Paper for Consideration by DIPWG

Considerations for Symbolizing Nautical Publication Information in ECDIS

Submitted by:	DIPWG Chair
Executive Summary:	References to the origin of the nautical publication symbology development in the DIPWG workplan are cited. Some issues for DIPWG and SNPWG to consider as they begin working together and a few prototype symbols to portray nautical information are presented.
Related Documents:	S-52, S-57, S-101, Nautical Publications
Related Projects:	Standardization of Nautical Publications Working Group (SNPWG), S-101 Stakeholders Workshop

Introduction / Background

Feb 2009 and Sep 2009

The paper, "Portrayal of Nautical Information," presented at the SNPWG-10 meeting in Norfolk, Virginia (FEB 2009) <http://www.iho-ohi.net/mtg_docs/com_wg/SNPWG/SNPWG10/SNPWG10-009_Portrayal.pdf> and a similar paper presented at the SNPWG-11 meeting in Monaco (Sep 2009) <http://www.iho-ohi.net/mtg_docs/com_wg/SNPWG/SNPWG11/SNPWG11-5_Portrayal.pdf> discussed nautical information that potentially would need to be portrayed in ECDIS to include nautical planning publications, such as:

a. Sailing Directions, Coast Pilots and their companion books such as Bowditch, Australian Seafarers Handbook, Guide du Navigateur and the Mariner's Handbook.

b. Tide Tables and their companions Tidal Stream Atlases and Co-Tidal Atlases

c. Lists of Lights (possibly)

d. Lists of Radio Signals

e. A special group of charts might also be considered: Routeing Charts and Routeing Guides.

Astronomical publications for celestial navigation were excluded.

These papers discussed the need to work closely with DIPWG to assist in developing ways to portray nautical information, including the possibility of modifying the DIPWG Terms of Reference to add, "and nautical" to paragraph iv of the Procedures Section so it would read:

a) The [DIP]WG should:

(iv) Identify basic scientific fundamentals and provide guidance to ECDIS manufacturers related to colours and symbolization of hydrographic and nautical information.

Some of the constraints and issues identified in the SNPWG paper included the following:

a. Nautical information consists primarily of text and will likely continue to be displayed as text within an ECDIS

b. "Even complex symbols could not convey the precise meaning of a carefully drafted sentence or paragraph."

c. Notwithstanding the two points above, "there may be far better ways to draw information from a database and to display it in novel ways."

d. When extensive portions of nautical information are presented, it may have to be done on another display.

e. "A combination of menus and search tools will need to be investigated" to aid the mariner.

f. Mariners will continue to desire uncluttered displays

g. "During passage planning, temporarily covering some parts of the chart display by nautical information will be inevitable and should not be prevented."

h. “Having multiple windows open with many of them minimized, is expected to be the norm for future electronic passage planning.”

Oct 2009
The desire to add nautical information to the DIPWG TOR was presented by SNPWG to the HSSC in 2009 as an informational paper, but not as a formal proposal, although SNPWG is still interested in pursuing this change. Nevertheless, the desire for assistance from DIPWG was discussed and Action Item 23 from the HSSC-1 meeting in Singapore added the following item to the DIPWG Work Plan: "Develop symbology for portrayal of nautical publications in ECDIS."

Dec 2009
In an exchange of e-mails between the DIPWG Chair, Colby Harmon, and the SNPWG Chair, David Acland, Harmon asked “Is SNPWG interested in additional S-52 symbolization (perhaps to show features or areas where additional sailing directions or other textual information is available), or is the major concern about how to integrate the (on or off chart display) of nautical publications text?”

The SNPWG Chair replied that, “I think we have to think about ‘Both’ and we (SNPWG) need to hear from the ECDIS manufacturers, who are mainly in the DIPWG.”

March 2010
The S-101 Stakeholders Workshop, (attended by both users and OEMs) held in Taunton held two breakout sessions related to Nautical Publications. The first (1.e), "Digital Nautical Publications and the Mariner," covered three topics: 1.) user interface, 2.) nautical information and its usefulness to the mariner in planning and executing voyages, and 3.) real time data. The other breakout session (1.g), covered the topics: 1.) Technical aspects of MIOs (NPubs, etc.) and 2.) Feature Catalogues

Excerpts describing these two sessions from the draft "Outcomes from the S-101 Stakeholders Workshop" report are included as Annex A of this paper.

Analysis/Discussion

As SNPWG continues to consider ways in which to organize and display digital nautical information there are many things that DIPWG will need to know in order to best lend assistance to SNPWG.

