Paper for Consideration by HSSC/IRCC

Effects of amended paper chart production practice

Submitted by:	Germany
Executive Summary:	Assessment of various side conditions if HOs decide to withdraw from established paper chart production and to use alternative production practices
Related Documents:	HSSC14-05.4C, C6-04.1B, https://nauticalcharts.noaa.gov/updates/noaa-custom-chart-version-2-0-now-available-to-the-public/ https://www.gov.uk/government/news/ukho-to-extend-timetable-for-paper-chart-withdrawal Council 6 Item C6-07.7A. Information (UK): Understanding the Drivers, Solutions and Enablers within the Shipping Industry IMO SOLAS Chapter V, Regulations 2, 9, 19 and 27 ECDIS Performance Standards (A.817(19)), as amended IMO MSC 107/15/2
Related Projects:	NIL

Introduction/Background

The US (NOAA) announced the withdrawal from paper chart printing using own facilities in 2025. The UK (UKHO) announced the withdrawal from paper chart production in the near future. These announcements raised severe concerns of those affected by these intentions.

A joint submission led by the USA to HSSC14 seeking guidance if paper charts would be produced based on ENC. This submission provided an analysis of paper chart content and layout using on-board printing devices with the intent to reduce paper chart production workload from HOs. In the meantime, NOAA is operating an online tool to manage the printout of charts with predefined scale and coverage either by customer's printers or by printing services.

The UKHO announced in summer 2022 officially the intended complete withdrawal from paper chart production by the end of 2026. However, considering those who have no access to paper chart alternatives, it was declared in February 2023 that UKHO will continue to provide a paper chart service until at least 2030.

The official on-board language of most vessels in international trade is English. Therefore, and with the intent to reduce the mariners' chart correction burden, most vessels rely on UKHO paper charts and their paper chart correction system. It was an unwritten assumption that this UKHO service will last indefinitely.

Customer reviews give an estimation that paper charts will be needed for navigation by a significant amount of users beyond 2030.

An MSC107 submission provided by Germany and the International Chamber of Shipping (ICS) underlines the concerns of a significant number of ship owners if the UKHO should really withdraw from paper chart provision in the foreseeable future. At the current stage, the availability of paper charts is important for certain ships to fulfil their SOLAS obligations. In addition, the paper provides a suggestion on how the paper chart provision could be continued without or with only limited UKHO involvement. The proposed solution in this MSC submission is similar to one of the recommendations explained further down in this paper.

However, the introduction of a full ECDIS carriage requirement for the entire SOLAS shipping as a possible solution is not mentioned in the MSC107 paper.

Independent from the provided year when both measures become effective, the intentions force coastal States to consider how the provisions of paper charts will be managed in the future.

The BSH conducted a deeper analysis of additional aspects to be considered before these intentions could be finally implemented. The focus was on legal and operational aspects and possible work items to be covered before datasets could be generated and finally provided for printing by third parties or on-board. Furthermore, the analysis is discussing internationally agreed paper chart coverage and an updating mechanism.

Analyses/Discussion

According to IMO SOLAV Chapter 5, Reg 9, coastal States have the obligation to provide and update hydrographic data and nautical information necessary for safe navigation.

1 Contracting Governments undertake to arrange for the collection and compilation of hydrographic data and the publication, dissemination and keeping up to date of all nautical information necessary for safe navigation.

2 In particular, Contracting Governments undertake to co-operate in carrying out, as far as possible, the following nautical and hydrographic services, in the manner most suitable for the purpose of aiding navigation:

.1 to ensure that hydrographic surveying is carried out, as far as possible, adequate to the requirements of safe navigation;

.2 to prepare and issue nautical charts, sailing directions, lists of lights, tide tables and other nautical publications, where applicable, satisfying the needs of safe navigation;

.3 to promulgate notices to mariners in order that nautical charts and publications are kept, as far as possible, up to date; and

.4 to provide data management arrangements to support these services.

3 Contracting Governments undertake to ensure the greatest possible uniformity in charts and nautical publications and to take into account, whenever possible, relevant international resolutions and recommendations.

4 Contracting Governments undertake to co-ordinate their activities to the greatest possible degree in order to ensure that hydrographic and nautical information is made available on a world-wide scale as timely, reliably, and unambiguously as possible.

The amended SOLAS regulation V/19 requires all newly built passenger ships of 500 gross tonnage and upwards, as well as newly built cargo ships of 3,000 gross tonnage and upwards engaged on international voyages to be fitted with ECDIS.

