Paper for Consideration by ENCWG3

AHO's experience producing High Density (HD) bathymetric ENCs

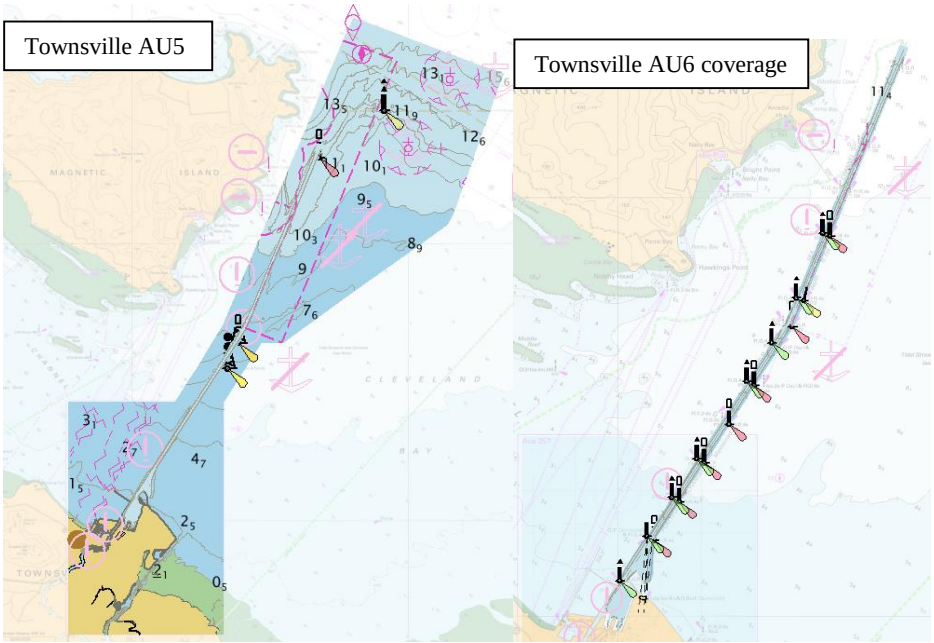
Submitted by:	Australian Hydrographic Office
Executive Summary:	Update on AHO's AU6 production
Related Documents:	S-57, ENCWG2-6.6C_AHS_bENC, AHO Experience on NP6 HD bENCs.ppt
Related Projects:	

