

Paper for Consideration by HSSC8
Development of an Additional Bathymetry Layer standard based on S-57/S-52

Submitted by:	CIRM, Germany, USA (NOAA)
Executive Summary:	Proposal for the standardization of an additional bathymetric layer "ABL" to supplement S-57 ENC's and the associated S-52 portrayal
Related Documents:	Bathymetric Inland ENC Product Specification, http://ienc.openencdis.org/?q=content/bathymetric-inland-enc-product-specification
Related Projects:	S-57; S-52

Introduction / Background

Specific navigational tasks like pilotage and vessel traffic services at seaward harbor approaches and port areas request the provision of more detailed seabed topography based on the most recent survey available. Such specific bathymetric layer should ideally allow the combination with regular ENC's and facilitate the application of tidal information to depth soundings and dense contour lines to aid precision navigation for pilots.

Analysis / Discussion

Standard ENC's usually depict a limited range of contour lines in defined 5, 10 und 20 meter steps similar to paper charts. Those contour lines are created to support common navigational practice but do not fully reflect the detailed bathymetric situation. For special applications like pilotage and vessel traffic services the density of these contours is not sufficient. Private service providers have identified this gap and started the provision of an additional bathymetric layer ABL in using the S-57 data structure and features such as soundings and depth areas called a bENC (bathymetric ENC) but the lack of an underlying standard has limited its widespread application.

The provided ABL data are derived from most recent local multibeam surveys and are disseminated via internet for local clients. Those clients are equipped with devices, e.g. Portable Pilot Units (PPU) which display software is adapted to the specifics of bENC. PPU's combine regular ENC's of the subject area with the received additional bathymetric layer. The software suppresses the display of depth soundings and contour lines coded within the ENC and load up the bENC content instead. The depth information is portrayed by means of a specific colour scheme which expands the designated ECDIS colour set for depth areas. Due to its nature as a layer of a content limited to bathymetric lines and areas, the bENC data sets are relatively easy to produce in high – up to weekly - frequency and ready for wireless transfer by means of small bandwidth infrastructure.



The picture above shows the bENC as a merge of ENC and ABL

In 2015, the bENC technique was adopted by the Inland ENC Harmonization Group, but because it is part of the IENC specification it still enjoys limited adoption beyond inland waterway navigation. However, because the format has started to move to a standardized framework, it allowed the United States (NOAA) to produce bathymetric Inland ENCs for the Port of Los Angeles and Long Beach to assist pilotage.

http://www.nauticalcharts.noaa.gov/mcd/enc_overlays.html

Conclusions

The bENC technology offers significant advantages compared to regular ENCs of denser contour intervals which could theoretically serve the same purpose. ABL data are much quicker to produce and disseminate up to weekly frequency without the cumbersome procedures of regular ENC distribution. Their practical use require specific skills and bENC technology is therefore not addressed to the regular navigation by means of ECDIS.

The bENC solution enjoys growing request and popularity in many pilotage areas of the world. However, since bENC is not available as an open consensus based standard, numerous potential user communities are hesitant to introduce it as a regular means. The same effect can be observed on producer's side. National HOs are not certain to invest in an enhancement of its production environment which is focused on a hydrographic data product. The S-100 framework utilizing the S-102 product specification will offer the optimal approach of delivering high resolution grids into the navigation system, but there is still a 3-5 year window before end users will see the results. Utilizing the S-57/S-52 standard will provide an interim solution that can be adopted by the sub-SOLAS community to aid in precision navigation. In addition, because the data structures and features are similar to what is utilized in S-100 the data can be converted to an S-100 conformant product, if it is desired to continue to produce this type of data within the S-100 environment. But the latter transition will hardly take place before a robust S-101 ENC environment will exist in the beginning of the next decade.

It appears evident that the setup of an S-57/S-52 based ABL standard would be the favorable solution for the local provision of dense bathymetry data on relative short notice. Alternative solutions cannot be either facilitated by the resulting work load (parallel production of dense contour line ENCs) or by absence of an operative technical environment for the production of full S-100 conformant data products.

