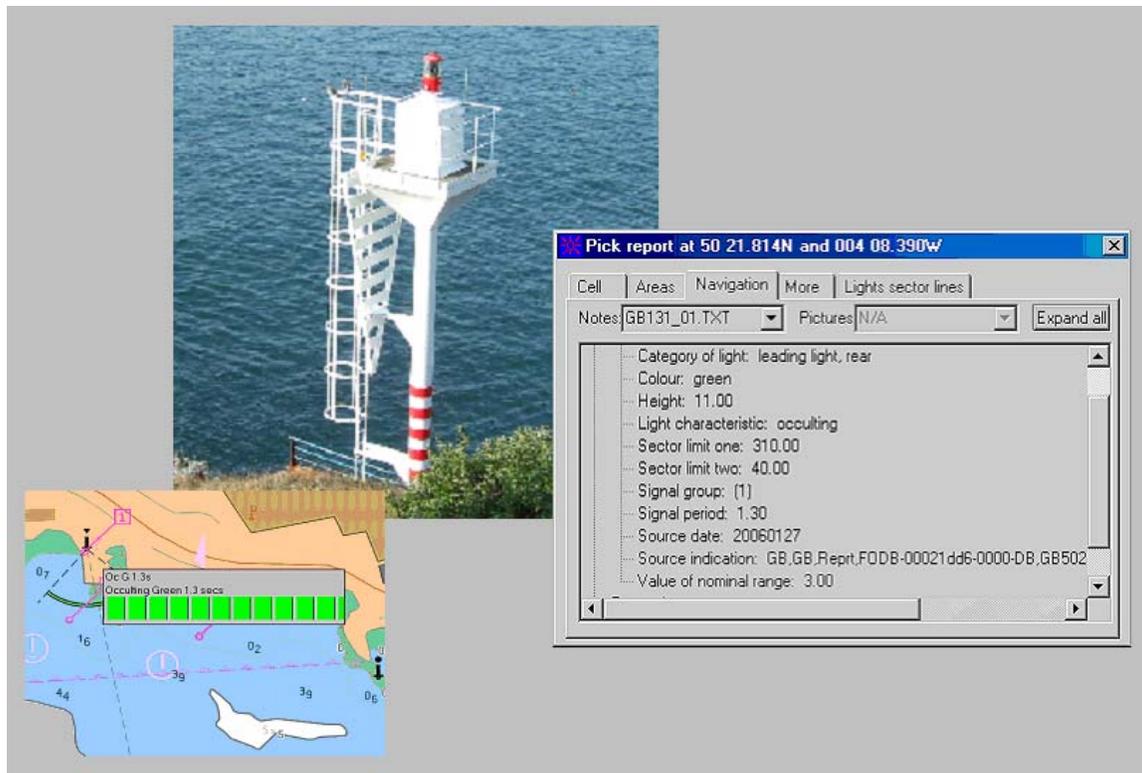United Kingdom Hydrographic Office

A Proposal for

Improving and Standardising

ECDIS/ECS Pick ReportS

Edition 0.4, January 2010 (Draft)

CONTENTS

1   Introduction

It is acknowledged that, for the most part, ENCs contain far more information than their paper chart counterpart. This is not always evident when viewing an ENC as much of the additional attribution is contained in the SENC and cannot be displayed in the viewer. The only method of accessing this information is through the *Pick Report*. This is the utility that the ECDIS manufacturers provide which allows users to interrogate *Cursor Picked* objects more fully.

The *S-52 Presentation Library* is not very prescriptive as to how these utilities should be implemented and limits its guidance to suggestions (see ANNEX A). From experience gained and feedback received from users it is considered this utility has greater safety implications than first thought. The purpose of this paper is to investigate ways in which this can be standardised for consistency and improved not just for current systems but also with an eye on the future and S-101.

2   Background

A common complaint from mariners is that some ENC symbols are not immediately identifiable to the user, e.g. Isolated Danger Symbol, Question and Exclamation Marks, etc. Furthermore not all ENC symbols carry sufficient information to make informed decisions without interrogating the object using the *Cursor Picking* option. This is exacerbated by the fact that when a particular symbol is interrogated the user is presented with a plethora of information much of which they are not interested in. The *Pick Reports* also display attribute information that is not navigationally significant and meaningless to the user.

The above coupled with the fact that it is not always practical or convenient for the user to interrogate objects on the display, especially if they are operating at high speed or navigating in confined or busy waters.

