20th CHRIS MEETING
Niteroi, RJ, Brazil 03.–07. November 2008

Report of the CSMWG to CHRIS-20

COLOURS & SYMBOLS MAINTENANCE WORKING GROUP (CSMWG)

From June 2006 – September 2007

Submitted by:	Chairman, CSMWG
Related documents:	CHRIS letter No. 1/2008 (call for reports) List of actions from CHRIS19
Related projects:	Not applicable

Chairman:	Mathias Jonas (Germany)
Vice Chair:	Julia Powell (USA)
Secretary (acting):	Richard Coombes (United Kingdom)
Member states:	***Australia, Canada, Denmark, Finland, France, Germany, Norway, South Africa, UK, USA,*** Venezuela
Expert contributors:	***SevenCs (Germany),*** **C-Map/*Jeppesen Marine (Germany/Norway), CARIS (Canada),*** Offshore Systems Inc. (Canada, DCIEM (Canada), ***Furuno Finland (Finland), GEOMOD (France),*** Hydroservice AS (Norway), ***IC-ENC (UK), IIC (Canada), Transas Group (Russia)***, SAM Marine Electronics (Germany), Wismar University (Germany)

Meetings held during reporting period

CSMWG18 Meeting 7.–9. May 2008, including 3nd combined TSMAD/CSMWG meeting in Cape Town, SA hosted by South African Hydrographic Office SANHO (Attendees of CSMWG18 and/or combined TSMAD/CSMWG meeting are marked in bold/italics)

Work program

Progress continues on the work items assigned by CHRIS as follows:

A Maintain S-52 App. 2 “Colours and Symbols Specifications for ECDIS”, Edition 4.2 and its Annex A “Presentation Library”,

A.1 Issue S-52, App.2, Edition 4.3; Annex A, Edition 3.4 and Addendum by application of Maintenance Documents Nos. 5 and 6

Status: Issue completed by January 2008 – ongoing maintenance by provision of minor amendments and corrections including look up table entries for objects not yet symbolized on ECDIS

A.2 Implementation of changed requirements of revised IMO ECDIS PS into S-52 C&S regulations

Status:
- *required adaptation through changes of look up tables and CSPs have already been implemented in PL Edition 3.4, January 2008*
- *As an indirect outcome of the coincidence of the “set in force” date of the revised IMO PS and the new PL 3.4 by 1. January 2009, HOs are encouraged to remove linear depth areas from their ENCs when new editions are produced after 1st January 2009. An encoding bulletin will be issued by TSMAD informing HOs of this change.*

B Contribute to IEC TC80/WG13 symbol harmonizing work

Status: AIS symbology defined under responsibility of IEC (IEC 62288 – Navigational Symbols) adopted into the Addendum to Annex A, Part I, Users´ Manual Edition 3.4 (2008)” Paper based description of symbols for use on ECDIS”, January 2008

C Examination of S-52 main documents and annexes for redundant operational aspects of ECDIS

Status: Operational aspects of S-52 main document and annexes have now been completely absorbed by the revised IMO ECDIS PS as applicable. S-52 main document could now undergo a revision process to streamline to the core matter of chart presentation. However, as external standards, namely the ECDIS test standard IEC 61174 reference clauses in S-52, main careful consideration will have to be given to this task. Note that CSMWG is only mandated to maintain S-52, App. 2. A revision of S-52 main document and annexes other than Appendix 2 have to be tasked by CHRIS separately.

D Introduce new website based recommendation service for good application practice of S-52

Status: Covered by “General information about chart presentation on ECDIS display” on IHO website

E Contribute to harmonised rules for ENC loading strategy, use of SCAMIN and overscale indication

Status:
- *Contribution to the SCAMIN discussion through the principal statement that application of SCAMIN is a cartographic decision if and when (in terms of selected display scale) an object should appear whereas the base display category of IMO only prevents the suppression of objects on display by user inter-*

rogation. This statement has been adopted by Baltic Sea ENC Harmonisation Working Group (BSEHWG) for their development of a regional approach to handle SCAMIN (to be presented at CHRIS20).