Roles for DIPWG and SNPWG
It would be helpful if the expectations for each working group regarding the portrayal of nautical information were clearly understood. For example, it would useful to differentiate between 1.) the portrayal of nautical information with symbols, either to depict specific nautical information or to indicate the availability of additional information that may be accessed elsewhere, and 2.) the formatting, indexing, search, display, etc. of the actual nautical information, which primarily consists of text, tables, and graphics.

Question 1: Can this distinction serve to define the expected scope of participation for each working group regarding nautical information?

For example, the formats of the data contained in nautical publications were enumerated in the SNPWG10 and SNPWG11 papers to include:

- Prose using fully formed sentences and paragraphs;
- Text using incomplete sentences;
- Lists;
- Diagrams. A special class of diagrams are chartlets in all scales covering the area of the whole world down to single berths;
- Photographs;
- Tables;
- [There may be others]

It is proposed here that the display of any of these types of data remains within the purview of the SNPWG, but that assistance regarding the design of symbols (and rules to control their use or behaviour) to depict any of this information within a geospatially reference display falls to the DIPWG.

Question 2: Is this an appropriate division of responsibilities between the two working groups?

In the past, SNPWG has categorized nautical information into the themes shown below:

- Environment
- Harbour infrastructure
- Hydrography
- Navigation marks
- Social and political
- Topography
- Traffic management
- Reference
- Publications also contain regulation, cautions, advice and experiential information

David Acland has also indicated that perhaps half a dozen new symbols might be needed for nautical information, such as:

- Pilotage Information
- Port Information
- Climatic Information
- Something like "Social and Political", attached to ADMARE that gives background information on Countries and States or Provinces at the level below the Nation State
- and others

Question 3: Might these two lists logically be conflated to roughly identify the types of information that could require symbols in the future?

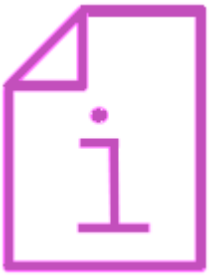
Regardless of "where the line is drawn" regarding roles, it is clear that the HSSC has directed DIPWG to, "Develop symbology for portrayal of nautical publications in ECDIS." With that in mind there are a number of questions that need to be answered before much else can be done. Some of these are listed below. The DIPWG and SNPWG are invited to add to this list so that we can more clearly know what we need to know to define the final symbology requirements.

Questions:

4. Will all symbols have a geospatial reference? Might some symbols be "parked" in a corner of the display to indicate that additional information regarding the entire displayed area is available?
5. Will symbols for all three geometry types (points, lines and areas) be needed?
6. What symbols will be needed and what will they be associated with? An entire ENC Cell, the area being displayed, Specific S-57 features, or other non-S-57, Nautical Publication features?
7. Will symbols be used only to indicate that a specific type of nautical information is available?
8. Will symbols also be needed to portray different characteristics or conditions? If so, what characteristics or conditions?

<u>A Few Ideas for new Nautical Information Symbols</u>

The need to develop a symbol for Pilotage Information could be fairly straight forward. A few recommendations for a symbol are presented below. The assumption being that the symbol would indicate that additional Pilotage Information was available and that there is a PILBOP, "Pilot Boarding Place" object to link the symbol to. The examples below evoke the S-52, "**i**" information icon as well as the "document" icon commonly seen on copiers and fax machines. These suggestions are merely put forth to start the conversation.

1		Existing S-52 Symbol CTYARE71, "Cautionary Area with Additional Information"
2		Existing S-52 Symbol "PILBOP02, "Pilot Boarding Place"
3		" Pilotage Information" symbol (Option 1)
4		"Pilotage Information" symbol (Option 2)
5		"Generic Nautical Publication Information" symbol (Option 1)
6		"Generic Nautical Publication Information" symbol (Option 2)
7		"Generic Nautical Publication Information" symbol (Option 3)

Conclusions

1. DIPWG is eager to assist SNPWG in developing symbols and associated rules and tables to facilitate the portrayal of nautical information.
2. The expertise within DIPWG is primarily related to the graphical display of information and not with effectively displaying large amounts of text.
3. There are many questions that still need to be answered in order to move forward with the portraying nautical information with symbols.
4. Use of DIPWG and TSMAD may be an easy way for SNPWG to gain access to many Original Equipment Manufacturers to find out more about what ideas OEMs might have about the ECDIS display of nautical information.
5. DIPWG can make recommendations for the design of specific symbols once the features, attributes or conditions that they represent are more clearly defined by SNPWG.

