



12th Meeting of the Hydrographic Services and Standards Committee

Report on the Future of the Paper Nautical Chart

Agenda Item 5.4B



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BACKGROUND

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- **First discussions at CSPCWG9 in 2012**
 - Originally about the INT concept, but quickly expanded to paper char in general

- **Later became a High Priority Work Item for NCWG**
 - Sub-group led by Colby Harmon (US) formed in May 2017
 - Preliminary Report presented to HSSC11 (May 2019)
 - Survey conducted in June 2019
 - Final Report for HSSC12 (Oct 2020)



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THE CHALLENGE

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- The sales of paper nautical charts is declining
- The sales of ENCs is increasing

- Benefit-cost ratio of the raster charts is getting too low to produce
- Demand for paper charts still exists

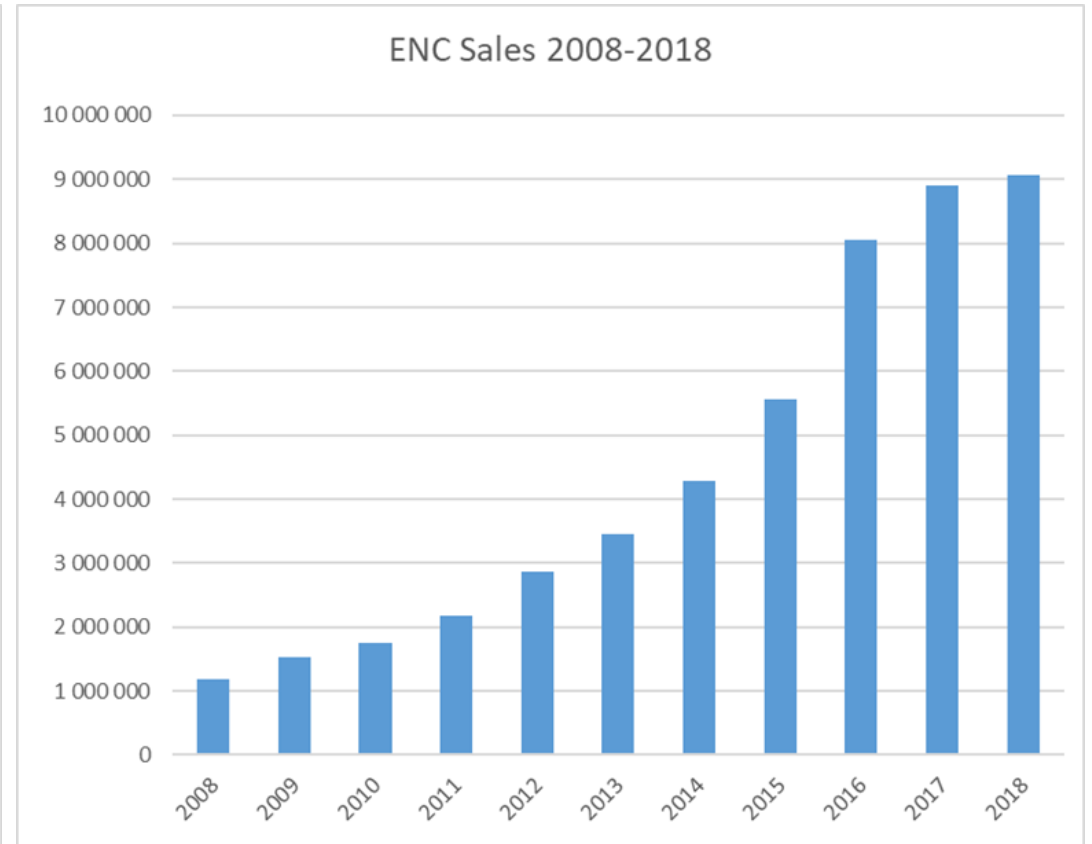
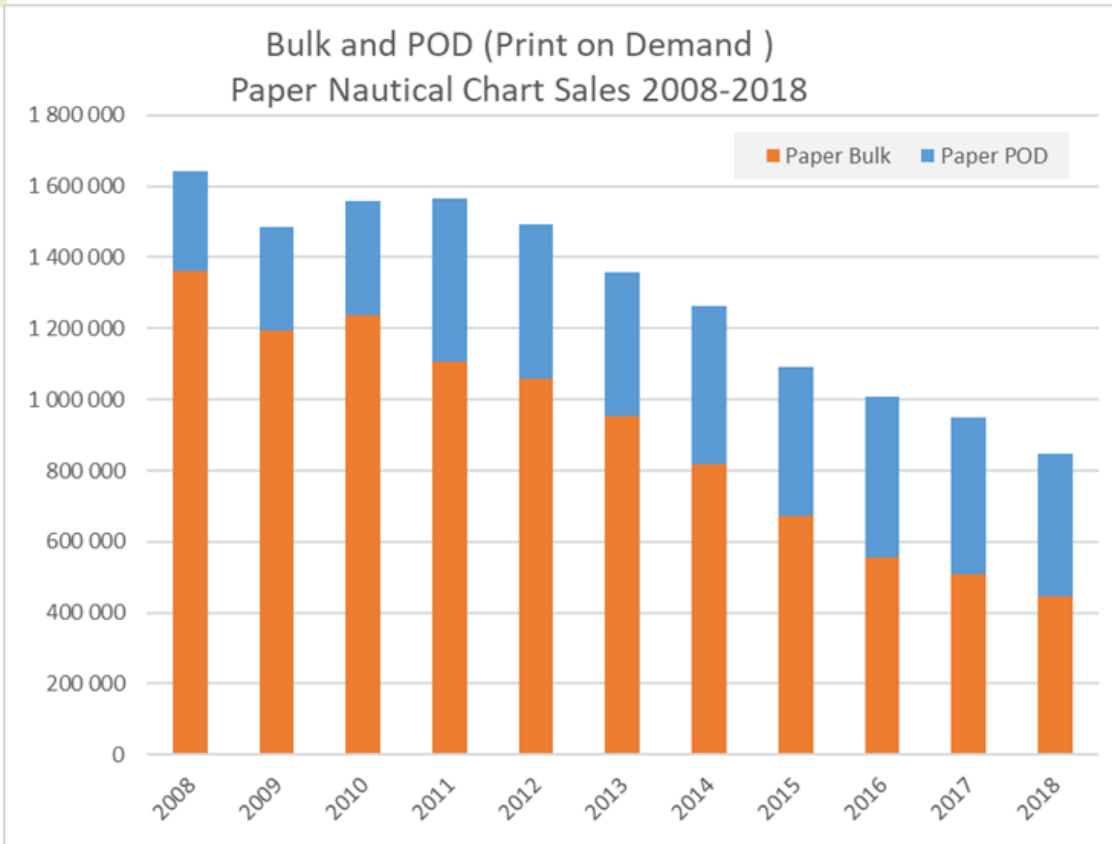
- Each HO is affected differently



