51)'
SHOW THE SELECTED SYMBOL IN THE CENTRE OF THE AREA	
<p>RETURN TO THE CALLING PROCEDURE</p>	

12.2.18 Conditional Symbology Procedure 'SAFCONnn'

(Note that this is called as a sub-procedure by DEPAREnn and DEPCNTnn)

Applies to:	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.
Remarks:	This conditional procedure will create a list of symbols that will be displayed at the position of the contour label.

Note: Continuation A of this procedure, which symbolises contours of 100 metres 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.

SAFCON01

Conditional symbology procedure for symbolizing 'contour labels'. Please note that this symbology procedure is called by other procedures

CREATE A 'LIST OF SYMBOLS' TO BE PRESENTED AT THE POSITION OF THE CONTOUR LABEL. THIS LIST IS INITIALLY BLANK	
SET THE SYMBOL PREFIX VARIABLE TO 'SAFCON'	
IS 'DEPTH-VALUE' LESS THAN 0 METRES OR GREATER THAN 99999 METRES?	
YES	NO
RETURN TO THE CALLING PROCEDURE INDICATING THAT THE CONTOUR SYMBOLS COULD NOT BE DETERMINED.	
DO NOTHING HERE	
IS 'DEPTH-VALUE' LESS THAN 10 METRES AND HAS IT A FRACTIONAL VALUE?	
YES	NO
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	
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 TO THE CALLING PROCEDURE WITH THE 'LIST OF SYMBOLS' WHICH WERE SELECTED.	
IS 'DEPTH-VALUE' LESS THAN 10 METRES?	
YES	NO
CREATE SYMBOL NAME BY ADDING '00' + 'DEPTH-VALUE' TO 'SYMBOL-PREFIX'	
ADD THIS SYMBOL NAME TO THE 'LIST OF SYMBOLS' TO BE PRESENTED	
DO NOTHING HERE	
RETURN TO THE CALLING PROCEDURE WITH THE SYMBOL WHICH WAS SELECTED.	
IS 'DEPTH-VALUE' LESS THAN 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)	
YES	NO
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 '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 TO THE CALLING PROCEDURE WITH THE 'LIST OF SYMBOLS' WHICH WERE SELECTED.	
IS 'DEPTH-VALUE' LESS THAN 100 METRES?	
YES	NO
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	
RETURN TO THE CALLING PROCEDURE WITH THE 'LIST OF SYMBOLS' WHICH WERE SELECTED.	
CONTINUATION A	

SAFCON01 CONTINUATION A

IS 'DEPTH_VALUE' LESS THAN 1000 METRES?	
YES	NO
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	
ISOLATE 'SECOND_DIGIT' OF 'DEPTH_VALUE'. CREATE SYMBOL NAME BY ADDING '00' + 'LEADING_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 '90' + 'LEADING_DIGIT' TO 'SYMBOL_PREFIX'	
ADD THIS SYMBOL NAME TO THE 'LIST OF SYMBOLS' TO BE PRESENTED	
RETURN TO THE CALLING PROCEDURE WITH THE 'LIST OF SYMBOLS' WHICH WERE SELECTED.	
IS 'DEPTH_VALUE' LESS THAN 10000 METRES?	
YES	NO
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' + 'LEADING_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' + 'LEADING_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 '70' + 'LEADING_DIGIT' TO 'SYMBOL_PREFIX'	
ADD THIS SYMBOL NAME TO THE 'LIST OF SYMBOLS' TO BE PRESENTED	
RETURN TO THE CALLING PROCEDURE WITH THE 'LIST OF SYMBOLS' WHICH WERE SELECTED.	
IS 'DEPTH_VALUE' LESS THAN 100000 METRES?	
YES	NO
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	
ISOLATE 'SECOND_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 'THIRD_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 'FOURTH_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 'FIFTH_DIGIT' OF 'DEPTH_VALUE'. CREATE SYMBOL NAME BY ADDING '70' + 'LEADING_DIGIT' TO 'SYMBOL_PREFIX'	
ADD THIS SYMBOL NAME TO THE 'LIST OF SYMBOLS' TO BE PRESENTED	
RETURN TO THE CALLING PROCEDURE WITH THE 'LIST OF SYMBOLS' WHICH WERE SELECTED.	

12.2.19 Conditional Symbology Procedure 'SLCONSnn'

Applies to: S-57 Object Class "shoreline construction" (SLCONS)

Spatial Object(s): Point, Line, Area

Attribute(s) used: Spatial attribute QUAPOS

Parameter(s): Object to be symbolised from SENC

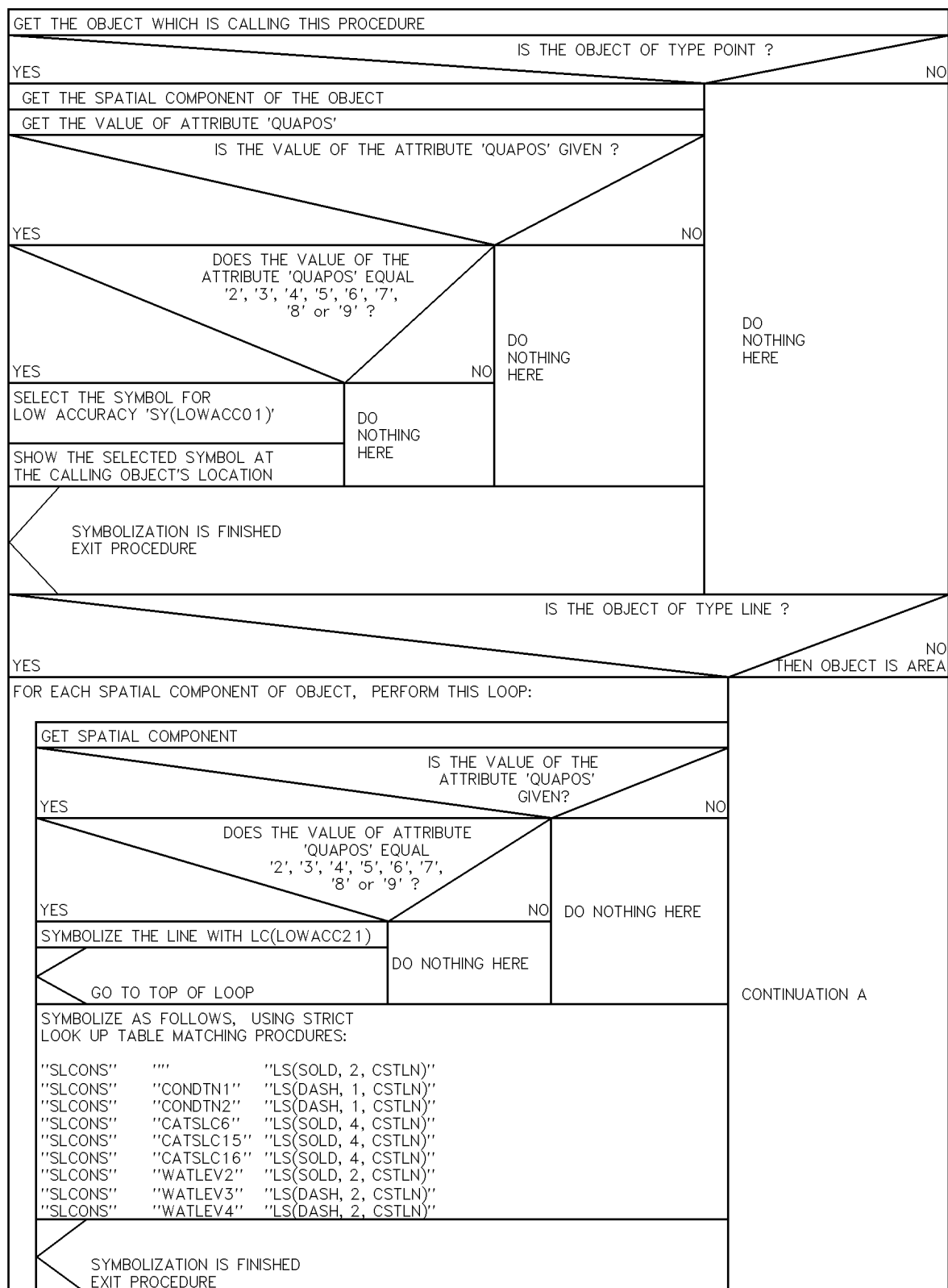
Defaults: Display Priority given by look-up table
OVERRADAR priority given by look-up table
Display Category given by look-up table
Viewing Group given by look-up table

