

3rd MEETING OF THE IHO COUNCIL

Monaco, 15-17 October 2019



REPORT OF THE 11th MEETING OF THE IHO HYDROGRAPHIC SERVICES AND STANDARDS COMMITTEE

REPORT OF THE IHO HYDROGRAPHIC SERVICES AND STANDARDS COMMITTEE TO THE 3RD MEETING OF THE IHO COUNCIL¹

Reference: *IHO Circular Letter 32/2019 dated 27 June – Call for approval of the revision of IHO Resolution 2/2007*

Annexes

- A. *List of Decisions and Actions from C-2 affecting HSSC*
- B. *List of Decisions and Actions of HSSC-11*
- C. *HSSC Letter 02/2019 dated 31st March 2019 – HSSC Comments on the IHO Future Strategic Plan drafted by SPRWG*

Introduction

1. The 11th Hydrographic Services and Standards Committee (HSSC) meeting took place from 6 to 9 May 2019 in Cape Town, South Africa, as announced by the IHO CL 57/2018.

The meeting was guided by HSSC main principles dealing with the promotion and the coordination of the development of standards, specifications and guidelines for official products and services in order to meet hydrographic information requirements for mariners and other users.

As consequence of the inputs from C-2 (see Annex A), the 11th Edition of HSSC was characterized by two main levels of discussion:

- An operational/strategic level, with the following topics being examined:
 - a) The final remarks of the Resolution 2/2007 as amended (Action C2/13)
 - b) The revised Strategic Plan (Action C2/40)
 - c) The S-100 Implementation Strategy (Action C2/31)
 - d) The future of paper nautical charts (HSSC11-05.4B)
- A technical level, with progresses in the development of the S-1xx Product Specifications (PSs) framework and their operationalization in accordance with the S-100 concept.

The list of Decision and Actions of the HSSC-11 is at Annex B.

Technical Programme Coordination

2. This document reports on the progress of the on-going implementation of the IHO Work Programme for 2019-2020 that takes into account HSSC Work Plan inputs provided by WGs/PTs Chairs during the meeting (C2/15 IHO Work Programme 2).

The HSSC Inputs to the IHO Work Programme 2021-2023 will be submitted to C-3

Difficulties and challenges yet to be addressed

3. There are no significant changes to the difficulties and challenges reported to C-2. Most of the actions agreed in May 2018 at HSSC-10 progressed successfully.

¹ See Action C2/17 that states “Considering the timelines between HSSC-11 and IRCC-11 meetings in 2019 and the countdown for submission of reports and proposals to C-3, the Council invited HSSC and IRCC Chairs to prepare their 2019 meeting minutes with the view that they will be used/submitted directly as reports and proposals to be considered at C-3”.

Thanks to the consolidated new approach to the development of the new PSs described with the Resolution 2/2007 as amended, the issue of PSs Edition 1.0.0 significantly accelerated (Action C2/11). As consequence, WGs, PTs and the Committee, benefited from the renewed autonomy and flexibility.

Achievements/outputs/conclusions

Progress made on revising the Resolution 2/2007

4. HSSC endorsed the final consolidated version of the IHO Resolution 2/2007 and reviewed its appendixes.

The Resolution 2/2007 as amended (see Annex A to IHO CL 32/2019 in Reference) is structured as follows:

- A main body describing the updated revised review cycle for working groups and project teams for the development phase of Product Specifications and Standards;
- Two Appendixes listing the Standards that have to be maintained in conformance with the IHO Resolution 2/2007 as amended;
- A third Appendix which provides guidance for conducting stakeholders impact study (see Action C2/12);
- Substantial editorial changes to align the Resolution with HSSC and IRCC new TORs and ROPs (IHO CL 02/2019 refers) were also made.

During HSSC-11 it was noted that, as expected, the Resolution 2/2007 as amended, not only will facilitate the working groups and project teams work in developing S-100 based products speeding up the development phase, but it will also enable IHO to maintain a high level of control on changes to standards and specifications. In addition, the authority of the two main Committees of the IHO (HSSC and IRCC) is preserved and consolidated.

As the Resolution 2/2007 is now applying also to IRCC publications, the HSSC final proposal was submitted to IRCC-11 and finally endorsed (see IRCC-11 Decision 32). Consequently, the approval phase by Member States has been launched (See IHO CL 32/2019 in Reference). Noting that the deadline for response is 15 September 2019, a report on the outcome of the approval phase is planned to be given at C-3.

Organization of a demonstration showcase of S-100 based products at C-3

5. HSSC considered and endorsed the possibility to organize a demonstration showcase of S-100 based products and test beds as an embedded session at C-3 in October 2019 (see Action C2/29).

The demonstration showcase structure was discussed during HSSC-11 starting with an HSSC Chair initial proposal. Member States (MS) volunteered to provide expertise, test data and examples, following the lead of the S-100 WG Chair that will also act as contributions collector. It was also agreed that the showcase should follow an “educational narrative” with the main aim to help the HOs to support and follow S-1xx framework concept development towards its operational phase.

HSSC-11 agreed that the showcase should highlight the front-of-bridge/back-of-bridge requirements. About this argument that many implication in the development of S-1xx framework, HSSC-11 will report during C-3 seeking for IHO Secretariat involvement with IMO.

The Committee agreed about the general need to work in connection with IRCC, especially concerning the production and dissemination of S-1xx PS and the role of RENCs. It is hoped that the demonstration showcase as structured could reach a larger audience during a dedicated presentation at the Assembly.

HSSC Chair invited Member States to provide to KHOA with S-100 based products test datasets to be visualized on the new Test Bed Platform that will be used for the showcase.

Progress on Development of an implementation strategy aiming to the regular and harmonized production and dissemination of S-100 based products for further discussion at A-2 and for the preparation of the 2021-2023 IHO Work Programme

6. C-2 had tasked the Secretary General (SG), and the Chairs of the Council, HSSC and IRCC to prepare an “S-100 Implementation Strategy” (Action C2/31).

Last March, IHO Secretariat provided a “Draft Skeleton” of the “Implementation Strategy” as first base to work on. HSSC contribution is one of the four main components of the document which are strongly correlated and influenced with each other’s. As the HSSC is a technical nature Committee, its contribution focuses on the state of the art of the standards and their implementation procedure.

HSSC Chair and WGs/PTs Chairs first inputs on the S-100 Implementation Strategy were presented during HSSC-11 in a dedicated presentation. Moreover, additional papers submitted for HSSC consideration, stimulated the discussion during the meeting. The development of an S-100 Implementation Strategy is part of a wider approach including the transition to the S-100 Universal Model. HSSC-11 highlighted that the strategy should be approached through a top-down analysis starting from the Strategic Plan to create the general concept of interoperability flow, and then the implementation of the catalogue of the interoperability rules.

HSSC-11 agreed that when S-100 Implementation Strategy will be finalized as an official IHO document, S-100WG will consider submitting a proposal by which this Strategy supersedes the S-100 Master Plan.

HSSC Chair provided the HSSC contribution in terms of a draft “*Roadmap for the Implementation of S-100 products/services*” to the Secretary-General, Council and IRCC Chairs.

HSSC-11 noted that the handover point between HSSC and IRCC responsibilities should be well defined. This topic was also discussed during IRCC-11. In addition, noting the IRCC proposal to develop WEND-like principles, HSSC Chair suggested at IRCC-11 that the WENDWG should be tasked to investigate the possibility to extend the WENDWG scope to S-101 ENCs and other S-100 based products.

Progress on revision of the IHO Strategic Plan

7. Following Council decision C2/40, a provisional list of Strategic Targets (ST) and Strategic Performance Indicators (SPI) was proposed by the Strategic Plan Review Working Group (SPRWG) for consideration by HSSC-11, in order to provide feedback on their possible implementation in the future.

HSSC Chair provided the HSSC WGs Chairs with an input paper pointing out the “*HSSC relevant elements of the Future IHO Strategic Plan*” drafted by the SPRWG in March. This paper was circulated by e-mail amongst the WGs/PTs Chairs in order to evaluate the list of ST and SPI proposed by the SPRWG, and to analyse the possible impact on the implementation of the HSSC Work Programme.

The Strategic Plan outlines the IHO mission, vision and high-level Goals for the next six years. It also takes into account how to measure the Goals (SPI) and the major projects in order to meet the ST. Considering that the implementation of the IHO Strategic Plan should focus on those Strategic Targets achievement, undertaken in conformance with the SPI, these Targets should be as “measurable” as possible. Therefore, quantifiable SPI would give a precise indication to implement the Strategic Plan, making the strategic vision a tangible reality.

Current work is on track in accordance with the HSSC Work Plan 2020. All HSSC action items are scheduled, already completed or ongoing. HSSC is ready to harmonize its Work Programme in accordance with the final version of the IHO Strategic Plan.

HSSC Chair, supported by HSSC WGs/PTs Chairs, provided the SPRWG Chair with an input paper on the Future Strategic Plan (see Annex D).

Determination of responsibility for product specification portrayal among HSSC WGs

8. HSSC-11 discussed the responsibility of portrayal and S100WG, ENCWG, NCWG, and NIPWG will develop a harmonized portrayal process for the draft S-98 (Data Product Interoperability in S-100 Navigation Systems).
9. Following the DQWG input paper (HSSC11-05.5B), HSSC-11 discussed the development of a new methodology for the portrayal of the quality of bathymetric data. Actually, current CATZOC symbology is still needed for overall spatial awareness and new symbols should be provided to be used in S-101. In fact, the transition from S-57 to S-101 opens new opportunities to provide better mechanism to the mariners to support decision making and improving safe navigation. This new methodology could also build a bridge from existing S-57 ENCs to S-101 ENCs to autonomous shipping.
10. HSSC-11 commented the DQWG for the work carried out on the development of the conditional visualization methodology of quality of bathymetric data and encouraged this development to be pursued in liaison with S-100WG Chair, NCWG, NIPWG, ENCWG, S-101PT, involving if possible, academia, training centres, expert contributors and industry partners (for testing and implementation experimentations)

Future of Paper Charts

11. Sales and use of paper nautical charts is declining while the use of electronic navigational charts (ENCs) is increasing. During HSSC-11 the final stage of the document “Future of Paper Charts” drafted by NCWG was discussed.

In addition, supplementary papers were provided by Member States about this topic. HSSC Chair summed up these inputs with a dedicated matrix of options highlighting the responses received before HSSC-11.

HSSC-11 noted that in order to gather further information from IHO Member States about the production of paper charts, NCWG prepared a dedicated survey that was sent to IHO MS through a Circular Letter (CL 29/2019 refers). HSSC11 endorsed the way forward proposed for finalizing the NCWG report. Member States will be asked to provide additional observations to NCWG on the preliminary report on the Future of the Paper Chart, as well as on the proposed survey.

HSSC-11 agreed that the automated production of paper charts from ENCs will be discussed during HSSC-12 by the lead of NCWG.

Moreover, HSSC-11 noted the following arguments of interest of IRCC/C-3/IHO Secretariat:

- Automated production of Paper Charts from ENCs;
- ENC regulation framework guidance from IMO;
- Front/back bridge requirements;
- Further Focus on ENCs as the preferred charting products of the IHO and Hydrographic Offices.

Develop and incorporate architectural vision of S-100 products and ECDIS into S-98

12. The S-100WG was tasked to consider how to incorporate generic interoperability between S-100 based products in correlation with Action C2/31, also requiring a strategy for the implementation of S-100 based products to be developed.

Actions taken on the priorities of IHO 2019 Work Plan 2

13. HSSC11 approved the amendments proposed by the HSSC WGs/PTs Chairs to their Work Plans that constitute HSSC contribution to IHO Work Programme (see Action C2/54).

In order to continue to monitor activities the notional S-100 Timeline for Product Specifications was updated by S-100WG in accordance with HSSC11 outcomes.

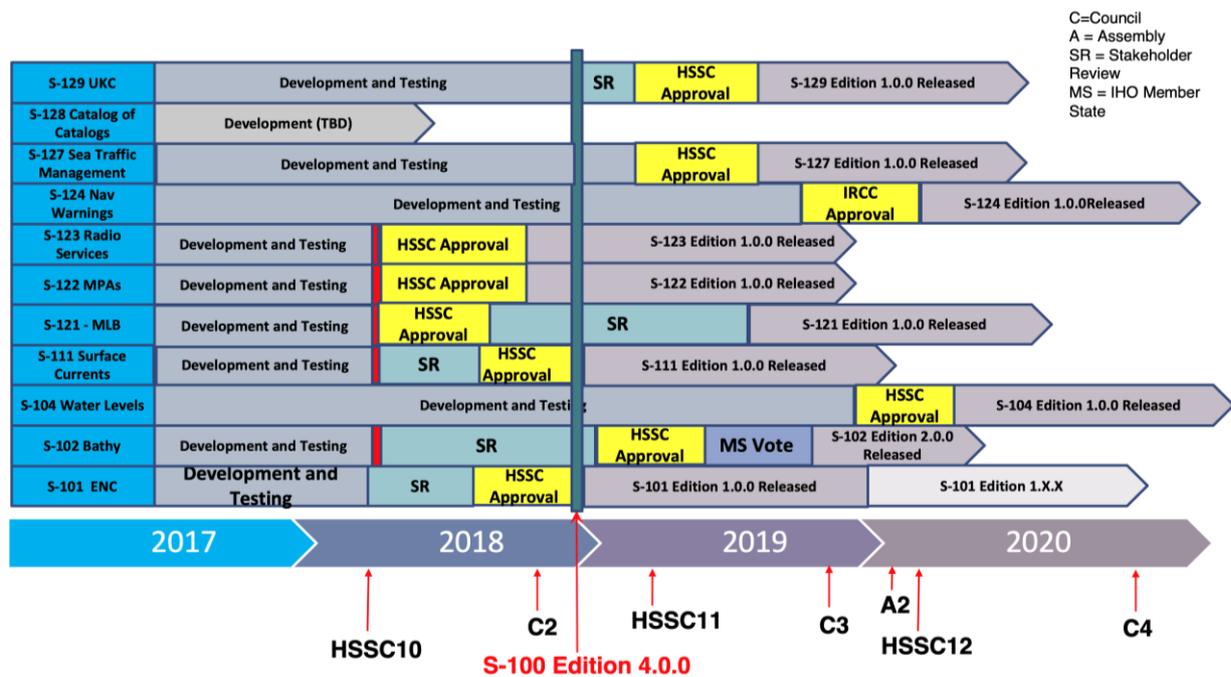


Figure 1- S-100 Timeline for Product Specifications

14. HSSC endorsed S-102 Ed. 2.0.0. IHO Secretariat will issue a CL to IHO Member States seeking for approval on Ed. 2.0.0 of S-102.
15. HSSC noted the proposed deadline for S-100 Edition 5.0.0 publication date to be 2021. In addition, HSSC11 tasked the HSSC WGs to consider earlier Editions of their S-1xx product specifications to be aligned with S-100 Ed. 4.0.0.
16. HSSC approved Edition 1.0.0 of S-97 according to the updated revised review cycle for working groups and project teams for the development phase of Product Specifications and Standards. It was also noted that additional editing is needed as part of the process to prepare Ed. 2.0.0.
 HSSC-11 tasked S-100 WG to incorporate the concept of “Technical Readiness Levels into S-97 Ed. 2.0.0. This topic was proposed by US as part of the Implementation Strategy (see Figure 2).
17. HSSC approved Ed.1.0.0 of S-127 for testing and experimentation according to the updated revised review cycle for working groups and project teams for the development phase of Product Specifications and Standards.
18. HSSC agreed on the renaming of S-100 based products under the remit of NIPWG as follows:
 - S-122 (Marine Protected Area)
 - S-123 (Marine Radio Services)
 - S-125 (Marine Navigational Services)
 - S-126 (Marine Physical Environment)
 - S-127 (Marine Traffic Management)
 - S-128 (Catalogue of Nautical Products)
19. HSSC Chair agreed to seek the agreement of IRCC for a survey to be managed by NIPWG, seeking information from Member States to indicate their intention to produce S-122 and S-123 data sets in the future.
20. HSSC approved S-129 Edition 1.0.0 for publication under the updated revised review cycle for working groups and project teams for the development phase of Product Specifications and Standards. S-129 will be tested and implemented.
21. HSSC agreed to allocate to the WMO, S-413 to Weather and Waves Conditions and S-414 to Weather and Waves Observations.
22. HSSC endorsed the concept of S-100 Technical Readiness Level (TRL) (see HSSC11-05.1D).

The concept of TRL was first developed by NASA to manage technology development and describe the progression of an idea from the research stage to where the idea has become a product in regular use. The following table lists shows the prerequisite components that have to meet each S-100 Readiness Level (5 Levels). In particular, it is required that all S-100 based product specifications conform to S-100 and both the Feature Catalogue and the Portrayal Catalogue must use the published S-100 infrastructure and process for creation and maintenance.

Required product specification component	(TRL5) Level 1 v1.0.0	(TRL6) Level 2 v1-2.0.0	(TRL7) Level 3 >v2.0.0	(TRL8) Level 4 >v2.0.0	(TRL9) Level 5 >v2.0.0
Main Document (Defines the relevant parts of S-100 that are required for the product specification)	X	X	X	X	X
A Default Encoding	X	X	X	X	X
S-100 Compliant Feature Catalogue	X	X	X	X	X
<i>DCEG</i>	X	X	X	X	X
S-100 Compliant Portrayal Catalogue NOTE: Not every specification will need a portrayal catalogue – this should be determined as part of the development process and stakeholder feedback		X	X	X	X
Data Quality Checks		X	X	X	X
Test Data Sets		X	X	X	X
<i>Data Validation (and test datasets)</i>		X	X	X	X
Exchange Catalogue		X	X	X	X
Encryption / Digital Signatures			X	X	X
Interoperability				X	X ¹
Alerts and Indications				X	X ¹
Operational data					X

Figure 2 - S-100 Readiness Level prerequisite components

Introducing the concept of S100 Readiness Levels into the PSs definition and rollout phases will provide the IHO and the broader community of product specification developers and implementers with a clear picture of what is required for implementation and operational use of a product developed under the S-100 framework

23. HSSC noted and commented the work done in the development of S-32 IHO Hydrographic Dictionary (HD). The HD and the IHO GI Registry will share the same management system, use the same metadata and will be enriched and maintained by using the same procedure. A lot of language improvements have been achieved. A new HDWG template will be used by the others HSSC WGs/PTs when submitting new terms. Noting the progress made with the Chinese, Indonesian versions and the intention to develop the Arabic version, the Member States were invited to develop their National variants that will be made available on the IHO website, as well as the HD members were invited to act as HDWG (and GI Registry) ambassadors in the RHCs.

24. HSSC noted the report by the Tide, Water Level and Current Working Group (TWCWG) and endorsed the proposed new IHO Resolution on Standard for Digital Tide and Tidal Current Tables and requested the IHO Secretariat to issue a CL to IHO Member States seeking for approval. (CL 31/2019 refers). HSSC encouraged the IHO Member States to consider participating in the tidal data archaeology project led by the TWCWG.

25. *Develop an S-100 interoperability Specification*

S-100WG is pursuing the development of Ed. 1.0.0 of S-98 as part of the S-100 Implementation Strategy with the aim to submit Ed. 1.0.0 for endorsement in 2020/2021.

The stake of interoperability has to be focused on enabling a harmonized display of information coming from different S-100 products. This is a fundamental goal to reach in e-navigation context. The development of interoperability specification S-98 is still in progress.

HSSC-11 agreed to organize a S-100 Test Strategy Meeting (TSM) in liaison with IEC to develop Ed.1.0.0 of S-98. As agreed during HSSC-11, in that occasion TSM will pursue the following task:

- to produce a functional analysis of related products from the point of view of the mariner, which may involve the mapping of data flow through related products, the definition of the architecture of S-100 products and their use cases;
- to define the operating principles governing S-100 ECDIS, including principles of interoperability;
- to check that the development achievement of S-100 products and S-98 is consistent with the overall vision of the implementation strategy of S-100. Concepts should be proven by test beds.

26. *Develop all the components needed to make S-101 a reality*

HSSC-11 agreed that the first revision Ed. 1.1.0 of S-101 is expected in December 2020. The plan for a S-101 Edition 1.1.0 is based on remaining action items deemed resolvable within the next calendar year as well as any feedback from initial industry implementation efforts.

HSSC-11 noted that the planned publication timeframe for Edition 2.0.0 is December 2022. The S-101 components for Encryption and Alerts and Indications are planned to be fully developed. The S-101 Full Test Data Sets for Type Approval are planned to be partially completed (see Figure 3).

Components	Edition 1.0.0 (2018)	Edition 1.X.X(2019)	Edition 2.0.0 (2022)
Main Documentation	✓	✓	✓
Feature Catalogue	✓	✓	✓
Portrayal Catalogue	Partial	✓	✓
Validation	Partial	✓	✓
Data Classification and Encoding Guide	✓	✓	✓
Encoding Format	✓	✓	✓
Encryption		✓	✓
Alerts and Indications		✓	✓
Full Test Data Sets for Type approval		Partial	✓
Notes	Portrayal will be limited to S-52 rules translated to LUA (SRL =1)	Edition 1.X.X refines all the additional rules (SRL =2-3)	Operational Edition (SRL =4)

*Figure 3 – S-101 way forward***27. Develop S-121 Product Spec for Maritime Limits and Boundaries**

HSSC encouraged the S-121PT, under the management of the S-100WG Chair, to pursue the development of Ed. 1.0.0. of S-121 in accordance with HSSC Rules of Procedures and IHO Resolution 2/2007 and make it available for testing and experimentation when appropriate.

HSSC encouraged IHO Member States to participate in the S-100 WG review process of S-121.

28. Consolidation and clarification of standards in relation to ECDIS/ENC

ENCWG is still working to identify the individual components in S-57 (file, size, etc.) that prevent ENC producers from providing High Density (HD) contour lines. In order to produce and maintain high density ENCs, ENCWG drafted a HD ENC production and maintenance guidance as a new annex to S-65. The Annex will be reviewed at the ENCWG4 meeting and if endorsed it will be added to S-65 to create a new edition of the document that in the specific case do not need the HSSC endorsement.

HSSC endorsed the proposed revision to the S-57 UOC, which includes improvements on S-57 UOC encoding guidance with the aim to enhance ENC display and assist transition to S-101.

HSSC endorsed the proposed clarifications for the S-52, S-63 and S-64 standards for publication.

In accordance with HSSC10 decisions, ENCWG liaised with CIRM and IEC on the need for updating S-63 for improved security for investigations and risk assessment. In particular, some technical issues presented to CIRM ECDIS WG will require a new edition of S-63 IHO Data Protection Scheme addressing Cyber Security concerns.

HSSC tasked ENCWG to develop a draft proposal for mitigation measures for cyber security in collaboration with the CIRM Cyber Risk Management WG/IEC and make an impact assessment and further investigations. Subsequently, HSSC will consider the need for updating S-63.

HSSC-11 instructed the IHO Secretariat to inform the IHO Member States that S-58 test dataset is now available in a web-based hosting service (GitHub), easily accessible and regularly maintained.

ENCWG Reported that 38% ENCs commercially available still have CATZOC U and urged to review their current ENC production processes and make changes where necessary to encode meaningful values of CATZOC. HSSC-11 agreed to inform the IRCC in order to encourage HOs to review the current ENC production process, making changes where necessary to encode meaningful values of CATZOC.

29. Consider data quality aspects in an appropriate and harmonized way for all S-100 based Product Specification

HSSC approved the proposed amendment to the DQWG TORs, so the DQWG can also support IRCC WGs and Sub-Committees (MSIDWG, S-124PT, CSBWG for instance) on request.

DQWG activity covered the following data quality aspects:

- Review of S-100 based product specifications for DQ aspects;
- Development and maintenance of a data quality checklist for product specification developers (S-97 – part C Data Quality - DQ Guideline);
- Monitoring of ISO and other international standards regarding DQ and advising the S-100WG accordingly;
- Providing guidance on DQ aspects to HOs in particular to ensure harmonized implementation.

30. Prepare Ed. 6.0.0 of S-44

HSPT is finalizing the drafting process of Edition 6.0.0 of S-44. HSSC agreed on the recommendation made by HSPT that the final draft version 1.x.x of the 6th Edition of S-44 should be circulated to all stakeholders, prior to submission for endorsement to HSSC-12. HSPT will submit final proposed

version 2.0.0 of 6th Edition of S-44 to HSSC for endorsement, with the aim to submit it for approval to IHO Member States for approval by July 2020.

HSPT submitted a proposal to become a WG. This proposal will be taken into consideration after the 6th Edition is submitted at the next HSSC meeting, in accordance with the current HSPT TORs.

31. *Develop initial guidance on definition and harmonization of Maritime Services in context of e-navigation*

HSSC tasked the responsible HSSC WGs to review the initial descriptions of “Maritime Services in context of e-navigation”, as renamed by IMO/ IHO Harmonization Group on Data Modelling, and to provide them to NIPWG for further action if appropriate. It also invited the IRCC/WWNWS-SC to provide their contribution.

HSSC11 noted the responsibilities of Maritime Services relevant to IHO. In particular:

- WWNWS-CG → No. 5 - Maritime Safety Information Service (MSI);
- NCWG, ENCWG → No. 11 - Nautical Chart Service;
- NIPWG → No. 12 - Nautical Publications Service;
- TWCWG → No. 15 - Real-time hydrographic and environmental information Service.

NIPWG will continue to coordinate the provision of the Maritime Services descriptions under IHO remit.

HSSC11 suggested to IHO Secretariat to develop an appropriate presentation of e-Navigation information on the IHO website including the place of the IMO Maritime Service Template

In addition, NIPWG Chair reported on the activities of the NIPWG including the outcomes of a workshop on XML NtMs.

HSSC endorsed the proposed amendments to Resolution 7/2009 about “Time reference”. The IHO Secretariat has issued IHO CL 25/2019 seeking IHO Member States’ approval on the new amendments on IHO Resolution 7/2009.

32. *Comments on the Proposals submitted to the consideration of the Council*

The HSSC-11 meeting was characterized by two levels of discussion: an operational/strategic level and a technical level. This new dual role results from Council guidance through C-2 Decisions and Actions and represents an added value, allowing WGs/PTs to have a wider view and prospective in relation with their efforts in the transforming navigation. As result, it should be highlighted the great achievements in the field of Product Specifications development.

HSSC work proceeds regularly in line with the Council priorities and the timeline of the Work Program. HSSC is also ready to update its Work Program as soon as the future IHO Revised Strategic Plan is approved.

Actions required of the Council

The Council is invited to:

- a) Note the Report
- b) Assess the recommendations of the HSSC on the Performance Indicators to be established in accordance with the proposed Revised Strategic Plan
- c) Provide initial guidance if any, on the preparation of the final recommendations on the Future of the Paper Nautical Chart, taking into account the preliminary report of the NCWG, Action HSSC11/47 and the survey in progress (IHO CL 29/2019)
- d) Discuss at the S-1xx showcase the various options to be considered in the future for the use of S-xx products together with S-101 in navigation systems (front-of-bridge versus back-of-bridge concepts, S-xx updates, data flow, governance, etc.).

- e) Take note of the efforts made by HSSC in contributing to the development of the S-100 Implementation Strategy.
- f) Take any other action as it may consider appropriate