INTERNATIONAL HYDROGRAPHIC ORGANIZATION

ANNUAL REPORT 2017

Edition 1.0.5

Published by the International Hydrographic Organization – Monaco

FOREWORD

The year 2017 can be regarded, with good reason, as extraordinary in the history of the International Hydrographic Organization. As a result of the finalization of the adoption process of the revised Convention in the preceding year, the IHO held its first Assembly, first election of a Secretary-General and two subordinate Directors and its first Council meeting. Another very significant change which took place following the approval of the amended Convention on the IHO was the renaming of the former International Hydrographic Bureau to 'IHO Secretariat'. Even though this renaming entered into force with immediate effect in November of the year before, 2017 was the first year that it was really regarded under this new naming and all written reference to the IHB was removed. Another milestone for our Organization!

These events have been more than merely of administrative nature. Their conduct and results demonstrate that the Organization is now prepared to address the needs of international collaboration in hydrography under arrangements which are fully synchronized with specialized agencies of the United Nations (UN). Our established liaisons with UN bodies and other expert organizations will take further benefit from these important rearrangements and deliver prospects to encourage new members to join. Overall however, it is now upon all of those who work for the Organization within the various activities representing their respective national interests, to bring to life those motivations which have been the prime objective for the renewal of the Convention, as pointed out at the beginning of the revision process which started fifteen years ago: *"To maintain the strengths, eliminate the weaknesses, achieve the Vision, Mission and Objectives of the IHO and be a more effective and cost-effective system."*

Committed to the World Hydrography Day theme for 2017 "Mapping our Seas, Oceans and Waterways - more important than ever" the 88 Member States progressed collaboratively on important subjects as addressed under the Strategic Plan in place and the detailed associated Work Programme. The relevant chapters of this report reflect this in more detail. The achievements resulting from the work carried out in the various Working Groups, by Member State representatives and designated industry experts, are impressive. Relevant progress was achieved in the development of the S-100 framework; the standardization of the practical aspects of hydrographic survey was revived and capacity building activities resulted in a so far unseen amount of actions in quality and quantity.

All this has been extensively discussed at the first Assembly. One of the results was the call for improved awareness for a future of data centric treatment of hydrographic information and their broad application even beyond the classic field of navigation. The collective response is the establishment of a process to revise the Strategic Plan which will become valid from 2019 onwards and for the next six years thereafter. The Assembly called for the necessary arrangements, but the Council will implement them – fully in line with the intentions of the revised convention as it was written more than twelve years ago. By means of this and other important recommendations, the Council now effectively acts in operational control of the Organization for the inter Assembly period. One important directive by the Council to the Secretariat was to overhaul the outreach strategy of the Organization. Therefore a first subsequent activity at the Secretariat was defining a critical survey of all of the Secretariat's communication means and digital working arrangements. A first workshop gained promising results in terms of plans and aspirations to be addressed before the next Assembly.

As one of the noted rearrangements under the new Convention, the financial supervision is now placed under the authority of the Council. Thanks to the conservative budgetary approach by the previous Directing Committee and approved by the Member States, the fiscal treatments resulted in a well-balanced outcome at the end of the year. As in previous years it is proposed that the bulk of the accrued surplus be transferred to the Capacity Building Fund, but also to allocate a smaller amount towards the centenary celebrations of the establishment of the international cooperation in Hydrography. The centenary celebrations will promote and remind the public of the remarkable milestones of the first Hydrographic Conference held in London in 1919 and the foundation of the International Hydrographic Bureau in 1921 and will offer the unique opportunity to highlight the best traditions and the present relevance of hydrography. It likewise allows the hydrographic community

to emphasize the astounding continuity of the significant support of the Principality of Monaco for the Organization in a centenary which saw a wealth of discontinuity and disruption. It seems appropriate to quote here the reasoning for the placement of the Organization in Monaco from the first yearbook ever published in 1923 because of its steady validity: *"One of the reasons connected with the selection of Monaco for the seat of this Bureau was the world-wide activities of the Prince which had raised Monaco into such an extraordinary center for the gatherings of international scientific organizations, and it naturally has been anticipated that this Bureau would share appreciably in the resulting benefits."* The enduring generous support and interest in the Organization was symbolically reaffirmed with the signing of the revised host nation agreement between the Government of Monaco and the International Hydrographic Organization in the margins of the first Assembly.

In full appreciation of the historic achievements gained so far and under the regime of the revised Convention, it is the right time for the Secretariat to undertake the noted review of some internal working arrangements to adapt to the digital environment. Thanks to the excellent work of the previous Directing Committee and the Member States, the Organization is in good shape. Manned by professional staff from relevant professions, presenting a good mixture of experience and skills, the relevant output such as standardization in technical and educational aspects is well accepted; the scope and the amount of the Capacity Building programme is still on a rise and collaboration with relevant organizations of the maritime domain such as IMO, IOC and IALA has reached excellent levels. Moreover, the intensified contribution to facilitate the United Nation´s programme for global geospatial management and the increased emphasis on aspects of Marine Spatial Data Infrastructure (MSDI) assist the Member States to adapt their hydrographic services to their future role as a national hub for marine geo-information, but also to maintain their role as official provider of nautical information for all those at sea. This approach symbolizes the way the organization is aiming to proceed: maintain tradition and address the challenges of digital age at the same time.

Monaco, 1st May 2018

Abri Kampfer	Dr Mathias Jonas	Mustafa Iptes
Director	Secretary-General	Director

INTRODUCTION

The Secretariat is pleased to present the Annual Report of the activities of the Organization for 2017. This report provides an account of the principal activities and achievements of the IHO, the subordinate bodies of the Organization and the Secretariat during the year. The report also describes the cooperation and participation of other international organizations and stakeholders in the execution of the IHO Work Programme. The report consists of two parts:

Part 1 – General

Part 1 provides short summary reports and observations on the execution of the IHO Work Programme. Part 1 is structured based on the three parts of the Work Programme: Corporate Affairs, Hydrographic Services and Standards and Inter-Regional Coordination and Support. In this way the Report is also directly related to the technical structure of the Organization which is based on the Secretariat (Corporate Affairs) function and the two principal Committees - the Hydrographic Services and Standards Committee (HSSC) and the Inter-Regional Coordination Committee (IRCC). As far as possible, Part 1 of the Report follows the same structure and uses the same headings as in the approved Work Programme. Some of sequential rearrangements and rephrased headings are made to purposely highlight items of special relevance. Work Programme items which did not enjoy specific activity within the course of the year are not listed in this report.

Part 2 – Finance

Part 2 provides the financial statement and accounts for 2017 together with the report of the external auditor.

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PART 2 - FINANCE

PART 1 – GENERAL

Summary reports and observations on the execution of the IHO Work Programme

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MEMBER STATES OF THE INTERNATIONAL HYDROGRAPHIC ORGANIZATION (IHO) – 31 December 2017

Algeria	Monaco
Argentina	Montenegro
Australia	Morocco
Bahrain	Mozambique
Bangladesh	Myanmar
Belgium	Netherlands
Brazil	New Zealand
Brunei Darussalam	Nigeria
Cameroon	Norway
Canada	Oman
Chile	Pakistan
China	Papua New Guinea
Colombia	Peru
Croatia	Philippines
Cuba	Poland
Cyprus	Portugal
Democratic People's Republic of Korea	Qatar
Democratic Republic of the Congo*	Republic of Korea
Denmark	Romania
Dominican Republic*	Russian Federation
Ecuador	Saudi Arabia
Egypt	Serbia*
Estonia	Seychelles
Fiji	Singapore
Finland	Slovenia
France	South Africa
Georgia	Spain
Germany	Sri Lanka
Greece	Suriname
Guatemala	Sweden
Iceland	Syrian Arab Republic
India	Thailand
Indonesia	Tonga
Iran (Islamic Republic of)	Trinidad and Tobago
Ireland	Tunisia
Italy	Turkey
Jamaica	Ukraine
Japan	United Arab Emirates
Kuwait	United Kingdom of Great Britain and Northern Ireland
Latvia	United States of America
Malaysia	Uruguay
Malta	Vanuatu
Mauritius	Venezuela (Bolivarian Republic of)
Mexico	Viet Nam

***** *Rights of membership suspended*

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IHO SECRETARIAT up to 31st August 2017

Secretary-General	Directors
Robert WARD, Australia	**Mustafa IPTES,** Turkey
	
	Gilles BESSERO, France
	

IHO SECRETARIAT from 1st September 2017

Secretary-General	Directors
Dr Mathias JONAS, Germany	**Abri KAMPFER,** South Africa
	
	Mustafa IPTES, Turkey
	

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Managerial Staff

Alberto PEDRASSANI COSTA NEVES	(Brazil)	Cooperation and Capacity Building	
Yves GUILLAM	(France)	Charting and Services	
Anthony PHARAOH	(South Africa)	Digital Technology	
David WYATT	(United Kingdom)	Surveying and Operations	
Ghislaine FAUCHOIS	(France)	Manager, Finance and Administration	

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Translators

Isabelle ROSSI	Head French Translator	
Perrine BRIEDA SAUVEUR	French Translator	
Mary Paz MURO	Spanish Translator	

Technical, Administrative and Service Staff

Isabelle BELMONTE	Website and Publications Editor	
Sandrine BRUNEL	Administrative and Accounting Assistant	
Lorène CHAVAGNAS	Office Assistant	

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Dan COSTIN	Information Technology Officer	
Caroline FONTANILI	Personal Assistant	
Arezki MAACHE	Bureau Support Assistant	
Daniel MENINI	Cartography and Graphics Assistant	
Mireille MOLLET	Registrar, Librarian	
Jeff WOOTTON	Technical Standards Support Officer	

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Associate Professional Officers

Yong BAEK (until March 2017)	(Republic of Korea)	S-100 Registry & Online Registration Projects	
Junghyun KIM (from March 2017)	(Republic of Korea)	Capacity Building, Assistant to Council-1 meeting	
Dr Kentaro KANEDA	(Japan)	GIS and IT Projects	
Luis HERNANDEZ RUBIN (until January 2017)	(Peru)	Spanish Dictionary revalidation project	
Atilio ASTE (from March 2017)	(Peru)	Council Managing Assistant	

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WORK PROGRAMME 1
Corporate Affairs

Introduction

IHO Work Programme 1 "Corporate Affairs" covers the provision of the principal organs as well as the other services of the Secretariat of the IHO including the management and fostering of relations with other international organizations. Work Programme 1 is executed primarily by the Secretariat, under the leadership of the Secretary-General assisted by the two Directors.

IHO Assembly and Council

The first Session of the Assembly

In accordance with the revised governance structure that entered into force on 8 November 2016, the first session of the Assembly of the International Hydrographic Organization was held in the Rainier III Auditorium in Monaco, from 24 to 28 April 2017. The Assembly replaces the International Hydrographic Conference that met previously every five years with a sequence of three years. This very first Assembly session in IHO´s history was attended by just under 350 representatives from 77 of the 87 Member States of the IHO, together with 12 non-Member States. In addition, 28 representatives from international, regional or national observer organizations took part in the discussions. A meeting of the Finance Committee was held immediately before the Assembly on 23 April. Two exhibitions, one illustrating the work of the IHO Member States and another provided by 30 commercial exhibitors, ran from 24 to 28 April.

Dr Parry Oei, the Chief Hydrographer of Singapore, and Captain Brian Connon, USN, representative of the United States of America, were elected as Chair and Vice-Chair of the Assembly respectively.

The IHO was honoured by the presence of HSH Prince Albert II of Monaco who formally opened the Assembly and the exhibitions on Monday 24 April. In addition HSH Prince Albert II of Monaco presented the Prince Albert I Medal for Hydrography to Mr Juha Korhonen of Finland in recognition of his long-standing contribution to world hydrography and to the work of the IHO.

The Secretary-General, Robert Ward, and the Chair of the Assembly delivered welcoming addresses. The keynote speakers were Mr Kitack Lim, Secretary-General of the International Maritime Organization; Professor Petteri Talaas, Secretary-General of the World Meteorological Organization; and Mr Michael Lodge, Secretary-General of the International Seabed Authority. During the opening ceremony representatives of Cameroon, Georgia, Viet Nam, Brunei Darussalam and Malta presented their flags to the Organization in recognition of joining the Organization since its last Conference in 2012.

The Assembly examined 13 proposals and several reports tabled by Member States, by subordinate organs and by the Secretary-General. The Assembly agreed on 30 decisions including the approval of the Work Programme and Budget of the Organization for the next three-year period.

An important item on the Agenda of the Assembly was the election of the Secretary-General and Directors for the forthcoming period. The elections took place on Friday 28 April: Dr Mathias Jonas (Germany) was elected as the next Secretary-General and Captain Abraham Kampfer (South Africa)

was elected as a Director for the period 2017-2023. Director Mustafa Iptes (Turkey) was re-elected as a Director for the period 2017-2020. All took up their posts on 1 September 2017.

The Assembly unanimously adopted a Resolution expressing the IHO's appreciation to HSH Prince Albert II of Monaco and his Government for the support provided for the important event.

One warship, FNS Commandant Bouan, from France, and three survey ships, NPqHo Vital de Oliveira from Brazil, INS Aretusa from Italy, and HMS Echo from the United Kingdom, called at Monaco on the occasion of the Assembly and delegates had the opportunity to visit them.

The Assembly agreed in principle to host its second session from 19 to 25 April 2020 in Monaco, subject to confirmation by the Secretary-General, in liaison with the Government of His Serene Highness the Prince of Monaco.

The first Session of the Council

As an another important consequence of the revised IHO governance structure, the Council, as a new organ of the Organization, was called to meet for its very first session in Monaco from 17 to 19 October 2017. The Chair of the Council, Rear Admiral Shepard Smith (United States), worked in close collaboration with the Secretary-General, Dr Mathias Jonas, who served as the Secretary of the Council. He noted the absence of India, Iran (Islamic Republic of) and South Africa and confirmed a quorum with 27 of 30 members present and welcomed the four IHO Member State observers (Egypt, Malta, Monaco and Qatar) registered in the meeting.

The Council members discussed the specific role and the goals of the new organ along the leading lines given through the renewed convention such as to draft reports, observations, recommendations, proposals concerning the overall strategy and the work programme for the Assembly; proposed the establishment of subsidiary organs and draft agreements between IHO and other organizations. The main issue of those discussion arose around the appropriate means to coordinate the activities of the Organization during Inter-Assembly period and in particular, the supervision of the subsidiary organs such as the Hydrographic Standards and Services Committee (HSSC) and the Inter-Regional Coordination Committee (IRCC).

The Council dealt with a number of items requested by the 1st Assembly, namely the adaptation of numerous IHO resolutions to the new regulatory framework. Special attention was given to the issue of the revision of the Strategic Plan. Members emphasized the importance of including higher-level strategic considerations and priorities in the revised Strategic Plan. It should reflect the overall object, vision and mission of the IHO; and the topics that can be best addressed as an international community through cooperation, which would not necessarily match those of individual Member States. There was strong support to focus on marine geospatial information and to identify and participate in keystone events with IMO and other organizations with respect to GMDSS, to e-navigation and other evolving technologies that would ensure that the IHO remained relevant and up-to-date. The Council decided to establish the Strategic Plan Review Working Group to revise the Strategic Plan for submission to the second session of the IHO Assembly. Australia, Brazil, Canada, Chile, China, Colombia, Croatia, Denmark, Ecuador, France, Indonesia, Iran (Islamic Republic of), Italy, Japan, Korea (Republic of), Mozambique, Netherlands, Norway, Singapore, Spain, Suriname, United Kingdom and United States of America volunteered to join the Strategic Plan Review Working Group.

As another item to note were the requests made by the subsidiary organs. The Council directed HSSC to provide a priority list of work items that need to be supported by the Special Project fund with special emphasis to the accelerated development of the S-100 framework. The Council endorsed the proposal for increasing the capacity building support at the IHO Secretariat to further investigate on the feasibility of recruiting a new staff member at the IHO Secretariat to provide management support for Capacity Building, as a matter of urgency.

In a new approach, the Secretary-General and the responsible Directors introduced the priorities, which they had defined with the associated issues and risks, for the three different Work Programmes. The Council endorsed the proposals made by the IHO Secretary-General and Directors on the key

priorities in the IHO 2018 Work Programme. The Council made altogether 51 decisions leading to certain activities and agreed finally to meet for the second Council in October 2018 in London, UK.

Cooperation with International Organizations

This element covers liaison and cooperation between the IHO and other international organizations. Notable activities during the year are described hereinafter. The IHO was represented in most cases by the Secretary-General, a Director or an Assistant Director.

Antarctic Treaty Consultative Meetings

The 40th Antarctic Treaty Consultative Meeting (ATCM-40) was held in Beijing, China. The Antarctic Treaty Consultative Meeting is the primary forum for the representatives of Parties to the Antarctic Treaty to exchange information and to formulate measures, decisions and resolutions to further the principles and objectives of the Treaty. Delegates from 45 countries and 12 scientific, intergovernmental and non-governmental organizations participated over ten days. The IHO is an Invited Expert to ATCM and was represented at the meeting by Secretary-General Robert Ward.

The Secretary-General, as Chair of the IHO Hydrographic Commission on Antarctica (HCA), introduced a report from the IHO at the opening plenary session. The report described the state of hydrographic surveying and nautical charting in Antarctica and highlighted the fact that very little of the waters of Antarctica have been surveyed, which poses serious risks of maritime incidents and impedes the effectiveness of marine science and related activities. Where nautical charts do exist, many have limited usefulness because of the lack of reliable depth or hazard information.

In order to obtain more information to improve hydrographic knowledge and nautical charts of the region, the IHO recommended that the ATCM encourage all vessels operating in Antarctica to be collecting depth data at all times when under way unless particular restrictions apply. They can use existing shipboard equipment supplemented by low-cost data logging systems for this *passage sounding*. The Secretary-General reported that the International Association of Antarctic Tour Operators (IAATO) is actively cooperating with the IHO to make tourist ships available - but there is a need to involve all other vessels - not just tourist vessels.

In addition, the Secretary-General informed the ATCM that all depth data, no matter what quality, no matter how old, that has already been collected as part of scientific and other studies, should be identified, declared and forwarded to the IHO Data Centre for Digital Bathymetry (IHO DCDB). This data will be useful in all those areas where no other data exists - which, for Antarctica is over 90% of the sea area.

The IHO report was considered further during the meeting, including the IHO proposal to conduct an information seminar on hydrography at the next ATCM in Ecuador in 2018. This was subsequently agreed by ATCM-40. This supports the 2018 priority item in the ATCM multi-year strategic work plan concerning hydrographic surveying in Antarctica. ATCM-40 also agreed to continue to encourage all parties to contribute bathymetric data to the IHO DCDB.

While in Beijing, the Secretary-General took the opportunity to call on Deputy Inspector Wang Zelong at the headquarters of the China Maritime Safety Administration, where he discussed the coordination of nautical chart production in Chinese waters. He also had discussions with Mr Lin Shanqing, the Deputy Administrator of the State Oceanic Administration (SOA), particularly in relation to SOA involvement in China's emerging marine spatial data infrastructure and its contribution to the work of the GEBCO Sub Committee on Undersea Feature Names (SCUFN).

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Comité International Radio Maritime (CIRM)

The Comité International Radio-Maritime (CIRM) held its Annual Meeting in Singapore from 22 to 24 April. CIRM is the international organization representing the maritime electronics industry in the development of relevant international regulations and standards and enjoys observer status with the IHO as a Non-Governmental International Organization. CIRM maintains an active role in the IHO Hydrographic Services and Standards Committee (HSSC), with a number of its members also participating as Expert Contributors in various HSSC Working Groups.

The meeting consisted of information sessions, seminars and working group meetings on topics including developments in navigation and communications, innovations in products and services, autonomous shipping, regulations and standards and cyber security.

The meeting featured a number of guest speakers from across the shipping industry, including representatives of the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), the International Maritime Pilots' Association (IMPA) and the International Electrotechnical Commission (IEC).

Mr Thomas Mellor, Chair of the IHO ENC Standards Maintenance Working Group, represented the IHO and provided a presentation on "IHO changes affecting the ECDIS industry". He described the structural changes to the IHO resulting from the entry into force of the Protocol of Amendments to the IHO Convention and provided an update on the maintenance of IHO standards related to ECDIS. He re-iterated the importance of ensuring that ECDIS software is compliant with the revised standards by the 31 August 2017 deadline. He explained that the IHO will be removing the ECDIS check dataset from circulation on this date and that new instructions to mariners on how to use ECDIS Chart 1, to check they were using the latest edition of the IHO S-52 ECDIS Presentation Library, had been published and were available from the IHO website.

In relation to the development of S-100-based product specifications, the meeting expressed the wish that a clear timeline is available to state when the standards will be published and when test bed activities will begin.

One of the three working groups established by the meeting discussed how ECDIS manufacturers might develop a common strategy to influence the future guidance on the so-called S-Mode (standardised mode of operation of navigation equipment) to be developed under the aegis of the International Maritime Organization (IMO).

The meeting considered the mixed feedback that had been received from the stakeholders (including the IHO) on draft Guidelines on Annual Testing of ECDIS and agreed that further consideration was required. The progress of a pilot project to evaluate a draft Standard on Software Maintenance of Shipboard Equipment developed by the CIRM was reported. The trial was scheduled to come to an end in July 2017. The results will be analysed and used to update the draft standard. The end goal remains to get the standard adopted by the International Organization for Standardization (ISO).

The role of the CIRM "User Feedback Forum" was highlighted. The purpose of this service, hosted and administered by CIRM is to put designers and manufacturers of marine navigation and communication systems directly in touch with users during product development to support and promote Human-Centred Design (HCD). It is also supported by the Nautical Institute.

European Union Initiatives

- **IHO-EU Network WG**

The IHO-EU Network Working Group (IENWG), established by the Inter-Regional Coordination Committee (IRCC) to monitor and deal with the activities and processes developed under the aegis

of the European Union (EU), held its sixth meeting in Saint-Mandé, France, on 27 and 28 September 2017, at the invitation of the French Hydrographic Office (SHOM).

The meeting was chaired by Laurent Kerléguer (France) and attended by representatives from the following Regional Hydrographic Commissions:

- Baltic Sea Hydrographic Commission (Sweden),
- Eastern Atlantic Hydrographic Commission (France),
- Meso American - Caribbean Sea Hydrographic Commission (France),
- Arctic Regional Hydrographic Commission (Denmark),
- Nordic Hydrographic Commission (Norway),
- Southern African and Islands Hydrographic Commission (France),
- South West Pacific Hydrographic Commission (France).

Apologies were received from Germany, representing the North Sea Hydrographic Commission and Greece, representing the Mediterranean and Black Seas Hydrographic Commission. Representatives from the Italian Hydrographic Office participated by video conference and a representative from Ireland participated in the meeting, both as Associate Members. Director Abri Kampfer represented the IHO.

