

Paper for Consideration by ENC Working Group

Presentation of High Resolution Bathymetry in S-57 ENC

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Executive Summary:	High density contours in ENCs
Related Documents:	S-57, S-58
Related Projects:	bENC

Introduction / Background

HSSC 8 action 27 to investigate various existing options for including additional bathymetry within ENCs was assigned to the ENCWG. The ENCWG are to report back their findings and recommendations to HSSC 9.

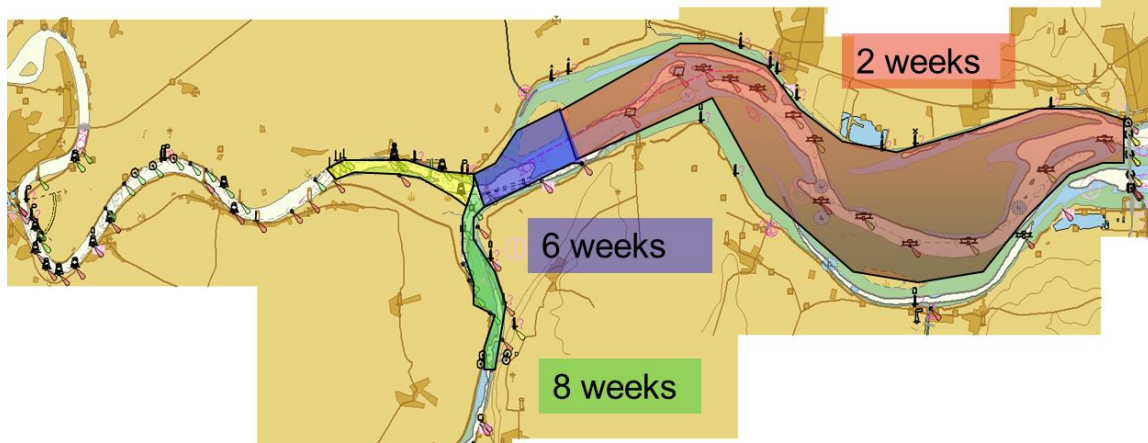
The following paper is a description of the methodology used by the UKHO to fulfil this requirement.

Analysis/Discussion

All hydrographic offices are receiving more data on an ever increasing basis, Multibeam, LIDAR (airborne surveying), Satellite Derived Bathymetry and Autonomous surveying, all generating masses of hydrographic data in volumes never experienced before. The challenge for us all lies in being able to quickly process this information and extract the safety critical information to apply in our products. Everyone is under pressure to use the same production tools and maintain the existing resourcing levels, whilst processing more complex information.

Over the last two years the UKHO have been working on new methods to generate ENCs for areas that have a rapidly changing hydrography. The goal has been to automate the production of produce high resolution bathymetry ENCs from raw survey information.

The Humber on the East coast of the UK was designated as the first trial area. Chosen for its rapidly changing hydrography, it's an area that is regularly surveyed by the port authority.

ABP HUMBER SURVEY SCHEDULE

Dynamic hydrographic environment .