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PAPER VS ENC

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POSSIBLE SOLUTIONS (NON-EXCLUSIVE)

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- As presented in HSSC11 (2019)

Optimize portfolio	Optimize content	Optimize portrayal	Optimize production
Reduce the number of charts available. May be done through reduced geographical coverage or reduced scales produced. Extreme case: Stop producing paper charts.	Reduce number of features in each chart. May be done through reduced level of detail or number of feature classes. Extreme case: Reduce content to the minimum level still acceptable to IMO.	Reduce manual cartographic editing. May be done with rule based cartography. Extreme case: Chart creation if fully automated with no human interaction needed.	Reduce duplicated work and parallel workflows. May be done through single source chart production database or similar solution.

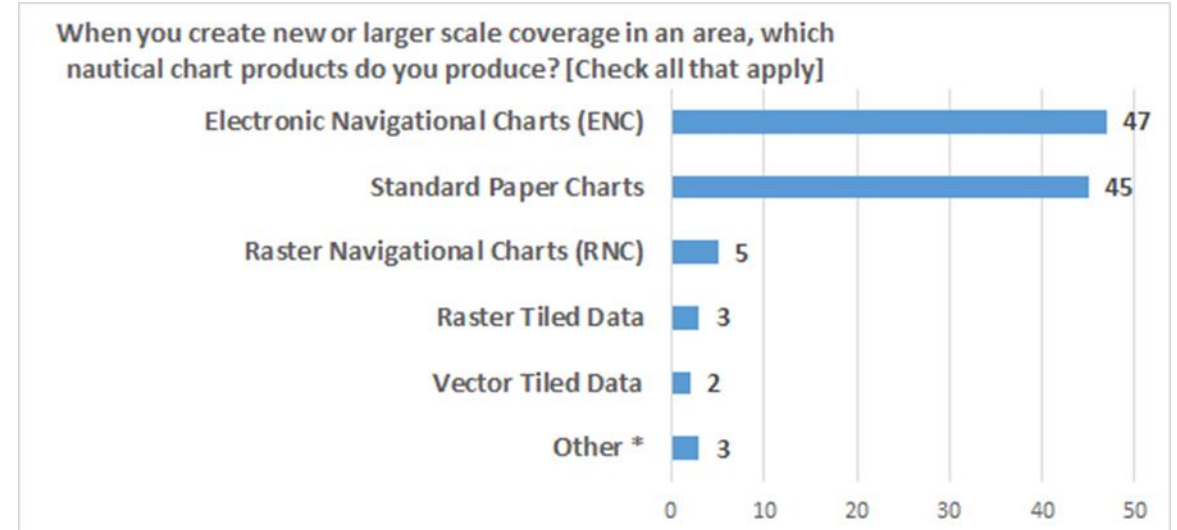
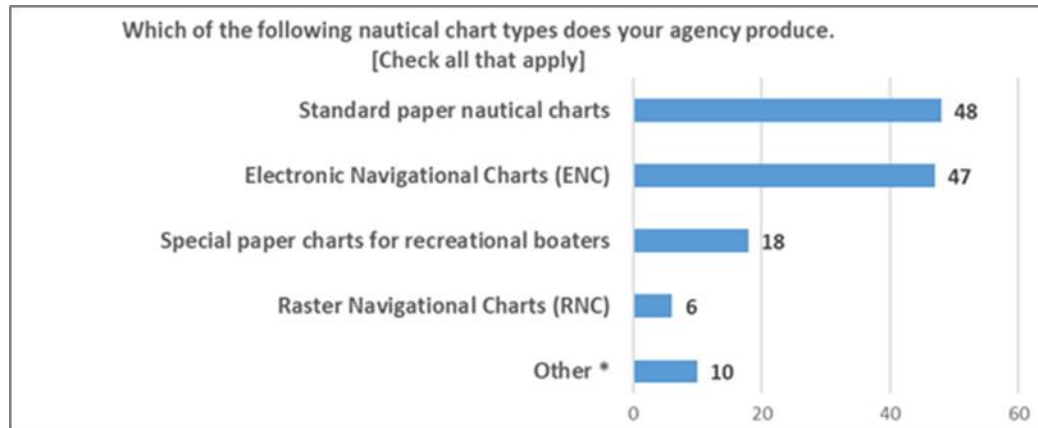


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OPTMIZING PORTFOLIOS

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- Scheming is based on national and regional consideration
- Paper Charts still have a strong position in the available products
- Member States still see need to publish paper charts





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OPTMIZING CONTENT

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- S-4 is flexible on content selection
 - Must support safe navigation
 - National consideration is already allowed
- Simplified products
 - May be produced with current specifications