- *Another outcome of principal importance was that the abstention from or to complement SCAMIN attribution by implementing similar automatable rules into the ECDIS application has been to seen as an unrealistic solution as long as there is no unified SCAMIN interpretation even on the data coding side.*

- *With regard to the SCAMIN problem it has been concluded that in S-57 it may not be possible to resolve this on the software side of things but that S-101 portrayal should address SCAMIN and come up with a realistic solution on the application side.*

F Assess the impact on S-52 C&S regulations of other IHO standards

F.1 Consideration of the implications of future S100/S101 on S-52 C&S regulations

Status:
- *provide updated ENC TDS plots as part of ENC TDS Instruction Manual to support IEC 61174 edition 3 and S-57 Edition 3.1.1*
- *development of a Chart 1 supplemented with ECDIS symbology*
- *active contribution to the definition process of ISO 19117 which forms the base for S-100 portrayal*
- *produce a strategic plan for revision of S-52, App. 2 Annex A (Presentation Library) in preparation of S-101 portrayal to become a Portrayal Library (see Annex A of this report). Potential tasks in this plan will include:*
  - *deletion of simplified symbols and re-definition of traditional symbols in coloured shape in future portrayal standards*
  - *investigations if the colour orange used to depict "mariner objects" could be substituted by a less disturbing colour in future portrayal standards*
  - *tests to encode CSPs in XML to be used in future portrayal standards as part of the overall aim of a fully machine readable Portrayal Library*
- *proposal to allow ECDIS to display water depths other than those coded into the ENC based on minimum water level under the following rules:*
  - *Dense bathymetry <= 1 metre*
  - *No recalculation of depth contours*
  - *Unchanged safety contour value and unchanged safety contour presentation*
  - *Timescale/Tidal Model Indicator (who has delivered the data/are of validity)*
  - *Timescale/Tide Value Indicator (account for time zone, point in time of presented tide values)*
  - *Tide values applied for display only including vertical reference.*

F.2 In close liaison with TSMAD, set up a portrayal register within the S100 registry

Status:
- *The main objective is to offer a consistent structure for the future hydrographic symbol registry in order to maintain consistent symbolisation. Then required symbols, referenced in the portrayal rule catalogue, can be extracted in a standard format.*
- *Continuation of work on portrayal register for S-100 is needed for the following components of the S100 Portrayal Exchange Set:*

  - *S100 Portrayal Package, that contains classes for defining and organising feature portrayal rules in a hierarchical structure (already close to completion):*
    - *S100 Portrayal Library class*

- *S100 Portrayal Mapping Catalogue*
- *S100 Portrayal Feature*
- *S100 Portrayal Rule Set*
- *S100 Portrayal Rule*

- *S100 Symbol Package, that contains classes for defining and organising symbols:*
  - *S100 Colour Symbol Catalogue*
  - *S100 Point Symbol Catalogue.*
  - *S100 Simple Line Style Symbol Catalogue.*
  - *S100 Complex Line Style Symbol Catalogue.*
  - *S100 Text Symbol Catalogue.*

- *S100 Graphic Model, consisting of:*
  - *Model For Color Symbols (completed already)*
  - *Model For Simple Line Style Symbols (not yet completed)*
  - *Model For Point Symbols (completed already)*
  - *Model For Complex Line Style Symbols (not yet completed)*
  - *Model For Text Symbols (not yet completed)*

- *Other pending items are the investigations for the coding of LUT and CSPs in XML.*

To complete these tasks of major strategic importance, the extension of the contract with external consultant to complete the task is vital.

G Improving ENC Consistency/loading strategies
G.1 Contribute and attend to a loading strategy workshop organized by ECDIS industry

Status: - *Contribution to ECDIS Stakeholder' Workshop, 4th – 6th March 2008, IHB Monaco which dealt with the loading strategy matter as a side topic. CSMWG is ready to contribute to such a workshop if stakeholder demonstrate common willingness to conduct.*

- Contributed to the S-101 discussion regarding cell loading strategies and developed a way forward to simply display of ENC cells.

H Harmonisation of pick report presentation
H.1 Contribute to common work of SNPWG and UNH, for NP3 presentation.