Remarks: 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.

Note: This procedure does not offer the option of removing the low accuracy symbol from a point object.

SLCONS03

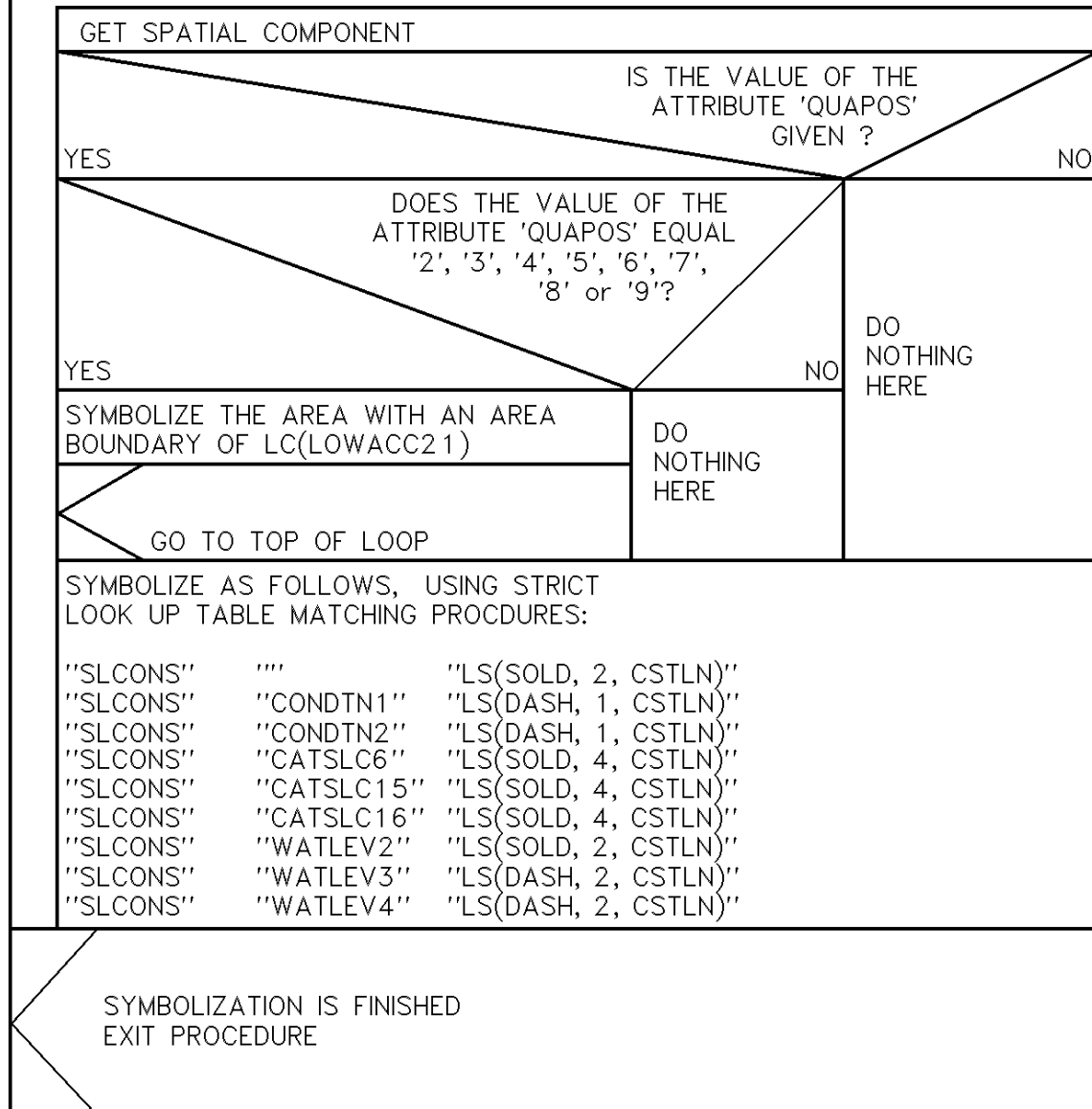
Conditional Symbolology Procedure for symbolizing shoreline construction objects.



SLCONS03 Continuation A

Continuation A: Type Area

FOR EACH SPATIAL COMPONENT OF THE AREA BOUNDARY, PERFORM THIS LOOP :



12.2.20 Conditional Symbology Procedure 'SEABEDnn'

(Note that this is a sub-procedure called by DEPAREnn)

Applies to: Symbolization of areas that form the seabed

Spatial Object(s): Area

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
 TWO_SHADES flag selected by the mariner
 (TWO_SHADES 'on' draws 2 depth area colour shades, 'off' draws 4)
 SHALLOW_PATTERN 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 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
<u>(safety contour)</u>
shallow/unsafe water depth shade

b. FOUR DEPTH SHADES:

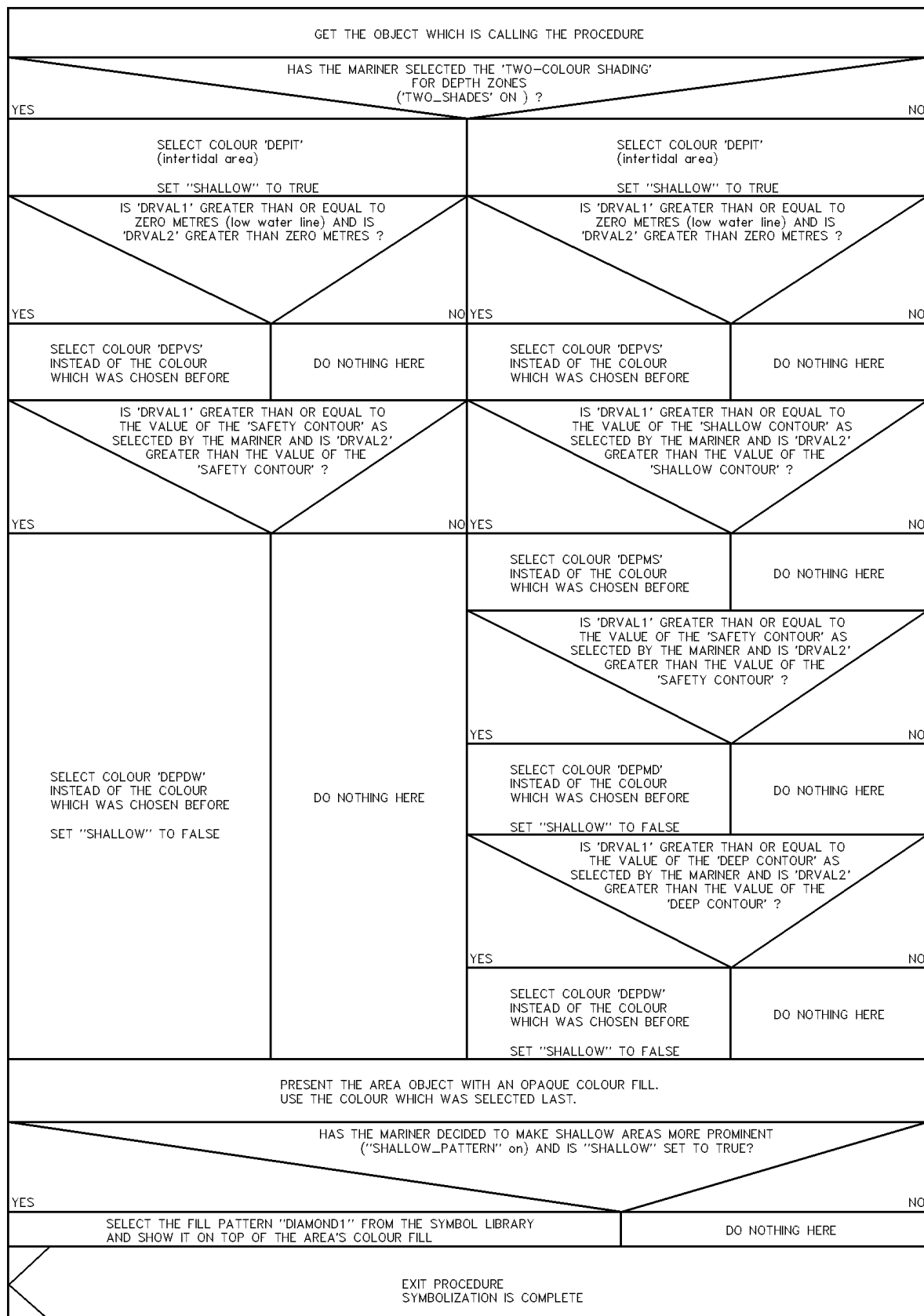
deep water depth shade
<u>(<i>deep contour</i>)</u>
medium deep water depth shade
<u>(safety contour)</u>
medium shallow water depth shade
<u>(<i>shallow contour</i>)</u>
very shallow water depth shade

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, the requirement to show the shallow pattern is not mandatory. However, both these features are strongly recommended.

SEABED01 (DRVAL1, DRVAL2)

Conditional symbology procedure for symbolization of areas that form the seabed.
Please note that this procedure is called by other procedures.



12.2.21 Conditional Symbology Procedure 'SNDFRMnn'

(Note that this is a sub-procedure called by SOUNDGnn, OBSTRNnn, and WRECKSnn)

Applies to:	Symbolization of depth values
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. This conditional symbology procedure accesses a set of carefully designed sounding symbols provided by the symbol library and composes them to sounding labels. It symbolizes swept depth and it also symbolizes for low reliability as indicated by attributes QUASOU and QUAPOS.

SNDFRM03 (DEPTH-VALUE)

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.

CREATE A 'LIST OF SYMBOLS' TO BE PRESENTED AT THE POSITION OF THE SOUNDING THIS LIST IS INITIALLY BLANK		
IS 'DEPTH-VALUE' EQUAL OR LESS THAN THE VALUE OF 'SAFETY-DEPTH' THAT WAS SELECTED BY THE MARINER ?		
YES	NO	
SET LOCAL VARIABLE 'SYMBOL_PREFIX' TO 'SOUNDS' (sounding – shallow) (Note: all sounding symbols with dominant colour have that prefix) [IMO PS 3.7]	SET LOCAL VARIABLE 'SYMBOL_PREFIX' TO 'SOUNDG' (Note: all sounding symbols with faint colour have that prefix)	
GET THE VALUE OF THE OBJECT'S ATTRIBUTE 'TECSOU'		
IS THE VALUE OF THE ATTRIBUTE 'TECSOU' GIVEN ?		
YES	NO	
DOES THE ATTRIBUTE 'TECSOU' INCLUDE '6' (swept depth) ?		
YES	NO	
CREATE SYMBOL NAME : 'SYMBOL_PREFIX' + 'B1' ('SOUNDSB1' OR 'SOUNDGB1') ADD THIS SYMBOL NAME TO THE 'LIST OF SYMBOLS' TO BE PRESENTED	DO NOTHING HERE	DO NOTHING HERE
GET THE VALUE OF THE OBJECT'S ATTRIBUTES 'QUASOU' AND 'STATUS' (Attribute 'QUAPOS' is on the spatial object)		
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) ?		
YES	NO	
CREATE SYMBOL NAME : 'SYMBOL_PREFIX' + 'C2' ('SOUNDSC2' OR 'SOUNDGC2') ADD THIS SYMBOL TO THE 'LIST OF SYMBOLS' TO BE PRESENTED	GET THE OBJECT'S CORRESPONDING SPATIAL OBJECT	
	IS THE VALUE OF THE ATTRIBUTE 'QUAPOS' GIVEN ?	
	YES	NO
	DOES THE SPATIAL OBJECT HAVE ATTRIBUTE 'QUAPOS' EQUAL TO 2, 3, 4, 5, 6, 7, 8 or 9 ?	
	YES	NO
	CREATE SYMBOL NAME : 'SYMBOL_PREFIX' + 'C2' ('SOUNDSC2' OR 'SOUNDGC2') ADD THIS SYMBOL TO THE 'LIST OF SYMBOLS' TO BE PRESENTED	DO NOTHING HERE
CONTINUATION A		

SNDFRM03 Continuation A

IS 'DEPTH_VALUE' LESS THAN ZERO METRES ?	
YES	NO
CREATE SYMBOL NAME : 'SYMBOL_PREFIX' + 'A1' ('SOUNDSA1') ADD THIS SYMBOL NAME TO THE 'LIST OF SYMBOLS' TO BE PRESENTED	DO NOTHING HERE
IS 'DEPTH_VALUE' LESS THAN 10 METRES ?	
YES	NO
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	DO NOTHING HERE
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 TO THE CALLING PROCEDURE WITH THE 'LIST OF SYMBOLS' WHICH WERE SELECTED	
IS 'DEPTH_VALUE' LESS THAN 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)	
YES	NO
ISOLATE 'LEADING_DIGIT' OF 'DEPTH_VALUE'. CREATE SYMBOL NAME BY ADDING '20' + 'LEADING_DIGIT' TO 'SYMBOL_PREFIX' . (e.g. 26.7 metres – isolates the '2' and create either 'SOUNDS22' or 'SOUNDG22') ADD THIS SYMBOL NAME TO THE 'LIST OF SYMBOLS' TO BE PRESENTED	DO NOTHING HERE
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 TO THE CALLING PROCEDURE WITH THE 'LIST OF SYMBOLS' WHICH WERE SELECTED	
CONTINUATION B	