The current guidelines for the display *Cursor Picked* information, is provided in the *IHO ECDIS PL, Edition 3.4, Jan 2008, S-52, ANNEX A of APPENDIX 2*. It is not particularly specific and does not mandate how this feature should be implemented. The introduction states the following, *"This section suggests ways of making the information more useful"*. This has left things very much up to the manufacturer how this feature is implemented in their system.

To understand the issue more fully it is necessary to take a look at the situation as it is at present and evaluate existing implementations. It is fully appreciated that manufacturers have to differentiate their product from their competitors. However it is considered that this feature is fundamental to safe navigation and as such should be standardised with more precise and clearly defined guidance as to how this feature should be implemented.

3   Where to Start?

It is clear from the different systems examined during the writing of this paper that some *Pick Reports* are overly complex and convoluted. The user is presented with far too much information much of which is totally meaningless or he has not the slightest interest in. To make a start we should look at the object attributes and see if there is anything superfluous which could be safely removed from the *Pick Report*.

3.1 *Attribute Categories*

Each object class has a specific set of associated attributes. Each object attribute is divided into three categories as defined below:

A.   Attributes in this subset define the individual characteristics of an object;
B.   Attributes in this subset provide information relevant to the use of the data.
C.   Attributes in this subset provide administrative information about the object and the data describing it;

Attribute categories A & B relate to the characteristics of an object (e.g. COLOUR), the conditions under which it is displayed (e.g. SCAMIN) and any supplementary information (e.g. INFORM). Category C attributes however provides supplementary information relating to the object. There are four attributes that fall into this category, RECDAT, RECIND, SORDAT and SORIND. These relate to the date when a specific object was captured, edited or deleted, how it was encoded, the date when the object was identified and the authority for it. An example of a SORIND attribute value is provided below; this is of no interest to the user even if he could decipher its meaning.

```
Source indication (SORIND):
GB,GB,Reprt,FODB-00010178-0000-DB,GB510110.000 [GB-3815100657-03491]
```

NOTE: Not all Producer Nations encode these attributes in any case.

The IHO S-57 transfer standard was developed for the exchange of ENCs between Hydrographic Offices where these attributes would have been more relevant. Information relating to the data quality is provided using the CATZOC attribute or encoded in other attributes, e.g. INFORM, TXTDSC, etc.

3.2 *Acronyms and Attribute Codes*

Some manufacturers display the object/attribute acronyms as well as the attribute look up table codes in the *Pick Report*. The provision of this information is unnecessary and in most cases meaningless to the end user. The inclusion of the attribute codes, as opposed to real world attribute values, creates further ambiguities within the *Pick* Report.

An example of this is provided at ANNEX B. The left hand column shows the actual text as presented in one manufacturer's *Pick Report* for a set of objects with a master/slave relationship. The right hand column has been created manually and shows how this information could be presented by removing this unnecessary detail.

3.3 *Unnecessary Padding*

It was noted that some *Pick Reports* contained attribute values that had been padded out with unnecessary zeros after the decimal point. The following example were taken from the *Pick Report* of a type approved ECDIS.

Depth Range Value 1 = 10.000000
Depth Range Value 2 = 15.000000
Value of Sounding = 1.800000
Signal Period = 10.000000

Attribute values formatted in this way can sometimes be confusing and open to misinterpretation. This practice should be avoided and attribution should be presented in the *Pick Report* in the same way it was encoded by the producing HO and as indicated in the example below.

Depth Range Value 1 = 10

4 Information Prioritisation & Filtering

It is important that users can view information about an object quickly and accurately. They do not want to be presented with a seemingly endless list, sometimes unsorted, of object information. To prevent the user from being over faced with too much information the *Pick Report* must have a method of prioritising and filtering information more readily. The SENC already has several fields that could be used to achieve this as follows:

- Symbol Display Priority (Contained in the S-52 Look Up tables)
- The IMO Display Category (Display Base, Standard & Other)
- The S-57 Geometric Primitives (Point, Line & Area)

4.1 *Information Prioritisation*

4.1.1 The Presentation Library Display Priorities

Each object is assigned a *Display Priority* in the *Presentation Library Look Up Tables*. They are given a value between 0 and 9, with 9 being the highest priority. See Annex C for further information. No real world or meta object has a display priority of 9 these are only assigned to the following symbols:

All real world and meta objects are assigned a display priority ranging from 1 – 8. The *Point, Line* and *Area* lookup tables were imported into a spreadsheet and sorted by *Display Priority*. This was done to see if this could be an effective method for sorting information in the *Pick Report*.