Feedback was provided by France on the participation in the Expert Group of States on the progress on the European Maritime Spatial Planning directive. The deadline for the establishment of Maritime Spatial Plans (MSP) is 2021. Member States are in different stages in their MSP processes, using different methodologies and tools. There is a requirement to note the trans-boundary issues and to increase cross-border cooperation. Updates on transnational projects were provided. Although HOs are potentially key players for MSP due to their background in management of many reference data, some of them are not involved in their national organisation for MSP. IENWG took an action for promoting the role of HOs for MSP; a DG-mare testimony will be sought to build the argument.

The Task Groups on Data of SIMNORAT, SIMWESTMED and SEANSE are open to Hydrographic Offices to contribute or be informed on the activity related to data and MSP. A SIMCelt data workshop was held on 28 November 2017 at the SIMCelt Conference, Liverpool, United Kingdom.

France, as the Project Coordinator, reported on the progress of the Coastal Mapping Project funded by the European Commission in support of the development of the European Marine Observation and Data Network (EMODnet) and in particular on phase III of the component of EMODnet. A consortium

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of 41 collaborating organizations held a meeting at the end of March 2017. A new modern EMODnet Bathymetry web portal with responsive design has been implemented and there is ongoing discussion on how to collaborate with the IHO-IOC GEBCO Project.

Discussion on the European strategy for high resolution coastal data was considered and in particular the relevance of the work of the IHO Crowdsource Bathymetry Working Group and the revision of S-44 by the Project Team on Standards for Hydrographic Surveys (HSPT).

The meeting shared the concern of irregular attendance by members that has as a consequence poor feedback to RHCs on the work of the IENWG. Consideration may have to be given to broaden the membership to include all European HOs.

International Federation of Hydrographic Societies (IFHS)

The conference Hydro17 in Rotterdam took place from 13 to 16 November. For the second time SS Rotterdam proved to be a very suitable location for the size and activities of this international showcase of the International Federation of Hydrographic Societies, in which nine regional societies from all over the world cooperate to exchange best practices and social calls relating to the hydrographic domain. The structure and overall routine of the Hydro Conferences was maintained, with the characteristic mix of commercial exhibition and scientific programme. The conference theme was 'Connecting 4D future', aiming to stretch connection in space & time from hydrography to any other relevant disciplines. The announced programme gained attraction for overall 344 participants from 26 countries plus 77 Dutch and Flemish students paid for by the Hydrographic Society of Benelux and conference organization (equivalent to 119 student days).

Hydro17 was formally opened by the Chief Hydrographer of the Navy, Captain Marc van der Donck, also the Netherlands representative to the International Hydrographic Organization. He was the first

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of six special guests to dwell on wider subjects connecting corners of the far field, in his case connecting the famous world charts by Blaeu of 1648 to the latest available products like Google Earth and GEBCO. Next was the 'The discovery of planet Earth' by Peter Westbroek, emeritus professor in Geology, who provided a summary of efforts to disclose the natural processes on a geologic time scale. At nearly 80 he addressed the packed auditorium with a perfectly logical and convincing review of the four dimensions in relation to life on earth and the development of Earth System Science as a realistic new scientific discipline, "Gaia revisited". Recently started in his position as Secretary General of the International Hydrographic Organisation, Dr Mathias Jonas titled his presentation: Data centric hydrography, bringing knowledge to action. The Nippon Foundation joined in with GEBCO in the global project Seabed 2030. The objective is to by 2030 to have identified all structures on the global seabed with a minimum size of 100 m. The IHO embodies standardization in every way to achieve this goal of global mapping in high resolution. The third keynote address, was by Rob Luijnenburg, former chairman of Hydrographic Society Benelux. During his more than 40 years career with Van Oord and Fugro he is perhaps second to no one in having gained insight and overview of commercial hydrography. He was also Fugro's spokesman on the project to find MH370, the Malaysian Boeing 777 that was lost in March 2014. The start of the search was only possible after conducting a gigantic bathymetric survey in the expected area where the airplane would have crashed. Rob's message was very much in line with Dr Jonas': The technology to even begin to think of such a task – of global mapping – has really only become available in the last two decades, the task is enormous. Apart from the scientific urge to learn all there is to know of the seabed, seabed information is key to future human prosperity.

The scientific program of the Conference consisted of ten sessions on a wide variety of themes, from traditional – bathymetry, backscatter, data processing, education – to innovative – airborne and autonomous surveying. In total 45 lectures were presented.

International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA)

- **<u>IALA – IHO Coordination Meeting</u>**

Under the framework of the Cooperation Agreement between the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) and the IHO, a coordination meeting was held at the IALA Headquarters in Saint-Germain-en-Laye, France on 18 July 2017. The meeting was attended by eight IALA representatives and five IHO representatives. The IHO delegation included Mr Jens Schröder-Fürstenberg, Chair of the Nautical Information Provision Working Group, Germany, Mr Yves Le Franc, Chair of the S-124 Correspondence Group, France and Ms Julia Powell, Chair of the S-100 Working Group, United States who participated by web conference. Director Gilles Bessero and Assistant Director Anthony Pharaoh represented the IHO Secretariat.

The meeting was welcomed by Mr Michael Card, IALA Deputy Secretary-General and was chaired by Mr Hideki Noguchi, chair of the IALA E-Navigation (ENAV) Committee.

The main objective of the meeting was to discuss and coordinate the contribution of both organizations in the development and implementation of the concept of Maritime Service Portfolios (MSP) in accordance with the related output recently agreed by the International Maritime Organization (IMO) and in preparation of the first meeting of the IMO/IHO Harmonization Group on Data Modelling (HGDM) held in October 2017 at the IMO Headquarters in London, United Kingdom.

Following a short overview of the structure and objectives of both organizations, the meeting identified the technical areas where cooperation was considered essential and reviewed the following topics:

- the possible overall architecture of the MSPs;
- the harmonization of related S-100 based product specifications;
- the development under the S-100 framework of a naming scheme that can uniquely identify any maritime resource on a global scale ("marine resource name");
- the development under the S-100 framework of provisions for data streaming; and
- the portrayal of aids to navigation on charts.

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The meeting agreed on related follow-on actions. It was decided in particular – and later done so - to develop a joint IHO-IALA submission to the HGDM based on the draft MSP guidelines developed by the IALA ENAV Committee and on the draft MSP mapping developed by the IHO NIPWG.

- **IALA Seminar on Arctic Navigation**

The IALA Seminar on Arctic Navigation was a follow up on a similar meeting held in February 2010 at the IALA Headquarters attended by Arctic nations where a number of actions were agreed by the participants. This seminar was attended by 38 delegates, representing 8 countries and 6 Sister organizations. The IHO was represented by the Secretary-General, Dr Mathias Jonas.

The seminar was structured with presentations on relevant topics on Arctic navigation. The views on the challenges of ensuring safe navigation in Arctic waters of all Arctic nations and international organizations which have an interest in this field, were discussed. The Seminar addressed the needs identified by the Arctic Council concerning hydrography, marine aids to navigation and maritime services. The current status and plans were considered, with regards to weather and climate, commercial shipping, position, navigation and timing (PNT), communications, data exchange, risk assessment, traffic awareness and monitoring, and other relevant topics. The purpose of the Seminar for nations and organizations which provide maritime services in the Arctic was to exchange information and develop views on:

- traffic awareness, ship reporting and data sharing;
- maritime digital information services;
- positioning services;
- marine aids to navigation.

During the Seminar the following suggestions, remarks and observations were made by participants:

- There is still a large need for information-exchange and learning about each other's initiatives, work and projects. There seem to be a number of individual initiatives that are not all involving relevant partners and stakeholders.
- There is a concern about the large number of "databases" presently developed or planned. There is a need to join forces and concentrate resources on a few, relevant, sites/portals.
- A harmonized approach should be adopted for marking polar routes, combining data sharing with common standards of provision and web-based services.
- IALA-NET could be a common platform for collecting and making available AIS data via satellite, if the relevant IALA Members agree to cooperate.
- Virtual AtoNs, Area Notices and other e-navigation services using VDES-SAT could be an important contribution to safety of Arctic navigation, but the frequency allocation needs to be supported at ITU.
- A multi-system approach should be developed for resilient PNT, using a mixture of GNSS and terrestrial systems and a multi-system receiver.
- Global warming is happening which is opening up new Polar routes and increasing summer availability.
- Ice Navigation needs specialist skills to support safe passage.
- Arctic adventure tourism is increasing and this is set to continue.
- The Arctic is still not used as a short cut "over the top" transit route due to concerns about reliability of passage with the present bunker prices.
- There is a significant shortage of hydrographic survey data to give a comprehensive set of ENC for Arctic voyages.

- Offshore exploration and mineral exploitation are likely to continue in the region and traffic for tourism is increasing.
- Avoiding accidents and environmental damage is critically important, since SAR and pollution control resources are limited and operational conditions are difficult.
- The area of the Polar code is limited and should be extended to include other areas of higher traffic density, also subject to ice conditions.
- STM provides coordinated real time data, route exchange, port call synchronization, with email/voice confirmation.
- Sharing information and the need for cooperation in developing VDES applications to provide communication solutions in Arctic.
- Arctic Web - free to use, open source development – provides tailored weather and ocean current forecasts and ice charts – supports voyage risk management, routing decisions and SAR online services.
- Ideally, from the operators' point of view, there would be one integrated information system for the Arctic, but this may not be achievable politically. Common service specifications would be an important step, allowing easy, reliable exchange of information.
- Improved communication of Vessel Traffic Services (MSP 5) depends on standardized, digital solutions (S-100), for MSI, ice routing etc., leading to an open bridge, not dependent on proprietary equipment.
- New NAVAREAs established a decade ago. E-navigation services, including VTS, must be provided for these areas. VDE-SAT could be an important contribution to providing the necessary connectivity.
- Maritime Connectivity Platform (MCP) can be used for information exchange via online services, utilizing communications available (ref. IALA MRCP). VDES provides a closed network with built-in security and authentication for e-navigation services.
- Main challenge for VDES is adoption by ship owners and manufacturers. Second greatest challenge for VDES in the Arctic is adoption by shore authorities, in competition with other investments in infrastructure.
- Need to free up frequencies for VDES and upgrade infrastructure to handle higher data rates and produce data in standard formats. Can share infrastructure, information systems and develop data sharing tools.
- Need both VDES and MCP in Arctic communications in a coordinated technical solution.

Participants of the IALA Seminar on Arctic Navigation, IALA Headquarters,Saint Germain en Laye, France

Six conclusions were agreed on the second day of the Seminar:

1. A harmonized approach should be adopted for marking polar routes and providing digital services with common standards of provision, web-based services and other means.
2. IALA-NET is a suitable platform for exchanging and storing historical AIS data for statistical analysis and the use of Risk Management tools.
3. Since connectivity is a primary enabler for development in the Arctic, the limited communication infrastructure continues to be a major challenge.
4. VDES-SAT could provide virtual AtoNs and other e-navigation services in the arctic. The frequency allocation needs to be supported at ITU.
5. A multi-system approach should be developed for resilient PNT, using a mixture of GNSS and terrestrial systems and a multi-system receiver.
6. There is a significant shortage of hydrographic survey data to give a comprehensive set of (simplified) ENC for Arctic voyages. Crowd sourcing of hydrographic data can give a significant contribution.

Relevant input for conclusion Nr 6 was given by the IHO Secretary-General by means of his presentation "Present hydrographic data and plans".

The conclusions resulted from the seminar were forwarded to the IALA Council for consideration and to all IALA Committees for future action.

International Cartographic Association (ICA)

USA/NOAA represented the IHO in the technical sessions and cartographic exhibition at the 28th Conference of the International Cartographic Association (ICA), ICC 2017, which took place in Washington, DC, USA from 2 to 7 July. A dedicated nautical cartography meeting was organized by the US Hydrographic Office (Office of Coast Survey/National Ocean Service).

The US Office of Coast Survey hosted a parallel one-day open house event on nautical cartography at NOAA's headquarters, Silver Spring, Maryland to report on current and future activities in cartography and GIS; to establish a regional and international network of cartographers in the field of nautical charting; to create more collaborative activities between IHO and ICA members; and to identify challenges in generating, producing, maintaining and distributing Raster and Electronic Navigational Charts.

International Maritime Organization (IMO)

The Secretariat of the IHO represented the Organization at all IMO sessions where the agenda contained items of relevance to the Member States, submitting papers for consideration as appropriate. The following paragraphs provide summaries of IHO involvement in various bodies of the IMO that met during the year.

- **IMO Assembly**

The biannual Assembly is the main organ of the International Maritime Organization (IMO). It regularly addresses a wide range of administrative and contentious operative issues. The 30th Assembly was attended by more than a thousand participants representing the vast majority of the overall 172 Member States and numerous observers – among them the IHO, represented by the Secretary-General, Dr Mathias Jonas, for the first four days.

The core elements of each IMO Assembly are the regular reports of the subordinate committees such as:

- Maritime Safety Committee
- Legal Committee
- Marine Environment Protection Committee
- Technical Cooperation Committee
- Facilitation Committee

IHO Secretary-General Dr Mathias Jonas and IMO Secretary-General Kitack Lim at a reception at the German Embassy in London

Before the respective committee chairs reported to the Assembly, the IMO Secretary-General Kitack Lim addressed the delegates with a thorough report on the Secretariat's performances. Numerous items of the IMO agenda are of potential relevance for the IHO Secretariat such as:

- The management of files and documents to turn information into knowledge.
- A web based solution to manage document workflow.
- The accessibility of voice recorded files of the Assembly and the Council via the IMOdocs website.
- The promotion of social media enhancing global awareness on the organization.

The Secretary-General reported further on the successful completion of the revision of the Strategic Plan for the Organization for the six-year period 2018 to 2023, including the Performance Indicators and the list of outputs, as well as the adjusted document on the Application of the Strategic Plan of the Organization together with the associated draft Assembly Resolutions. The systematics of this revision may deliver a template for the similar process as just started by the IHO Council for the revision of the Strategic Work Plan of the IHO.

Another important element for the IHO to note was the formal adoption at the Assembly, of the future mandatory implementation of the IMO Audit Scheme, which will now encompass the eight important treaties under the umbrella of the IMO. Among the audited elements is SOLAS Chapter V Regulation 9 which explicitly states the obligation of the Coastal States to undertake regular survey and charting within their waters of responsibility. This is good news for the IHO since the need and the relevance of hydrography is now an inherent part of each audit and forces the coastal states to respond according to their respective activities. The audit output on this issue will add to a comprehensive image of the world´s hydrographic activities, which in combination with the information presented by the IHO, allows a more precise target on joint capacity building activities.

The Assembly also discussed the problem of plastic litter induced by shipping and agreed to put this on the agenda of the Marine Environment Protection Committee calling for short notice action.

For the purpose of navigation in Polar Regions the delegates unanimously agreed to start the second phase of the polar code to target any shipping activity within this environmentally vulnerable region. The anticipated future activities will impact on the agenda of IHO´s Regional Hydrographic Commissions for the Arctic and Antarctic Region as well.

The IHO Secretary-General took the opportunity to approach several IMO Member States to advertise for IHO membership and discussed ways to deepen the collaboration between IMO and IHO on the fields of technical standardization – namely the Harmonization Group on Data Modelling (HGDM) and aspects of joint activities in Capacity Building which need to be reactivated.

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- **Maritime Safety Committee**

MSC 98

IMO MSC 98 in plenary session

The Maritime Safety Committee (MSC) is the highest technical body of the International Maritime Organization (IMO). The 98th session of the MSC (MSC 98) was held at the IMO Headquarters in London, UK, from 7 to 16 June. Assistant Director David Wyatt represented the IHO. In addressing the agenda of the session in his opening statement, the Secretary-General of IMO, Mr Kitack Lim, encouraged all to implement standards in a coordinated and uniform manner across the maritime world. He noted shipping accounts for over 80% of world trade and highlighted the economic benefits supported by well managed and regulated shipping. He highlighted the United Nations Ocean Conference, which was taking place in New York at same time as MSC 98 and that the health of oceans and seas and the protection of the marine environment should be a concern to all. Highlighting the outcomes of the 4th meeting of the Sub-Committee for Navigation, Communications, and Search and Rescue (NCSR 4), he particularly noted the draft amendments to the SOLAS Convention, the draft performance standards for GMDSS equipment and the activation of the IMO-IHO Harmonization Group on Data Modelling (HGDM) as significant topics which needed to be addressed and progressed by MSC 98 together with the initial work on the second version of the Polar Code.

Hydrography and Charting

The MSC addressed various matters related to hydrography and nautical charting resulting from the NCSR 4 held in March 2017. The main items included adopting the amendments to the existing long Sand Head two-way route and SUNK Inner precautionary area in the traffic separation scheme "In the SUNK area and in the Northern approaches to the Thames Estuary" for dissemination by means of COLREG.2/Circ.69; the adoption of a new recommended route "Off the western coast of Izu O Shima Island", a new area to be avoided "Off Peninsula de Osa in the Pacific coast off Costa Rica" and a new area to be avoided as an associated protective measure for the "Tubbataha Reefs Natural Park Particularly Sensitive Sea Area (PSSA) in the Sulu Sea" to be published as SN.1/Circ.335. These routeing measures were programmed to come into force on 1 January 2018.

The Committee approved the amendments to MSC.1/Circ.1503– *ECDIS - Guidance for good practice* – developed by the sub-Committee on Human Element, Training and Watchkeeping (HTW) and instructed the Secretariat to issue it as MSC.1/Circ.1503/Rev.1.

Global Maritime Distress and Safety System (GMDSS)

The Committee adopted the draft amendments to the following resolutions:

- MSC.148(77) on *Revised performance standards for narrow-band direct-printing telegraph equipment for the reception of navigational and meteorological warnings and urgent information to ships (NAVTEX)* – to be issued as resolution MSC.430(98);
- MSC.306(87) on *Revised performance standards for enhanced group call (EGC) equipment* – to be issued as resolution MSC.431(98);
- MSC.401(95) on *Amendments to Performance standards for multi-system shipborne radionavigation receivers* – to be issued as resolution MSC.432(98).

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The MSC supported the proposed text amendments to and the draft MSC resolution on *Performance standards for a ship earth station for use in the GMDSS*, including revisions submitted by the United Kingdom, United States and Comité International Radio-Maritime (CIRM). The Secretariat was tasked to make the necessary editorial amendments and to issue it as resolution MSC.433(98).

The MSC endorsed the action taken by the NCSR in instructing the Secretariat to convey a liaison statement on changes consequential to displaying NAVTEX and Inmarsat-C SafetyNET information on Integrated Navigation Displays to IHO, WMO and IEC TC 80.

The MSC approved the draft Modernization Plan of the Global Maritime Distress and Safety System (GMDSS) as well as approving draft amendments to SOLAS IV and its appendix on certificates, with a view to subsequent adoption at MSC 99. The Committee also supported the text provided for use of the term *Recognized mobile satellite service* and the definition that was submitted.

The Committee endorsed the view of the NCSR that the recognition of the Inmarsat FleetBroadband Maritime Safety Data Service for use in the GMDSS should be treated as a new application, noting that not all elements of resolution A.1001(25) would need to be reviewed in detail in this specific case and that it would be subject to the evaluation of these elements by the International Mobile Satellite Organization (IMSO). The MSC invited the IMSO to undertake the necessary technical and operational assessment of the Inmarsat FleetBroadband Maritime Safety Data Service and provide a report for consideration by the NCSR.

e-Navigation

The MSC agreed to activate the IMO/IHO HGDM and endorsed the holding of the first meeting of this Group, at IMO Headquarters in London, from 16 to 20 October 2017.

- **Sub-Committee on Navigation, Communications and Search and Rescue**

NSCR4

The Sub-Committee on Navigation, Communications and Search and Rescue (NCSR) is a subordinate body of the Maritime Safety Committee (MSC) of the International Maritime Organization (IMO). Its functions are to consider technical and operational matters related to the obligations of Governments and operational measures related to safety of navigation.

The 4th session of the Sub-Committee (NCSR 4) was held at the IMO Headquarters in London, United Kingdom from 6 to 10 March. The IHO was represented by Director Gilles Bessero, Assistant Director David Wyatt, Mr Peter Doherty, the Chair of the World-Wide Navigational Warning Service Sub-Committee (WWNWS-SC), and Mr Christopher Janus, Branch Chief, NGA Maritime Watch - NAVAREA IV/XII. Several representatives of Hydrographic Offices also attended the meeting as a member of their national delegation.

IMO NCSR 4 Plenary in session

NCSR 4 approved two routeing measures and two areas to be avoided, which were forwarded to the MSC for adoption at its 98th session, (see MSC 98 above).

The Sub-Committee received reports from the Chair of the IMO NAVTEX Panel, including details of proposed new NAVTEX stations which had recently become operational and stations which had become or remained non-operational. The Chair of the IHO WWNWS-SC reported on the activities of the sub-committee, highlighting the on-going maintenance of the documentation related to the provision of Maritime Safety Information (MSI) and the capacity building training provided to the Meso American and Caribbean Hydrographic Commission and the South West Pacific Hydrographic Commission regions. The Sub-Committee approved a revision to the in-force notification period for MSI documents after approval by the MSC. In future amendments to IMO resolutions will come into

force on 1 January following MSC approval or at another date as decided by the MSC. The Sub-Committee noted that amendments to the GMDSS Master Plan had been distributed in GMDSS/Circ.19 and Administrations were encouraged to check their national data for accuracy.

Director Bessero in the plenary at NSCR 4

In support of the work item on the development of *Guidelines for the harmonized display of navigation information received via communications equipment* and *guidelines and criteria for ship reporting systems* the IHO submitted a document on the contribution of the S-100 framework to the harmonized display of navigation information. As invited at MSC 96, the IHO submitted a document proposing the activation of the IMO/IHO Harmonization Group on Data Modelling (HGDM) to assist in developing guidance on the definition and harmonization of the format and structure of Maritime Service Portfolios (MSPs) in support of the implementation of e-navigation. The Sub-Committee referred the proposal to activate the group to the MSC, inviting interested parties to submit proposals related to the proposed work plan and to a possible revision of the HGDM terms of reference for further consideration at MSC 98.

The Sub-Committee considered the progress of several outputs related to the display of navigation-related information. The Sub-Committee approved the draft amendments to resolutions MSC.252(83) (*Additional modules to the Revised performance standards for Integrated Navigation Systems (INS)*), MSC.306(87) (*Revised performance standards for Enhanced Group Calling (EGC) Equipment*) and MSC.148(77) (*Revised performance standards for Narrow-Band Direct-Printing Telegraph equipment for the reception of Navigational and Meteorological Warnings and Urgent Information to Ships (NAVTEX)*) addressing the interconnection of NAVTEX and Inmarsat SafetyNET receivers and their display on Integrated Navigation Display Systems, and invited the MSC to adopt them. The Sub-Committee agreed to the establishment of a Correspondence Group under the coordination of Norway to continue the development of Guidelines for the harmonized display of navigation information received via communications equipment. The Sub-Committee agreed to propose to the MSC not to develop further at this stage the proposed additional modules to the Revised Performance Standards for Integrated Navigation Systems (INS) relating to the harmonization of bridge design and display of information.

The Sub-Committee endorsed the draft Modernization Plan of the GMDSS for approval of the MSC. The NCSR endorsed the proposal for a new output on the revision of SOLAS Chapter III and IV for the Modernization of the GMDSS and agreed the terms of reference of the Correspondence Group to continue the modernization of the GMDSS under the coordination of the United States, in anticipation of the Committee's approval.

The IHO reported on the monitoring of ECDIS issues and Electronic Navigational Chart (ENC) coverage. The IHO confirmed the withdrawal of the previous versions of the IHO standards for ECDIS on 31 August 2017 as agreed at NCSR 3 in 2016, following the entry into force of the revised set of IHO standards in August 2015. It was noted that some items of MSC.1/Circ.1503 (*ECDIS – Guidance for good practice*) related in particular to operating anomalies will no longer be relevant for up-to-date ECDIS and the Sub-Committee was invited to consider revising the Circular in connection with the possible development of port State Control guidelines on ECDIS. Noting the relevant considerations by the IMO Sub-Committee on Implementation of IMO Instruments (III) and the revision of the section of the Circular on ECDIS training by the IMO Sub-Committee on Human Element, Training and Watchkeeping, the Sub-Committee decided not to take further actions.

- **IMO/ITU Experts Groups**

The International Telecommunication Union (ITU) is a specialized agency of the United Nations (UN) which is responsible for issues that concern information and communication technologies, including aeronautical and maritime navigation. The Experts Group (EG) established jointly by the International Maritime Organization (IMO) and the ITU consists of representatives active in the IMO and the ITU in relation to maritime communications. The function of the IMO/ITU EG is to advise on the development of future requirements for maritime radio communications taking into account the operational needs as defined by the IMO and the regulatory needs as defined by the ITU. The 13th session of the IMO/ITU EG (IMO/ITU EG13) was held at the IMO Headquarters in London, United Kingdom, from 10 to 14 July under the chairmanship of Mr Christian Rissone (France). Assistant Director David Wyatt and Mr William Van-Den-Bergh (UK Hydrographic Office and Chair, IMO NAVTEX Coordinating Panel) represented the IHO.

The Group addressed a number of topics of direct interest to IHO Member States.

After considering the outcomes of NCSR 4, MSC 97 and MSC 98, the participants focused on further developing the IMO position on the WRC-19 agenda items relating to maritime services. In particular the participants addressed the modernization of the Global Maritime Distress and Safety System (GMDSS), and expressed concerns over the inclusion of the new system for maritime data broadcasting NAVDAT (Navigational Data) in the IMO proposal that is currently being developed. It was agreed that the inclusion of possible frequencies to be used for NAVDAT should be considered for WRC-23.

It was noted that the Modernization Plan of the GMDSS had been completed after the endorsement and approval given at MSC 98. The majority of the meeting was then spent on developing the related preliminary draft revisions of SOLAS Chapters III and IV. There was considerable discussion on whether to expand the scope of application of Chapter IV to include all ships on international voyages, regardless of tonnage. No consensus was reached and it was therefore agreed that the current scope of application should be retained. A comprehensive review was conducted with numerous amendments and revisions proposed, including the revision and development of a number of definitions for terms such as *bridge-to-bridge communications*, *Enhanced Group Call (EGC)*, *GMDSS*, *Recognised mobile satellite service* and *Sea areas A3 and A4*. No final agreement was reached on a new definition of *Security-related communications*, which will be further discussed during NCSR 5. All these definitions will be developed further by the CG for submission to NCSR 5.

The Group developed a preliminary draft work plan for the related and consequential amendments to other existing instruments. The draft work plan included resolution MSC.191(79) – *Performance Standards for the presentation of navigation-related information on shipborne navigational displays*, resolution A.801(19) as amended by MSC.199(80) - *Provision of radio services for the Global Maritime Distress and Safety System, (GMDSS)*, Resolution A.707(17) - *Charges for Distress, Urgency and Safety Messages through the Inmarsat System*, Resolution MSC.306(87) - *Revised performance standards for Enhanced Group Call (EGC) equipment*, and Resolution MSC.68(68), Annex 3 - *Performance Standards for MF/HF Radio Installations Capable of Voice Communication, Narrow Band Direct Printing and Digital Selective Calling* – all of which impact on the work of a number of IHO committees, sub-committees and working groups. It is intended that the first draft revisions would be submitted to NCSR 5 for further consideration.

13th session of the IMO-ITU EG

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- **IMO – TC 67**

The 67th session of Technical Cooperation Committee of the International Maritime Organization (IMO-TC 67) was held at the IMO Headquarters in London, UK, from 17 to 19 July. Mr. Zulkurnain Ayub (Malaysia) chaired the meeting. The IHO was represented by Assistant Director Alberto Costa Neves.

The meeting reviewed the achievements in delivering the 2016 component of the Integrated Technical Cooperation Programme (ITCP), but notably, no joint activity with the IHO was delivered in 2016, for the first time in recent years. The IHO had submitted a document recalling the work done by the IHO for the benefit of IMO Member States that are not members of the IHO in support of fulfilling their obligations arising from SOLAS. It also indicated a change in eligibility criteria such that the level of capacity-building support available from the IHO for those IMO Member States that are not members of the IHO has been reduced.

The Chair of the IMO Technical Cooperation Committee addresses the meeting.

The meeting considered the report of the Caribbean Regional Senior Maritime Administrators' Workshop that invited the IMO to consider facilitating the participation of the IHO and the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) at the next meeting of the Senior Maritime Administrators of the Caribbean States. The report requested the Caribbean States to consider inviting the IHO to assist in the establishment of national frameworks for hydrographic services so as to meet the mandatory obligations of SOLAS Chapter V - Regulation 9, highlighted the need to consider the feasibility of the establishment of a regional hydrographic office and encourages States to become members of the Meso American - Caribbean Sea Hydrographic Commission (MACHC) and the IHO. Antigua and Barbuda acknowledged the contribution of the IHO in the Caribbean Region.

The ITCP for 2018-2019 was approved by the Committee with a funding requirement of US$23.9 million. This requires mobilization of external funding for its realization and the Secretary-General established a new post in the Technical Cooperation Division for resource mobilization and the development of partnerships to strengthen the capacity to engage with donor agencies and technical cooperation partners. The new officer is now the main liaison with the IHO for pursuing common objectives under the UN "Delivering as One" concept, which guides the work of the Joint IHO-IMO-IOC-WMO-IALA-IAEA-FIG Capacity Building group.

The Committee was updated on the status of the Country Maritime Profile (CMP) and of the IMO Member State Audit Scheme (IMSAS). Draft Assembly resolutions were endorsed on "The linkages between IMO's technical assistance work and the 2030 Agenda for Sustainable Development", "Guiding principles of IMO's Integrated Technical Cooperation Programme in support of the 2030 Agenda for Sustainable Development" and "Financing and partnership arrangements for an effective and sustainable ITCP". The critical role played by the IMO Regional Presence Scheme in the delivery of the ITCP was positively acknowledged by the Committee which indicates that the IHO and the IMO should continue to pursue cooperation at regional level.

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- **IMO Sub-Committee on Implementation of IMO Instruments (III)**

The Sub-Committee on Implementation of IMO Instruments (III) is a subordinate body of the Maritime Safety Committee (MSC) of the International Maritime Organization (IMO).

The 4th session of the Sub-Committee (III 4) was held at the IMO Headquarters in London, United Kingdom from 25 to 29 September. The IHO was represented by Assistant Director David Wyatt.

IMO III 4 Plenary in session

Of relevance to IHO Member States were the discussions on measures to harmonize PSC activities and procedures worldwide, in particular a submission by INTERTANKO (International Association of Independent Tanker Owners) on the outcomes of the 4th session of the Sub-Committee for Navigation, Communications, and Search and Rescue (NCSR 4) on monitoring ECDIS issues, which raised concerns that some manufacturers had not been able to upgrade their systems to incorporate ECDIS Presentation Library Edition 4.0 prior to 1 September 2017. The IHO made an intervention, which provided information on the relevant IHO standards and their relationship to IEC Test Standards for Type Approval of ECDIS. The IHO highlighted that the ECDIS Chart 1 was only meant to provide a mechanism for the mariner to confirm that his ECDIS portrayal is correct and in no way should be used as a full compliance approval test. The IHO commented that the proposals submitted by INTERTANKO, on how vessels, which had not been able to update their ECDIS systems by the target date, could be inspected by PSC officers, were a pragmatic interim solution to allow the shipping industry and the equipment manufacturers some additional time to achieve full compliance with current IMO/IHO regulations/standards, whilst not disadvantaging those manufacturers who have made the changes within the pre-agreed timescale. There was support from IMO member states for the INTERTANKO proposals, which were used as a basis to develop wider IMO guidance to maritime administrations and PSC to cover the interim period until the shipping industry and equipment manufacturers have completed the upgrade process.

IMO dressed overall for World Maritime Day – 29 September

Intergovernmental Oceanographic Commission of UNESCO

Cooperation between the IHO and the Intergovernmental Oceanographic Commission (IOC) of UNESCO takes place at several levels. The detailed work of the IHO-IOC GEBCO programme falls under IHO Programme 3. Liaison with the Joint Technical Commission of the World Meteorological Organization (WMO) and the IOC for Oceanography and Marine Meteorology (JCOMM) is reported within this section further below. Representation at the 50th Executive Council of IOC and liaison with the IOC Secretariat are reported here.

- **IOC Assembly (29th Session and IOC Executive Council 50)**

The Assembly is the highest governing body of the Intergovernmental Oceanographic Commission (IOC) of UNESCO. The functions of the Assembly are to consider matters related to managing the regional subsidiary bodies and their programmes, overseeing the ocean research programmes, the ocean observing systems and data management, the regional tsunami warning systems, the coordination of warning and mitigation systems for ocean hazards, the capacity building programme and strategy, sustainable development and governance, administration and management of the IOC and governance of the IHO-IOC GEBCO Project in cooperation with the IHO.

The 29th session of the IOC Assembly was held at the UNESCO Headquarters in Paris, France from 21 to 29 June, preceded by the Fiftieth Session of the IOC Executive Council held on 20 June.

Director General of UNESCO HE Irina Bokova at the opening session of the IOC Assembly

The Assembly received reports from the Executive Secretary, on the activities of the IOC regional subsidiary bodies – *the sub-commissions for the Western Pacific, the Caribbean and adjacent regions, and Africa and adjacent Island States* - the status of the IOC global ocean science report, the world climate research programme and the second international Indian Ocean expedition. The Assembly discussed the UN world ocean assessment and the progress with the Global Ocean Observing System, the Global Climate Observing System and the World Meteorological Organization (WMO)-IOC Joint technical commission for oceanography and marine meteorology (JCOMM).

Ocean Bathymetry and Capacity Building

The Assembly considered the report of the Chair of the GEBCO Guiding Committee (GGC) and expressed its support to the increased IOC engagement in the work of GEBCO activities. Following the GEBCO review process conducted in 2015–2016 by the IOC, and the decision of IOC Member States to strengthen IOC's contribution to GEBCO, a budget line was proposed in the draft programme and budget of the Commission and ultimately endorsed by the IOC Assembly. The Chair of the GGC also informed the Assembly of the development of a major initiative entitled "Seabed 2030" funded by the Nippon Foundation designed to boost ocean mapping activities globally, with the ultimate aim to map all undersea features larger than 100 meters. The Assembly also welcomed this initiative and thanked the Nippon Foundation for its support for this new initiative.

The IHO representative highlighted areas of cooperation with IOC, including under GEBCO, and informed that IHO Member States had adopted at the 1st session of the IHO Assembly a resolution on improving the availability of bathymetric data worldwide. He welcomed the IOC budgetary allocation foreseen for GEBCO as a renewal of the fruitful and long-lasting cooperation between IOC and IHO. He also informed the Assembly that the IHO supports the IOC proposal to establish an International Decade on Ocean Science for Sustainable Development and welcomes the Decade on Ocean Science's focus on ocean mapping.

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Discussion Panel on the International Decade of Ocean Science for Sustainable Development Panel

The Secretary-General of the IHO, Robert Ward, at the panel discussion.

A discussion panel on the International Decade of Ocean Science for Sustainable Development was held during the afternoon session of the Assembly on 22 June moderated by Professor Peter Haugan, IOC Chair. The Secretary-General of the IHO, Robert Ward, was invited as a panelist. He addressed the Assembly on "How can innovative technology help to close existing knowledge gaps in the open ocean, in coastal areas, from the sea surface down to the ocean floor". During his speech, the Secretary-General highlighted the re-vitalising of crowdsourced bathymetry and the use of ships of opportunity which is considered probably one of the most significant and cost effective ways of getting at least some of the much-needed environmental data that everyone wants to collect. He also emphasized that much important data has already been collected, but remains archived and undiscoverable since it has served its initial purpose. This data needs to be made available. He emphasized that the IHO is particularly keen to be part of the Decade of Ocean Science.

International Organization for Standardization (ISO)

- **ISO Technical Committee 211**

The Technical Committee (TC) 211 - *Geographic information/Geomatics* of the International Organization for Standardization (ISO/TC211) deals with the development of standards and specifications in the geospatial domain and is currently responsible for maintaining 72 ISO standards. The IHO is a Class A liaison member of ISO/TC211 and participates in its standards development and maintenance activities. The ISO/TC211 19100 series of standards and specifications underpins the IHO S-100 - *Universal Hydrographic Data Model*.

- **44th WG and plenary meeting of the ISO/TC 211**

The Swedish Standards Institute (SIS) hosted the 44th Working Group and Plenary Meeting of the Technical Committee (TC) 211 - *Geographic Information/Geomatics* of the International Organization for Standardization (ISO) in Stockholm, Sweden from 29 May to 2 June.

The ISO TC211 deals with the development of standards and specifications for the geospatial domain. The International Hydrographic Organization (IHO) is a Class A liaison member of ISO TC211 and participates in its standards development and maintenance activities. The ISO/TC211 19100 series of standards and specifications underpins the IHO S-100 Universal Hydrographic Data Model.

Assistant Director Anthony Pharaoh represented the IHO Secretariat at the 44th meeting.

Participants in the 44th ISO/TC211 Plenary Meeting.

The meeting agreed to the establishment of an internal liaison with ISO/TC 307 dealing with blockchain and electronic distributed ledger technologies. Blockchain is a digital platform that records and verifies transactions in a public and secure manner. It provides a decentralised, cryptography-based solution for sharing information.

The meeting agreed a resolution to produce a new edition of the ISO 19152 standard (Land administration domain model). This was in response to a proposal by the International Federation of Surveyors (FIG) (class A liaison) following discussions that took place at the 6th workshop of the Land Administration Domain (LADM) that was held in Delft, Netherlands in March 2017. Relevant liaison and stakeholder organizations such as FIG, IHO, the Open Geospatial Consortium (OGC), the United Nations (UN) Committee of Experts on Global Geo-Information Management (UN-GGIM), the UN Expert Group on Land Administration and Management (UN EG—LAM), ISO/TC 307, the International Society for Photogrammetry and Remote Sensing (ISPRS), the World Bank, UN Habitat, the UN Human Settlements Programme, the UN Division for Ocean Affairs and the Law of the Sea (UNDOALOS), and the UN Food and Agriculture Organization (FAO) were invited to participate in the drafting of the new edition.

ISO requires that all standards undergo regular revisions. The 44th plenary meeting agreed that the following relevant standards, should undergo a systematic review: ISO 19118:2011 (Encoding), ISO 19141:2008 (Schema for moving features) and ISO 19156:2011 (Observations and measurements).

TC 211 also maintains a number of resources for users and implementers of the 19100 geographic standards and associated models. These include:

- A harmonized model repository which includes UML models of all the 19100 standards and information on how to access them.
- A glossary of terms and definitions which has been translated into 14 different languages. Its purpose is to encourage consistency in the use and interpretation of geospatial terms/definitions used in the 19100 standards.
- The ISO TC211 XML Schema Repository, which includes XML schema, transforms, Schematron rules, and examples for ISO TC211 metadata and data quality standards.

A half-day workshop on GIS (Geospatial Information System)/BIM (Building Information Modelling) interoperability was also held during the course of the 44th meeting.

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- **45th meeting of the ISO/TC 211**

Standards New Zealand hosted the 45th meeting of the International Organization for Standardization (ISO) - Technical Committee 211 (ISO/TC211) which took place at the Victoria University in Wellington, New Zealand from 27 November to 1 December. The ISO TC211 deals with the development of standards and specifications for the geospatial domain. The TC211 19100 series of standards and specifications have been used for the development of the IHO S-100 Universal Hydrographic Data Model. Assistant Director Anthony Pharaoh represented the IHO Secretariat at the Working Group and Plenary meetings.

45th ISO/TC211 Plenary Meeting Members.

ISO requires that all standards undergo regular revisions to ensure that they remain fit for purpose. The 45th plenary meeting approved the revision of the 19152:2012 Land Administration Domain Model (LADM) standard. The International Federation of Surveyors (FIG) agreed to hold a LADM Workshop in Zagreb, Croatia from 12 to 13 April 2018. The meeting also agreed that a systematic review should be carried out for the following standards; 19144 Classification system - Part 2: Land cover meta language (LCML); 19159-1 Calibration and validation of remote sensing imagery sensors and data - Part 1: Optical sensors; 19117 Portrayal and ISO 19155 Place Identifier (PI) architecture.

Due to extensive work being undertaken by the Open Geospatial Consortium (OGC) on geospatial web services, it was decided to cancel the current revision projects for the 19142 (Web Feature Service) and 19143 (Filter encoding) standards until the OGC projects have been completed.

The plenary meeting agreed to use the domain name “isotc211.org” for web access to all its official resources, including the 19100 XML Implementation Schemas, XML Codelists, XML example files, ontologies, UML files and profiles of standards.

In response to a discussion on different methods of data classification, it was agreed to hold a classification workshop during the 46th meeting which will take place in May 2018. Participants will be invited to report on their experiences using a top-down and bottom-up approach to classification. An outreach seminar was held during the course of the meeting. Presentations were provided on; a project (by Australia and New Zealand) to build a geospatial knowledge infrastructure using linked data resources; the OGC’s Discrete Global Grid Systems (DGGS) Abstract Specification; and an Australian initiative to produce a cross-walk of metadata catalogues.

United Nations

- **United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM)**

The seventh Session of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) took place at the UN Headquarters in New York, USA in August.

The principal purpose of the UN-GGIM is to play a leading role in setting the agenda for the development of global geospatial information management and to promote the use of geospatial information in addressing key global challenges, particularly taking into account the role of geospatial data in monitoring and achieving the Sustainable Development goals agreed under the UN 2030 Agenda for Sustainable Development. The UN-GGIM reports to the UN Assembly via the UN Economic and Social Council (ECOSOC).

The Secretary-General, Robert Ward, represented the IHO, assisted by the Secretary of the IHO Marine Spatial Data Infrastructures Working Group (MSDWG), Mr John Pepper. Unfortunately, national hydrographic services were not well represented among the delegations.

The IHO Secretariat, in collaboration with the Secretariat of the UN-GGIM and with the contribution of Mr John Nyberg, the Head of the Charting Division of the Office of Coast Survey of NOAA, mounted a poster display and organized a well-attended panel discussion on marine geospatial information as one of the side events.

Several items on the agenda of UN-GGIM7 were of direct relevance to IHO Member States, particularly in relation to the contribution of hydrographic data and services to national and regional spatial data infrastructures.

Among other things, the Committee reviewed the progress being made by its working group (WG) on global fundamental geospatial data themes. These themes will be considered as the minimum list of geospatial data themes that all States should be addressing as part of their SDI. The Committee of Experts adopted a list of 13 themes, which included *elevation and depth* as one of the themes.

The view from the IHO Secretary-General's desk at UN-GGIM-7

The Committee also agreed to establish a UN-GGIM Marine Geospatial Information Working Group (UN-GGIM: MGIWG). The WG will provide input to the Committee to support its Member States in developing national policy, strategic priorities, decision-making and the monitoring of global developments in relation to their spatial data infrastructures and marine

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geospatial information management. Uniquely, the IHO was allocated a specific Observer position in the Terms of Reference of the WG.

- **UN Ocean Conference 2017**

The Secretary-General, Robert Ward, represented the IHO at the United Nations (UN) Conference to Support the Implementation of Sustainable Development Goal (SDG) 14: *Conserve and sustainably use the oceans, seas and marine resources for sustainable development* (The Ocean Conference). The Ocean Conference took place in the General Assembly Hall at the UN Headquarters in New York, USA in June, coinciding with World Oceans Day, observed annually on 8 June. The overarching theme of the Ocean Conference was - *Our oceans, our future: partnering for the implementation of Sustainable Development Goal 14*.

SDG14 comprises 10 targets covering a wide range of issues affecting the continuing sustainable development of the seas and oceans.

IHO Information Display

Almost all the 193 Member States of the UN attended. Many were represented by their Head of State or Government. The Secretaries-General or equivalent of all the principal intergovernmental organizations with with which the IHO collaborates were present, together with representatives from business, academia and science, and ocean and marine life advocates.

Opening Session of the UN Ocean Conference

The IHO Secretary-General made a statement on behalf of the Organization during the Conference. He pointed out that all the targets agreed under SDG14 depend upon a better knowledge of the depth and shape of the seafloor, not only in the deeper ocean but also in the world's coastal waters where 50% remains unsurveyed.

The Fiji Military Forces Band opens the World Ocean Day celebrations

The Secretary-General highlighted the IHO's continuing desire to improve the currently unsatisfactory situation and the need to support government hydrographic surveying programmes. He explained that in addition to national surveying programmes, the IHO is now re-invigorating the concept of crowdsourcing or passage sounding - where all vessels use their standard navigation equipment to help measure and map the depth of the sea. At the same time, the IHO is investigating the use of other innovative technologies, including the use of autonomous roaming vehicles, and the determination of the depth in shallow water using satellite imagery, where conditions allow. The Secretary-General specifically mentioned the IHO-IOC GEBCO (General Bathymetric Chart of the Oceans) programme as a way to support the aims of SDG14.

During the Conference, Mr Yohei Sasakawa, on behalf of the Nippon Foundation, announced that the Nippon Foundation will increase its involvement in the IHO-IOC GEBCO programme and was planning to contribute US$18.5M over ten years to support the specific goal of comprehensively mapping all of the seafloor by 2030. This will be known as Project Seabed 2030.