SNDFRM03 Continuation B

TRUNCATE 'DEPTH_VALUE' TO INTEGER. DO NOT ROUND UP.	
IS 'DEPTH_VALUE' LESS THAN 100 METRES ?	YES / NO
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	DO NOTHING HERE
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 TO THE CALLING PROCEDURE WITH THE 'LIST OF SYMBOLS' WHICH WERE SELECTED	
IS 'DEPTH_VALUE' LESS THAN 1000 METRES ?	YES / NO
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	DO NOTHING HERE
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'. CREATE SYMBOL NAME BY ADDING '00' + 'LAST_DIGIT' TO 'SYMBOL_PREFIX'. ADD THIS SYMBOL NAME TO THE 'LIST OF SYMBOLS' TO BE PRESENTED	
RETURN TO THE CALLING PROCEDURE WITH THE 'LIST OF SYMBOLS' WHICH WERE SELECTED	
IS 'DEPTH_VALUE' LESS THAN 10000 METRES ?	YES / NO
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	DO NOTHING HERE
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 TO THE CALLING PROCEDURE WITH THE 'LIST OF SYMBOLS' WHICH WERE SELECTED	
CONTINUATION C	

SNDFRM03 Continuation C

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'. CREATE SYMBOL NAME BY ADDING '40' + 'LAST_DIGIT' TO 'SYMBOL_PREFIX'.
ADD THIS SYMBOL NAME TO THE 'LIST OF SYMBOLS' TO BE PRESENTED

RETURN TO THE CALLING PROCEDURE WITH
THE 'LIST OF SYMBOLS' WHICH WERE SELECTED

12.2.22a Conditional Symbology Procedure 'SOUNDGnn'

Applies to:	S-57 Object Class "soundings" (SOUNDG)
Spatial Object(s):	Point
Attribute(s) used:	depth values from sounding array
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 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.

SOUNDG02

Conditional symbology procedure for symbolization of objects of the class 'SOUNDG' (sounding) .

GET THE OBJECT WHICH IS CALLING THIS PROCEDURE

FOR EACH SOUNDING THAT IS PART OF THE OBJECT'S SOUNDING ARRAY, PERFORM THIS LOOP :

GET THE DEPTH VALUE OF THE SOUNDING THAT IS CURRENTLY EXAMINED.

SNDFRM03 (DEPTH_VALUE)

PERFORM THE SYMBOLOGY PROCEDURE 'SNDFRM03' TO SYMBOLIZE THE DEPTH VALUE.
PASS THE DEPTH VALUE ON TO 'SNDFRM03'.
A LIST OF SYMBOLS IS RETURNED.

[IMO PS 3.7]

SHOW THE SYMBOLS WHICH WERE SELECTED BY 'SNDFRM03'.
PLACE THEM AT THE POSITION WHICH IS GIVEN BY THE CURRENTLY EXAMINED SOUNDING.

SYMBOLIZATION IS FINISHED
EXIT PROCEDURE

12.2.22b 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.

SYMINS01

Conditional Symbolology Procedure for symbolization of objects of the class "NEWOBJ".

Get the object which is calling this procedure.

Get the value of the attribute "SYMINS".

Perform the symbolization instructions which are stored in the value of the attribute "SYMINS". If any of the symbolization instructions is a call to the CSP "SYMINS01", skip it and continue with the next instruction. This check is to prevent recursive calls.

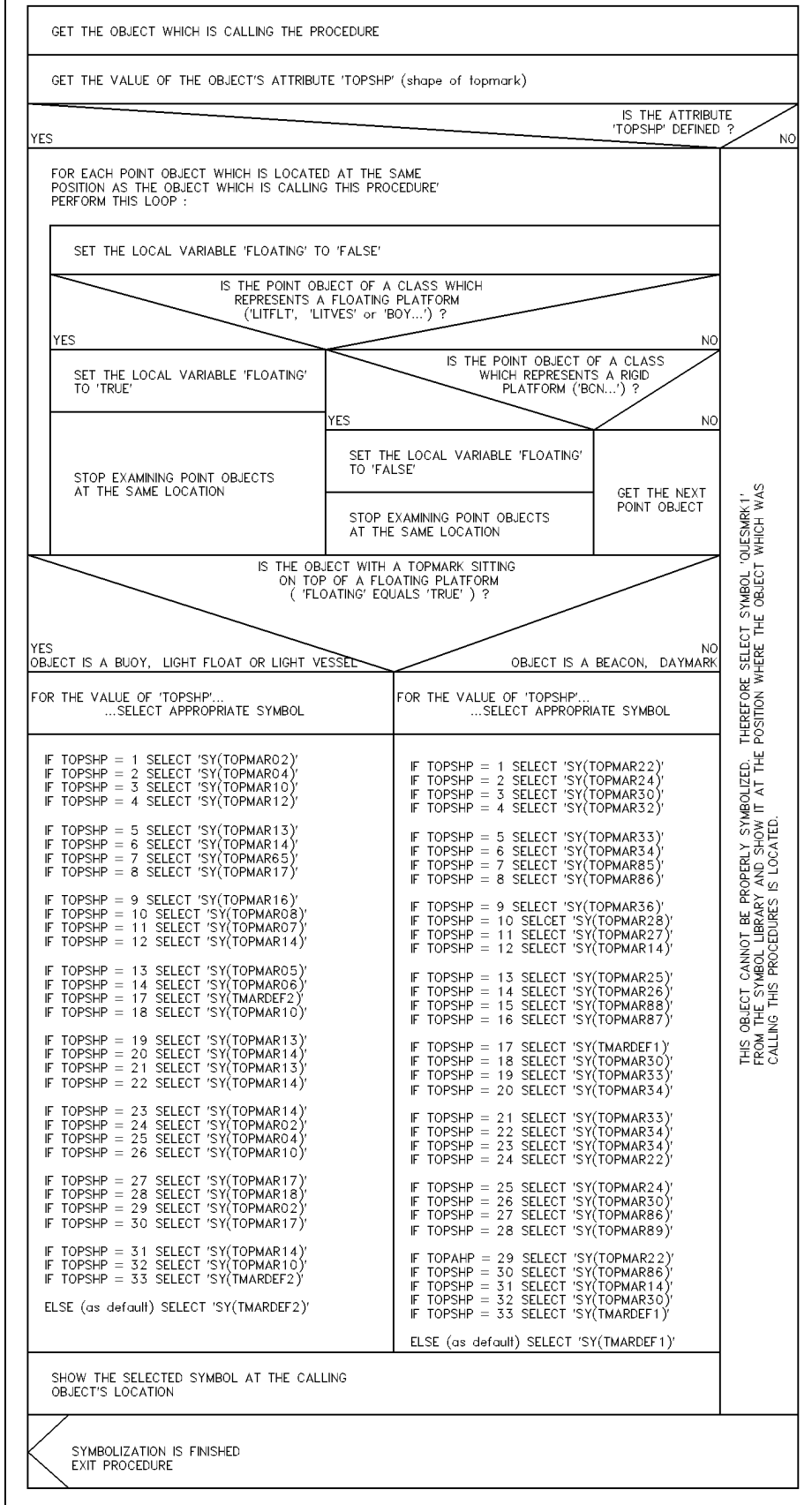
Symbolization is finished.
Exit procedure.

