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REPORTS ON THE WORK OF THE IHO FOR THE PERIOD 2012 - 2016

**WORK PROGRAMME No. 3
INTER-REGIONAL COORDINATION AND
SUPPORT**

**REPORT ON THE EXECUTION OF PROGRAMME 3
INTER-REGIONAL COORDINATION AND SUPPORT
2012-2016**

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Introduction

1. The IHO Work Programme 3 - Inter-Regional Coordination and Support, seeks to establish, coordinate and enhance cooperation in hydrographic activities amongst States on a regional basis, and between regions, especially on matters associated with Capacity Building (CB); the World-Wide Navigational Warning Service; General Bathymetry and Ocean Mapping, Marine Spatial Data Infrastructures (MSDI), Education and Training, and the implementation of the Worldwide ENC Database (WEND), suitable for the needs of international shipping. IHO Work Programme 3 is implemented under the principal responsibility of the Inter-Regional Coordination Committee (IRCC).

Difficulties and challenges yet to be addressed

2. ***Level of engagement of Regional Hydrographic Commissions.*** The level of engagement of Regional Hydrographic Commissions (RHCs) in support of IRCC activities and objectives has varied greatly from region to region. Some RHCs have been active and responsive, both within their regions and with the Secretariat, whereas the level of involvement of a smaller number of RHCs has been much less. Some Commissions find difficulty in identifying Member States willing or able to devote the resources required to occupy the Chair. Obtaining RHC input to the IHO Reports and responses to IRCC Circular Letters has been patchy and slow.
3. ***Performance Indicators.*** Obtaining the necessary annual data and information for the Performance Indicators (PI) and the additional six-monthly progress reports (in accordance with Decision No. 3 of the 5th Extraordinary International Hydrographic Conference (EIHC-5)) from relevant IRCC bodies was problematic in a number of cases. It may be that in some instances, the chosen PI is not a good indicator or that it is simply too difficult to measure or to report. For these reasons, and as required by EIHC-5 Decision 3, the progress monitoring and risk management framework needs to be considered further at the 1st Session of the IHO Assembly (see document A.1/WP1/03).
4. ***IHO Capacity Building Programme.*** The IHO Capacity Building Programme is a strategic objective of the organization which has operated successfully within the available funds. However, the requirements for capacity building activities continue to outstrip resources - more funds are required. The short-term tenure of some RHC Capacity Building Coordinators led to a lack of continuity or ownership of the issues, which, in turn, reduced the capacity of the regions affected to properly take full benefit of the Capacity Building Programme. It would be preferable that the appointment of capacity building coordinators is regarded as a longer-term appointment that may not necessarily be linked to the length of the term of the Chair of an RHC.
5. ***Secretariat resources available to support Programme 3.*** Personnel resources in the IHO Secretariat available to provide administrative support to the IHO Capacity Building Programme and to the International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) are stretched. This is due to the significant increase in the level of activities of both of these bodies. This shortfall has been raised consistently by the relevant bodies and the recruitment of additional staff has been endorsed in principle by the IRCC.
6. ***HO involvement in Marine Spatial Data Infrastructures.*** Awareness of the importance and significance of involvement by Hydrographic Offices (HO's) in Marine Spatial Data Infrastructures (MSDI) is growing, but many HO's are still focussed on gathering data primarily for chart production rather than to provide authoritative and relevant hydrographic geospatial data as a basic building block of national and regional economic and environmental management and development.
7. ***Increasing IBSC Workload and Complexity.*** The workload of the International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) has increased significantly in recent years due to the success of the Standards and the development /

transition to the new standards framework. More organizations (commercial, defence and academia) are submitting more programmes year on year which puts considerable pressure on Board members and the IHO Secretariat to address all of the work of the IBSC intersessionally and during the annual meeting.

The continuing challenge is to overcome the increasing workload of the IBSC with limited resources and scarce expertise in an efficient and effective manner to the satisfaction of the three parent organizations (FIG, IHO, ICA) and submitting organizations.

8. ***Political Influence on SCUFN Activities.*** Some aspects of the activities of the Sub Committee on Undersea Feature Names (SCUFN) have attracted unhelpful political attention. Some Member States have made claims that the naming of certain undersea features carries sovereignty implications. It is the general view of SCUFN that this is not the case, in the context of the applicable guidelines (IHO Publication B-6). The GEBCO Guiding Committee has striven to protect SCUFN from being drawn into political agendas.
9. The difficulties and challenges yet to be addressed by the RHCs are included as part of each individual RHC Report that has been submitted in accordance with paragraph 7 of IHO Resolution 2/1997 as amended.

Achievements/Outputs/Conclusions

Overview

10. The IRCC, through its annual meetings, provided an excellent and productive forum to discuss the activities, outputs and outcomes, and the work plans for each subsequent intersessional period of the Regional Hydrographic Commissions, as well as to develop a common strategy to achieve the objectives of the IHO.
11. The IRCC coordinated and enhanced cooperation in hydrographic activities amongst States on a regional basis, and also, between the regions. In this respect, hydrography was promoted and these efforts supported the accession of new Member States to the IHO (Montenegro, Georgia, Viet Nam, and Brunei Darussalam) and applications to join from several others.
12. The IRCC encouraged the RHCs, in coordination with their Member States, to be attentive to opportunities to raise awareness of the value and role of hydrography and the importance of improving mankind's knowledge of the seas and oceans in support of the United Nations 2030 agenda for sustainable development, disaster risk reduction and the integrity of the oceans.
13. IRCC strongly supported increasing the level of CBSC activities and the efficient implementation of the annual IHO Capacity Building Work Programmes (CBWP) by the RHCs and encouraged additional funding contributions to enhance the delivery of the Capacity Building Programme. As a result, the level of activity of the CB Programme increased significantly during the report period. The IRCC also guided the CBSC on its revision of the CB Strategy which was subsequently endorsed by the 5th Extraordinary International Hydrographic Conference (EIHC-5) in October 2014.
14. The IRCC encouraged the RHCs to consider risk assessment methodologies, for example, the model developed by New Zealand, as an important tool in the assessment and justification for Capacity Building, and to prioritize requirements for hydrographic surveys.
15. The IRCC monitored the WENDWG activities and the continuing progress being made towards the full implementation of the WEND Principles and the Guidelines. The IRCC encouraged the RHCs to work on reducing overlapping data in regional ENC coverage by applying the WEND Principles and Guidelines when determining ENC production boundaries. The IRCC continued to support RENC to RENC cooperation.
16. Taking into account Decision 12 of EIHC5 concerning the long term consequences of not achieving full implementation of the WEND Principles, the IRCC tasked its WENDWG to review the WEND Principles and the Guidelines in relation to the status of their

implementation, and the status of ENC coverage including gaps and overlaps. Based on the subsequent WENDWG report delivered to the 7th meeting of the IRCC (2015), the IRCC agreed that no further action should be taken at present on amending the WEND Principles and Guidelines.

17. The IRCC commended the work done by the Sub-Committee on the World-Wide Navigational Warning Service (WWNWS-SC) and its long-term positive impact on the safety of navigation. The IRCC encouraged the RHCs to seek more engagement by Member States, national MSI Coordinators and Observers in matters related to the WWNWS.
18. The IRCC monitored the activities of the MSDI Working Group after its governance was transferred from the HSSC to the IRCC at the beginning of 2015 and encouraged the RHCs to emphasize the role and value of Hydrographic Offices being involved in their respective national spatial data infrastructures.
19. The IRCC increased its level of oversight of the General Bathymetric Chart of the Oceans (GEBCO) project and the governance and administration of the GEBCO Guiding Committee (GGC) with regard to the effective financing and implementation of the GEBCO work plan. The on-line GEBCO Gazetteer of Undersea Feature Names, funded and developed by the United States at the IHO Data Centre for Digital Bathymetry and maintained by the IHO Secretariat, became fully operational in 2013.
20. The IRCC recognized the relevance of the activities and aspirations of the Group on Earth Observations (GEO) and supported the continuation of IHO representation in GEO related events.
21. The IRCC monitored the work of the FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) and commended the work done by the IBSC with respect to the review of the increasingly large number of submissions and the development of separate competency requirements for Category “A” and Category “B” hydrographic surveyors and nautical cartographers.
22. The IRCC established the IHO-EU Network Working Group (IENWG) in 2014 and the Crowded Sourced Bathymetry Working Group (CSBWG) in 2015 (as a result of Decision 8 of EIHC-5).
23. In 2012, the 18th International Hydrographic Conference (IHC-18) welcomed the monitoring system to be put in place by the IHB Directing Committee based on the Strategic Performance Indicators (SPIs) in the Strategic Plan (see CONF.18/WP.1/Add.2) and invited it to take action. The IRCC was also invited to review the Working Level Performance Indicators (WPIs) relevant to its activities. The IRCC reviewed the WPIs related to its activities at its 3rd and 4th meetings, in 2011 and 2012 respectively. IRCC4 agreed to monitor the WPIs and invited the RHCs and the relevant subsidiary organs to provide annually, to the IRCC Chair, their estimated values as of 31 December of the preceding year, and target values as of 31 December of the following year. The Annual Report of the IHO for 2012 included Performance Indicators for the first time. As repeated in the subsequent IHO Annual Reports, obtaining the necessary input from IRCC bodies has been problematic, although the situation improved a little over time. The published IRCC WPIs for the period 2012-2016 are shown in Annex A.
24. As directed by Decision 3 of EIHC-5 in 2014, performance monitoring was supplemented by a biannual reporting mechanism that requested the Chairs of committees, sub-committees and working groups to report at year-end and mid-year on the overall status of their respective work programmes by completing a template listing current goals and priorities and current or expected gaps and needs. The outcome of the first three biannual assessments was submitted to Member States through IHO Circular Letters (CL 17/2015, 66/2015, 14/2016, 48/2016). Most entities under the governance of the IRCC did not provide their biannual reports as requested. The following entities provided their reports:
 - end of 2014: EAHC, MACHC, NIOHC, NSHC, SAIHC, HCA, CBSC, WWNWS-SC, IENWG, MSDIWG, WEND-WG, GEBCO GC, TSCOM & SCRUM, SCUFN;

- mid-2015: EAthC, MACHC, NSHC, SAIHC, HCA, WWNWS-SC, IENWG, WEND-WG, GEBCO GC, TSCOM & SCRUM, SCUFN;
 - end of 2015: EAthC, MACHC, NIOHC, NSHC, SAIHC, WWNWS-SC, IENWG, WEND-WG, TSCOM & SCRUM, SCUFN;
 - mid-2016: MBSHC, MACHC, NSHC, SAIHC, HCA, CBSC, IENWG, CSBWG.
25. The structure, membership, meetings and standing agenda items of the IRCC are shown in Annex B.
 26. Reports from the IRCC subordinate bodies during the period of 2012-2016 are provided in Annex C.
 27. The Terms of Reference and Rules of Procedure of the IRCC are shown in Annex D.

Element 3.1 Co-operation with Member States and attendance at relevant meetings

28. The objective of this element is to facilitate coordination, cooperation and collaboration among IHO Member States in order to improve the provision of hydrographic and charting services and products through the structure of the 15 RHCs and the IHO Hydrographic Commission on Antarctica.
29. This element of the Work Programme is largely accomplished through the meetings of the RHCs. The frequency of meetings of the RHCs has varied from annually to triennially, depending on the region. RHC meetings continued to increase in importance as they exercise an increasingly active role in the overall planning, execution and assessment of the IHO Work Programme as it relates to their regions.
30. The main achievements and outputs of the RHCs and the HCA are included under their individual reports in Annex E.

Element 3.2 Increase participation by non-Member States

31. One of the important strategic goals of the IHO is to increase the participation of non-Member States in IHO activities. The objectives of this element are:
 - to raise awareness in non-Member States of the importance of hydrography and nautical charting services and their related products,
 - to give advice to coastal States on how to comply with international regulations such as SOLAS Chapter V and highlight the importance of coordinated efforts in providing for safety of navigation and protection of the marine environment, and
 - to stress the importance of becoming an IHO Member State and of integration in the work of the RHCs.
32. Taking the opportunity of attending regional and other international meetings / events, in particular during the BSHC, EAHC, MACHC, MBSHC, NIOHC, RSAHC, SAICHC, SWPHC, IMO and IOC meetings held during the period, the IHO Secretary-General and Directors, Assistant Directors and IHO representatives from the RHCs visited and briefed a number of high level governmental officials directly and through their diplomatic representatives as part of the IHO awareness-raising campaign. During the reporting period, Albania, Azerbaijan, Brunei Darussalam, Bulgaria, Cambodia, Jordan, Liberia, Maldives Malta, Mauritania Montenegro, Panama, Republic of the Congo, Timor Leste and Viet Nam were visited or contacted by IHO representatives in order to promote the value of the activities of the Organization.
33. Non-Member States of the IHO were encouraged and invited to participate in the RHC meetings, CB initiatives and relevant IHO meetings.
34. Additional information related to Element 3.2 is included under the individual RHC Reports which are provided in Annex E, when applicable.

Accession of New Member States

35. During the reporting period Cameroon, Montenegro, Georgia, Viet Nam, and Brunei Darussalam joined the IHO as Member States (as of 31 December 2016). This brought the IHO membership to 85 Member States.

Element 3.3 Capacity Building Management

36. The IHO Capacity Building Programme is a strategic objective of the organization that considers the maturity of coastal States and provides targeted training, technical assistance and hydrographic awareness seminars aimed at improving nautical charting and the delivery of maritime safety information in regions, particularly for developing countries. The Capacity Building Programme is implemented by the Capacity Building Sub-Committee (CBSC) in close coordination with the IHO Secretariat.
37. During this reporting period, the IHO Capacity Building Programme has been funded from the IHO budget supplemented by additional specific support from Member States (Japan, through the Nippon Foundation, and the Republic of Korea). Many other Member States contributed significant in-kind resources to the CB Programme.
38. Taking into account the growing demands for IHO Capacity Building activities, more funds and contributions are required. For this reason, the Secretary-General and Directors of the IHO continued their campaign to identify additional donor States and funding organizations. This included visits to high level authorities in several countries, participation in RHC meetings, attendance at various seminars and conferences, and the active promotion of IHO activities in specialized magazines and journals. IHO representatives engaged external stakeholders such as the United Nations, IMO, IALA, the European Commission, funding agencies (in particular the World Bank), academia and industry in general. IHO representatives had several meetings with the World Bank which were helpful for networking and identifying funding opportunities for regional hydrographic projects, in particular for the Caribbean, West Africa and South West Pacific regions.
39. The level of activity of the IHO Capacity Building (CB) Programme continued to increase during the period of this report. Based on the growing level of the CB Fund, expenditure in the 2015 CB Work Programme (760,801 Euros) was 153% greater than the expenditure in 2011 (300,388 Euros). Approximately 80% of the annual budgeted CB Work Programmes were executed and paid for. Some planned CB activities could not take place because of administrative and other issues in host nations, the unavailability of nominated personnel, or other late changes to the planned events. Most of the activities that could not take place in the scheduled year were postponed and transferred to the following year's CB Work Programme for successful execution.
40. Detailed information about the CB Work Programme is available in the IHO Annual Reports and in the Capacity Building section of IHO website.
41. Due to the significant increase in the level of activity of the CB Programme, the CBSC approved funding in 2013 and 2014 for the temporary employment of a part-time Capacity Building Assistant (CBA) at the IHO Secretariat. The CBA worked during the second half of 2013 and throughout 2014. She effectively and closely monitored the CB activities, maintained the reports and produced CB statistics. However, this contracted support, which had been in place for 18 months, was terminated at the end of 2014 in order that the position would not be considered permanent in terms of long-term pension or employment rights. The role of the CBA has been absorbed by existing staff in the IHO Secretariat wherever possible.

Evolution of the CB Activities and of the CB Fund

42. The level of CB activities has grown significantly from the previous five years due to the continuous growth in the resources available to the CB Fund. The figures are indicated in the

following table:

Year	CB requests submitted	CB projects delivered	Technical visits delivered	Number of students	Funding required (Euros)	Actual expenditure (Euros)
2012	30	22	11	227	516,185	310,810
2013	36	20	6	129	412,600	325,717
2014	27	24	8	154	687,444	636,263
2015	30	24	2	141	930,907	738,488
2016	34	22	8	180	975,106	727,198
Total	157	112	35	1,058	3,522,243	2,738,477

43. The Republic of Korea (ROK) contributed 1,388,100 Euros to the Capacity Building Programme during the report period (2012-2016). The Programme Management Board (PMB), consisting of representatives from the ROK, the IHO Secretariat and the CBSC Chair coordinated the Korean contribution under the current MoU. The major projects were funding of up to four students annually from IHO Member States for a Category “A” Hydrographic Master Programme at the University of Southern Mississippi, sponsoring five students at the Korea Hydrographic and Oceanographic Agency (KHOA), Busan, ROK for a Category “B” Marine Geospatial Information Programme and the development of a “Training for Trainer” programme, an initiative on e-learning. During the report period, a total of twelve Category “A” Hydrographic Master Programme students and five Category “B” Marine Geospatial Information Programme students were sponsored by the ROK. In addition, many short courses have been supported by ROK’s fund in accordance with annual CB Work Programmes.
44. Japan through the Nippon Foundation (NF) contributed 696,377 GBP to the Capacity Building Programme during the report period. In line with the MoU between the IHO and Japan Hydrographic Association, two courses in “Hydrographic Data Processing and Marine Cartography including specialism in the Electronic Navigational Chart (ENC)” and, as a continuation of these courses, three course in “Marine Cartography and Data Assessment” delivered for the CHART (Cartography, Hydrography and Related Training) Project, under the terms of the MoU between the IHO and Nippon Foundation, have been conducted at the UKHO, Taunton, recognized at the Category “B” level by the IBSC were funded by the Nippon Foundation and 28 students sponsored during the report period (2012-2016). An Alumni Workshop was also held in November 2016 in Bangkok, Thailand organized by the IHO and supported by the Nippon Foundation of Japan. The objectives of the Alumni Workshop were to strengthen the IHO-NF Alumni network, to encourage cooperation between the fellows, to further develop global linkages and to obtain feedback from the alumni. Of the total of 51 fellows, 18 alumni from 16 countries were available to participate in this event.
45. Notwithstanding the generosity of certain Member States, and the significant in-kind support provided by others, the financial resources needed to meet the increasing number of CB requests submitted by the RHCs during the reporting period was insufficient to cover all the requests. An increase in the annual CB contribution from the IHO budget is therefore warranted in order to implement the anticipated CB programme for the next three years (2018-2020). This has been taken into account by the Secretary-General in the next three-year budget proposal (see Assembly document A-1/F/02).

Meeting with other organizations, funding agencies, the private sector and academia

46. The IHO Secretariat actively participated in all the annual meetings of the Joint IHO-IMO-IOC-WMO-IALA-IAEA-FIG Capacity Building Group (Joint CB Group) held during the reporting period (the 2016 meeting was cancelled due to the non-availability of the intended venue). The meetings brought together representatives from the IHO, IMO, WMO, IOC, IALA and FIG to assess and progress where priorities and joint policies can reinforce each other's CB programmes.
47. The Joint CB Group submitted a joint paper - *Partnership arrangements, Delivering as One in action* to the 65th session of the IMO Technical Co-operation Committee (TC 65) in June 2015 as a joint approach under the United Nations policy of "Deliver as one".
48. The Joint CB Group agreed to focus their efforts on the identification of a suitable region (such as the Caribbean, South-West Pacific or West Africa) for the development of a joint regional project to seek funding from donor agencies.

IHO Capacity Building Strategy

49. The 18th International Hydrographic Conference had tasked the CBSC to present a revised Capacity Building Strategy to the EIHC-5. The revision of the CB Strategy was reviewed, finalized and adopted by the CBSC at its 12th meeting in May 2014. The Chair of the CBSC presented the revised IHO Capacity Building Strategy to the EIHC-5, where it was adopted unanimously.

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

50. The main objectives of the IBSC are to establish and review minimum standards of competence for hydrographic surveyors and nautical cartographers. During the reporting period, the IBSC:
 - reviewed the recommended minimum standards of competence for hydrographic surveyors and nautical cartographers and developed separate competency requirements for Category "A" and Category "B" hydrographic surveyors and nautical cartographers;
 - maintained and promulgated all publications and documents resulting from the tasks carried out by the Board, in particular S-5A and S-5B - *Standards of Competence for Hydrographic Surveyors* and S-8A and S-8B - *Standards of Competence for Nautical Cartographers*;
 - provided advice and comments on the submissions of the syllabi by comparison with the recommended minimum standards and award certificates of programme recognition, where appropriate;
 - reviewed the procedures of submission; and
 - reviewed 74 programmes from submitting organizations and recognised 49 of those programmes. As of December 2016, there were a total of 60 recognized programmes and two recognized schemes worldwide.
51. The IRCC at its 8th meeting (2016) commended the work of the IBSC with respect to the review of the large number of submissions and the revision of the Standards of Competence for Hydrographic Surveyors and Nautical Cartographers.

Timetable for the adoption of S-8A and S-8B - Standards of Competence for Nautical Cartographers.
52. The IRCC was informed at its 8th meeting (May 2016) that the timetable for the adoption of the new editions of S-8A and S-8B - *Standards of Competence for Nautical Cartographers*, was based on the intention that all submission for cartographic courses made to the IBSC in 2018 would be based on the new editions. It was envisaged that the draft new editions of S-8A and S-8B would be endorsed by the IRCC at its next meeting in May 2018 and subsequently passed

to Member States for formal adoption by voting shortly thereafter. The new standards would then be in force by August.

53. However, under the arrangements that will now be in force as a result of the recent ratification of the Protocol of Amendments to the Convention on the IHO (November 2016), the IRCC will, in future, be required to submit its recommendations to the Council, before any voting procedure can take place.
54. Noting that the IHO Council is not expected to hold its first session until October 2017, this will significantly delay the tight adoption timetable that was anticipated by both the IBSC and its prospective applicants for recognition of their courses. In this case, and noting that the approval timetable was agreed before it was known that the IHO Council would be established, the Chair of the IBSC, with the support of the Chair of the IRCC, seeks the approval of the Assembly for the IRCC to submit the proposed new editions of S-8A and S8-B directly to Member States for approval, rather than via the 1st session of the IHO Council.
55. *Financial management.* The IBSC Fund was transferred from the FIG Secretariat to the IHO Secretariat in 2015 and the IHO Secretariat took over the role of Treasurer in 2015. This transfer permitted increased efficiency, accountability and improved governance, since the IHO Secretariat was already acting as Secretary to the Board and the IHO is, in effect, the principal stakeholder organization regarding the work of the Board.
56. The report of the IBSC is provided in Annex C.

Capacity Building and Standards of Competence Stakeholders' Seminars

57. The first stakeholders' seminars related to the work of the IHO Capacity Building Programme and the FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers took place consecutively between 5 and 7 March 2014, at the IHO Secretariat. About 60 participants from IHO Member States and industry/academia stakeholders attended the seminars which were broadcast as a live stream via internet.
58. The objectives of the CB seminar were to raise awareness of the IHO CB Programme, obtain feedback from a broad range of stakeholders, and review the future of the IHO CB Programme considering the new demands/projects/possibilities. The seminar focused on the revision of the CB Strategy and the lessons learned from previous CB activities. The outcome of the seminar was presented to the 12th CBSC meeting in May 2014.
59. The IBSC stakeholders' seminar concentrated on the need for future revisions to the Standards of Competence for Hydrographic Surveyors and Nautical Cartographers.
60. The report of the CBSC is provided in Annex C.

Element 3.4 Capacity Building Assessment

61. Assessment is one of the first phases in the Capacity Building process. It mainly consists of technical visits and high level visits carried out at different levels.
62. Technical visits were carried out by IHO Technical Visit Teams, made up of appropriate experts, to assess the hydrographic surveying, nautical charting and nautical information status of the nations and regions visited. The Technical Visit Teams provided guidelines for the further development of in-country hydrographic capabilities taking into account the regional context and the possibilities for support through shared capabilities with other countries. High level visits were also made to high level governmental authorities and national stakeholders by the IHO Secretary-General and Directors and also by the national Hydrographers in some regions, such as in the East Asia region, to raise awareness on the value and importance of developing national hydrographic capabilities and also to invite and encourage the application of the visited country to become a member of the IHO.
63. During the reporting period, 24 technical and advisory visits were conducted by expert teams

from the relevant Regional Hydrographic Commissions or by the IHO Secretariat. The visits programme concentrated on the South West Pacific, Central America and the Caribbean Sea, Africa, East Asia, the Indian Ocean and the Mediterranean regions. In general, this coincides with the priorities also identified by sister organizations such as the IMO, IOC and WMO.

64. Detailed information on the technical and advisory visits conducted during the reporting period is available in the IHO Annual Reports and in the CB section of the IHO web site.

Element 3.5 Capacity Building Provision

65. Capacity Building Provision is the “action” phase of the IHO CB Strategy. It consists of the conduct of training and education opportunities according to the needs identified by the RHCs to address identified shortcomings. During the report period, 112 CB projects were delivered and a total 1,058 students were trained in various short and long courses.
66. More detailed information on the provision of CB including the short courses, seminars and workshops planned during the report period are available in the IHO Annual Reports and in the CB section of the IHO web site.

Element 3.6 Coordination of Global Surveying and Charting

67. The objective of this element is to facilitate the achievement of a world-wide quality nautical charting coverage to suit the needs of the mariner in support of safe and efficient navigation through the development of specifications and standards for the production, distribution and updating of cartographic products and supporting publications.

C-55 - Status of Hydrographic Surveying and Nautical Charting worldwide Database

68. The IHO Secretariat continued to maintain publication C-55 - *Status of Hydrographic Surveying and Nautical Charting Worldwide*. As a result of work undertaken by officers seconded from Japan, C-55 is now generated from a GIS database application that is continuously updated as an online service accessed in the download section of the IHO website. During the reporting period, work has continued on developing the GIS database application to support C-55. In response to the request to complement C-55 composite data (percentage of areas adequately surveyed / requiring re-survey / not surveyed) with CATZOC information (see IHO CL 52/2015), CATZOC data was provided by the RENCs and some Member States.

WENDWG activities

69. The principal objective of the WENDWG is to monitor and advise the IRCC on the achievement of adequate ENC coverage that meets the SOLAS V/19 carriage requirements for ECDIS.
70. During the report period, the WENDWG:
- closely monitored the implementation of the WEND Principles and reported to the IRCC at its annual meetings,
 - mainly worked to reduce overlaps by applying the WEND Principles in defining approved ENC schemes and drafted an IHO Resolution to address the overlaps in ENC coverage to be reported to the IRCC, and
 - promoted the RENC co-operation for the benefit of ENC end-users.
71. In 2014, amendments to the Annex of the WEND Principles and revision of the Guidelines for the implementation of the WEND Principles, which addressed mainly gap and overlap issues in ENC coverage, were adopted by the Member States. IHO Resolution 1/1997 was amended accordingly.

72. In response to the direction of EIHC-5 (see EIHC-5 Decision 12), the IRCC tasked its WENDWG to consider the long term consequences of not achieving full implementation of the WEND Principles. Based on the resulting WENDWG report, the IRCC recommends to the Assembly that there is no need to further amend or enhance the existing WEND Principles and the Guidelines for the implementation of the WEND Principles, at this stage.

RENC TO RENC Cooperation

73. The WEND Principles encourage Member States to distribute their ENC's through a Regional ENC Coordinating Centre (RENC) in order to share in common experience, to reduce expenditure, and to ensure the greatest possible standardization, consistency, reliability and availability of ENC's. At the end of 2016, the two principal RENC organizations IC ENC and PRIMAR had 41 and 15 contributing members respectively.
74. The WENDWG encouraged RENC to RENC cooperation for better harmonization, technical and marketing coordination between RENCs. The IHO Secretariat also supported the RENC to RENC cooperation and joined the annual coordination meetings to review the RENC related issues. The Secretariat participated in IC- ENC Steering Committee and PRIMAR Advisory Committee meetings as Observer starting from 2015.
75. The report of the WENDWG is provided in Annex C.

Coordination of ENC schemes

76. In 2015-2016, the Nautical Cartography Working Group (NCWG), in liaison with the INT Chart / ENC Regional Coordinators, prepared a new draft edition of IHO Publication S-11 Part A, the main purpose of which was to incorporate guidance relating to the preparation and maintenance of ENC schemes. Based on this publication, RHC's are expected to coordinate the development and maintenance of small/medium scale ENC schemes and to ensure that uniform parameters are used to ensure consistency and quality. RHCs are also invited to monitor and report on gaps and overlaps in ENC coverage on a regularly basis.
77. With regard to ENC coverage, reporting from individual RHCs to the IHO Secretariat or the WENDWG remained inconsistent but was improving with the use of the IHO ENC on-line Catalogue and the RENC Coverage and Overlap Checker tool made available by the RENCs in 2015. The examination of the IHO ENC Catalogue, compiled primarily from data provided by the two established RENC organizations and the UKHO, showed that ENC small/medium scale coverage was generally satisfactory, though there were a number of instances of overlapping or duplicated data in the same usage band, as well as some gaps in coverage. At larger scales, there were still a number of ports, harbours, moorings and approaches for which there was not an ENC to correspond to a published paper chart of the same area.
78. The IHO reported statistics concerning global ENC coverage annually to the IMO. The statistics are included in Annex A and underpin Strategic Performance Indicator 2 (see document A.1/WP1/01). At the end of 2016, ENC coverage worldwide was reported as:

Small scale	~ 100%
Medium scale	93%
Large scale	98%

79. With some exceptions, ENC coverage is considered to be generally satisfactory. In most cases, there is ENC coverage that matches existing paper chart coverage, except for those areas where the quality of the data supporting the paper chart is of such a low quality that the production of an ENC would be inappropriate. Further improvement of ENC coverage is now primarily dependent upon new surveys or re-surveys of areas where there is no satisfactory data coverage. No serious concerns about ENC's were reported by ENC users during the period of this report.

Maintenance of INT chart schemes and improvements of availability of the INT chart series

80. The purpose of the IHO INT chart series is to define and produce a set of medium and large-scale nautical charts that are specifically designed for planning, landfall and coastal navigation and access to ports used by ships engaged in international trade.
81. The Secretariat initiated the development of an on-line web-based interactive version of IHO Publication S-11 Part B - *Catalogue of INT Charts* in 2015, generously supported by the resources of the Korea Hydrographic and Oceanographic Agency (KHOA). The resultant INT Chart Web Catalogue and the associated INT Chart on-line Web Manager services (“INToGIS”) were made available in January 2016 through the IHO website at: www.iho.int > Standards & Publications > S-11 > Part B (link) (see IHO CL 89/2015).
82. The “INToGIS” is a complement to the IHO Geographic Information System (GIS). It provides regional International Charting Coordination Working Groups (ICCWGs) with useful and efficient tools to review and maintain INT chart schemes and to better monitor the scheming and production of INT charts and to ensure the wide on-line availability of up to date information on the status of INT charts (see IHO CL 89/2015).
83. A workshop for INT Chart / ENC Coordinators took place in the IHO Secretariat on 25 April 2016, where the INT Chart / ENC Coordinators of 14 out of the 15 charting regions were provided with a comprehensive demonstration of the new “INToGIS”.
84. The maintenance and updating of S-11 Part B - Catalogue of INT Charts and the quality of the supporting database improved significantly in 2016, as a result of the introduction of INToGIS.
85. The following table summarizes the status of the regional INT chart schemes at the end of 2016:

Region	Coordinator	Commission	Scheduled	Published Total	Regional Database Version
A	USA/NOS	USCHC	15	15	3.0.0
B	USA/NOS	MACHC	82	49	3.0.0
C1	Brazil	SWAtHC	51	34	3.0.1
C2	Chile	SEPRHC	44	7	3.0.0
D	UK	NSHC	215	215	3.0.3
E	Finland	BSHC	299	287	3.0.5
F	France	MBSHC	240	167	3.0.1
G	France	EAtHC	172	139	3.0.3
H	South Africa	SAIHC	125	93	3.0.2
I	Iran (I.R of)	RSAHC	117	68	3.0.0
J	India	NIOHC	172	132	3.0.0
K	Japan	EAHC	294	240	3.0.0
L	Australia	SWPHC	62	58	3.0.0
M	UK	HCA	117	78	3.0.1
N	Norway	ARHC	12	8	3.0.0
1 :10 million	IHO Secretariat		25	24	3.0.0

Total number of INT charts planned:	2,042	
Total number of INT charts published by end 2016:	1,614	(79.0% of the planned total)

Element 3.7 Maritime Safety Information

86. The objectives of this element are:
- to facilitate the efficient provision of Maritime Safety Information (MSI) to mariners through coordination and the establishment of relevant standards between agencies;
 - to improve the coordination of NAVAREAs in liaison with the RHCs and relevant international organizations.
87. The Sub-Committee on the World-Wide Navigational Warning Service (WWNWS-SC) monitored and guided the IHO/IMO World Wide Navigational Warning Service which includes the standardised promulgation of NAVAREA and coastal warnings. The Sub-Committee is responsible for studying and proposing new methods to enhance the provision of navigational warnings to mariners at sea, facilitating the implementation of the major changes in procedures for dissemination of navigational warnings and providing appropriate guidance to concerned IHO Member State representatives to further the evolution of the WWNWS. The Sub-Committee maintained a close liaison and cooperation with the WMO and its complementary Worldwide Met-Ocean Information and Warning Service (WWMIWS).
88. During the period of this report, the WWNWS-SC completed the revision of all WWNWS documentation. Following approval by IHO Member States this documentation was submitted to and subsequently adopted by the IMO.
89. The WWNWS-SC has continued to support and provide advice and guidance with respect to shore-to-ship broadcasting of Maritime Safety Information to the IMO, the International Mobile Satellite Organization (IMSO) and the commercial satellite communications provider Iridium in relation to the evaluation of Iridium's application to be recognized as a GMDSS satellite service provider.
90. The WWNWS-SC developed a three-day training course on MSI for the Capacity Building Sub-Committee and delivered it on ten occasions since the 18th IH Conference. Training documentation for this course has been developed in English, French and Spanish.
91. The report of the WWNWS-SC is provided in Annex C.

Element 3.8 Ocean Mapping Programme

92. The objective of this element is to contribute to global ocean mapping programmes through the IHO-IOC General Bathymetric Chart of the Oceans (GEBCO) Project, the International Bathymetric Chart (IBC) Projects and other related international initiatives.
93. The GEBCO Project is a joint programme that is executed under the governance of the IHO and the IOC. GEBCO is directed by a Guiding Committee made up of representatives from both IHO and IOC and is supported by a Technical Sub-Committee on Ocean Mapping (TSCOM), a Sub-Committee on Regional Undersea Mapping (SCRUM) and a Sub-Committee on Undersea Feature Names (SCUFN). Through the work of its subsidiary organs, GEBCO produces and makes available a range of bathymetric data sets and products, including gridded bathymetric data sets, the GEBCO Digital Atlas, the GEBCO world map, the GEBCO Gazetteer of Undersea Feature Names and the GEBCO Cook Book. GEBCO maintains a comprehensive website at: <http://www.gebco.net>.
94. During the report period, GEBCO continued to collect, store and disseminate bathymetric data for the world's oceans. GEBCO worked towards improving its participation in regional mapping activities and appointed representatives to participate in selected meetings of Regional

Hydrographic Commissions that operate under the umbrella of the IHO.

95. Traditionally GEBCO has focused on waters deeper than about 200m; however, it is now actively collecting data in shallow water areas to support activities such as coastal zone management and development, and the mitigation of marine disasters such as storm surges and tsunami inundation.
96. Revised Terms of Reference and Rules of Procedures for the GEBCO Guiding Committee were approved in 2015 in close coordination with the IOC, as the other parental organization of GEBCO.
97. GEBCO funds previously managed by the University of Stockholm were transferred to the IHO Secretariat in April 2015. As a result, the IHO Secretariat now acts as treasurer and manager of all the accounts of GEBCO. This provides efficiency, accountability and improved governance of the GEBCO related funds. From January 2016, the Secretary of the GEBCO Guiding Committee was also provided by IHO Secretariat.
98. Supported by the Nippon Foundation, the Forum for Future Ocean Floor Mapping (F-FOFM) was held in June 2016 in Monaco organized by the GEBCO Guiding Committee. The outcome of the F-FOFM was a new initiative aimed at leaving no features on the ocean floor larger than 100 metres unmapped by the year 2030. In this context, a new project - *Seabed 2030*, was initiated by the GEBCO Guiding Committee and will begin in January 2017.
99. Work on the regional mapping projects -Indian Ocean Bathymetric Compilation (IOBC), North Atlantic Seabed Mapping Project, International Bathymetric Chart of the Arctic Ocean (IBCAO), International Bathymetric Chart of the Southern Ocean (IBCSO) and Baltic compilations- continued. A polar mapping workshop was held at the IHO Secretariat in conjunction with the F-FOFM.
100. The Nippon Foundation continued to support generously the Nippon Foundation - GEBCO Ocean Mapping training program at the University of New Hampshire, USA. There are now 72 programme graduates from 35 countries.
101. International discussions in groups such as the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM), the Group on Earth Observation (GEO), and others, indicates a growing acknowledgement and awareness of the relevance and the potential contribution of hydrographic information in the context of global geospatial data infrastructures and in the proper governance and sustainable development of the *blue economy*. This emphasises the importance of GEBCO as a fundamental part of the global geospatial information infrastructure. The IHO Secretariat encouraged all relevant stakeholders to recognise that GEBCO is the custodian and provider of the most authoritative publicly-available bathymetry of the world's oceans.

Updating and enhancing the GEBCO Gazetteer (B-8) for internet access

102. Maintenance of the underlying geospatial database of the on-line GEBCO gazetteer (B-8) is carried out by a network of appointed editors (mainly, SCUFN members) under the coordination of an Administrator who is currently the SCUFN Secretary from the IHO Secretariat. In order to improve the content and the quality of the Gazetteer and to remove some inconsistencies, a comprehensive review and corrections of anomalies were undertaken by contract in 2015 under the supervision of the IHO Secretariat. The results, covering about 3,000 feature names, have been used to improve significantly the quality and consistency of the database.
103. The report of the GEBCO Guiding Committee is provided in Annex C.

IHO Data Centre for Digital Bathymetry

104. The IHO Data Centre for Digital Bathymetry (DCDB) is a significant global repository of

digital ocean bathymetry used by IHO Member States and ocean science communities. The DCDB also hosts the on-line GEBCO Gazetteer of Undersea Feature Names that was funded and developed by the United States and became fully operational in 2013. The IHO DCDB facility is generously hosted by the US National Oceanographic and Atmospheric Administration (NOAA) on behalf of the IHO Member States.

105. The IHO DCDB data store contains oceanic soundings that have been acquired by hydrographic, oceanographic and other vessels during surveys or while on passage. These data are used for the production of improved and more comprehensive bathymetric maps and grids, particularly in support of the GEBCO Ocean Mapping Programme. Bathymetric data located at the IHO DCDB can be viewed and filtered via a web map interface, and freely downloaded. The map interface can be accessed at: <http://maps.ngdc.noaa.gov/viewers/bathymetry/>
106. Funded by NOAA, a phased upgrade of the DCDB web-based data portal began in 2015. This will enable easier uploading and downloading of data from the DCDB database and in particular, it will support ingest of data from modern-day Crowd Sourced Bathymetry programmes. This will enable an IHO-led CSB infrastructure to be established and promoted across the wider maritime community.
107. The report of the IHO DCDB is provided in Annex C.

Crowd Sourced Bathymetry

108. As a result of Decision 8 of the EIHC-5, the IRCC established a Crowd Sourced Bathymetry Working Group (CSBWG) at its seventh meeting (2015). The CSBWG was tasked to examine how best to incorporate, manage and use bathymetric data acquired by other than conventional means and develop principles and guidelines to enable the appropriate collection and use of crowd sourced bathymetry for the benefit of all stakeholders interested in knowing the shape and nature of the seafloor and its depths.
109. The CSBWG was tasked to draft an IHO publication on policy for trusted crowd sourced bathymetry including guidelines on the collection and assessment of CSB data, not only for potential use for charting purposes but also for its wider use in non-navigational applications. The objective of the publication is to take into account the work that is underway to enhance the IHO DCDB as a data discovery and upload/download portal for crowd sourced bathymetry and to draw upon any lessons already learned and specifications created by those already engaged in CSB.
110. The report of the Crowd Sourced Bathymetry Working Group is provided in Annex C.

Participation in Atlantic seabed mapping programme

111. The Atlantic Seabed Mapping International Working Group (ASMIWG) was established in 2015 to address seabed mapping issues related to the implementation of the Galway Statement of 2013 through which the European Union (EU), the USA and Canada agreed to join forces on Atlantic Ocean Research. Representatives from the IHO Secretariat attended the meetings of the ASMIWG in 2015 and 2016 and drew attention to the GEBCO project, the IHO DCDB and the developments to support and encourage CSB, including the continuing contribution of the scientific community. As an outcome of this engagement, it is expected that data gathered from the Atlantic Seabed Mapping activities will be submitted to the DCDB.

Element 3.9 Marine Spatial Data Infrastructures

112. The objectives of this element are:
 - to monitor developments related to the hydrographic component of Spatial Data Infrastructures,
 - to develop and maintain the relevant IHO publications, and

- to provide technical advice as appropriate.
- 113. The Marine Spatial Data Infrastructure Working Group (MSDIWG) was transferred to the IRCC structure on 1 January 2015. During the reporting period, the MSDIWG began work on preparing an updated edition of the IHO Publication C-17 - *Spatial Data Infrastructures: "The Marine Dimension" - Guidance for Hydrographic Offices*.
- 114. The MSDIWG also assisted IHO Member States and Regional Hydrographic Commissions in understanding the benefits of, and the means for, establishing MSDIs.
- 115. The report of the MSDIWG is provided in Annex C.

Actions required of the Assembly

- 116. The Assembly is invited to:
 - a. **note** this report on the execution of programme 3;
 - b. **note** the reports provided by the Regional Hydrographic Commissions in Annex E;
 - c. **approve** the continued existence of the IRCC under its Terms of Reference and Rules of Procedure as shown in Annex D;
 - d. **agree** that there is no need to further amend or enhance the existing WEND Principles and the Guidelines for the implementation of the WEND Principles, at this stage (see paragraph 72);
 - e. **approve** the IRCC, at its next meeting, to seek approval of the proposed new editions of IHO Publications S-8B and S-8A by Member States through Circular Letter voting (see paragraphs 52 to 54).

IRCC Working Level Performance Indicators

No	Designation	Source	Status 31 Dec. 2012	Status 31 Dec. 2013	Status 31 Dec. 2014	Status 31 Dec. 2015	Status 31 Dec. 2016
WPI 15	Growth in ENC coverage worldwide, as reported in the IHO on-line catalogue, relative to the existing gap in adequate coverage (as defined by IMO/NAV) from the benchmark 01 Aug. 2008.	WEND WG through RHCs	Small scale: ~ 100% Medium scale: 88% Large scale: 95%	Small scale: ~ 100% Medium scale: 90% Large scale: 96%	Small scale: ~ 100% Medium scale: 91% Large scale: 97%	Small scale: ~ 100% Medium scale: 92% Large scale: 97%	Small scale: ~ 100% Medium scale: 93% Large scale: 98%
WPI 16	Number of additional IHO MS starting to produce & maintain (with/without support) relevant ENCs (contributing to 'adequate coverage') in the reporting period relative to those already producing at 01 Aug. 2008.	WEND WG through RHCs	No suitable information was available at the IHO Secretariat	2 (No suitable information provided by 8 out of 15 RHCs)	0	1	1
WPI 17	Percentage of coastal States delivering hydrographic services - categorized by CB phases (MSI services, surveying capabilities, charting capabilities), directly or through an agreement with a third party, at the end of the reporting period.	CBSC through RHCs	No suitable information was provided by most RHCs				

No	Designation	Source	Status 31 Dec. 2012	Status 31 Dec. 2013	Status 31 Dec. 2014	Status 31 Dec. 2015	Status 31 Dec. 2016	
WPI 18	Percentage of IHO MS updating their C-55 entry data regarding hydrography survey, INT charts, ENC, and MSI in the reporting period.	IRCC through RHCs	17% (14/81)	21% (17/82)	24% (20/82)	24% (20/85)	22% (19/85)	
WPI 19	Status of hydrographic surveys in each region.	IRCC through RHCs	Metrics yet to be defined by IRCC					
WPI 20	Percentage of agreed INT chart schemes, percentage of INT charts available. ¹	IRCC through RHCs or ICCWGs	88% (14 schemes out of 16) 72% (1,429 charts published out of 1,988 planned)	88% (14 schemes out of 16) 75% (1,491 charts published out of 1,980 planned)	88% (14 schemes out of 16) 77% (1,558 charts published out of 2,013 planned)	88% (14 schemes out of 16) 79% (1,588 charts published out of 2,009 planned)	88% (14 schemes out of 16) 79% (1,614 charts published out of 2,042 planned)	
WPI 21	Percentage of agreed ENC schemes, percentage of ENC available.	WEND WG through RHCs or ICCWGs	No suitable information was available at the IHO Secretariat	No suitable information provided by most RHCs (input only from SEPRHC and SWAtHC)	IHO Secretariat estimate for UB1, 2 and 3 based on existing coverage: ~80%	IHO Secretariat estimate for UB1, 2 and 3 based on existing coverage: ~82%	IHO Secretariat estimate for UB1, 2 and 3 based on existing coverage: ~82%	
WPI 22	Increase in effective MS participation in RHC activities.	IRCC through RHCs.	No suitable information was available at the IHO Secretariat	No suitable information provided by RHCs	No suitable information provided by RHCs	No suitable information provided by RHCs	No suitable information provided by RHCs	
WPI 23	Percentage of coastal States which are IHO Member States.	IHO Secretariat	54% (80 / 151)	54% (81 / 151)	54% (82 / 151)	56% (85 / 152)	56% (85 / 152)	

¹ Regions A and N, for which no scheme is available yet, are excluded

No	Designation	Source	Status 31 Dec. 2012	Status 31 Dec. 2013	Status 31 Dec. 2014	Status 31 Dec. 2015	Status 31 Dec. 2016	
WPI 24	Number of new coastal States joining the IHO during the reporting period.	IHO Secretariat	1	1	0	3 ⁹	0	
WPI 25	Number of potential new IHO MS (indicated by the start of the application process) relative to the number of "non-IHO" IMO MS.	IHO Secretariat	8 / 89 Number of IMO MS: 170 Number of IHO MS: 81	7 / 88 Number of IMO MS: 170 Number of IHO MS: 82	7 / 88 Number of IMO MS: 170 Number of IHO MS: 82	8 / 86 Number of IMO MS: 171 Number of IHO MS: 85	8 / 86 Number of IMO MS: 172 Number of IHO MS: 85	
WPI 26	Percentage of coastal States which have achieved CB phase 1, 2 or 3 and established a National Hydrographic Office.	CBSC through RHCs	No suitable information was available at the IHO Secretariat					
WPI 27	Number of States which have achieved CB phase 1, 2 or 3 and established a National Hydrographic Office in the reporting period.	CBSC through RHCs	No suitable information was available at the IHO Secretariat					
WPI 28 => SPI 1	Percentage of coastal States which provide ENC coverage directly or through an agreement with a third party.	WEND WG through RHCs	No suitable information was available at the IHO Secretariat	No suitable information provided by RHCs IHO Secretariat estimate: ~60%	No suitable information provided by RHCs IHO Secretariat estimate: ~64%	No suitable information provided by RHCs IHO Secretariat estimate: ~66% ²	No suitable information provided by RHCs IHO Secretariat estimate: ~66%	

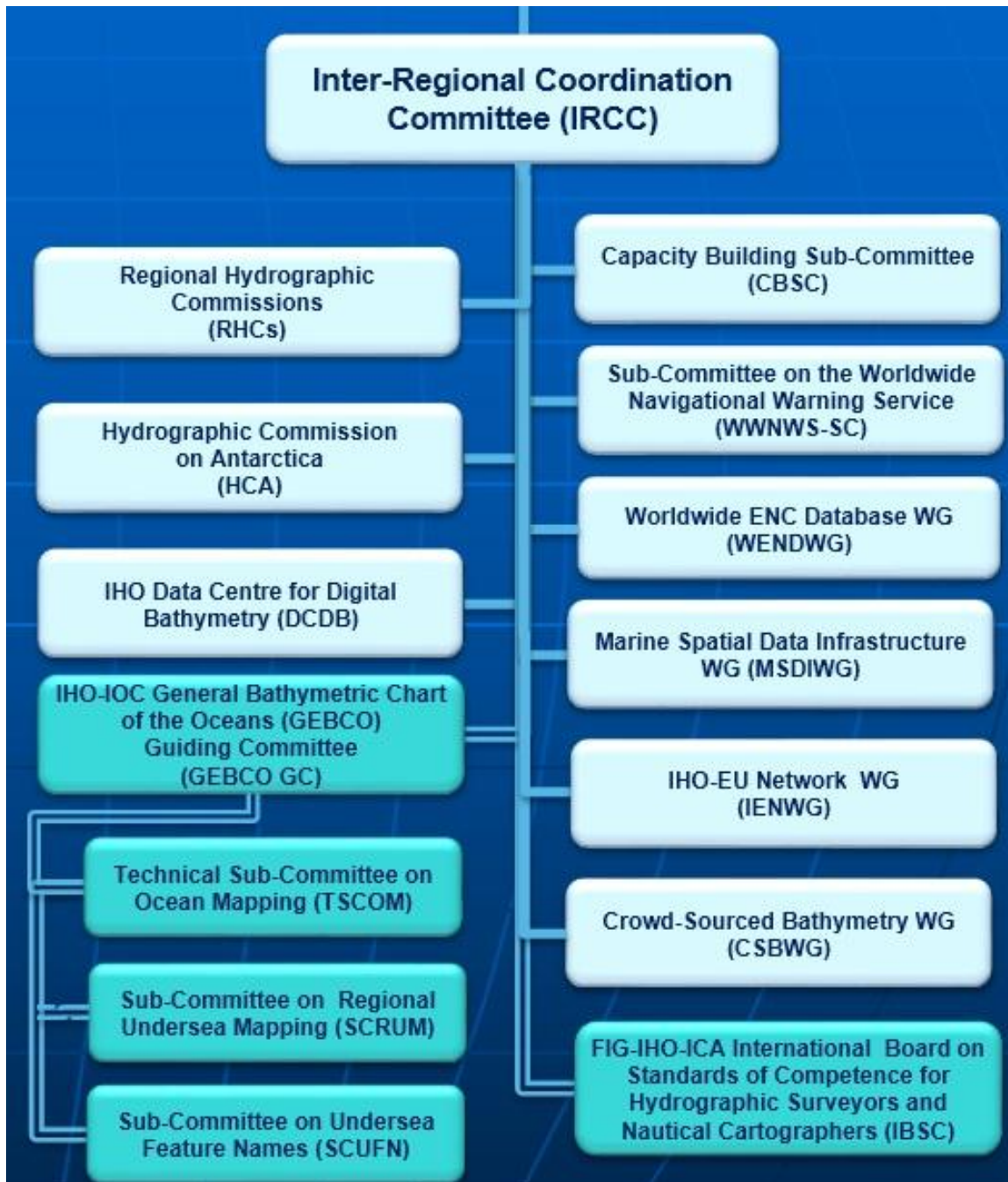
² Information is difficult to obtain from Primary Charting authorities acting on behalf of coastal States. Thanks to the information kindly provided by Australia, France, New Zealand, South Africa and UK in 2016, the estimate is likely to be better than previous year.

No	Designation	Source	Status 31 Dec. 2012	Status 31 Dec. 2013	Status 31 Dec. 2014	Status 31 Dec. 2015	Status 31 Dec. 2016
WPI 29	Percentage of coastal States which have set up a national geospatial infrastructure.	IRCC through RHCs	No suitable information was available at the IHO Secretariat	IHO Secretariat estimate: 18% (28/151) (based on limited information provided by some RHCs and MSDIWG)	No information available at the IHO Secretariat to make an estimate	No information available at the IHO Secretariat to make an estimate	No information available at the IHO Secretariat to make an estimate
WPI 40	Number of agreements signed in the reporting period, including bilateral agreements and RENC membership, etc.	IRCC through RHCs	Limited information available at the IHO Secretariat IHO Secretariat estimate: 2	No suitable information was available at the IHO Secretariat	Limited information available at the IHO Secretariat IHO Secretariat estimate: 2	Limited information available at the IHO Secretariat IHO Secretariat estimate: 4	Limited information available at the IHO Secretariat IHO Secretariat estimate: 2
WPI 41	Percentage of planned CB events that are achieved.	CBSC	73%	86%	82%	79%	88%
WPI 42	Number of acceptable CB requests received.	CBSC	31	28	29	30	33
WPI 43 => SPI 4	Percentage of "acceptable" CB requests which are planned.	CBSC	97%	75% ³	97%	93%	100%

³ Reduction due to reduction in CB funds available in 2013

Structure and membership of the IRCC

Structure of the IRCC and its subordinate bodies



Inter-Regional Coordination Committee (IRCC)**Chairmanship****Chair**

Ingénieur général Gilles BESSERO	France	until June 2012
Dr Savi NARAYANAN	Canada	June 2012 - November 2013
Rear Admiral Tom KARSTEN	United Kingdom	November 2013 - August 2015
Dr Parry OEI	Singapore	since August 2015

Vice-Chair

Rear Admiral Nick LAMBERT	United Kingdom	June 2012 - December 2012
Rear Admiral Tom KARSTEN	United Kingdom	June 2013 - November 2013
Dr Parry OEI	Singapore	May 2014 - August 2015
Rear Admiral Gerd GLANG	United States	since August 2015

Membership

Members

Chairs of the Regional Hydrographic Commissions (RHCs):

- Nordic Hydrographic Commission (NHC)
- North Sea Hydrographic Commission (NSHC)
- East Asia Hydrographic Commission (EAHC)
- United States Canada Hydrographic Commission (USCHC)
- Mediterranean and Black Seas Hydrographic Commission (MBSHC)
- Baltic Sea Hydrographic Commission (BSHC)
- Eastern Atlantic Hydrographic Commission (EAHC)
- South East Pacific Regional Hydrographic Commission (SEPRHC)
- South West Pacific Hydrographic Commission (SWPHC)
- Meso-American - Caribbean Sea Hydrographic Commission (MACHC)
- Southern Africa and Islands Hydrographic Commission (SAIHC)
- ROPME Sea Area Hydrographic Commission (RSAHC)
- North Indian Ocean Hydrographic Commission (NIOHC)
- South West Atlantic Hydrographic Commission (SWAtHC)
- Arctic Regional Hydrographic Commission (ARHC)

Chair of the Hydrographic Commission on Antarctica (HCA)

Chair of the Capacity Building Sub-Committee (CBSC)

Chair of the Worldwide Navigational Warning Service Sub-Committee (WWNWS-SC)

Chair of the International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC)

Chair of the General Bathymetric Chart of the Oceans (GEBCO) Guiding Committee (GGC)

Chair of the Worldwide Electronic Navigational chart Database (WEND) Working Group

Chair of the IHO-EU Network Working Group (IENWG) from December 2013

Chair of the Marine Spatial Data Infrastructures Working Group (MSDIWG) from January 2015

Chair of the Crowd Sourced Bathymetry Working Group (CSBWG) from June 2015

Observers⁴

IHO Member States:

Australia, Brazil, Canada, China, Chile, Ecuador, Estonia, France, Greece, India, Indonesia, Italy, Japan, Latvia, Mexico, Morocco, Mozambique, New Zealand, Nigeria, Norway, Peru, Portugal, Republic of Korea, Saudi Arabia, South Africa, Singapore, Thailand, Turkey, United Kingdom, United States.

Intergovernmental Organizations (IGO) / Non-Government International Organizations (NGIOs) / RENCs:

CIRM, IC-ENC, PAIGH/IPGH, PRIMAR, RTCA

Meetings

IRCC has met annually since IHC-18 as follows:

IRCC-4	Singapore, Singapore	7-8 June 2012
IRCC-5	Wollongong, Australia	3-4 June 2013
IRCC-6	Paris / Saint-Mandé, France	19-20 May 2014
IRCC-7	Mexico City, Mexico	1-3 June 2015
IRCC-8	Abu Dhabi, United Arab Emirates	29-31 May 2016

Agenda Items

The standing agenda items:

- Review of Terms of Reference and Rules of Procedure
- Report by the Chair and the IHO Secretariat
- RHC Reports
- Reports from IRCC Bodies
- Inputs from Member States and other bodies affecting IRCC
- Review of IRCC Work Programme Indicators and Performance Monitoring
- Any other business
- Review of the Actions and Decisions
- IRCC Work Programme Management
- Recommendations of the IRCC for consideration of the IHO Member States

Specific items:

- IRCC-4:
 - Input to the IHO Strategic Planning Mechanism
- IRCC-5:
 - Satellite Derived Bathymetry and the Use of New Technologies
 - Developments on C-55
- IRCC-6:
 - WEND Principles and Governance
 - Performance Monitoring
 - Data gathering and management

⁴ List of the observers who attended at least one meeting of the Committee.

- IRCC-7:
 - - WEND Principles, ENC Coverage and Proposals arising from the WENDWG Report
 - - Data gathering and Management, Maximizing the use of Hydrographic Data
 - - Developments on GIS
- IRCC-8:
 - Data gathering and Management, Maximizing the use of Hydrographic Data
 - Developments on GIS
 - Review of the IHO Strategic Plan
 - Review of IRCC Work Programme Indicators and Performance Monitoring

Reports of the IRCC Subordinate Bodies

1.	Capacity Building Sub-Committee	CBSC
2.	International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers	IBSC
3.	Worldwide Electronic Navigational chart Database Working Group	WENDWG
4.	Worldwide Navigational Warning Service Sub-Committee	WWNWS-SC
5.	General Bathymetric Chart of the Oceans (GEBCO) Guiding Committee	GGC
6.	IHO Data Centre for Digital Bathymetry	DCDB
7.	Crowd-sourced Bathymetry Working Group	CSBWG
8.	Marine Spatial Data Infrastructures Working Group	MSDWG
9.	IHO-EU Network Working Group	IENWG

1. REPORT OF THE CAPACITY BUILDING SUB-COMMITTEE (CBSC)

Chair

Mr Thomas DEHLING Germany since 2011

Vice-Chair

Mr Olumide OMOTOSO Nigeria since 2012

Membership:

Member	Member State	CB Coordinator
Evert FLIER	Norway	NHC/NSHC/ARHC
Brian CONNON	United States	USCHC
Junghyun KIM	Republic of Korea	EAHC
Thomas DEHLING	Germany	BSHC
Burak INAN	Turkey	MBSHC
Eric LANGLOIS	France	EAHC
Jorge A. ALAVERA ALVARADO	Ecuador	SEPRHC
Adam GREENLAND	New Zealand	SWPHC
Jeff BRYANT	United Kingdom	MACHC/NIOHC/SAIHC/RSAHC
Abri KAMPFER	South Africa	
Thani AL MAHROUKI	Oman	
Helber CARVALHO MACEDO	Brazil	SWAtHC
Amol G MERWADE	India	
Yukihiro KATO	Japan	
Janis KRASTINS	Latvia	
Manuel Ricardo LÓPEZ CRUZ	Mexico	
Humberto MUTEVUIE	Mozambique	
Olumide OMOTOSO	Nigeria	

Meetings

CBSC10:	Singapore	04 - 06 June 2012
CBSC11:	Wollongong, Australia	30 May - 01 June 2013
CBSC12:	Brest, France	14 - 16 May 2014
CBSC13:	Mexico City, Mexico	27 - 29 May 2015
CBSC14:	Abu Dhabi, United Arab Emirates	24 May - 26 May 2016

Agenda Items:

- Regional Assessment of CB Activities
- Development and update of annual Capacity Building Work Programme
- Regional projects for CB
- Strategic Issues of the CBSC
 - Assessment of the IHO CB Strategy
 - Way Ahead for the IHO CB Strategy
 - Development of projects to seek donor funds
 - Measures of success of the CB Programme
- Operational issues of the CBSC
 - Development and revision of CB Procedures
 - CB Management System
 - C-55 Status and Developments
- CB Management and CB Fund
- Cooperation with other organizations
 - Joint CB efforts (IHO, IMO, IOC, IALA, WMO, FIG, IAEA)

2. REPORT OF THE FIG/IHO/ICA INTERNATIONAL BOARD ON STANDARDS OF COMPETENCE FOR HYDROGRAPHIC SURVEYORS AND NAUTICAL CARTOGRAPHERS (IBSC)

Chair

Prof. Dr Lysandros TSOULOS	ICA	2011-2013
Prof. Dr Nicolas SEUBE	IHO	2014-2016
Mr Adam GREENLAND	FIG	from 2017

Vice-Chair 1

Prof. Dr Delf EGGE	IHO	2011-2013
Mr Adam GREENLAND	FIG	2014-2016
Mr Ron FURNESS	ICA	from 2017

Vice-Chair 2

Prof. Dr Mohd RAZALI Mahmud	FIG	2011-2013
Mr Ron FURNESS	ICA	2014-2016
Captain Nickolás ROSCHER	IHO	from 2017

Secretary

Assistant director Alberto Costa NEVES (IHO Secretariat) from 2011

Membership

The FIG/IHO/ICA IBSC is composed of four Members from FIG, four Members from IHO and two Members from ICA.

IHO Appointed Members

Captain Nickolás ROSCHER	Brazil	
Captain Andrew ARMSTRONG	United States	
Commodore Rod NAIRN	Australia	
Prof. Dr Nicolas SEUBE	Canada	
Prof. Dr Delf EGGE	Denmark	until 2015
Rear Admiral K. N. NAIR	India	until 2014

FIG Appointed Members

Mr Adam GREENLAND	New Zealand	
Mr Gordon JOHNSTON	United Kingdom	
Prof. Dr Keith MCGOWAN MILLER	Trinidad and Tobago	
Mr Sobri SYAWIE	India	
Prof. Dr Mohd RAZALI Mahmud	Malaysia	until 2014

ICA Appointed Members

Mr Ron FURNESS	Australia
Prof. Dr Lysandros TSOULOS	Greece

Meetings

Workgroup (WG) S-5 (Wellington, NZ)	Feb 2012
IBSC35 Buenos Aires, Argentina (2 weeks, 15 Submissions)	May 2012

IBSC36 Lisbon, Portugal (2 weeks, 16 Submissions)	Apr 2013
WG S-5 (Brest, FR)	Sep 2013
Stakeholder Seminar Hydro13 (UK)	Oct 2013
WG S-5 (Durham, US)	Dec 2013
WG S-5 & Stakeholder Seminar (Monaco)	Mar 2014
IBSC37 Tokyo, Japan (2 weeks, 15 submissions)	Apr 2014
WG S-5 (Paris, FR)	May 2014
WG S-5 (Hamburg, DE)	Jun 2014
WG S-5 (Durham, US)	Jun 2014
Stakeholder seminar Hydro14 (US)	Oct 2014
WG S-5 (Durham, US)	Dec 2014
Stakeholder seminar US Hydro16 (US)	Mar 2015
IBSC38 Niteroi, Brazil (2 weeks, 10 submissions)	Mar/Apr 2015
WG S-8 (Rio, BR)	Jul 2015
Site visit (Netherlands)	Sep 2015
Stakeholder seminar Hydro15 (ZA)	Nov 2015
WG S-5 (Rimouski, CA)	Dec 2015
Stakeholder seminar MACHC16 (AG)	Dec 2015
WG S-5 (Antigua)	Dec 2015
WG S-8 (Bandung, ID)	Feb 2016
IBSC39 Brest, France (2 weeks, 18 submissions)	Apr 2016
WG S-8 (London, UK)	Sep 2016
Stakeholder seminar Hydro16 (DE)	Nov 2016
WG S-8 (Singapore, SG)	Nov 2016

Agenda Items

In broad terms the IBSC role is to:

- maintain the Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (S-5 & S-8);
- maintain the publications C-6 (Reference Texts for Training in Hydrography) and C-47 (Training Courses in Hydrography and Nautical Cartography);
- review programme submissions from institutions against these standards;
- award certificates of programme recognition when appropriate; and
- undertake onsite visits to institutions offering recognized programmes

Agenda items are as follows:

- Review of Programmes submitted for recognition
- Maintenance of the Standards
- Review Terms of Reference and Rules of Procedure
- Review Annual Reports of Institutions offering Recognised Programmes
- Review On-site Visit programme
- Review opportunities for engagement / outreach with stakeholders
- New Standards and Guidelines development

- S-5B & S5-A Standards of Competence for Hydrographic Surveyors
- S-8B & S8-A Standards of Competence for Nautical Cartographers
- Guidelines for the Implementation of the Standards of Competence for Hydrographic Surveyors and Nautical Cartographers

3. REPORT OF THE WORLDWIDE ENC DATABASE WORKING GROUP (WENDWG)

Chair

Mr Jamie MCMICHAEL-PHILLIPS United Kingdom since May 2010

Vice-Chair

Mr John NYBERG United States since 10 March 2016

Membership (as of 21 November 2016)

Member State	RHC	Name of representative
Argentina	SWAtHC	Captain Fabian VETERE
Australia	SWPHC	Mr Mike PRINCE
Australia	-	Mr Nick LIGACS
Brazil	-	Captain Nickolás ROSCHER
Canada	ARHC, USCHC	Mr Laurent TARDIF
Denmark	-	Mr Jens Peter HARTMANN
Finland	BSHC	Mr Jarmo MÄKINEN
France	EAtHC, MBSHC	Ingénieur en chef Laurent KERLEGUER
Germany	-	Dr Mathias JONAS
Hong Kong, China	EAHC	Mr Michael CM CHAU
India	NIOHC	Rear Admiral Vinay BADHWAR
Italy	-	Commander Carlo MARCHI
Japan	-	Dr Yukihiro KATO
Norway	NHC	Mr Evert FLIER
Oman	RSAHC	Commander Thani AL MAHROUKI
Poland	-	Mr Stanislaw PIETRZAK
Singapore	-	Dr Parry OEI
Turkey	-	Lieutenant Commander Eşref GÜNSAY
United Kingdom	-	Mr Jamie MCMICHAEL-PHILLIPS
United Kingdom	NSHC	Mr Nigel SUTTON
South Africa	SAIHC	Captain Abri KAMPFER
United States	MACHC	Mr John NYBERG
United States	-	Captain John LOWELL

RENCs		
PRIMAR	PAC Chair	Mr Stanislaw PIETRZAK
PRIMAR	Operator	Ms Birte Noer BORREVIK
PRIMAR	Manager	Mr Hans Christoffer LAURITZEN
IC-ENC	SC Chair	Captain Marc VAN DER DONCK
IC-ENC	Operator	
IC-ENC	Manager	Mr James HARPER

IHO Secretariat	
Director	Mr Mustafa IPTES
Assistant Director	Mr Yves GUILLAM (Secretary)

Meetings

WENDWG2 - London, UK	21-22 September 2012
WENDWG3 - Monaco	13-14 May 2013
WENDWG4 - Niteroi, Brazil	18-20 May 2014
WENDWG5 - Singapore	3- 5 March 2015
WENDWG6 - Stavanger, Norway	8-10 March 2016

Agenda Items

- Meeting IMO ECDIS Carriage Requirements
- ENC Coverage, Gaps, Risk Assessment
- Overlapping ENCs and associated Policy and Procedures
- Quality, Consistency, Updating Issues, Consistency with Paper Charts, Marine Information Overlays
- ENC Scheming in Regional Hydrographic Commissions
- RENC Distribution and Harmonization
- WEND Principles and Governance, Guidelines, Cartographic Boundaries/Limits
- ECDIS Display Issues (IHC-18, PRO-3 refers)
- IHO Strategic and Work Programme Performance Indicators
- IHO ENC Catalogue
- Impact of S-101 ENCs

4. REPORT OF THE WORLD-WIDE NAVIGATIONAL WARNING SERVICE SUB-COMMITTEE (WWNWS-SC)

Chair

Mr Peter DOHERTY United States since 2007

Vice-Chair

Captain (Ret) Alain ROUAULT France since 2012

Membership

IHO Member States

Argentina, Australia, Brazil, Canada, Chile, China, Ecuador, Egypt, France, Germany, Greece, India, IR of Iran, Italy, Japan, Monaco, New Zealand, Norway, Oman, Pakistan, Peru, Russian Federation, South Africa, Spain, Sweden, Turkey, United Kingdom, United States

Ex-Officio Members

IMO, IMSO, WMO

Expert Contributors

SONSAT (including AWNIS), CIRM, Inmarsat, Iridium

Meetings

- WWNWS4 Tokyo, Japan 24 – 28 September 2012
- WWNWS5 IHO Secretariat, Monaco 1 – 4 October 2013
- WWNWS6 Wellington, New Zealand 18 – 22 August 2014
- WWNWS7 IHO Secretariat, Monaco 24 – 27 August 2015
- WWNWS8 Ålesund, Norway 12 – 16 September 2016

Additionally the WWNWS-SC Document Review WG met at the IMO in London during the week following the IMO Sub-Committee on Navigation, Communications, and Search and Rescue (NCSR) meeting:

- DocRev10 20 – 22 March 2012
- DocRev11 29 – 31 January 2013
- DocRev12 8 – 10 July 2014
- DocRev13 17 – 19 March 2015
- DocRev14 8 – 10 March 2016

Agenda Items

- Review of Action Items from previous WWNWS-SC meeting
- Matters Relating to the GMDSS Master Plan
- Promulgation of Maritime Safety Information (MSI)
 - Review of Outcome of the Annual IMO MSC, NCSR and IMO/ITU Experts Group meetings
 - Development of the GMDSS Modernization Plan and issues relevant to WWNWS
 - Self Assessments by NAVAREA Coordinators
 - Quality Management Analyses of Self Assessments

- Broadcast Systems and Services
- Developments in the WWNWS
- Emerging Technologies/Modernisation.
- Review of Guidance Documents and Other Related Documentation
- WWNWS Representation at Regional Hydrographic Commissions (RHCs) and other Conferences
- WWNWS member attendance at RHCs
- Capacity Building MSI Training Course Developments
- Review of Action Items

5. REPORT OF THE GEBCO GUIDING COMMITTEE

Chair

Dr Robin FALCONER	New Zealand	until 11 October 2013
Mr Shin TANI	Japan	since 11 October 2013

Vice-Chair

Mr Chris FOX	United States	until December 2012
Prof Martin JAKOBSSON	Sweden	since 11 October 2013

Current Membership of GEBCO Guiding Committee

IHO Appointed Members

Mr Shin TANI	Japan
Rear Admiral Patricio CARRASCO	Chile
Dr HYO Hyun Sung	Republic of Korea
Captain NORHIZAM Hassan	Malaysia
Dr Graham ALLEN	United Kingdom

IOC Appointed Members

Prof Martin JAKOBSSON	Sweden
Dr Robin FALCONER	New Zealand
Dr Marzia ROVERE	Italy
Dr Johnathan KOOL	Australia
Captain Leonid SHALNOV	Russian Federation

Ex-officio Members:

Dr Hans-Werner SCHENKE	Germany	Chair of SCUFN
Dr Karen MARKS	United States	Chair of TSCOM
Dr Vicki FERRINI	United States	Chair of SCRUM
Ms Jennifer JENCKS	United States	Director of IHO-DCDB

NOTE: Members of the Secretariats of the IHO and IOC are permanent non-voting Members in the Committee.

Meetings

GEBCO Guiding Committee (GGC)

29 th GGC Meeting	5 October 2012	Monaco
30 th GGC Meeting	11 October 2013	Venice, Italy
31 st GGC Meeting	13-15 June 2014	Monaco
32 nd GGC Meeting	8-9 October 2015	Kuala Lumpur, Malaysia
33 rd GGC Meeting	13-14 October 2016	Valparaiso, Chile

Sub-Committee on Undersea Feature Names (SCUFN)

25 th SCUFN Meeting	23-27 October 2012	Wellington, New Zealand
26 th SCUFN Meeting	23-27 September 2013	Tokyo, Japan
27 th SCUFN Meeting	16-20 June 2014	IHO Secretariat, Monaco
28 th SCUFN Meeting	12-16 October 2015	Niteroi, Brazil

29th SCUFN Meeting 19-23 September 2016 Boulder, USA

Technical Sub-Committee on Ocean Mapping (TSCOM) and
Sub-Committee on Regional Undersea Mapping (SCRUM)

28 th TSCOM and SCRUM Meeting	1-4 October 2012	Monaco
29 th TSCOM and SCRUM Meeting	7-9 October 2013	Venice, Italy
30 th TSCOM and SCRUM Meeting	11-13 December 2014	Mountain View, USA
31 st TSCOM and SCRUM Meeting	5-9 October 2015	Kuala Lumpur, Malaysia
32 nd TSCOM and SCRUM Meeting	10-14 October 2016	Valparaiso, Chile

Agenda Items

- Reports from IHO, IOC, SCUFN, TSCOM, SCRUM, IHO DCDB, Digital Atlas Manager, and IBCs
- Reports on Finance, NF Project, and Outreach
- GEBCO World Map Production
- Implementation of Work Programme
- Nippon Foundation scholar program 10 year celebration
- Revision of GGC's TOR/ROP
- Raising support for GEBCO operations
- Future GEBCO Directions
- Report of the Forum for Future Ocean Floor Mapping
- Arctic and Antarctic Workshop outcomes
- IOC review into future GEBCO engagement
- Engagement with international programmes
- Users and uses of GEBCO

6. REPORT OF THE IHO DATA CENTRE FOR DIGITAL BATHYMETRY (DCDB)

Director

Ms Lisa TAYLOR	United States	until October 2016
Ms Jennifer JENCKS	United States	since October 2016

Difficulties encountered and challenges yet to be addressed

1. Securing on-going resources to maintain and enhance the GEBCO Gazetteer of Undersea Features database and online interface.

Achievements/outputs/conclusions

2. Enhanced the IHO DCDB web pages and map viewers.
3. GEBCO Gazetteer of Undersea Features database and online interface.
 - a. Decoupled front and back end of the Gazetteer web application to facilitate targeted and efficient user interface enhancements;
 - b. Updated supporting technology to ensure robust security and ability to leverage cutting edge development options;
 - c. Addressed user requested enhancement backlog, including expanded documentation, workflow improvements and visual interface changes;
 - d. Addressed regular maintenance needs including bug fixes and system upgrades, migrations and patches; and
 - e. Coordinated with GEBCO's Subcommittee on Underwater Features Names (SCUFN) to review, prioritize, and scope the effort of requested enhancements and bug fixes for the Gazetteer in anticipation for future software development work.
4. Crowd-Source Bathymetry:
 - a. Expanded the IHO DCDB system to include crowd-sourced bathymetry (CSB) data stream from Rose Point Navigation Systems;
 - b. Researched and developed a new beta version of a CSB interactive map for discovery and access;
 - c. Explored various technology options for scalable storage to accommodate increasing data volumes;
 - d. Hosted IHO Crowd-Sourced Bathymetry Working Group in February, 2016. Group discussed and made decisions to refine data format, metadata content, and data transfer processes based on lessons learned from the IHO/PYA/Sea-ID crowd-sourcing pilot project;
 - e. Captured requirements for improved data visualization with the goal of ultimately displaying the points as lines, grids or other products in the viewer; and
 - f. Enabled the NCEI Extract System delivery of CSB data so the public can easily access and download data.

7. REPORT OF THE CROWD-SOURCED BATHYMETRY WORKING GROUP (CSBWG)

Chair

Ms Lisa TAYLOR	United States	until October 2016
Ms Jennifer JENCKS	United States	from October 2016

Vice-Chair

Mr Serge GOSSELIN	Canada	from November 2016
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Membership

Member States

Argentina, Australia, Brazil, China, France, India, Italy, Japan, Nigeria, Portugal, Turkey, United Kingdom, United States

Expert Contributors

Caris, Olex AS, Sea-ID, PYA, TeamSurv, GEBCO Project, SevenCs/Chartworld

Meetings

CSBWG1	Kuala Lumpur, Malaysia	07 October 2016
CSBWG2	Boulder, Colorado, USA	10-11 February 2016
CSBWG3	Warnemünde, Germany	7-8 November 2016

Agenda Items

- Review of Action Items from previous CSBWG meeting
- Updates of Current Projects
- Overview review of the initial draft CSB Guidance Document (CSBGD)
- Progress incorporation of feedback comments and input into each section, to develop final draft version
- Review of CSBGD development timeline and milestones
- Review of Terms of Reference and Rules of Procedure

8. REPORT OF THE MARINE SPATIAL DATA INFRASTRUCTURES WORKING GROUP (MSDIWG)

Chair

Mr Jens Peter HARTMANN Denmark since 2012

Vice-Chair

Ms Ellen VOS Netherlands until 2016

Vacant since 2016

Secretary

Mr John PEPPER OceanWise since 2012

Membership

Member States

Argentina, Australia, Brazil, Canada, Cuba, Denmark, Estonia, Finland, France, Germany, Indonesia, Japan, Malaysia, Nigeria, Netherlands, Norway, Philippines, Portugal, Republic of Korea, Romania, Slovenia, Spain, Singapore, Thailand, Ukraine, United Kingdom and United States.

Expert Contributors

CARIS, Envitia, ESRI, Geosciences Australia, GSDI Association, OceanWise, Open Geospatial Consortium (OGC).

IHO Secretariat

Meetings

MSDIWG4	Copenhagen, Denmark preceded by a one-day MSDI Open Forum	31 January - 1 February 2013
MSDIWG5	Silver Spring, Maryland, USA preceded by a one-day MSDI Open Forum	5 - 7 February 2014
MSDIWG6	London, United Kingdom preceded by a one-day MSDI Open Forum	4 - 6 March 2015
MSDIWG7	Tokyo, Japan preceded by a two-day MSDI Demonstration Workshop and Open Forum	27 - 29 January 2016

Agenda Items

- Identify and promote national and regional best practices
- Assess the existing and new standards in the provision of marine components of spatial data infrastructures (SDI)
- MSDI training and education
- Facilitate (external) MSDI communication
- Maintain and extend the IHO publication MSDI C-17
- Ensure that MSDI is a standing agenda item for RHCs' meetings (IHO Res 2/1997, as amended, refers)
- Presentation of the result of the Questionnaire about MSDI.

9. REPORT OF THE IHO-EU NETWORK WORKING GROUP (IENWG)

Chair

Ingénieur en chef Michel EVEN	France	March 2014 - June 2015
Ingénieur en chef Laurent KERLÉGUER	France	since June 2015

Membership

ARHC, represented by Denmark
 BSHC, represented by Sweden
 EAtHC, represented by France
 MACHC, represented by France
 MBSHC, represented by Greece
 NHC, represented by Norway
 NIOHC, represented by United Kingdom
 NSHC, represented by Germany
 SAIHC, represented by France
 SWPHC
 Italy (associate member)
 IHO Secretariat (observer)

Meetings

IENWG 1	Saint-Mandé, France	2 September 2014
IENWG 2	Saint-Mandé, France	28-29 January 2015
IENWG 3	Saint-Mandé, France	9-10 June 2015
IENWG 4	Saint-Mandé, France	18-19 January 2016
IENWG 5	Brussels, Belgium	13-14 October 2016

Agenda Items

Note: the main achievements are described in the report on Programme 1 (see Element 1.1).

- Improve cooperation with the European Commission, by promoting amongst its entities and with decision makers the role of HOs in the development of the maritime policies of the European Union;
- Monitor European directives, calls for tenders and proposals, projects, events, etc., potentially impacting HOs and define actions to be conducted in accordance;
- Promote the IHO and HOs as providers of authoritative data;
- Coordinate the response to the call for tender of the European Commission on coastal mapping and monitor the outcome;
- Develop a joint position of European HOs in relation with the third phase of EMODnet.

Terms of Reference and Rules of Procedure of the IRCC

References:

- a. IHO Circular Letter 115/2007, dated 10 December 2007
- b. IHO Circular Letter 46/2009, dated 03 July 2009
- c. IHO Circular Letter 54/2009, dated 03 August 2009
- d. IHO Circular Letter 28/2010, dated 30 March 2010
- e. IHO Circular Letter 71/2014, dated 24 October 2014
- f. IHO Circular Letter 86/2015, dated 10 December 2015
- g. IHO Circular Letter 64/2016, dated 07 December 2016

Considering the need to promote and coordinate those activities that might benefit from a regional approach, and considering further that Capacity Building and wider use of marine data gathering have been identified as strategic objectives, the International Hydrographic Organization establishes an Inter-Regional Coordination Committee (IRCC) with the following Terms of Reference and Rules of Procedure. The IRCC shall report to each ordinary session of the Assembly through the Council.

Note: The IRCC shall assume the responsibility of the policy matters related to the Worldwide Electronic Navigational Chart Database (WEND) until the Council is established.

TERMS OF REFERENCE

1. Establish, coordinate and enhance cooperation in hydrographic activities amongst States on a regional basis, and between regions, especially on matters associated with Capacity Building; the World-Wide Navigational Warning Service; General Bathymetry and Ocean Mapping, Marine Spatial Data Infrastructures, Education and Training, and the implementation of the WEND suitable for the needs of international shipping.

Establish co-operation and partnership with stakeholders to enhance the delivery of Capacity Building programs and to ensure long-term sustainability.
2. Monitor the work of specified IHO Inter-Organizational Bodies engaged in activities that require inter-regional cooperation and coordination as directed by the Assembly and provide advice and guidance to the IHO representatives as required.
3. Promote co-operation between regional organizations concerned with the use of hydrographic and bathymetric data, information and products as well as Maritime Safety Information (MSI) for navigation safety and all other marine purposes, including economic development, environmental protection and coastal resource management, particularly within Marine Spatial Data Infrastructures.
4. Review and implement the IHO Capacity Building Strategy and promote the Capacity Building and Training initiatives identified by the relevant subsidiary bodies of the Organization, facilitating interaction between RHCs and potential donors at both international and regional levels.
5. Prepare and maintain publications related to the objectives of the Committee.
6. Prepare a Committee Work Programme and propose it to each ordinary session of the Assembly through the Council (when the Council is established). Consider and decide upon proposals for new work items under the Committee Work Programme, taking into account the financial, administrative and wider stakeholder consequences and the IHO Strategic Plan and Work Programme.
7. Monitor the execution of the Committee Work Programme and report to each meeting of the Council, including an evaluation of the performance achieved.

8. Propose to the Assembly through the Council, the establishment of new Sub-Committees, when needed, supported by a comprehensive cost-benefit analysis.
9. As required, establish Working Groups to fulfil the Committee Work Programme, in conformance with Article 6 of the General Regulations and approve their Terms of Reference and Rules of Procedure.
10. Monitor the work of its Sub-Committees, Working Groups and other bodies directly subordinate to the Committee.
11. Review annually the continuing need for each Working Group previously established by the Committee.
12. Liaise and maintain contact with relevant IHO and other bodies to ensure that IHO work activities are coordinated.
13. Liaise with other relevant Intergovernmental Organizations and Non-Government International Organizations (NGIOs).
14. These Terms of Reference can be amended in accordance with Article 6 of the General Regulations.

RULES OF PROCEDURE

1. The Committee shall be composed of the Chairs of the Regional Hydrographic Commissions; the Chairs of the Hydrographic Commission on Antarctica (HCA), the Capacity Building Sub-Committee (CBSC), the World-Wide Navigational Warning Service Sub-Committee (WWNWS), the International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC), the Worldwide ENC Database (WEND) Working Group, the IHO-European Union (EU) Network Working Group (IENWG), the Marine Spatial Data Infrastructures (MSDI) Working Group, the Crowd-Sourced Bathymetry Working Group (CSBWG) and the General Bathymetric Chart of the Oceans (GEBCO) Guiding Committee. Committee Meetings shall be open to all Member States of the IHO. Intergovernmental Organizations and Non-Governmental International Organizations (NGIOs) accredited as Observers to the IHO may attend Committee Meetings.
2. A Director of the Secretariat shall act as Secretary to the Committee. The Secretary shall prepare the reports required for submission to each ordinary session of the Assembly and Council.
3. The Chair and Vice-Chair shall be a representative of a Member State. 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 Committee Members present and voting. 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.
4. The Committee shall meet once a year, by mid-June, and whenever possible in conjunction with another relevant conference or meeting. The venue and date of the meeting shall be decided at the previous meeting, in order to facilitate participants' travel arrangements. The Chair or any member of the Committee, with the agreement of the simple majority of all members of the Committee, can call extraordinary meetings. Confirmation of the venue and the date shall normally be announced at least six months in advance. All intending participants shall inform the Chair and Secretary ideally at least one month in advance of their intention to attend meetings of the Committee.
5. Decisions shall generally be made by consensus. If votes are required on issues or to endorse proposals presented to the Committee, decisions shall be taken by a simple majority of Committee Members present and voting. When dealing with inter-sessional matters by correspondence, a simple majority of all Committee Members shall be required.
6. The draft record of meetings shall be distributed by the Secretary within six weeks of the end of

meetings and participants' comments should be returned within three weeks of the date of dispatch. Final minutes of meetings should be distributed to all IHO Member States and posted on the IHO website within three months after a meeting.

7. The working language of the Committee shall be English.
8. When established, Working Groups shall operate by correspondence to the maximum extent practicable.
9. Recommendations of the Committee shall be submitted to IHO Member States for adoption through the Council to the Assembly.
10. These Rules of Procedure can be amended in accordance with Article 6 of the General Regulations.

**Reports of the Regional Hydrographic Commissions and the HCA
(In Alphabetical Order)**

1. Artic Regional Hydrographic Commission	ARHC
2. Baltic Sea Hydrographic Commission	BSHC
3. East Asia Hydrographic Commission	EAHC
4. Eastern Atlantic Hydrographic Commission	EAtHC
5. Meso-American - Caribbean Sea Hydrographic Commission	MACHC
6. Mediterranean and Black Seas Hydrographic Commission	MBSHC
7. Nordic Hydrographic Commission	NHC
8. North Indian Ocean Hydrographic Commission	NIOHC
9. North Sea Hydrographic Commission	NSHC
10. ROPME Sea Area Hydrographic Commission	RSAHC
11. Southern Africa and Islands Hydrographic Commission	SAIHC
12. South East Pacific Regional Hydrographic Commission	SEPRHC
13. South West Atlantic Hydrographic Commission	SWAtHC
14. South West Pacific Hydrographic Commission	SWPHC
15. United States Canada Hydrographic Commission	USCHC
16. Hydrographic Commission on Antarctica	HCA

1. REPORT OF THE ARCTIC REGIONAL HYDROGRAPHIC COMMISSION (ARHC)

Chair

Mr Sigvard Stampe VILLADSEN	Denmark	from September 2011
Mr Evert FLIER	Norway	from October 2012
Captain Sergey TRAVIN	Russian Federation	from January 2014
Mr Denis HAINS	Canada	from October 2015
Ms Pia Dahl HØJGAARD	Denmark	from October 2016

Vice-Chair

Mr Evert FLIER	Norway	from September 2011
Captain Sergey TRAVIN	Russian Federation	from October 2012
Mr Denis HAINS	Canada	from January 2014
Ms Anne-Sofie JENSEN	Denmark	from October 2015
Ms Pia Dahl HØJGAARD	Denmark	from January 2016
Ms Birte Noer BORREVIK	Norway	from October 2016

Membership

Members

Canada, Denmark, Norway, Russian Federation, United States

Associate Members

Finland, Iceland

Meetings

- The Commission has met at least annually since the close of the 18th IHC, in accordance with the ARHC Statutes:

3 rd meeting	Tromsø, Norway	9-11 October 2012
4 th meeting	Portsmouth, NH, United States	29-30 January 2014
Special meeting	Monaco	7 October 2014
5 th meeting	Saint Petersburg, Russian Federation	28 - 30 October 2015
ARHC teleconference	13 April 2016)	
Extraordinary meeting	Abu Dhabi, UAE	28 & 31 May 2016
6 th meeting	Iqaluit, Nunavut, Canada	3 and 6 October 2016

Agenda Items

- The main subjects dealt with during the reporting period were the following:
 - Associate Member Investiture
 - Approval of the Rules and Procedures for ARHC representation on the IHO Council
 - Establishing an Arctic Voyage Planning Guide for mariners
 - Operational and Technical Working Group with an emphasis on Hydrographic Risk Assessment in the Arctic.
 - Arctic International Charting Coordination Working Group

- Established Arctic Regional Marine Spatial Data Infrastructure Working Group
 - Communicate Arctic activities to associated IHO Working Groups
 - Outreach to Arctic Council and its working groups including the Protection of the Arctic Marine Environment (PAME) and Conservation of Arctic Flora and Fauna (CAFF)
 - Engage with Arctic marine users including cruise line industry
 - Outreach to IMO
 - Investigate potential of crowd-sourced bathymetry for use within the Arctic community
 - Investigate potential of remote sensing and satellite-derived bathymetry (SDB)
 - Participate with the Arctic SDI/Open Geospatial Consortium (OGC) Arctic Spatial Data pilot project
3. ARHC workings groups:
- ARHC Strategic Planning Working Group (SPWG) [Dormant]
 - ARHC Operations and Technologies Working Group (OTWG)
 - Arctic International Charting Coordination Working Group (AICCWG)
 - Arctic Regional Marine Spatial Data Infrastructure Working Group (ARMSDIWG)

Difficulties encountered and challenges yet to be addressed

4. Large gaps in hydrographic data creating increased hydrographic data risk (see OTWG report)
5. Increasing marine traffic
6. Increasing need for improved data and navigational products
7. Finding methodologies for collecting and encoding traditional knowledge

Conclusions

8. ARHC has positioned itself as the Intergovernmental Organization that deals with regional hydrographic and charting issues
9. ARHC engages across the Arctic community to communicate the hydrographic and charting data situation
10. ARHC has made great strides to improve our understanding of the hydrographic data environment and communicate this situation to a broad community of users.
11. Established a consolidated Web site for access to all national Arctic Voyage Planning Guides.
12. Utilizing existing data, established a repeatable process to understand the impact of hydrographic data environment on marine traffic.
13. Establish an Arctic Regional Marine Spatial Data Infrastructure Working Group (ARMSDIWG)

Actions required of the Assembly

14. The Assembly is invited to note the report.

2. REPORT OF THE BALTIC SEA HYDROGRAPHIC COMMISSION (BSHC)

Chair

Mr Patrik WIBERG	Sweden	until 20 September 2012
Mr Jukka VARONEN	Finland	20 September 2012 - 18 September 2013
Mr Taivo KIVIMÄE	Estonia	18 September 18, 2013 - 12 June 2014
Mr Janis KRASTINS	Latvia	12 June 12, 2014 - 18 September 2015
Captain Sergey TRAVIN	Russian Federation	18 September 2015 - 29 September 2016
Mr Mindaugas CESNAUSKIS	Lithuania	29 September 2016 - present.

Vice-Chair:

Mr Jukka VARONEN	Finland	until 20 September 2012
Mr Taivo KIVIMÄE	Estonia	20 September 2012 - 18 September 2013
Mr Janis KRASTINS	Latvia	18 September 2013 - 12 June 2014
Captain Sergey TRAVIN	Russian Federation	12 June 2014 - 18 September 2015
Mr Mindaugas CESNAUSKIS	Lithuania	18 September 2015 - 29 September 2016
Dr Mathias JONAS	Germany	since 29 September 2016.

Membership

Members

Denmark, Estonia, Finland, Germany, Latvia, Poland, Russian Federation, Sweden.

Associate Member

Lithuania.

Meetings

17 th meeting	Helsinki, Finland	18-20 Sept 2012
18 th meeting	Tallinn, Estonia	16-18 Sept 2013
19 th meeting	Riga, Latvia	10-12 June 2014
20 th meeting	Saint Petersburg, Russian Federation	6-18 September 2015
21 th meeting	Klaipeda, Lithuania	27-29 September 2016

Agenda Items

• IHO-EU Network WG (IENWG)

1. Sweden acted as representative from BSHC. BSHC Member States have been active in participating in the IHO-EU Network Working Group since its inception in 2012 with substantial cooperation and progress on one of the European Commission's flagship maritime projects European Marine Observation and Data Network (EMODnet) and its coastal mapping project. Latvia, Sweden and Germany contributed as consortium members to EMODnet derivations, namely the EU projects Coastal Mapping and High Resolution Seabed Mapping.

• Re-survey Monitoring and coordination

2. BSHC developed and operates a standing scheme of re-surveys for the region. Schedule and execution of surveys are provided in an updated web based interface maintained and operated by Sweden. Surveys are being regularly coordinated between neighbouring countries. The

BSHC Re-Survey Monitoring Working Group liaises with the respective NSHC Working Group.

3. Further developments of the common re-survey database as metadata repository are ongoing. Member States update the information for their waters of jurisdiction independently. Intention is to form a BSHC task-group to look at updating of S-44, Edition 5.

Link to BSHC RE-Survey Database: <https://helcomresurvey.sjofartsverket.se/>

- **Baltic Sea Bathymetric Database (BSBD)**

4. Sweden operates a cross border bathymetry database and a geo portal (data.bshc.pro) on behalf of the Commission. BSHC Member States are providing gridded meso-resolution depth information. Data density differs between the Member States with a minimum resolution of 500 m. The website is fairly widely used. It is possible to either download data or to use the WMS service provision. The options for the re-use of the data are not fully harmonised and depend from the specific national legal regulations. Sweden plans to release a new version of the grid as far as newer and better data is available from numerous countries.
5. The BSHC bathymetry database is recognized by GEBCO as a Regional Mapping Project. At the same time BSBD uses the GEBCO dataset for areas where no data has been provided by national HO's of the region. BSBD is used in the EMODnet phase 2 model and it is planned to assist in deliveries to EMODnet "High Resolution Seabed Mapping" (phase III).

- **Harmonized Chart Datum in the Baltic**

6. BSHC developed the Baltic Sea Chart Datum 2000 as a joint height reference. It is based on the European Vertical Reference Frame (EVRF). A first specification of such a harmonized chart datum was completed in 2016. The specification reflects the specific needs of surface navigation and hydrography in addition to EVRF conventions. The Chart Datum WG is monitoring and gives guidance for the implementation of the harmonized chart datum. BSHC Members have widely committed to implement it. In some countries implementation has already started.

- **FAMOS**

7. Several BSHC Member States (DE, DK, EE, FI, LV, LT, SE) and Working Groups are involved in the FAMOS project coordinated by Sweden. The project focuses on surveying areas relevant for commercial shipping in the Baltic Sea according to the BSHC-HELCOM re-survey scheme. Furthermore, it serves as a platform for implementing the common Baltic Sea chart datum as proposed by the BSHC Chart Datum Working Group and agreed upon within BSHC. The project receives EU co-financing from the Connecting Europe Facility for Transport (CEF Transport).
8. The first phase of the project, FAMOS Freja, was successfully executed from 2014 to 2016. The second phase of the project, FAMOS Odin, is ongoing for the period 2016-2018.

- **BSICC**

9. The Baltic Sea INT Chart Coordination Working Group (BSICC) processes ENC and paper chart issues fully in parallel and to the same extent. The facilitation of the INT Chart Web Catalogue and continuous updating of S-11 Part B, have become inherent part of the chart publishing process in all Member States. Monitoring of Baltic Sea ENC scheme and the identification of potential gaps and overlaps has been added to the standing agenda items of the Working Group. BSHC Member States agreed about the unlimited internal use of the small scale ENC covering the whole Baltic as provided by Germany as the responsible producer.

- **Marine Spatial Data Infrastructure (MSDI)**

10. MSDI delivers the instruments for the enhanced scope of hydrographic information users. MSDI can create the framework for future provision of this information beyond the classic field of surface navigation. BSHC and NSHC see the importance to deal with these opportunities

from a regional approach. The respective WGs in both RHCs have merged in 2016 to the NSHC and BSHC Baltic Sea North Sea Marine Spatial Data Infrastructure Working Group (BSNSMSDIWG). It will report to both commissions and cooperate with the respective IHO MSDI Working Group.

- **WENDWG**

11. BSHC is regularly represented in the WEND Working Group by Finland. The representative shall report to the Commission, including; review of the progress on the work items of WEND, resolving overlaps, ENC distribution and harmonisation, ENC coverage status. BSHC receives the annual report and gives further guidance to the BSHC WENDWG representative.

- **BSHC Internet Domain**

12. BSHC developed an internet domain (www.bshc.pro). It is operated by Sweden. The content is under ongoing development. Major facts about the Members and activities of the Commission are already presented. URL links are provided to GIS applications matching the scope of the Commission and to IHO web pages.

- **Capacity Building**

13. Activities in CB are mainly dealt internally within BSHC. CBSC is chaired by Germany and Germany provides the CB Coordinator for the BSHC.

Difficulties encountered and challenges yet to be addressed

14. Lithuania as BSHC Associate Member is not a member of the IHO. Since Lithuania is currently holding BSHC chair, IHO related activities are therefore effectively processed by the Vice Chair (Germany).

Achievements/Outputs/Conclusions

15. The cooperation within the BSHC is very productive. Several projects have led to joint databases and results provided on the web. The outreach of the hydrographic work in the region and beyond has improved even further.
16. Member States have continued to contribute extensively to the work of the IHO and have been active participants of working groups.
17. There has been substantial cooperation between the commission's Member States and other European States and the EU on information sharing and shared projects.

Actions required of the Assembly

18. The Assembly is invited to note the report.

3. REPORT OF EAST ASIA HYDROGRAPHIC COMMISSION (EAHC)

Chair

Commodore Romeo I HO	Philippines	until October 2013
Commodore Jacinto M. CABLAYAN	Philippines	October 2013 - October 2015
Rear Admiral Dato' Pahlawan ZAAIM bin HASAN	Malaysia	since October 2015

Vice-Chair

Dr Arata SENGOKU	Japan	since April 2016
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Membership

Members

Brunei Darussalam, China, Democratic People's Republic of Korea, Indonesia, Japan, Malaysia, Philippines, Republic of Korea, Singapore, Thailand, Vietnam (provisional)

Observers

Cambodia, Timor Leste, United Kingdom, United States, GEBCO Guiding Committee

Meetings

11 th EAHC Conference	Chiangmai, Thailand	4-6 September 2012
9 th EAHC ENC Task Group Meeting	Incheon, Republic of Korea	25-27 July 2012
10 th EAHC ENC Task Group Meeting	Busan, Republic of Korea	21-22 January 2013
7 th EAHC Coordinating Meeting	Busan, Republic of Korea	23-24 February 2013
1 st EAHC Charting and Hydrography Committee Meeting	Bohol, Philippines	26-28 June 2013
1 st EAHC Training and Research Development Committee Board of Directors Meeting	Busan, Republic of Korea	4-5 September 2013
2 nd EAHC Training and Research Development Committee Board of Directors Meeting	Kuala Lumpur, Malaysia	23 February 2014
2 nd EAHC Charting and Hydrography Committee Meeting	Kuala Lumpur, Malaysia	24-25 February 2014
1 st EAHC Steering Committee Meeting	Kuala Lumpur, Malaysia	26-27 February 2014
3 rd EAHC Charting and Hydrography Committee Meeting	Hong Kong, China	30 July-1 August 2014
3 rd EAHC Training and Research Development Committee Board of Directors Meeting	Singapore	6-8 January 2015
2 nd EAHC Steering Committee Meeting	Singapore	10-12 February 2015
1 st EAHC Regional Chart Coordinating Centre	Singapore	10 February 2015
2 nd EAHC Regional Chart Coordinating Centre	Tokyo, Japan	28 July 2015
4 th EAHC Charting and Hydrography Committee Meeting	Tokyo, Japan	28-30 July 2015
4 th EAHC Training and Research Development Committee Board of Directors Meeting	Manila, Philippines	12 October 2015
12 th EAHC Conference	Manila, Philippines	13-15 October 2015
5 th EAHC Training and Research Development Committee Board of Directors Meeting	Surakarta, Indonesia	22-23 February 2016
3 rd EAHC Steering Committee Meeting	Surakarta, Indonesia	24-26 February 2016

Agenda Items

- EAHC Strategy Plan
- EAHC Membership (Outreach to Cambodia and Timor Leste)
- EA Administrator, hosting of RECC and update on South China Sea & East Asia ENC
- Emergency Disaster Framework

Difficulties encountered and challenges yet to be addressed

- Regional Geographical Name
- Political Influence
- Communication with Democratic People's Republic of Korea

Achievements/Outputs/Conclusions

- EAHC Capacity Building Programme:
 - EAHC Workshop on Seabed Classification, 25-29 June 2012
 - EAHC Workshop on Database Design and Management, 5-9 November 2012
 - EAHC Workshop on Technical Aspects of Maritime Boundaries, Baselines and the Extended Continental Shelf, 19-23 November 2012
 - Seminar on S-100, 9-13 September 2013
 - Marine Spatial Database Infrastructure, 7-10 October 2013
 - Basic Training for Trainers (TFT) in Cartography, 18-29 November 2013
 - Training Course on Maritime Boundaries, 10-14 November 2014
 - Training Course on Tide and Water Level for Hydrographic Survey, 8-12 December 2014
 - Training Course on MSI, 3-5 February 2015
 - Training on Seabed Classification and Multibeam Survey, 5-9 October 2015
 - Tsunami Inundation Mapping Workshop, 25-27 November 2015
 - MSDI and Database Management, 18-22 January 2016
 - 1st Training for Trainers in Hydrography, 24 October – 4 November 2016
- Establishment of East Asia ENC and South China Sea ENC.
- Conceptualisation of Cartographic Boundary.
- Successful outreach:
 - Vietnam and Brunei Darussalam joined IHO
 - Technical Visit to Cambodia, 4-6 December 2013
 - Technical Visit to Vietnam, 5-7 November 2014
- Technical Visit to Brunei Darussalam, 2-4 December 2014
- Technical Visit to Timor Leste, 6-7 December 2016
 - Establishment of Working Groups on Tide Studies, MSDI and MIO.

- Establishment of TRDC website for e-learning.

Actions required of the Assembly

The Assembly is invited to note the report.

4. REPORT OF THE EASTERN ATLANTIC HYDROGRAPHIC COMMISSION (EAtHC)

Chair

Rear Admiral Agostinho RAMOS DA SILVA	Portugal	until 16 November 2012
Ingénieur général Bruno FRACHON	France	16 November 2012 - 18 September 2014
Captain Abdelouahed DIHAJI	Morocco	18 September 2014 - 20 October 2016
Captain Juan A. AGUILAR CAVANILLAS	Spain	since 20 October 2016

Vice-Chair

12 th meeting	Ingénieur général Bruno FRACHON	France
13 th meeting	Captain Abdelouahed DIHAJI	Morocco
14 th meeting	Captain Juan A. AGUILAR CAVANILLAS	Spain

Membership

Members

Cameroon, France, Morocco, Nigeria, Portugal, Spain.

Associate Members

Benin, Cabo Verde, Congo, Côte d'Ivoire, Guinea, Guinea-Bissau, Mauritania, Senegal, Togo.

Observers

Angola, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Gambia, Liberia, Sao Tome and Principe, Sierra Leone, United Kingdom, United States.

Meetings

12 th meeting	Lisbon, Portugal	14 - 16 November 2012
13 th meeting	Casablanca, Morocco	16 - 18 September 2014
14 th meeting	Cádiz, Spain	18 - 20 October 2016

Agenda Items

1. In 2012 Cameroon joined the IHO and became the sixth member of this Commission.
2. Up to the 11th EAtHC Conference three Capacity Building visits were conducted in the EAtHC region –Gabon, Guinea-Bissau and Cameroon, and a basic course in hydrography and cartography, sponsored by the IMO and delivered by SHOM, was planned to the Maritime University of Abidjan, 19 November to 1 December 2012.
3. On November 2013 a seminar on Hydrography and Cartography was held in Pointe Noire (CG) with representatives of IHO (IHO Director and EAtHC Chair), MOWCA and several EAtHC States.
4. On December 2014 there was a MSI workshop for EAtHC members hosted by ARSTM, Abidjan (RCI), organized by SHOM with the support of the IHO Secretariat and ARSTM.
5. A Technical Visit to Liberia was conducted from 3 to 5 February 2016, supported by the Liberia Maritime Authority (LiMA), approved in 2014 by the IHO Capacity Building Sub-Committee to assess the current status of nautical charting and hydrography in the country and to provide advice to the government and to stakeholders on a way ahead. The IHO Secretariat and UKHO jointly formed the visiting team.

6. On July 2016 a Memorandum of Understanding (MoU) establishing cooperation between the IHO and the Maritime Organization of West and Central Africa (MOWCA) was signed.

Difficulties encountered and challenges yet to be addressed

7. As previously stated, since the establishment of the Capacity Building Sub Committee, several technical visits have been conducted and training courses have been offered to the EAtHC countries. Despite these successful activities, it is still necessary to strengthen Capacity Building initiatives in the region, identify more efficient strategies that could be shared by the countries themselves and guarantee the commitment and participation of the concerned coastal States.
8. Although the 13th EAtHC Conference prequels the forthcoming 30th anniversary of the creation of the Commission, progress still needs to be made in the region, and the recurrent absence of some coastal States of the region from EAtHC events is a signal among others. This is an issue still to be solved.
9. Some Member States and/or associates (Rep of the Congo, Côte d'Ivoire, Guinea, Togo) do not have a national Hydrographic Service, although some of them have created specific services to address the safety of navigation and committees for hydrographic and navigation security issues.
10. There exists a big concern about the necessity to know and understand the needs and hydrographic priorities for the Nations as well as to have the right skills and tools to get the message through to all different African governments and try to create a project to integrate all the hydrographic data/information. This issue has been highlighted in all the meetings of the period.
11. There is still a need to check and update the MSI Points of Contact to NAVAREA II Coordinator. This is also a recurrent action present in all the meetings. In much the same way there is also a need to know, and subsequently inform the NAVAREA II Coordinator, the oil platforms locations and moving forecasts.

Achievements/Outputs/Conclusions

12. During the 13th Conference, IHO Director Bessero outlined the fact that this EAtHC Conference had been hosted for the first time by a North African country (Morocco) which meant a real milestone.
13. There have been numerous cooperation projects among Member States and with others outside the region, resulting in a good sharing of information that can be considered as CB relative success.
14. France has carried out several surveys in different States of the Region (Gabon, Sao Tome, Morocco, Cameroon...) as well as photogrammetric works in Côte d'Ivoire, Togo, Benin, Cameroon, Equatorial Guinea, Gabon....
15. Portugal has carried out five surveys in close cooperation with Cabo Verde in 2015, not for CB but in the scope of a bilateral agreement between both States. Besides, one survey was accomplished in the Democratic Republic of Sao Tome and Principe.
16. During this period Portugal and Spain have carried out several joint surveys in the common borders of both countries.
17. The CBSC has increased the presence of courses, workshops and visits to the region, thus improving the access to relevant training for the sub-region, although the difficulties arisen to put in practice the training received due to the lack of equipment.

Actions required of the Assembly

18. The Assembly is invited to note the report.

5. REPORT OF THE MESO AMERICAN AND CARIBBEAN HYDROGRAPHIC COMMISSION (MACHC)

Chair

Rear Admiral Nick LAMBERT	United Kingdom	until December 2012
Rear Admiral Tom KARSTEN	United Kingdom	December 2012 to March 2013
Mr Michel AMAFO	Suriname	March 2013 to March 2015
Captain Marc VAN DER DONCK	Netherlands	since March 2015

Vice-Chair

Mr Michel AMAFO	Suriname	until March 2013
Captain Peter KORTENOEVEN	Netherlands	March 2013 to September 2014
Captain Marc VAN DER DONCK	Netherlands	September 2014 to March 2015
Commander Ricardo LOPEZ CRUZ	Mexico	March 2015 until June 2016
Rear Admiral Fernando Alfonso RODRIQUEZ ANGLI		since June 2016

Membership

Members

Brazil, Colombia, Cuba, France, Guatemala, Jamaica, Mexico, Netherlands, Suriname, Trinidad and Tobago, United Kingdom, United States, Venezuela.

Associate Members

Antigua and Barbuda, Barbados, Belize, Costa Rica, Dominican Republic, El Salvador, Guyana, Haiti, Honduras, Nicaragua, Panama, Saint Lucia, Saint Kitts and Nevis, Saint Vincent and the Grenadines.

The accession of three Associate Members during the reporting period illustrates the vitality of the MACHC.

Meetings

13 th Conference	Antigua, Guatemala	November 2012
14 th Conference	Phillipsburg, Sint Maarten, Netherlands	December 2013
Extraordinary meeting	Monaco	October 2014
15 th Conference	Manzanillo, Mexico	December 2014
16 th Conference	Saint John's, Antigua & Barbuda	December 2015
17 th Conference	Belem, Brazil	December 2016

Agenda Items

- Task numbers refer to the Work Programme for 2016 (see IHO CL 87/2015)

IHO Work Programme 1 – "Corporate Affairs"

Task	Topic	Actions taken
1.1.4	Co-operation with European Union	Cooperation takes place through the IHO/EU Network Working Group (IENWG), in which FR represents the MACHC.

Task	Topic	Actions taken
1.1.8	Co-operation with IALA	- A close relation with IALA is maintained through presence at the MACHC Conferences. - The MACHC Hydrographic Awareness Seminars are joint IALA/IHO/IMO activities.
1.1.12	Co-operation with IMO	- A close relation with IMO is maintained through presence at the MACHC Conferences. - The MACHC Hydrographic Awareness Seminars are joint IALA/IHO/IMO activities. - MSC: Several MS are involved in MSC meetings. - NCSR Subcommittee: Several MS are involved in NCSR meetings.
1.1.14	Co-operation with UNESCO-IOC	GEBCO: A close relation with GEBCO is maintained through presence at the MACHC Conferences and the IBCCA project.
1.1.18	Co-operation with UN-GGIM	A close relation with UN-GGIM Americas is maintained through Mexico.
1.1.20	Co-operation with PAIGH	A close relation with PAIGH is maintained through presence at the MACHC Conferences as an observer.
1.1.20	Co-operation with OECS	A close relation with the Organization of East Caribbean States (OECS) is maintained through presence at the MACHC Conferences as an observer.
1.1.20	Co-operation with THSOA	A close relation with The Hydrographic Society of America (THSOA) and its Latin American chapter is maintained through presence at the MACHC Conferences as an observer.
1.3.4	General Public Relation support	Hydrography was promoted at the highest level of the government of Antigua & Barbuda during MACHC16.

IHO Work Programme 2 - "Hydrographic Services and Standards"

Element	Topic	Actions taken
2.10	Hydrographic Data Acquisition and Processing	MACHC monitors SDB during its conferences, including results of pilot projects within the MACHC region.
2.12	Law of the Sea	MACHC delivered a Maritime Boundaries and Baselines workshop in support of ABLOS in 2015.

IHO Work Programme 3 – "Inter Regional Coordination and Support" (Various Elements)

Task	Topic	Actions taken
3.1.13	South-West Atlantic Hydrographic Commission	A close relation with SWAtHC is maintained through the presence of dual members at the MACHC Conferences.
3.1.15	US and Canada Hydrographic Commission	A close relation with USCHC is maintained through presence of dual members at the MACHC Conferences.
3.1.17	WEND Working Group	US represent the MACHC during WENDWG

Task	Topic	Actions taken
		meetings.
3.1.18	Industry participation	Industry participation is common and appreciated during MACHC Conferences.
3.2.3	MACHC strategy to increase participation of non-Member States in IHO activities	Non-MS are actively encouraged to get involved in MACHC activities.
3.2.11	Approval of pending IHO membership	MS are encouraged to approve pending IHO memberships.
3.3	Capacity Building Management	MACHC CB Coordinator (CBC) represents MACHC in the CBSC.
3.4	Capacity Building Assessment	MACHC CB plan in place, with funded activities and effective management by the CBC.
3.5	Capacity Building Provision	MACHC benefits greatly from the IHO Capacity Building efforts, as coordinated by the CBSC. MACHC is very grateful to Japan and the Republic of Korea for their generous contributions to IHO's Capacity Building efforts. MACHC organizes Hydrographic Awareness workshop, Phase 1 Skills Courses for Spanish speakers, and Technical Aspects of Maritime Boundaries and Baselines workshops.
3.6.1	C-55 Status of Hydrographic Surveying and Nautical Charting World-wide	As a continuous action item, MS are encouraged to update their status in C-55 on an annual basis.
3.6.2	Implementation of the WEND principles	MACHC conducted an internal on-line survey on the implementation of the WEND principles in 2015. 12 MS replied and all considered their data to be available through a RENC and most considered that the WEND principles were being implemented.
3.6.3	ENC schemes, consistency and quality	MACHC monitors its ENC scheme on a quarterly basis and posts updates on its website. It continues to monitor overlaps and gaps and has expanded its criteria for finding gaps in coverage with a focus on cruise ship traffic. NOAA provides port analysis evaluations to this end.
3.6.4	INT Chart Schemes and availability of the INT Chart Series	The INT Chart Scheme is tracked quarterly and updated on an annual basis in S-11. MACHC has made significant progress on completing the INT scheme in its area, most notably in the Pacific Ocean.
3.6.5	Global status of hydrographic surveying	The MACHC encourages MS to update C-55 on an annual basis. The status is less than satisfactory and slowly improving.
3.7	Maritime Safety Information	As a standing topic, MS are urged to distribute MSI, for which NGA has WNWNS facilities available
3.8	Ocean Mapping Programme	MACHC maintains a close relation with GEBCO and its IBCCA regional project.

Task	Topic	Actions taken
3.9	Marine Spatial Data Infrastructures	NL maintains relations with IHO MSDIWG.

Difficulties encountered and challenges yet to be addressed

2. Further developments on the use of Spanish are needed, in order to stimulate membership and active participation. There also is a need for more CB courses in Spanish. MACHC Action item 16.1.6 reads: “*Member States to consider how to provide dual versions in Spanish and English of MACHC documents, for instance as a voluntary service by a Member State.*”
3. The high cost of carrying out surveys and the limits on national budgets during the period have been a limiting factor on survey activity. New acquisition techniques and risk assessment methodologies need to be implemented, in order to gain the most efficient result.
4. Despite the progress, full coverage with ENC’s has not yet been achieved. Priority ports were identified by the MICC WG. The status of August 2016 is 87%.
5. In the region, several MS offer CB events, which is greatly appreciated. The timely coordination of the events is also an additional factor for the MACHC CBC to take into account.

Achievements/Outputs/Conclusions

6. The limited survey capacity needs to be dealt with. The MACHC MS share the task of following developments towards the operationalization of new acquisition techniques. Improving coverage of the MACHC region with paper and digital charts receives considerable attention. Risk Assessment methodologies could assist with the best use of the available resources for survey prioritization and chart adequacy assessments.
7. Some of the MACHC achievements are:
 - a. the renewed focus on MSDI, led by the MEIP Working Group;
 - b. the continued interest in the shared application of risk assessment methodologies;
 - c. the ENC Online initiative, in which several MS allow online access to view their ENC’s of the MACHC region;
 - d. the organization of a series of successful capacity building events, in English and Spanish;
 - e. strong participation of industry during the past Conference;
 - f. a growing suite of ENC’s that better position the needs of shipping in the region;
 - g. an expanded suite of INT charts, most notably in the Pacific Ocean;
 - h. steps towards increased use of Spanish by amending the Statutes, to increase participation of Latin American coastal States. This is done in addition to the use of English as the MACHC working language.

Actions required of the Assembly

8. The Assembly is invited to note the report.

6. REPORT OF THE MEDITERRANEAN AND BLACK SEAS HYDROGRAPHIC COMMISSION (MBSHC)

Chair

Commodore George MATARANGAS	Greece	until 27 September 2013
Captain Erhan GEZGIN	Turkey	27 September 2013 to 2 July 2015
Ingénieur général Bruno FRACHON	France	since 2 July 2015

Vice-chair:

18 th conference (2013)	Captain Erhan GEZGIN	Turkey
19 th conference (2015)	Mr Revaz BABILUA	Georgia

Membership

Members (20)

Algeria, Croatia, Cyprus, Egypt, France, Georgia, Greece, Italy, Monaco, Montenegro, Morocco, Romania, Russian Federation, Serbia (suspended), Slovenia, Spain, Syria, Tunisia, Turkey, Ukraine.

Associate Members (6)

Bulgaria, Israel, Malta, Palestinian Authority, United Kingdom, United States.

Observers

Albania, Germany, Lebanon, DINMA, IOC, IC-ENC, PRIMAR.

Meetings

18 th Conference	Istanbul, Turkey	25-27 September 2013
19 th Conference	Batumi, Georgia	30 June - 2 July 2015

Agenda Items

- IHO Work Programme 1 – “Corporate affairs”

Element 1.1 Cooperation with International

1. MBSHC Member States have been active in participating in the IHO-EU network working group (IENWG) since its inception in 2012. Greece has been named as the MBSHC focal point for the IENWG. Several MBSHC Member States took part in European Commission’s flagship maritime projects EMODnet and its coastal mapping project.

- IHO Work Programme 2 – Hydrographic Services and Standards

Element 2.3 Nautical Cartography

2. The INT scheme and ENC coverage coordination and monitoring is handled by the Region F International Charting Coordination Working Group (ICCWG) which is mainly organized by correspondence. However, side-meetings have been organized alongside to the 19th MBSHC Conference. Since then, MBSHC Member States solicited the Regional Charting Coordinator (RCC) to organize another face-to-face meeting is to be organized alongside the first IHO Assembly in 2017 and the next MBSHC Conference.

3. New INT chart approval process by the Region F ICCWG is currently done through silence procedure initiated by circular letter, according to its Terms of Reference agreed at the 16th MBSHC Conference in 2011.

Element 2.8 Digital Data Updating

4. MBSHC Member States provide on an annual basis their Hydrographic status of surveys map to the Commission. These pieces of information are synthesized through a GIS portal hosted by Spain.

- IHO Work Programme 3 –Inter Regional Coordination and Support

Element 3.1 Co-operation with Member States and attendance at relevant meetings

5. MBSHC is represented to the WEND working group by the Chair of ICCWG for Region F, who participated to every meeting of the WEND WG and took the lead on some actions tasked by the 5th Extraordinary Hydrographic Conference regarding the implementation of WEND principles.

Element 3.2 Increase participation by non-Member States

6. The Commission has endeavoured liaising with non-Member States, and therefore inviting them to take part of the Conference: Malta, Israel, Libya, Montenegro and Georgia attended the 18th Conference in 2013. Lebanon, Malta, Israel attended the 19th Conference in 2015, as Montenegro and Georgia which meanwhile had accessed to membership.
7. During the 19th MBSHC, the IHO Secretariat and Iran gave an informative focus on the hydrographic activities in the Caspian Sea.

Element 3.3 Capacity Building Management

8. At the 17th MBSHC Conference (2011), Turkey was appointed as MBSHC Regional Capacity Building Coordinator. Since then, Turkey has been the official MBSHC representative at the annual Conferences of the Capacity Building Sub-Committee (CBSC) and is in charge of monitoring MBSHC 3 years CB work plan.

Element 3.4 Capacity Building Assessment

9. Since 2012, technical visits have been provided to the following MBSHC coastal States: Albania, Georgia, Israel, Lebanon and Montenegro. Several workshops and courses have been provided for the MBSHC coastal States on various topics: Maritime Safety Information, Multi-beam echo sounders and side-scan sonars systems.

Element 3.9 Marine Spatial Data Infrastructures

10. MBSHC discussed the stakes and feasibility of a Common Bathymetric Database for this region with regards of the forthcoming call for the third phase of the European project EMODnet.

Difficulties encountered and challenges yet to be addressed

11. The main difficulties faced by the MBSHC have been the INT chart schemes and ENC coverage monitoring and coordination: despite a consolidated small scale INT scheme and a growing large scale coverage, mid-scale schemes development have been slowed down by several long-lasting coproduction issues. Those issues have prevented the Commission from disposing of a consolidated regional INT chart catalogue during the S-11 publication era.
12. The 2016 entering into force of the IHO *INTERNATIONAL Chart Web Catalogue* came up with a solid way forward to overcome that situation.
13. As for the Regional ENC coverage, MBSHC is impacted by the lack of progress on a disparate Usage Band 1 scheme, non-consistent with the small scale INT charts scheme covering the

region. Furthermore, the persistency of some UB1 overlapping cases induces some domino effect, which impacts the issue of UB2 overlapping cases, preventing the ICCWG from properly addressing the UB2-3 schemes.

14. Other discrepancies between new ENC and existing INT charts are raising new difficulties regarding consistency of nautical information provided by different producers.

Achievements/Outputs/Conclusions

15. As for the integration of non-Member States in the region, Montenegro and Georgia, two MBSHC States, became respectively the 82nd and 83rd IHO Member States. Following up the entering into force of the new IHO Convention on 8 November 2016, Malta is in the process to present the new request for accession to the IHO Convention by January 2017.
16. Moreover, MBSHC invited States bordering the Caspian Sea at its 20th Conference in 2017 and invited them to the MSI workshop scheduled in late 2015. Following up that decision, Azerbaijan attended the MSI course in Istanbul in October 2015.
17. In order to progress on INT chart coproduction issues, MBSHC discussions have been focusing on examples of good practices as way forward to solve them: at the last Conference, Members agreed that, based on the provision of such technical way forwards, some technical discussions should be kept on bilaterally with the purpose of exploiting those concrete approaches, with the support of the RCC. In 2016, a Region F ICCWG silence procedure was for the first time processed using IHO web GIS solution to review those proposals. At its 19th conference, the MBSHC endorsed the recommendations issued at IRCC7 regarding the revision and monitoring of INT Charts.
18. As for ENC coverage coordination, the MBSHC asked all ENC producer nations concerned by those UB1 overlaps to liaise with each other under the coordination of Italy and to report back to RCC on the resolution of those overlapping cases. The proposal of focusing on larger scale usage bands, UB4-5-6, was approved as a way forward on the approval of ENC schemes in the region. Work on these larger scales is on-going.

Actions required of the Assembly

19. The Assembly is invited to note the report.

7. REPORT OF THE NORDIC HYDROGRAPHIC COMMISSION (NHC)

Chair

Mr Patrik WIBERG	Sweden	from May 2012
Mr Rainer MUSTANIEMI	Finland	from April 2013
Mr Georg LARUSSON	Iceland	from August 2014
Mr Evert FLIER	Norway	from April 2015
Ms Pia Dahl HØJGAAR	Denmark	from April 2016

Vice-Chair

Mr Ralf LINDGREN	Sweden	from May 2012
Mr Jarmo MÄKINEN	Finland	from April 2013
Mr Hilmar HELGASON	Iceland	from August 2014
Mr Noralf SLOTSVIK	Norway	from April 2015
Mr Jens Peter HARTMANN	Denmark	from April 2016

Membership

Members

Denmark, Finland, Iceland, Norway, Sweden

Meetings

- The Commission has met annually since the close of the 18th IHC (April 2012), in accordance with the NHC Statutes:

56 th Meeting	Copenhagen, Denmark	21 - 23 May 2012
57 th Meeting	Arko Island near Norrköping, Sweden	15 - 17 April 2013
58 th Meeting	Helsinki, Finland	19 - 20 August 2014
59 th Meeting	Reykjavik, Iceland	13 - 15 April 2015
60 th Meeting	Stavanger, Norway	11 - 13 April 2016
61 st Meeting	Elsinore, Denmark	6 - 8 March 2017

Agenda Items

- The main subjects dealt with during the reporting period were the following:
 - Report status and plans of nautical publication
 - Validation of multibeam data
 - Multibeam workshops in order to exchange knowledge and share experience
 - Nordic Chart Production
 - ENCs to leisure markets
 - Admiralty Information Overlays (AIO)
 - RENC operations
 - Finland-Sweden Pilot project on harmonisation of depth presentation
 - Revision of NHC Statutes.
 - Nordic Nautical Publication Working Group (NNPWG)

Conclusions

3. The NHC Member States decided that a report on nautical publications should be part of the national reports to NHC.
4. To arrange yearly Hydrographic Survey Technologies workshops and to add Lidar technology and data processing on the agenda for the workshops in order to exchange knowledge and share experience.
5. To continue to arrange Nordic Chart Production Expert Group meetings and to include experiences with Print on Demand solutions in the agenda
6. To continue the discussions about ENCs to leisure markets and to agree on a way forward for digital navigational products for the leisure or non-SOLAS market. The aim of a new ENC service is to enhance safety at sea among leisure craft mariners by providing an official alternative to paper charts as the primary means of navigation.
7. The NHC Member States agreed to review the critical competence needed within each NHC HO and investigate the possibility of arranging common training courses.
8. A procedure for election to the Council was endorsed and will be annexed to the Statutes of NHC. Sweden was elected by the NHC Member States as the first member of the Council.
9. The Statutes of the Nordic Hydrographic Commission were revised October 2014

Actions required of the Assembly

10. The Assembly is invited to note the report.

8. REPORT OF THE NORTH INDIAN OCEAN HYDROGRAPHIC COMMISSION (NIOHC)

Chair

Vice Admiral S K JHA	India	from June 2012 -3 July 2013
Vice Admiral Witoon TANTIGUN	Thailand	from 3 July 2013 - 24 July 2014
Rear Admiral Tom KARSTEN	UK	from 24 July 2014 - 9 June 2015
Rear Admiral Aurangzeb CHOWDURY	Bangladesh	from 9 June 2015 - 14 March 2015
Rear Admiral M Makbul HOSSAIN	Bangladesh	from 14 March 2015 - July 2016
Commander Ahmed Naguib HAFEZ	Egypt	since July 2016

Vice-Chair

Vice Admiral Witoon TANTIGUN	Thailand	from June 2012 - July 2013
Rear Admiral Tom KARSTEN	UK	from 3 July 2013 - 24 July 2014
Rear Admiral Aurangzeb CHOWDURY	Bangladesh	from 24 July 2014 - 9 June 2015
Commander Ahmed Naguib HAFEZ	Egypt	from 9 June 2015 - July 2016
Rear Admiral Vinay BADHWAR	India	since July 2016

Membership

Members

Bangladesh, Egypt, India, Myanmar, Pakistan, Saudi Arabia, Sri Lanka, Thailand, United Kingdom

Associate Members

Australia, France, Oman, Mauritius, Seychelles, United States

Observers

Malaysia, Russian Federation and Sudan

Observer Organizations

International Association of Marine Aids and Lighthouse Authorities (IALA), General Bathymetric Chart of the Oceans (GEBCO), Regional ENC Coordinating Centres (ICENC & PRIMAR) and Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden(PERSGA)

Meetings

13 th NIOHC Meeting	Yangon, Myanmar	19 - 22 February 2013
14 th NIOHC Meeting	Bangkok, Thailand	26 - 28 February 2014
15 th NIOHC Meeting	Muscat, Oman	16 - 18 March 2015 with NICCWG - 15 March 2015
16 th NIOHC Meeting	Chittagong, Bangladesh	14 - 16 March 2016 with NICCWG

Agenda Items

- During the period of this report, the NIOHC annual meetings have been structured to include the following agenda items:
 - Report of the IHO Secretariat

- National reports of Member States
- IHO matters affecting NIOHC, including:
 - NIOHC report to IRCC
 - WEND-WG report
 - HSSC report
 - P-5 update
 - Status of hydrographic surveying and nautical charting (C-55).
- NICCWG meeting: INT chart scheming for Region J, progress made since last meeting, actual charting status; ENC production status; new requirements and modifications proposed to the scheme.
- Discussion of the Regional Capacity Building Management Plan and CBSC technical visits.
- Maximising hydrographic data
- Crowd-sourced bathymetry
- Marine / hydrographic spatial data infrastructure (MSDI)
- Feedback on regional projects

Difficulties encountered and challenges yet to be addressed

2. There is still much to do within the NIOHC region with regard to capacity building to allow Member States to be self-sufficient.

Achievements/outputs/conclusions

3. Member States within the region have been more involved as active participants to the work of the IHO.
4. In regard to capacity building, progress is being made and training obtained from CBSC and other providers at a steady pace.
5. INT chart production is increasing and thus the scheme is increasing in both coverage and currency.
6. A better communication between regional chart coordinators has been achieved to resolve chart overlapping issues during the past year.
7. ENC production in the region has been deemed acceptable for UB1-3; Member States are continuing to refine the scheme and coverage for changing shipping patterns and developments

Actions required of the Assembly

8. The Assembly is invited to note the report.

9. REPORT OF THE NORTH SEA HYDROGRAPHIC COMMISSION (NSHC)

Chair

Ingénieur général Bruno FRACHON	France	until 21 June 2012
Mr Evert FLIER	Norway	21 June 2012 - 27 June 2014
Captain Peter KORTENOEVEN	Netherlands	27 June 2014 - 12 Sept 2014
Captain Marc VAN DER DONCK	Netherlands	12 Sept 2014 - 23 June 2016
Captain Declan BLACK	Ireland	since 23 June 2016

Vice-Chair

Mr Evert FLIER	Norway	until 21 June 2012
Captain Peter KORTENOEVEN	Netherlands	21 June 2012 - 27 June 2014
Captain Declan BLACK	Ireland	27 June 2014 - 23 June 2016
Ms Virginie DEBUCK	Belgium	since 23 June 2016

Membership

Belgium, Denmark, France, Germany, Iceland, Ireland, Netherlands, Norway, Sweden, United Kingdom.

Meetings

30 th meeting	Ålesund, Norway	18-21 June 2012
31 st meeting	Amsterdam, Netherlands	25-27 June 2014
32 nd meeting	Dublin, Ireland	21-23 June 2016

Agenda Items

1. Task numbers refer to the IHO Work Programme for 2016.

IHO Work Programme 1 – Corporate Affairs

Element 1.1 Co-operation with International Organisations and participation in relevant meetings.

Task 1.1.4 European Union Initiatives

2. NSHC Member States have been active in participating in the IHO-EU network working group since its inception in 2012 with substantial cooperation and progress on one of the European Commission's flagship maritime projects European Marine Observation and Data Network (EMODnet) and its coastal mapping project.
3. The NSHC Member States have also been active in the area of the need for maritime spatial planning and the importance of data from Hydrographic Offices to underpin these plans and support development of the blue economy.

Tasks 1.1.5 (FIG) and 1.1.6 (IFHS)

4. Member States actively participate in International Federation of Hydrographic Societies (IFHS) conferences and the tidal working group provided input into the new International Federation of Surveyors (FIG) publication 62 "Ellipsoidally Referenced Surveying for Hydrography"

Task 1.1.12 (IMO)

5. Several Member States including NSHC Hydrographic Offices (HO) representatives are involved in International Maritime Organization (IMO) meetings, in particular the Maritime Safety Committee (MSC) and the Navigation, Communications and Search and Rescue - Subcommittee (NCSR) and their working groups. These are particularly important to HO's in the area of E-NAV, ECDIS, Maritime Safety information and ships routing. The expertise of HO's is invaluable to these organs in supporting safety at sea.

IHO Work Programme 2 – Hydrographic Services and Standards*Element 2.7 Tides and Water Levels*

6. The United Kingdom is represented at both the IHO Tides, Surface Currents and Water Levels working group (TWCWG) and the NSHC Tidal Working Group (TWG). The NSHC Tidal Working Group continues to work on the way to combine existing national models in order to develop a common reference surface for tidal reduction to Chart Datum in the North Sea.

Element 2.13 Surface Currents

7. The Netherlands is represented at both the NSHC Tidal Working Group (TWG) and the IHO Tides, Surface Currents and Water Levels Working Group (TWCWG). The Netherlands keeps the NSHC TWG group aware of the progress being made specifically in the global 'Surface Current' arena.

IHO Work Programme 3 – Inter Regional Coordination and Support*Element 3.1 Co-operation with Member States and attendance at relevant meetings*

Task 3.1.1

8. There are no unresolved matters with Arctic Regional Hydrographic Commission (ARHC): border limit issues were resolved and INT chart Region N was established. ARHC was represented in the NSHC European Union Marine and Maritime Policies Working Group (EU2MPWG).

Task 3.1.2

9. The NSHC Tidal and resurvey working groups maintain contact. The MSDI Working Group is now a merged group between NSHC and BSHC, the Baltic Sea North Sea Marine Spatial Data Infrastructure Working Group (BSNSMSDIWG), and will report to both commissions.

Task 3.1.9

10. The Commission met three times since the 18th International Hydrographic Conference with all Member States attending meetings. Considerable work was undertaken by the Netherlands to the way NSHC manages its list of conclusions. The resulting changes have been adopted by the commission and the list of conclusions has now been replaced by a List of Actions and a List of Decisions to provide more focus on current and future issues rather than a historical record.
11. The statutes of the NSHC have been amended to facilitate the Council representative election process.
12. The NSHC has established a permanent place on internet under www.nshc.pro to raise the profile of our work in the region and inform the public of the work that the commission undertakes. This website was developed, hosted and is maintained by Germany on behalf of NSHC.

Task 3.1.17

13. The United Kingdom provides NSHC representation at the World-Wide Electronic Navigational Chart Database (WEND) Working Group. In addition, the UK provides the Chair of the WEND Working Group.

Task 3.1.18

14. There has been a high level of industry participation in NSHC meetings during the open session of the meetings which appears to be very beneficial to Member States and industry participants.

Element 3.3 Capacity Building Management

Task 3.3.1

15. There are no real capacity building initiatives currently carried out within the NSHC. However a number of the NSHC members are involved in capacity building activities: the CBSC is chaired by Germany and a number of Member States HO's participate; NSHC is represented by Norway.

Element 3.4 Capacity Building Assessment

Task 3.4.1

16. Some Member States of the NSHC, especially the United Kingdom and France have participated in technical and advisory visits to regions outside NSHC.

Element 3.5 Capacity Building Provision

Task 3.5.2

17. Both the UK and France have offered workshops/short courses. Norway provides courses both through PRIMAR and through their Capacity Building project in Albania.

Element 3.9 Marine Spatial Data Infrastructures

Task 3.9.1

18. The MSDI Working Group is now a merged group between NSHC and BSHC (BSNSMSDIWG) and will report to both commissions. There has been sharing of experience and expertise between members that have more developed systems in place with members that are in the process of deciding how to constitute MSDI and how best to utilise the available data that HO's have available to contribute to or indeed underpin decision making.

Difficulties encountered and challenges yet to be addressed

19. The high cost of carrying out surveys and the limits on national budgets during the period have been a limiting factor on survey activity.

Achievements/Outputs/Conclusions

20. Member States have continued to contribute extensively to the work of the IHO and have been active participants of working groups.
21. There has been substantial cooperation between commission Member States and other European States and the EU on information sharing and shared projects.
22. There has been continued progress and cooperation on achieving an up to date bathymetric data set for the North Sea and resurvey strategies.
23. There had been considerable sharing of experiences in MSDI and raising the profile of HO's and the data that they acquire and hold.

24. There is shared progress on the establishment of vertical reference frames, including national chart datums, in particular making efforts to reduce to an acceptable level any differences at national boundaries.

Actions required of the Assembly

25. The Assembly is invited to note the report.

10. REPORT OF THE ROPME SEA AREA HYDROGRAPHIC COMMISSION (RSAHC)

Chair

Commander Thani Harith AL MAHROUKI	Oman	until March 2013
Dr Colonel Adel AL SHAMSI	United Arab Emirates	March 2013 - May 2016
Vacant		since May 2016

Vice-Chair

Mr Vladan JANKOVIC	Qatar	until March 2013
Mr Ahmed PARHIZI	Iran (Islamic Rep. of)	March 2013 - February 2016
Vacant		since May 2016

Membership

Members

Bahrain, Iran (Islamic Rep. of), Kuwait, Oman, Pakistan, Qatar, Saudi Arabia, United Arab Emirates (UAE)

Associate Members:

France, Iraq, United Kingdom, United States

Meetings

5 th Meeting	Riyadh, Saudi Arabia	4-6 March 2013
1 st Extraordinary Meeting	Abu Dhabi, United Arab Emirates	9-11 February 2014
6 th Meeting	Abu Dhabi, United Arab Emirates	9-11 February 2015
7 th Meeting	Muscat, Oman	20-22 February 2017

Agenda Items

1. Feedback from other IHO Bodies affecting RSAHC
 - IRCC
 - CBSC
 - IHO Secretariat
2. RSAHC Activities in the light of IHO Work programme
 - Presentation of national reports: hydrographic surveying, nautical charting, nautical publications and information status
 - Review of status of hydrographic surveying and nautical charting (C-55)
 - INT chart scheme for Region I and NAVAREA IX self-assessment: progress made since last meeting; actual charting status; ENC production status; new requirements and modifications proposed to the scheme.
 - Progress on the implementation of ENC coverage and other issues.
 - WEND WG issues
 - Developments of marine spatial data infrastructure (MSDI) in the region

- Procedures in response to marine disasters
- Revision of RSAHC Statutes

Difficulties encountered and challenges yet to be addressed

3. Political influence on the activities of the Commission
4. Lack of commitment at different levels
5. Communication problems with some members
6. Limited resources and trained personnel
7. Lack of national structures to coordinate national approach to a coordinated effort
8. Limited participation and representation in the IHO meetings

Achievements/outputs/conclusions

9. Increasing involvement in the Capacity Building Programme:
 - a. Technical visit – UAE – December 2013
 - b. Workshop on Port & Shallow Water Surveys – Abu Dhabi, UAE – September 2014
 - c. MSI training – Muscat, Oman – December 2014
 - d. MBES Processing – Abu Dhabi, UAE – June 2015
 - e. Tidal and Water Levels Workshop – Abu Dhabi, UAE – September 2015
10. Leading role for hosting the meetings and assuming Chairmanship by Oman and the UAE
11. High level performance on hydrographic surveys and chart production by Saudi Arabia
12. Strong participation of industry to the RSAHC meetings

Actions required of the Assembly

13. The Assembly is invited to note the report.

- Marine / Hydrographic Spatial Data Infrastructure
- Feedback on Regional Projects
- Revision of SAIHC Statutes

Difficulties encountered and challenges yet to be addressed

2. Participation of Associate Members of SAIHC is unpredictable and non-attendance of Conferences often results in no submission of national reports and therefore no information to improve the SAIHC Capacity Building programme. Technical visits are therefore still the only effective measure to determine progress, gauge capacity building requirements and interact with decision makers on the importance of hydrography.
3. The provision of survey data and reports of changes that may affect safety of navigation in national waters by coastal States to INT Chart producer nations remains problematic and these requirements are constantly communicated.
4. The effective exchange of information is difficult to achieve and communication must improve to allow for better execution of the SAIHC Capacity Building Strategy. Limited Capacity Building options are available as the majority of coastal States must still achieve Phase 1 of Hydrographic development.

Achievements/Outputs/Conclusions

5. Statutes have been amended to reflect the amendments to the IHO Convention.
6. A SAIHC Response to Marine Disasters emergency contact details have been established and are maintained. Efforts will be made to identify and publish secondary contacts for each coastal State.
7. The SAIHC ICCWG has been very successful to maintain the INT Chart Catalogue for Region H and good progress has been made to create a similar ENC catalogue. Future ICCWG meetings will be conducted as an agenda item of SAIHC Conferences to improve the participation of the recipients of an INT Chart production service.
8. There has been a high level of industry participation in SAIHC meetings with ample opportunities to share experiences and contribute to discussions. Active participation of IALA in SAIHC Conferences have added value to discussions and contributed positively to capacity building efforts within the region

Actions required of the Assembly

9. The Assembly is invited to note the report.

12. REPORT OF THE SOUTH EAST PACIFIC REGIONAL HYDROGRAPHIC COMMISSION (SEPRHC)

Chair

Captain Patricio CARRASCO HELWIG	Chile	4 April 2011 - 17 June 2013
Rear Admiral Rodolfo SABLICH LUNA	Peru	18 June 2013 - 12 July 2015
Captain Humberto GOMEZ PROAÑO	Ecuador	since 13 July 2015

Membership

Members

Colombia, Chile, Ecuador, Peru

Observer

Panama

Meetings

11 th Meeting	Lima, Peru	17-19 June 2013
12 th Meeting	Guayaquil, Ecuador	13-16 July 2015

Agenda Items

1. In coordination with SEPRHC members, the IHO Work Programme has been reviewed, also with the necessities from IHO communications, emitting all the regional points of view about specific topics of the IHO Work Programme.
2. Under the auspice of CBSC, all the planning activities on training for SEPRHC members have been accomplished. Other courses have taken place through coordination with and participation from other Regional Commissions, such as MACHC and SWAtHC, in order to increase technical capabilities related to the management of new technologies and IT tools that are used in hydrographic and cartographic productions. As an example, the courses which addressed hydrographic data collection and processing up to the production of paper and electronic nautical charts contributed to an increase in knowledge for all the Hydrographic Offices that are SEPRHC members and the participants from the Hydrographic Commissions mentioned above.
3. In coordination with SEPRHC members, the Capacity Building Plan (from 2018 to 2020) was generated and sent as requested to the CBSC.