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2 Shipborne navigational equipment and systems

2.1 All ships irrespective of size shall have:

…

.4 nautical charts and nautical publications to plan and display the ship's route for the intended voyage and to plot and monitor positions throughout the voyage; an electronic chart display and information system (ECDIS) may be accepted as meeting the chart carriage requirements of this subparagraph;

...

2.10 Ships engaged on international voyages shall be fitted with an electronic chart display and information system (ECDIS) as follows:

*.**1 passenger ships of 500 gross tonnage** and upwards constructed on or after 1 July 2012;*
*.**2 tankers of 3000 gross tonnage** and upwards constructed on or after 1 July 2012;*
.3 cargo ships, other than tankers, of 10000 gross tonnage and upwards constructed on or after 1 July 2013;
***.4 cargo ships, other than tankers, of 3000 gross tonnage** and upwards but led than 10000 gross tonnage constructed on or after 1 July 2014;*
.5 passenger ships of 500 gross tonnage and upwards constructed before 1 July 2012, not later than the first survey on or after 1 July 2014
.6 tankers of 3000 gross tonnage and upwards constructed before 1 July 2012, not later than the first survey on or after 1 July 2015;
…

According to the ECDIS Performance Standards (A.817(19)) as amended, MSC.232(82) and MSC.530(106) paper charts in specific scale ranges can be considered as appropriate back-up tools if a vessel is not equipped with two independently working ECDIS systems.

3.1 Required functions and their availability
3.1.1 Presentation of chart information
The back-up system should display in graphical (chart) form the relevant information of the hydrographic and geographic environment, which are necessary for safe navigation.
3.1.2 Route planning
The back-up system should be capable of performing the route planning functions, including:
.1 taking over of the route plan originally performed on the ECDIS;
.2 adjusting a planned route manually or by transfer from a route planning device.
3.1.3 Route monitoring
The back-up system should enable a take-over of the route monitoring originally performed by the ECDIS, and provide at least the following functions:
.1 plotting own ship's position automatically, or manually on a chart;
.2 taking courses, distances and bearings from the chart;
.3 displaying the planned route;
.4 displaying time labels along ship's track;
.5 plotting an adequate number of points, bearing lines, range markers, etc. on the chart.

The table below reflects these legal aspects and provides information on what should be the necessary work items to be covered by which stakeholder. The table does not provide a list of the current paper chart production methods. The information is focussing solely on SOLAS ships.

Although it is well-known that certain customers who are navigating fully ECDIS carriage requirement compliance may require a continuous paper chart provision in the future, satisfying these requests are not reflected in the table below.

Assumption	**Effects**	**Legal aspect**	**Operational aspect**
HOs provide digital printing files of paper charts and ENCs	• Full ENC coverage is not needed (Raster chart back-up) • Full ECDIS carriage requirement is not needed	No IMO involvement	• Charts or at least chart data sets must be provided • provide updates using established methods on to production method **No 1** on to production method **No 2**

HOs provide only ENC data sets as printing file manuscript	• Full ENC coverage		• Charts derived from ENC data • definition of chart coverage/limits at defined scale and according to available usage band content • definition of chart content • provide updates using established methods on to production method **No 1** on to production method **No 2**
HOs will no longer provide digital printing files of paper charts	• Full ENC coverage • Full ECDIS carriage requirement	• SOLAS V amendment • ECDIS PS amendment • "ECDIS best practise guidelines" amendment	• Each vessel to be equipped with two ECDIS to fulfil obligations

Production method No 1			
Assumption	**Effects**	**Legal aspect**	**Operational aspect**
Printing and provision by authorised chart providers	• Printing by HOs or third parties • Provision by established distribution methods	• Digital Supply Chain Certificate is necessary	• Definition of chart paper size • Definition of printing date • Use of S-4 for chart design • Establish/ maintain delivery service • Apply updates using Digital Supply Chain Certificate

Production method No 2			
Assumption	**Effects**	**Legal aspect**	**Operational aspect**
Print only on board	• On board printing facilities necessary	• Digital Supply Chain Certificate is necessary • Carriage requirement for printing device (possibly a plotter to handle large paper size)	• Definition of chart paper size • Definition of printing date • Use of S-4 for chart design • Stock of paper • Stock of toner • Maintain printer/plotter • Apply updates using Digital Supply Chain Certificate

At the current stage, the majority of coastal States underlined that they will proceed with the provision and updating of paper charts in appropriate scale ranges to fulfil their SOLAS coastal State obligations.