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OPTMIZING PORTRAYAL

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- Current S-4 portrayal at times poorly automatable
- Production software developers see it practically impossible to provide HO's with an out-of-the-box symbolization
 - Rule-based portrayal would make this possible
- For rule-based portrayal some revision of existing symbols would also be needed
- S-52 portrayal is designed and optimized for on-screen use and therefore not recommended to be used in paper products

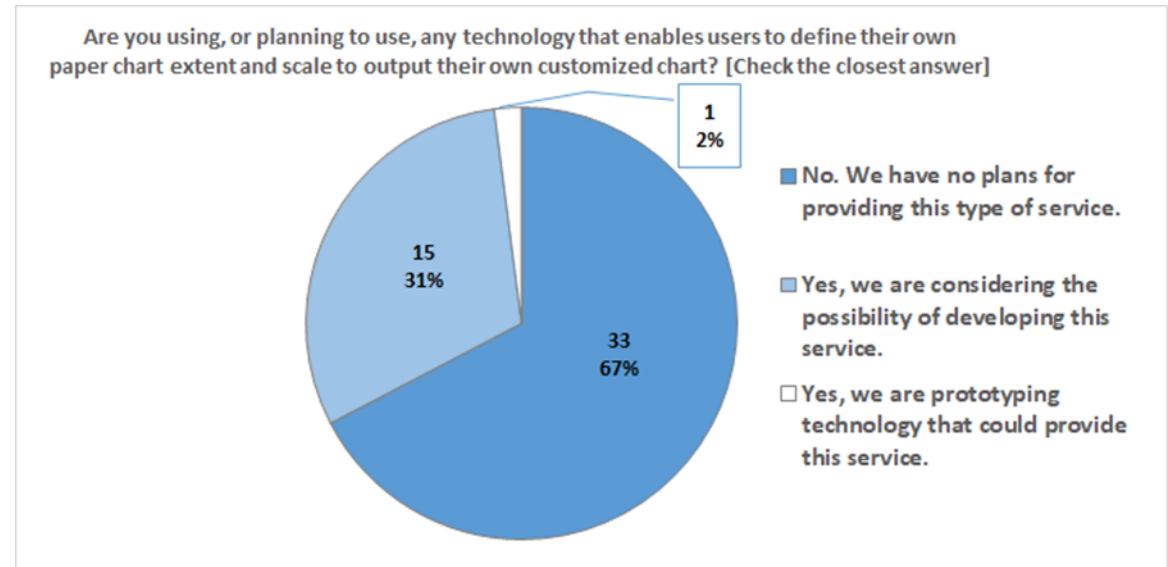
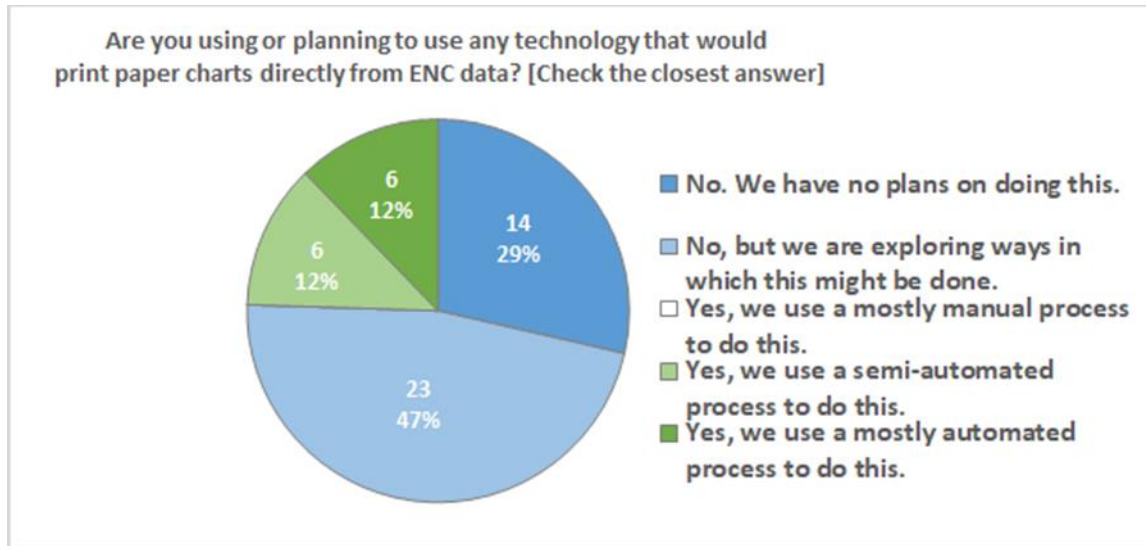