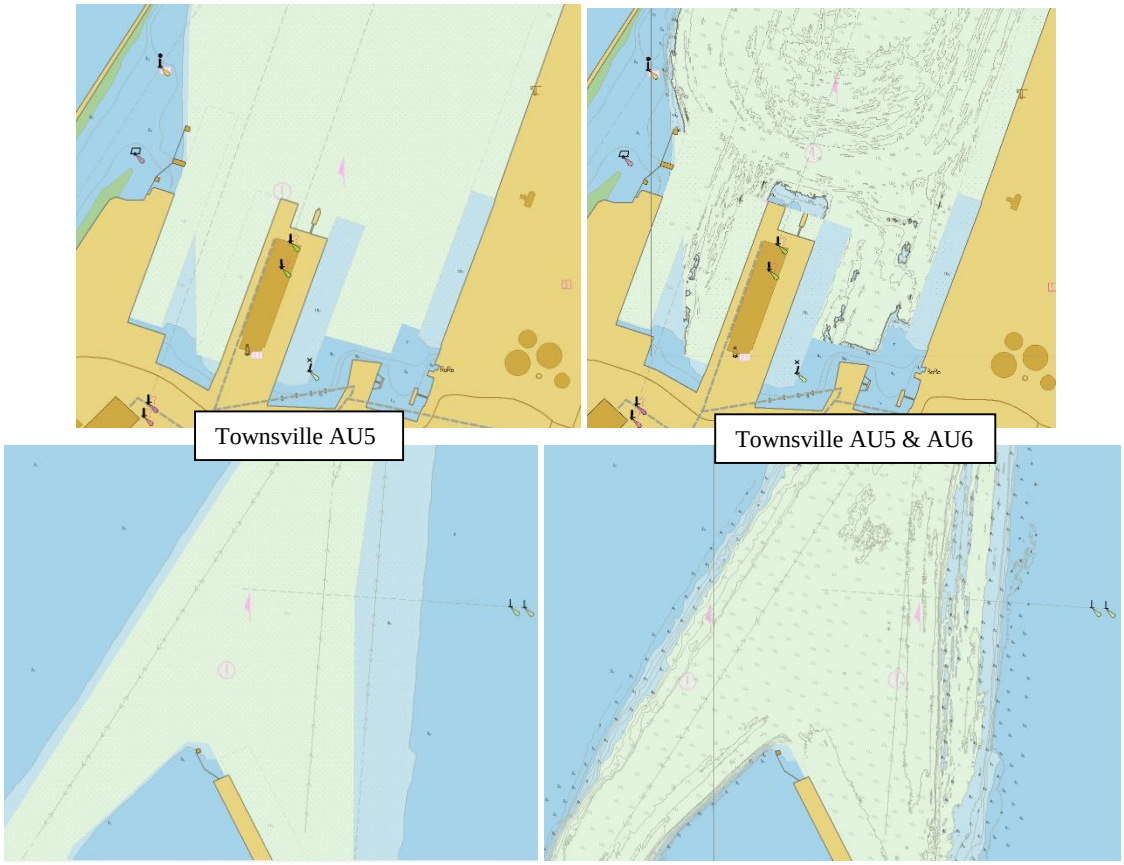
Introduction / Background

The Australian Hydrographic Office has recognised an emerging requirement for Electronic Navigational Charts (ENC) covering commercial ports to include significantly greater scale and bathymetric content levels than any ENC equivalent of a paper nautical chart. This requirement is driven by:

a) the increasing size of vessels in relation to ports and their channels,
b) reduced under-keel depth margins as more vessel sailings are required within each tidal window,
c) a fundamental shift in the way these vessels are navigated, and
d) a change in user expectations.

The AHO is keen to see that these requirements are met through official S-57 / S-63 ENC rather than the 'closed' proprietary formats in use in a number of overseas ports. There is a concern that use of a proprietary format creates a situation whereby the ship's Pilot has a considerably different view of the navigation situation compared to the vessel's Master, leading to ineffective Bridge Resource Management, confusion and increased risk. On the other hand, use of S-57 / S-63 ENC would allow for access and use of the same information by all parties.
Two ports (Cairns and Townsville) were used as 'proof of concept' scenarios and in 2017 6 AU6 cells have been published. The feedback received from the port authorities, harbormasters, state authorities and pilots was excellent and they are very grateful of having the AHO's support.





Analysis/Discussion

Simulations and real-world trials have shown that higher resolution bathymetry provides significant benefits for pilotage and ship handling when the displayed safety depth is closely aligned to a ship's draft.

The AHO believes this can be progressively achieved within approach and maneuvering corridors for certain ports by creating a new series of Navigation Purpose 6 'Bathymetric' ENC (1 metre contour spacing) to overlay the exiting Australian AU5 'Harbour' ENC.

Initial AU6 developmental ENC (2006-2010) included highly detailed wharf plans (such as bollards and fenders). These were requested by a small number of ports but then found to have no practical value for Pilots and Masters. In 2017 the AHO carried out further consultation with key stakeholders related to the test case areas and concluded that levels of detail would be strictly limited to bathymetry plus any other essential aids to navigation or submerged infrastructure which lies within the extent of the AU6 ENC. The ENC cells in Cairns and Townsville were compiled at very large scale (e.g: 1:2500) and they do not include additional infrastructure such as bollards, ladders, fendering arrangements, etc.

Once created, the AU6 ECs will be updated by new editions which will include a complete replacement bathymetric survey for that area, supplied to an agreed standard by the port. These will be referred to as 'Bathymetric ENC'.