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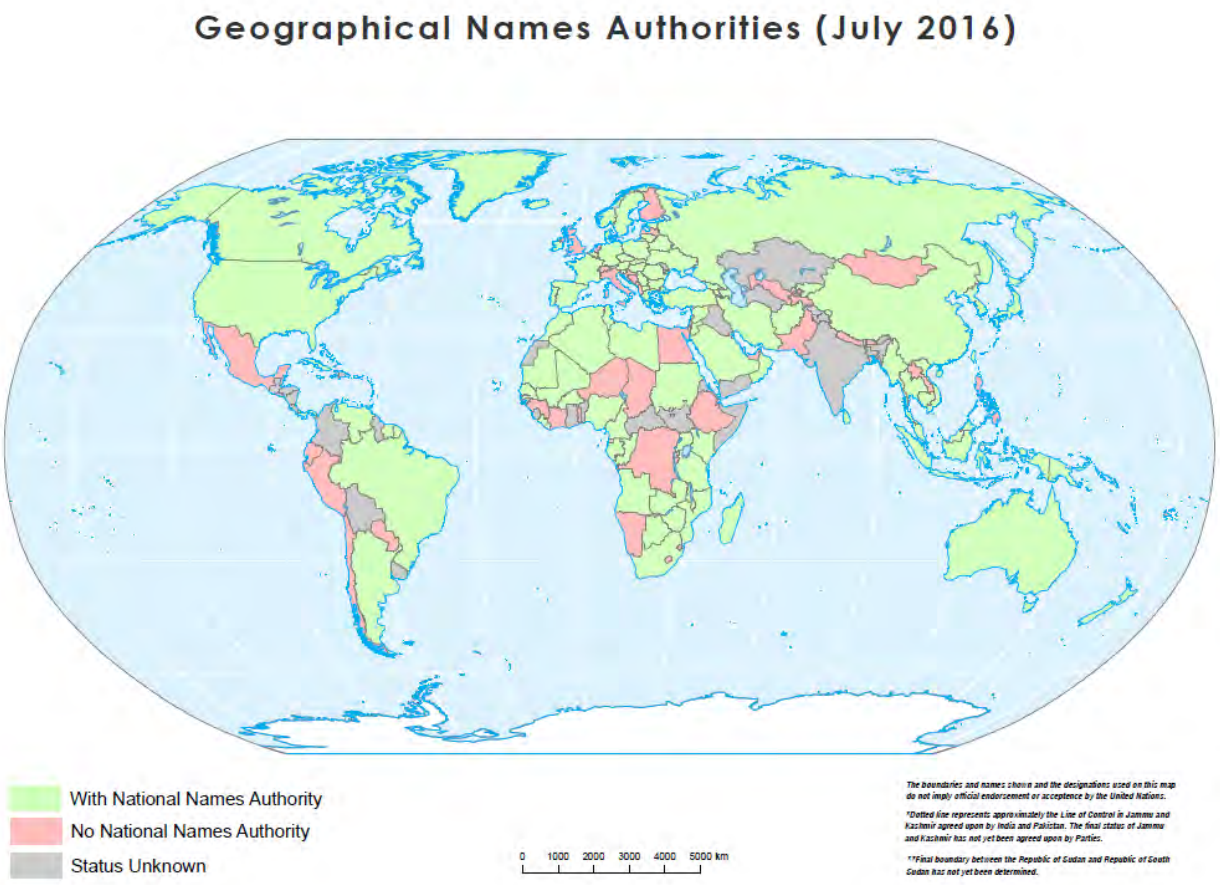
- **UNGEGN30-UNCSGN11**

The 30th Session of the United Nations Group of Experts on Geographical Names (UNGEGN-30) and the 11th Conference of the United Nations on the Standardization of Geographical Names (UNCSGN-11) were held at the United Nations Headquarters, New York, United States of America, in August, immediately after UN-GGIM 7. The IHO Secretariat was represented by Assistant Director Yves Guillam, during the first week.

The UNGEGN is composed of some 150 experts from 52 countries, organized into 24 linguistic/geographical divisions. One of the main goals of the UNGEGN is to emphasize the importance of the standardization of geographical names at the national and international levels and to demonstrate the benefits of such standardization.

Mr Stefan Schweinfest, Director of the United Nations Statistics Division delivered an opening speech in which he connected the work of the Conference and the outcomes of the seventh Session of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM). He raised several general geospatial information issues that are familiar within the IHO (the best use of data, capacity building, crowd-sourcing, the technical nature of the work placed in a political context) and made favourable references to the IHO on several occasions.

At the invitation of the Conference, the IHO Secretariat gave a special presentation under the guiding theme for World Hydrography Day for 2017 - *Mapping our Seas, Oceans and Waterways - more important than ever*. This presentation provided the opportunity to raise the IHO profile, introduce the Organization and inform the Group of Experts on the development and maintenance of standards and publications, on the S-100 framework and on the IHO geospatial information registry. The IHO involvement in activities related to undersea feature naming were also highlighted.



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Participation at ETMSS, ETSI and other JCOMM meetings

- **ETMSS and ETSI**

The Expert Teams on Maritime Safety Services (ETMSS) and Sea Ice (ETSI) are part of the World Meteorological Organization (WMO) and the Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM) of the UNESCO Intergovernmental Oceanographic Commission (IOC). The ETMSS participates in, and provides the meteorological input to the IHO World-Wide Navigational Warning Service Sub-Committee (WWNWS-SC). The ETSI is the responsible body for the WMO operational sea ice standards, including WMO Sea Ice nomenclature. It is the formal body responsible for the Ice Objects Catalogue together with the WMO Secretariat as co-manager of the catalogue responsible for operational sea ice standards. ETMSS meets approximately every four years and the ETSI approximately every three years. Both bodies held their 5th and 6th meetings, respectively, at the Finnish Meteorological Institute, Helsinki, Finland, from 28 February to 3 March. The IHO was represented by Assistant Director David Wyatt.

Mr Jussi Kaurola addressing the delegates at the opening session of the joint JCOMM ETMSS and ETSI meeting

Delegates from the WMO Secretariat, Australia, Argentina, Brazil, Canada, Chile, China, Denmark, Finland, France, Germany, Greece, Italy, Japan, Norway, Russian Federation, UK, USA, International Mobile Satellite Organization (IMSO), Inmarsat, Iridium and the Chair of the JCOMM Services Coordination Group, were welcomed by Mr Jussi Kaurola, Director Weather and Safety at the Finnish Meteorological Institute (FMI). The meetings were chaired by Mr Neal Moody (National Manager, Marine Weather Services, Australian Bureau of Meteorology) and Dr Vasily Smolyanitsky (Arctic and Antarctic Research Institute (AARI) and State Oceanographic Institute (GOIN) of Roshydromet, Russian Federation).

The participants of the JCOMM ETMSS and ETSI meeting

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Assistant Director Wyatt addressing the JCOMM Technical Conference

The joint meeting received reports and presentations from Services and Forecast Systems Programme Area (SFSPA) of JCOMM, the ETMSS Chair, the ETSI Chair, the International Maritime Organization (IMO) delivered by a representative of the WMO Secretariat, the IHO, the IMSO, Inmarsat and Iridium. The IHO presentation, delivered by Assistant Director Wyatt, provided background information on the IHO and the role of its WWNWS-SC in providing the standards that underpin the provision of Maritime Safety Information. The IHO representative also gave a presentation on the IHO capacity building programme framework with a focus on the delivery of MSI training courses. It was confirmed that representatives from the IMO/WMO World-Wide Met-Ocean Information and Warning Service (WWMIWS) could witness the MSI training courses as a way of identifying how to establish a similar training structure as well as identify opportunities to harmonize the delivery of training.

The meeting reviewed the status of relevant WMO and joint IMO/IHO/WMO documentation and agreed upon the actions necessary to bring the WMO documentation into closer alignment with the joint documentation, particularly in relation to the update cycle for the relevant IMO Resolutions. The meeting endorsed the need for continuing the close cooperation between the WMO and the IHO through their ETMSS and WWNWS-SC. In particular it was agreed to move forward with the dialogue between NAV and MET AREA Coordinators, which began at the collocated meeting in Wellington, New Zealand, in 2014.

In addition to more general comments on relevant activities, the IHO representative was able to provide significant contribution during the discussions on progress with the developments of S-100-based product specifications: S-411 – *Ice Information* – and S-412 – *Weather Overlay* – for which comprehensive presentations were provided by Lieutenant Joseph Phillips (NOAA, USA) and Jürgen Holfort (Head of the German Ice Service, Bundesamt für Seeschifffahrt und Hydrographie (BSH)). Relevant issues to be addressed at the fourth session of the IMO Sub-Committee for Navigation, Communications and Search and Rescue (NCSR 4), in particular the Modernization Plan for the Global Maritime Distress and Safety System (GMDSS) and the process of the recognition of new mobile satellite service providers of the GMDSS, were also discussed.

It was agreed that a second collocated WWNWS-SC meeting and WWMIWS workshop would be of significant benefit to develop further the discussions and dialogue between the NAV and MET Areas Coordinators. The WWNWS10 meeting, which is anticipated to be held in Monaco in 2018, was identified as a suitable opportunity.

The meetings concluded with the development of a list of actions to be completed in preparation for the 5th Session of JCOMM to be held in Indonesia in October 2017.

- **JCOMM-5**

JCOMM, the Joint Technical Commission for Oceanography and Marine Meteorology, is an intergovernmental body of technical experts that provides a mechanism for international coordination of oceanographic and marine meteorological observing, data management and services, combining the expertise, technologies and capacity building capabilities of the meteorological and oceanographic communities. The creation of this Joint Technical Commission resulted from a general recognition that worldwide improvements in coordination and efficiency could be achieved by combining the expertise and technological capabilities of the World Meteorological Organization (WMO) and the UNESCO Intergovernmental Oceanographic Commission (IOC).

JCOMM Technical Conference in session

The 5th meeting of JCOMM was held at WMO Headquarters in Geneva, Switzerland, from 25 to 29 October; it was preceded by a two day technical conference on 23-24 October. Assistant Director David Wyatt represented the IHO.

The conference was organized to provide an overview of the advances in marine meteorological and oceanographic (metocean) observing systems, data management and services developed and continued during the JCOMM-5 intersessional period. The aim was to properly interface the JCOMM management and expert groups with the IOC-WMO Member activities and have them interact with a large community of stakeholders worldwide, gathered at the JCOMM-5 Session. The session of particular interest to the IHO was Session 4 – *Integrated Meteo-hydro-marine-ocean services and methodological and implementation aspects of met-ocean state assessments* – which covered integrated observing and modelling systems developed to serve as a knowledge and operational basis for Disaster Risk Reduction and the Multi-Hazard early warning systems. Presentations covered observational needs, modelling challenges and experiences, as well as decision support systems stemming out of observing and modelling systems. The IHO representative gave a presentation on the lack of global bathymetric coverage and the potential impacts of this lack of coverage has on WMO and IOC model forecasts results.

JCOMM-5 plenary in session

The JCOMM-5 meeting covered numerous topics concerning the governing bodies on the WMO and IOC; Climate research and services; Disaster Risk Reduction, early warning and operation services; Sustainable Development Goals; Marine Meteorological and Oceanographic services and forecasting systems; Data management, exchange and information systems; Integrated observing systems; and a review of technical regulations, which included WMO Manual 558 – *Marine Meteorological Services* - the manual for the delivery of services under the IMO/WMO World-Wide Met-Ocean Information and Warning Service (WWMIWS).

Of particular interest to the IHO were the discussions on the WMO engagement with marine meteorological services, coastal inundation forecasting, the Global Multi-hazard Alert System (GMAS) and the implementation of the Met-ocean observing system. The IHO proposed a number of amendments to document JCOMM5/5/1 – *Services and Forecasting Systems Programme Area (SFSPA) Vision, new Structure and Governance* – which included the establishment of the Worldwide Met-Ocean Information and Warning Service (WWMIWS) Committee to replace the Expert Team on Maritime Safety Services (ETMSS) and the establishment of a network of National Marine Services Focal Points, which closely replicates the network of Nation Coordinators within the NAVAREA framework, and to which Committee the IHO will be requested to nominate a representative. In addition the JCOMM noted the work by the IHO and IALA to progress the IMO e-navigation framework using the data standards and formats of the IHO S-100 (Universal Hydrographic Data Model) for the

display of communication information on integrated bridge displays. Additionally the IHO proposed minor amendments to JCOMM5/9/1 – *Revised Manual on Marine Meteorological Services (WMO-NO. 558)* – to ensure terminology was in harmony with other MSI documentation.

The IHO was highlighted as a key partner of the WMO and IOC within the JCOMM framework; the contribution of and the engagement with the IHO was noted in a number of documents presented to the plenary. The continued close engagement and cooperation between IHO, WMO and IOC remains essential for the progress of a number of IHO programmes and initiatives, such as Crowdsourced Bathymetry (CSB), GEBCO, the World-Wide Navigational Warning Service (WWNWS) and provision of maritime safety information (MSI), global sea level observing and disaster risk reduction and management.

Other Organizations with relevant agendas to the programme of the IHO

- **Asian Pacific Heads of Maritime Safety Agencies (APHoMSA)**

The 18th session of the Asia-Pacific Heads of Maritime Safety Agencies (APHoMSA) forum was held from 22 to 24 March 2017 in Langkawi, Malaysia. The meeting was attended by 20 Members, four observing States and four observing organization, including the IHO, represented by the National Hydrographic Centre of Malaysia. The meeting was updated on the relevant cooperation with international and regional organizations, the development of a Domestic Shipping Safety Assessment and the implementation of IMO Conventions and IMO Member State Audit Scheme (IMSAS).

SPC reported on the coordination and technical assistance in the Pacific region under the Framework for Action on Transport Services 2011-2020 and the alignment of its work plan and priorities to assist its Members to achieve the UN's Sustainable Development Goals. IALA updated the meeting on recent activity in the Asia-Pacific region with technical needs assessment missions and the value of IALA's distance learning programme for aids to navigation managers.

- **Group on Earth Observations (GEO)**

GEO, the "Group on Earth Observations" is a voluntary partnership of governments and international organizations. GEO was launched in 2003 in response to calls for action by the 2002 World Summit on Sustainable Development and by the G8 (Group of Eight) leading industrialized countries. GEO is coordinating efforts to build a Global Earth Observation System of Systems (GEOSS) in order to exploit the growing potential of Earth observations to support decision making in an increasingly complex and environmentally stressed world.

GEO's Members now include 105 Governments and the European Commission. In addition, 115 intergovernmental, international, and regional organizations with a mandate in Earth observation or related issues have been recognized as Participating Organizations. The IHO was recognized as a Participating Organization in 2006. GEO meets annually in plenary session. Its strategic guidance is provided by a Ministerial Summit which takes place about every three years. The GEOSS Implementation Plan has been steered by the GEO Co-Chairs (four Members: China, European Commission, South Africa, and USA) and the Executive Committee (sixteen Members selected on a geographical basis).

The 14th GEO Plenary Session (GEO-XIV) took place in Washington DC, USA on 25 and 26 October 2017, chaired by Mr Stephen Volz (United States) who is one of the Co-Chairs of the GEO. The meeting was also combined with side events and exhibitions that highlighted and promoted the role, applications and opportunities to use Earth observations in delivering "Insight for a changing world". More than 500 representatives from Members and Participating Organizations and Observers attended the plenary. Director Mustafa Iptes represented the IHO.

GEO-XIV plenary in session.

The GEO-XIV Plenary was held in panel format, in general, to incorporate more participation from diverse arenas, including the commercial sector, in order to help the GEO community transition from a data-centric to a user-centric approach. The first day of the plenary focused on different perspectives of Earth observations and the following topics were broadly discussed at the panel sessions:

- Earth Observations in Public Policy; city and country level policy makers examined the current use of data to inform public policy.
- Earth Observations in the Commercial Sector; decision makers from private sector explored current uses of Earth observations by commercial companies to assess and manage risks, thereby optimizing their investments.
- Earth Observations in International Development; representatives from national and international funding and development agencies discussed their role and interest in increasing the world's Earth observation capacity, and how this is incorporated in their own policies and programmes.

The second day of the plenary reviewed and updated the 2017-2019 GEO Work Programme and the 2018 budget. The GEO Work Programme includes 34 Community Activities, 24 Initiatives, four Flagship projects and 10 Foundational Tasks. Among the GEO Initiatives, the "*Oceans and Society: Blue Planet Initiative*" aims to ensure the sustained development and use of ocean and coastal observations for the benefit of society.

At the end of the plenary, the last panel discussion on "National Earth Observations" was held. Representatives from developed and developing GEO Member States discussed the value and best practices in developing and accessing national Earth observation portfolios.

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- **International Seabed Authority (ISA)**

The International Seabed Authority (ISA) held its twenty-third session at its headquarters in Kingston, Jamaica from 31 July to 18 August. The session included meetings of the ISA Assembly, the ISA Council, and several subsidiary organs.

Secretary-General Robert Ward represented the IHO during the second week of the session, when the Assembly and the Council met for the first time in the session.

Secretary-General Ward addressed the Assembly, where he introduced a background report on the IHO that included an overview of the purpose and the objectives of the IHO and its relevance to the ISA. He particularly emphasised the relevance of the IHO's aim to ensure that the world's seas and oceans are properly mapped so as to benefit all human activity that takes place in, on or under the sea. He pointed out the relevance of IHO and ISA activity in the context of the UN 2030 Agenda for Sustainable Development and the achievement of Sustainable Development Goal 14 covering the oceans, seas and marine resources.

ISA Headquarters, Kingston, Jamaica

He informed the Assembly of the ISA that the IHO have well-established globally implemented geospatial data standards for depth and associated information and that it has very effective levels of liaison and collaboration with the data sensor manufacturers and the marine data industry. He reminded the Assembly that the IHO is recognized as a competent technical authority to all the relevant intergovernmental organizations dealing with maritime data and information, such as the UN-GGIM[1], UN-DOALOS[2], UNESCO-IOC[3], IMO[4], and WMO[5], and now most recently with ISA under the auspices of the agreement between the two Organizations that was signed in 2016.

He concluded by saying that the IHO stands ready to collaborate with the ISA, to ensure that appropriate data transfer protocols and data exchange standards are put in place for depth data to ensure that both Organizations can provide effective support towards the achievement of the UN Sustainable Development Goal for the Ocean and also to serve the common interests of all mankind in relation to the use and understanding of the ocean environment.

Secretary-General of the ISA

In addition to calling on the Secretary-General and the Deputy Secretary-General of the ISA, the Secretary-General took the opportunity to discuss with the relevant staff how the depth data that is submitted to the ISA "for the benefit of mankind as a whole" can be reflected in the IHO Data Centre for Digital Bathymetry (DCDB) and used by the IHO-IOC programme of the General Bathymetric Chart of the Oceans (GEBCO) and others. As a result, a plan of action was developed that will bring together the appropriate Secretariat Staff of the IHO and the ISA and the Director of the DCDB to achieve this.

[1] UN-GGIM: United Nations Committee of Experts on Global Geospatial Information Management
[2] UN-DOALOS: United Nations Division for Ocean Affairs and the Law of the Sea
[3] UNESCO-IOC: Intergovernmental Oceanographic Commission of UNESCO
[4] IMO: International Maritime Organization
[5] WMO: World Meteorological Organization

- **Our Ocean Conference**

Since 2014, high-level participants from many countries have attended Our Ocean Conferences (hosted by the Governments of the United States of America (2014 and 2016) and Chile (2015), including Heads of State, Government ministers, companies from global industry, non-governmental organizations (NGOs) and philanthropic organisations. Our Ocean Conferences focus on all maritime aspects and regularly invites world leaders to look into the future and respond, delivering high-level commitments and transforming the challenges ahead into an opportunity for cooperation, innovation and entrepreneurship.

High-level participants of the Our Ocean Conference-2017

The 2017 edition of the Our Ocean Conference, "An ocean for life", was hosted by the European Union (EU) and took place in St. Julian's, Malta on 5 and 6 October. The Conference was combined with an exhibition illustrating contributions to ocean related activities from coastal States, International Organizations, non-governmental organizations and industry. High level representatives including Presidents, Prime Ministers and Ministers from more than 100 states attended the Conference. His Serene Highness Prince Albert II of Monaco, His Royal Highness Prince Charles, the Prince of Wales, and Her Majesty Queen Noor of Jordan delivered key note speeches at the Conference. Director Mustafa Iptes represented the IHO.

Our Ocean Conference-2017 covered numerous ocean related topics which were considered at different panel sessions during the two day event:

- Marine pollution
- Marine protection
- Maritime security
- Sustainable blue economy
- Sustainable fisheries
- Climate related impacts on the ocean
- Our Ocean Leadership

Each panel session was followed by the announcement of commitments from different sectors. Our Ocean Conference-2017 generated an unprecedented level of ambition:

- 437 tangible and measurable commitments,
- EUR 7.2 billion in financial pledges,

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- 2.5 million Square kilometers of additional Marine Protected Areas committed by Chile, the Cook Islands, Indonesia, Niue and Palau in the Pacific Ocean.

With 100 commitments from the corporate sector, the 2017 Conference for the first time mobilized at scale, the business community in ocean conservation. The EU's 36 commitments alone amounted to over EUR 550 million, and together with its Member States and the European Investment Bank, the total EU pledge exceeded EUR 2.8 billion. Other countries, NGOs, foundations, research institutes and international organisations tabled nearly 300 commitments in a truly global show of determination to act. Altogether, almost doubling the amount pledged since 2014, substantially increasing the world's marine protected areas and launching impactful action in all corners of our oceans.

In addition to the panel discussions in the Conference, a very extensive programme of side meetings and briefings took place under the Exhibition Stage Programme, covering the full range of interests in protection of the world's seas and oceans and moving towards new projects for healthy oceans.

Information Management

- **IT-Infrastructure of the Secretariat**

The information management infrastructure of the Secretariat and the IHO has been progressively developed and improved over the reporting period. The IT-infrastructure continues to rely on a combination of one dedicated member of staff and approximately a third of the time of an Assistant Director, together with assistance and services provided by several service providers under contract terms. In the face of evolving new requirements, particularly in relation to adopting an increasingly complex digital data and information environment, resources remain stretched to meet all the requirements. The complex IHO IT-infrastructure serves a significant archive of reference documents, an extensive and dynamic website that includes the following online applications: a meeting registration system, the ENC catalogue, the INT chart catalogue, an online hydrographic dictionary, a stakeholders database, an S-62 producer code database and an index of downloadable GEBCO charts. Several on-line web services support the mobile computing environment for the senior members of staff who are required to travel frequently. These include mail services and secure access to the Secretariat internal network services.

The work of two officers seconded by Japan and the Republic of Korea enabled several important capabilities to be implemented that might otherwise not have been possible within existing resources; the reporting period saw important progress in enhancements of the GIS environment, combining country and regional information systems, chart information systems and capacity building and bathymetry information. Parts of the system, including web mapping services, are available only within the Secretariat at this stage, however the goal is to provide secure access for Member States and Regional Commissions.

- **Maintenance of publications that are not allocated to a specific IHO body**

The Secretariat maintained and issued various publications during the year including P-5 - IHO Yearbook, P-7 - IHO Annual Report, S-11 Part B – Catalogue of INT Charts, and M-3 - IHO Resolutions.

- **Communication between the IHO Secretariat and Member States through Circular Letters**

During the year, the Secretariat published 71 Circular Letters (CLs) in English, French and Spanish and three Finance Circular Letters were published in English and French. In addition, ten Council Circular Letters were published in preparation of the 1st Session of the IHO Council.

- **Technical Library of the IHO Secretariat**

The Secretariat's technical library comprises of bound manuscript copies of all significant IHO records, such as Conference Proceedings and Circular Letters, together with an extensive ad hoc collection of reference books and periodicals on various topics related to hydrography and nautical charting.

Public Relations and outreach

The Secretariat maintained a record of the principle IHO activities in the monthly publication of the IHO Bulletin, as well as providing a quarterly article in the journal *Hydro International*.

- **International Hydrographic Review**

The annual edition of the International Hydrographic Review was compiled and published in collaboration with the appointed editor, Mr Ian Halls. The IHR is a pdf publication, with peer-reviewed articles, with two editions a year and an annual printed copy consisting of a compilation of the articles. Access to this publication is free via the IHO website and without restriction. Member States are strongly urged to contribute to the Review as an important means of sharing information on their activities and developments within the hydrographic community. Other organizations or individuals working in related hydrographic fields, are also invited to contribute to this publication. The IHO Secretariat has been working with the University of New Brunswick (UNB), Canada, in a project to develop a digital repository of the complete library of the IHR. As a result, the first phase of the project now provides access to volumes from 1963 to 2015. They can be found at: https://journals.lib.unb.ca/index.php/ihr

- **World Hydrography Day 2017**

The Secretariat provided briefing material for World Hydrography Day 2017 and published reports on the IHO website that described the celebrations that were conducted by Member States around the world. World Hydrography Day 2017 marks the 96th anniversary of the establishment of the organization known today as the IHO. On this occasion, the IHO and its now 88 Member States reaffirmed their commitment to raising awareness of the importance of hydrography; and continue to coordinate their activities, in particular through maintaining and publishing relevant international standards, providing capacity building and assistance to those countries who aim to increase their activities in sea survey and cartography.

- **Relationships with the Government of Monaco and the diplomatic corps accredited in Monaco**

The relationship with the Government of Monaco remained excellent throughout the year. The Department of External Relations and Cooperation continued to assist the IHO Secretariat. The Secretary-General and Directors were also able to further promote good relations when they met various diplomatic and government officers at functions and events hosted in Monaco by the Government or diplomatic missions in the Principality.

- **Monacology 2017**

The 2017 edition of Monacology took place from 06 to 09 June directly in front of the International Hydrographic Organization's Headquarters. Monacology is an annual event that aims to raise children's awareness about the environment and sustainable development. This year the organizers made reference to the United Nations sustainable development goals for the protection of the planet. The IHO presented a chart of the «Marine protected area from Toulon to Orbetello » courtesy of the French Hydrographic Office (SHOM).

IHO stand at Monacology 2017

Learning to read and grasp the geography of our Blue Planet is allowing our children to address the question of hydrography and marine science and to create awareness of their importance with regards to the sustainable development goals determined by the United Nations and in particular Goal 14 involving the seas and oceans.

In this instance all the participating children from local schools, including special needs children, associations for the underprivileged and sick children were able to produce their own charts which they could take home or back to school.

Two GEBCO globes were presented as gifts

Each budding hydrographer was given an IHO badge « Junior Hydrographer » in recognition of their efforts.

« Junior hydrographer»

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The IHO was honored by the visit of HSH Prince Albert II, on Friday 9 June. He was welcomed by Director Gilles Bessero who presented the IHO Stand which focused on creating awareness for the new generation on the importance of hydrography for sustainable development of sea and oceans especially the Mediterranean which is their playground.

HSH Prince Albert II of Monaco on the IHO stand
with Director Gilles Bessero
(photo credit Manuel Vitali/Communication Department)

Work Programme & Budget, Strategic Plan and Performance Monitoring

This element of the work programme concerns the execution of the IHO work programme, the new structure and organization of the IHO and its capacity to meet future requirements.

- **Financial situation**

The finances of the Organization remain healthy. The Secretariat pursued a conservative budget and closely monitored expenditure. All details have been reported to the Assembly for endorsement. Part 2 of this annual report provides the full scope.

- **Programme management, performance monitoring and risk assessment**

The processes for programme management, performance monitoring and risk assessment described in the edition of the Strategic Plan in place since 2009 have been difficult to implement in a meaningful way. This was reported to Member States regularly and resulted in an increased frequency of reporting by collecting and compiling bi-annual reports from all the IHO and associated bodies. However, this did not make a significant difference to the original problem of obtaining the necessary input from the various IHO bodies, particularly obtaining reports from the Chairs of Regional Hydrographic Commissions (RHCs).

As a result of the above and other factors related to minimising the workload on all those involved, the Secretariat proposed a number of changes to the Strategic Plan in order to make the programme management, performance monitoring and risk assessment process more meaningful and easier to implement in future. Additional to several editorial amendments that reflect the revised Convention, a number of new topics, including *the blue economy*, *an open data environment*, *crowd sourcing*, and *disaster preparedness and response* have been introduced in the revised Strategic Plan 2017. The description of the implementation of performance indicators has been clarified. The description of the risk management framework has been generalised, and the specific example relating to the risk analysis has been removed. The new Strategic Plan now ranges from 2018 to 2020. In order to improve preparedness for the years to come after, the Assembly tasked the Council to conduct a

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comprehensive review of the Strategic Plan and to provide a draft revised Plan, as appropriate, in time for the consideration of the 2nd ordinary session of the Assembly in 2020 and empowered the Council to establish a working group for this discrete purpose.

An updated risk analysis for 2017, based on the methodology described in the Strategic Plan was separately adopted by the Assembly, in support of the proposed 3-year work programme 2018-2020.

Based on Secretariat´s proposals, the Assembly adopted a number of revisions to IHO Resolution 12/2002 – *Planning Cycle* in order to reflect the planning and reporting requirements and timetable resulting from the changed arrangements under the revised Convention and the establishment of the Council. The revised text refines and re-arranges the provisions according to two cycles addressing respectively Assembly years on the one hand and non-Assembly years on the other hand.

Annex B reports on the status of performance indicators allocated for the purpose of performance monitoring within 2017.

A significant part of the operational budget is allocated to travel. This supports the travel expenses of the Secretariat Staff engaged on IHO activities. A list of Secretariat travel in 2017 is shown in **Annex C**.

Management of the IHO Secretariat

- **Staff Regulations**

The adoption by Member States of a new edition of the Staff Regulations in 2016 marked the end of a protracted revision process originally intended to be undertaken by a working group made up of Member States. After more than seven years' of very limited progress, and as agreed by the EIHC-5, the task was completed by the Secretariat in 2015 under the oversight of the working group. The new edition of the Staff Regulations (Edition 8.0.0), which entered into force on 1 January 2017, now more closely follows the United Nations and the Monaco Civil Service as the benchmark organizations for the remuneration packages and conditions of service for the internationally recruited and the locally recruited members of staff, respectively. One notable new arrangement is the option to award members of staff excluding the Secretary-General and Directors with an exceptional performance bonus to recognize outstanding and exceptional performance in fulfilment of their respective duties. This option was taken in the course of individual staff performance assessments conducted in December.

- **Secretariat Staff**

Ms Lorene Chavagnas joined the Secretariat as Office Assistant. She is mainly involved in registry matters of ingoing and outgoing communication by analogue and digital means.

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- **Secondment of Personnel to the IHO Secretariat**

***From left to right**: Mr Junghyun Kim (ROK),*
Dr Kentaro Kaneda (Japan), Captain Atilio Aste (Peru)

Three officers were seconded to the Secretariat during 2017 under the terms of IHO Resolution 3/1987 as amended. Mr Junghyun Kim from the Korea Hydrographic and Oceanographic Agency replaced Mr Yong Baek in March. Captain Atilio Aste from the Hydrographic Office of Peru replaced Captain Luis Hernandez Rubin in March and Dr Kentaro Kaneda from the Hydrographic and Oceanographic Department of the Japan Coast Guard continued his existing secondment.

Mr Kim was employed as the Associated Professional Officer (APO) to support the capacity building activities of the IHO, and worked on the development of the capacity building management system and online registration system. He did great contribution for the preparation of the first Council meeting and for the implementation of the post-Assembly tasks.

Dr Kaneda continued to work on the geo-information databases and web-based functions that assist both the IHO Secretariat and the RHCs in fulfilling their roles and the IHO Country Information System that supports the production and maintenance of IHO Publication P-5 - IHO Yearbook and C-55.

Captain Aste continued the work of maintaining and reviewing the IHO Hydrographic Dictionary in English, French and Spanish versions. He also collaborated in improving the data of the IHO Country Information System and was designated as Editor of the GEBCO Undersea Features Names Gazetteer. He also gave most helpful assistance for the preparation and conduct of the Assembly and other meetings.

- **Translation Service**

The Secretariat continued to translate key documents from English into French and Spanish through the use of its translation staff, who were employed primarily on the translation of Circular Letters and Secretariat's correspondence. Translations from French into English, when required, were provided by the Personal Assistant. All incoming Spanish correspondence was translated into English, for internal use, by the Spanish Translator.

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The volume of this work was similar to previous years and the continued rise in the technical complexity of some of the translations meant there was little opportunity to make any significant progress in the backlog of active IHO publications that await translation into the French and Spanish languages other than the maintenance of those publications that have already been translated. Some translation was done under contract in order to meet deadlines and requirements.

- **Secretariat Operations & Performance Improvement Campaign**

The new Directing Committee initiated a process of systematic review of the current internal arrangements of the Secretariat in order to identify needs and options to adapt to changed conditions, to optimize the internal work flow, aiming to improve efficiency and make the best use of the skills and talents of all the Members of Staff by acting more collectively. A one day workshop was conducted with all the Secretariat Staff. Using the "Harvard Methodology" structured approach, a free flow of ideas designated in several main categories, was triggered and moderated by the Secretary-General and the seconded officer Captain Aste. The categories included:

- Internal Workflow
- Staff Management
- Capacity Building
- Communication & Publicity
- IT Infrastructure & Applications
- Office Infrastructure
- Others

The results were categorized and will be used for change management in the years to follow.

WORK PROGRAMME 2
Hydrographic Services and Standards

Introduction

The IHO Work Programme 2 "Hydrographic Services and Standards" seeks to develop, maintain and extend technical standards, specifications and guidelines to enable the provision of standardised products and services that meet the requirements of mariners and other users of hydrographic information. This Work Programme is under the principal responsibility of the Hydrographic Services and Standards Committee (HSSC).

Technical Programme Coordination

This element monitors technical developments and oversees the development of IHO technical standards, specifications and publications through the coordination and interaction of the relevant IHO working groups reporting to the HSSC.

Conduct Annual meeting of HSSC

The ninth meeting of the Hydrographic Services and Standards Committee (HSSC) was hosted by the Canadian Hydrographic Service (CHS). The meeting took place at the Fairmont Château Laurier Hotel in Ottawa, Canada, from 6 to 10 November 2017. The Director General of CHS, Mr Denis Hains, opened the meeting and welcomed participants to Ottawa.

HSSC-9 participants

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The meeting was chaired by the Acting Chair of the HSSC Mr Mike Prince, Australia, and was attended by 56 representatives from 22 Member States, the IHO Secretariat, and six international organizations were accredited as observers. The IHO Secretary-General Dr Mathias Jonas, Director Abri Kampfer and Assistant Directors Yves Guillam and Anthony Pharaoh represented the IHO Secretariat.

The Committee reviewed the activities, proposals, and work plans of its subordinate bodies and the decisions of other organizations affecting its work and decided a number of resultant actions.

A summary of the main outcomes is provided below:

- **IHO Assembly-1 Decisions related to HSSC**

The HSSC Chair reported that there were several IHO Assembly decisions that related to the work of the HSSC and its subordinate bodies. The most significant item affecting the HSSC is the task of adding an annex to IHO Resolution 2/2007 – *Principles and Procedures for Making Changes to IHO Technical Standards and Specifications* – providing guidance on the procedure for conducting impact studies.

It was also noted that the Assembly urged Member States to contribute more actively to the implementation of Programme 2 and to maintain the relevant expertise while acknowledging the significant contribution of expert contributors from industry and academia and encouraged their continuing involvement in the activities of the Organization.

- **Decisions from the IHO Council (C-1) affecting HSSC**

As a consequence of the decision made at the first Council (C-1) to retain the current HSSC and IRCC procedures for approving proposals, HSSC decided that the proposed amendments to IHO Resolution 2/2007 should be dealt with in two steps. Firstly a revision of the HSSC Terms of Reference (TORs) are to be considered in parallel with the proposed revisions to IHO Resolution 2/2007. Secondly, any new proposals for amendments will considered, before a final submission is prepared for the 3rd Council meeting, and submission to the 2nd Session of the Assembly (A2) for approval

The HSSC Members were informed of the key priorities of the IHO Work Programme 2 – *Hydrographic Services and Standards* – that were highlighted and endorsed at C-1.

It was also noted that the Council tasked HSSC to establish a prioritized list of work items that need Special Project funding. The three requests presented at HSSC-9 for the development of the S-101 Portrayal Catalogue and Portrayal Catalogue Builder; the creation of S-58 check datasets; and the development of the S-127 – *Traffic Management* – Product Specification, were approved for funding.

S-100 and related activities

The S-100WG Chair reported that S-100 Edition 3.0.0 had been published in June 2017 and a schedule for the publication of future editions of S-100 in order to accommodate maintenance and extension to the standard was proposed and adopted.

It was noted that the draft Edition 1.0.0 of the S-100 Interoperability Specification, applicable to navigation systems only, had been completed by the S-100WG, and the S-98 number was allocated to this publication.

The Committee welcomed the nomination of Mr Albert Armstrong as the new S-101 Project Team Chair, noting that the development of the S-101 – *Electronic Navigational Charts – ENC* – Product Specification is clearly identified as the cornerstone of the IHO Work Programme 2. The participants also welcomed the progress made in the development of the S-121 – *Maritime Limits and Boundaries* – Product Specification, which is required by the United Nations Division for Oceans and Law of the Sea (DOALOS), to enable Member States to meet their obligations to deposit their maritime limits and boundaries.

Noting the upcoming availability of S-100 based products, proposals were made to implement robust validation checks procedures, and to use the test bed platform under development by the Republic of Korea in general, and the validation tool developed by Canada specifically for the S-111 – *Surface Currents* – Product Specification.

The Committee acknowledged the good progress made by the Nautical Information Provision Working Group (NIPWG) in the development of its S-100 based products, such as S-122 – *Marine Protected Areas*, and S-123 – *Radio Services* – Product Specifications.

The HSSC agreed on the critical need for the Data Quality Working Group (DQWG) to pursue its activities, under new Terms of Reference, which are intended to ensure that data quality aspects are addressed in an appropriate and harmonized way for all S-100 based Product Specifications. The quality indicators for bathymetric data in S-57 ENCs and S-101 ENCs remains a critical issue. The meeting discussed addressing this issue through the development of a new publication S-67 - *Mariners' Guide to Accuracy and Reliability of ENC* – and through the presentation of a possible conditional ECDIS visualization mechanism.

The HSSC-9 meeting approved the allocation of funds for the development of an S-101 Portrayal Catalogue and for upgrades to the existing Portrayal Catalogue Builder application. It also approved contract support for the development of an S-127 – *Traffic Management* – Product Specification; and test datasets to be used with the S-58 Edition 6.0 standard.

The HSSC-9 meeting assigned the "S-98" number to the "Interoperability Specification for Navigation Systems" being developed by the S-100WG. It also allocated the number range "S-421" to "S-430" for use by the International Electrotechnical Commission - Technical Committee 80 (IEC/TC80). The S-112 Product Specification (now withdrawn) content will be included within S-104 – *Water Levels Product Specification* and the S-112 number will be available for assignment to another Product Specification. The meeting allocated the S-402 number to the Inland ECDIS Harmonization Group (IEHG) for their *Bathymetric ENC* Product Specification.

ECDIS matters and Nautical Cartography

The ENCWG Chair reported on the revisions to a number of IHO publications completed in 2017 (S-52; S-64; S-57 UOC[6], S-58, S-65 and S-66). Fruitful discussions on high density bathymetric contours in ENCs led to the conclusion that the ENCWG needed to identify the current limitations in S-57, while ENC Producers will be invited to include more contour lines in their ENCs as appropriate. Various concerns raised by INTERTANKO in its report (un-assessed CATZOC areas, high density contour lines, Temporary and Provisional ENC Updates, portrayal issues) provided useful mariners feedback.

The NCWG reported on the completion of revisions to IHO publications S-4 and S-11 Part A, and that the study on the "future of paper chart" was now being progressed by a sub-group. The HSSC requested the NCWG to consider recent investigation reports covering nautical accidents and to provide recommendations for amending the IHO standards and guidance documents if appropriate.

The representative of the IEC presented the typical time line required to produce a major new revision of an IEC standard, which includes S-100 concepts for ECDIS, as well as the IEC concept of stability date.

Project Team on Standards for Hydrographic Surveys (HSPT)

The HSPT reported that a number of the limitations in the current version of S-44 were identified at its first meeting. A questionnaire was used to obtain feedback from the S-44 user and stakeholder communities. This feedback will be used to help develop the next Edition (6.0) of S-44, which is anticipated to be available for HSSC endorsement by 2020.

[6] Use of the Object Catalogue for ENC.

Relations with other bodies and Stakeholders

The Committee welcomed the various presentations given by the Chair of the IHO Inter-Regional Coordination Committee; and HSSC stakeholders and expert contributors. The HSSC benefited in particular from the informative report by the Open Geospatial Consortium (OGC), and from the user perspective provided by INTERTANKO. The awareness report provided by the International Cable Protection Committee (ICPC) was welcomed and further actions covering cables data release, associated surveys, and the charting of cables were identified.

- **Chairmanship**

At the end of the meeting, Captain Luigi Sinapi (Italy) and Mr Mike Prince (Australia) were elected as Chair and Vice-Chair of the HSSC respectively for the period of 2017 to 2020.

E-Nav Underway Conference

The 7th e-Navigation Underway International Conference was held from 31 January to 02 February 2017 on board the ferry M/S *Pearl Seaways*, sailing from Copenhagen, Denmark to Oslo, Norway and back to Copenhagen. Jointly organized by the Danish Maritime Authority (DMA) and the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), the conference was also supported by the IHO, BIMCO, the Comité International Radio-Maritime (CIRM) and the International Chamber of Shipping (ICS). It was attended by about 150 delegates from 28 countries, representing national maritime administrations, hydrographic offices (Norway, Republic of Korea, Sweden, Ukraine, United Kingdom, United States), industry and international organizations (BIMCO, CIRM, IALA, IHO, International Association of Independent Tanker Owners, International Harbour Masters' Association, International Maritime Pilots' Association).

The primary focus of the conference was on showcasing the development of practical e-Navigation solutions and test beds. The conference was jointly opened by Mr Francis Zachariae, Secretary-General of IALA, Mr Troels Blicher Danielsen, Deputy Director General of DMA, and Mr Kwang-youl Park, Director General of the Ministry of Ocean and Fisheries, Republic of Korea. The keynote address was delivered by Mr Michael Bergmann, President of the CIRM. Director Gilles Bessero, representing the IHO, presented the IHO perspective on e-Navigation progress and trends in relation to the development and implementation of the concept of Maritime Service Portfolios (MSPs). He highlighted the issues that need to be addressed to transition from the current structure of hydrographic services inherited from the paper chart environment to an e-Navigation friendly structure, and outlined the anticipated role of the IMO-IHO Harmonization Group on Data Modelling (HGDM). The progress in developing S-100 to underpin e-Navigation was presented by Ms Julia Powell, United States, Chair of the IHO S-100 Working Group.

Participants to the 7th e-Navigation Underway Conference

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Gilles Bessero and Julia Powell addressing the Conference

As a result of about 30 presentations and related discussions that took place over the three days of the Conference, five highlights were identified:

- There is a need to identify reliable business-cases showing how e-Navigation addresses the interests of various maritime stakeholders;
- At least one national authority is considering e-Navigation to address autonomous shipping in coastal waters;
- Cyber-security continues to be an issue that need to be addressed;
- The list of 16 MSPs in the e-Navigation Strategy Implementation Plan requires further refinement and should be considered by all organizations involved including the IMO-IHO HGDM; and
- The maritime cloud requires a sound business case including cyber security, ownership and governance.

Hydrographic Data Transfer Standards

This element addresses the developments related to transfer standards for digital hydrographic data, the maintenance of the relevant IHO standards, specifications and publications, and the provision of technical advice as appropriate.

Conduct meetings of S-100 and ENC Standards Maintenance Working Groups

- **S-100WG and S-101PT**

The Italian Hydrographic Institute hosted the 2nd meeting of the S-100 Working Group (S-100WG) in Genoa, Italy from 15 to 17 March 2017. A meeting of the S-101 ENC Product Specification Project Team (S-101PT) took place on 18 March. The meetings were chaired by Ms Julia Powell (United States). Fifty participants from eighteen Member States and eleven stakeholder organizations attended the meetings. Assistant Director Anthony Pharaoh and Technical Standards Support Officer Jeff Wootton represented the IHO Secretariat.

S-100WG2 participants.

Reports were provided on the status of the new portrayal section for the S-102 – *Bathymetric Surface* – Product Specification, the S-121 – *Maritime Limits and Boundaries* – Product Specification, the S-129 – *Under Keel Clearance Management* – Product Specification, and the S-101 – *Electronic Nautical Chart – ENC* – Product Specification.

Other significant items considered by the meeting included "session oriented services" for data streaming within the S-100 framework, and the use Maritime Resource Names (MRN) that will enable real world entities (that are modelled as features in S-100-based products), to be assigned globally-unique identifiers.

A report was provided on the current status of the IHO Geospatial Information (GI) Registry application and the development of a new "Conventions and Guidelines" document that will provide guidance for Registry "Submitting Organizations" and "Control Bodies".

There were also discussions on related Registry applications such as the S-100 Feature Catalogue and Portrayal Catalogue Builders, and a generic S-100 product viewer application.

- **S-100WG Test Strategy Meeting**

The meeting was hosted by the Radio Technical Commission for Maritime Services (RTCM) in Arlington, USA. Participants from the following Member States attended the meeting: Canada, Germany, Korea (ROK) and the USA. Stakeholder members from the following organizations also participated: IIC, ESRI, KRISO, Furuno, SevenCs and US SPAWAR. Assistant Director Anthony Pharaoh represented the IHO Secretariat.

A report was provided on the S-100 product interoperability test beds projects that had been carried out by the Korea Hydrographic and Oceanographic Agency (KHOA). Reports were also provided on the use of the Lua scripting language for S-100 portrayal; the status of extensions to the IHO Registry; revisions to the S-100 Spatial Schemas) to include bSpline geometry; the use of a unique identifier for Aids to Navigation data; and the possible benefits of splitting soundings into discrete objects for S-101 ENCs. Furuno reported on the outcome of their tests which compared the use of the Lua scripting language and XSLT for conditional portrayal procedures.

Participants of the 4th S-100 Test Strategy Meeting.

- **ENCWG**

The Italian Hydrographic Institute hosted the 2nd meeting of the ENC Standards Maintenance Working Group (ENCWG) in Genoa, Italy from 20 to 22 March 2017. The meeting was chaired by Mr Thomas Mellor (United Kingdom). Thirty nine participants from nineteen Member States and seven stakeholder organizations attended the meetings. Assistant Director Anthony Pharaoh and Technical Standards Support Officer Jeff Wootton represented the IHO Secretariat.

ENCWG2 participants

New editions of S-58 – *Recommended ENC Validation Checks* and S-65 – *ENC Production, Maintenance and Distribution Guidance* were published during 2017. Minor new editions of S-52 **Annex A** – *IHO ECDIS Presentation Library*, and S-64 – *IHO Test Data Sets for ECDIS*, containing clarifications only, were also published.

There were also discussions on the development of a new product specification for high density bathymetric, and how to improve guidance on the promulgation of the equivalent of paper chart "Temporary and Preliminary" (T&P) Notices to Mariners (NtM) for ENCs.

Following a report indicating that many ENCs have areas of unassessed (i.e. CATZOC = "unassessed") bathymetry data quality in areas where equivalent paper charts do have bathymetric data quality information, the meeting concluded that further guidance should be included in the S-57 Use of the Object Catalogue (UOC) document.

Maintain and extend the relevant IHO standards, specifications and publications

The ENCWG has included strengthened wording regarding the issue of ENC Updates "equivalent" to paper chart Temporary and Provisional (T&P) Notices to Mariners in Clause 2.6.2 of Edition 4.7.0 of S-57, Appendix B.1, Annex A – Use of the Object Catalogue for ENC. The development of a draft consolidated, authoritative IHO document addressing the issue of "equivalent" T&Ps for ENCs, in liaison with the NCWG, is in progress. The intention is to distribute the completed document to Hydrographic Offices, port State Control authorities and mariners. The document will also take into account the comments received from Member States.

The meeting also formed a sub-working group to deal with ECDIS display issues and to develop a ECDIS display guidance document for ENC encoders.

Maintain and extend S-100 Registry

Approximately 1400 proposals for new items or amendments to existing items within the Feature Concept Dictionary (FCD) Register of the IHO Geospatial Information (GI) Registry were received and processed during 2017. This brings the total number of "valid" items registered in the FCD Register to approximately 4600. A complete review of the content of the FCD Register has been carried out by the IHO Secretariat, with the findings to be presented to the S-100WG at its 3rd meeting (April 2018). Current activity within the Registry is principally focussed on the consolidation of the content to support the building of Feature Catalogues for several S-100 based Product Specifications, including S-101 – *Electronic Navigational Charts – ENC* – Product Specification.

Several enhancements have been agreed to be included in the IHO GI Registry application. These include improvement to the user interfaces, the inclusion of a "concept register", and extension to Product Specification metadata. These enhancements will be implemented, mainly due to the continued support provided by the Republic of Korea, during 2018. Work commenced on a new edition of the S-99 publication – *Operational Procedures for the Organization and Management of the S-100 GI Registry* – including a possible new Annex providing guidelines and conventions for Registry content. The extension and maintenance of S-99 will be resourced by the IHO Secretariat.

Provide outreach and technical assistance regarding transfer standards

Presentations on the use of IHO standards were provided at forums such as the 7th e-Navigation Underway Conference, the ISO Technical Committee 211 meetings, the joint IMO IHO Harmonization Group on Data Modelling, and various Regional Hydrographic Conference meetings.

The IHO secretariat provided ongoing technical assistance to users of the S-63 Protection Scheme and the IHO Registry application.

Nautical Cartography

This element addresses the developments related to nautical cartography for paper nautical charts and the colours, symbols and display rules used to show System ENC (SENC) information on ECDIS, the maintenance of the relevant IHO standards, specifications and publications, and the provision of technical advice as appropriate.

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Conduct meetings of Nautical Cartography Working Group (NCWG)

The third meeting of the Nautical Cartography Working Group (NCWG) took place at the Headquarters of Esri, in Redlands, California, USA, from 16 to 19 May 2017. The meeting was chaired by Mr Mikko Hovi (Finland), supported by Mr Andrew Heath-Coleman, Secretary (United Kingdom). Seventeen delegates from 13 Member States (Brazil, Canada, Denmark, Finland, Italy, Japan, Netherlands, Norway, Spain, Sweden, Turkey, United Kingdom, USA), two Expert Contributors (Esri), and the IHO Secretariat, represented by Assistant Director Yves Guillam, attended the meeting.

NCWG-3 participants gather at the entrance of the ESRI Headquarters

The NCWG considered all the actions from the 8th meeting of the Hydrographic Services and Standards Committee (HSSC) that related to charting. The Working Group developed a protocol (workflow) and a template, aiming to guide other Working Groups, Member States and stakeholders when they seek advice from the NCWG on their requirements for the portrayal of S-100 based products. Anticipating the possible disbandment of the Data Quality Working Group (DQWG) in November, the NCWG agreed to consider the work items that might fall under its remit if and when required, provided that the new quality model for bathymetric data for S-101 ENC is finalized, documented and registered.

The Working Group considered a proposal submitted by Germany for a new portrayal solution for bathymetric data quality indicators in ECDIS, promoting a concept of a regular and transparent grid structure. This was considered viable as a basis for further development.

A presentation on the improvement of the ENC display in ECDIS, prepared by France and considered previously by the S-100 and ENC Standards Maintenance Working Groups (S-100WG and ENCWG) at their meetings in March, was delivered by the Chair and well received. Having some members involved in the ENC Display Sub-Group established in March, the NCWG agreed on the benefits to follow the progress made by the Sub-Group, and to consider its recommendations, when available, and their impact on current standards.

Drafting session of the Future of the Paper Chart Sub-Group

The Sub-Working Group on the Future of the Paper Chart, a high priority item of the NCWG Work Plan, organized its work. Available materials

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and thoughts from previous meetings were considered and a table of content was drafted during an ad hoc session that could be used as a basis for future reports to HSSC. Allocation of tasks to the sub-group members is to be planned so that an intermediate report can be delivered at HSSC-9. In order to share what technology can bring in the future, the Geodata Software Company Esri gave a promising demo and presented a paper on the limits of automated chart production in the maritime domain.

Several cartographic issues and proposals were considered by the NCWG (minimum size of islets or rocks which never cover, swinging circle of anchor berths placed beyond chart borders, etc.). Following this review, it was agreed to amend the submission template used by the NCWG: Change proposals on symbology or chart regulations will now have to include a short analysis of the possible impact on ENCs.

The Working Group also endorsed a proposal made by the IHO Secretariat on Section 100 of S-11 Part A Edition 3.0.0 - *Guidance for the Preparation and Maintenance of International (INT) Chart Schemes* – for the monitoring of INT charts.

At the end of the meeting, Mr Mikko Hovi (Finland) was re-elected as Chair of the NCWG, and Ms Jacqueline Barone (USA) as Vice-Chair.

Digital Data Protection and Authentication

This element addresses the developments related to data protection and data authentication, the maintenance of the relevant IHO standards, specifications and publications, and the provision of technical advice as appropriate.

Conduct meetings of Data Protection Scheme Working Group (DPSWG)

HSSC-8 decided to disband the DPSWG and allocated its tasks to the S-100 and ENC Working groups. The S-100WG is tasked to extend the protection scheme in order to cater for S-10X Product Specifications, and the ENCWG is tasked to maintain the current S-63 scheme.

The IHO Secretariat continued to carry out the role of administrator of the S-63 scheme. This function involves processing applications and providing technical support and the individual and unique digital certificates and codes that are required to allow ENC data servers, OEMs and software developers to encrypt and de-encrypt ENCs as part of the services or equipment that they provide.

Data Quality

This element addresses the developments related to methods of classifying and depicting the quality of hydrographic information, the maintenance of the relevant IHO standards, specifications and publications, and the provision of technical advice as appropriate.

Conduct meetings of Data Quality Working Group (DQWG)

The 12th meeting of the IHO Data Quality Working Group (DQWG) was hosted by the Hydrographic Service of the Royal Netherlands Navy from 13 to 15 June 2017 in The Hague,

The meeting was chaired by Mr Antti Cástren (Finland). Five delegates from four Member States (Australia, Finland, Netherlands and USA) attended the meeting. Assistant Director Yves Guillam represented the IHO Secretariat.

Participants in the DQWG-12 meeting, The Hague, Netherlands

The meeting started with a comprehensive review of the work items of the DQWG Work Programme and of the list of new proposals received prior to the meeting. This was undertaken in order to review the requirements being placed upon the DQWG by the Hydrographic Services and Standards Committee (HSSC) to which the DQWG reports. As a result of the review, it was obvious that there were expectations from other groups to obtain support from the DQWG on data quality and guidance on the harmonization of data quality aspects for all S-100 based product specifications. Subsequently, the participants agreed that the DQWG Terms of Reference (ToRs) should be reconsidered to better address the continuing and evolving role of the DQWG and to reinvigorate its membership. Draft revised ToRs were prepared and will be submitted to HSSC for its consideration.

The US representative presented the standards and rules that are applied in NOAAs current CATZOC[7] project that aims to incorporate CATZOC values in about 1,220 ENCs. In order to assist all ENC producers in the harmonized use of CATZOC values, and therefore improve their common understanding by mariners, it was proposed that best national practices should be shared and the development of appropriate guidance could be considered subsequently. All participants agreed that such a mechanism would ensure a smoother transition plan when the convertor from S-57 to S-101 ENC becomes operational, at least for its data quality component.

The provision of materials to support the education of mariners on the quality of bathymetric data is one of the work items assigned to the DQWG. A draft proposal for a new IHO publication, S-67 – *Mariners' Guide to Accuracy of ENCs* – was submitted by Australia. This was well received and reviewed by the DQWG.

Following a request made by the S-100 Working Group, a preliminary comparison of the data quality components within the ISO geospatial standards, the INSPIRE[8] Directive and the IHO S-100 – *Universal Hydrographic Data Model* - was presented by the Netherlands representative. Some further work still needs to be done to ensure a full comparison with the S-100 framework.

Some other important remaining tasks were identified including the completion of several draft versions of texts (data quality model, decision tree for the allocation of quality values to bathymetric

[7] Category of Zone of Confidence.

[8] Infrastructure for Spatial Information in Europe.

data) to be included in S-100 and in existing sections of the S-101 Data Classification and Encoding Guide (DCEG) and the clarification of the use of the attribute *Quality of Horizontal Measurement*.

Mr Antti Cástren (Finland) reported that he had to step down as Chair due to work commitments. Mr Rogier Broekman (Netherlands) was elected as the new Chair and Mr Sean Legeer (USA) was re-elected as Vice-Chair. Mr Mike Prince (Australia) accepted to act as Secretary.

The DQWG provided input and recommendations to the S-100WG, NIPWG and ENCWG on quality elements relating to the standards and specification being developed under their remit.

Nautical Publications

This element addresses the developments related to the preparation of nautical publications, the maintenance of the relevant IHO standards, specifications and publications, and the provision of technical advice as appropriate.

Conduct meetings of Nautical Information Provision Working Group (NIPWG)

The 4th meeting of the Nautical Information Provision Working Group (NIPWG) took place in Durham, New Hampshire, USA, from 22 to 26 May 2017, hosted by the Centre for Coastal and Ocean Mapping of the University of New Hampshire (UNH). The IHO Secretariat was represented by Assistant Director Yves Guillam.

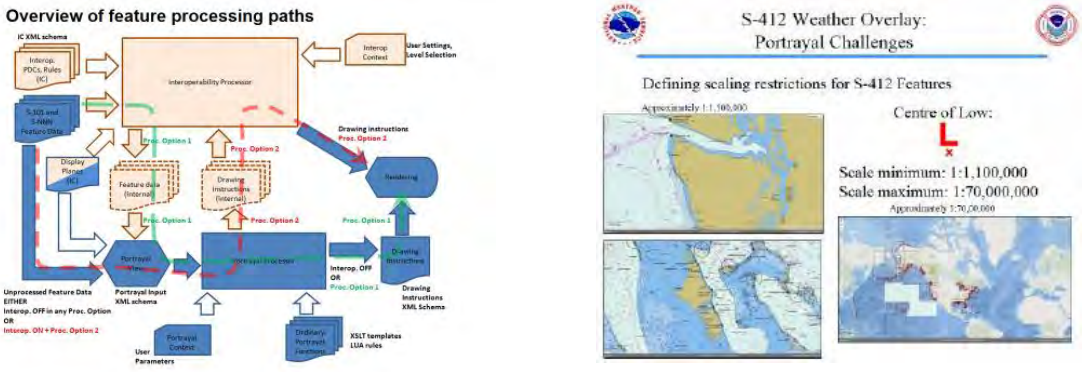
The NIPWG is the IHO working group reporting to the HSSC that is responsible for the development of S-100 conformant Product Specifications in support of future e-Navigation services that are intended to provide mariners with harmonized up-to-date information on integrated displays.

The first two days of the meeting and the morning session of the third day were dedicated to a workshop on the visualization of nautical information (VONI), attended by about 40 participants (Member States representatives - including the Chairs of the Nautical Cartography Working Group and the S-100 Working Group, and expert contributors from industry and academia).

NIPWG-4 participants at the Centre for Coastal and Ocean Mapping of the University of New Hampshire (UNH)

Test bed examples, use-cases for data (crossing an area, berthing…) and web-based innovations for the display of static and real-time varying objects depicting nautical information, in multiple national languages, were shared and discussed at length, in a brainstorming mode. Following presentations depicting interesting and promising innovations that are in progress at various national levels, some participants suggested that the future maintenance regime of nautical products in general should be addressed, by taking into account the possibilities offered by new technologies (print-on-demand, near-real time updates, etc.). A live practical exercise for submitting feature definitions and attributes related to S-122 – *Marine Protected Areas* – to the IHO Geospatial Information Registry through the NIPWG wiki was organized for participants.

A number of conclusions were made at the workshop, including the need to create a "user handbook" or "e-tutorial" to assist Hydrographic Offices (HOs) on better understanding the data modelling and data-flow process and to encourage them to develop their own roadmaps to prepare for the conversion of their current data/information into S-100 based products, as appropriate.



Interoperability and portrayal issues were addressed at the VONI workshop during NIPWG-4

The plenary NIPWG meeting started on the third day immediately after the workshop. The meeting was chaired by Mr Jens Schröder-Fürstenberg (Germany). Twenty-seven delegates from 14 Member States (Brazil, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, Norway, Republic of Korea, Spain, Sweden, United Kingdom, and the United States) and expert contributors (Anthropocene Institute, IIC Technologies, NOAA-Weather, SPAWAR, Portolan Sciences, SevenCs and the University of New Hampshire) attended the meeting.

The meeting considered the high-priority development of the S-100 based Product Specifications assigned to the NIPWG, particularly S-122 – *Marine Protected Areas* – and S-123 – *Radio Services*. These two Product Specifications are being developed under contract.

Thanks to the input of the expert contributors, the NIPWG members' awareness was raised on a number of interoperability portrayal and conceptual issues related to features in other Product Specifications such as S-111 – *Surface Currents* – and S-412 – *Weather Overlay*. The meeting was enlightened by a presentation delivered by the Chair of the S-100 Working Group who explained the complexity of this topic. The discussion focussed on those features that should be displayed on ECDIS and those that could remain in the back-of-bridge systems or could be considered as additional maritime layers for non-navigational uses.

The NIPWG agreed that the next Product Specification to be considered as a high priority item should be S-127 – *Traffic Management* – due to its importance in under keel clearance management systems.

With regard to the definition of e-Navigation Maritime Service Portfolios (MSP) by the IMO, the NIPWG considered that its current work plan is adequate to support the future implementation of relevant MSPs through the delivery of appropriate data (which is a high-priority for HOs). However, the NIPWG considered that it cannot drive by itself the delivery of MSP services, due to the lack of resources and guidance. Subject to the outcome of the forthcoming meetings (98th and 99th meetings of the IMO Maritime Safety Committee, and 1st meeting of the IMO-IHO Harmonization Group on Data Modelling), the NIPWG considered that the current strategy in place in the IHO, is consistent with the IMO's e-Navigation Strategy Implementation Plan.

At the end of the meeting, Mr Jens Schröder-Fürstenberg (Germany) was re-elected as Chair of the NIPWG, and Dr Edward Hosken (United Kingdom) as Vice-Chair. Mr Thomas Loeper (USA) was also confirmed as Secretary of the Working Group.

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Develop, maintain and extend S-10n - Nautical Information Product Specifications

The NIPWG continued the development of S-100 based product specifications assigned to the Working Group. It will focus on the finalization of the S-122 – *Marine Protected Areas* – and S-123 – *Radio Services* – Product Specifications. Draft editions will be submitted to HSSC10 for endorsement (action HSSC9/24). HSSC endorsed the provision of funding for the development of the S-127 Product Specification.

In cooperation with the International Cable Protection Committee (ICPC), NIPWG developed a proposed amendment to IHO Resolution 4/1967 (Submarine Cables) for consideration by the 1st Session of the IHO Assembly.

Tides and Water Levels

This element addresses developments related to tidal and water level observation, analysis and prediction and other related information including vertical and horizontal datums, the maintenance of the relevant IHO standards, specifications and publications, and the provision of technical advice as appropriate.

Conduct meetings of the Tides, Water Level and Currents Working Group (TWCWG)

The TWCWG held its 2nd Meeting at the Chateau Victoria Hotel and Suites in Victoria, British Columbia, Canada, from 8 to 12 May 2017 under the chairmanship of Ms Gwenaële Jan (France). The meeting was attended by 27 delegates from 13 IHO Member States (Australia, Brazil, Canada, Finland, France, Germany, Japan, Netherlands, Norway, Peru, Republic of Korea, South Africa and USA), the Space and Naval Warfare Systems Command (SPAWAR) Atlantic – USA and the IHO Secretariat. David Wyatt, Assistant Director, represented the IHO Secretariat.

TWCWG2 plenary in session

Significant time was set aside to progress the S-100 based Product Specifications for which the TWCWG is responsible. One and a half days of breakout sessions enabled participants to focus on the draft Product Specification documents, and make significant progress on further developing the draft specifications. The results of using the test datasets for S-111 – *Surface Currents* – were demonstrated. All participants were encouraged to create datasets compatible with S-104 – *Water Level Information for Surface Navigation* – and S-111 for testing and evaluation. It was agreed to seek, through the HSSC, guidance from the S-100WG on the need for S-112 - *Dynamic Water Level Data Transfer* – rather than a generic S-100 Data Transfer standard. This proposal was submitted for consideration by the 9th meeting of HSSC in November.

Further progress was made on a standard for digital tide tables with a draft version being generated by the USA for further consideration. Although some inputs to the inventory of tide gauges and current meters, and the list of Actual Tides On-line Links had been received, it was agreed to highlight these tools through Regional Hydrographic Commissions with the purpose of raising awareness and encouraging additional inputs.

TWCWG2 participants visit the Canadian Hydrographic Service (CHS) tide station at the Institute of Ocean Sciences

The Tides, Water Level and Currents Capacity Building (CB) course was discussed and the contents reviewed. Methods for further development of these courses were agreed as well as identifying the need for closer liaison with the Regional CB Coordinators to assist in selecting appropriate candidates for future courses. It was agreed that there was a need for the course material to be translated into French, Spanish and Portuguese so as to increase its availability as a CB resource.

The proposed revision of IHO Resolution 3/1919 as amended – *Datums and Bench Marks* – recommended by the Working Group was approved and adopted by IHO Member States (see IHO CL10/2017).

The Working Group maintains an inventory of tide gauges and current meters that are operated by Member States. The Working Group has also developed a repository for Vertical Reference Frame datums based on the Global Navigation Satellite System (GNSS), to be maintained on the IHO website; to date no details of datums have been made available.

Further progress was made on a standard for digital tide tables, with the further refinement of the list of fundamental attributes generated by the USA in preparation for more detailed discussions at the next meeting of the TWCWG. It was agreed to expand the work to include current data.

Work continued on the S-111 – *Surface Currents* – Product Specification, and the development of test datasets. The results of using the test datasets was demonstrated at the second TWCWG meeting which took place in Victoria, British Columbia, Canada, from 8 to 12 May 2017.

No further work was undertaken on S-112 pending the decision of the HSSC on whether to develop a generic S-100 Data Transfer standard rather than individual standards for each data type.

The continuing development of S-104 – *Water Level Information for Surface Navigation* – was focused on data standards and the encoding of water level data in the HDF5 format. The definition of additional terms for inclusion in the Registry were progressed.

Hydrographic Dictionary

This element addresses the development, maintenance and extension of IHO Publication S-32 - *Hydrographic Dictionary* in English, French and Spanish, and the provision of technical advice as appropriate.

Maintain and extend the IHO Hydrographic Dictionary in English, French and Spanish.

The Hydrographic Dictionary Working Group (HDWG) held its 1st meeting at the Headquarters of the Institute of Marine Engineering, Science and Technology (IMarEST), London, United Kingdom (UK) from 25 to 26 July 2017 under the chairmanship of Mr Jean Laporte (France). Four representatives

from three Member States (Argentina, France and United States), and the IHO Secretariat attended the meeting. Assistant Director David Wyatt represented the IHO Secretariat.

The participants reviewed the Terms of Reference, the Business Rules for the HDWG and its Work Plan for 2018-2019, developing draft proposals for submission to the 9th meeting of the HSSC (HSSC-9). Significant time was devoted to discussing a proposed new structure and database application developed by the IHO Secretariat; these discussions were led by Assistant Director Anthony Pharaoh and Technical Standards Support Officer Jeff Wootton, via remote link from the IHO Secretariat. It was agreed that these proposals would be developed further by the United States and the IHO Secretariat as part of a database solution comprising an S-32 Hydrographic Dictionary Register. It was also agreed that the long-planned comprehensive review of the content of S-32 would be undertaken over the next two years by France and Argentina with those terms identified for removal being subsequently considered by the full HDWG. It was agreed that there was a need for the participation of additional members, who had experience and knowledge in database applications. It was felt that once a new database structure had been developed then the experience base of the WG should move further towards hydrography and cartography in order to undertake the task of reviewing and maintaining the terms and definitions in the database.

Develop the new Wiki version of S-32

The current dictionary is maintained as part of a WIKI infrastructure, however tests were conducted to establish the feasibility of moving the dictionary into a database application and linking items in the IHO Geospatial Information (GI) Registry, to equivalent dictionary items using unique identifiers, as discussed during the HDWG-1 meeting.

ABLOS

This element addresses the developments related to the hydrographic aspects of the United Nations Convention on the Law of the Sea (UNCLOS), the maintenance of the relevant IHO publications, and the provision of technical advice as appropriate. The Advisory Board on the Law of the Sea (ABLOS) is a joint body of the IHO and the International Association of Geodesy (IAG). It comprises four representatives from IHO Member States and four representatives from the IAG. Four observers from IHO Member States and two Expert Contributors were also involved in the activities of the Board during the year.

Organize and prepare ABLOS annual business meeting

The 24th Business Meeting of ABLOS was held at the IHO Secretariat in Monaco on 9th and 12th October 2017. The 9th ABLOS Conference, titled 'UNCLOS: Pushing the Limits of UNCLOS' took place 10-11 October 2017 and also was held at the IHO Secretariat.

- **<u>24th Business Meeting of ABLOS</u>**

All ABLOS members and observers from Australia, Brazil, Canada, Chile, Denmark, France, India, Japan, Republic of Korea and the United Kingdom (UK) were present; representatives from Qatar and the UK Hydrographic Office also attended both events.