It was interesting to see that *Aids to Navigation* featured *Display Priority 8* together with potential hazards such a *Bridges.* However it was noted, with surprise that objects such as *Obstructions, Wrecks* and *Under Water Rocks* were assigned a *Display Priority 4*. That is not to say that this is wrong from an ECDIS drawing perspective. The *Depth Area* object has a *Display Priority 1* although this was not such a surprise as all other information must display over them.

It can be seen from the examples identified above that the *Display Priorities* <u>CANNOT</u> be used as they stand. For example it would not be particularly helpful to have all the *Depth Area* information at the bottom of a list as this is often a high priority for the user. The look up tables could be used as a starting point and with some modification a *Pick Report Lookup Table* could be developed.

If a new *Lookup Table* is developed it could be broken down to categories and objects assigned a priority within their own category. This would be useful if it was identified that a set of tabs were used to display the *Pick Report*. Such categories could be subdivided to include the following:

- Navigational Aids (Lights, buoys, beacons, etc.)
- Routing (TSS, ASL, Recommended Tracks, etc.)
- Hazards (Obstructions, Wrecks, Rocks, Cautionary Areas, etc.)
- Depth Information (Depth Areas, Dredged Areas, Unsurveyed Areas, etc.)
- Other

4.1.2 Prioritisation using the IMO Display Categories

There are three *IMO Display Categories*, *"Base"*, *"Standard"* and *"Other"* defined for the display of ENCs. A brief overview of these is provided at ANNEX D of this document. This provides another opportunity to try and prioritise object information in the *Pick Report. Appendix 2 of the IMO PERFORMANCE STANDARD FOR ECDIS* specifically identifies the objects that are displayed in each category. The fact that *"indication of fixed and floating aids to navigation"* is only displayed when the *Standard Display* is selected would seem to rule out this as an option for automatically prioritising objects in the *Pick Report*. However as in section 4.1.1 above it could be used to assist the definition of a *Pick Report Lookup Table*.

4.2 *Information Filtering*

To further reduce the amount of information provided in the *Pick Report* a method of filtering the information could be provided. This could allow the user to define the objects reported during a *Cursor Picking*. Some manufacturers already offer a simple means of filtering information in the *Pick Report* using the *Geometric Primitive* of an object; these can be point, line and/or area. This *Pick Report* is configured to allow the user to display objects of a single primitive type, e.g. point objects. This is particularly useful for *Cursor Picking* particular feature types, especially point features such as lights, buoys, etc. This prevents the unnecessary display of numerous area objects. Information relating to the object primitives is already contained in the SENC.
Further filtering options could be provided to the user so that they can define just those groups of objects required for examination by *Cursor Picking*. For example these could include the following:

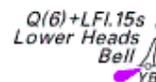- Depth Information
- Aids to Navigation

- Cautionary Areas (Areas subject to Alarming)
- Etc.

5 Additional Functionality

There is additional functionality that could enhance the user's experience and improve the method of deriving information from the ENC. The following section seeks to look at ways in which this might be achieved.

5.1 *Graphical Representation*

The user is probably already familiar with paper chart symbols and their associated abbreviations; this is especially true when it comes to navigational aids similar to the example across. It has been identified by some ECDIS users that it would be very useful if the *Pick Report* had a function that allows *Cursor Picked* information to be presented in the same way as on the paper chart.

Some manufacturer *Pick Reports* already provide a graphical representation of the *Cursor Picked* symbol. However the user still has to view the attributed information in the *Pick Report*. Ideally the user would be presented with something similar to the examples provided below.

It is easy enough to draw the symbol somewhere within the *Pick Report* as this can be derived from the drawing instructions used for the main display. Using light descriptions as an example these can already be displayed in the ECDIS when configured to do so. It would not take a lot to display this against the symbol in the *Pick Report*. Additional information relating to objects that share a master/slave relationship could be displayed such as the features name, other navigationally significant features, etc.

The *Pick Report* could look something similar to the example across, see also ANNEX B.

Further work would be necessary to identify which objects and their associated attributes are important from a mariner's perspective. Not all objects are of interest to the mariner and some are obvious without *Cursor Picking*.

NOTE: This option should be restricted to text that can already be displayed by the ECDIS using the current Presentation Library.