Assuming that industry participants are active in the drafting process and assuming further that the inventors of the bENC solution unveil the details of this technology for the purpose of IHO standardization, it is proposed that HSSC takes action to

- adopt the task to develop a S-57/S-52 based Standard for Additional Bathymetric Layer (ABL) to its work plan,
- task ENCWG to set up a ABL Project Team to develop a product specification if member states and industry are able to assign sufficient personal resources to it,
- accept industry representative as project leader,
- advice the ABL Project Team to take guidance from IENC Committee which has already adopted the bENC technology in a similar way to its scope of standards.
- Set up a time line to submit a draft Standard for adoption at HSSC9 in 2017.
- Decide whether this Standard should be annexed to the existing S-57 / S-52 Standards or form its own S-xx Standard referencing to the above ones.

Justification and Impacts

The provision of a standard for detailed bathymetric information to complement the information of sea bed bathymetry embedded in ENC's closes the gap between the need of information in local areas and the existing system for global navigation.

Recommendations

The establishment of an ABL Project Team under supervision of ENCWG tasked to adapt the existing technical bENC solution to the general outline of S-xx IHO standards maintaining compatibility to S-57 / S-52 standards. Draft Terms of Reference (ToR) and Work Plan are proposed in Annex A.

Action required of HSSC8

The HSSC8 is invited to:

- a. note this paper,
- b. support the Project Team idea,
- c. approve the ToR and the Work Plan for the Project Team,
- d. invite the MS and industry to nominate the Project Team members.

Annex A

ABL PROJECT TEAM (ABLPT)

Draft Terms of reference and Rules of Procedure

1. Objective

Development of an Additional Bathymetric Layer (ABL) Product Specification to amend S-57 and S-52 for the provision of more detailed seabed topography, presented in combination with ENC's.

- Identify suitable elements of the existing common and proprietary definitions of bathymetric ENC's (bENC) by taking guidance from the Bathymetric Inland ENC Specification of IENC Committee.
- Align those elements to the notation of the existing IHO standards S-57 and S-52 and draft the resulting amendments as new Annexes.
- Maintain compatibility with existing bENC solutions.
- Produce ABL test samples matching with the applicable ENC's contained in the S-64 IHO test data set for ECDIS.

2. Authority

This Project Team (ABLPT) is a subsidiary of the ENC Working Group (ENC WG). Its work will be guided by the 2016-18 Work Plan established by the ENC WG and subject to its approval.

3. Composition and Chair

- a) The Project Team (ABLPT) shall comprise representatives of IHO Member States (MS), Expert Contributors (EC) and observers from accredited NGOs. The IHO Secretariat may also be represented. A membership list shall be maintained and posted on the IHO website.
- b) EC membership is open to entities and organizations that can provide relevant and constructive contribution to the work of the ABLPT. EC's shall seek approval of their membership from the Chair of the ABLPT.
- c) EC membership may be withdrawn, in the event that a majority of ABLPT members agree that an EC's continued participation is either irrelevant or not constructive to the work of the ABLPT.
- d) The Chair of the ABLPT is designated by the parent body.
- e) If a Secretary is required, he/she should normally be drawn from a member of the ABLPT.

4. Procedures

- a) The ABLPT should work primarily by written correspondence and teleconferences.
- b) Decisions should be made by consensus. Dissenting opinions, if any, should be reflected in the ABLPT report.
- c) The ABLPT should liaise with other IHO bodies, international organizations, end users and industry to ensure the relevance and currency of its work.
- d) The ABLPT should report in accordance with its Work Plan.

ABL Project Team (ABLPT) - Draft Work Plan 2016-2018

Tasks

A	Development of an Additional Bathymetric Layer (ABL) product specification
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Work items

Work Item	Title	Priority H-high M-medium L-low	Next Mile stone	Start Date	End Date	Status P-Planned O-On going C-Completed S-Superseded	Contact Person	Related Pubs / Standard	Remark
A.1	Identify suitable elements of the existing proprietary definition of bathymetric ENC's (bENC)	H	A.2	2016	2017	P	PT Chair	Bathy-metric Inland ENC PS	Take Guidance from the Bathymetric Inland ENC Specification
A.2	Align those elements to the notation of the existing IHO standards S-57 and S-52 and draft the resulting amendments as new Annexes.	H	A.3	2016	2017	P	PT Chair		Maintain compatibility with existing bENC solutions
A.3	Submit ABL specification to the ENC WG for review and approval so it can be forwarded to HSSC 9	H	A.4	2017	2017	P	PT Chair		
A.4	Pending HSSC9 approval, produce ABL test samples matching with the applicable ENC's contained in the S-64 IHO test data set for ECDIS.	M		2017	2018	P	PT Chair		

Meetings

Date	Location	Activity

Chair:

Vice Chair/Editor:

Email:

Email: