

**5<sup>th</sup> NCWG MEETING REPORT [FINAL]  
Stockholm, Sweden, 5-8 November 2019**

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**REPORT:** (Note: The paragraph numbering is the same as in the agenda.)

**1. Welcome, introductions and administrative arrangements**

*Docs: NCWG5-01A List of Documents (on website)*  
*NCWG5-01B List of Registered Meeting Participants*  
*NCWG 5-01C List of NCWG Members*

*Key note speaker comments:*

Mr Magnus Wallhagen, Head of Production at Swedish Maritime Administration and vice chair of HSSC warmly welcomed members of NCWG to Sweden, commenting that this was the first IHO working group meeting to be held in Sweden for several years. Mr Wallhagen provided an overview of the work of the Swedish Maritime Administration and explained the challenges of charting the Swedish coastline which consists of many small islands created during the ice age.

Mr Wallhagen emphasised the importance of S-4 and also the NCWGs work on the future of the paper chart. The HSSC is relying on NCWG to determine the best procedures and use of resource for producing and maintaining charts. The year 2020 will start the decade of implementing S-100 and it will be the priority focus of HSSC for the working groups.

The NCWG Chair also welcomed members to NCWG5 and extended a warm welcome to CARIS who attended the meeting for the first time.

*Participants:*

There were 39 participants from 22 countries attending this meeting, among them there were 20 new participants. The Chair welcomed everyone and invited all delegates to briefly introduce themselves. A list of meeting participants is at ANNEX C.

*Apologies* were received from South Africa, New Zealand and Islamic Republic of Iran.

**2. Approval of Agenda**

*Docs: NCWG5-02A Agenda*

The agenda was approved, and no amendments were received.

The Chair thanked members for submitting their topics and commented that many were past the deadline which is 7 weeks before the meeting. This meant that there was not a lot of time for members to review and prepare comments. If a member identifies a topic for a new paper early in the year, they are encouraged to submit the paper to the Secretary and Chair early and not wait for the formal deadline.

### 3. Status of Actions from NCWG3

*Docs: NCWG5-03A Status of Actions*

The Secretary updated the meeting on the status of actions from NCWG4. Good progress had been made with most of the actions from NCWG4. Updates for actions not noted therein as completed or time expired were supplied as follows:

ACTION 3/ 5 Closed  
 ACTION 3/16 Closed  
 ACTION 3/21 Closed  
 ACTION 4/13 Closed  
 ACTION 4/21 Closed  
 ACTION 4/22 Closed

ACTION 4/10 S-49 preparation of the new specs are on the agenda at the next NIPWG in 2 weeks, submission has been made by NGA. S49 is NIPWG's responsibility.

### 4. Matters arising from HSSC

#### 4.1 Notes from HSSC11

*Docs: Presentation*

The chair provided a summary of the notes effecting NCWG from HSSC11. HSSC11 met in May –63 delegates participated from 24 member states and 11 stakeholder orgs.

The main topics from HSSC of interest to NCWG were:

1. Revised IHO Strategic plan
2. Revision of Resolution 2/2007
3. S-100 Implementation Strategy
4. S-100 interoperability (S-98)
5. Future of the Paper Nautical Chart (FOPNC)
6. S-44 Ed6.0.0

The strategic plan will include a target on the automation of production of paper charts. S-100 status is nearing the phase of being ready and discussions are being had on when to use it etc. The S-98 standard is also being worked on to understand how the standards will work and operate together, this standard is key to the success of S-100. Countries have provided their input into the FOPNC questionnaire and report, NCWG will consider this work and will provide recommendations to HSSC 12 which will be held in Bristol, UK in May 2020. The NCWG recommendations on the FOPNC need to be submitted by 16 March 2020 and there may be feedback and amendments resulting from IHO Assembly which is taking place in April 2020.

The vice chair of HSSC commented that the next IHO assembly will present an S-100 showcase on how S-100 will be used in reality. The vice chair also reported that Republic of Korea have conducted some sea trials of S-100. It is becoming clearer to the IHO on how we can deliver value added products to the customer, an example being bathymetry, water level and currents. An operational version of S101 2.0.0 is planned for December 2022.

#### 4.2 Actions from HSSC11

*Docs: Presentation*

The chair provided a summary of the action items effecting NCWG from HSSC11.

1. HSSC 11/06 Equivalent T&Ps for ENCs

The IHO Sec confirmed that wording has been approved and is available on IHO website. [www.iho.int](http://www.iho.int) > News > ECDIS PSC Advice > #IHO Advice for PSC Inspectors Concerning IHO Standards

2. HSSC 11/34 INT 1 – need for .svg file based symbol repository
3. HSSC11/42 – MARPOL
4. HSSC11/44 – IHO resolution 1/2005 as amended (IHO Response to Disasters)  
This topic was covered at agenda item 6.8
5. HSSC11/45 – Future options for INT 1  
This topic was covered at agenda item 7.2
6. HSSC11/46 – Future of Paper Chart  
This was discussed at agenda item 6.1
7. HSSC11/47 – From ENC to paper chart  
This was discussed at agenda item 6.5
8. HSSC11/48 – Portrayal for S-98  
NCWG to work with other groups led by the S-100WG Chair.
9. HSSC11/50 – Visualisation of Quality of Bathymetric data

#### **4.3 Report from S-100WG - Presentation**

*Docs: Presentation*

S100WG vice chair provided a summary for the S-100WG. S100 ed4.0.0 has been released and they are now working on ed5.0.0 with a planned deadline of February 2020. Edition 1.0.0 of S-101 is now available on IHO website. Defining S-98 is the most important work for the group and a draft version has been given to member states for review. There are two S-100 testbeds, one provided by NGA and the other by KHOA. The following decade will be the time when S100 is implemented.

#### **4.4 Report from ENCWG - Presentation**

*Docs: Presentation*

The chair provided a summary for the ENCWG. The group have discussed amendments to S-52 and S-63. However, S-52 is unlikely to be changed in the coming years, only critical changes due to expected update in 2024.

The group will create some new guidance on the production of high density ENCs for inclusion in S-65, this will include an agreed definition of high density / definition ENCs. There are currently different practices amongst countries and with some nations issuing official high density ENCs and some nations issuing unofficial ENCs.

Extensive revision of the draft guidance on high density ENCs in S-65 is needed before being released for comment.

#### **4.5 Report from NIPWG - Presentation**

*Docs: None*

The IHO Sec provided an overview of the NIPWG report which included details of how the IALA S-201 Product Specification will be used by IALA to develop IHO S-125. Also included was a summary of the budget allocated by IHO for outsourcing work such as prototyping, as well as an overview of the architectural analysis of S-100. The need to get member states actively involved in developing specifications was highlighted. S-100 is a priority for NIPWG.

#### 4.6 Report from DQWG - Presentation

*Docs: NCWG5-04.6A      Report from DQWG - Presentation*  
*NCWG5-04.6B      Using data quality for safe navigation*

Ben Timmerman (NL) presented the subject “using data quality for safe navigation” on behalf of chair DQWG. India asked for clarification on which CATZOC category should be assigned to Satellite Derived Bathymetry. The IHO Sec replied that this is considered on a case by case basis by member states taking into consideration factors such as ground truthing. Reference to the DQWG webpage > Reference Documents > National Methodologies from Survey Data to CATZOC was given.

The UK asked if the proposed new methodology and safety alert areas would be mandatory and it was suggested that they would not. Finland provided an example of how the safety alert areas could look on their coastline, most members agreed that the ENC looked very cluttered with magenta lines. The chair stated that the safety alert areas were being developed in response to the mariner’s tendency to over zoom and encounter problems when close to dangers.

ESRI commented that the clutter of magenta lines on the example provided by Finland is likely to cause users to over zoom more to improve the visibility of the ENC, this would therefore contribute to the problem that it was trying to resolve. The UK asked if the problem of over zoom could be passed to the OEM community to resolve, in response the IHO Sec stated that this is not possible and had been discussed in the past.

**ACTION: 5/1** – All members to consider proposal and provide feedback to chair of DQWG.

### 5. NCWG Administration and Work Plan

#### 5.1 Review of Terms of Reference and Detailed Procedures

*Docs: See ANNEX F*

Members did not initially provide any proposed changes to ToR but the IHO Sec explained that the NCWG existence may be under threat if it did not make clear to the HSSC the importance and relevance of its work. Some amendments to its Terms of Reference in order to propose a better alignment of its activities with the IHO Work Programme and priorities, such as the S-100 Implementation Decade were drafted. The IHO Sec recommended that NCWG reviewed the wording in its ToR to provide a fuller account of the benefits that the work of this group brings, particularly with regards to S-4 and its relevance to other products. Germany and Spain agreed with this proposal. Amendments are included in ANNEX F for consideration.

**ACTION: 5/2** NCWG to review terms of reference during NCWG5. UK, CA, DK, SE, IHO Sec

#### 5.2 Summary of progress, items completed (SEC)

*Docs: NCWG5-05.2      work plan items completed*

Secretary displayed the work plan and talked through the content. Work item H2 is now completed and needs to be updated at next HSSC. Work item E10 has evolved and has now changed to providing a universally agreed symbol library in .SVG format.

## 6. S-4 Chart Specifications, New and revised symbology

### 6.1A Future of Paper Chart [Work item A16] (Future of paper chart SubWG)

*Docs: NCWG5-06.1A Future of Paper Chart (Colby Harmon, US NOAA), Presentation*

To help generate good discussion on the topic of FOPNC the chair provided an early overview on the first day of the meeting of possible solutions for members to consider ahead of the main agenda item. Various options under the following headings were provided:

- Optimise portfolio - reduce the numbers of charts available in terms of coverage or scale
- Optimise content - reduce the number of features i.e. NCWG would need to advise IMO regarding the minimum level of content that is required.
- Optimise portrayal - reduce manual cartographic editing.
- Optimise production - reduce duplicated work / parallel workflows by using a single source database.

It was stated that it is possible that the future solution could be based on a mixture of the above. The HSSC vice chair stated that the IMO rely on IHO to advise on the optimum minimum content for the mariner therefore it is up to working groups like NCWG to decide this. The IHO Sec commented that while the SOLAS need for paper charts is reducing, we need however to determine if there is a need to modify the minimum requirements for 'back up' paper charts. For the other users' categories, when we understand the minimum requirements, then we can consider how to make the right product for users' needs. On a proposal from Australia justifying the need for a new type of chart designed with the main purpose of serving as back-up to electronic navigation that can be easily produced from officially (and richer) published ENC data, the working group noted that "two" standards would certainly create some confusion to the mariners. It was also agreed that the associated proposed Australian amendment to the IMO definition of what constitutes a back-up paper chart was not helpful on the matter (See paragraph 12.6).

Colby Harmon (US) led the main discussion on the work so far regarding the Future of the Paper Chart (FOPNC) by starting with a summary of the FOPNC report progress and questionnaire for members. Colby Harmon provided the IHO Council reaction and Council decision regarding the work so far. C-3 meeting has tasked HSSC to submit draft recommendations at C-4 on the way forward, such as follow up activities for:

- Producing paper charts from ENCs.
- Alignment of WGs program of work
- Simplified standard for paper charts meeting functional requirements
- Future of INT chart concept

The next steps before HSSC12 in Bristol May 2020

- Revise text, based on survey results
- Integrate major survey findings into main report document
- Develop and agree upon NCWG recommendations to HSSC-12
- Make any other necessary revisions to the final report

Colby Harmon suggested building a task force to assist with finalising the report and the Chair agreed that FOPNC SubWG members should assist with this task.

Colby Harmon's third presentation on the FOPNC focused on the recommendation topics based upon 3<sup>rd</sup> council meeting which were:

- Production of paper charts from encls

- Simplified standard for paper charts
- Future of int chart
- Subsequent alignment to WGs

#### Production of paper charts from ENC's

Colby Harmon made a recommendation to add a task to the NCWG workplan to develop ways to enable or enhance our ability to produce paper or raster chart images from ENC or other

S-57 or S-101 encoded data.

There was then an active discussion on whether our efforts should be invested into S-101 instead of S-57 which is frozen and will be superseded by S-101 in the future. The Chair recommended that it would be more efficient use of our time to consider S-101 only and stated that it would possibly double the amount of work for NCWG members if we considered both S-57 and S-101. The Chair was also concerned that there may be a risk that the rulesets for the two standards may deviate if we choose to deliver both. Germany was in agreement that the group's focus should be on S-101.

Spain suggested that some members may continue to use S-57 for a while and may not move to S-101 for several years therefore we needed to consider this in making our decision. The IHO Sec responded by a recommendation that members should be encouraged to convert S-57 to S-101 to follow the optimum path. CARIS stated that they believe that conversion from S-57 to S-101 is closer than we think. ESRI questioned how soon mariners would be using S-101 and suggested that it would be a gradual change from S-57 to S-101. The Chair agreed that there was no certainty regarding the date that S-101 will be fully operational. Canada commented that nations would need a significant amount of training regarding S-101 even when using a converter.

The HSSC vice chair stated that he agreed with focusing effort on S-101, and that discussion has shown the possibility of using S-101 as a tool for more automated paper chart production. If we agree then this may speed up the transition to S-101. He believed that the focus must be on S-101 but was not sure if there should be a back traceable element to S-57.

The US (NOAA) stated that they have developed a paper chart from ENC solution based upon S-57 and proposed that the group considers both S-57 and S101 to which the IHO Sec agreed. The Chair was concerned that some nations may invest in S-57 technology that then become redundant when S-101 is operational. NOAA suggested that some nations may wish to consider using converter software to move their S-57 content to S-101. Brazil commented that they have a database and believe that it is better to move to using S-101 rather than proceeding further with the older S-57 format and using a converter.

Rep of Korea reported that they are doing some tests on converting S-57 to S-101 and S-101 to S-57 for comparison, but still need to test more cases. They agree that there is an option to use a converter but believe that we need to choose which way we are going forward, if we consider the future then that would be choosing S-101.

Denmark asked if it is possible to identify portrayal mechanism in S-101 that we can influence, that would help transform ENC to paper. The Chair agreed and commented that this is why he recommended limiting work to S-101. Canada suggested that it may help if we identified features that will not change between S-57 and S-101 and then concentrate our efforts on the ones that don't.

#### Simplified standard for paper charts

There was a good debate about the need for a simplified paper chart as a 'back up'. The results from the FOPNC questionnaire showed that the majority of nations did not have any plans to make a simplified back up chart. The Chair questioned what prevents members from already making these using S-4. The US (NOAA) suggested that it may be helpful to include a table in S-4 that shows what is considered as necessary in a simplified chart. The Chair agreed that a shared understanding is needed to avoid people doing different things and

suggested that it could be useful to include the 'must have' / minimum level of content. Germany agreed that this was a good idea and there was not a requirement for another standard. India commented that we needed to quantify what is meant by simplification, is it minimising data or minimising marginalia. The HSSC vice chair agreed that we need to be clear on the level of content that would be included in a simplified chart, stating that S-57 specifies what is mandatory so we could use that as a starting point when reviewing S-4.

US (NOAA) questioned what the gain is in doing this and why do we want to have a simplified chart, before suggesting that the simplified chart concept is to reduce maintenance effort for HO's instead of helping the mariner. The Chair agreed and asked, if we achieved an advanced level of automation would there still be a need to create a specification for a simplified chart? Australia stated that if they stopped making traditional paper charts then they would recompile the data for that area into the ENC. Spain stated that there was not enough benefit to be gained from spending the time to make a new specification for a simplified chart.

There was a debate about our understanding of the terms simplification and generalisation as it was important that we all agreed on this. The US (NOAA) offered an opinion that simplification is removing features and is one technique of generalisation. Prof. Lysandros Tsoulos from ICA provided a cartographic explanation of the simplification that we are discussing stating that it was semantic generalisation {choice of information to be shown on the chart} followed by cartographic generalisation {simplified representation of detail appropriate to scale and purpose of chart}.

The HSSC vice chair explained that the HSSC will require an explanation of the way forward with this and suggested that the group would need to update the recommendation wording to HSSC and the Council. India questioned whether simplified charts would replace standard charts, to which the Chair responded that standard charts would remain, and simplified charts is an additional option, stating that nations will determine what is allowed for navigation in their waters.

#### Future of INT chart Concept

The IHO Sec proposed to the group that there was no longer a requirement to produce new INT charts, stating that the concept of printer nations had now been superseded by use of ENCs. The IHO Sec recommended that nations focus on ENC scheming instead. Several members raised concerns at the prospect of stopping INT charts. The Netherlands questioned how we would coordinate existing INT charts that had overlapping data from other nations, to which the IHO Sec responded that it would be managed by the ENCs instead. Spain shared a concern regarding potential difficulties in data sharing and the UK stated that there was still a need for active INT charting in the Antarctic region.

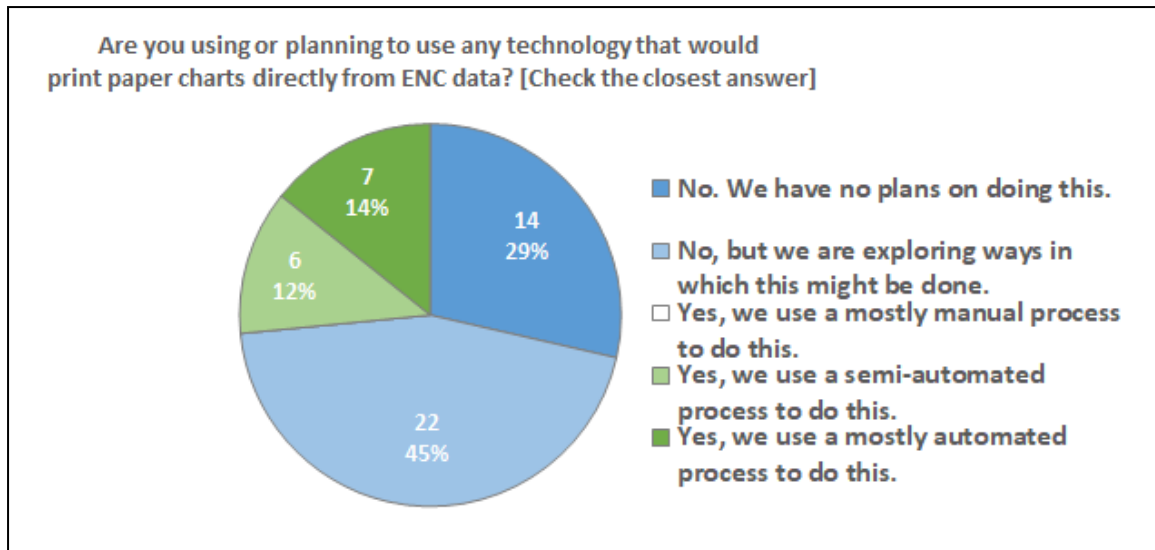
The Chairman questioned how Notice to Mariners could be organised if there was no responsible producer, commenting that a paper chart may be made up of several ENCs. The Chair proposed to the group that they consider making INT schemes a secondary priority to ENC related coordination tasks.

#### Recommendations to include in FOPNC report

Colby Harmon led the discussions of the FOPNC subWG during the meeting and the group agreed on the following recommendations to include in the FOPNC report.

##### 1. Regarding the creation of paper nautical charts from ENC data:

There was much discussion of this topic and the group recognized that there are several related efforts that could support the creation of paper charts from ENC data or that could be outcomes of such an effort. There was general support for this effort by working group members at NCWG-5 and 71% of respondents to the FOPNC survey also stated that their HO was either actively pursuing or considering such an effort.



The basic recommendation to HSSC could be:

“Add task to NCWG workplan to develop ways to enable or enhance HO’s ability to produce paper charts or raster chart images from ENC data.

Focus will be on S-101 data but we should also be aware that some HO’s will also want to create paper charts from S-57 encoded ENCs. The recent development of an S-57 to S-101 data converter may serve to facilitate this.”

“It is also recognized that this effort may ultimately provide the foundation needed to create database driven INT1 documents and a modernized version of S-4 (or other specification) that describes compilation guidance needed for the production of both paper/raster nautical charts and ENCs.”

Additional aspects of the effort could include:

Create an SVG Symbol Library of S-4 symbols, starting with the most commonly used ones first. SVG is the same graphics format used for the S-101 Portrayal Catalogue.

Create engineering drawings as necessary to specify exact characteristics of the symbols.

Create standard set of portrayal rules to facilitate paper chart symbolization of ENC data. These could be modified from existing S-52, S-101 portrayal catalogue, or other rules that have been developed by a hydrographic office.

Understanding that the output paper chart will look different from existing, traditional “standard” paper nautical charts and some simplification of the portrayal may be necessary and desired.

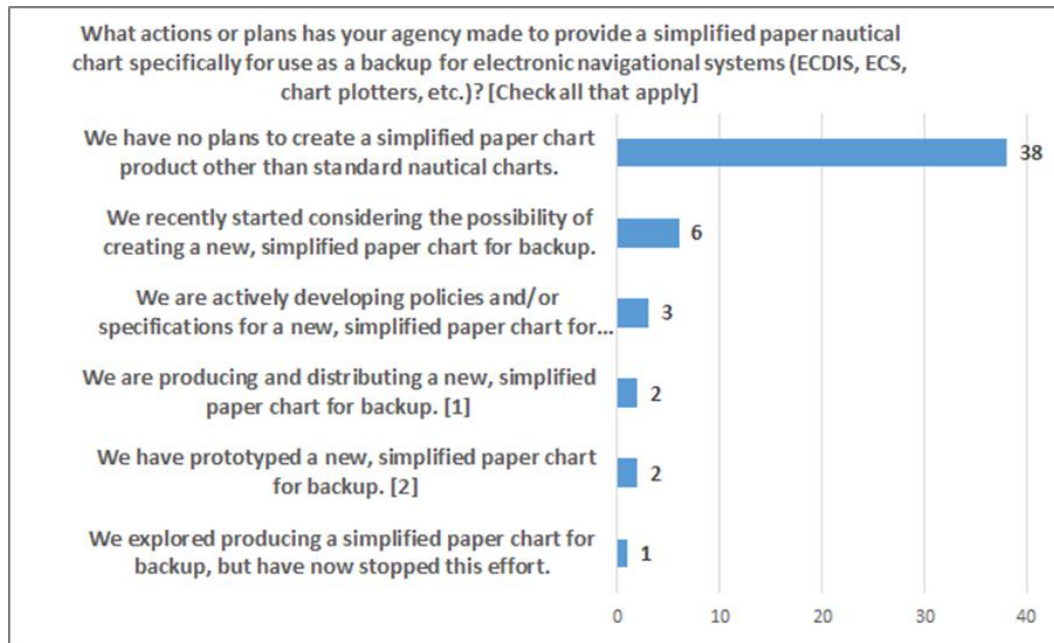
This effort could also facilitate a greater harmonization of S-4 and ECDIS symbolization.

## 2. Regarding the creation of a new standard for “Simplified Charts” or a standard for “Backup Charts.”

Although some hydrographic offices are exploring the creation of simplified charts or charts for backup, the responses to the FOPNC survey and discussion at the NCWG-5 meeting did not show a much support for developing a separate specification or guidance at this time.



Therefore, the NCWG does not recommend adding a NCWG Workplan item to develop a separate specification for simplified or backup nautical charts at this time.



It was recognized that some simplification of charts is likely to take place as part of the workplan item to create paper charts from ENC's and that these charts may be especially suitable as a backup, but no separate effort focused on simplification is needed.

**3.** Regarding the future of the INT chart concept, INT chart production, INT chart coordinating working groups (ICCWG).

There was much discussion of this topic at NCWG-5. It was finally agreed that the production of INT charts continues to be important in some regions, but not in others. In fact some regions have no need or interest in producing any new INT charts.

Understanding that some INT chart production will continue, there was a general consensus that the efforts of the ICCWG should focus on coordinating and registering ENC schemes amongst ENC producing agencies.

**4.** Regarding the “freezing” of future modifications to S-4 and INT1.

There was some discussion about a possible desire to suspend any new changes to the S-4 Specification. There did not appear to be significant support at NCWG-5 for officially freezing S-4, as this would restrict any flexibility to make improvements that may be needed in the future. However, the fact that no proposals to make changes to S-4 were approved at NCWG-5 speaks to the NCWG members’ reluctance to implement changes for which a significant need doesn't exist. This enables the NCWG to better focus on supporting portrayal of S-101 and other S-100 based products.

**ACTION: 5/7** FOPNC sub WG to develop recommendations into FOPNC report, then distribute to group following timescales in FOPNC timeline.

### **6.1B Future of Paper Chart: Management Plan (Future of paper chart SubWG)**

*Docs: NCWG5-06.1AB Future of Paper Chart Management Plan,*

Colby Harmon (US NOAA) presented a time schedule for finalising the FOPNC report in time for submission to HSSC12 on 16<sup>th</sup> March 2020 and subsequent presentation of report by NCWG Chair at HSSC12 during 11-15 May 2020.

The IHO Sec commented that between 16 March and the HSSC meeting in May there is an IHO Assembly in-between which may provide further opportunity for feedback on the FOPNC report ahead of being presented at HSSC12.

### **6.1C Results of the Future of the Paper Nautical Chart Survey of IHO Member States**

*Docs: NCWG5-06.1C Results of the future of the paper chart Survey of IHO Member States*

Colby Harmon presented the results of the survey and explained some of the different graphs of survey findings. Fifty-two member states responded to the survey which is a good representation of views. Some of the significant results were the following:

- 39 member states have no plans to create a simplified back up chart and only 13 member states do have plans for this.
- ENC sales have increased almost 7 times since 2008
- Use of bulk printing has gradually decreased and POD printing has increased, the amount of bulk printing is now slightly higher than the volume of POD.
- The amount of new INT charts planned to be made by members in the next 3 years is 89 charts. 26 members have no plans to make any new INT charts.
- Members perceive that paperless navigation will require a medium - high level of impact / change on international regulation, national regulation, user requirements, nautical product production and sales revenue.

The Chair invited member's comments and feelings regarding the results. The IHO Sec commented that this work is the 'end of the beginning' and there would be more work to do, the survey results demonstrated that we are not there yet in a paperless world. The IHO Sec recommended that we take this into account in the recommendations included in the FOPNC report.

The HSSC vice chair commented that the results show that there are many nations who do not have plans to create a simplified paper chart and France suggested that some countries may be concerned that this will become a second product in addition to the standard nautical chart.

The IHO Sec thanked Colby Harmon for his work, the member response rate was very good which showed the interest in this issue.

### **6.1D Discussion on the future of the paper chart from another perspective**

*Docs: NCWG5-06.1D Discussion on the future of the paper chart from another perspective (CN)*

The Chair displayed the paper and group discussion followed. The ICA agreed to review the paper further and provide feedback to the group.

**ACTION: 5/12** ICA to consider paper and provide feedback.

**6.2 Future of S-4 [Work item A28] (Chair)**

*Docs: None*

This item has remained on hold for the last few meetings as the Chair wanted to progress the discussions on the FOPNC before discussing the future of S-4. During NCWG5 the topic of the future of S-4 was raised several times as members identified the requirement to have a standardised set of .svg symbols and clearer rules-based guidance that would support advances in automating chart production and moving to S-101.

**6.3 Protocol for considering portrayal requirements [Work item A26] Chair**

*Docs: None*

The Chair recommend that item 6.3 was closed and the subject would be considered at agenda item 9.2 instead as the subject has been overtaken by events.

**6.4 Proposal to update limit between Charting Region D and Charting Region E to S-4, A-204.8**

*Docs: NCWG5-06.4A Proposal to updated limit between Charting Region D and Charting Region E to S-4, A-204.8*

The need for an updated limit with clear information on the positions of the limit was explained and no objections received.

**ACTION: 5/3** IHO Sec to update IHO GIS systems for region D and E limits and provide UK with amendments for S-4 clarification. (IHO Sec)

**ACTION 5/4** UK to update S-4 (A204.8) and diagram with footnotes and positions of limits of charting regions D and E. (UK)


**6.5 Automated production of paper charts from ENC's (Chair)**

*Docs: Presentations by ESRI and CARIS*

ESRI presentation

ESRI provided the group with an overview of the challenges they have encountered when developing automated chart production solutions. Chart scheme layouts and chart symbols are some of the most significant challenges. ESRI suggested that scheming ENCs using a gridded scheme instead of a chart scheme would support automation. The lack of conformity makes automation unnecessarily difficult. The different versions of INT 1 all have slightly different symbols due to the fact that the specific details of how the symbol is constructed are not included in the specification.

ESRI recommend that a future version of S-4 should include details of the size, colour and pattern of the symbol. S-4 recommends that users conform with symbol representation but doesn't provide the details on how to conform. ESRI stated that the Archipelagic Sea lane symbol in S-4 (B-435.10) is a good example of the details required although it does require details of the colour to use. ESRI suggested that the following example shows some of the symbol details required for automation.

Symbol	S-4 Reference	Symbol Name	Geometry	COLOUR	Dimensions	Line weight	S-57 Encoding
	462.5	Pillar Buoy	Point	100,100,100	3mm w x 3mm h	.15mm	OBJECT LIKE ('BOY*') AND BOYSHP = 4 AND (COLPAT <> '2' OR COLPAT IS NULL) AND (COLOUR IN ('-32767','1','3','5','6','7','8','9','10','11','12','13') OR COLOUR LIKE ('*.*'))

The lack of a data driven specification is an obstacle to automation, therefore the next version of S-4 should be data driven like S-52 is. Instead of a descriptive paragraph machines require an instruction that they can understand, this will then support greater automation. ESRI reported that Hydrographic Offices are increasingly seeking to become geo-spatial data providers to different user groups who expect information in different ways than in the past, data driven cartography has arrived and is proceeding without the input of NCWG.

The Chair thanked ESRI for the presentation and remarked that there was a time in the past that the NCWG considered adding dimensions for symbols. However, S-4 was originally made at a time when charts were made manually and all you needed in the past was images to base your symbol on and dimensions were intentionally avoided. This is a good example of how times have changed, what was once best practice has now become worst practice.

Brazil asked about a symbol library and ESRI responded that they believe that S-57 will remain for several years and could be transferred to S-101. The US (NOAA) commented that S-101 portrayal library has a catalogue which includes .svg files of symbols and asked if that was sufficient or would it also need to include engineering drawings for the symbols. ESRI responded that engineering drawings of the symbols would be useful in addition to the .svg files.

#### CARIS presentation

CARIS presented some similar challenges to ESRI regarding the variation in symbol content. It was reported that most Hydrographic Offices are now using a source database and generating paper charts by applying rules to their source data, with computer programs generating much of the chart appearance. CARIS believe that nations will move to using S-100 in the future.

CARIS stated that prescriptiveness is important in supporting automation and currently S-4 is not very prescriptive as it includes advice such as 'should' or 'may' which is difficult to use in automation. Terms such as 'navigationally significant' and 'consider essential' are not translatable and suggested that we need to introduce rules so that the computer can determine the symbol. These rules can become very complex but once defined they can become encoded.

Non S-57 attributes including national symbols adds to the difficulty in defining rules based portrayal. Text and symbol placement can also be a difficult issue for automation but limiting the cartographer's options would help with rules-based portrayal.

It was highlighted that there are currently instances where the ENC symbology does not exist in S-57 to allow the paper chart symbol to be automated. When printing a paper chart from an ENC there may sometimes be an issue with lack of information in the ENC, in these circumstances the option could be to accept a less well refined chart.

The IHO Sec congratulated both ESRI and CARIS for their presentations and mentioned that at the next HSSC meeting there will be an afternoon session for stakeholders and industry and suggested that it would be useful to deliver these presentations then also. The IHO Sec then remarked that IHO is not able to enforce the specifications therefore that is how the specification include terms such as 'may' and 'should' etc and interpretation by the user is possible.

India commented that cartographers should determine the size of symbols and other cartographic decisions based upon the scale and amount of space. ESRI responded that we needed to identify the rules for that cartographic editing so that it can be automated.

The Netherlands made an observation that some nations including the Netherlands are making charts from a single database therefore they are interested in the last part of the process such as text placement and masking etc. This process is different to making paper charts from ENCs. CARIS commented that the database method could be improved to help the automation of the last stages of chart production.

The HSSC vice chair stated that S-101 includes an attribute for text placement that improves the display on an ECDIS and this could potentially help with the automation of text placement.

The Chair commented that both presentations highlighted that if there is not a common baseline for symbology then we will end up with different looking charts. This means that we are currently duplicating our work effort because we do not have a shared baseline regarding symbols and rules, the Chair then asked the group if we need to start developing a new version of S-4 with common baselines and rules. A short discussion was had and it was generally acknowledged that this was an opportunity to bring paper chart and ENC symbology closer together and also an opportunity to move from S-57 databases to S-101 ENCs for automated production.

The Chair stated that we need to define chart content somewhere and therefore suggested that S-4 is kept. The UK acknowledged the need for standardised portrayal to assist automated production and believed that S-4 should not be frozen as it was such an important specification.

## **6.6 Consider issue of distinguishing between obstructions and foul ground (FR, AU)**

*Docs: NCWG5-6.6A Distinction between obstructions and foul ground.*

Australia explained the proposals in their paper highlighting the need for clearer information on foul grounds and obstruction in S-4 to support the cartographer's decision-making process. France commented that SHOM had intended to submit a paper also but had not come to agreement yet on the wording of their proposal. France provided some further reasons why there is a need for further guidance, stating that some vessels are instructed to avoid all charted obstructions that may cause vessel alarms to be set off. It was suggested that vessels avoiding obstructions, that are not actually dangerous, may make them navigate closer to real dangers. Finland commented that wrecks and obstructions should always have depth values otherwise they will always be shown as dangerous.

The UK did not agree with the proposed S-4 amended guidance as it required the cartographer to make a judgement on the maximum draught of vessels in a specific area and then calculate if there was a safe underwater clearance. Sweden also did not agree with the wording and felt that this issue was more of concern to the paper chart rather than the ENC.

The Chair encouraged members to discuss this topic further in the coffee break and then report back their recommendations. No further recommendations or comments were received so the Chair conducted a vote of members present to determine how many members agreed that S-4 guidance needed updating. France and Australia voted for changing the wording and the rest of the members voted to not change the wording.

**DECISION:** Retain existing wording with no further action as the majority of members were not convinced that there was a need for new guidance. Australia and France are welcome to consider the comments made and resubmit a new paper if they consider that there is still a need for further guidance.

## **6.7 Swept wreck depths (NL)**

*Docs: None*

The Chairman provided an overview of the responses received from members to the proposal for further guidance on Swept wrecks (NCWG letter 4 action 14). The responses from members were circulated by NCWG Letter 5 before the meeting and this was also displayed during the meeting. There was an even number of members supporting the proposal and not supporting it. France and Germany explained how they class wrecks as swept when they have been surveyed or examined by two independent methods.

**ACTION: 5/ 5 NL** to re-draft proposed S-4 wording for swept wrecks based upon the comments received.

## 6.8 Emergency contact details (IN)

*Docs: NCWG5-06.8A      Emergency contact details, presentation*

India delivered a presentation explaining the requirement for adding emergency details and the option to include it on the back of the chart or outside of the marginalia. Several members including the chair stated that S-4 guidance does not allow for content to be printed on the back of INT charts. The UK commented that print on demand charts are unlikely to be able to print the emergency details on the back of the chart which may be a problem.

The US (NOAA) suggested that a better place for this information would be Sailing Directions. CARIS questioned how this would work with the advancements of making automated paper charts from ENC's and suggested that consideration of how the emergency contact details would be added to these charts is needed. ESRI agreed that this new note would need careful consideration for automated charts, stating that this large note may take up a lot of chart space and cover other content. Estonia made a useful suggestion that this information could potentially be accessed by a QR code on the chart if needed.

The IHO Sec questioned if this proposal was still needed following IHO resolution 1/2005 and suggested that IRCC may need to be contacted to confirm if there is still a need for the IHO to show emergency details on charts.

**ACTION: 5/6** IHO SEC and NCWG SEC to report back to HSSC requesting guidance on how we proceed and then liaise with NIPWG.

## 6.9 IALA FFI light characteristics (US /Sec / IHO)

*Docs: None*

The Secretary and US (NGA) confirmed that IHO had recently attended a workshop meeting with IALA. IALA has agreed to submit some guidance to IHO regarding updating the FFI lights.

**DECISION:** Ongoing action item. When IALA advice is received a proposal will be prepared by US NGA / SEC to amend S-4 and will be circulated to members for comment.

## 6.10 WIG Craft (ROK)

*Docs: NCWG5-06.10A, presentation*

Rep of Korea delivered an interesting presentation regarding the development of Wing In Ground Effect craft (WIG) which are vehicles that are designed to sustain flight over a level surface but do not maintain constant contact with the surface. It was reported that WIG craft are faster than ships and have a maximum altitude of up to 150 metres.

The presentation generated some good discussion regarding the need for a separate nautical product that combined an element air and nautical charts. France questioned whether there was a requirement for an INT standard and asked if WIG craft made international voyages. Rep of Korea responded that international voyages are not made yet but there was a requirement for international shipping to be aware of WIG craft and more nations are starting to develop WIG craft.

India questioned how it would be possible to merge nautical and aviation symbols on a chart. Rep of Korea confirmed that WIG craft are classed as ships and not aircraft. Therefore WIG craft need a nautical chart that combines all of the data, trials have shown that certain scales work well but not always the larger scales.

The Chair asked if this would be a separate product to Rep of Korea's nautical charts and Rep of Korea confirmed that it would be a separate product. The Chair then enquired

what the carriage requirements are and Rep of Korea confirmed that WIG are classed as small vessel therefore require a paper chart.

The Chair asked the group if we should recommend that HSSC task NCWG with working on this, to which the IHO Sec suggested that autonomous shipping is likely to be the priority before WIG craft.

**ACTION: 5/8** – Report to HSSC and seek guidance on WIG craft. (CHAIR)

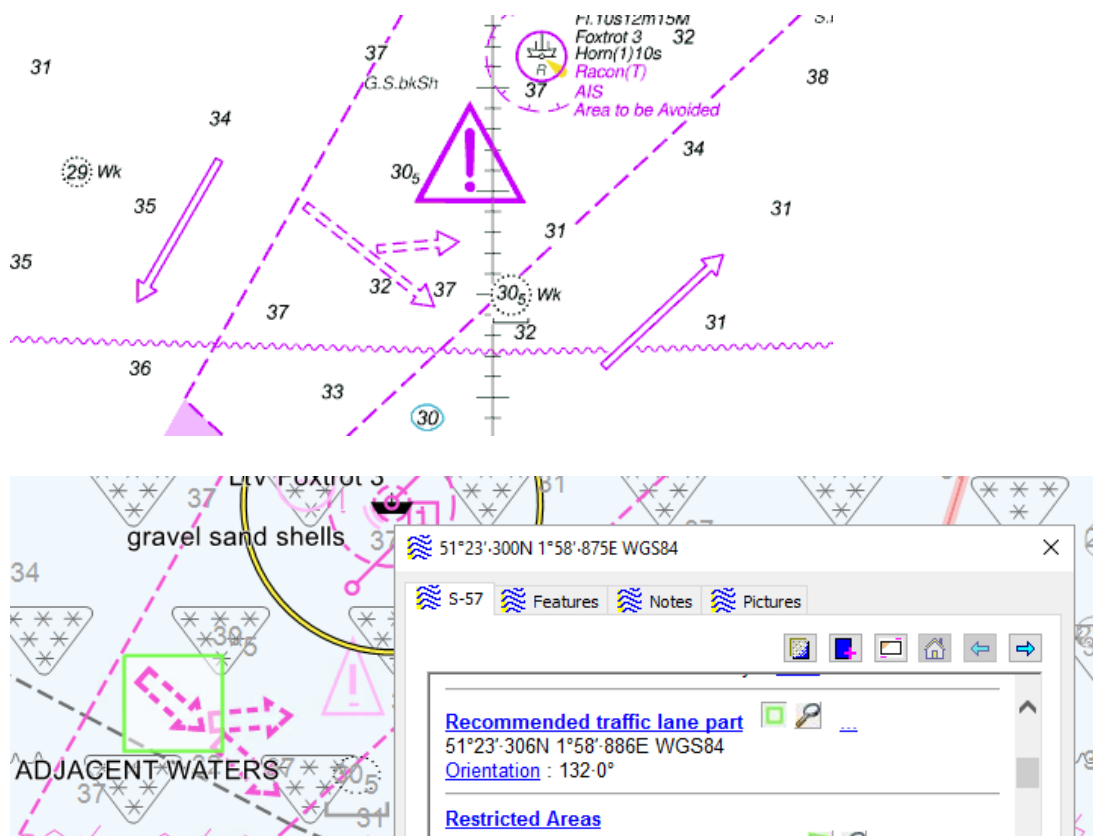
**6.11 Portrayal of Indonesian ASL in TSS**

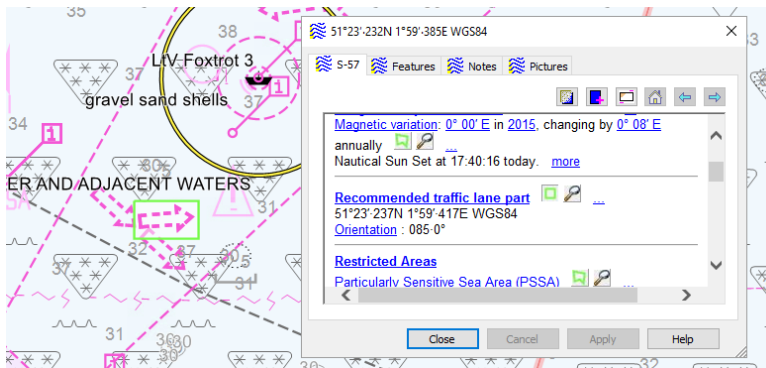
*Docs: NCWG5-06.11A TSS in Indonesia ASL and recommended direction of Traffic flow , presentation*

Indonesia presented the paper and explained the difficulties experienced in determining the correct portrayal of the new TSS in the ASL. There are different regulatory bodies for the TSS and ASL, therefore it was not clear which had priority. The issue of recommended direction of traffic portrayal was also discussed.

The chair invited the group to share comments and experiences. The UK had prepared a response with a recommendation to Indonesia and provided advice on both the ASL / TSS issue and the question regarding recommended direction of traffic flow. The UK showed the example below of GB chart 323 / ENC GB400323 to demonstrate how they resolved a similar scenario.

“GB Chart 323/ENC GB400323) – we have encoded sets of 3 x point RCTLPT features using the orientation on two of them to show the primary direction of traffic flow (132°) and on the third to show the secondary direction of traffic flow (085°).”





**ACTION:5/ 9** UK to provide summarised comments to secretary and Indonesia.  
**DECISION:** Put name of TSS and ASL in TSS to show they are joined. Capture separate arrows in precautionary area to show two way route.

## 6.12 Guidance for coloured CATZOCs

*Docs: NCWG5-6.12A Guidelines for coloured CATZOC diagrams*

The Chair commented that he was pleased to see this submission by Netherlands. Members were invited to share details of their practices and a good discussion was had. The IHO Sec questioned whether the real focus of our efforts should be invested in data quality work regarding CATZOC depiction in ENCs as opposed to colours used on paper charts. The Chair commented that he considered the move from showing source diagrams to CATZOC diagrams a good thing as it brought the paper chart into closer agreement with ENCs.

ESRI commented that a CATZOC that included colours only would support automated production whereas CATZOCs that incorporated elements of text such as the example that the UK offered were more complex and made it difficult to automate.

The chair concluded that this issue probably needs resolving before we get even more variations in the use of colour. The IHO Sec informed that a colour pattern had been adopted for INTOGIS II for the CATZOC Layer ( from A1 – green – to D – red, and U – grey -). The chair asked members to vote on whether to make changes to S-4 or not.

**DECISION:** 10 nations voted against changing S-4 and 7 members voted for changing it. The vote concluded that no changes to S-4 will be made.

## 7. INT 1 / 2 / 3

### 7.1 Report from Secretary of INT1 subWG [Work item E1] (Sec)

*Docs: NCWG5-07.1 Report from INT 1 subWG (Sec)*

The Secretary reported that the three INT versions are now closely synchronised with two being published in 2018 and one in 2019. The Secretary had met with other members of the INT 1 SubWG during the meeting and provided an update on the discussions held. The main topic discussed was the future of INT 1 and in particular finding a solution for the ongoing maintenance and publication of the English language version after Germany steps down from maintaining it.

The UK have offered to take over responsibility for publishing and maintaining the English language INT 1 and are in discussions with Germany regarding handing over responsibility. The UK intend to use their existing publication 5011 Guide to Symbols and abbreviations used on Admiralty Paper Charts and add INT1 title to the product.

**DECISION:** INT1 Sub WG to continue to work on proposals and report back to group.



## 7.2 Future options for INT 1

*Docs: NCWG5-07.2 Future options for INT 1 (Sec)*

The Secretary explained that the HSSC had also tasked NCWG with considering the future of the three versions of INT 1. The SubWG had identified that a paper publication of INT 1 was still required by the mariner but hydrographic offices also had a separate requirement for improving the registry of symbols and alignment of symbols across different specifications.

An opportunity exists to investigate the possibility of making a symbol registry that provides details of S-52, paper chart and S-101 symbols along with a linked .svg symbol file and dimensions of the symbols. This would support automated production efforts and also assist with the transition to S-100, maintenance of the symbols should also be easier.

The IHO Sec requested that the UK confirm when they will have a new edition ready to allow them to take over INT 1. The Chair asked that Germany confirms when they will stop being the producer of English version of INT1, at HSSC they reported that it was April 2020.

**DECISION:** Germany to confirm that reformat and copies of INT 1 will be available up until UK make a new edition. UK to estimate a date for when they will make a new edition and inform Chair and IHO sec.

**ACTION: 5/14** Germany to provide confirmation that they will provide support for English INT1 by 2020. (Note: This was confirmed by Germany during the meeting, they will keep INT1 until a new edition by a new publisher is ready).UK to confirm date for new edition. Aim to coordinate dates to avoid gaps

## 8. S-11 Part A

*Docs: None*

With regard to S11 Part B, the IHO Sec took the opportunity of the meeting to introduce the new functionalities of INTToGIS II to the participants (Post meeting reference: IHO CL 60/2019).

## 9. Liaison with other working groups

### 9.1 S-101 Portrayal (Chair)

*Docs: Presentation*

The Chair delivered a presentation and updated the members on the progress made regarding S-101 portrayal. The group needs to identify which symbols are needed or not for S-101. Progress so far has indicated that the majority of features will not need new symbology as they are the same as existing features. When the list of features is completed it will be progressed further by volunteers to identify final recommendations.

The current status is that the updated list was provided in Sept 2019, but this was too close to the NCWG meeting to be able to do any further work before the meeting. This list contained 36 new features and 400 new feature attribute and feature attribute- enumerate combinations. Finland will continue to work on the list and reduce the number of requirements. It is planned that the final recommendations will be delivered to S-101PT by May 2020.

Rep of Korea asked the Chair if NCWG will provide .svg files. The Chair responded that we would not provide .svg files but would provide a draft 'hand drawn' symbol to NICW (formerly SPAWAR) to develop. This would mean that the NCWG didn't have to learn about the .svg file requirements.

**DECISION:** This is already covered by an outstanding Action 3/3.

## 9.2 Harmonised portrayal between data products used in the interoperability mode of ECDIS (Chair)

*Docs: NCWG5-09.2A Portrayal Harmonisation*

An overview of the issues effecting harmonisation of the features on a navigation screen was provided and discussed the following aspects:

- Pick reports
- Content harmonisation
- Display of significant features
- Symbol harmonisation
- Colour harmonisation
- Operating mode (day/ night / dusk modes)
- Viewing groups
- Text
- Alarms and indications

The Chair requested that members consider the paper further and provide comments back to the NCWG, the chair will then report back the comments of the group.

**ACTION: 5/ 11** NCWG to review paper and provide comments to NCWG by end of January 2020. Chair will then send comments to S-100WG.

## 9.3 Mariners Guide to Accuracy of Depth Information ENCS

*Docs: NCWG5-09.3A – S-67 Mariners guide to Accuracy of depth information in Electronic navigational charts (Chair)*

The chair presented the paper on behalf of DQWG and members were invited to review the paper and provide feedback via their DQWG delegate or via the chair.

**ACTION: 5/13** NCWG members to review and provide feedback to DCWG via their delegate or via NCWG chair. Deadline for comments is 15<sup>th</sup> December. If passing via NCWG chair please pass comments earlier.

## 10. Lessons learned from Marine Incidents

*Docs: None*

No lessons from marine incidents reported.

## 11. Review of Actions and Work Plan

### 11.1 Review of meeting actions

The Secretary provided a list of the actions taken during this meeting and the members reviewed it and added three further actions that had not been listed. A copy of the actions is included at ANNEX D.

### 11.2 New Item's for work Plan

Proposals for the work plan will be considered following the work of the FOPNC SubWG and INT1 SubWG.

## 12. INF papers, reports and Any Other Business

### 12.1 Unexploded Ordnance (UK)

*Docs: NCWG5-12.1 INF1 Definition of exceptional circumstances to chart unexploded ordnance*

The UK explained how they had needed to determine their own guidance on what constituted an exceptional circumstance to chart unexploded ordnance. Germany commented that they remove all known ordnance and the exceptional case to chart it for example is when it is not possible to remove it. The Chair invited other members to share their experience and comments. France agreed that some extra guidance in S-4 may be useful but Germany was concerned that the list of exceptional criteria may miss out a reason. Brazil stated that we needed to be clear that we were not excluding other exceptional circumstances. Canada agreed that there may be more exceptions than the ones listed by UK but these were likely to be the main reasons and it would help junior cartographers to make informed decisions.

**ACTION: 5/10** UK to formulate final text for S-4 based upon discussion had.

### 12.2 Paper chart maintenance efficiency improvements presentation (UK)

*Docs: NCWG4-12.2 INF2 UKHO's omission of detail program, presentation*

The UK provided a presentation providing further clarification of their omission of detail program of work and how it had significantly reduced the amount of notice to mariners on charts that had the omission of detail line.

There was a good discussion following the presentation, the Netherlands asked if re-scheming was required and the UKHO stated that this was not necessary and the changes to place over several years, so it gradually evolved. France questioned if the UK was introducing a difference between its ENC and paper charts and the UK confirmed that they maintain a hydrographic database and have an updating ENC first policy.

The Chair asked if it is safe for mariners to use the chart inside of the omission of detail line, the UK stated that mariners were forced to use the appropriate larger scale within the omission line area. The Chair asked if the UK would still need to do this omission line if chart production was fully automated, the UK replied that it would still be needed as it reduced the amount of notice to mariners. Sweden stated that they also use a similar line on their charts to reduce maintenance.

### 12.3 ICA Marine Cartography Commission (ICA)

*Docs: Presentation*

Professor Lysandros Tsoulos gave an interesting presentation on the work of the ICA Marine Cartography Commission which was re-established in August 2019 having been previously dismantled 10 years ago. There is a MOU between ICA and IHO and both groups wish to establish an active link between the two bodies.

The Professor asked members if following the presentation, they saw a need to cooperate with the ICA, the Chair confirmed that we used to have an agenda item in our meetings to discuss ICA and they are still a member of our group. The Chair added that he often goes to ICA's International Cartographic Conferences (ICC) and have found them to be a rich experience and would recommend to anyone that they should become involved. The IHO Sec commented that the IHO and ICA have a lot to learn from each other and the IHO should not ignore what is being done by the ICA.

### 12.4 International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (FIG/IHO/ICA IBSC)

*Docs: Presentation*

Professor Lysandros Tsoulos provided an overview of the developments that have been made to the content of the CAT A and CAT B standards for Cartographers that are found in S-8. The standards represent the minimum degree of knowledge and experience expected of nautical cartographers. The FIG/IHO/ICA IBSC have been considering developments in education and technology and have revised the standards as a result. Subjects in the standards for nautical cartographers now include the following:

S-8A Subjects	S-8B Subjects
B1 Mathematics, Statistics, Theory of Errors B2 Information and Communication Technology B3 Earth Sciences	B1: Mathematics, Statistics, Theory of Errors B2: Information and Communication Technology B3: Earth Sciences
F1 General Geodesy F2 Hydrography and Nautical Products F3 Photogrammetry and Remote Sensing	E1: General Geodesy E2: General Cartography E3: Hydrography and Nautical Products
C1 General Cartography C2 Data for Nautical and Special Purpose Charting C3 Geospatial Information and Processing C4 Nautical Cartography C5 Legal aspects (Relating to nautical cartography) C6 Special Purpose Charting C7 Map/Chart Reproduction	E4: Data for Nautical and Special Purpose Charting E5: Photogrammetry and Remote Sensing E6: Geospatial Information and Processing E7: Nautical Cartography E8: Legal aspects (Relating to nautical cartography) E9: Special Purpose Charting E10: Map/Chart Reproduction
COMPREHENSIVE FINAL CARTOGRAPHIC PROJECT	COMPREHENSIVE CARTOGRAPHIC PROJECT

The new standards will be valid for 6 years where as the old standard was valid for 10 years.

The UK asked how long it took the IBSC to restructure the training and content, the IBSC confirmed that it took 2 years. The US (NOAA) shared their positive experience of delivering a CAT B programme using the old standard, commenting that many students have gone on to do a master’s degree or even a PhD. The IBSC representative was very pleased to hear this positive feedback. The US(NOAA) commented that many colleges teach GIS but no longer cartography, so it is good to have this course. The IBSC representative commented that there are 65 recognised course programs in Hydrography and Nautical Cartography worldwide and they are being overwhelmed by the number of submissions each year. The IBSC representative encouraged members to continue submitting new programmes to the IBSC and invited Hydrographic Offices to consider appointing senior cartographers on the FIG/IHO/ICA IBSC.

**12.5 US plans for future of US paper chart series (US)**

*Docs: NCWG5-12.5A INF- US plans for future of NOAA paper charts  
NCWG5-12.5B INF – NOAA Custom Chart application, presentation*

The US (NOAA), explained their plan to stop publishing traditional paper charts within the next 5 years and provided details of their plan to ‘Sunset’ raster production which includes:

- Re-scheme and improve the NOAA ENC suite – number of cells will increase from 1200 to about 9000.
- Provide alternative ENC based paper charts – make back up chart from ENC data without intervention.
- Gradual end of traditional charts. – will spend a year talking to stakeholders to get ideas on how to optimise transition for them. Keeping paper is not an option.

In November 2019 they will release a statement to the public informing them of project sunset and will start gathering the views of customers. Later in 2019 NOAA will have meetings with the US Coastguard and POD vendors, the information gathered will influence the timing in which the rest of the sunset phase will proceed. In late 2020 the plan is to start systematically shutting down all traditional raster and nautical chart products and services. The criteria for cancelling individual charts will be:

- Where new larger scale ENC coverage is available
- When a large amount of new source data is received
- When POD chart sales are low
- Other criteria may be developed as well as consideration of cancelling on a regional basis

NOAA have plans for improving the paper charts made from ENC using the new web application that they have developed with ESRI. The interface currently uses S-52 symbology but they would like to use NOAA symbology instead in the future. Popular charts for the main ports will be pre built in the web application based upon the existing chart schemes. The user will still have the option of producing a customised chart if they require. CATZOC diagrams and other marginalia will be included on a separate page that can be printed with paper chart.

The Netherlands asked if other companies can recompile charts from NOAA data, NOAA confirmed that this was possible and that companies recompiled the data but would leave off the NOAA seal. Canada asked why NOAA has an export geo pdf option in the new web service, NOAA confirmed that this is not certified for carriage yet and didn't want to presuppose how the information was being used. India raised a question about the risk of computer problems, stating that their experience is that a lot of human checks are required and asked who was taking responsibility for the automated product verification. NOAA confirmed that they do not intend to check each printed chart and that their main purpose was to avoid having to work on raster charts altogether.

France asked if there would be a warning to users who choose their own customised chart limits, about the possibility of dangers falling just outside the limits of their chart. NOAA stated that they will allow the user to determine the limits but standard limits for popular charts will be an option. Denmark questioned why S-52 symbology was used instead of INT1 version of symbols. ESRI replied that a library of .svg symbols would help with the portrayal of symbols in the web application. NOAA stated that there is some logic in following the S-52 symbology for ECDIS backup users as they are used to S-52 symbols shown on the ECDIS.

Canada asked the Chair and IHO Sec when we will make new symbols to support this automation, as we require them right away. Brazil suggested considering using one of the open source symbol libraries. The Chair commented that many symbol libraries are orientated to national symbols only. Rep of Korea commented that we need to consider symbols for S-100 and try to synchronise S-4 and S-52 symbology.

## **12.6 Paper charts from ENCs – the need for a new standard (AU)**

*Docs: NCWG5-12.6INF*

*Paper charts from ENCs- The need for a new standard*

Australia briefed members on their plans to withdraw larger scale paper charts and retain a series of 1:25,000 and 1:50,000 instead. This will reduce their chart maintenance burden. They expected their ports to be against the proposal but most ports were okay with this and only a few ports wanted to keep the larger scales. Some of the content that was on the larger scale paper charts has now been transferred to the next smaller scale paper chart available and a reference to an 'ENC' chart Note has been added in those areas where additional (larger scale) detail only exists in an ENC.

Australia suggested that we require a more flexible definition of a 'back up' chart as referred to in IMO resolution A.817(19), as amended (copied below). Instead they suggested that the wording should say 'navigation to a safe waiting place'.

*“A 19/Res.817 - IO - 13.2 ECDIS should provide a suitable alarm or indication of system malfunction. 14 BACK-UP ARRANGEMENTS Adequate back-up arrangements should be provided to ensure safe navigation in case of an ECDIS failure . . 1 Facilities enabling a safe take-over of the ECDIS functions should be provided in order to ensure that an ECDIS failure does not result in a critical situation . . 2 A back-up arrangement should be provided facilitating means for safe navigation of the remaining part of the voyage in case of an ECDIS failure.”*

Australia would like to progress to the NOAA concept in the future and make paper charts from the push of the button. France asked if Australia intended to make a larger scale paper chart for non SOLAS users. Australia responded that the feedback that they have received indicates that 1:25,000 coverage is adequate.

The Chair asked if a re-modernised version of S-4 with a common baseline and details of a minimum requirement would help. Australia agreed that this would help with automation rules.

The UK asked if this proposal was to be considered as part of S-4 or separately. Australia confirmed that they proposed that this was a separate specification. The HSSC questioned whether we could stop issuing notice to mariners in the future if the paper charts are made by the user and asked NOAA if they intended to issue notices to mariners. NOAA replied that there were no corrections to make after the user printed the chart. The Netherlands informed the group that almost half of the Dutch-flagged SOLAS-vessels are (because of their size) not mandated by SOLAS carriage requirements rules to use ECDIS. These ships are often not willing to make an investment for an ECDIS. The IHO Sec suggested that more information or research was needed into vessel failures to confirm the demand for back up paper charts.

The Chair reminded members that back up ECDIS need to be independent of each other so if one failed the other should not. The chair also suggested that we should be cautious to avoid duplicated products so that users didn't have both standard charts and back up charts. The Chair asked the group if they agreed that there was not a need for a separate specification for back up charts, no responses were received and the Chair stated that members silence will be taken as agreement.

**DECISION:** There is no requirement to make a separate specification for back up charts. The minimum requirement will be listed in S-4.

**ACTION: 5/15** - AUS to check if there is a proposal to IMO NCSR<sup>17</sup> to submit a new definition on back up paper charts. (Post meeting note: no proposal was made by Australia to IMO at this stage).

## **12.7 S-100 portrayal harmonization project (KO)**

*Docs: NCWG5-12.7A INF- S100 portrayal harmonization project, presentation*

Rep of Korea delivered a very good presentation updating members on the progress and challenges so far with their national S-100 portrayal harmonisation project. Members were shown examples in the presentation of symbol development and the studies in the conceptual use of colour in symbols.

Germany asked how we could take this work forward and if it had been presented to the S-101WG. Rep of Korea stated that so far they have been studying various cases such as which is the best for a new user or old user etc. Rep of Korea require support from NCWG to provide input into this work and also provide feedback and any concerns. At the moment this is a national project and IHO is welcome to contribute to it.

Canada asked about the files sizes when the new symbology is used, does it make the file size too big. India commented that mariners are used to the S-52 symbols and therefore

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<sup>1</sup> IMO Sub-Committee on Navigation, Communication, Search and Rescue.

the new symbols should not deviate too much from S-52 standard as it will create confusion. The Chair responded that some modernisation needs to be done as the current symbology and techniques were constrained by the technology in the 1990's and there is no longer that technology restriction. The Chair also added that the semantics in our symbols have been included for decades therefore how much are we willing to change? S-52 and S-4 are already different in places, in an ECDIS an isolated danger symbol is shown in magenta but on a paper chart it is in black, what is the appropriate amount of change?

**ACTION: 5/16** KR to provide update on S-100 portrayal project

### **12.8 Seaweed cultivation – (UK)**

*Docs: NCWG5-12.8A INF – Seaweed cultivation*

The UK requested members comments and views on the need to differentiate sea weed marine farms with a different symbol. There was general consensus from members that a new symbol was not needed, and the existing marine farm symbol was suitable for sea weed cultivation as well.

Canada stated that there are many different types of marine farm (salmon, crab, lobster, etc) therefore would we need to have different symbols for them also. Canada also added that extra symbols would not help with the automation of paper charts.

**DECISION:** Paper and discussion noted, no need to update current guidance in S-4.

### **12.9 Any other Business**

- a) UK briefed members on a recent vessel incident, Saga Sky, and explained how the vessel had dragged its anchor in a storm and broke a chartered submarine cable. The UK Maritime Authority (MCA) had asked the UKHO to consider if the cables needed to be shown with more emphasis on the chart. The UKHO were therefore interested to get the advice of NCWG on whether a change to S-4 guidance was needed. There was a small discussion by members and the Chair concluded that no charting changes to cables were recommended. The IHO reminded members and UK that IHO resolution 4/1967 provided further information regarding our cable policy and had been discussed with the International Cable Protection Committee (ICPC).
- b) India requested that the new terms of reference were circulated with the minutes for comment. These can be found at ANNEX F.
- c) The IHO Sec provided a brief overview of the new INTToGIS II application and demonstrated the new functionality.
- d) Germany asked if it was possible to change the list of ports. The NGA provided Germany with the contact details for the editor of IHO Publication P50.

### **13. Date and Location of next meetings**

**NCWG6 – Cadiz, Spain 3-6<sup>th</sup> November 2020**

**NCWG7-** No volunteers yet to host 2021 meeting

### **14. Closing remarks**

The Chair thanked everyone for a fruitful and productive week.

## ANNEX A

**Agenda for 5th NCWG MEETING**  
**5-8 November 2019, Stockholm, Sweden**

Please assemble at 0915 for 0930 start (Tuesday) and 0845 for 0900 start (other days).  
 Close by approximately 1630 (1300 on Friday).

**1. Welcome, Introductions and Administrative Arrangements**

**2. Approval of Agenda**

*Docs: NCWG5-02A – Agenda v1.3*

**3. Status of Actions from NCWG4**

*Docs: NCWG5-03A – Status of actions (Sec)*

**4. Matters arising from HSSC**

- 4.1. Notes from HSSC11 **(Chair)**
- 4.2. Actions from HSSC11 **(Chair)**
- 4.3. Report from S-100WG **(Chair)**
- 4.4. Report from ENCWG **(Chair)**
- 4.5. Report from NIPWG **(IHO Sec)**
- 4.6. Report from DQWG **(DQWG Chair)**

*Docs: NCWG5-4.6A Report from DQWG*

*NCWG5-04.6B Using data quality for safe navigation*

**5. NCWG Administration and Work Plan**

- 5.1. Review of Terms of Reference and Detailed Procedures **(Chair)**
- 5.2. Summary of progress, items completed **(Sec)**

*Doc: NCWG5-05.2A Work plan: Summary of progress*

**6. S-4 Chart Specifications, New and revised symbology**

- 6.1. Future of Paper Chart [Work item A16] **(Harmon)**

*Docs: NCWG5-06.1A Future of Paper Chart (Colby Harmon)*

*NCWG5-06.1B Future of paper chart: Management plan (Colby Harmon)*

*NCWG5-06.1C Results of the Future of the paper nautical chart Survey of IHO member states. (Colby Harmon)*

*NCWG5-06.1D Discussion on the future of the paper chart from another perspective (CN)*

- 6.2. Future of S-4 [A28] **(Chair)**
- 6.3. Protocol for considering portrayal requirements [A26] **(Chair)**
- 6.4. Update INT charting region D and E limits **(FI)**

*Docs: NCWG5-06.4A Proposal to update limit between charting region D and Charting Region E to S-4, A204.8 (FI)*

- 6.5. Automated production of paper charts from ENC's **(Chair)**
- 6.6. Consider issue of distinguishing between obstructions and foul ground **(FR, AU)**

*Docs: NCWG5-06.6A Distinction between obstructions and foul grounds (AU)*

- 6.7. Swept wreck depths **(NL)**

- 6.8. Emergency contact details **(IN)**

*Docs: NCWG5-06.8A Recommendation to add emergency contact details to charts. (IN)*

- 6.9. IALA FFL light characteristics **(US /Sec / IHO)**

- 6.10. WIG Craft **(Rep KR)**

*Docs: NCWG5-06.10A WIG Craft (Rep KR)*



- 6.11 Portrayal of Indonesia ASL in TSS **(ID)**  
*Docs: NCWG5-06.11A Portrayal of Indonesia ASL in TSS (ID)*
- 6.12 Guidelines for coloured CATZOCS **(NL)**  
*Docs: NCWG5-06.12A Guidelines for coloured CATZOCS (NL)*

## 7. INT 1 / 2 / 3

- 7.1. Report from Secretary of INT1 subWG [E1] **(Sec)**  
*Docs: NCWG5-07.1 Report from INT 1 subWG (Sec)*
- 7.2. Future options for INT 1 **(Sec)**  
*Docs: NCWG5-07.2 Future options for INT 1 (Sec)*

## 8. S-11 Part A

### 9. Liaison with other working groups

- 9.1. S-101 Portrayal **(Chair)**
- 9.2. Harmonised portrayal between data products used in the interoperability mode of ECDIS **(Chair)**  
*Docs: NCWG5-09.2A Portrayal harmonisation (Chair)*
- 9.3. Mariners Guide to Accuracy of Depth Information ENCS **(Chair)**  
*Docs: NCWG5-09.3A – S-67 Mariners guide to Accuracy of depth information in Electronic navigational charts (Chair)*

## 10. Lessons learned from Marine Incidents

### 11. Review of Actions and Work Plan

- 11.1. Review of Meeting Actions
- 11.2. New items for Work Plan

### 12. INF papers, reports and Any Other Business

- 12.1 Unexploded Ordnance **(UK)**  
*Docs: NCWG5-12.1A INF Definition of exceptional circumstances to chart unexploded ordnance (UK)*
- 12.2 Paper chart maintenance efficiency improvements presentation **(UK)**  
*Docs: NCWG5-12.2A INF – UKHO’s omission of detail program (UK)*
- 12.3 ICA Marine Cartography Commission **(ICA)**
- 12.4 International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers **(ICA)**
- 12.5 US plans for future of US paper chart series **(US)**  
*Docs: NCWG5-12.5A INF- US plans for future of NOAA paper charts (US)*  
*NCWG5-12.5B INF – NOAA Custom Chart application (US)*
- 12.6 Paper charts from ENCs – the need for a new standard **(AU)**  
*Docs: NCWG5-12.6A INF – Paper charts from ENCs – The need for a new standard (AU)*
- 12.7 S-100 portrayal harmonization project **(Rep KR)**  
*Docs: NCWG5-12.7A INF- S100 portrayal harmonization project (Rep KR)*
- 12.8 Seaweed cultivation – **(UK)**  
*Docs: NCWG5-12.8A INF – Seaweed cultivation (UK)*

### 13. Date and location of next meetings

NCWG6 - November 2020 – Cadiz, Spain  
 NCWG7 - November 2021 (TBD)

### 14. Closure of meeting

ANNEX B	Meeting Documents		
NCWG5-01Ba NCWG5-01Bb	28  28 Oct	Oct	<a href="#">List of Meeting Participants</a>  <a href="#">List of Workshop Participants</a>  The Lists of Participants are kept up-to-date and available on the IHO on-line registration system
NCWG5-01C	--		<a href="#">List of NCWG Members</a>
NCWG5-02A v1.4	1 Nov		Agenda ( <a href="#">.doc</a> , <a href="#">.pdf</a> ) and Timetable ( <a href="#">.doc</a> , <a href="#">.pdf</a> )
NCWG5-03A	25 Oct		Status of Actions from NCWG4 ( <a href="#">.doc</a> )
NCWG5-04.1A			Notes from HSSC11
NCWG5-04.2A			Actions from HSSC11
NCWG5-04.3A			Report from S-100WG - <i>Presentation</i>
NCWG5-04.4A			Report from ENCWG - <i>Presentation</i>
NCWG5-04.5A			Report from NIPWG - <i>Presentation</i>
NCWG5-04.6A	1 Oct		<a href="#">Report from DQWG</a> - <i>Presentation</i>
NCWG5-04.6B	22 Oct		<a href="#">Using data quality for safe navigation</a>
NCWG5-05.1A			Review of Terms of Reference and Detailed Procedures
NCWG5-05.2A	25 Oct		Work Plan: Summary of progress, items completed ( <a href="#">.doc</a> )
NCWG5-06.1A	30  11 Nov	Oct	<a href="#">Finalizing the Future of the Paper Nautical Chart Presentation</a> <a href="#">Part 1</a> , <a href="#">Part 2</a>

NCWG5-06.1B	21 11 Nov	Oct	<a href="#">Future of Paper Chart: Management Plan Presentation</a>
NCWG5-06.1C <b>Rev1</b>	28 11 Nov	Oct	<a href="#">Results of the Future of the Paper Nautical Chart Survey of IHO Member States Presentation</a>
NCWG5-06.1D	25 Oct		<a href="#">Discussion on the Future of the Paper Nautical Chart from another perspective</a>
NCWG5-06.2A			Future of S-4
NCWG5-06.3A			Protocol for considering portrayal requirements
NCWG5-06.3A			
NCWG5-06.4A <b>Rev1</b>	30 Oct		<a href="#">Proposal to update limit between Charting Region D and Charting Region E to S-4, A-204.8</a>
NCWG5-06.5A			
NCWG5-06.6A	21 Oct		<a href="#">Distinction between obstructions and foul grounds</a>
NCWG5-06.8A <b>Rev1</b>	21 Oct		<a href="#">Recommendation to add emergency contact details to charts</a>
NCWG5-06.10A	30 Oct		<a href="#">Symbols for Wing-in-ground-effect (WIG) Craft</a>
NCWG5-06.11A	1 Nov		<a href="#">Traffic Separation Scheme in The Indonesia Archipelagic Sea Lane, and Recommended Direction of Traffic Flow Portrayal</a>
NCWG5-06.12A	1 Nov		<a href="#">Guidelines for coloured CATZOC diagrams</a>
NCWG5-07.1A	30 Oct		<a href="#">Report of INT1 subWG</a>
NCWG5-07.2A	30 Oct		<a href="#">Future options for INT1</a>
NCWG5-08.2A			
NCWG5-09.2A	14 Oct		<a href="#">Portrayal Harmonization</a>

NCWG5-09.3A	14 Oct	S-67 Mariner’s Guide to Accuracy of Depth Information in Electronic Navigational Charts ( <a href="#">.doc</a> )
NCWG5-12.1 INF	4 Oct	<a href="#">Definition of exceptional circumstances to chart unexploded ordnance</a>
NCWG5-12.2 INF	4 Oct	<a href="#">UKHO’s omission of detail program</a>
NCWG5-12.3 INF	11 Nov	<a href="#">ICA Marine Cartography Commission</a>
NCWG5-12.4 INF	11 Nov	<a href="#">IBSC for Nautical Cartographers</a>
NCWG5-12.5A INF	30 Oct	<a href="#">US Plans for Future of NOAA Paper Charts</a>
NCWG5-12.5B INF	30 Oct	<a href="#">NOAA Custom Chart Web Application</a>
NCWG5-12.6 INF	21 Oct	<a href="#">Paper Charts from ENC’s – The need for a new standard</a>
NCWG5-12.7 INF <b>Rev1</b>	30 Oct/11 Nov	<a href="#">KHOA S-100 Portrayal Harmonization Project</a>
NCWG5-12.8 INF	30 Oct	<a href="#">Depiction of areas of Seaweed Cultivation</a>