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.

TOPMARO 1

Conditional symbology procedure for symbolization of objects of the class 'TOPMAR' (topmarks).



12.2.24 Conditional Symbology Procedure 'UDWHAZnn'

(Note that this is called as a sub-procedure called by OBSTRNnn and WRECKSnn)

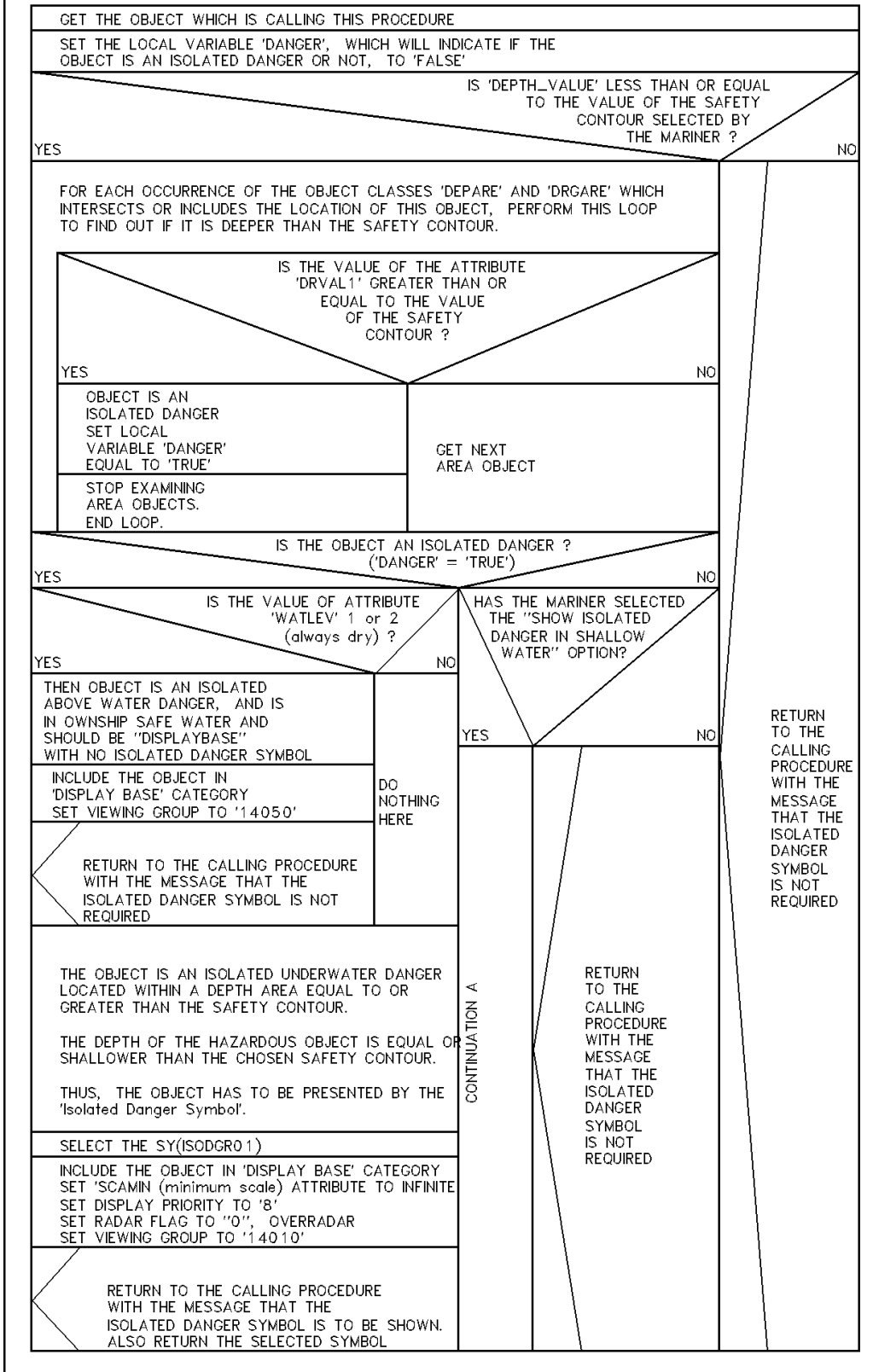
Applies to:	Underwater hazards of all kinds
Spatial Object(s):	Point, Area
Relation(s) used:	adjacency of areas location of point objects within areas
Attribute(s) used:	"depth range value1" (DRVAL1) «depth range value2» (DRVAL2)
Parameter(s):	Object to be symbolized from SENC SAFETY_CONTOUR depth value 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 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.
Remarks:	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 put in IMO category "DISPLAY BASE" (see IMO Performance Standards for ECDIS [3]). This task is performed by this conditional symbology procedure. 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).

UDWHAZO 4

Conditional symbology procedure for symbolization of 'isolated dangers'. Please note, that this symbology procedure is called by other procedures (obstruction and wrecks) which handle the symbolization of obstructions located on the seabed.

This procedure is expecting the calling procedure to pass the local variable 'DEPTH_VALUE'.



UDWHAZ04 Continuation A

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.

IS THE VALUE OF THE ATTRIBUTE 'DRVAL1' GREATER THAN OR EQUAL TO THE ZERO METRE CONTOUR AND LESS THAN THE SAFETY CONTOUR ?

YES

NO

OBJECT IS AN
ISOLATED DANGER
SET LOCAL
VARIABLE 'DANGER'
EQUAL TO 'TRUE'

STOP EXAMINING
AREA OBJECTS.
END LOOP.

GET NEXT
AREA OBJECT

IS THE OBJECT AN ISOLATED DANGER ?
('DANGER' = 'TRUE')

YES

NO

IS THE VALUE OF ATTRIBUTE
'WATLEV' 1 or 2
(always dry) ?

YES

NO

THEN 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.

INCLUDE THE OBJECT IN
'STANDARD' CATEGORY
SET VIEWING GROUP TO '24050'

DO
NOTHING
HERE

RETURN TO THE CALLING PROCEDURE
WITH THE MESSAGE THAT THE
ISOLATED DANGER SYMBOL IS NOT
REQUIRED

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'.

SELECT THE SY(ISODGR01)

INCLUDE THE OBJECT IN 'STANDARD' CATEGORY
SET DISPLAY PRIORITY TO '8'
SET RADAR FLAG TO '0', OVERRADAR
SET VIEWING GROUP TO '24020'

RETURN TO THE CALLING PROCEDURE
WITH THE MESSAGE THAT THE
ISOLATED DANGER SYMBOL IS TO BE SHOWN.
ALSO RETURN THE SELECTED SYMBOL

RETURN
TO THE
CALLING
PROCEDURE
WITH THE
MESSAGE
THAT THE
ISOLATED
DANGER
SYMBOL
IS NOT
REQUIRED

12.2.25 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 [9]
 IEC 62288 [10]

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.)