BUOY (cardinal) (Point)
Buoy shape: Pillar
Category of cardinal mark: South cardinal mark
Colour: Yellow & Black
Colour pattern: Horizontal stripes
Object name: Lower Heads

LIGHT (Point)
Colour: white
Light characteristic: Quick-flash plus long-flash
*Signal group: (6) + (1)*
Signal period: 15 seconds

TOPMARK (Point)
Colour: Black
Topmark/daymark shape: 2 cones (points downward))

FOG SIGNAL (point)
Category of fog signal: Bell

5.2 *Cursor/Floating Point Information*

It has been noted by some users that it is not possible to view light descriptions associated with sectored lights. The reason for this is because these are usually multiple light objects at the same point, one for each sector. If this were allowable it would finish up with these descriptions overwriting each other.

One manufacturer, there may be others, display information relating to light descriptions when the cursor passes over the light object. An example of this is provided across. It shows the light description of each sectored light. The depiction of the light characteristics is considered superfluous but shows what can be done.
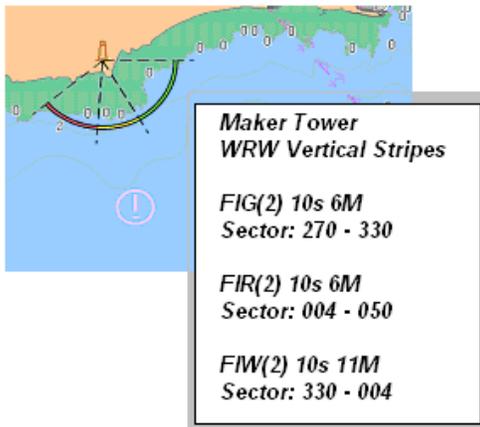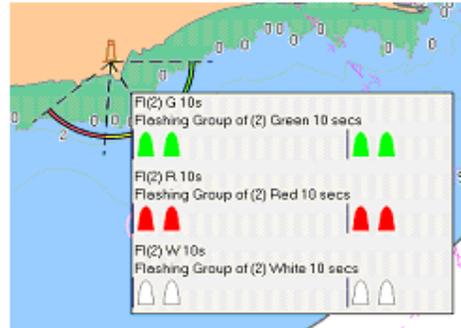
Taking this a step further the visible sector angles could be provided in a similar way under the appropriate light description. The mock up below provides an example of how this could look.

The ability to view information about an object by simply passing the cursor across an object could potentially save the user untimely selection processes.

This functionality could be provided for all point objects considered of navigational interest to the user. Consideration should also be given to time limiting the display of the information.

5.3 *M_QUAL and CATZOZ Information*

It is usually obvious from looking at a paper chart what the likely age and quality of the bathymetric data is, e.g. sounding density, old style chart, etc. This can be further endorsed with reference to the *Source Data Diagram* which provides information relating to the age and survey method employed plus the scale it was carried out at. ENCs on the other hand all look similar irrespective of the quality.

Information relating to the quality (M_QUAL) of the bathymetric data contained in an ENC and its associated attribution (CATZOC) has been the subject of criticism for some time. The symbology used, apart from cluttering the viewer, is not particularly intuitive for the user. The attribution reported in the *Pick Report* is even more obscure, e.g. *Category of Zone of Confidence = B*. Therefore from a safety point of view a more consistent and informative method of displaying this information is required for ENCs.

Furthermore inspection of some ECDIS has revealed that they only display *Real World Objects"* in the *Pick Report* therefore information about the M_QUAL object is not available. The user is only able to derive information about the data quality from the symbol. It should also be noted that these symbols are only visible when the *Display Category* is set to *ALL*. Any future documentation on this subject should make the display of this information mandatory.

The table below is provided for information and identifies the attribution values and symbols used for the meta object *QUALITY* [M_QUAL]. It also provides information relating to the survey characteristics which would be far more informative to the end user.

ID	CATZOC	Symbol	Typical Survey Characteristics*
1	A1		Controlled systematic high accuracy Survey on WGS 84 datum; using DGPS or a minimum three lines of position (LOP) with multibeam, channel or mechanical sweep system.
2	A2		Controlled systematic survey to standard accuracy; using modern survey echo sounder with sonar or mechanical sweep.
3	B		Controlled systematic survey to standard accuracy.
4	C		Low accuracy survey or data collected on an opportunity basis such as soundings on passage.
5	D		Poor quality data or data that cannot be quality assessed due to lack of information.
6	U		Source information has not been assessed for quality by the ENC producer

* The wording used in this column is copied from S-57 Appendix A, Chapter 2. Suitable descriptions for each attribute value could be considered.