## ANNEX C

<b>Country</b>	<b>Organization</b>	<b>Participant</b>	
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**ANNEX D****RETAINED NCWG2 ACTIONS**

No	NCWG 2 Agenda item	NCWG2 Action	Delegate	Status at NCWG4
2/20	8.6	Chair to discuss DQ options with Ron Furness (ICA)	Chair	ongoing
2/24	8.9	Chair to propose changes to definitions for seagrass and seaweed in S-32 to HDWG (and consider whether any related definitions, such as kelp, need adjusting).  Note from NCWG3: Additionally, to monitor HDWG's processing of NCWG2/4 on the agreed revised definitions of height, elevation and altitude.	Chair	ongoing

**RETAINED NCWG3 ACTIONS**

No	NCWG 3 Agenda item	NCWG3 Action	Delegate	Status at NCWG 4
3/3	3	Chair to share list of possibly required symbols for S-101 among volunteers (IT, TR, DE, FI, US-NOAA, US-NGA) and to check latest S101 data quality model is included in the list.	Chair	Ongoing
3/5	3	UK to define the freedom for using UKHO symbol sets.	UK	CLOSED at NCWG5
3/6	4.4	Secretary, Chair and IHO (Sec) to review all IHO Resolutions associated with NCWG activities with a view to cancelling them, or absorbing them into the appropriate standard.	Secretary, Chair, IHO(Sec)	In progress
3/15	7.3	NCWG reps to 'Visualization' workshop to report back to NCWG on agreed protocol for seeking advice from NCWG. This action will be completed at NCWG4	Chair, Colby Harmon,	ongoing
3/16	7.7	Chair to augment draft ENCWG T&PNM document and circulate to WG members for review	Chair	CLOSED at NCWG 5

3/21	8.5	IHO(Sec) to check the UOC concerning contour lines and advise ENCWG if there is a need for some revision.	IHO(Sec)	CLOSED at NCWG 5
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#### Retained actions from NCWG4

No	NCWG 4 Agenda item	NCWG4 Action	Delegate	Status
4/1	4.6	Discuss and agree a new S-101 symbol for QOBD (Quality of Bathymetric Data) as part of missing symbols work. Inform S-101 project team when considering alarms and indications.	Chair	ongoing
4/2	6.1B	Delegates who volunteered to write new sections for future of paper chart document to submit content to Colby Harmon by 31 <sup>st</sup> December 2018	UK, TR, ES, SE, ESRI, CO,NGA, DE, NOAA, IHO Sec	ongoing
4/3	6.6	Nations using Satellite Derived Bathymetry (SDB) should share their practices with the UK. The UK will then prepare a consolidated report to identify any common SDB practices and share their findings back to the nations using SDB. If further wording in S-4 required then submit a new paper.	UK and all members who use satellite derived bathymetry	ongoing
4/4	6.7	Considering discussions had UK to send paper NCWG4-06.7A to NIPWG	UK	completed
4/5	6.8	Considering discussions had NL to send paper NCWG4-06.8A to S100WG	NL	ongoing
4/6	6.8	Formulate S-4 wording regarding solar farms and circulate to NCWG members.	Secretary	ongoing
4/7	6.9	Draft a plan regarding pilot boarding area (and other) boundary symbols and a centralised symbol alternative if boundary symbols not permitted. Submit plan to S-100WG and ENCWG.	UK and FI	ongoing
4/8	6.10	Review S-4 guidance at B400 so that it is more product neutral. Identify areas that effect ENCs then contact AUS and member states.	Secretary	ongoing
4/9	6.12	Contact IALA to discuss FFI and draft proposal for S4 depending upon their view. Also consider S-101.	Secretary and NGA	ongoing
4/10	6.14	NCWG to offer support to review or update S-49.	Chair	ongoing

No	NCWG 4 Agenda item	NCWG4 Action	Delegate	Status
4/11	6.15	Draft S-4 amendment regarding 'Existence Doubtful' and circulate to members.	Secretary and Chair	ongoing
4/12	6.15	Chair to notify other working groups regarding change of wording in S-4 regarding 'Existence Doubtful'.	Chair	ongoing
4/13	6.16	Chair to check Hydrographic Dictionary WG and S-101WG regarding Seagrass. All nations should report any identified inconsistencies between s-4 and S101 to S-101WG.	Chair and all nations	CLOSED at NCWG5
4/14	12.1 INF1	Netherlands to draft wording for S-4 regarding swept wrecks and also consider impact on S-57.	NL	ongoing
4/15	12.2 INF2	Draft wording for S-4 regarding recommendation to issue chart correcting notice to mariners when shoaler wreck depths from snagged fishing nets are discovered. Also include need for temporary notice until nets cleared.	UK	ongoing
4/16	12.5 INF5	Further consider issue of distinguishing between obstructions and foul ground, propose changes for S-4.	FR, AU	ongoing
4/17	6.4	Chair and Secretary to draft amendments to B443 and C408.1 Submarine cables, to include reference to IHO resolution 4/1967 as well as minor changes to wording. Circulate wording to members for review.	Chair and Secretary	ongoing
4/18	7.2	INT1 SubWG to continue work with section V and confirm if it will be included in INT1.	INT1 SubWG	ongoing
4/19	7.2	UK to share any user feedback received regarding new section V in NP5011 (UK INT 1 version) to INT1 SubWG and also NOAA.	UK	ongoing
4/20	7.4	DE to report back any developments regarding volunteers to take on responsibility for English INT1 version.	DE	ongoing
4/21	12.3	If needed Germany to resubmit paper regarding chart references.	DE	CLOSED at NCWG 5
4/22	10.3	Chair NCWG to report back findings to HSSC regarding vessel incidents and 'alarm fatigue'	Chair	CLOSED at NCWG 5

## NCWG5 ACTIONS

No	NCWG5 Agenda item	NCWG5 Action	Delegate	Status
5/1	4.6	All members to consider proposal and provide feedback to DQWG.	All members	
5/2	5.1	NCWG to review terms of reference during NCWG5. UK, CA, SE, IHO Sec circulate via minutes and respond in 4-6 weeks and Chair to submit	UK, CA, SE, IHO SEC	
5/3	6.4	IHO Sec to update IHO GIS systems for region D and E limits and provide UK with amendments for S-4 clarification. (IHO Sec)	IHO SEC	
5/4	6.4	UK to update S-4 (A204.8) and diagram with footnotes and positions of limits of charting regions D and E. (UK)	SEC, UK	
5/5	6.7	NL to re-draft proposed S-4 wording for swept wrecks based upon the comments received.	NL	
5/6	6.8	IHO SEC and NCWG SEC to report back to HSSC requesting guidance on how we proceed and then liaise with NIPWG.	IHO SEC , NCWG SEC	
5/7	6.1	FOPNC sub WG to develop recommendations based upon discussions during NCWG5 meeting for inclusion in FOPNC report. Recommendations to be distributed to NCWG following timescales in FOPNC timeline.	FOPNC subWG (AU, BR, CA, DK, FI, FR, DE, IT, KR,NL, RU, SE, UK, US NGA, US NOAA, IHO Sec, ESRI, CARIS)	
5/8	6.10	Report to HSSC about WIG craft and seek guidance on WIG craft.	Chair	
5/9	6.11	UK to provide summarised comments regarding ASL in TSS and two way route symbols in ENC, to sec and Indonesia.	UK	
5/10	12.1	UK to formulate final text for S4 regarding unexploded ordnance exceptional circumstances based upon discussion had.	UK	
5/11	9.2	NCWG to review paper on Harmonised portrayal and provide comments to NCWG by end of January 2020. Chair will then send comments to group.	all	

No	NCWG5 Agenda item	NCWG5 Action	Delegate	Status
5/12	6.1d	ICA to consider paper NCWG5-06.1d Future of paper chart -a different perspective and provide feedback.	ICA	
5/13	9.3	members to review paper NCWG5-09.3A and provide feedback to DCWG via their delegate or via NCWG chair. Deadline for comments is 15 <sup>th</sup> December. If passing comments via NCWG chair please pass comments earlier.	all	
5/14	7.1	DE to provide confirmation that they will provide support for English int 1 by 2020. UK to confirm date for new edition. Aim to coordinate dates to avoid gaps.	DE, UK	
5/15	12.6	Aus to check if there is a proposal to ncsr7 to submit a new definition on back up paper charts.	AU	
5/16	12.7	KR to provide update on S-100 portrayal project	KR	

**ANNEX E****Work plan 2019-20 - Summary of progress**

(updated to 24 OCT 2019 following NCWG4 and subsequent activity)

**Tasks**

A	Maintain and extend Publication S-4 'Chart Specifications of the IHO & Regulations of the IHO for INT Charts' (IHO Task 2.2.1)
B	Maintain and extend Publication S-11 Part A 'Guidance for the Preparation and Maintenance of INT Chart schemes' (IHO Task 2.2.2)
D	Development of new (and revised) symbology (IHO Task 2.2.1)
E	Maintenance of S-4 supplementary publications INT 1, 2 & 3 (IHO Task 2.2.1)
G	Conduct meetings of NCWG (IHO Task 2.1)
H	Provide technical assistance to other IHO working groups and support regarding the implementation of S-100 (IHO Task 2.3)

**Work items**

\* Allowing for approval via HSSC (in accordance with Resolution 2/2007) before MS and publication.

No	Work item	Priority H-high M-medium L-low	Next Milestone	Start Date	End Date	Status P-Planned O-Ongoing C-Completed	Contact Person(s)	Affected Pubs/Standard	Remarks
A16	Consideration of the 'future of the paper chart'	H	<a href="#">Distribute Preliminary Report MS and conduct survey. Final report to HSSC12.</a>	2014	2020	O	Colby Harmon		CSPCWG10 Action 36 NCWG1 Action 54 Meeting following NCWG2 NCWG3 Action 12 Report at HSSC9 Report at HSSC10 <a href="#">Report at HSSC11</a> <a href="#">NCWG4 Action 4/2 - completed</a> <a href="#">Discuss at NCWG5</a>
A26	Portrayal subWG	H	Agree protocol for seeking advice from NCWG	2016		O	Chair NCWG		HSSC7 Action 18 NCWG2 Actions 5, 22, 30-32 Attendance at NIPWG Visualization workshop May 2017. NCWG3 Action 15
A28	Future of S-4		On hold, pending progress with A16			P	Chair NCWG	S-4	NCWG3 Agenda 7.4: waiting on progress with A16
A29	Consider ICPC submission on charting submarine cables taking into account deep sea mining	L	<a href="#">Amend S-4 B-443 and C-408.</a>			O	Chair NCWG	S-4	HSSC8/68 (pending submission from ICPC). ICPC unavailable for discussion at NCWG3. NCWG3 Action 19 completed: S-4 contains nothing contradictory to Res.4/1967 (as amended IHO-A1) <a href="#">NCWG4 – Action 4/17 completed. S-4 needs update.</a>

E1	Maintain official INT 1s		Publication next editions planned for 2018			O	DE: S Spohn FR: S Guillou ES: F. Yanguas	INT 1	In progress <a href="#">DE INT 1 edition 9 published August 2018</a> <a href="#">ES INT 1 edition 6 published April 2018</a> <a href="#">FR INT 1 edition 7 published in 2019</a>
E9	Develop new section V for INT1 for 'data quality'	M	Draft under consideration by INT1 subWG	2014	<a href="#">2020</a>	O	Chair NCWG INT1 subWG	INT1	CSPCWG10 Action 35 NCWG3 Agenda 11.2: Transferred to UK <a href="#">NCWG4 – Action 4/18 ongoing</a>
E10	Symbol library	L	UK to confirm freedom to use UK's symbol set	2016		O	UK (N Rodwell) US (C Harmon)	S-4, INT1	NCWG Actions 45, 46 NCWG3 Agenda 3: Not required to progress at this time.
H2	Prepare a single educative IHO authoritative document addressing the issue of "equivalent" T&Ps for ENCs, in view of its distribution to HOs, Port State Control authorities and mariners after approval.	M	Chair to circulate revised draft to WG members for comment	2016		O	NCWG Chair and ENCWG Chair	S-66 Stage 2?	HSSC8/28 NCWG3 Action 15



**Meetings** (Task G)

<b>Date</b>	<b>Location</b>	<b>Activity</b>
16-19 May 2017	Redlands, CA, USA	NCWG3
6-9 November 2018	The Hague, Netherlands	NCWG4
5-8 November 2019	Stockholm, Sweden	NCWG5

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## ANNEX F

### NAUTICAL CARTOGRAPHY WORKING GROUP (NCWG)

(Formerly the Chart Standardization and Paper Chart Working Group - CSPCWG)

#### Terms of Reference and Rules of Procedure

- Ref:
- 1) 1<sup>st</sup> HSSC Meeting (Singapore, October 2009)
  - 2) 4<sup>th</sup> HSSC Meeting (Taunton, United Kingdom, September 2012)
  - 3) 6<sup>th</sup> HSSC Meeting (Viña del Mar, Chile, November 2014) (name change only)
  - 4) 7<sup>th</sup> HSSC Meeting (Busan, Republic of Korea, November 2015)
  - 5) 8<sup>th</sup> HSSC Meeting (Monaco, November 2016) (clarification in section 4.c only)
  - 6) 9<sup>th</sup> HSSC Meeting (Ottawa, Canada, November 2017) (editorial changes, and 4.a) (iii)
  - 7) 12<sup>th</sup> HSSC Meeting (Bristol, United Kingdom, May 2020) (....

#### 1. Objectives

- a) To provide expert and authoritative advice and guidance to IHO Member States, relevant IHO bodies and non-IHO entities on the concepts of nautical cartography, including
  - (i) The definition and the construction of digital chart content for the optimal and efficient production and maintenance of nautical chart products (S-57 ENCs, S-101 ENCs, paper charts meeting IHO standards if needed)
  - ~~(i) Its application to nautical charts existing in any physical or digital form;~~
  - (ii) The development of specifications for symbolization of any data required to be displayed on nautical charts from ENC on ECDIS (S-57 based, S-100 based, dual-fuel) and on paper charts meeting IHO standards if needed
  - (iii) The interoperable integration of the nautical chart and other cartographic nautical products for e-Navigation in support of the S-100 implementation roadmap. This includes resolving portrayal issues related to the simultaneous display of a nautical chart in combination with navigational information and non-navigational information within an integrated navigation system.
- b) To provide expertise to the International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) on the standards of competence for cartographers when deemed necessary.
- c) To monitor the development of other relevant international standards.
- d) The primary support compiling the rules to be used by nautical cartographers in their decision-making process for creating chart content is S-4.

#### 2. Authority

This WG is a subsidiary of the Hydrographic Services and Standards Committee (HSSC). Its work is subject to HSSC approval.

#### 3. Composition and Chairmanship

- a) The WG shall comprise representatives of IHO Member States (MS), Expert

Contributors (EC), observers from accredited Non-Governmental International Organizations (NGIO), and a representative of the IHO Secretariat. A membership list shall be maintained and posted on the IHO website.

- b) The Chair will monitor membership to ensure that each Regional Hydrographic Commission is invited to be represented on the WG.
- c) EC membership is open to entities and organizations that can provide a relevant and constructive contribution to the work of the WG.
- d) The Chair and Vice-Chair shall each be a representative of a MS. The election of the Chair and Vice-Chair shall be decided at the first meeting after each ordinary session of the Assembly and shall be determined by vote of the MS present and voting.
- e) A Secretary should be appointed to ensure the smooth running of WG business; to administer consultation and collation of members' views; and may act as Editor of the WG's publications. The position is normally filled by a member of the WG.
- f) If the Chair is unable to carry out the duties of the office, the Vice-Chair shall act as the Chair with the same powers and duties. If the position of Chair or Vice-Chair becomes vacant during the period between two ordinary sessions of the Assembly an election should be conducted at the next meeting of the Working Group or by correspondence.
- g) ECs shall seek approval of membership from the Chair.
- h) EC membership may be withdrawn in the event that a majority of the MS represented in the WG agrees that an EC's continued participation is irrelevant or unconstructive to the work of the WG.
- i) All members shall inform the Chair in advance of their intention to attend meetings of the WG.
- j) In the event that a large number of EC members seek to attend a meeting, the Chair may restrict attendance by inviting ECs to act through one or more collective representatives.

#### 4. Procedures

~~a) The WG's main tasks are listed at (1) above and are amplified here:~~

~~(i) Keep under continuous review the IHO publication S-4 'Regulations of the IHO for International (INT) Charts and Chart Specifications of the IHO', in order to advise the HSSC on their updating, design and format and the portrayal of symbols. Note: S-4 is supplemented by:~~

~~INT 1 'Symbols, Abbreviations and Terms used on Charts'~~

~~INT 2 'Borders, Graduation, Grids and Linear Scales'~~

~~INT 3 'Use of Symbols and Abbreviations'~~

~~These supplementary documents are maintained by individual MS, under the supervision of NCWG.~~

~~(ii) Advise the HSSC on suggestions put forward by MS to update S-4, in accordance with IHO Specification B-160, with the goal of achieving the maximum possible adherence by MS to the Regulations and Specifications.~~

- ~~(iii) — Keep under continuous review S-11 Part A ‘Guidance for the Preparation and Maintenance of International (INT) Chart and ENC Schemes’ in order to advise the HSSC on its updating.~~
  - ~~(iv) — Advise the IHO Secretariat and Regional Hydrographic Commissions, as appropriate, on the work of International Charting Coordination Working Groups (ICCWG) or Regional Charting Groups (RCG) in order to promote the production of international (INT) charts.~~
  - ~~(v) — Offer advice based on the WG experience to ICCWG/RCG and individual MS, on chart schemes and cartographic work, in order to strongly encourage adherence to IHO charting specifications.~~
- b) The WG should work by correspondence, teleconferences, group meetings, workshops or symposia. The WG should meet about once a year. When meetings are scheduled, and in order to allow any WG submissions and reports to be submitted to HSSC on time, WG meetings should not normally occur later than nine weeks before a meeting of the HSSC.
  - c) Decisions should generally be made by consensus. If votes are required on issues or to endorse proposals presented to the WG, only MS may cast a vote. Votes at meetings shall be on the basis of one vote per MS represented at the meeting. Votes by correspondence shall be on the basis of one vote per responding MS represented in the WG.
  - d) The date and venue of group meetings shall normally be announced by the Chair at least six months in advance.
  - e) The draft record of meetings shall be distributed by the Chair (or the secretary) within six weeks of the end of meetings and participants’ comments should be returned within three weeks of the date of despatch. Final minutes of meetings should be posted on the IHO website within three months after a meeting.
  - f) Sub-working groups and project teams may be created by the WG or proposed to HSSC to undertake detailed work on specific topics. The terms of reference and rules of procedure of the sub-working groups and project teams are determined or proposed by the WG as appropriate.
  - g) The WG will maintain close liaison with other HSSC WGs, particularly the ENCWG, NIPWG and S-100WG, and other groups developing and maintaining S-100 based products. The WG should liaise also with other IHO bodies, international organizations and industry, as appropriate and as instructed by HSSC.
  - h) The WG should prepare annually a report on its activities and a rolling two-year work plan, including expected time frame.

**ANNEX G****LIST OF ACRONYMS AND ABBREVIATIONS USED AT NCWG5**

<b>AU</b>	Australia
<b>BR</b>	Brazil
<b>CATZOC</b>	Category of Zone of Confidence
<b>CL</b>	Circular Letter (of IHO)
<b>CO</b>	Colombia
<b>CSPCWG</b>	Chart Standardization and Paper Chart WG (of HSSC)
<b>DE</b>	Germany
<b>DK</b>	Denmark
<b>doc</b>	NCWG4 document or paper associated with the meeting
<b>DQ</b>	Data quality
<b>DQWG</b>	Data Quality Working Group (of HSSC)
<b>E110</b>	IALA standard for rhythmic characters of lights on aids to navigation
<b>ECDIS</b>	Electronic Chart Display and Information System
<b>ED</b>	Existence Doubtful
<b>EN</b>	Explanatory note
<b>ENC</b>	Electronic Navigational Chart
<b>ENCWG</b>	Electronic Navigational Chart Working Group (of HSSC)
<b>ES</b>	Spain
<b>ESRI</b>	Environmental Systems Research Institute
<b>FI</b>	Finland
<b>FOPNC</b>	Future of Nautical Paper Chart
<b>FR</b>	France
<b>HAT</b>	Highest astronomical tide
<b>HDWG</b>	Hydrographic Dictionary Working Group (of HSSC)
<b>HO</b>	Hydrographic Office
<b>HQ</b>	Headquarters
<b>HSSC</b>	Hydrographic Services and Standards Committee (of IHO)
<b>IALA</b>	International Association of Lighthouse Authorities

<b>IBSC</b>	The FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers
<b>ICA</b>	International Cartographic Association
<b>ICPC</b>	International Cables Protection Committee
<b>ID</b>	Indonesia
<b>IHA</b>	International Hydrographic Assembly
<b>IHO</b>	International Hydrographic Organization
<b>IHO(Sec)</b>	Secretariat of the IHO (based in Monaco)
<b>IHO(TSSO)</b>	Technical Standards Support Office of the IHO
<b>IMO</b>	International Maritime Organization
<b>IN</b>	India
<b>INF</b>	Information paper associated with the meeting
<b>INT</b>	International
<b>INT1</b>	Symbols, Abbreviations, Terms used on Charts
<b>INT3</b>	Use of Symbols and Abbreviations - standard reference chart
<b>IRCC</b>	Inter-Regional Coordination Committee
<b>JP</b>	Japan
<b>MARPOL</b>	International Convention for the Prevention of Pollution from Ships (MARPOL)
<b>M_QUAL</b>	Quality of data
<b>MS</b>	Member State (of IHO)
<b>NCWG</b>	Nautical Cartography Working Group (of HSSC)
<b>NGA</b>	National Geospatial-Intelligence Agency (US)
<b>NIPWG</b>	Nautical Information Provision Working Group (of HSSC)
<b>NL</b>	Netherlands
<b>NO</b>	Norway
<b>NOAA</b>	National Oceanic and Atmospheric Administration (US)
<b>NM</b>	Notice to Mariners
<b>NP 5011</b>	Nautical Publication 5011, symbols and abbreviations used on Admiralty paper charts, published by UK.
<b>OEMs</b>	Original equipment manufacturers for ECDIS
<b>PDF</b>	Portable document format

<b>(P)NM</b>	Preliminary Notice to Mariners
<b>PPT</b>	Microsoft PowerPoint
<b>PSC</b>	Port State Control
<b>Res.</b>	Resolution (of the IHO)
<b>Rev</b>	Revision (of a paper)
<b>S-4</b>	Chart Specifications of the IHO and Regulations for International (INT) Charts
<b>S-11</b>	Guidance for the Preparation and Maintenance of International Chart Schemes and Catalogue of International (INT) Charts
<b>S-32</b>	Hydrographic Dictionary
<b>S-52</b>	Specifications for Chart Content and Display Aspects of ECDIS
<b>S-57</b>	IHO Transfer Standard for Digital Hydrographic Data
<b>S-100</b>	IHO Geospatial Standard for Hydrographic data
<b>S-100WG</b>	S-100 Working Group (of HSSC)
<b>S-101</b>	ENC Product Specification
<b>S-122</b>	Marine Protected Area Specification
<b>SCAMIN</b>	The SCAMIN value of an object determines the display scale below which the object is no longer visible on an Electronic Chart Display and Information System (ECDIS).
<b>SE</b>	Sweden
<b>Sec</b>	Secretary
<b>SOLAS</b>	The international convention for Safety of Life at Sea
<b>SubWG</b>	Sub-working group (of relevant HSSC WG)
<b>T&amp;P</b>	Temporary and Preliminary (NMs)
<b>TIF</b>	Tagged Image File
<b>(T)NM</b>	Temporary Notice to Mariners
<b>TOR</b>	Terms of Reference
<b>UK</b>	United Kingdom of Great Britain and Northern Ireland
<b>UOC</b>	Use of Object Catalogue for ENC
<b>US</b>	United States of America
<b>WIG</b>	Wing in Ground
<b>WG</b>	Working Group (of IHO)