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OPTMIZING PRODUCTION

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- Reduce overlapping and manual work
- User-side creation of paper charts?



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POSSIBLE SOLUTIONS (NON-EXCLUSIVE)

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Optimize portfolio	Optimize content	Optimize portrayal	Optimize production
<p>Reduce the number of charts available.</p> <p>May be done through reduced geographical coverage or reduced scales produced.</p> <p>Extreme case: Stop producing paper charts.</p> <p>→ At national or regional discretion</p>	<p>Reduce number of features in each chart.</p> <p>May be done through reduced level of detail or number of feature classes.</p> <p>Extreme case: Reduce content to the minimum level still acceptable to IMO.</p> <p>→ At national or regional discretion</p>	<p>Reduce manual cartographic editing.</p> <p>May be done with rule based cartography.</p> <p>Extreme case: Chart creation if fully automated with no human interaction needed.</p> <p>→ Currently challenging due S-4 portrayal specifications</p>	<p>Reduce duplicated work and parallel workflows.</p> <p>May be done through single source chart production database or similar solution.</p> <p>→ Currently challenging due to portrayal challenges</p>



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RECOMMEDATIONS

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1. Add task to NCWG workplan to develop ways to enable or enhance HO's ability to produce paper charts or raster chart images directly from S-101

The goal is to create a 'Common IHO Baseline Symbology' including basic symbol sets and rules

- The resulting Baseline Symbology may then be used
 - by the production software developers as basis for further development
 - by HO's to provide simplified products



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RECOMMEDATIONS

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- 2. NCWG does not recommend adding a NCWG Workplan item to develop a separate specification for simplified or back-up nautical charts at this time.**
 - There is no sufficient international need for such product. The results of recommendation 1 may be utilized by HOs to provide such a product if needed.

- 3. NCWG does not recommend freezing maintenance of S-4 or INT1.**
 - S-4 is the foundation document for all nautical chart content, including ENC.s.



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RECOMMENDATIONS

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- 4. Recommendations to IRCC: The efforts of the ICCWGs should focus on coordinating and registering ENC schemes amongst ENC producing agencies. Though HOs willing to produce or re-print INT charts, or national paper charts:**
 - a. **should be in accordance with IHO Resolution 7/1919 (HOs arrangements on exchange and reproduction of nautical products), as amended**
 - b. **must comply with S-4 regulations**
 - c. **must maintain the procedures (such as NtMs) to ensure that the final product is kept up-to-date**
 - There is still a need for the INT concept to be maintained.

- 3. NCWG does not recommend freezing maintenance of S-4 or INT1.**
 - S-4 is the foundation document for all nautical chart content, including ENCs.



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RECOMMENDATIONS

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5. Regarding the End of Paper Nautical Chart Production by Some Hydrographic Offices

The IHO should recognize that some of the paper nautical chart producers are at this moment seriously considering or are already undertaking steps to cease all traditional, standard paper and raster nautical chart production.

6. HSSC is invited to approve the Terms of Reference of the NCWG at ANNEX E of HSSC12-05.4A