The current CATZOC symbols, apart from cluttering the display, can be confusing and open to misinterpretation. A better method of displaying this important information is required. Several methods could been considered as follows:

Route Planning
- Simple line defining the limits of different CATZOC areas/values.
- The *Pick Report* should allow individual areas to be highlighted with a meaningful notification of the survey characteristics, seafloor coverage or other defined indication of quality.
- Floating point information at a user defined radius around a selected /plotted waypoint. Restricted display for a limited period of time, e.g. 5 seconds.
- The use of shading to highlight the areas of different CATZOC attributes on demand for the entire are in view.
- Additional functionality within the *Pick Report* that provides users with more detailed information relating to the survey details, e.g. positional and depth accuracies.

Route Monitoring
- Simple line defining the limits of different CATZOC areas/values
- The *Pick Report* should allow individual areas to be highlighted with a meaningful notification of the survey characteristics, seafloor coverage or other defined indication of quality.
- Floating point information at a user defined radius around the ships own position. Restricted display for a limited period of time, e.g. 5 seconds.
- The use of shading to highlight the areas of different CATZOC attributes on demand and for a limited period. [Perhaps a traffic light system green through to red in varying shades!]

The above options are not exhaustive and are provided as a starting point for discussion.

5.4 *Date Dependant Objects*

ECDIS systems already have functionality that allows the user to view objects with temporal attributes, e.g. Traffic Separation Schemes (TSS), Seasonal Buoys, etc. The implementation of this feature, as described in S-52 Appendix 2, Annex A, by manufacturers is wide and varied. See ANNEX E for further information.

It is not always immediately apparent if there are *date dependant objects* in a particular ENC. The *Pick Report* could alert the user to the presence of temporal attributes if present in the ENC currently being viewed. If such objects are present it should be possible to highlight the affected objects in the dataset. This could be particularly helpful during *Route Planning*.

5.5 *Relationship Objects*

All objects which share a relationship such as an *Aggregation, Association* and *Master/Slaves* should be displayed in the *Pick Report* collectively. The example in section 5.1 shows a *Master/Slave* relationship with the buoy as the master (as the support object) and the light, topmark and fog signal are the slaves. A method of making these relationships more obvious in the *Pick Report* could be

considered.

For instances all slaves to a master object could be indented below the master feature similar to the two examples below:

5.6 *Viewing External Files (Text and Picture Files)*

All ECDIS have the functionality to view external files relating to ENCs. However the methods of accessing and viewing these vary. Some systems present the user with a list of all external files associated with all objects in the *Pick Report*. However it is not always obvious which object each external file relates to.

A better method would be to list any associated external files under the relevant object in the *Pick Report.* The external filename (attribute value) should contain be hyperlinked so that the file is displayed on demand.

The window displaying any external file should be sized to accommodate the contents rather than fill the screen/viewer.

5.7 *Object Highlighting*

Objects when selected from a list in the *Pick Report* should be highlighted in the viewer. This is necessary so that the user is left in no doubt which object is being queried, both in the *Pick Report* and on the screen.

6 ENC Cell Information (Meta Data)

The *Pick Report* should contain information about the SENC status of the ENC cell. This information should be available upon request but should form part of the *Cursor Pick Results*, perhaps under a

separate tab. The following information is considered necessary to determine the status of all ENCs in the SENC.

- Cell Name
- Edition Number and issue date
- Update number and issue date
- The date and week of issue when the last update CD was applied to the system, even if the cell did not require an update.

Whether additional information is necessary such as vertices limits, horizontal and vertical settings, etc. is open to debate. Additional information could be supplied as suggested in this paper such as are there objects in this cell containing temporal or T&P information.

7 Rules for Pick Report Content

The criteria used by manufacturers when selecting which objects, and their attributes, to present in the *Pick Report* varies. It has been identified that some systems construct a *Pick report* based on the *Display Category* being displayed in the viewer.

This is not necessarily considered bad practice but is yet another example of inconsistencies between different manufacturer implementations. Again this has safety implications for users handling multiple ECDIS from different manufacturers or who move between vessels regularly. [The authors opinion is that ALL information should be displayed regardless of the selected category unless some form of user defined filtering is applied]

The table below is an actual example of what was displayed in the *Pick Report* under the different viewing conditions.

