2nd meeting of the HSSC Project Team on Standards for Hydrographic Surveys (HSPT2)

3 - 6 July 2018, Niterói, Brazil

(Paragraph numbering is the same as the Agenda Item numbering and does not necessarily reflect the order in which matters were discussed.)

1. Opening

Captain Sebastião Simoēs de Oliveira, Director Brazilian Navy Hydrographic Centre, welcomed the participants on behalf of Vice-Admiral Antonio Fernando Garcez Faria, the Brazilian National Hydrographer. He noted the large challenge set to the HSPT and wished every success during the meeting.

The Chair, M Christophe Vrignaud, welcomed all participants and thanked them for coming to the 2nd meeting of the IHO HSSC Project Team for Hydrographic Surveys (HSPT2). He thanked the Directorate of Hydrography and Navigation (DHN) for hosting the meeting. He noted the large amount of work to be addressed during the meeting. The vice-Chair noted how pleased DHN was to host the meeting and hoped it would be successful.

The IHO provided some comments and observations on the tasks set by HSSC, these included some from the Chair HSSC and some guidance on the way to address the tasks set.

2. Administrative Arrangements

The Chair provided details of the programme for the meeting and how he wished to proceed, particularly, that he requested the participants to remain focused only on the desired output for the meeting.

3. Introduction of participants

All participants introduced themselves and provided brief details of their background and organizational interest in the HSPT work.

Apologies were received from Germany, Republic of Korea, Norway, Argans, IFHS, FIG Commission 4 WG4.1 University of Gothenburg and University of Southern Mississippi.

The agenda was approved.

4. Review of action list from HSPT1 and outcomes from HSSC9 and HSSC10

The Chair provided a short brief on the work undertaken since the HSPT1, including highlighting the ten identified Limitations of S-44 and potential ways to approach and make improvements. He noted the development of the spreadsheet, which had been circulated to HSPT members, and invited them to populate the spreadsheets with information on how to address the identified Limitations and to provide draft wording for inclusion in S-44. He thanked BRA/PRT/CAN for the work undertaken on the Matrix approach proposals, after HSPT1. The Chair highlighted the outcomes of HSSC9 and HSSC10 and the resultant decisions and actions on the HSPT. He provided brief comments on the Customer Requirements Survey questionnaire and he thanked IFHS and FIG Commission for their work on the analysis of the responses received. He noted that over 500 responses had been received, which made the data significant.

The Chair outlined the proposed way he wished to approach the meeting. He noted his intention to divide the document for discussion in breakout sessions. He highlighted his proposed programme and timing. He underlined key objectives for the future version of S-44: "make it simple, practical and usable". The IHO representative noted the direction and guidance given to the Chair by the HSSC, also asked participants to consider to which chapters they felt most able to contribute and whether to volunteer to lead the drafting effort.

5. Presentations

AUS provided a presentation overview on the identified Limitations and the inputs received to populate the spreadsheet as well information taken from the questionnaire. He discussed each Limitation and the information provided with the potential solutions to address the Limitations. The Chair noted the discussions with the Chair DQWG with respect to CATZOC and their relationship with S-44 standards. NOAA asked if any other Limitations had been identified, the Chair noted that none had been proposed yet, although the list of ten should not be seen as exhaustive. It was suggested that the Annexes should be removed and noted to HSSC that the information should be included in a revised C-13 (one of the limitations identified), which should be a major task for a new WG.

See https://www.iho.int/mtg_docs/com_wg/HSSC/HSPT/HSPT2/HSPT2.htm for the presentation.zip for pdf versions for all presentations.

6. Review of Customer Requirements Survey

Undertaken in the Chair overview, agenda item 4.

7. Key Discussions

The participants discussed the previously identified Limitations of S-44, providing further details and potential solutions to mitigate the Limitations.

i. Limitation 1 (updated Table 1 or Matrix Approach)

BRA, CAN and PRT introduced their work on development of Table 1, displaying the three options which they had been generated: making minor adjustments to the current Table 1, full matrix version and matrix version with modified current Table 1. This generated wide ranging discussion and numerous questions and comments. The Chair highlighted the importance of backward compatibility for any proposed version of the Table. It was agreed that it was important the document should be downloadable for use off-line with a print capability of selected sections. BRA noted that the document needed to be useable by all member states, regardless of their capability and development. SWE suggested having the capability to add more restrictive criteria in the future without having to completely regenerate the Table to accommodate future changes. The Chair summarised that the participants agreed that the Matrix approach was the preferred option. NOAA highlighted how HSSC9 had received the future capability of the matrix. IHO highlighted the importance of providing a quality standards for datasets, rather than indicating for what the data can be used, which is the end user's assessment based on the data standards and the associated metadata provided by the relevant HO. NOAA suggested not confining to current capabilities but to allow for future methods of generating data which could be considerably more restrictive. FRA underlined the importance of retaining Table 1 with the matrix approach so as to keep the safety of navigation standards more obvious. It was agreed to follow the Matrix approach, it was identified that the contents of the table and whether some form of the current Table 1 needed to be

maintained, and remain totally dedicated for Safety of Navigation. BRA, CAN, PRT, iXblue and Fugro agreed to progress the matrix development.

ii. Limitation 2 (difficulty to have an overview of all requirements)
FRA suggested adding additional criteria to the table such as depth classification, current measurements and sea floor characteristics (already mandatory, for specific areas, in S-44 5th Ed.). AUS suggesting adding some S-101 attributes to establish the relationship with S-101 CATZOC; it was noted that many of the attributes did not have associated values yet. It was suggested The Data Quality Working Group (DQWG) be approach to clarify which attributes were mandatory. **Action Chair** The Chair noted that this Limitation was directly linked to Limitation 1, as it would require the addition of new criteria.

iii. Limitation 3 (Limited number of definitions)
The Chair highlighted comments provided by SHOM and BSH. This generated a number of comments on the way the uncertainty was expressed and its definition. The Chair confirmed it should be always at the 95% level. AML indicated they could assist with checking and potentially harmonizing the definition using the ISO22013 or VIM definition. **Action AML**

iv. Limitation 4 (Misalignement with CATZOC)
The Chair indicated that the solution should be generated by the HSPT, potentially inserting values into the matrix, as suggested by the DQWG and S-101WG; it was noted that the DQWG had informed HSPT that no CATZOC modification will be considered by S-100 WG. The Chair asked whether the CATZOC values should be used in the matrix, NGA suggested avoiding using values from particular products in the matrix, which could generate artificial constraints. BRA suggested appropriate descriptions could be included in the text to help identify the relationship between the standards and CATZOC. SWE highlighted that the CATZOC was not simply the data quality but included how the data was used to create the chart. BRA suggested that the S-44 standards should directly influence CATZOC values. NGA recommended that there had to be an understandable correlation, although it may not be appropriate to include actual CATZOC values into the matrix. NOAA highlighted that work is being undertaken to revise the CATZOC values, thus it would not be appropriate to include values. The Chair highlighted the different formula used in CATZOC and S-44 for TVU and thus developing a direct relationship would be problematic. CAN suggested developing a descriptive relationship rather than a numeric correlation. NGA suggested that it was not necessary to create a direct relationship. ITA suggested it could be possible to articulate a relationship. NGA, AUS, CAN and BRA agreed to progress the task to generate a CATZOC correlation, if assessed as achievable, for discussion at HSPT3. **Action AUS/BRA/CAN/NGA** NGA noted that more clarification of the S-101 CATZOC was required.

v. Limitation 5 (grid resolution and bathymetric surfaces not addressed)
NOAA explained that the Lidar community was a main driver behind the idea of addressing bathymetric surfaces and gridded data. The Chair noted the relationship between resolution and criteria. It was suggested that gridded data was a product and therefore it may be inappropriate for inclusion in S-44. IHO noted that not all standards needed to be inserted into the matrix, standards could be described without a numeric value. SWE noted that current S-44 was focused on point data rather than bathymetric surfaces. AUS noted that the standards need to address the minimum values to generate a surface. SWE highlighted that the gridded surface was a product and therefore not appropriate for inclusion, however NOAA noted that Lidar data was based on a grid in which a minimum number of

observations needed to be obtained to generate the necessary data density. Fugro noted that MBES, Lidar and SDB generate data from a point grid/cloud. NGA suggested whether it would be appropriate to include details on grid sizes in some part of the document. NOAA indicated that it could be appropriate to include details on various grid sizes related to feature detection, AML suggested an Annex including best practice advice might be appropriate. The Chair suggested there was a need to included values for point cloud density in the matrix, instead of surface values, which referred to a product. NGA suggested this was in reality a grid and therefore the type of grid needed to be defined. NOAA, AUS, PRT and Fugro agreed to progress on gridded data and points cloud density values. SWE noted that during development of the 5th Edition the idea of focusing on gridded data was rejected as being exclusive of limited capability and developing organizations. It was agreed that it was appropriate to include standards and values for both point data and grid/cloud data. NOAA noted that grid definition was used to determine a criteria for how many points in a grid cell. NOAA agreed to invite CCOM-JHC to participate. NOAA explained what criteria were being discussed and described.

vi. Limitation 6 (Confusion between a-priori TPU and a-posteriori qualification)
The Chair introduced the issues relevant to the use of the S-44 standards for a-priori TPU and a-posteriori Qualification. AUS highlighted the comments received from OMC and FRA noted the comments made by SHOM. NLD with FRA/PRT/BRA agreed to progress this Limitation. AUS displayed the comments received with respect to Limitation 7, which generated numerous additional comments and questions. BRA suggested explanation and guidance should be included in the revised document to assist potential users to understand the rationale behind the changes and the way it is intended the standards should be used. SWE noted that currently there is no account taken of the temporal and spatial variations, nor any standard or direction on how to report them. IHO cautioned against including guidance on methodology back into the S-44, particularly having decided at HSPT1 to remove all guidance from the standards and insert in C-13 at its next revision. It was noted that the information contained in the Annexes required to be revised, even though it was recognised that they would be moved to C-13 at the next revision. The Chair noted that some reference would be needed to guide users to the relevant section of C-13.

vii. Limitation 7 (S-44 should remain technology neutral)
NLD questioned how the standards can be made use independent. The Chair noted that it had been decided maintain the connection with safety of navigation through the retention of the current Table 1 with a new table matrix which opens up the standards to other uses. Fugro agreed to check the document for sections which appeared to be focused on a particular technique or methodology. **Action Fugro**
AUS and Fugro suggested the inclusion of guidelines on how to achieve the required TPU which would be applicable to various technologies and methodologies. It was noted that the current version of S-44 had been written with certain technologies and methodologies in mind.

viii. Limitation 8 (Metadata)
AUS noted that this had not been included in the survey, however it was felt that for higher specification surveys it would be appropriate to include minimum metadata requirements. AUS with Furgo/iXblue/FRA agreed to progress this issue.

ix. Limitation 9 (Outdated Chapters)
It was agreed this would be progressed during the drafting process.

x. Limitation 10 (Annexe A and B could be placed in C-13)
It was noted the Annexes needed to be revised, even though they could be moved to C-13 at a later stage. NLD/FRA/iXblue/CCOM-JHC/CAN/NAVO/BRA/AML/PRT agreed to work on this task.

IHO recommended that the headline titles of the chapters/sections were decided prior to breaking out, the first stage could be to decide what would be the basic contents of each section then achieve a group confirmation before actually starting to draft the contents. NGA noted that it would be necessary to confirm the contents of the matrix before starting the drafting as the matrix content would drive the chapter/section contents, as the current Table 1 does for the current edition.

Matrix Construction

NOAA introduced the various options for the design of the matrix to gain consensus on which format should be used. It was agreed that the rows and columns should be labelled for ease of reference of each cell. It was agreed that the measured criteria should be grouped for ease of use. The issue of whether the most demanding criteria should be in the left column or in the right column initiated wide ranging discussions and comments. It was agreed that the criteria for the previous Orders should be highlighted in the matrix for ease of use in achieving backward compatibility (as a reference to Table 1). It was agreed finally that the matrix should be constructed with more demanding criteria in the right hand columns, which would allow new more demanding criteria to be added in the future. It was also agreed that new criteria could be added as additional rows at the bottom.

The Chair introduced the task of identifying the categories for which measurements and accuracies should be obtained. It was noted that values for each cell would be included at a later stage. The following were identified as potential criteria:

THU (m)
TVU (m)
Full Seafloor Search Overlap between swath/line spacing
Feature Detection Cubic features (edge size)
Image resolution (backscatter, sidescan unit to be defined)

Positioning of Fixed Aids (m)
Mean position of floating aids
Positioning of the Coastline and topography (m)
Seafloor characterization (samples/NM/square)

Structure Height/Clearance (m)
Point Cloud Grid resolution (m)
Point Cloud Density (pts/m2) or number of points (pts)
Survey Data Grid Resolution (m2)
Grid Source Sounding Density (pts/bin)
Bathymetric surface Grid Resolution (m)
Bathymetric surface soundings density per node/cell/pixels (95%)
Seismic penetration (m)
Sedimentological characterization (on granulometry)
Seabed dynamics – temporal variation of seafloor topography
Metadata
Tidal and Water levels
Tidal stream and currents

Water column
Uncertainty of elevations (m)
Magnetometer (teslas)
Angular measurements

The participants divided into groups to further address the Limitations and the matrix. One group addressed the Matrix, including the relationship between the matrix and CATZOC, and another group addressed the issue of a-priori TPU and a-posteriori Qualification.
The Chair provided a summary update of the work achieved during the first two days, including highlighting the objectives on which the HSPT needs to remain focused. He explained the way he wished the remaining time would be used, with the main focus being on starting the drafting task on the chapters to support the now defined matrix format and categories.

Wide ranging discussion on scope of what the standards needed to cover – solely focused on safety of navigation or have the ability to be used for a broader scope of applications. It was agreed that the focus should be on HYDROGRAPHIC Surveys to include wider hydrographic needs and the wider hydrographic community. It was also agreed that the main use should remain for safety of navigation and protection of the marine environment without being exclusive.

The participants reviewed the chapter titles and considered alternatives; the proposed titles were agreed as:

Preface
Introduction
Glossary
Acronyms
Chapter 1 – Classification of Surveys
Chapter 2 – Horizontal and Vertical Positioning
Chapter 3 – Depths
Chapter 4 – Features and Nature of the bottom
Chapter 5 – Tides, Water Levels and Currents
Chapter 6 – Topographic Surveys
Chapter 7 – Metadata
Chapter 8 – Table 1 and Matrix
Annex A – Quality Control
Annex B – Data Processing
Annex C – Grid Considerations

NLD suggested to include at the beginning of the S-44, an explanation highlighting the main changes from the 5th Ed (e.g. the Matrix approach).

The following agreed to be chapter leads (in bold) to coordinate the drafting of revisions:

Glossary/Acronyms – **AML**/GER/Argans/FRA
Chapter 1 – **CAN**/PRT/ITA/GBR
Chapter 2 – **NOAA**/NLD/SWE
Chapter 3 – **BRA**/PRT/SWE
Chapter 4 – **NGA**/iXblue/Fugro
Chapter 5 – **iXblue**/Fugro/NLD/NAVO/CAN
Chapter 6 – **SWE**/CAN
Chapter 7 – **AUS**/iXblue/Fugro/FRA
Chapter 8 – **CAN**/BRA/NGA/Fugro/iXblue/GBR
Annexes A & B – **NLD**/FRA/iXblue/CCOM-JHC/CAN/NAVO/BRA/AML/PRT
Annex C – **NAVO**/NOAA/PRT/AUS/CCOM-JHC/Furgo/BRA/SWE

Fugro agreed to undertake the overall check to ensure the final revised draft document was technology and methodology neutral.
AML agreed to undertake the overall check to ensure the final revised draft document used properly the vocabulary defined in the Glossary.

IHO suggested a methodology to undertake the revision and the process and cycle times. It was agreed that three iterations could be achieved by the end of 2018 with the following time frame:

Version 1.0 of individual chapters circulated to HSPT by 14 September;
Comments back to chapter leads by 28 September;
Version 2.0 of individual chapters circulated to HSPT by 2 November;
Comments back to chapter leads by 16 November; and
Version 3.0 of individual chapters to coordinating Editor by 21 December.
Consolidated version 1.0 of draft revised S-44 for circulation to HSPT by 25 January;
Comments back to Coordinating Editors by 15 February; and
Consolidated version 2.0 of draft revised S-44 for circulation and discussion at HSPT3 by 1 March.

It was agreed that responses should be provided within a two weeks period. Each chapter version should circulated to all members of the HSPT. **Action All**

The participants divided into small breakout groups to progress the initial drafting task. At the end of the day, each chapter leader provided a short report on the progress achieved as well as highlighting any significant challenges to be addressed prior to completing the version 1.0 of their chapter.

8. Review of ToRs

The IHO displayed the current ToRs. It was agreed that no amendments were necessary at this time.

9. Any other Business

Potential Tasks for an HSWG

The Chair introduced proposals for potential tasks to be undertaken:

a. Maintenance of S-44;
b. Updating and maintaining C-13;
c. Maintain close liaison with DQWG;
d. Lead the Translation task of S-44 into more languages (only English, French, Spanish and Portuguese currently available for the 5th Edition);
e. Increase education on use of S-44 and generate a supporting document to articulate best practice guidance;
f. Identifying new systems, technologies and methodologies and exchanging experiences, best practice and challenges; and
g. Act as focal point for industry engagement with the IHO.

IHO explained the administrative process which would need to be followed. AML agreed that there was a need for a revised C-13, particularly with the number of sections of S-44 which have been identified to be moved into C-13. It was agreed there was a need to maintain S-44 and update periodically. NLD suggested a formal periodic review cycle should be agreed with

HSSC. It was suggested attendance at DQWG meetings would be of benefit and all were encouraged to attend their meetings. AUS suggested a new HSWG could be the focal point for industry engagement with the IHO. It was noted that translations would need to be undertaken by individual states, which subsequently could be adopted as official translations. BRA suggested there should be a document articulating best practice on applying the S-44 standards. PRT suggested that the contents of C-13 and S-44 also need to consider and harmonized with the S-5. The Chair suggested further discussion at HSPT3, IHO agreed to provide draft HSWG ToRs for discussion at HSPT3, see Annex E. **Action IHO**

10. Work Plans

The IHO displayed the draft work programme for 2019-2020 which had been prepared in advance of the meeting and amended with the Chair to reflect discussion and progress during this meeting, Annex F. It was noted that further revision would be necessary to reflect progress at the next meeting, HSPT3, before it was submitted to HSSC11 for approval. **Action Chair/IHO**

11. Draft report to HSSC11 / Draft Agenda for HSPT3

The IHO, the Chair and the Vice-Chair would prepare the final report to HSSC11 using the format required by HSSC. The Chair noted the main items he anticipated would be included in his report to HSSC11. He noted all the reports and presentation given to HSSC are available from the website. He noted that the reports and presentations were an overview of activities. Representation of HSPT at the HSSC11 meeting would be discussed between the Chair and the Vice-Chair. **Action IHO, Chair & vice-Chair**

12. Venue and dates of the 3rd HSPT Meeting and intersessional activities

It was agreed there would be a necessity to hold a further meeting once the initial drafts of the individual sections had been circulated and initial analysis had been conducted of the additional inputs and comments. It was agreed 12-15 March 2019 was a suitable period and Australia offered to host the meeting in Wollongong. **Action AUS/IHO** It was note that this was before HSSC11, at which the Chair would need to report on intersessional activities as well as the outcomes of the HSPT3 meeting and progress on the revision of S-44. It was suggested that HSSC11 may wish to informally circulate the draft version of S-44 for wider member state and stakeholder comment, in which case a 4th meeting, HSPT4, would be necessary to review the comments and inputs received. NOAA agreed to investigate whether there might be an opportunity to hold a meeting in Silver Springs in late November/early December 2019 to prepare the final draft 6th Edition, prior to formal presentation to HSSC, Council and IHO Member States. **Action NOAA** The Chair highlighted the proposed schedule for the revision and presentation to HSSC, Council and IHO Member States through 2019 into 2020. SWE requested a copy of the draft HSPT3 agenda be included as an annex to the invitation letter to assist with travel applications.

13. Review of Action List and draft agenda for HSPT3

A draft list of Action Items from the meeting were reviewed and agreed. All Action Items are marked in this report and are collected together at Annex D. It should be noted that the list of action items does **NOT** include tasks that are in the HSPT Work Plan. An updated list of the Action Items will be maintained on the HSPT web page and all those who have actions to complete should keep the IHO and Chair informed of any progress. **Action ALL.**

It was agreed that the IHO would circulate a draft meeting report to all attendees by 13 July. **Action IHO.** Participants were requested to provide any comments by 27 July. **Action ALL.** It was intended the final meeting report would be published by 10 August. **Action IHO**

The Chair requested IHO to generate a draft Agenda and include as Annex G to the report. The draft Agenda may require further amendment following the outcome of HSSC11.

14. Closing remarks

The Chair provided an overview summary of the three days, highlighting the topics and issues which had been discussed, he noted the amount of progress achieved. He particularly thanked DHN for hosting the meeting and the excellent facilities provided. The Chair thanked everyone for coming to the meeting and for the effort and enthusiasm towards the task; he wished them a safe journey home and looked forward to seeing them at HSPT3. BRA noted a change of representation on the HSPT, providing the contact details of the two new officers.

The meeting closed at 1030.

The following Annexes are attached:

A. HSPT2 – List of Participants.
B. HSPT2 – Agenda
C. HSPT2 – List of Documents
D. HSPT2 – List of Actions
E. HSPT2 – Draft ToRs and RoPs for HSWG
F. HSPT2 – Draft Work Plan 2019-2020
G. HSPT2 – Draft Agenda for HSPT3

2nd meeting of the IHO HSSC Project Team on Standards for Hydrographic Surveys
List of Participants HSPT2

Member State	Organization	Name	E-mail
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Brazil	DHN	Anderson Peçanha	a.pecanha@marinha.mil.br
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Expert Contributor	Fugro	Hugh Parker	h.parker@fugro.com

2ND MEETING OF THE IHO HSSC PROJECT TEAM ON STANDARDS FOR HYDROGRAPHIC SURVEYS (HSPT2)
Niterói, Brazil, 3 - 6 July 2018

1. Welcome and opening remarks by the Chair.
2. Domestic and administrative arrangements (*Host*/*Secretary*).
3. Introduction of participants, apologies and approval of agenda.
4. Review of action items from HSPT1 and HSSC9 and HSSC10.
5. Presentations – Member State activities, Limitations spreadsheet progress.
6. Review of Customer Requirements Survey questionnaire replies and analysis.
7. Key topics for discussion, to be included whilst addressing identified limitations and during drafting breakouts:
   .1 Scope of task, divide publication into chapters for drafting review;
   .2 New data types/sources;
   .3 Format of next edition and initial draft wording.
8. Review of ToRs and RoPs.
9. Any other business.
10. Work Plan 2019-2020.
11. Considerations for items to be included in the Chair's Report to HSSC11.
12. Date and venue of next meeting – HSPT3 – and intersessional activities.
13. Review of Action List and draft agenda for HSPT3.
14. Closing remarks by Chair.

HSPT2 - List of Documents

Document No	Document Title
HSPT2-Invitation	Invitation letter
HSPT2-Logistics	Logistic Information
HSPT2-Registration	Registration Form (pdf version)
HSPT2-Registration	Registration Form (Word version)
HSPT2	Provisional List of Participants
HSPT2-3	HSPT2 Draft Agenda-v4.0
HSPT2-3	HSPT2 Draft Programme-v3.0
HSPT2-4.1	List of Actions HSPT1 - updated 26 June 2018
HSPT2-4.2	Extract from HSSC9 Final report
HSPT2-4.3	Relevant HSSC9 List of Actions
HSPT2-4.4	Extract from HSSC10 draft report
HSPT2-4.5	Relevant HSSC10 List of Actions
HSPT2-5	Presentations.zip
HSPT2-5	S-44 Edition 5 Template for Proposed Changes-v1.0
HSPT2-5	S-44 Limitaions.zip
HSPT2-6	Customer Requirements Survey questionnaire replies and analysis - IFHS
HSPT2-7	Draft Revised Annex A - Shom
HSPT2-8	ToRs and RoPs
HSPT2-10	Work Plan 2019-2020 Draft
HSPT2-13	HSPT3 Draft agenda

LIST OF ACTIONS – Updated 10 August 2018

Agenda Item	Subject	Status/Date	Comments	Action
HSPT2				
7ii	Limitation 2	HSPT3	Clarify with Chair DQWG which attributes in S-101 and S-57 CATZOC were mandatory with respect to S-44	Chair
7iii	Limitation 3	HSPT3	Check and potentially harmonizing the definition of Uncertainty using the ISO22013 definition	AML
7iv	Limitation 4	HSPT3	Generate a CATZOC correlation, if assessed as achievable, for discussion at HSPT3	AUS/BRA/CAN/ NGA
7vii	Limitation 7	HSPT3	Check revised version to ensure technology neutral	Fugro
7	S-44 revision	14 Sep	Circulate version 1 of individual chapters to HSPT for comment	Chapter leads
7	S-44 revision	28 Sep	Provide feedback to chapter leads	All
7	S-44 revision	2 Nov	Circulate version 2 of individual chapters to HSPT for comment	Chapter leads
7	S-44 revision	16 Nov	Provide feedback to chapter leads	All
7	S-44 revision	21 Dec	Provide version 3 of individual chapters to Coordinating Editors	Chapter leads
7	S-44 revision	25 Jan	Circulate consolidated version 1 of draft revised S-44 to HSPT for comments	Editors
7	S-44 revision	15 Feb	Provide feedback on consolidated draft to Coordinating Editors	All
7	S-44 revision	1 Mar	Circulate consolidated version 2 of draft revised S-44 for discussion at HSPT3	Editors
~~9.1~~	~~AOB~~	~~HSPT3~~ Complete	~~Generate draft ToRs for proposed new HSWG~~	~~IHO~~
10	Work Plan	HSSC11	Update Work Plan to reflect progress intersessionally and at HSPT3	Chair/IHO
11	Report to HSSC11	8 Mar	Draft report for review and amendment by Chair and vice-Chair	IHO
11	Report to HSSC11	29 Mar	Submission of final version to HSSC	Chair/IHO Vice-Chair

12	HSPT3 venue and dates	30 Aug	Circulate an initial letter of invitation	IHO/AUS
12	HSPT4	HSPT3	Investigate opportunity to host meeting late November/early December	NOAA
13	Action List	HSPT2	Keep IHO informed of progress with allocated actions	All
~~13~~	~~HSPT2 Draft Report~~	~~13 Jul~~ Complete	~~Draft to be circulated for comment~~	~~IHO~~
~~13~~	~~HSPT2 Draft Report~~	~~27 Jul~~ Complete	~~All to provide comments on draft report to IHO~~	~~All~~
~~13~~	~~HSPT2 Final Report~~	~~10 Aug~~ Complete	~~Publish final report~~	~~IHO~~

TERMS OF REFERENCE
OF THE
~~IHO PROJECT TEAM ON STANDARDS FOR~~ HYDROGRAPHIC SURVEYS ~~(HS PT)~~
WORKING GROUP (HSWG)
~~November 2016~~

Reference: 8th meeting of the HSSC, Monaco, November 2016
9th meeting of HSSC, Canada, November 2017

1. Introduction

The International Hydrographic Organization (IHO) is an intergovernmental consultative and technical organization that was established in 1921 to support safety of navigation and the protection of the marine environment. The objectives of the IHO are:

a. Promote the use of hydrography for the safety of navigation and all other marine purposes and to raise global awareness of the importance of hydrography;

b. Improve global coverage, availability and quality of hydrographic data, information, products and services and to facilitate access to such data, information, products and services;

c. Improve global hydrographic capability, capacity, training, science and techniques;

d. Establish and enhance the development of international standards for hydrographic data, information, products, services and techniques and to achieve the greatest possible uniformity in the use of these standards;

e. Provide authoritative and timely guidance on all hydrographic matters to States and international organizations;

f. Facilitate coordination of hydrographic activities among its Member States; and

g. Enhance cooperation on hydrographic activities among States on a regional basis.

At the 5th meeting of the IHO Hydrographic Services and Standards Committee (HSSC5 meeting it was noted that after the restructuring of the HSSC Working Groups, there was not a single WG focused on hydrographic surveying. At HSSC8 a Project Team on Standards for Hydrographic Surveys (HSPT) was established to review IHO publication S-44 – *Standards for Hydrographic Surveys* – with the task of preparing a draft 6th Edition. In addition the HSPT was tasked to submit a proposal and recommendation on whether the HSPT should continue as standing working group with details of appropriate tasks for the proposed working group to undertake.

At HSSCx it was agreed that there was a need for a standing working group, a Hydrographic Surveys Working Group (HSWG), whose focus should be on all aspects related to the conduct of hydrographic surveys and the maintenance of relevant IHO publications.

~~S-44 provides minimum standards for the execution of hydrographic surveys for the collection of data which will primarily be used to compile navigational charts to be used for the safety of surface navigation and the protection of the marine environment. It therefore needs to be reviewed on a periodical basis in order to take account of the developments in requirements~~

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~~and in surveying equipment and procedures. The following note is taken from the Preface to the 5th Edition (2008) of S-44:~~
~~"*Finally it was the view of the WG that S-44 provides "Standards for Hydrographic Surveys" and that it is the responsibility of individual Hydrographic Offices / Organizations to prepare "Specifications" based on these Standards. Specifications will be more system specific and as such will be quite dynamic as systems change.*"~~

2. Objective

~~To maintain IHO standards which apply to hydrographic surveys: to prepare a draft 6th Edition of IHO publication S-44 – *Standards for Hydrographic Surveys* for approval by IHO Member States (MS).~~

~~When undertaking this task the Project Team (PT) should consider, as a minimum, the following matters, in support of safety of navigation data products and services:~~

~~(i) Review the existing edition of S-44 (5th edition) and identify any deficiencies in either the standards or explanatory content;~~

~~(ii) Following review, update the content and structure of S-44 to the extent identified during the review, with the intention of publishing revisions as a 6th edition of S-44;~~

~~(iii) On completion of publication of a 6th edition of S-44, submit a proposal and recommendation to the Hydrographic Services and Standards Committee (HSSC) on whether the PT should continue as a standing working group and, if so, what tasks have been identified to justify transition to a standing working group.~~

a. To maintain IHO publication S-44 – *Standards for Hydrographic Surveys* – preparing and proposing revisions and amendments to reflect changes in the demands of hydrographic data users, particularly those pertaining to data quality and standards;
b. Maintain IHO publication C-13 – *IHO Manual on Hydrography* - to reflect current techniques, methodologies and survey systems, in particular to ensure harmonization with the standards articulated in S-44;
c. Lead the translation task for S-44 and C-13 to enable their widest possible application and use;
d. Maintain close liaison with other HSSC working groups, in particular the work of the Data Quality Working Group (DQWG) and the presentation/visualization of nautical data to the maritime customer;
e. Lead the education on the use of S-44 and develop supporting documentation to articulate best practice guidance on the application of the standards contained in S-44;
f. Identify new systems, technologies and methodologies and exchange experiences, best practice and challenges amongst member states in line with the IHO objectives; and
g. Act as a focal point for industry engagement with the IHO.

3. Authority

This ~~PT~~ WG is subordinate to~~a subsidiary of~~ the HSSC. Its work is subject to HSSC approval.

4. Composition and Chairmanship

a) The ~~PT~~ HSWG shall comprise representatives of IHO 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.

Last updated: ~~6 July 2018~~

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b) EC membership is open to entities and organizations that can provide a relevant and constructive contribution to the work of the ~~PT~~HSWG.

c) The Chair and Vice-Chair shall be a representative of a MS. The election of the Chair and Vice-Chair shall be decided at the first meeting after each Assembly and shall be determined by vote of the Members present and voting.

d) If a Secretary is required it should normally be drawn from a Member of the ~~PT~~HSWG.

e) If the Chair is unable to carry out the duties of the office, the Vice-Chair shall assume the Chair with the same powers and duties.

f) ECs shall seek approval of membership from the Chair.

g) EC membership may be withdrawn in the event that a majority of the Members represented in the ~~PT~~ HSWG agrees that an EC's continued participation is irrelevant or unconstructive to the work of the ~~PT~~HSWG.

h) All Members shall inform the Chair in advance of their intention to attend meetings of the ~~PT~~HSWG.

i) 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.

5. Procedures

a) The ~~PT~~ HSWG should work by correspondence, teleconferences, group meetings, workshops or symposia. The ~~PT~~ HSWG should meet about once a year. When meetings are scheduled, and in order to allow any ~~PT~~ HSWG submissions and reports to be submitted to HSSC on time, ~~PT~~ HSWG meetings should not normally occur later than nine weeks before a meeting of the HSSC.

b) Decisions should generally be made by consensus. If votes are required on issues or to endorse proposals presented to the ~~PT~~HSWG, only Members may cast a vote. Votes at meetings shall be on the basis of one vote per Member represented at the meeting. Votes by correspondence shall be on the basis of one vote per Member represented in the ~~PT~~HSWG.

c) The ~~PT~~ HSWG should liaise with other IHO bodies, international organizations and industry to ensure the relevance of its work and timely notice of changes to the standards.

d) The ~~PT~~ HSWG should report to HSSC on its activities and submit a rolling two-year work plan, including expected time frame.

STANDARDS for HYDROGRAPHIC SURVEYS PROJECT TEAM (HS PT) WORK PLAN 2019-20

Tasks

A	Review the existing edition of S-44 (5th edition) and identify any deficiencies in either the standards or explanatory content.
B	Identify Orders of Surveys (in terms of horizontal and vertical uncertainty requirements, feature detection requirements, and statistical confidence levels), which are required to meet certain user requirements, noting that user requirements include, but are not limited to, the differing levels of CATZOC (S-57) / Quality of Bathymetric Data (S-10X).
C	Define, if and as appropriate, a relationship between survey orders in the IHO S-44 Publication and CATZOC used in S-57 ENC and Quality of Bathymetric Data in S-101 ENC.
D	Following review, update the content and structure of S-44 to the extent identified during the review, with the intention of publishing revisions as a sixth edition of S-44.
E	Identify any other emergent requirements not addressed within the scope of tasks A to D, and develop a proposal and recommendations on whether the Hydrographic Survey Project Team should close, continue working on specific tasks, or be migrated to a standing Working Group with an expanded Work Plan.
F	On completion of publication of a sixth edition of S-44, submit a proposal and recommendation to HSSC on whether the Project Team should continue as a standing Working Group and, if so, what tasks have been identified to justify transition to a standing Working Group.