- 2.1 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).
- 2.2 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 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)

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 (VRM):

1.1 The VRM 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. Linestyle to be provided by the manufacturer.

2. Electronic Bearing Line

2.1 The EBL 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

3.1 The ERBL 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.

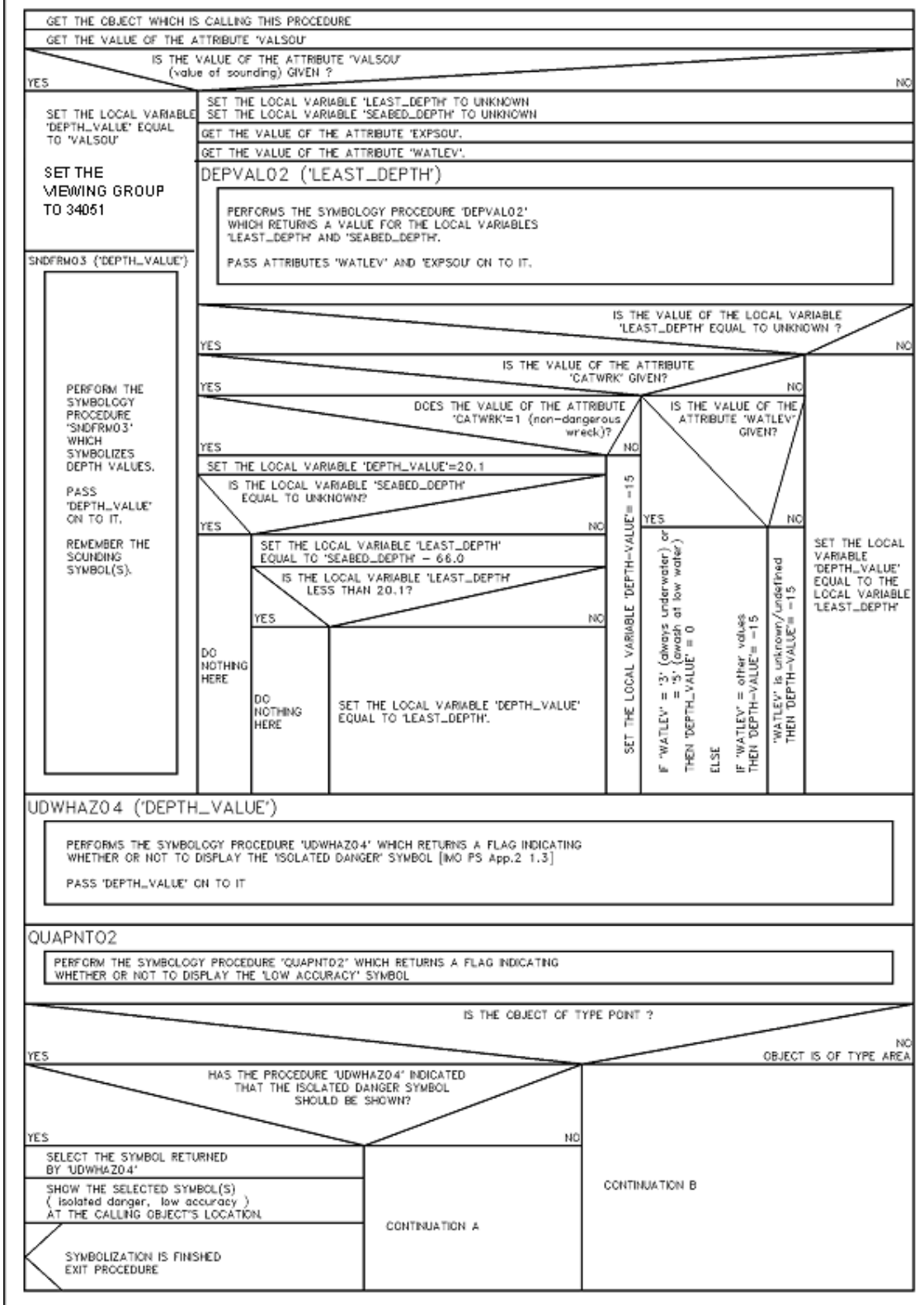
3.6 Rotate the symbol to the direction indicated by the bearing line.

12.2.27 Conditional Symbology Procedure 'WRECKSn'

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)
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:	<p>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]). This task is performed by the sub-procedure "UDWHAZnn" which is called by this symbology procedure.</p> <p>CSP "UDWHAZ" also allows the mariner the option of displaying isolated dangers in the waters between the safety contour and the zero metre line.</p> <p>In the case that the value of attribute VALSOU for the wreck is unknown, sub-procedure 'DEPVAL' is called. This will provide as default 'LEAST_DEPTH' 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).</p> <p>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.</p>

WRECKSO4

Conditional symbology procedure for symbolizing objects of the class wrecks (WRECKS).