IMO Category		
BASE	**STANDARD**	**ALL**
Information about the ENC Depth contour (DEPCNT), line Depth area (DEPARE), area Depth area (DEPARE), area	Information about the ENC Depth contour (DEPCNT), line Navigational system of marks (M_NSYS), area Military practice area (MIPARE), area Caution area (CTNARE), area Caution area (CTNARE), area Depth area (DEPARE), area Depth area (DEPARE), area	Information about the ENC Depth contour (DEPCNT), line Quality of data (M_QUAL), area Navigational system of marks (M_NSYS), area Military practice area (MIPARE), area Caution area (CTNARE), area Caution area (CTNARE), area Harbour area (administrative) (HRBARE), area Coverage (M_COVR), area Depth area (DEPARE), area Depth area (DEPARE), area

8 Standardise the Presentation of the Report

It would be useful if the look and feel of the *Pick Report* could be standardised for those users working with multiple ECDIS implementations on the bridge or regularly moving between vessels. It is considered better (and safer) to have a standard method of displaying the *Pick Report* with a common set of tools for customising and filtering the display of *Cursor Picked* information. The issues identified and highlighted in this paper tend towards a tabbed window for the Pick Report although other options may be considered better through discussion.

9 S-101 and the Future

The new ENC Product Specification (S-101) provides an opportunity to standardise the *Cursor Pick Report* and mandate some of the features identified previously in this paper. System resources and

performance are no longer an issue and should not be a barrier to implementing this improved functionality.

Additionally it is necessary to look at the way objects and their associated attributes are categorised. The ECDIS must have a means of prioritising and filtering information supplied in the *Pick Report*. Currently S-57 defines a set of relevant attributes for each object class. These attributes are further divided into three subsets as shown below:

"Attribute A" Attributes in this subset define the individual characteristics of an object;
"Attribute B" Attributes in this subset provide information relevant to the use of the data, e.g. for presentation or for an information system;
"Attribute C" Attributes in this subset provide administrative information about the object and the data describing it;

A similar method could be expanded upon in S-101 to provide the manufacturers with sufficient flags which allow prioritisation and filtering of information in the *Pick Report*. Additional Attribute Levels to the ones identified above could be created. The following example of a possible *S-101 Catalogue Entry* is provided as a straw man.

Geo Objects

Object Class:	Buoy, special purpose/general
Acronym:	BOYSPP
Code:	19
Pick Priority:	2 (High)
Pick Category:	2 (Aids to Navigation)

Attribute Level	Allowable Attributes
Attribute A (Object Characteristics)	BOYSHP; CATSPM; COLOUR; COLPAT; CONRAD; DATEND; DATSTA; MARSYS; NATCON; NOBJNM; OBJNAM; STATUS; VERACC; VERLEN;
Attribute B (Object Information)	INFORM; NINFOM; NTXTDS; PICREP; TXTDSC; (Hyperlinked information to view on demand)
Attribute C (Temporal Information)	DATSTA; DATEND; PERSTA; PEREND; SURSTA; SUREND; TIMSTA; TIMEND: (The *Pick Report* highlights that the *Cursor Pick* has identified a temporal[1] attribute)
Attribute D (Administrative Information)	RECDAT; RECIND; SCAMAX; SCAMIN; SORDAT; SORIND; (Not visible in the *Pick Report* unless prompted for, e.g. show hidden attributes)
Attribute E (Preliminary & Temporary NMs)	PRELNM; TEMPNM; (The *Pick Report* highlights that the *Cursor Pick* has identified T or P NM[2] attribute)
Attribute X	Other subsets could be identified

[1] Users should be able to run a check for all objects with temporal attribution during route planning.
[2] Users should be able to run a check for all T&P NMs during route planning.

Definition:
A buoy is a floating object moored to the bottom in a particular place, as an aid to navigation or for other specific purposes. (IHO Dictionary, S-32, 5th Edition, 565) A special purpose buoy is primarily used to indicate an area or feature, the nature of which is apparent from reference to a chart, Sailing Directions or Notices to Mariners. (UKHO NP 735, 5th Edition) Buoy in general: A buoy whose appearance or purpose is not adequately known.