Status:
- *review of existing recommendations of displaying the pick report aiming to the provision of guidelines*
  - *S-52 PL 3.4 Part 1 Clause 8.8 adequately describes the pick report presentation (see Annex B to this report).*
  - *Re-iterate to OEM's that the guidance is located in S-52 and that additional guidance should be given towards better pick report functionality for multiple features that are aggregated together.*
- *A full set of design rules for the User Interface is not practical, in addition it allows for differentiation between OEMs.*
- *liase with SNPWG to develop basic presentation rules for NP data intended for use in ECDIS (NP3)*

I Develop Symbols for object and attribute enhancements of S-57 Edition 3.1.1
I.1 Adapt ECDIS chart 1 to PL Edition 3.4 by means of SYMINS mechanism

Status: - *Symbols for object and attribute enhancements of S-57 Edition 3.1.1 have become part of PL Edition 3.4, January 2008*
- *Re-Issue of ECDIS Chart 1 using SYMINS mechanism together with PL Edition 3.4, January 2008*

J Harmonisation with CSPCWG
J.1 Liase with CSPCWG

Status: Taking note of CSPCWG activities – no specific action since CHRIS19

K Maintain the CSMWG bulletin and FAQ section on the IHO website
K.1 Establish links at IHB server

Status: link established under Committees

Progress on CHRIS19 Action Items:

ACTION No.	ACTIONS (in bold, action by)	STATUS (Sep 08)
19/10	**IHB, in liaison with Chairman of CSMWG**, to publish Edition 3.4 of the Presentation Library in early 2008, as part of S-52, Appendix 2.	**Done**. (re: CL 29/08)
19/11	**IHB** to issue C&S Maintenance Document No. 6 before end 2007, to facilitate the entry of Edition 3.4 of Presentation Library with the revised IMO ECDIS Performance Standards for ECDIS.	**Done** (see: CSMWG page on IHO website)
19/14	**IHB** to monitor the continuation of activities to establish an IHO Symbol Specifications Register as part of S-100, to be done under an IHO contract of approximately 12,000 Euros per year.	Ongoing
19/15	**Chairmen of CSMWG & TSMAD, and IHB** to organize an S-101 user requirements workshop; it should also resolve cell loading issues, addressing the problems from both a data production and OEM perspective.	**Done**. S-101 Workshop held March 08 (re: CL 26/08)

Problems encountered

none

Any Other Items of Note

- The proposed new structure of CHRIS after conversion to HSSC puts the tasks of CSMWG into the Coordinating Sub-committee on Symbology & Data Presentation Standards (SDPS) together with the specifications and standards for analogue products – currently hosted by CSPCWG. It is common opinion of CSMWG-members that even under the new regime digital chart presentation should remain separated from the paper chart standardisation. Instead CSMWG (renamed to Digital Information Portrayal Working Group - DIPWG) and TSMAD should stay as they are but committed to joint meetings with joint agenda whenever appropriate.

- Chairman announced to step back just before the next CSMWG-meeting at CHS in Ottawa, May 2009. The post of secretary will become vacant the same time.

- IHB had received one nomination for the newly vacated position of the chairman. The nominee being Mr Colby Harmon from NOAA and if there are no objections from attendees he is proposed as the next chairman of the CSMWG.

- The current chairman stated that he will continue as an active member of CSMWG, at least until after the next meeting, to provide a handover to Mr Harmon and to provide a degree of continuity to the working group.

- The upcoming 19th CSMWG-meeting to be held in Ottawa is to jointly with TSMAD to progress S-101 and associated portrayal.

Conclusions and Recommended Actions

CHRIS20 is invited to re-consider the arrangement of the technical working groups under the new HSSC regime and the proposal to rename CSMWG to Digital Information Portrayal Working Group – DIPWG expressing the enhanced scope of the working group for the creation of the whole portrayal of the digital chart information by this revised name.

Justification and Impacts

Not applicable

Action required of CHRIS

The CHRIS is invited to note this report and endorse the continuance of the Work Plan.