Recommendations

1. The best role for DIPWG at this point might be as a sounding board for SNPWG's ideas as they continue to refine their needs for portraying nautical information.
2. SNPWG should continue to keep DIPWG apprised of their progress and make every attempt to participate in TSMAD and DIPWG meetings and fora so DIPWG members and OEM representatives can better understand SNPWG's needs and provide face to face advice on what manufactures think might be a desired approach on any specific nautical information portrayal issue.

Action Required of DIPWG

The DIPWG is invited to:

Make additional recommendations as to how DIPWG and SNPWG might most effectively work together to develop symbology for nautical information.

Provide feedback to the DIPWG Chair on the possibility of modifying the DIPWG Terms of Reference to add, "and nautical" to paragraph iv of the Procedures Section, to read, "(iv) Identify basic scientific fundamentals and provide guidance to ECDIS manufacturers related to colours and symbolization of hydrographic and nautical information.

Provide input regarding additional issues that will need to be addressed to portray nautical information.

Provide ideas related to new nautical information symbols in addition to those presented in the table of symbols above.

e. Digital Nautical Publications and the Mariner

topics include:

- *user interface*
- *nautical information and its usefulness to the mariner in planning and executing voyages*
- *real time data*

Questions for Breakout Group B:

It is intended that future systems will have better capability to include information which is supplementary to the basic electronic chart.

1. *how can useful nautical information be flagged to a mariner and then displayed in a way, which will not compromise the display of electronic chart information?*
2. *what information or process would reduce the overheads experienced at either the planning stage or during voyage execution?*
3. *what real time data, which can be considered as accurate, is now widely available at modern ports or canal lock entrances? Eg Tide, Air Temperature, Currents Wind speed and direction.*

Workshop Conclusions / Recommendations:

- It was discussed that dynamic restricted areas, MARPOL regulated areas and emission regulations areas would be useful.
- A nearest medi-vac search function would be of benefit, also an integrated man overboard function would be useful.
- Passage plan – select the feature or area and single button (?) will access all information relating to the selection from SDs, ALRS, Port information, etc
- Larger and multiple monitors should be used to avoid layers causing a cluttered display.
- More detailed information required back of bridge than front of bridge.
- An example of real time data was of wind speed and direction broadcast at the Port of Southampton.
- It was discussed that the range of formats and means of accessing these was a limiting factor.
- Standardisation of real time information would ease integration with ECDIS.
- The group went on to discuss how AIS could potentially be used to carry weather information.
- The advantage of having cause dependent presentation of nautical information was discussed
- It was not confirmed that the whole book content is still required (neither printed nor digital), rather the book content should be prepared/modelled for front and/or back wheelhouse display.

g. Group A

topics include:

- *Technical aspects of MIOs (NPubs Etc)*
- *Feature Catalogues*

Questions for Breakout Group A:

1. *As an ECDIS manufacturer in what formats would you prefer to see information on: Ports, TSS/VTS Environmental data such as Currents, Wind, Sea state and Ice?*
2. *If Current information was delivered in 1or ½ or even 1/6th degree rectangles, how could you display it and use it for calculation so that better ETA's could be calculated from climatic data?*
3. *In what formats are 5 day weather forecasts now available? Do ECDIS already read them and display them on top of chart displays?*
4. *Could information that was identified during passage planning be bookmarked for use during execution?*
5. *What key factors would persuade you or your organisation that the next generation ECDIS environment is a 'must have' solution? (preparation for final plenary session)*

Workshop Conclusions / Recommendations:

- Marine Information Overlays containing nautical publication data should be called Nautical Information Overlays
- 8211 suitable for data about points or areas; text or photos applied to vector data.
- GRIB more appropriate for large area weather/climatic data. Contour data should be converted to GRIB – easier for GIS tools to interpolate.
- Easier for ECDIS if climatic, real time and forecast data all in same format
- Needs to include both climatic and meteorological information
- If current known, could apply to Man overboard symbol
- Two ECDISs, which connect to internet, already have type approval. Offers possibility of real time and forecast weather information – wind; water level
- Wind speed and direction could come via AIS.
- NP's vary greatly between HO's and existing products cannot be standardised
- The Nautical Information Overlay(s) product specification(s) should standardise the content, although certain HO's may not support this
- NPs bring together a wide variety of information. Need to clarify scope and overlaps between products
- Layers may need to interact and a unique identifier will be required to ensure consistent referencing
- Think about how to provide information on Sulphur Emission Control Areas (SECA) – 3 mile / 6 mile limits
- Issue of the need to transfer weather information and passage plans from back of bridge system to ECDIS
- The idea of a route specific version of sailing directions ordered for the passage is a possibility