Independent of the continuation of the UKHO paper chart service, German ship owners expect an uninterrupted availability of paper charts of worldwide coverage, preferably by continuing the current INT chart coverage. Although most ships are fully ECDIS carriage compliant, paper charts are needed to provide a certain level of independency from electronic as additional backup and for other purposes.

For mariners on ships which are not fully ECDIS carriage requirement compliant, and with a lack of UKHO as a provider of a worldwide paper chart portfolio, mariners are requested to use paper charts from each coastal State on the intended voyage route for route planning and monitoring. SOLAS Chapter V requires that paper charts should be kept up-to-date. That means that mariners will have to check the Notices to Mariners of each chart portfolio producer. This will put an additional workload on the mariners. Depending on language skills, the language barrier could be significant and may cause trouble in some areas.

Bearing in mind the existing tools the IHO has on hand, BSH developed an approach on how the provision of paper charts could be continued with the least possible costs.

The first and most important precondition is that all coastal States will commit to continuing with the INT-chart coverage and production according to the relevant IHO recommendations. It is to discuss whether the current INT chart coverage is appropriate or if a revision is necessary. This might be the case if significant overlaps exist or if areas are not covered by INT charts.

It is not relevant if the charts will be printed by the responsible HOs themselves or by a printing provider. Although it may have impact on the budget, it is for the purpose of providing paper chart content not relevant if the chart content is derived from the same database the ENC is using or if it is provided by an extra chart production system. The most important aspects are that the chart coverage and scale are defined according to the IHO INT chart regime and that an appropriate update system is in place.

As mentioned above, an appropriate update system following the quality measures according to the relevant ISO standard is the second precondition. This system should employ the common NtM XML format, developed by NIPWG some years ago. The third important precondition is that the corrections should be provided free of charge. Establishing a payment barrier to access the corrections would complicate the updating procedure significantly.

The provision of free of charge chart corrections allows third parties to gather the corrections, process them and establish a sophisticated supply chain of chart corrections with local, regional or worldwide coverage.

Conclusion

Mariners would have the option to receive chart corrections individually in a standardised format with no language barriers if the chart provision and update systems are established. Existing chart provision services can be used. Many business models for chart correction provision are possible.

Recommendation

Taking into account that the introduction of every new paper chart production method which involves on-board facilities are requesting additional resources and coordination, and taking further into account that coordination with IMO is time consuming and challenging, BSH recommends continuing the paper chart or paper chart data provision using the coverage of the INT paper charts until a full ECDIS carriage requirement is in place.

The paper chart correction should be provided online in the standardised IHO NtM XML format free of charge.

A full ECDIS carriage requirement is to be achieved as a long term goal, though. The recommendations above will close the gap between the time when the UKHO will stop the paper chart production and when the IMO will introduce the full ECDIS carriage requirement. The IMO involvement is currently undetermined and cannot be predicted.

Justifications and impacts

The continuation of paper chart production under national responsibility requires solutions to keep the mariners' workload acceptable. The proposal requires revision and possible adjustment of the current chart correction system. This may have financial and/or personal impacts on the HOs, which should engage IT experience to align the current chart corrections to the NtM XML format. However, it is expected that this workload is not significant.

If it is decided:

- to manage the chart printing by printing services (HOs or third party), no IMO involvement is necessary,
- to manage the chart printing on board, amendments of relevant IMO regulations must be initiated. That requires comprehensive pre-planning and close coordination with coastal States and ship owner associations.
- to introduce a full ECDIS carriage requirement, amendments of relevant IMO regulations must be initiated. That requires comprehensive pre-planning and close coordination with coastal States ship owner associations.

Action required of HSSC:

The HSSC is invited to:

a. note and discuss this paper,

b. invite HOs to provide paper chart corrections in the IHO commonly agreed NtM XML format online,

c. Consider the necessary steps to address the need of a full ECDIS carriage requirement to IMO

Action required of IRCC:

The IRCC is invited to:

a. note and discuss this paper,

b. to invite responsible RHCs to assign the INT paper chart scheme appropriateness check and possible review of the scheme,

c. agree on the paper chart provision continuation following existing or revised INT paper chart scheme,(outcome of action IRCC b) to be considered),

d. invite HOs to consider the provision of paper chart corrections according to the MtM XML format free of charge.