Work items

Work item	Title	Priority H-high M-medium L-low	Next milestone	Start Date	End Date	Status P-planned O-ongoing C-completed S-Superseded	Contact Person(s)	Related Pubs / Standard	Remarks
A-1	Review the existing edition of S-44 (5th edition) and identify any deficiencies in either the standards or explanatory content.	H	HSSC 9	2016	~~2017~~ 2018	~~P~~ ~~C~~ ~~O~~ C	Chair	S-44 Edition 5	
B-1	Identify Orders of Surveys (in terms of horizontal and vertical uncertainty requirements, feature detection requirements, and statistical confidence levels), which are required to meet certain user requirements, noting that user requirements include, but are not limited to, the differing levels of CATZOC (S-57) / Quality of Bathymetric Data (S-10X).	H	HSSC ~~10~~ 11	2017	~~2018~~ 2019	~~P~~ O	Chair / MS	S-44 Edition 5 S-57	
C-1	Define, if and as appropriate, a relationship between survey orders in the IHO S-44 Publication and CATZOC used in S-57 ENC and Quality of Bathymetric Data in S-101 ENC.	M	HSSC ~~9 & 10~~ 11	2017 2018	2018 2019	~~P~~ O O	MS / Experts	S-44 Edition 5 S-57 S-101	
C-2	Define, if and as appropriate, a relationship between survey orders in the IHO S-44 Publication and S-5 in order to mitigate the human element factor.	M	HSSC ~~9 & 10~~ 11	2017 2018	2018 2019	~~P~~ O O	MS / Experts	S-44 Edition 5 S-5	

Work item	Title	Priority H-high M-medium L-low	Next milestone	Start Date	End Date	Status P-planned O-ongoing C-completed S-Superseded	Contact Person(s)	Related Pubs / Standard	Remarks
D.1	Following review, update the content and structure of S-44 to the extent identified during the review, with the intention of publishing revisions as a sixth edition of S-44.	H	HSSC ~~10~~ 11	2018	~~2019~~ 2020	~~P~~ O	MS / Experts / IHO Bodies	S-44 Edition 5	
E-1	Identify any other emergent requirements not addressed within the scope of tasks A to D, and develop a proposal and recommendations on whether the Hydrographic Survey Project Team should close, continue working on specific tasks, or be migrated to a standing Working Group with an expanded Work plan.	H	HSSC ~~10~~ 11	2018	2019	~~P~~ O	Chair / MS	C-13	
F-1	On completion of publication of a sixth edition of S-44, submit a proposal and recommendation to HSSC on whether the Project Team should continue as a standing Working Group and, if so, what tasks have been identified to justify transition to a standing Working Group.	H	HSSC ~~9 & 10~~ 11	2017	2019	~~P~~ O	MS/HSSC Bodies	C-13	
G-2	Start the discussion on the way forward.	H	HSSC 10 & 11	2018	2019	~~P~~ O	MS/HSSC		

Meetings

Date	Location	Activity
20-22 June 2017	Paris, France	HSPT1

3-6 July 2018	Niterói, Brazil	HSPT2
12-15 March 2019	Wollongong, Australia	HSPT3

PT Chair: Christophe Vrignaud Email: christophe.vrignaud@shom.fr
PT Vice Chair: Nickolás de Andrade Roscher Email: nickolas.roscher@dhn.mar.mil.br
PT Secretary: David Wyatt Email: adso@iho.int

3RD MEETING OF THE IHO HSSC PROJECT TEAM ON STANDARDS FOR HYDROGRAPHIC SURVEYS (HSPT3)

Wollongong, Australia, 12 - 15 March 2019

1. Welcome and opening remarks by the Chair.
2. Domestic and administrative arrangements (*Host*/*Secretary*).
3. Introduction of participants, apologies and approval of agenda.
4. Review of action items from HSPT2.
5. Presentations – Member State activities.
6. Review of progress on draft revision of S-44 with Coordinating Editors' comments and assessment of next actions.
7. Key topics for discussion, to be included whilst addressing review of raft individual chapters and during drafting breakouts:
   .1 Scope of tasks still to be addresses during drafting review;
   .2 New data types/sources or information for consideration;
   .3 Format of next edition and draft wording.
8. Review of ToRs and RoPs.
9. Any other business.
10. Work Plan 2019-2020.
11. Considerations for items to be included in the Chair's Report to HSSC11.
12. Date and venue of next meeting – HSPT4 – and intersessional activities.
13. Review of Action List and draft agenda for HSPT3.
14. Closing remarks by Chair.