Annex A to the report of the CSMWG to CHRIS-20

Draft strategic plan strategic plan for revision of S-52, App. 2 Annex A (Presentation Library) in preparation of S-101 portrayal to become a Portrayal Library

Submitted by:	CSMWG
Executive Summary:	This paper will discuss the transition concept from S-52 presentation to S-100 portrayal
Related Documents:	S-100
Related Projects:	S-100 and S-101 development

Introduction / Background

As a result of lessons learned of over a decade, the IHO launched its ambitious S-100 project in 2001 aiming not only to enhance ENCs for future type approved ECDISes but for extended provision of hydrographic information beyond ships navigation. In order to facilitate data exchange in new fields of application such as survey, offshore exploration, spatial resource planning, marine environmental information, logistic management, ships security, long range tracking and others, S-57 "The IHO Transfer Standard for Digital Hydrographic Data" is now promoted to "The IHO Geospatial Standard for Hydrographic Data", called the S-100 series. The name change is intended to conspicuously differentiate S-100 from S-57 and will meet the following requirements:

- Content and carrier are independent;
- Core standard can evolve through extensions - no need for new versions of product specifications or system revisions;
- Updating may be performed by plug and play;
- Product Feature Catalogues are more flexible and capable of expansion;
- S-100 data will accommodate future IMO regulations;
- S-100 data will support emerging ECDIS / E-Navigation requirements (integrated Nautical Publications, Inland ENC and others).

S-100 is not specific for the application of ECDIS, instead in includes all the components needed to build product specifications to handle a variety of different geospatial applications for hydrographic data, including product specifications for ENC data. This also includes mechanisms for data portrayal, which is different from the current IHO standards structure where S-57 and S-52 are contained in separate standards.

Analysis/Discussion

Traditionally, S-52 has defined the presentation library for ECDIS, and the use of S-52 beyond the presentation of ENC content in ECDIS is non-existent. However, in S-100, portrayal is an integral aspect of the standard and the mechanisms envisioned for are extensible to applications beyond ECDIS chart presentation. This paper presents a draft transition plan in migrating from traditional S-52 presentation to S-100 portrayal. S-100 portrayal represents the portrayal aspect to any product specification developed under S-100 including S-101 ENC.

S-52 Presentation Library consists of the following:

- A library of symbols, line styles and fill styles
    - Point symbols consist of both chart and simplified
- A colour coding scheme which includes the IHO colour tables for day, night, and dusk
- A set of look-up tables that link object description to the appropriate symbology instructions depending on whether:

- There is a direct relationship between an object's description and its presentation
- Or if conditions apply – such as a depth area, whose colour fill depends on the choice of the safety contour. Then a Conditional Symbology Procedure is called

- A set of conditional symbology procedures to decide the appropriate symbolization in cases determined by the mariner's selection.

The portrayal component of S-100 is given in Part 8. It utilises the concepts laid out in ISO 19117 – Portrayal. The main feature of S-100 portrayal is the creation of a Portrayal Register **that has a collection of *portrayal sub registers*. This is similar to the** FDD register **for *sub-registers* of feature data dictionaries. The** Portrayal Register **will house numerous *sub-registers*: the *IHO Portrayal Register* for chart information portrayal and the H*ydro-related Portrayal Register* which will contain *Portrayal Registers* of the following designation:**

- *Hydro Portrayal Register*
- *Ice Portrayal Register*
- *Open ECDIS Foundation Portrayal Register*
- *Inland ENC Portrayal Register*
- *Nautical Publications Portrayal Register*

The above S-100 Portrayal Registers will consist of Portrayal Catalogues - a collection of all defined portrayals for individual product specifications. Portrayal Catalogues are principally split into to inter-dependent elements in XML-notation:

- Portrayal Rules: A collection of rules that are applied to the feature to determine what portrayal specification to use.
- Portrayal Specification: A collection of operations applied to the feature instance to portray it.

The interaction between those two elements of a Portrayal Catalogue is shown in Figure 1.

