

Paper for Consideration by CSPCWG

Berthing (large-scale) ENC: consequences for SNC / S-4?

Submitted by:	Chairman
Executive Summary:	With the emerging development of very large-scale ENC products, to what degree should CSPCWG be engaged with advising on charting principles and symbology of features? Should CSPCWG be engaged with such development? Should S-4 expand its scope and focus?
Related Documents:	S-4
Related Projects:	Port ENC product specifications; Inland ENC
Notes:	SNC = standard nautical <i>paper</i> chart 'Berthing scale ENC' may be an inappropriate term (AU)

Introduction / Background.

1. There is the prospect of very large-scale ENC products being developed for ports and other areas which have no equivalent or basis in a paper chart. CSPCWG does not currently monitor this activity and its documents do not provide chart specifications or guidance that encompasses the range of objects and attributes that may be required to populate such a digital product.
2. Many features will have a direct link to smaller-scale charts (paper and digital). These can be captured and portrayed to the same principles that have already been developed through existing mechanisms and controls which support standardisation. However, there may be features that are new to charting in this 'large-scale' environment that have not previously been considered. In such cases, how can the established cartographic principles, developed in the context of both paper and digital charting, be translated and adapted, where applicable, to best effect.
3. The same mariner will be using products in both the large-scale (eg port) and open-sea environments, so will already be used to existing conventions of practice, symbology etc.
4. Note: In response to Letter 7/2011 (CSPCWG7 action on 'wharfside obstructions' and S-4 B-410.1), AU provided the comments at Annex A.
5. S-4 B-126 'Terms for chart scales' categorises:
 - Harbour: harbour/anchorage/narrow straits - larger than 1:30 000
 - Berthing - very large scales.
6. UK has some knowledge of related developments including:
 - Port ENCs – eg Port of Hamburg (presented at HSSC2 – Annex B refers), Port of London berths.
Note: whilst there is a dialogue between IHO and the 'Inland ENC' community, I am unaware that any similar link exists to support or advise those who may be creating Port ENCs. Perhaps these exist nationally within MS?
 - The creation of a 'stand-alone' ENC product to support anchoring and manoeuvring for a cruise company (Bahamas beach).

Analysis / Discussion.

7. Are there charting principles involved that should be recognized and incorporated within S-4?
8. Should CSPCWG be involved in these developments or leave for ENC community to control and provide the advice, consulting with CSPCWG, as appropriate?
9. If CSPCWG is to be more directly involved, to what degree and through what mechanisms?

Conclusions. None

Recommendations. None.

Justification and Impacts. The standardisation of charting products.

Action required of CSPCWG.

CSPCWG is invited to discuss and advise the Chairman on an initial way forward, if any.

ANNEX A
to CSPCWG8-09.7A

In response to Letter 7/2011 (CSPCWG7 action on 'wharfside obstructions' and S-4 B-410.1), **AU provided the following comments:**

"AU considers that it is inappropriate to make reference to berthing scale ENCs [in the first bullet point], for the following reasons:

- There is no other incidence in S-4 (that AU can recall) relating a charting specification to any particular ENC scale(s). Indeed, there is no relationship between ENC Navigation Purpose and ENC compilation scale in S-57, therefore there is no such thing as a "berthing scale" ENC.
- The portrayal references within the clause to dashed lines, out of position soundings and colour tints, are either not in the control of the ENC compiler, or are not permitted for ENC.
- There are ENC specific ways to provide such information to the mariner, through population of DRVAL1 (minimum depth at the berth) and/or INFORM (maximum draft permitted at the berth) for the BERTHS object, which is included in S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC, in addition to encoding the geometry of depth and dredged areas adjacent to berthing facilities.

AU has corresponded with the Chair of TSMAD on this and as a result suggests that the text "(including berthing scale ENC)" be removed [from the first bullet point], as the relevance of S-4 in terms of digital charting standards is adequately defined in B-100; and in line with the above points."

The Port ENC – a proposal for a new port related ENC standard

(Paper HSSC2-INF4 to 2nd IHO-HSSC Meeting, Rostock, Germany, October 2010)

The Port ECDIS Work package was a part of an European R&D project named EFFORTS. (Effective Operation in Ports). The EFFORTS project was divided in 3 subprojects: "Navigation in Ports"; "Ports and Environment" and "Port Organisation". Navigation in Ports deals with "TUG assistance", "Precise Navigation and Manoeuvring in Ports" and with "Port ECDIS". The duration of the project was 42 month, from May 2006 to October 2009!

Port ECDIS was the work package synonym, but we developed a proposal for a new extended Port ENC standard. The work package leader was the Hamburg Port Authority, namely Dieter Seefeldt. We worked together with the companies CARIS BV and SevenCs and with the TUHH (Technical University Hamburg Harburg). We think, that the Port ECDIS work package was one of the most interesting one, because the other two work packages need the information of the Port ECDIS as base information.

Less harbour and manoeuvre space and larger vessels and the knowledge about the requirements (on base of a questionnaire) the users (harbour masters, pilots, captains on board, ship officers, TUG operators, fire brigade, police, port maintenance operators and for simulation et cetera) have compared to the current ECDIS standard gives a clear understanding and call for the highest level of accuracy and reliability of digital chart information for navigation in fairways and ports currently not being met by equipment according to SOLAS V Carriage Requirements!

ECDIS and Inland ECDIS, both with the same accuracy requirements, cannot be used in ports for precise navigation, manoeuvring, berthing, turning, docking, maintenance etc. because they don't fulfil up to-dateness, reliability, large scale charts and accuracy for bathymetric and topographic aspects!

So different charts must be used, the official ENC in an ECDIS and special fair sheets form the Port Authority. The achieved accuracy of modern positioning sensors must be inherent in the underlying electronic charts! That calls for a specific Port ENC! The Port ENC should serve as a missing link between maritime shipping and inland shipping and fill the gap and a Port ENC intended to align with the ongoing developments for maritime and Inland ENCs. (→ IHO S100 Standard, Maritime Spatial Data Infrastructure MSDI....)

IHO S57 Standards do not provide significant topographic source data for integration in ENCs. No dedicated accuracy requirements are defined that apply for different navigational purposes / categories (e.g., port operations). Within ENCs and Inland ENC's, the IHO S-57 Zone of Confidence (ZOC) assessment is used to describe the quality of bathymetric data, but is not used for topographic data! The IHO S44 Minimum Standard for Hydrographic Surveys defining different accuracy requirements! We think, that should be harmonized.

The port requirements compared with the official ENC for the Port of Hamburg (produced and issued by BSH (Federal Maritime and Hydrographic Agency / Germany)) we find out, that it meets all the relevant ENC related standards and fulfils the requirements for maritime navigation, but the ENC is too small in scale, does not have any bathymetric detail, not showing up-to-date information and poorly defined horizontal accuracy for topographic features such as quay walls, piers, pontoons, etc.. Result: the official maritime ENC is not suitable for special operations within the port area but to be fair, the official BSH - ENC has a different purpose to meet (usage band 5 – harbour).

So we produced a new Port ENC dataset including very precise topographic and bathymetric information for large scale presentation, defining some new objects, using gridded bathymetry

information, combined this information with a bathymetric ENC (7Cs) and developed a so named channel reference model which represents the nominal harbour bottom, so that also new data models like and real 3D information can be part of the Port ENC.

Using the Port ENC we had a lot of very successful Port ENC tests (onboard of Survey vessels, PPU, Container vessels, Cruise Liners, during docking, onboard of a Hopper Dredger etc.). Overall we produced as result some papers like "Definition of present Data Quality in Standards used for ENC data (S57 versus S44 standard)", a "Port ENC Feature Catalogue" - description of the Port ENC features, a "Port ENC encoding guide" - representation and symbolisation, a "Port ENC product specification", a report about "Tests with Port ECDIS (Port ENC) prototype (based on basic dataset), a Port ECDIS viewer and a Port ECDIS follow up requirement paper. All of this information, we have distributed to more than 15 organizations that might be interested in this topic.

At the end the outcome was a proposal and comprehensive concept as basis and input for European / international standardization proved by validation and functional tests in the Port of Hamburg. From my point of view the keys points and their significance for the IHO are described before and there is an essential need for a Port ENC standard on base of the old S57 standard (a first adaption) and on base of the future S100 standard.

HSSC2 Minutes:

Presentation: 'The Port ENC' by Mr Dieter SEEFELDT, Hamburg Port Authority, Germany.

Doc: HSSC-INF4 The Port ENC - a proposal for a new port related ENC standard

The Chair commented that this type of initiative was good and supplemented the approach and harbour ENCs produced by HOs. On request from Turkey (LCdr Bülent GÜRSES), Mr SEEFELDT indicated that the budget for the Port ECDIS project was about 400,000 Euros.

USA (ANDREASEN) explained that NGA was also making port charts that conform to WGS-84, by using high-definition imagery. He believed that „flash Lidar“ was something that could be used for that purpose. Singapore (OEI) commented that changes in shore-side development are an important issue and could become part of a Port ENC.

Germany (JONAS) expressed concerns about the status of the Port ENC Product Specification, and the possible perception that official ENCs are of lower quality. He had also concerns about harbour administration in effect becoming mini-HO"s producing an alternative type of ENC. He pointed out that the Pilot is an advisor to the Master, and if they are using customized port ENCs with different bathymetry from that in the ENC, this may cause a problem. In his view, if a national HO was provided with the accurate topographic and hydrographic data being included in port ENCs, then that HO could produce a similar type of large scale ENC. He also expressed concern about having two types of ENCs, i.e. official ENCs and port ENCs.

The Chair noted that this presentation pointed out the need for further extension of S-44 and S-57 (CATZOC) to cater for the higher accuracy and precision of data contained in Port ENCs.

Outcome: The Committee noted the paper and the contents of the presentation.