Difficulties encountered and Pending challenges

4. There are still some difficulties in the information exchange process in relation with ENC cells located at the borders of the countries, to analyse differences and to access the cells issued by each country.
5. On the other hand, there are difficulties at Government levels in some countries of SEPRHC to attend the IHO meetings in order to meet the commitments required.
6. The change in the representative from SEPRHC to the CBSC with the change in the Chair makes dealing with issues more difficult and causes delays in handling some tasks in the format required by the CBSC. This topic was discussed through videoconference and will be discussed again at the next SEPRHC meeting in 2017 along with the revision of the statutes.
7. At the regional level, there is a lack of technology, data, staff trained in Lidar technology for bathymetric data capture

Achievements / Results / Conclusions:

8. Analysis and monitoring of the IHO Work programme at the regional level.
9. Coordination and development of Capacity Building across the MACHC – SWAtHC – SEPRHC regions.
10. The usage of a videoconference platform through which SEPRHC managed to generate agreements, activities and regional resolutions in relation with IRCC, CBSC and IHO topics.

Actions required of the Assembly

11. The Assembly is invited to note the report.

13. REPORT OF THE SOUTH WEST ATLANTIC HYDROGRAPHIC COMMISSION (SWAtHC)

Chair

Captain Orestes PEREYRA	Uruguay	2011-2012
Rear Admiral Andrés Roque DI VINCENZO	Argentina	2012-2013
Vice Admiral Antonio Carlos PONTES LIMA Junior	Brazil	2013-2014
Captain Gustavo Musso SOLARI	Uruguay	2014-2015
Rear Admiral Andrés Roque DI VINCENZO	Argentina	2015-2016
Vice Admiral Marcos Sampaio OLSEN	Brazil	2016-2017

Vice-Chair

Rear Admiral Andrés Roque DI VINCENZO	Argentina	2011-2012
Vice Admiral Marcos NUNES de MIRANDA	Brazil	2012-2013
Captain Gustavo Musso SOLARI	Uruguay	2013-2014
Rear Admiral Andrés Roque DI VINCENZO	Argentina	2014-2015
Vice Admiral Marcos Sampaio OLSEN	Brazil	2015-2016
Captain Gustavo Musso SOLARI	Uruguay	2016-2017

Membership

Members

Argentina, Brazil, Uruguay

Associate Member

Paraguay

Observer

Bolivia

Meetings

6 th Meeting	Montevideo, Uruguay	15-16 March 2012
7 th Meeting	Buenos Aires, Argentina	18-19 March 2013
8 th Meeting	Arraial do Cabo – Brazil	20-21 March 2014
9 th Meeting	Montevideo, Uruguay	19-20 March 2015
10 th Meeting	Buenos Aires, Argentina	07-08 April 2016

Agenda Items

1. review and modification of SWAtHC Statutes to change the presidential term, in order to bring it into line with the IHO Council.
2. review of information on survey status and input to IHO Publication C-55
3. progress on INT charting in the region
4. progress on ENC developments in the region, including distribution
5. progress about IEHG activities
6. Capacity Building in the region, including training

Difficulties encountered and challenges yet to be addressed

7. Derived products of S-100 (having concluded Workshop S-100 in Uruguay-2014).

Achievements/Outputs/Conclusions

8. The main conclusions and recommendations from the SWAtHC meetings are as follows:
 - a. The Commission is committed to developing cooperation with IHO Member States, Non-IHO Member States, adjacent Regional Hydrographic Commissions, other International Organizations and Industry;
 - b. The SWAtHC would like to highlight that ENC coverage of the region is progressing well and ENC Harmonization in border areas between Argentina and Uruguay - Rio de la Plata. Result satisfactorily achieved, after agreement between the parties.
 - c. Signed the contingency plan by the representatives of NAVAREA V (Brazil) and NAVAREA VI (Argentina) in 2016.
9. The following visits and trainings were undertaken:
 - a. Technical Visit to Paraguay led by Brazil with IHO Secretariat 13 - 16 January 2014.
 - b. Multibeam training course -Practice on data acquisition and processing (with the SEPRHC and the MACHC) led by SHN, Argentina, 12-17 October 2016.
 - c. Tide training course (with the MACHC) led by DHN, Brazil, 3-7 October 2016.
 - d. International ENC Validation training course led by IC-ENC and Panama Canal Authority, Panama, 5-16 September 2016.
 - e. MSDI Workshop (with the MACHC and the SEPRHC) led by DHN, Brazil, 23-27 November 2015.
 - f. Seminar on S-100 led by SOHMA, Uruguay, 18-20 November 2015
 - g. Technical Workshop on Hydro/Cartography River Survey, for SEPRHC, SWAtHC MACHC led by Peru, 22 - 24 October 2014.
 - h. Regional Workshop in Hydrographic Production Database (HPD) invited by SEPRHC, Peru, 2-6 Sep 2013.
 - i. Processing and Administration of Spatial Databases (with the SEPRHC and the MACHC) led by DHN, Brazil 26-30 November 2012.
 - j. Brazil offers place of Foreign Countries for the courses on Hydrography CAT "A" and CAT "B".
 - k. Argentina offers place of Foreign Countries for the courses on Hydrography CAT "B" and Cartography CAT "A".

Actions required of the Assembly

10. The Assembly is invited to note the report.

14. REPORTS OF THE SOUTH WEST PACIFIC HYDROGRAPHIC COMMISSION (SWPHC)

Chair

Mr Nicholas PION	Papua New Guinea	until May 2012
Rear Admiral Nick LAMBERT	United Kingdom	June 2012 - December 2012
Rear Admiral Tom KARSTEN	United Kingdom	December 2012 - February 2014
Commodore Brett BRACE	Australia	February 2014 onwards

Vice-Chair

Commodore Rod NAIRN	Australia	until May 2012
Mr Nicholas PION	Papua New Guinea	June 2012 - December 2016
Lieutenant Commander Gerard ROKOUA	Fiji	December 2016 onwards

Membership

Members

Australia, Fiji, France, New Zealand, Papua New Guinea, Tonga, United Kingdom, United States

Associate Members

Cook Islands, Kiribati, Niue, Palau, Samoa, Solomon Islands, Vanuatu

Observers

New Caledonia, Tuvalu

Observer Organizations

IALA, IMO, GEBCO, Pacific Community (SPC)

Meetings

12 th meeting SWPHC12	Port Vila, Vanuatu	12-14 November 2013
13 th meeting SWPHC13	Rarotonga, Cook Islands	25-27 February 2015
14 th meeting SWPHC14	Nouméa, New Caledonia	30 November - 2 December 2016

Agenda Items

1. The main agenda items dealt with since the 18th International Hydrographic Conference pertain to the following:
 - a. Exchange of information through reports on hydrographic surveying and charting activities in the region
 - b. Capacity Building - particularly increasing Government awareness of hydrographic responsibilities among the Pacific Island Countries and Territories (PICTs), followed by training of personnel in hydrographic surveying and cartography.
2. Accordingly the SWPHC activities, aligned with the structure of relevant components of the IHO Work Programme, have been as follows:

IHO Work Programme 3 –Inter-Regional Coordination and Support*Element 3.1 Co-operation with Member States and attendance at relevant meetings*

Task 3.1.14 South West Pacific Hydrographic Commission

3. The Commission met three times since the 18th International Hydrographic Conference with all Member States attending the meetings.

Task 3.1.18 Industry participation in RHC meetings

4. There has been a significant level of industry participation in SWPHC meetings, which included a half day ‘Industry Session’ in the programme. Representatives were invited as Expert Contributors and provided valuable input to the capacity building initiatives.

Task 3.1.19 Contribute to improving the framework of IHO response to marine disasters

5. The South West Pacific region was impacted by significant natural disasters in recent years, including “Severe Tropical Cyclone PAM” in March 2015 affecting Vanuatu mainly and “Severe Tropical Cyclone WINSTON” which struck Fiji in February 2016. The Chair of SWPHC in close coordination with the IHO Secretariat monitored the impact of these disasters and implemented the IHO Resolution 1/2005, as amended. SWPHC Members provided direct and indirect support to the countries affected by these disasters.

Element 3.2 Increase participation by non-Member States

Task 3.2.10 Execute strategy to increase participation of non-Member States in IHO activities and advise them on how to comply with international regulations such as SOLAS V

6. Most non-Member States in the region attended the SWPHC meetings and workshops during the reporting period. The IHO Technical Assessment and Advice Visits augmented with CB activities in the region have resulted in Vanuatu and Solomon Islands applying for IHO membership.

Element 3.4 Capacity Building Management

Task 3.4.1 Technical and Advisory Visits

7. The following technical and advisory visits were carried out in the region:
 - a. Technical Visit to Cook Islands to facilitate National Hydrographic Requirements (October 2013) – by NZ National Hydrographer as part of Hydrography Risk Assessment for Cook Islands
 - b. Technical Visit to Tonga (March 2014) – by NZ National Hydrographer as part of Hydrography Risk Assessment for Tonga
 - c. Technical Implementation Visit to Vanuatu (November 2015) – by UKHO and SPC
 - d. Technical Assessment Visit to Kiribati (November 2015) – by UKHO and SPC
 - e. Technical Assessment Visit to Niue (February 2016) – by NZ
 - f. Technical Assessment Visit to Samoa (August 2016) – by NZ

Element 3.5 Capacity Building Provision

Task 3.5.2 Technical workshops, seminars, short courses

8. The following were carried out in the region:
 - a. MSI Regional Workshop (August 2014) – Led by New Zealand
 - b. Technical Workshop on Hydrography and Hydrographic Governance (February 2015) – Led by LINZ; Presenters from AUS, NZ, UKHO, SPC
 - c. Tides & Water Levels Technical Workshop (August 2015) – Led by Australia
 - d. MSI Regional Workshop (August 2016) – Led by New Zealand
 - e. Technical Workshop for PICTs in Formulating and Implementing Strategic Development Plans for Hydrography (November 2016) – Led by New Zealand; Presenters from Australia, New Zealand, United Kingdom, IALA, SPC
9. The strategy of preceding SWPHC meetings with a CB workshop has proved very beneficial, with the 2016 workshop and meeting attended by approximately 50 persons, many of which were from PICTs. All participants were extremely active and contributed to collective and own knowledge of hydrography.

Task 3.5.4 On the Job Training (Ashore / On board)

10. The following were carried out in the region:
 - a. PNG National Hydrographic Capability Development (November-December 2012) – attachment of two cartographic staff from Papua New Guinea to the Australian Hydrographic Office
 - b. Solomon Islands National Hydrographic Capability Development (August 2014) – attachment of one cartographic staff from Solomon Islands to the Australian Hydrographic Office

Element 3.6 Coordination of Global Surveying and Charting

Task 3.6.3 RHC to coordinate ENC schemes, consistency and quality;

Task 3.6.4 Maintenance of INT chart schemes and improvements of availability of the INT chart series

11. The regional International Charting Coordination Working Group (SWPHC ICCWG) was established in 2012 and comprises Producer Nations who publish Paper Charts and ENCs in the region. It is chaired by Australia, the INT Chart Co-ordinator for Region 'L'. Its main responsibility is the coordination of nautical charting in the region, ensuring the paper chart INT series is comprehensive and current, and the ENC coverage is appropriate. The main focus is on paper charts at 1:500,000 and smaller and ENC Navigational Purpose 1 and 2 coverage.
12. The Producer Nations (Australia, France, New Zealand, United Kingdom and United States) maintain good working relationships with the Hydrographic Offices / National maritime jurisdictions and/or Governments of the countries they chart.

Element 3.7 Maritime Safety Information

Task 3.7.1 Sub-Committee on the World-Wide Navigation Warning Service (WWNWS-SC)

13. The region is covered by NAVAREAS X (Coordinator: Australia) and NAVAREA XIV (Coordinator: New Zealand). Both coordinators attended the annual meetings of WWNWS-SC and provided the MSI Self-Assessment Reports for their respective areas.
14. New Zealand's Pacific Regional Navigation Initiative (PRNI), a 5-year programme (2015-2019) to improve maritime safety throughout the region – includes hydrography risk assessment for Niue, Samoa and Tokelau, capacity building to assist PICTs reach Phase 1 of IHO CB Strategy, in particular establishment of National MSI Coordinator position

Achievements/Outputs/Conclusions

15. All PICTs have made progress on hydrographic activities, and in the case of Fiji, Papua New Guinea, Solomon Islands, Tonga and Vanuatu it has been significant.
16. PICTs recognize the value of hydrographic data for the development of the region, and the need to establish a regional hydrographic data gathering capability. The Pacific Regional Energy and Transport Ministers Meeting in April 2014 endorsed the establishment of a hydrographic unit at SPC to develop and further enhance regional hydrographic services to Members, and also supported PICTs becoming Members of the IHO and SWPHC.
17. Vanuatu and Solomon Islands have applied for IHO membership.
18. New Zealand developed a GIS-based risk assessment methodology to determine surveying and charting priorities, and to date has effectively used this for work in the Cook Islands, New Zealand, Niue, Tonga and Vanuatu.
19. New Zealand's PRNI to improve maritime safety throughout the region includes hydrography risk assessment for Niue, Samoa and Tokelau, and capacity building to assist PICTs reach Phase 1 of IHO CB Strategy, in particular the establishment of National MSI Coordinator position.
20. New Zealand has signed a bilateral arrangement with Cook Islands, and is progressing one with Tonga.
21. Australia is working with UKHO and Solomon Islands Maritime Safety Administration (SIMSA) to assume the role of primary charting authority for Solomon Islands in early 2017.
22. SWPHC Statutes were amended to reflect selection of State(s) that will occupy seat(s) on IHO Council allocated to SWPHC.
23. SWPHC is committed to carrying forward hydrographic, nautical cartographic and capacity building activities in close alignment with IHO objectives and goals.

Difficulties encountered and challenges yet to be addressed

24. Capacity of the Capacity Builders.
25. More, potentially too much, is being asked of the RHCs and RHC Chairs; which then impacts delivery.

Actions required of the Assembly

26. The Assembly is invited to:
 - a. note the report.
 - b. note the value of preceding SWPHC meetings with CB related workshops.

15. REPORT OF THE USA AND CANADA HYDROGRAPHIC COMMISSION (USCHC)

Co-Chairs

Dr Savi NARAYANAN (Canada) and Captain John LOWELL (USA) from April 2012
 Rear Admiral Gerd GLANG (USA) and Dr Savi NARAYANAN (Canada)
 from April 2013
 Mr Denis HAINS (Canada) and Rear Admiral Gerd GLANG (USA) from April 2014
 Rear Admiral Shep SMITH (USA) and Mr Denis HAINS (Canada) from August 2016

Membership

Members

Canada and United States

Meetings

1. The Commission has met at least annually since the close of the 18th IHC:

35 th Meeting	Niagara Falls, Canada	14 May 2012 Observers: IHO & UK
36 th Meeting	New Orleans, USA via WebEx video conference call	29 April 2013 Observers: IHO & UK
37 th Meeting	St. John's, Newfoundland, Canada	16 April 2014 Observers: IHO & UK
38 th Meeting	National Harbor, (MD), USA	16 March 2015 Observers: IHO, Mexico & UK
39 th Meeting	Halifax, Nova Scotia, Canada	16 May 2016 Observers: IHO & UK
Extraordinary meeting	Silver Spring, MD, USA	25 August 2016

Agenda Items

2. The main subjects dealt with during the reporting period were the following:
 - Selection of USCHC representative to the IHO Council.
 - Marine Spatial Data Infrastructure (MSDI).
 - Trans-boundary ENC overlaps.
 - Crowd-sourced bathymetry (CSB).
 - Remote sensing (e.g. LiDAR) and satellite-derived bathymetry (SDB).
3. USCHC workings groups:
 - Chart Advisors Committee

Difficulties encountered and challenges yet to be addressed

4. The future of the paper chart.
5. Implementation of S-100.

6. Increasing need for improved data and navigational products e.g. e-navigation, marine services portfolios (MSPs).
7. Investigate potential of crowd-sourced bathymetry (CSB) and engagement of the Cruise Liners Industry Association (CLIA).
8. Investigate potential of remote sensing (such as LiDAR) and satellite-derived bathymetry (SDB).
9. Policies for collection, integration, and qualification of “non-traditional” sensor derived data e.g. bathymetry.
10. CATZOC attribution.
11. USCHC support for the INT charting programme.
12. Timely response to IHO/IRCC reporting requirements and relevant action items.

Conclusions

13. USCHC successfully resolved the ENC overlaps between the two countries. This was the major collaborative effort and major success of the Commission for this reporting period.
14. Member States have continued to support the applications of States to the IHO
15. WebEx and teleconference calls are being used at the working level between MS to share experiences and information.
16. MS continue to explore areas for continued collaboration and cooperation e.g. better lines of communication have been established to ensure there are no further overlap issues.
17. The return to scheduling the USCHC conferences in conjunction with the US/CA Hydrographic Conferences has proven to be of great benefit for all parties.

Actions required of the Assembly

18. The Assembly is invited to note the report.

16. REPORT BY THE HYDROGRAPHIC COMMISSION ON ANTARCTICA (HCA)

Chair:

Mr Robert WARD Secretary-General, IHO since Sept. 2012

Vice-Chair

Mr John J. HAUMANN United States since October 2012

Secretary

Mr Michel HUET IHO Secretariat until May 2014

Mr Yves GUILLAM IHO Secretariat since July 2014

Membership

Members

Argentina, Australia, Brazil, Chile, China, Colombia, Ecuador, France, Germany, Greece, India, Italy, Japan, New Zealand, Norway, Peru, Republic of Korea, Russian Federation, South Africa, Spain, United Kingdom, United States, Uruguay, Venezuela

Observer Organizations

Antarctic Treaty Secretariat (ATS), Council of Managers of National Antarctic Programmes (COMNAP), International Association of Antarctic Tour Operators (IAATO), Scientific Committee on Antarctic Research (SCAR)⁵, International Maritime Organization (IMO), Intergovernmental Oceanographic Commission (IOC), General Bathymetric Chart of the Oceans (GEBCO), International Bathymetric Chart of the Southern Ocean (IBCSO)

Meetings

12th meeting (HCA12) Montevideo, Uruguay 10-12 October 2012

13th meeting (HCA13) Cádiz, Spain 3-5 December 2013

14th meeting (HCA14) Tromsø, Norway 28 - 30 June 2016

Agenda Items

1. The following notable topics have been discussed at the meetings:
 - a. Data collection, crowd-sourced bathymetry, data recovery.
 - b. Contribution to the IMO Polar Code in relation to precautions in using nautical charts in Polar waters.
 - c. Survey priorities, monitoring of new maritime shipping routes, ENC and INT chart scheming.
 - d. Outreach: engagement with ATCM, COMNAP, SCAR, co-operation with IAATO, IBCSO.
 - e. IHO HCA GIS for Antarctica and other Antarctica geospatial portals.
 - f. Hydrography equipment for use in Antarctic environment, polar vessels.

⁵ SCAR through the British Antarctic Survey and the Norwegian Polar Institute.

Difficulties encountered and challenges yet to be addressed

2. Participation of HCA Members and stakeholders in IHO HCA Conferences is somewhat unpredictable. Achieving the quorum of $\frac{1}{3}$ of the HCA Members has sometimes been difficult. Practical liaison and the regular, systematic exchange of information and experience between HCA (IHO) national representatives and other in-country national representatives involved in Antarctic operations and in representation in other bodies at the international level continue to be limited and sub-optimal.
3. The effective exchange of information and an awareness of the activities and complementary aims of the IHO HCA and those of other international organizations concerned with Antarctica are difficult to achieve.
4. Raising an awareness of hydrography in the ATCM is not easy.

Achievements/Outputs/Conclusions

5. Statutes amended (to provide flexibility in the scheduling of Conferences, inclusion of recent ATCM Resolutions in relation to hydrography).
6. Ongoing development and maintenance of a Hydrographic Survey Priorities Plan
7. Development of Guidelines for bathymetric observations by Ships of Opportunity.
8. Development of IHO GIS for Antarctica, supporting ENC and INT chart scheming, and monitoring of production status.
9. Revitalisation of liaison between HCA Secretariat and COMNAP, IAATO, SCAR and the Executive Secretary of the Antarctic Treaty in 2016.

Actions required of the Assembly

10. The Assembly is invited to note the report.