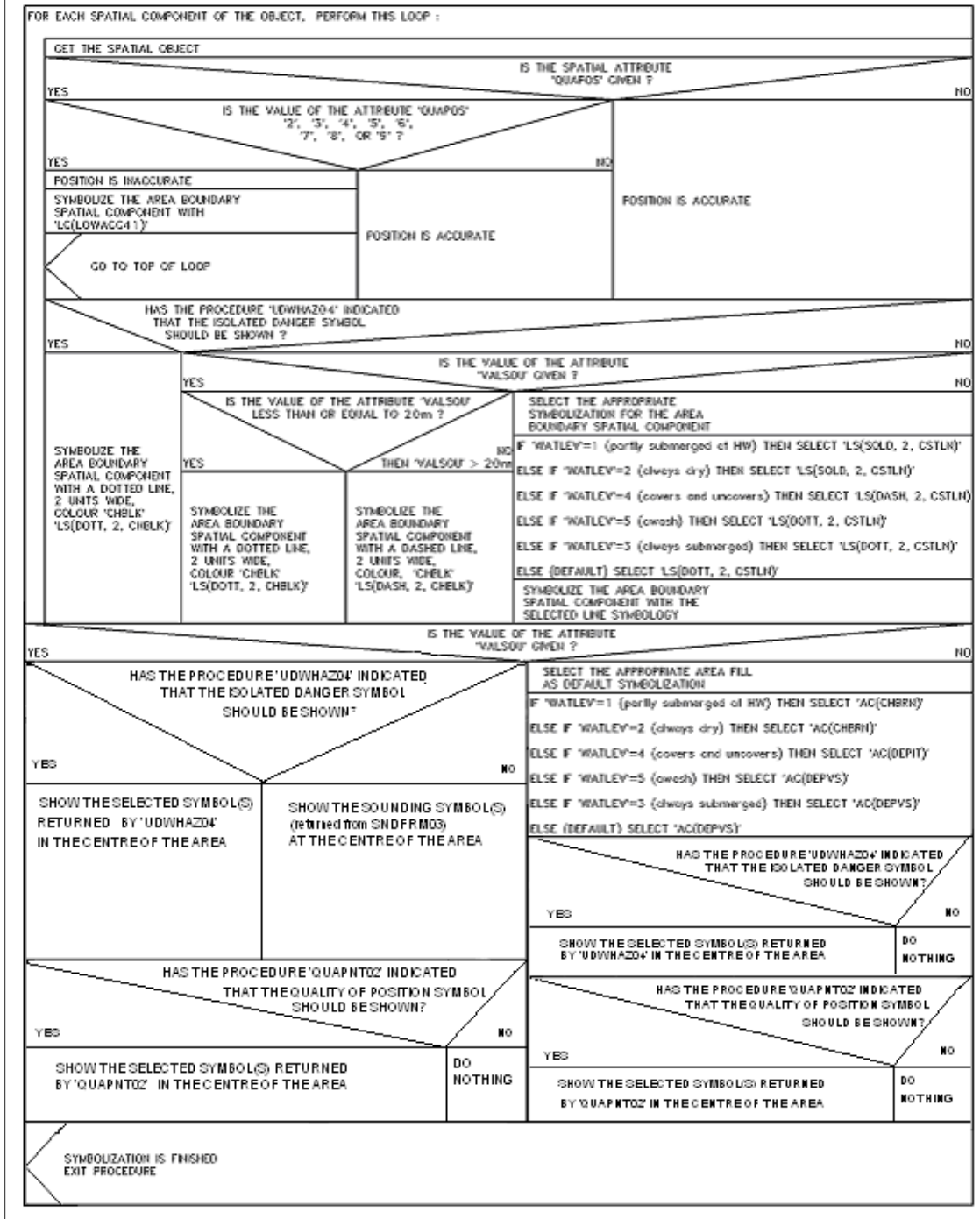
WRECKSO4 Continuation A

Point objects, wrecks (WRECKS)

IS THE VALUE OF THE ATTRIBUTE 'VALSOU' GIVEN ?		
YES		NO
IS THE VALUE OF THE ATTRIBUTE 'VALSOU' LESS THAN OR EQUAL TO 20m ?		SELECT THE APPROPRIATE SYMBOL :
YES	NO THEN 'VALSOU' > 20m	IF 'CATWRK'=1 (non-dangerous wreck) AND 'WATLEV'=3 (always submerged), THEN SELECT 'SY(WRECKSO4)'
SELECT 'SY(DANGER01)'	SELECT 'SY(DANGER02)'	ELSE IF 'CATWRK'=2 (dangerous wreck) AND 'WATLEV'=3 (always submerged), THEN SELECT 'SY(WRECKSO5)'
SHOW THE SELECTED SYMBOL(S) (danger, low accuracy) AT THE CALLING OBJECT'S LOCATION		ELSE IF 'CATWRK'=4 (wreck showing mast/masts) THEN SELECT 'SY(WRECKSO1)'
SHOW THE SOUNDING SYMBOL(S) (returned from SNDFRM03) ON TOP AT THE CALLING OBJECT'S LOCATION		ELSE IF 'CATWRK'=5 (wreck showing any portion of hull or superstructure) THEN SELECT 'SY(WRECKSO1)'
DO NOTHING HERE		ELSE IF 'WATLEV'=1 (partly submerged at HW) THEN SELECT 'SY(WRECKSO1)'
		ELSE IF 'WATLEV'=2 (always dry) THEN SELECT 'SY(WRECKSO1)'
		ELSE IF 'WATLEV'=5 (awash) THEN SELECT 'SY(WRECKSO1)'
		ELSE IF 'WATLEV'=4 (covers and uncovers) THEN SELECT 'SY(WRECKSO1)'
		ELSE (DEFAULT) SELECT 'SY(WRECKSO5)'
		SHOW THE SELECTED SYMBOL(S) (wreck, low accuracy) AT THE CALLING OBJECT'S LOCATION
< SYMBOLIZATION IS FINISHED EXIT PROCEDURE		

WRECKS04 Continuation B

Area objects, wrecks (WRECKS)



13. TABLES

13.1 Colour tables

The following pages list the colour tables which have been designed for different conditions of ambient illumination on the bridge.

The colours are defined in CIE 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 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 Viewing groups

The use of 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 <i>40000 reserved</i>	20000 reserved <i>50000 reserved</i>	30000 reserved <i>60000 reserved</i>
11000 A,B information about the chart display <i>41000 tools</i>	21000 A,B 51000 tool	31000 A,B <i>61000 tools</i>
12000 C, D, E, F land features <i>42000 own ship, planned route</i>	22000 C, D, E, F <i>52000 own ship etc</i>	32000 C, D, E, F <i>62000 own ship etc</i>
13000 H, I depths & currents <i>43000 mariners' features</i>	23000 H,I <i>53000 mariners' features</i>	33000 H,I <i>63000 mariners' features</i>
14000 J,K,L obstructions, pipelines <i>44000 other vessels</i>	24000 J,K,L <i>54000 other vessels</i>	34000 J,K,L <i>64000 other vessels</i>
15000 M traffic,routes <i>45000 manufacturers' features</i>	25000 M <i>55000 manufacturers' features</i>	35000 M <i>65000 mfrs' features</i>

DISPLAY BASE	STANDARD DISPLAY	OTHER INFORMATION
16000 N special areas <i>46000 mariners' assignments</i>	26000 N <i>56000 mariners' assignments</i>	36000 N <i>66000 mariners' assgnts</i>
17000 P,Q,R,S buoys, beacons, lights, radar <i>47000 reserved for mariners' information</i>	27000 P,Q,R,S <i>57000 reserved</i>	37000 P,Q,R,S <i>67000 reserved</i>
18000 T,U services & small craft facilities <i>48000 reserved for mariners' information</i>	28000 T,U <i>58000 reserved</i>	38000 T,U <i>68000 reserved</i>
19000-19999 reserved <i>49000-49999 reserved</i>	29000-29999 reserved <i>59000-59999 reserved</i>	39000-39999 reserved <i>69000-69999 reserved</i>
70000-99999 reserved for future use.		

Notes:

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 are 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