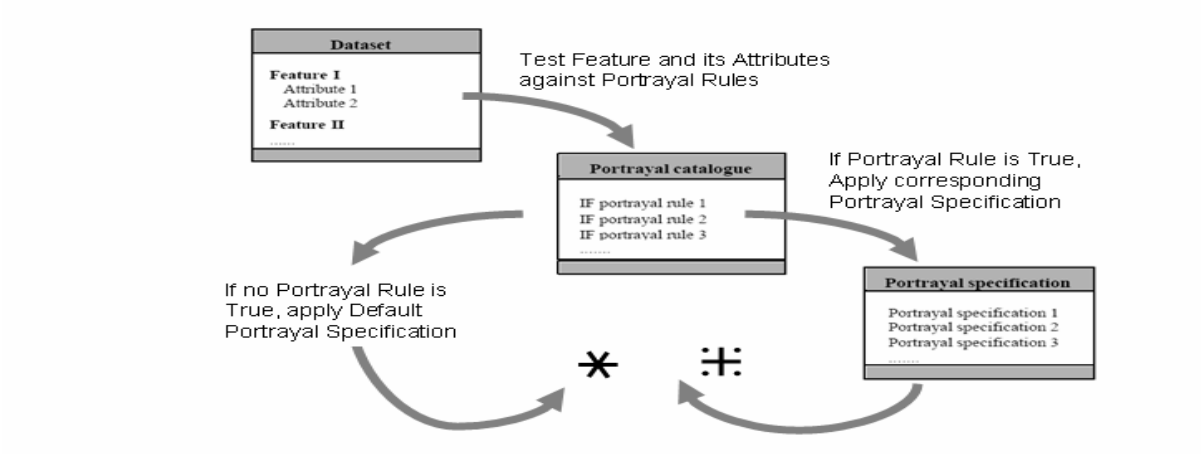


Fig. 1: S-100 Portrayal Catalogue elements

The new ENC Product Specification (S-101) will contain both a Feature Catalogue and a Portrayal Catalogue. The feature catalogue is all the available features, attributes and enumerants that are allowed in the product. It is at the feature catalogue level that specifies how each of these are bound to each other. The portrayal catalogue contains the rules, specifica-

tions, and symbols that will allow the features in the feature catalogue to be portrayed in applications such as ECDIS.

S-101 Stakeholders Workshop

In March 2008 the IHO hosted an S-101 stakeholders workshop with attendees from various user groups. Some of the items on the agenda included the transition from S-52 presentation to S-101 Portrayal – and what could be done to improve upon S-52 as the IHO moves to S-101 from the viewpoints of the ECDIS manufacturers and the end-users.

The key discussion outcomes are below:

- A major review and revision f -52 is required. This will need resources not available in IHO.
    - Industry participation is needed. This includes contribution (e.g. resources to perform the task) as funding may not be available within IHO budget.
- Chart presentation should be reviewed in relation to Human Factor Research results.
- IHO needs to find ways to facilitate the process. This could be part of the work of the CSMWG.
- Additional attributes for "de cluttering" and rotation of labels may help in dynamic display de cluttering.
- Portrayal library
    - open standard to do everything by machine readable files is technically possible, but difficult to create and result is not optimal for performance of drawing
    - OEMs see different presentation as a possibility to differentiate in competition
    - “plug and play” should be done by individual OEMs and this process should be type approved by each OEM
    - Versioning of the portrayal library should be linked to publishing of new version of Product specification (S-101, AML etc.). Consider minor and major version numbering.

. **Transition Activities**

In order to migrate from S-52 presentation to S-100 portrayal and the establishment of the S-101 portrayal catalogue the following activities must occur:

- Establishment of an S-100 Portrayal Register (currently in-work)
- Finalization of the S-100 Portrayal Component (dependent upon completion of the ISO 19117 re-draft)
- Review of S-52 Presentation Library for migration to the S-100 portrayal register and S-101 Portrayal Catalogue.

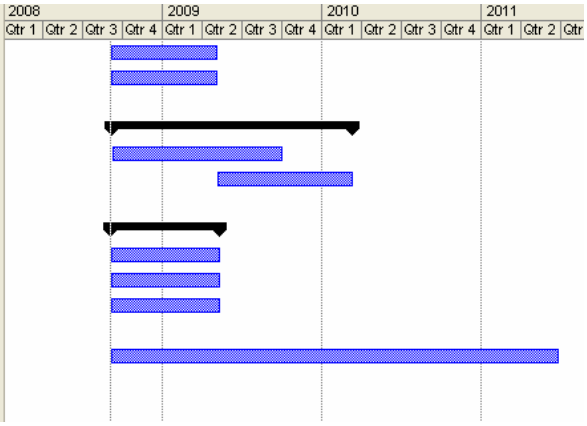
The review of S-52 Presentation Library will include:

- Discontinuation of Simplified Point Symbols

- Translation of S-52 Lookup tables to machine readable XML
- Review of the Conditional Symbology Procedures. This will include looking to reduce the number and translating them in to a machine readable format by either introducing new attributes for S-101 to get control via Lookup-table entries or creating embedded XML statements
- Review of the existing colour tables

In order to undertake a thorough review of S-52 it is imperative that the user community is actively involved. This community includes mariners, manufacturers and hydrographic offices.

	Task Name	Duration	Start	Finish
1	S-100 Register	173 days?	Thu 9/4/08	Mon 5/4/09
2	S-100 Portrayal Component	173 days?	Thu 9/4/08	Mon 5/4/09
3				
4	**S-101 Product Specification**	**393 days?**	**Mon 9/8/08**	**Wed 3/10/10**
5	S-101 Feature Catalogue	278 days?	Mon 9/8/08	Wed 9/30/09
6	S-101 Portrayal Catalogue	223 days?	Mon 5/4/09	Wed 3/10/10
7				
8	**S-52 Review**	**178 days?**	**Thu 9/4/08**	**Mon 5/11/09**
9	XML look up tables	178 days?	Thu 9/4/08	Mon 5/11/09
10	CSP Reduction	178 days?	Thu 9/4/08	Mon 5/11/09
11	Colour Palattes	178 days?	Thu 9/4/08	Mon 5/11/09
12				
13	User Outreach	732 days?	Thu 9/4/08	Fri 6/24/11



Work to be done – project plan

Conclusions

The primary objective in the development of the new IHO Geospatial Standard for Hydrographic Information is to support enhanced data products beyond the limited scope of the current ENCs, improve product consistency, provide better version control and create a "plug and play" model for data updates. The S-100 model and future S-101 product specification for next generation ENCs is to ensure a continuity of service, providing a manageable transition while introducing an improved environment for users and ensuring a smooth transition between data standards.

The transition needs to focus on re-boot of the S-52 presentation library to S-100 based portrayal in order to give more flexibility in allowing swift updating of ENC standards in terms of data model and presentation. This plan also needs to take into account user wishes by providing a machine readable portrayal library and better maintenance of the presentation software in the field by implementing portrayal catalogues where the new catalogue can conceivably be sent out with the data.

In addition, the mechanisms developed to support S-101 portrayal can be used for any S-100 product that needs a portrayal aspect. It will allow for rapid prototyping of new S-100 based products by leveraging the register mechanism for features and portrayal.

Recommendations

The IHO, including TSMAD and CSMWG will need to continuously involve the users in the development of S-101, in order to accomplish a smooth changeover from S-57/S-52 based standards to S-100 based standards. This can come in the form of workshops such as the S-101 Stakeholders Forum, educational materials, and conference presentations.

Justification and Impacts

Benefits of S-100 would include a plug and play portrayal catalogue, making it easier to update and maintain, and allow for the IHO to respond rapidly to new and emerging requirements.

This plan only deals with the test and implementation phase of S-100 and S-101 portrayal.

Action Required of CHRIS

The CHRISis invited to:

a. Acknowledge the basic assumptions of this plan and the time lines given

Annex B to the report of the CSMWG to CHRIS 20

Review of existing recommendations of displaying the pick report aiming to the provision of guidelines

Extract of S-52, Appendix 2, Annex A PL 3.4

Part 1 Clause 8.8:

8.8 Cursor Pick and interface panel display

8.8.1 Cursor Pick

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.