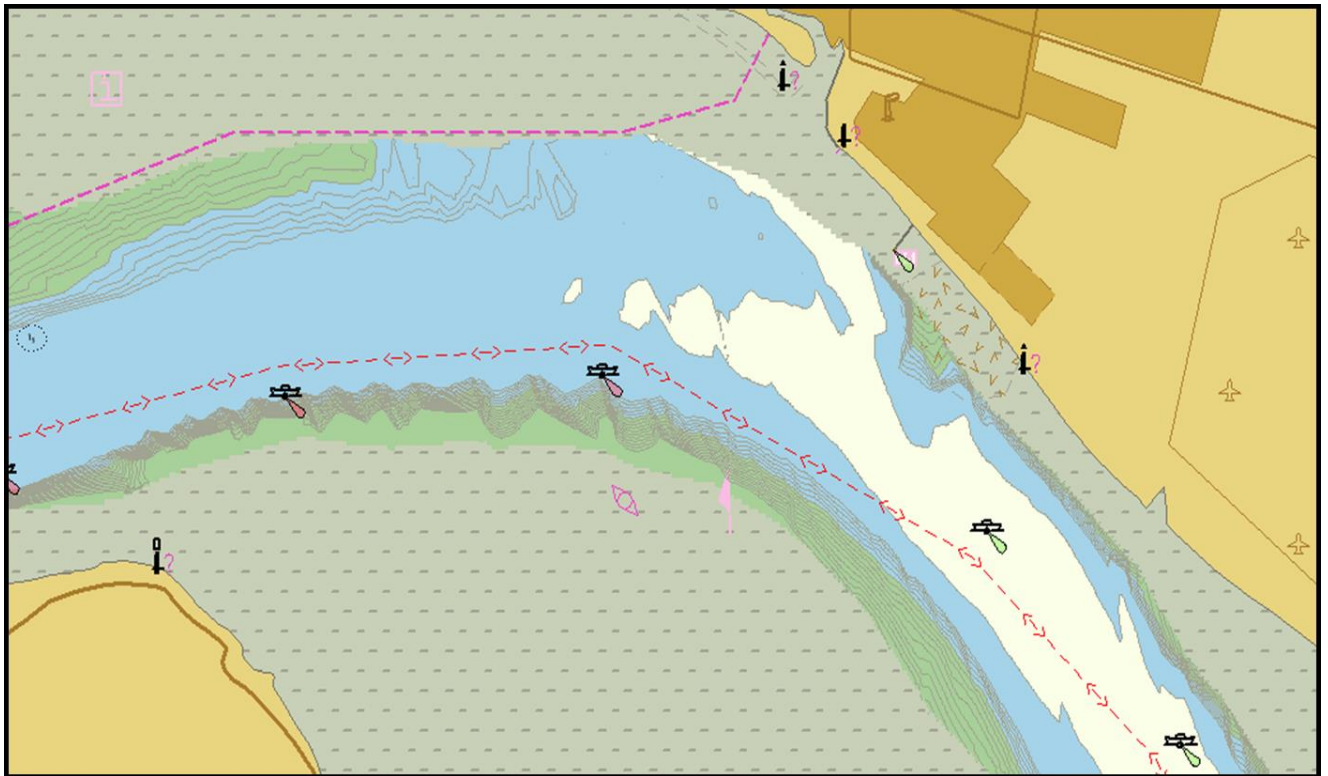
Surveyed by ABP Humber on very frequent basis :

Ship's course and buoyage amended every 14 days.

Current traditional ENC production systems cannot cope with speed of change within this area we therefore needed a new approach to ENC creation for this area. The project was tasked with producing a new ENC with high density contours within a strict two day time period.

Working with the Caris HPD toolset we automatically generated a usage band 5 harbours cell with a high density contoured channel from 0.5 dry to 1m, using a contour interval of 0.1m. Using the current S-57 and S-58 standards we were able to produce a high density ENC that passed validation and could be used successfully in ECDIS.

Meeting the tight time frame would not have been possible with a manual approach to data capture.

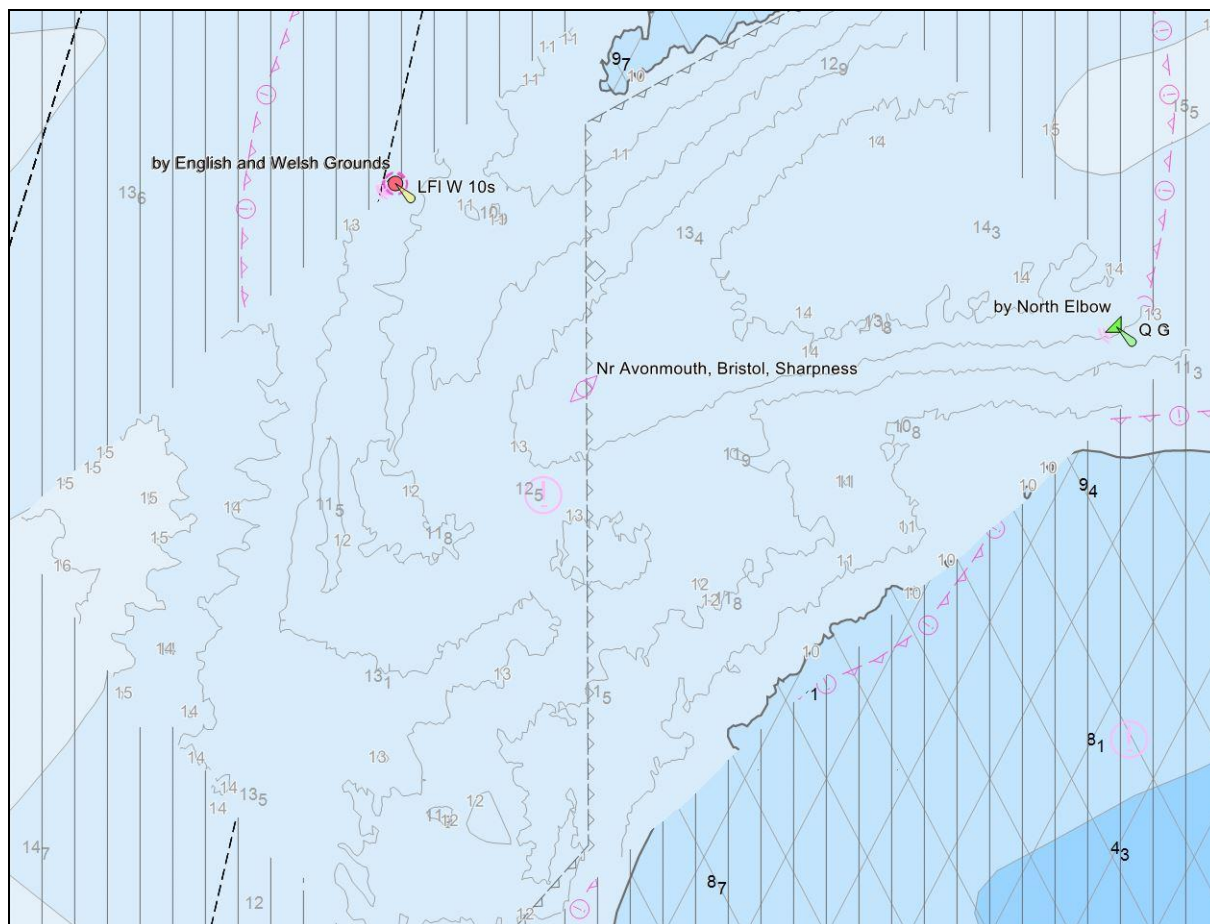


2. Humber high density contoured ENC

The automatic ENC production process was proven to be very successful with the ENC's taking approximately 1 day to produce and issued every 2 weeks for approximately 1 year. These ENC's have the benefit of working with ECDIS without the need for any ECDIS software upgrade.

Phase two of the project selected a new area which again would benefit from the enhanced bathymetric ENC. Avonmouth dock was nominated, a busy port with two container terminals and a large focus on the import and export of motor vehicles. Located on the Severn estuary within Southwest England the port has the second highest tidal range in the world, approximately 15m. The estuary's funnel shape, its tidal range and the underlying geology of rock, gravel and sand, produce strong tidal streams and high turbidity. Large vessels therefore need highly accurate bathymetric information to ensure they can transit to the berth safely.

The new ENC created for Avonmouth is a berthing cell band 6 which has a 1m contour interval. On the previous harbours ENC when the Mariner selected 11m safety contour the ECDIS defaulted to the next deep contour interval 20m. This makes the area the vessel will have to transit through appear to be dangerous, and would trigger alarms and indications within the ECDIS. However, with our new ENC, Mariners can plan a berth to berth passage using accurate data.



3. Avonmouth 1m contour ENC cell GB601174

Produced automatically from Caris HDB in accordance with the S-57 ENC specification it has now been added to the AVCS database and is being used within the following ECDIS.

ECDIS using GB601176
Danelec Marine
Furuno
SIMRAD
Japan Radio Co.
Transas
Totem Plus
Offshore Systems Ltd
Tokyo Keikei

Recommendations

The following report has revealed how high density contour intervals are being included in commercially available ENC's, in accordance with current IHO ENC specifications.

The report has demonstrated how it's possible to automatically produce bathymetric ENC's from current ENC production tools, reducing production time and cost. These advantages can then be passed directly to the ENC users where they will benefit from improved situational awareness, enabling better passage planning and improved under keel clearance calculations. It's recommended that the ENCWG endorse this approach to including high density bathymetry in ENC's.

Action Required of ENC WG

The ENCWG is invited to:

- a. Discuss the details within the paper
- b. Agree to the recommendations above
- c. Propose to HSSC 9 that there is no change to S-57 required to create high density ENC's