(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	<u>Information about the Chart Display</u>
11010	cursor [symbol SY(CURSRA01)]
11020	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	<u>Land area</u>
12010	land area (LANDARE)
12200	<u>Dangers above water</u>
12210	bridge (BRIDGE), pylon (PYLONS), overhead cable (CBLOHD), conveyor (CONVYR), overhead pipeline (PIPOHD), offshore platform (OFSPLF)
12400	<u>Shoreline</u>
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	<u>Safety Contour</u>
13010	safety contour (from conditional symbology procedure DEPCNT03)
13020	<u>na</u>
13030	depth area (DEPARE), dredged area (DRGARE),
J, K, L	SEABED, OBSTRUCTIONS, PIPELINES
14000	<u>Dangers under water</u>
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	<u>na (not assigned)</u>
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	<u>Information about the Chart Display</u>
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 (LNDGRN, SEAARE)
C, D, E, F NATURAL & MAN-MADE FEATURES, PORT FEATURES	
22000	<u>Major Coastal Features</u>
22010	Riverbank (RIVBNK), lake (LAKARE), lakeshore (LAKSHR), sloping ground (SLOGRD), slope top (SLOTOP), dyke (DYKCON), causeway (CAUSWY), dam (DAMCON),
22200	<u>Conspicuous landmarks:</u>
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	<u>Depths</u>
23010	Area of depth less than the safety contour (DIAMON01 pattern)
23020	Na
23030	Swept area (SWPARE)
J, K, L SEABED, OBSTRUCTIONS, PIPELINES	
24000	<u>Seabed dangers</u>
24010	Mooring cables (MORFAC, CATMOR6), (CBLSUB, CATCBL6), tunnel on Seabed (TUNNEL, BURDEP=0), sandwaves (SNDWAV)
M TRAFFIC ROUTES	
25000	<u>Routes and Tracks</u>
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	<u>Restricted and Cautionary Areas</u>
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	<u>Information Areas. Protected Areas</u>
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	<u>Buoys, Beacons, Topmarks, Lights, Fog Signals</u>
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	<u>Radar</u>
27210	racon (RTPBCN)
27220	na
27230	radar reflector (RADRFL)
T, U SERVICES & SMALL CRAFT FACILITIES	
28000	<u>Services</u>
28010	pilot boarding point (PILBOP)
28020	signal station, traffic (SISTAT), sig. strn. 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	<u>Information about the Chart Display</u>
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	<u>Natural Features</u>
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	<u>Shore Structures</u>
32210	na
32220	any of the following not classified as CONVIS1 (conspicuous): landmark (LNDMRK), building (BUISGL), tank, silo, water tower (SILTNN)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	<u>Port Features</u>
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	<u>Depths, Currents, Tide rips, etc</u>
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	<u>Seabed Information: rocks, wrecks & obstructions, pipes & cables</u>
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	<u>Routes</u>
35010	na
N SPECIAL AREAS	
36000	<u>Administrative Areas</u> , (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	<u>Services</u>
38010	radar station (RADSTA), radio station (RDOSTA)
38020	na
38030	coastguard station (CGUSTA), rescue station (RSCSTA)
38200	<u>Small craft facilities</u>
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	<u>Own ship</u>
42010	Own ship (ownship), symbol or scaled version, together with heading line, beam bearing line and course and speed vector
42200	<u>Selected Planned Route</u>
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	<u>Manufacturers' Features</u>
MARINERS' ASSIGNMENTS TO DISPLAY BASE	
46000-46999	<u>Mariners' and manufacturers' objects assigned to Display Base by the mariner</u>
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	<u>Notations on Selected Planned Route</u>
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	<u>Alternate Planned Route</u>
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	<u>Past Track</u>
52410	event (events)
52420	<u>na</u>
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	<u>Mariners' features</u>
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	<u>Other Ships</u>
54010	other ships (vessels) from radar
54020	notations on other ships (acqsta)
54030	other ships from other sources or undefined sources
MANUFACTURERS' FEATURES	
55000	<u>Manufacturers' Features</u>
55010	manufacturers' feature (mnufea, catnot 1)
55020	manufacturers' feature (mnufea, catnot 2)
MARINERS' ASSIGNMENTS TO STANDARD DISPLAY	
56000-66999	<u>Mariners' and manufacturers' Objects Assigned to Standard Display by the Mariner</u>
RESERVED	
57000-59999	reserved for mariners' information

OTHER MARINERS' INFORMATION

RESERVED	
60000	reserved for mariners' information
TOOLS	
61000	<u>Tools</u>
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	<u>Position fixes</u>
62010	position fix (positn)
62020	position line (poslin)
MARINERS' FEATURES	
63000-63999	na
OTHER VESSELS	

64000-64999	na
MANUFACTURERS' FEATURES	
65000-65999	<u>Manufacturers' Features</u>
MARINERS' ASSIGNMENTS TO OTHER INFORMATION	
66000-66999	<u>Mariners' and manufacturers' objects assigned to other information by the mariner</u>
RESERVED	
67000-69999	reserved for mariners' information

EXAMPLE

The following is an example of how the above viewing groups might be implemented in an ECDIS:

<u>Over-group</u>	<u>content</u>	<u>viewing groups included</u>
1	Display Base	10000 - 19999, 40000 - 49999
Standard display - chart:		
2	unknown object	21010
3	chart data coverage	21020 - 21060
4	land features	22010 - 22260
5	area of depth less than safety contour	23010
6	water and seabed features	23020 - 24010
7	traffic routes	25010 - 25040
8	cautionary areas	26010 - 26050
9	information areas	26210 - 26270
10	buoys & beacons	27010 - 27050
11	Lights	27070
12	fog signals	27080
13	radar	27210 - 27230
14	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	information about chart data	31010 - 31070
24	land features	32010 - 32460
25	Soundings	33010
26	depth contours, currents, magnetics	33020 - 33060 & 31080
27	seabed and obstructions	34010 - 34070
28	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.
- 10 Important Text
- 11 vertical clearance of bridges, overhead cable, pipe or conveyor (BRIDGE, CBLOHD, PIPOHD, CONVYR, VERCSEA, 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)
- 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, LNDGRN 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
- 50-69 mariners' text, including planned speed etc.
- 70-79 manufacturer's text
- 80-99 future requirements (AIS etc.)

* National text is a supplementary option for ECDIS. If used, the style should be similar to that of the Presentation Library.

13.4 Abbreviations

The following abbreviations are used on the ECDIS display:

13.4.1 'TE' text command abbreviations

The following abbreviations are used with the "TE" command word:

<u>Prefixes:</u>	<u>Suffixes</u>	<u>'C' Format Command</u>
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
FI	flashing
LFI	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
FFI	fixed and flashing
FI+LFI	flash/long-flash
AIOc FI	alternating occulting/flashing
FLFI	fixed/long-flash
AIOc	alternating occulting
AILFI	alternating long-flash
AIFI	alternating flash
AI	group alternating
Q+LFI	quick-flash plus long-flash
VQ+LFI	very quick-flash plus long-flash
UQ+LFI	ultra quick-flash plus long-flash
AI	alternating
AIF FI	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 Nature of seabed abbreviations ('TX')

The following abbreviations may be used for values of NATSUR - nature of seabed:

NATSUR 1, mud	M	NATSUR 8, cobbles	Cb
NATSUR 2, clay	Cy	NATSUR 9, rock	R
NATSUR 3, silt	Si	NATSUR 11, lava	R
NATSUR 4, sand	S	NATSUR 14, coral	Co
NATSUR 5, stones	St	NATSUR 17, shells	Sh
NATSUR 6, gravel	G	NATSUR 18, boulder	R
NATSUR 7, pebbles	P		

To write out on the display "Mud Sand Gravel", for example, causes much more clutter than writing " M S G". ECDIS manufacturers are encouraged to use the abbreviations both on the chart display and when providing cursor-pick information.

The meanings of the abbreviations in 13.4.2 and 13.4.3 must be made available to the mariner.

SYMBOL LIBRARY AND SYMBOL PLOTS

Sections 14 through 19 will not become part of S-101

Most of this content will be addressed by the Portrayal Register and the S-101 Portrayal Catalogue. It is recommended that the ECDIS Chart 1 be made into a separate entity.