

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

Abstract - Summary - Overview

The Port ECDIS Workpackage 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.