References: INT 1: IQ 130.6; M-4: 461;

Remarks: Topmark, light, fog signal, radar reflector and retro-reflector are separate objects.
Distinction: buoy lateral; buoy safe water; buoy isolated danger; buoy cardinal; buoy installation; mooring/warping facility;

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10 Conclusions

It was apparent in the preparation of this paper that there is much that could be done now with the current S-52 and S-57 standards to improve and standardise the *Pick Report*. It should be possible to implement the following with the minimal of work on the part of the manufacturers:

- Remove all category "C" attributes from the *Cursor Pick* query
- Omit references to all ACRONYMS and "Enumerated" and "List" ID values in the *Pick Report*.
- Use familiar charted abbreviations rather than a list of attributes and their values. Also include the charted symbol.
- Include a *Point*, *Line*, *Area* and *All* filtering capability into the *Pick Report* so that users can define which types of objects are queried.
- Additional filtering by object groups, e.g. Navigational Aids, Depth Areas, etc. (Will have to be defined)

The implementation of some of the other proposals put forward in this paper, such as, *Floating Point Information* and *Directed Cursor Enquiries* may require significant development work on the part of the manufacturer. It is also recognised that if some form of prioritisation is introduced the adequate *Pick Report Look Up* tables will have to be constructed and made available to the OEMs. This should not be the responsibility of one person and should be more widely discussed among stakeholders.

Due consideration should be given to providing stricter guidance in S-101 standard on the content and display of the *Cursor Pick Enquiry* and the *Pick Report*. Also it will be necessary to identify the functionality required to allow users some control over the information displayed. However none of this will be any good if we do not provide the manufacturers with the necessary encoded information to implement this from the standard.

IHO ECDIS PL, Edition 3.4, Jan 2008, S-52, ANNEX A of APPENDIX 2

Section 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.

		Q(6)+LFl.15s	Bell	Lower Heads	

The software could initially display only the symbol and abbreviation. However it should be possible to expand on this view as identified in the two options below.

Light (LIGHTS), point
Colour (COLOUR) : 1 (white)
Light characteristic (LITCHR) : 25 (quick-flash plus long-flash)
Signal group (SIGGRP) : (6)(1)
Signal period (SIGPER) : 15
Source date (SORDAT) : 20050824
Source indication (SORIND) : GB,GB,Reprt,FODB-00011c43-0000-DB,GB510210.000 [GB-2141038783-00387]

Buoy, cardinal (BOYCAR), point
Buoy shape (BOYSHP) : 4 (pillar)
Category of cardinal mark (CATCAM) : 3 (south cardinal mark)
Colour (COLOUR) : 6 (yellow); 2 (black)
Colour pattern (COLPAT) : 1 (horizontal stripes)
Object name (OBJNAM) : Lower Heads
Source date (SORDAT) : 20050824
Source indication (SORIND) : GB,GB,Reprt,FODB-00011c49-0000-DB,GB510210.000 [GB-3869126625-00389]

Top mark (TOPMAR), point
Colour (COLOUR) : 2 (black)
Topmark/daymark shape (TOPSHP) : 14 (2 cones (points downward))
Source date (SORDAT) : 20050824
Source indication (SORIND) : GB,GB,Reprt,FODB-00011c40-0000-DB,GB510210.000 [GB-3521368383-00386]

Fog signal (FOGSIG), point
Category of fog signal (CATFOG) : 7 (bell)
Source date (SORDAT) : 20050824
Source indication (SORIND) : GB,GB,Reprt,FODB-00011c46-0000-DB,GB510210.000 [GB-3816081508-00388]

Display Option 1

BUOY (cardinal)
Buoy shape: Pillar
Category of cardinal mark: South cardinal mark
Colour: Yellow & Black
Colour pattern: Horizontal stripes
Object name: Lower Heads
    LIGHT
    Colour: white
    Light characteristic: Quick-flash plus long-flash
    Signal group: (6) + (1)
    Signal period: 15 seconds
    TOPMARK
    Colour: Black
    Topmark/daymark shape: 2 cones (points downward))
    FOG SIGNAL
    Category of fog signal: Bell

Display Option 2

Lower Heads Cardinal BUOY
Pillar, South cardinal mark, Yellow & Black, Horizontal stripes
    LIGHT - Light characteristic: Quick-flash plus long-flash
    White, (6) + (1), 15 seconds
    TOP MARK - Black, 2 cones (points downward)
    FOG SIGNAL - Category of fog signal: Bell

The *IHO ECDIS PRESENTATION LIBRARY, Edition 3.4, January 2008, S-52, ANNEX A of APPENDIX 2,*
Has the following to say on Display Priority and Category:

8.3.4 Display Priority and Display Category

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 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.

8.3.4.3 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]). (See ANNEX F)

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
MARINERS OTHER	category the mariner assigns them to

The PL Look Up Tables

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.