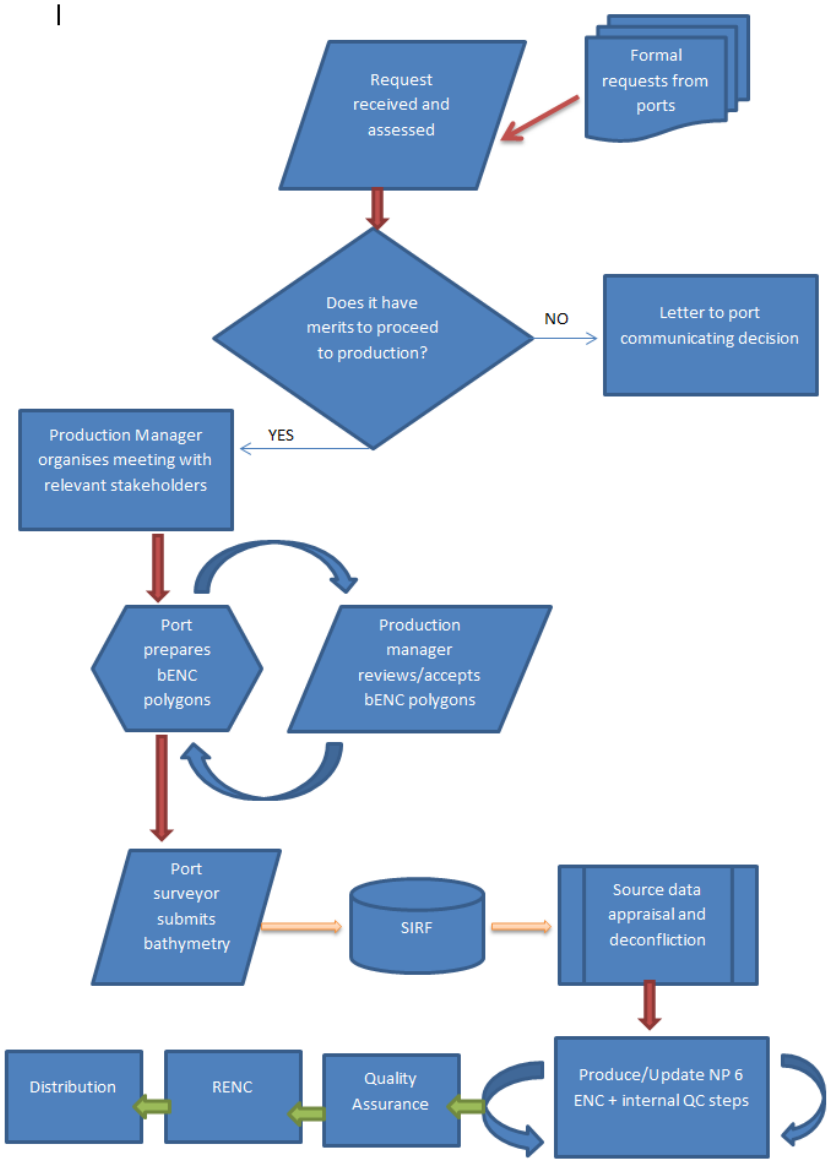
This new product is intended to permit ships and pilots to take full advantage of precise electronic navigation systems to monitor position and orientation within narrow approach channels and confined maneuvering areas.

Not all ports will require (or will be able to justify) bathymetric ENCs. The plan is to distribute through Ports Australia a 'Business case' template and 'source bathymetry' requirements (survey characteristics and tidal info) to all commercial ports. Each port will need to complete a business case and submit it to the Director of Charting Services at the AHO for approval. Priorities will be allocated based on the overall operational and safety benefit for the port and the total number of ports participating in the program will depend on the AHO's production capacity.

Some ports do maintenance surveys yearly but others re-survey their channels up to three times a year. The maximum number of surveys affecting NP6 products the AHO could handle per month is estimated at 2-4 and therefore this has to be considered when approving NP6 ENCs for new ports.

It is possible that some NP6 cells could be also created in remote and/or offshore areas to attend requests from States or Territories regarding new destinations for the cruise industry. The main difference with the NP6 in port areas is that these other ENCs won't be affected by frequent surveying programs and therefore, after publication, they will not be updated for a long period of time.

Bathymetric ENC production - General workflow



Conclusions

The Australian Hydrographic Office has succeeded on demonstrating that High Density Bathymetric ENCs can be created and maintained in S-57 format.

The challenge ahead is managing new stakeholder requirements and re-prioritising charting activities by rationalising the existing paper chart portfolio and making as much use of automation at all chart compilation stages as possible.

Recommendations

Member states are encouraged to explore the production of high density bathymetric ENCs using existing standards.

Justification and Impacts

The availability of AU6 ENCs as commercial products supports the implementation of a unique and agreed 'Pilotage passage planning' arrangement, between a ship's crew and the pilot. This is critical to set a common 'mental picture' during the navigation and is considered fundamental to the successful and safe conclusion of a voyage.

Action Required of NIPWG

The ENCWG is invited to:

a. note AHO's experience in the compilation of High Density Bathymetric ENCs