Each look up table record contains the following fields :
Field 1 - code of the object class
Field 2 - attribute combination
Field 3 - symbolization instruction
Field 4 - display priority
Field 5 - radar
Field 6 - IMO display category (Display Base, Standard & Other)
Field 7 - viewing group (optional)

Examples:
```
"MORFAC","CATMOR5","SY(PILPNT02)","6","O","DISPLAYBASE","12410"
"LNDMRK","CATLMK20CONVIS1","SY(POSGEN03)","6","O","STANDARD","22220"
"LNDMRK","CATLMK3","SY(CHIMNY01)","4","O","OTHER","32220"
```

IMO PERFORMANCE STANDARD FOR ECDIS Section 3
3. DISPLAY OF SENC INFORMATION
3.1 ECDIS should be capable of displaying all SENC information.
3.2 SENC information available for display during route planning and route monitoring should be subdivided into the following three categories; Display Base, Standard Display and All Other Information (see Appendix 2).
3.3 ECDIS should present the Standard Display at any time by a single operator action.
3.4 When a chart is first displayed on ECDIS, it should provide the Standard Display at the largest scale available in the SENC for the displayed area.
3.5 It should be easy to add or remove information from the ECDIS display. It should not be possible to remove information contained in the Display Base.
3.6 It should be possible for the mariner to select a safety contour from the depth contours provided by the SENC. ECDIS should emphasize the safety contour over other contours on the display.
3.7 It should be possible for the mariner to select a safety depth. ECDIS should emphasize soundings equal to or less than the safety depth whenever spot soundings are selected for display.
3.8 The ENC and all updates to it should be displayed without any degradation of their information content.
3.9 ECDIS should provide a method to ensure that the ENC and all updates to it have been correctly loaded into the SENC.
3.10 The ENC data and updates to it should be clearly distinguishable from other displayed information, such as, for example that listed in Appendix 3.

APPENDIX 2 - SENC INFORMATION AVAILABLE FOR DISPLAY DURING ROUTE PLANNING AND ROUTE MONITORING

1. Display base, permanently retained on the ECDIS display, consisting of:
   1.1   coastline (high water);
   1.2   own ship's safety contour, to be selected by the mariner;
   1.3   indication of isolated underwater dangers of depths less than the safety contour which lie within the safe waters defined by the safety contour;
   1.4   indication of isolated dangers which lie within the safe water defined by the safety contour such as bridges, overhead wires, etc., and including buoys and beacons whether or not these are being used as aids to navigation;
   1.5   traffic routeing systems;
   1.6   scale, range, orientation and display-mode;
   1.7   units of depth and height.

2. Standard display, to be displayed when the chart is first displayed by ECDIS, consisting of:
   2.1 Display Base + the following
   2.2 drying line
   2.3 indication of fixed and floating aids to navigation
   2.4 Boundaries of fairways, channels, etc.
   2.5 visual and radar conspicuous features
   2.6 prohibited and restricted areas
   2.7 chart scale boundaries
   2.8 indication of cautionary notes

3. All other information. All other information displayed individually on demand, for example:
   3.1 spot soundings
   3.2 submarine cables and pipelines
   3.3 ferry routes
   3.4 details of all isolated dangers
   3.5 details of aids to navigation
   3.6 contents of cautionary notes
   3.7 ENC edition date

3.8 geodetic datum
3.9 magnetic variation
3.10 graticule
3.11 place names

APPENDIX 3 - NAVIGATIONAL ELEMENTS AND PARAMETERS *

1. Own ship
    1.1 .1 Past track with time marks for primary track
    1.2 .2 Past track with time marks for secondary track

2. Vector for course and speed made good.

3. Variable range marker and/or electronic bearing line

4. Cursor

5. Event
    5.1 .1 Dead reckoning position and time (DR).
    5.2 .2 Estimated position and time (EP).

6. Fix and time

7. Position line and time

8. Transferred position line and time
    8.1 .1 predicted tidal stream or current vector with effective time and strength (in box)
    8.2 .2 Actual tidal stream or current vector with effective time and strength (in box)

9. Danger highlight

10. Clearing line

11. Planned course and speed to make good. Speed is shown in box

12. Waypoint

13. Distance to run

14. Planned position with date and time

15. Visual limits of lights arc to show rising/dipping range

16. Position and time of "wheelover"
_____
* See IEC Publication 1174.

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.

Presentation Examples