The first session of the business meeting (Chaired by Mr John Brown (IHO – UK)) completed the final preparations for the 9th ABLOS Conference.

ABLOS Members gathered for ABLOS BM24 in Monaco

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The ABLOS members and observers discussed notable topics from the various conferences, seminars and workshops that they had attended and undertaken since the previous business meeting. The meeting also discussed the material for the ABLOS capacity building training course and reviewed ways to develop it further.

During the second session of the business meeting the Terms of Reference and Rules of Procedure for ABLOS were reviewed, a number of amendments were proposed, which once finalised, will be presented to the 10th session of the HSSC and the IAG Executive Council for consideration.

The revisions identified for chapter 3 of Edition 5.0.0 of the *Manual on Technical Aspects of the United Nations Convention on the Law of the Sea - 1982* (TALOS Manual - C-51) were discussed. The revision time frame and process were decided with a target completion in 2018 for consideration by the 10th meeting of the Hydrographic Standards and Services Committee. Japan agreed to provide the revised chapter 3 text for review by the Editorial Board. In addition the French and Chilean members of ABLOS agreed to progress the completion of the French and Spanish translations of Edition 6.0.0, so that all three language versions would be in the same Edition state.

On completion of the ABLOS Conference, Dr Niels Andersen (Denmark) assumed the role of Chair and Mrs Izabel King-Jeck (Brazil) was elected as Vice-Chair.

- **9th ABLOS Conference**

The 9th ABLOS Conference was attended by approximately 68 delegates from 24 different States, (Algeria, Argentina, Australia, Brazil, Canada, Chile, China, Denmark, France, Germany, India, Japan, Malaysia, Monaco, Netherlands, New Zealand, Norway, Oman, Qatar, Republic of Korea, Saudi Arabia, , Switzerland, United Kingdom and USA). The Conference included 20 presentations covering a wide variety of topics and issues in relation with the theme "*UNCLOS: Pushing the Limits of UNCLOS*". IHO Secretary-General, Dr Mathias Jonas, welcomed the delegates on behalf of the IHO. The opening key note address was given by Mrs Kristina Maria Gjerde, Senior High Seas Policy Advisor to the International Union for the Conservation of Nature's Global Marine and Polar Programme. The general theme of the conference was the impact of new technologies and techniques, and the implementation of UNCLOS into the Area Beyond National Jurisdiction (ABNJ). The presentations on various aspects of the Law of the Sea generated numerous questions and comments in plenary and much discussion in the margins during the breaks.

Participants at the 9th ABLOS Conference

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WORK PROGRAMME 3
Inter-Regional Coordination and Support

Introduction

The IHO Work Programme 3 "Inter-Regional Coordination and Support" seeks to establish, coordinate and enhance cooperation in hydrographic activities on a regional basis, and between regions, especially on matters associated with the coordination of global surveying, nautical charting and ocean mapping, dissemination of maritime safety information (MSI) and capacity building (CB), including education and training. IHO Work Programme 3 is implemented under the principal responsibility of the Inter-Regional Coordination Committee (IRCC).

Inter-Regional Coordination Committee (IRCC)

The IRCC promotes and coordinates those activities that might benefit from a regional approach. The principal objective of the IRCC is to establish, coordinate and enhance cooperation in hydrographic activities amongst States on a regional basis, and between regions; establish cooperation to enhance the delivery of capacity building programmes; monitor the work of specified IHO Inter-Organizational Bodies engaged in activities that require inter-regional cooperation and coordination; promote cooperation between pertinent regional organizations; and review and implement the IHO Capacity Building Strategy, promoting capacity building initiatives.

Conduct annual meeting of IRCC

The ninth meeting of the Inter-Regional Coordination Committee (IRCC9) was held in Paramaribo, Suriname, from 12 to 14 June, hosted by the Maritime Authority Suriname (MAS). The meeting was attended by the Chairs, or their representatives, of the 15 Regional Hydrographic Commissions (RHCs) and the IRCC subordinate bodies, the Chair of the Hydrographic Standards and Services Committee (HSSC) and 15 observers. A total of 35 participants were present. The meeting was chaired by Dr Parry Oei (Singapore). The opening ceremony was attended by the Chair of the MAS Supervisory Board, Mr Theo Vishnudatt. The IHO Secretariat was represented by Director Mustafa Iptes (IRCC Secretary) and Assistant Director Alberto Costa Neves (IRCC Assistant Secretary).

The IRCC reviewed the reports and activities of the RHCs and its subordinate bodies, considered the outcomes of the 1st Session of the IHO Assembly (A-1), acknowledged the accomplishments and challenges of the Capacity Building programme and IBSC activities, examined the developments on Crowd-Sourced Bathymetry and maximizing the use of hydrographic data and considered issues related to the Worldwide ENC Database (WEND).

The meeting considered at the regional level the key achievements and developments on the status of surveys and charting, on the harmonization of depth data and its presentation in ENCs, the provision of the joint regional bathymetric databases, on the implementation of harmonized chart datum, on the parallel processing of all ENC and paper chart issues, on the progress of Marine Spatial Data Infrastructures and on the broad aspects related to the use of official S-57 data in the leisure craft

market. The Committee noted with satisfaction that some regions had made significant progress in eliminating overlaps, properly assessing CATZOCs and addressing gaps in a consistent way and that regional geoportals with ENC data had been established to facilitate harmonization of charts and risk assessment.

The Committee received reports on the progress made in all the Pacific Island Countries and Territories (PICTs) with respect to governance of hydrographic activities, with significant headway being made in Fiji, Papua New Guinea, Solomon Islands, Tonga and Vanuatu, the endorsement of a *Regional Strategy on Safety of Navigation in the Pacific*, and the contribution of New Zealand in conducting risk assessments in the Cook Islands, Niue, Tonga and Vanuatu and implementing the *Pacific Region Navigation Initiative*.

Reports presented additional contributions from Member States to regional projects from Mexico to the Meso-America and Caribbean Sea area providing training through its FOCAHIMECA Project, from France to the Western and Central Africa Definition Study, from the United Kingdom with the Commonwealth Marine Economies Programme, with the Overseas Territories Seabed Mapping Programme and with the Scoping Study in the Organisation of the Eastern Caribbean States (OECS). The USA reported on its Crowd-Sourced Bathymetry Pilot Project in conjunction with the IHO Data Centre for Digital Bathymetry (DCDB), NOAA and Rose Point Navigation Systems for data logging.

The fact that no more than 15% of ocean depths have been directly measured was noted by the meeting that recognized the need to maximize data gathering by increasing data collection by government agencies in priority areas; by releasing available data from scientific and commercial surveys and complementing these efforts with satellite-derived and crowd-sourced bathymetry. The meeting also identified the importance of the Crowd-Sourced Bathymetry Working Group, the Nippon Foundation support to the GEBCO Seabed 2030 Project and the need for additional engagement on data gathering in several forums.

The Committee received reports on the development of an IHO Satellite-Derived Bathymetry assessment and charting programme for uncharted or poorly charted areas, on matters related to the future of the paper chart, the implementation of S-100 product specifications, the increasing need for improved data and navigational products (through e-navigation and marine services portfolios - MSPs) to support the effective and sustainable use of maritime spaces and their natural resources.

The meeting reviewed progress towards the full implementation of the WEND Principles, the guidance for the preparation and maintenance of INT Chart and ENC Schemes, the need to implement ENC scheming at the regional level, the challenges for coordinating INT Chart schemes and improving ENC coverage, in particular the establishment of consistent INT schemes in semi-closed basins. The Committee urged Regional Hydrographic Commissions to seek to resolve ENCs overlaps in small scale usage bands which pose significant risks to navigation and endorsed a proposed draft IHO Resolution for eliminating overlapping ENCs. The importance of providing CATZOC information in all ENCs was considered, in particular to support the work of the RHCs in risk analysis.

The Committee commended both Regional ENC Coordinating Centres (RENCs) on the work undertaken hitherto to reach maturity and stability and for the support provided to hydrographic offices and end-user service providers, the IHO Secretariat on the improvements made to the IHO ENC catalogue and other aspects of the infrastructure. The meeting considered the need for the RHCs to encourage the Member States in each region to consider making all ENC data available through the RENCs and to release bathymetric datasets or subsets into the public domain via the IHO DCDB. The meeting endorsed a revised statement on the use of Marine Information Overlay (MIO) to assist in drawing attention to any differences between a published paper chart and the corresponding ENC or to assist in displaying Temporary & Preliminary notices for an ENC.

The IRCC noted the establishment of the Open Geospatial Consortium (OGC) Marine Domain Working Group (Marine DWG), a group of experts that advises OGC on the way forward in relation to the Marine Domain, identifying gaps in the current OGC baseline regarding marine geospatial data and ocean mapping. The cooperation with OGC ensures that the evolving IHO standards are brought to the attention of the OGC that best practices are used and the latest technical approaches considered. The meeting was also informed on the development of the Concept Development

Initiative - Defining the Future of Marine Spatial Data Infrastructure (MSDI), developed by OGC at the request of the MSDIWG and a newly prepared White Paper on MSDI.

The meeting was informed of the achievements through the Capacity Building Programme, namely the recent technical visits to Liberia and to Cabo Verde, technical assessment and advice visits to Samoa and Tuvalu, technical and raising awareness workshops, Maritime Safety Information training and courses in Hydrography and Nautical Cartography. The meeting acknowledged the role of the generous support from the Republic of Korea and from the Nippon Foundation of Japan, the in-kind support from Member States and industry stakeholders and the work of the RHC CB Coordinators and Project Leaders in these achievements.

The Regional Hydrographic Commissions expressed concerns on the main difficulties and challenges posed by the reduced resources that have restricted surveying capability and the maintenance of staff members and their ability to contribute to the IHO Work Programme. The meeting noted in particular the restrictions imposed on developing the capacity of the Capacity Builders and on the support needed from the primary charting authorities for capacity building activities. These are under constant strain as scarcer resources are targeted on national priorities. In this context, increased support from the IHO Secretariat was seen as critical to the ongoing success of the Capacity Building Programme, not only for implementing the programme as such, but also for its effectiveness, governance and due diligence for the benefit of the Member States.

The 2017 Capacity Building Work Programme as submitted by the CBSC was endorsed by the IRCC. The Committee agreed that a major challenge to the successful operation and further enhancement of the Capacity Building Programme is the lack of additional Capacity Building assistance in the Secretariat due to the significant increase in the level of CB activities and other competing IHO requirements/priorities.

Attention was devoted to other challenges for an effective and sustainable CB Phase 1, in particular the need to identify potential staff to accompany MSI trainers in order to become MSI trainers themselves, the need for closer engagement of the National MSI Coordinators of coastal States with the relevant NAVAREA Coordinators and between NAVAREA Coordinators and Regional CB Coordinators. The meeting was also briefed on the use of Training-for-Trainers (TFT) and e-learning methods to support the development of CB Phase 1, on the importance of using the Joint Manual on MSI to ensure correct terminology and formats are used in MSI messages.

The meeting was also briefed on recent progress in the Arctic with the development of Hydrographic Risk Assessment, the work of the Arctic International Charting Coordination Working Group, the establishment of the Arctic Regional Marine Spatial Data Infrastructure Working Group, the Arctic Voyage Planning Guide for mariners and the investigation on the potential of remote sensing and satellite-derived bathymetry and of crowd-sourced bathymetry for use within the Arctic community.

The Committee was informed on the progress made with publications under its responsibilities and acknowledged the work done by the MSDIWG on the draft New Edition 2.0.0 of the IHO Publication C-17 *Spatial Data Infrastructures: "The Marine Dimension" - Guidance for Hydrographic Offices* and by the IBSC on the draft New Editions 1.0.0 of the IHO Publications S-8A and S-8B *Standards of Competence for Category "A"* and *Category "B" Nautical Cartographers*. The three publications were endorsed. The meeting also approved clarifications in Editions 1.0.1 of the IHO Publication S-5A and S-5B *Standards of Competence for Category "A"* and *Category "B" Hydrographic Surveyors* and noted the development of the Guidance Document on Crowd-Sourced Bathymetry.

The IRCC considered the outcomes of the 1st Session of the IHO Assembly including those related to the establishment of the IHO Council and its membership, the revision of IHO Resolutions, the 2018-2020 IHO Work Programme and the IHO Strategic Plan. The meeting decided to establish a drafting group to review the IHO Resolution 2/1997 as amended *Establishment of Regional Hydrographic Commissions – RHC* and tasked the East Asia Hydrographic Commission to provide input to the IHO Resolution 1/2005 *IHO Responses to Disaster*. The meeting encouraged RHCs to consider using satellite derived bathymetry and risk assessment methodologies in uncharted or poorly charted areas in their respective regions as a way of developing survey priority areas as part of attracting donor funding.

Participants in the IRCC9 Meeting.

The meeting invited the RHCs to encourage Member States to support the establishment of a Working Group on Marine Geospatial Information (WG-MGI) by the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) and to promote the use of the UN-GGIM Shared Guiding Principles for Geospatial Information Management to align the S-100 framework for marine geospatial data and regional implementations of Marine Spatial Data Infrastructures.

The meeting considered the benefits of having solid infrastructure in the IHO Secretariat to support and inform decisions of its Member States and the subordinate bodies, and the developments in databases, online services and IHO Geographic Information System (GIS) tools. The meeting also considered the positive developments on the management, review and monitoring of new INT Charts and endorsed the amendment to Section 100 of IHO Publication S-11 - Part A Ed. 3.0.0 - *Guidance for the Preparation and Maintenance of International (INT) Chart Schemes*.

The meeting re-elected Dr Parry Oei (Singapore) as the IRCC Chair and elected Mr Thomas Dehling (Germany) as the Vice-Chair for the period of 2017-2020.

Cooperation with Member States and attendance at relevant meetings

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.

This element of the Work Programme is largely accomplished through the meetings of the RHCs. The frequency of meetings of the RHCs varies 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. A Director, sometimes accompanied by an Assistant Director, represented the IHO Secretariat at the RHC meetings, providing guidance and assistance on IHO matters.

Arctic Regional Hydrographic Commission

The 7th Conference of the Arctic Regional Hydrographic Commission (ARHC) was held in Ilulissat, Greenland, Denmark, from 22 to 24 August, and included a maritime workshop that took place on 22 August.

Twenty participants representing four of the five ARHC Members (Canada, Denmark, Norway, and the USA), two Associate Members (Finland and Iceland) participated in the Conference. Fifteen stakeholders including the Association of Arctic Expedition Cruise Operators (AECO), Arctic shipping

companies, and representatives from the government of Greenland and from local authorities participated in the workshop. The stakeholder representatives provided informative user perspectives on polar navigation, charting, and marine geospatial information in support of various applications including hunting management.

The Conference was chaired by Ms Pia Dahl Højgaard, Director-General of the Danish Geodata Agency. Assistant Director Yves Guillam represented the IHO Secretariat.

Participants in ARHC-7, Ilulissat, Greenland, Denmark

All participants reported on their activities in the Arctic region. As part of the reorganization of the Danish Geodata Agency, the delegation from Denmark reported on their good progress and efforts made in improving staffing levels and expertise since the last Conference, in order to meet their charting obligations in Greenlandic waters. Norway reported on the role and membership of the Arctic International Charting Coordination Working Group (AICCWG), highlighting the fact that the Region N charting area is covered by only eight INT charts, all of which are produced by Norway, and that no ENC scheme exists. The members of the ARHC were invited to consider what should be the objectives and the programme of work to be assigned to the working group. The IHO Secretariat suggested that the AICCWG develops and maintains, in liaison with the Operational and Technical Working Group of the ARHC (OTWG), an up-to-date composite polar projection diagram of the existing charting coverage and traffic routes in the Arctic. This could then be used in various stakeholders' forums (Arctic Shipping Summit, PAME[9], etc.) to raise awareness as well as supplementing the cautionary notice regarding the status of charting in the region that was sent to various ARHC stakeholder organizations in June 2017 on behalf of the ARHC Members. It was also suggested that this coverage diagram should be included in the IHO annual report on ECDIS matters provided to the IMO Sub-Committee on Navigation Communication and Search and Rescue (NCSR). Several other tasks were assigned to the AICCWG and/or the OTWG including a re-run of the Chart Adequacy Assessment Analysis, and the monitoring of the population of CATZOC values in ENCs.

The Arctic Regional Marine Spatial Data Infrastructure Working Group (ARMSDIWG) reported on its developing relationship with the Arctic Council's Spatial Data Infrastructure and presented a white paper that will be submitted to PAME, aiming to promote MSDI activities in the Arctic.

The IHO Secretariat reported on IHO Assembly decisions that may impact ARHC. The proposals being submitted to the 1st meeting of the IHO Council were reviewed for coordination purpose, noting

[9] PAME: Arctic Council's working group on the Protection of the Arctic Marine Environment.

that the Chair-elect of the IHO Council was present at the Conference and that all ARHC Members have a seat in the IHO Council. The ARHC Members considered the outcome of the 10th Ministerial Meeting of the Arctic Council in Fairbanks, Alaska, USA, on 11 May 2017 where the IHO application for Observer status was not considered. As a result, the ARHC members agreed to further engage with their national representatives at the Arctic Council in order to ensure that favorable consideration is given to the proposal in future.

Following on from discussions that occurred at ARHC-6 on the possible impact of marine noise management on hydrographic surveying operations, the IHO Secretariat informed the participants of informal discussion raised during the fortieth meeting of the Antarctic Treaty Consultative Meeting (ATCM XL) held in Beijing, China, in May, that identified several countries that have enforced restrictions on the use of certain acoustic devices, including multi-beam echo sounder and other sonars. He also informed the participants that the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea (UNICPOLOS) will focus its discussions at its nineteenth meeting, in 2018, on the theme "*Anthropogenic underwater noise*"[10]. As a result, the USA agreed to provide copies of relevant reports and studies in relation to acoustic noise and hydrographic surveying, for the information of the ARHC Members and for the use of the IHO Secretariat in appropriate international forums and organizations.

Fruitful discussions took place on crowd-sourced bathymetry, on surveying using autonomous vehicles, and on research projects occurring in the Arctic - some of them being funded by the European Commission Horizon 2020 programme such as the SEDNA[11] project aiming to improve maritime safety in the Arctic. Canada and Denmark agreed to investigate the possibility of being involved in this project.

Arctic navigation in practice…

The *High North 17* Arctic geophysical research campaign carried out in the south of Svalbard, Norway in July 2017 by the Italian hydrographic service was also considered as part of an application from Italy to be accepted as an Associate Member of the ARHC. This application was approved by consensus.

Norway was elevated from the position of Vice-Chair to take over the Chair at the end of the Conference. In the absence of the Russian Federation at the meeting, the Chair will invite the Russian Federation to consider occupying the Vice-Chair position as part of the established rotation.

[10] UN Letter (UN Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs) dated 31 July 2017, *Ocean noise studies.*

[11] SEDNA : Safe maritime operations under extreme conditions: the Arctic case

Baltic Sea Hydrographic Commission

The 22nd Conference of the Baltic Sea Hydrographic Commission (BSHC22) was held in Rostock, Germany, from 19 to 21 September, under the Chairmanship of Mr Mindaugas Cesnauskis (Lithuania). Seven out of eight members of the Commission (Denmark, Estonia, Finland, Germany, Latvia, Poland, Sweden) and associate member Lithuania were represented at the Conference. The delegation of the Russian Federation did not participate. The United Kingdom and the United States of America were also represented at the Conference as Observers. The IHO Secretariat was represented by Secretary-General, Dr Mathias Jonas.

The Russian Federation, as Chair of the previous Conference (BSHC21) in Klaipeda, Lithuania in 2016, provided the final minutes prior to the beginning of BSHC22. The Conference endorsed the minutes overall but decided to compile their remarks and comments into an addendum to be drafted and circulated by the Chairman after the conference.

BSHC22 covered a wide range of regional topics including developments in each of the Member States, the latest status of hydrographic surveying and nautical charting including INT Charts, ENC production and BSHC cooperative projects. The members of the BSHC reported on their national hydrographic, cartographic and Maritime Safety Information activities since the 21st meeting. They also presented new developments with regard to surveying, chart production and maritime traffic management. Secretary-General Dr Mathias Jonas reported on the IHO Work Programme and the Organization's activities during the previous year. He also provided the Commission with general information on the effects of the decisions of the 1st IHO Assembly and the revised convention of the IHO pertaining to the work of the Commission. He placed special emphasis on the program of the 1st IHO Council (C-1), highlighting the fact that five (Denmark, Finland, Germany, Sweden and the Russian Federation) of the eight BSHC members will be represented at the Council.

The Vice-Chair identified necessary amendments of the Statutes of the BSHC in order to reflect changes of the IHO Convention. He accepted to prepare such draft amendments prior to BSHC23 (2018). It is planned to conduct a formal signing ceremony of the amended BSHC Statutes at this event.

The Commission reviewed on-going regional initiatives in particular the activities of the Monitoring Re-survey Working Group (MWG), Baltic Sea Bathymetric Database Working Group (BSBDWG), Baltic Sea Marine Spatial Data Infrastructure Working Group (BSNSMSDIWG), Baltic Sea International Charting Coordination Working Group (BSICCWG) and the Chart Datum Working Group (CDWG). The Commission considered the outcome of the 9th meeting of the Inter-Regional Coordination Committee (IRCC) and the 7th meeting of World Wide ENC Database Working Group (WEND-WG).

The Conference put special emphasis on regional engagement within the framework of the IHO-European Union Networking Working Group (IENWG). Multilateral projects such as Coastal mapping and Emodnet phase III which enjoy active participation of BSHC members, were presented in further detail. The Conference took note of national activities in European projects with relation to maritime themes and links to hydrography.

The Commission renewed its commitment to the continued maintenance of the BSHC internet portal hosted by Sweden including the provision of a gridded bathymetry model for the whole of the Baltic. The current model still enjoys good public perception as confirmed by a significant number of visitors and downloads. Numerous members confirmed their plans to supply up to date data in higher resolution to improve the usability of the model. The Member States reaffirmed these activities as their regional contribution to the joint IHO / IOC GEBCO Project's initiative "Seabed 2030".

At the end of the meeting, Mr Thomas Dehling, (Germany) was elected as the new Chair of the BSHC.

Participants of the 22nd Conference of the Baltic Sea Hydrographic Commission.

East Asia Hydrographic Commission

The 4th meeting of the Steering Committee of the East Asia Hydrographic Commission (EAHC) was held in Tokyo, Japan from 22 to 24 February, hosted by the Japan Hydrographic and Oceanographic Department (JHOD) of the Japan Coast Guard and chaired by the Hydrographer of Malaysia Rear Admiral Dato' FADZILAH bin mohd Salleh. The EAHC Steering Committee meets annually between the triennial meetings of the EAHC to monitor progress in the region and to provide an annual forum for the region's Hydrographers to meet.

Representatives from all but one EAHC Member State attended the meeting. The following IHO Member States were present: Brunei Darussalam, China, Indonesia, Japan, Republic of Korea (RoK), Malaysia, Philippines, Singapore, Thailand and Viet Nam. The Democratic People's Republic of Korea was not represented. Cambodia and Timor Leste were represented at the meeting as Observer States together with the Chair of the GEBCO Guiding Committee (GGC). IHO Secretary-General Robert Ward attended as an invited observer from the Secretariat of the IHO.

The meeting received progress reports on the Training and Research Development Center (TRDC), based at the Korea Hydrographic and Oceanographic Agency, in Busan, RoK, established by the Commission to deliver its regional Capacity Building Programme (see: http://trdc.eahc.asia/). The Committee endorsed the 2018 work programme and funding bids to be forwarded to the IHO Capacity Building Sub Committee. Secretary-General Ward provided a report of IHO activities of relevance to the Commission and the Chair of the GGC provided a briefing on the IHO-IOC GEBCO project and its involvement with crowd-sourcing for data.

Participants of the 4th meeting of the Steering Committee of the East Asia Hydrographic Committee

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The Commission discussed progress and involvement in Marine Spatial Data Infrastructures and established two working groups to provide further advice and information to be presented at the next meeting of the Commission.

Details of regional electronic navigational chart (ENC) coverage were discussed including the need to temporarily suspend the distribution of the co-produced navigation purpose 2 (small scale) ENC coverage in the South China Sea until such time as an agreed geographical naming policy could be determined. In application of IHO's WEND concept, it was agreed that China - Hong Kong would provide the East Asia Regional ENC Coordinating Centre (EA-RECC) to carry out harmonization, quality assurance and updating of the EAHC co-produced ENCs, to arrange the distribution and sale of ENCs of the EA-RECC and other regional ENCs with chart distributors, and to be the ENC coordinator for INT charting region K.

During the meeting, the participants agreed that Malaysia and Indonesia will occupy the two seats on the IHO Council allocated to the EAHC for the period April 2017 to April 2020.

Prior to the 4th meeting of the EAHC Steering Committee, the Secretary-General took the opportunity to call on the Commandant of the Japan Coast Guard and to engage in informal discussion with the Executive Director of the Maritime Affairs Programmes of the Nippon Foundation in relation to the continuing and very successful IHO capacity building activities that are funded by the Nippon Foundation.

Meso American - Caribbean Sea Hydrographic Commission

The 18th Meeting of the Meso-American - Caribbean Sea Hydrographic Commission (MACHC) was held in Varadero, Cuba from 29 November to 2 December with fifty two participants representing nine Member States, ten Associate Members, one observer country, five observer organizations and five commercial companies. Director Mustafa Iptes and Assistant Director Alberto Costa Neves represented the IHO Secretariat.

The meeting was hosted by the National Office of Hydrography and Geodesy (ONHG) of Cuba and chaired by Rear Admiral Henrique Flores Morado, Chair of the Commission and National Hydrographer of Mexico. The meeting was opened by Rear Admiral Carlos Augusto Duque Ramos, Chief of the Cuban Revolutionary Navy. He highlighted the severe natural disasters that impacted the region with a high toll of human lives, the importance of knowing the sea floor for an effective maritime policy and the benefits of the IHO Capacity Building support to Cuba at several levels.

Participants of the 18th Meeting of the Meso American – Caribbean Sea Hydrographic Commission

An IHO Capacity Building seminar held on 27 and 28 November with regards to "Hydrographic Governance and Managing Hydrography in Challenging Environments" preceded the Conference.

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The seminar received the contribution from the International Association of Aids to Navigation and Lighthouse Authorities (IALA) and from several industry stakeholders. Participants from 12 coastal States in the region received relevant information and actively contributed to the seminar.

The seminar was followed by the meetings of the MACHC Integrated Chart Coordination Committee (MICC), the Capacity Building Committee (CBC) and the Risk Assessment Working Group (RAWG). Ms Dawn Seepersad from the University of the West Indies (UWI) presented the preliminary results of her research topic on Risk Assessment in Maritime Navigation for the Greater Caribbean Region. The Commission subsequently decided to continue to support the UWI risk assessment research.

The agenda of the Commission meeting was arranged according to themes; developments in the region, impact of the work of the IHO bodies and of other international and regional organizations, reports from countries, surveying and risk assessment, spatial data infrastructures, nautical charts and publications, capacity building and response to disasters. Industry stakeholders also contributed to the various agenda topics.

The meeting was informed on the progress done by the MICC and of the significant progress in ENC coverage in the region with 60 new ENCs, three were cancelled, reaching 820 available cells in the region. ENC producing nations were urged to continue populating ENCs with meaningful CATZOC information in order to ensure safety of navigation, including assisting voyage planning that utilize CATZOC information.

The meeting was also updated on the cruise port gap analysis, which concluded that 43 out of the 373 world-wide cruise ship ports/anchorages not covered by Usage Band 4, 5, or 6 ENCs are located in the MACHC region. From these 43, 14 ports identified will have large scale ENC coverage in the next two years. The MICC also reported that 8 MACHC Members contribute to MACHC ENC Online Viewer: Brazil, Colombia, Cuba, Mexico, Netherlands, Suriname, USA and Venezuela.

As a direct consequence of the cooperation between the WWNWS-SC and the CBSC, Cuba and Haiti began supporting the issuing of Notices to Mariners and navigational warnings informing inconsistencies between AtoN and the nautical charts of their waters, for assistance of mariners in the region.

Participants were informed on the technical visit to Haiti jointly conducted by Brazil, France and USA, on the need and opportunities of continued professional development and hydrographic certification, on the outcomes of the Mexican FOCAHIMECA (Strengthen the Hydrographic Abilities in Mesoamerican and the Caribbean Sea) Project, on projects for surveying and charting inland waters in the region and on new tools for workflow management for nautical charting and digital publications.

In the context of the recent disasters that impacted on a number of countries in the region, the meeting was informed of the actions taken by France, Netherlands, United Kingdom and USA. The Conference agreed to investigate the creation of a GIS environment to facilitate the work of the MACHC Chair in support of the affected countries and the potential connections with the UN-GGIM Disaster Response Framework.

Mediterranean and Black Seas Hydrographic Commission

The 20th Conference of the Mediterranean and Black Seas Hydrographic Commission (MBSHC) was held in Herceg Novi, Montenegro from 4 to 6 July, hosted by the Institute of Hydrometeorology and Seismology of Montenegro (IHMS). The Conference was chaired by Ingénieur général Bruno Frachon, Director General of the French Hydrographic Service (Shom). A total of 44 representatives from 17 Member States of the MBSHC (Algeria, Croatia, Cyprus, France, Georgia, Greece, Italy, Malta, Monaco, Montenegro, Romania, Russian Federation, Slovenia, Spain, Tunisia, Turkey, Ukraine) and two Associate Member States (United Kingdom and United States of America) participated in the Conference. Albania, Norway, the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), the Intergovernmental Oceanographic Commission (IOC) of UNESCO, the Mediterranean Science Commission (CIESM), IC-ENC and PRIMAR, as the two Regional ENC Coordinating Centres (RENC), were represented as observers. Three

stakeholders from industry participated as invited expert contributors. The IHO Secretariat was represented by Director Mustafa Iptes and Assistant Director Yves Guillam.

At the beginning of the Conference, Captain Luigi Sinapi, Director of the Italian Hydrographic Institute (IIM), was elected as Vice-Chair of the MBSHC.

The MBSHC received national reports from Member States and Associate Member States and the report of the IHO Secretariat. Director Iptes reported on the IHO work programme in general and the activities of the Organization during the intersessional period that impact Regional Hydrographic Commissions, including the main outcomes of the IHO Assembly and of the 9th meeting of the Inter-Regional Coordination Committee. The IHO representatives also provided informative presentations and updates on the cooperation with the International Maritime Organization (IMO), on capacity building matters, on the development of standards, and on the evolution of the IHO information management system using Geographic Information System (GIS) layers derived from the country information database maintained by the Secretariat. Participants were encouraged to consider the use of CATZOC values extracted from the official charts as a way of assessing the status of hydrography and charting in the region. They were also invited to liaise with their national representatives to the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) in order to support the growing interest in the maritime component of geospatial information and the likely establishment of a UN-GGIM Marine Geospatial Information Working Group. Following a presentation by Spain on the status of hydrographic surveying in the region (based on the information in IHO publication C-55 – *Status of surveying and charting worldwide*), it was recommended to consider a more dynamic, geographic and interoperable GIS approach in the future, if possible and resources permitting.

It was the first participation of the Director General of the Mediterranean Science Commission (CIESM) in a Conference of the MBSHC since the signature of the Memorandum of Understanding with the IHO in March 2017. His presentation was very welcome and was followed by a presentation from Malta focusing on initiatives of the European Union (EU) in which hydrographic offices of the MBSHC may consider to be more directly involved. The coordinated participation of MBSHC representatives in various important European maritime events, at least for raising the IHO profile and at best for capturing some funding, remains a matter of concern for the IHO-EU Network Working Group and its focal point in the region, which is Greece.

One of the remaining and core activities in the Commission is the establishment of agreed INT paper charts and ENC schemes. The MBSHC International Chart Coordination Working Group (ICCWG) held a separate half-day meeting during the Conference period, chaired by the Region F Chart Coordinator (France).

Participants of the MBSHC20 Meeting

Director Iptes provided a general overview of the IHO capacity building activities. It was followed by the report of the representative of Turkey, as Capacity Building (CB) Coordinator for the region. All participants were invited to apply the CB procedures so that requirements can be addressed by the CB Sub-Committee in consistent manner.

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A report on Maritime Safety Information (MSI) activities in NAVAREA III was presented by Spain and reviewed by the Commission. The recent activities of the Working Group for the Safety of Navigation in the Black and Azov Seas (BASWG) was presented by the Chair of BASWG (Turkey) and potential developments in the hydrographic domain in the Caspian Sea region were discussed.

The Member States of the MBSHC having a seat at the IHO Council considered the provisional agenda of the Council. They met together in the margins of the Conference to coordinate their views and reviewed the available documents. At the end of the Conference, Captain Luigi Sinapi took over as Chair of the MBSHC.

Nordic Hydrographic Commission

The 61st Meeting of the Nordic Hydrographic Commission (NHC) was hosted in Elsinore, Denmark from 6 to 8 March by the National Geodata Agency of Denmark. The Agency is responsible for hydrographic surveys and charting in Denmark, the Faroe Islands and Greenland as well as for the implementation of the Danish Marine Spatial Data Infrastructure.

Ms Pia Dahl Højgaard, Director-General of the National Geodata Agency of Denmark, opened and chaired the beginning of the meeting before a requirement to attend to other business. The meeting was then chaired by her deputies. All NHC Members were represented: Denmark, Finland, Iceland, Norway and Sweden. Secretary-General Ward represented the IHO Secretariat as an observer.

View from Kronberg Castle, Elsinore

Participants of the 61st Meeting of the Nordic Hydrographic Commission

The meeting reviewed hydrographic progress in the region and the various developments affecting the region and agreed on a number of actions to further enhance cooperation and the development of hydrographic services among the members.

The meeting received presentations of national reports on progress and notable developments in the past year, which included hydrographic office involvement in Maritime Spatial Data Infrastructures, the future of paper chart production, the regional perspective and inputs to the forthcoming IHO Assembly, and cooperation in sharing training opportunities between Hydrographic Offices in the region. At the end of the meeting Sweden took up the Chair of the NHC.

North Indian Ocean Hydrographic Commission

The 17th meeting of the North Indian Ocean Hydrographic Commission (NIOHC) was held in Cairo, Egypt, from 17 to 20 July, under the chairmanship of Commander Ahmed Hafez from the Egyptian Navy Hydrographic Department. Participants were welcomed at the opening ceremony by Vice Admiral Ahmed Khaled, Commander in Chief of the Egyptian Navy, in the presence of Dr Hesham Arafat, Minister of Transportation, and Vice Admiral Mohab Mamesh, Chairman of the Suez Canal Authority.

Director Iptes addressing the opening ceremony of the NIOHC17

NIOHC Member State representatives from Bangladesh, Egypt, India, Myanmar, Saudi Arabia, Sri Lanka, Thailand and the United Kingdom (UK) attended the meeting together with representatives of Associate Members from France, Mauritius, Oman and the United States. The Russian Federation and Indonesia were represented as Observer States. Representatives of the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) and the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA) and several industry stakeholders also attended as invited observers. Director Mustafa Iptes and Assistant Director David Wyatt represented the IHO Secretariat.

The NIOHC received reports from Member States, Associate Member States and the IHO Secretariat as well as summary reports on the last meetings of the IHO Hydrographic Services and Standards Committee and the Inter Regional-Coordination Committee and a comprehensive update on the activities of the GEBCO Project, including the establishment of the *Seabed 2030 project*. The meeting also received reports on progress and issues related to the work of the IHO Marine Spatial Data Infrastructures Working Group, relevant activities that had taken place in the International Maritime Organization, an up-date from the NAVAREA VIII coordinator and the outcomes of the 8th meeting of the World-Wide Navigational Warning Service Sub-Committee.

Director Iptes reported on the IHO Work Programme and the Organization's activities during the previous year, including a comprehensive report on the first session of the IHO Assembly. As at previous meetings, time was devoted to capacity building (CB) and regional requirements. A comprehensive CB plan was developed for submission to the 16th meeting of the IHO Capacity Building Sub-Committee (CBSC16). Assistant Director Wyatt provided an up-date on the IHO crowd-sourced bathymetry programme, which generated numerous comments and questions.

The meeting included a number of presentations from industry representatives. These highlighted technologies and training opportunities available to the region. Industry representatives were keen to emphasize their willingness to engage with the NIOHC and its members to assist the development of hydrographic and cartographic capability within the region.

NIOHC17 in plenary session

Indonesia applied for full membership of the NIOHC. It was confirmed that Indonesia had territory within the limits of the INT Chart Region J and was therefore eligible for membership. As a result, Indonesia was unanimously welcomed as a full member of the NIOHC.

India assumed the Chair of the NIOHC four months after the meeting in accordance with the Statutes of the Commission. The NIOHC elected the UK to assume the Vice-Chair position for the next period.

ROPME Sea Area Hydrographic Commission

The 7th meeting of the ROPME (Regional Organization for the Protection of the Marine Environment) Sea Area Hydrographic Commission (RSAHC) was held in Muscat, Oman, from 20 to 22 February. The meeting was opened by Mqaddam Juma al Busaidi, Acting Director of the National Hydrographic Office of Oman, in the presence of Ameed Harib bin Rashid al Rahbi, Director General Operations and Plans in the Royal Navy of Oman. Representatives from RSAHC Member States Bahrain, Islamic Republic of Iran, Oman, Pakistan, Qatar and Saudi Arabia attended the meeting with Associate Members attending from France, United Kingdom and USA and observers from a number of organizations and authorities together with several representatives from industry. Director Mustafa Iptes and Assistant Director David Wyatt represented the IHO Secretariat.

Director Iptes addresses delegates at the opening session of RSAHC7

The meeting received national reports from Member and Associate Member States after which the meeting received reports on the IHO-IOC GEBCO project and on Worldwide ENC Data Base (WEND) issues. Delegates were encouraged to provide regular updates to the IHO Yearbook (P-5) and IHO publication C-55 - *Status of Hydrographic Surveying and Nautical Charting Worldwide*. Details of regional INT Chart and electronic navigational chart (ENC) coverage were discussed as well as encouragement to access the INToGIS web portal in order to manage INT chart and ENC coverage across the region. The NAVAREA IX Coordinator (Pakistan) provided an up-date on issues relating to the World-Wide Navigational Warning Service (WWNWS) and outcomes from related IMO meetings were reviewed. Director Iptes briefed the Commission on current IHO issues and activities as well as forthcoming session of the IHO Assembly.

Participants of the RSAHC7 Meeting

The meeting included presentations from industry representatives that highlighted technologies and training opportunities available to the region. Industry representatives were keen to emphasize their willingness to engage with the RSAHC and its members to assist the development of hydrographic and cartographic capability within the region. These presentations were followed by presentations from the regional Capacity Building (CB) Coordinator. All the presentations generated considerable debate on various issues and regional requirements. A comprehensive list of CB requirements was developed for submission to the IHO Capacity Building Sub Committee (CBSC) that will meet in June. Presentations were also given on the Indian Ocean Tsunami Warning and Mitigation System and the IHO-IOC GEBCO Project, both of which supported the request that Member States contribute to the IHO-IOC GEBCO programme through the provision of shallow water bathymetric data to the IHO Data Centre for Digital Bathymetry (DCDB).

The participants reviewed the Commission statutes and agreed to amend the statutes to include a fixed term for the role of Chair with the Vice-Chair automatically taking over as Chair after each meeting. Pakistan was elected as the next Chair of the Commission with the Islamic Republic of Iran being elected as Vice-Chair. The Commission also agreed that the Chair (Pakistan) and Vice-Chair (Iran) would occupy the two seats on the IHO Council allocated to the RSAHC for the period April 2017 to April 2020.

Southern Africa and Islands Hydrographic Commission

The 14th Southern Africa and Islands Hydrographic Commission (SAIHC) Conference was hosted by the French Hydrographic Office (Shom) and held in Saint-Gilles les Bains, French Department of la Réunion, France from 6 to 8 September under the chairmanship of RAdm Tim Lowe from the United Kingdom. The Conference was attended by delegates from France, Mozambique, Norway, United Kingdom, Namibia, Portugal and Seychelles. Delegates from the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) and the two Regional Electronic Nautical Chart (RENC) organizations: IC-ENC and PRIMAR also participated in the meeting. Industry participants from Fugro Survey, Kongsberg Maritime and Chartwise and a delegate from the United States of America attended as observers. The application by India to join SAIHC as an Associate Member State was approved. Director Abri Kampfer and Assistant Director Anthony Pharaoh represented the IHO Secretariat.

The 14th Conference included a meeting of the regional International Charting Coordination Working Group (ICCWG) during which the status of INT chart production in the region was discussed. There was agreement that an ENC Scheme for SAIHC should be progressed as a matter of priority. INT Chart production in the region shows good progress and several new charts are in final stages of production.

Participants of the 14th SAIHC Conference

Each of the participating Member and Associate Member States represented at the Conference provided a briefing on the status of hydrography and charting priorities in their areas of responsibility.

There were reports, presentations and discussions on Marine Spatial Data initiatives, GEBCO activities, and the IHO capacity building programme for the region. Other topics discussed during the meeting included; the status of IHO publications, the accuracy of C-55 information and the need to provide regular updates, procedures for marine disasters that should include an updated list of emergency contacts with alternate contacts where applicable and maritime safety information for NAVAREA VII. The lack of NAVTEX stations in the region and poor or no communication with the NAVAREA VII coordinator were raised as major concerns.

The two RENC organizations provided an update on their individual programmes and the status of ENC distribution in the region. Presentations were also provided by each of the industry participants.

Comprehensive national reports were provided by France, Mozambique, Norway, South Africa, United Kingdom, Portugal, Namibia and Malawi.

The Statutes of the Commission were amended with some editorial changes resulting from the entry into force of the Amendments to the IHO Convention and a new paragraph governing the joining of IHO Member States as Associate Members of the Commission.

A discussion was held on strategies to improve attendance of SAIHC Conferences and difficulties that may exist as several Member and Associate Members cancelled attendance at short notice. The importance of IHO membership was highlighted and Associate Members were encouraged to report at the next conference on their progress with regards to in-country processes.

Rear Admiral Tim Lowe, United Kingdom was elected as Chair and Captain Theo Stokes, Republic of South Africa, was elected as Vice Chair.

South East Pacific Regional Hydrographic Commission

The 13th meeting of the South-East Pacific Regional Hydrographic Commission (SEPRHC) was hosted and chaired by the Hydrographic Office of Colombia (*Dirección General Marítima - Centro de Investigaciones Oceanográficas e Hidrográficas del Caribe - DIMAR/CIOH*) from 21 to 25 August. The first two days were devoted to an "Update Workshop for Hydrographers and Cartographers". Around forty delegates attended the meeting. The participants included sixteen representatives of the four IHO Member States of the Region (Chile, Colombia, Ecuador and Peru) and one observer from Panama. The United Kingdom and the United States (Naval Oceanographic Office) were also represented as observers. Eighteen representatives from industry contributed to the workshop and were invited to attend the meeting of the Commission as observers. In addition, some forty attendees from the Naval Academy and the Naval Non-Commissioned Officers' School of Colombia and from

local universities followed the workshop. Prof. Keith Miller (Trinidad and Tobago) represented the FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC). Dr Cesar Toro, Secretary of the Sub-Commission for the Caribbean and Adjacent Regions of the Intergovernmental Oceanographic Commission (IOCARIBE) contributed to the agenda item related to the IHO/IOC GEBCO Project. The IHO Secretariat was represented by Director Gilles Bessero.

The workshop was conducted in English and Spanish with simultaneous translation between the two languages. The presentations at the workshop covered a wide scope of subjects, including the importance of hydrography, new technologies and developments related to hydrographic surveying, nautical charting and spatial data infrastructures, and capacity building aspects. Prof. Miller presented the new structure of the standards of competence and the course recognition process. Director Bessero provided an overview of the S-100 framework.

The meeting itself was conducted in Spanish. The opening ceremony was chaired by Rear Admiral Paulo Guevara Rodríguez, Director-General of DIMAR, and marked the transfer of chairmanship from Ecuador to Colombia. Following the report of the outgoing Chair, who acknowledged the support provided by the IHO Secretariat and the Capacity Building Sub-Committee (CBSC), Director Bessero presented the report of the IHO Secretariat, highlighting the activities and issues relevant to the Commission. The subsequent sessions were chaired by Captain Ricardo Torres Parra, the Director of the CIOH. The Members of the Commission and Panama presented reports on their national activities since the 12th Conference held in 2015. The representative of the Maritime Authority of Panama confirmed the intention of Panama to join the IHO. The national reports were followed by an overview of the outcome of the last meetings of the two main IHO Committees (HSSC8 and IRCC9 respectively) and the consideration of the participation of the region in the relevant work programmes. Separate agenda items focused on capacity-building (CB), the status of the coverage of Electronic Navigational Charts (ENC), the provision of Maritime Safety Information (MSI), the implementation of Marine Spatial Data Infrastructures (MSDI) and the GEBCO Project.

Participants of the SEPRHC13 Meeting

The discussions were particularly open and well guided by the Chair. They led to a dozen actions and a further dozen decisions that focused in particular on CB and MSDI issues. In response to an

observation from the CBSC and the IRCC, the Commission agreed to disconnect the designation of its regional CB coordinator from the normal rotation of the Chair of the Commission. Chile agreed to take up the position of CB coordinator for an initial term of six years. The Commission agreed also to propose that the Capacity Building Sub-Committee consider including the development of an MSDI as a specific phase in the CB strategy.

The Commission decided to establish a working group tasked to develop a three-year action plan aiming at producing a regional tsunami response plan addressing the most urgent hydrographic needs.

The Commission agreed that all ENCs covering INT Region C2 should be made available through a Regional ENC Coordinating Centre and acknowledged the need to develop and maintain a regional ENC scheme. With regard to the production of INT charts, Chile expressed the view that the efforts of the Members of the Commission should focus on the Antarctica Region.

The Members of the Commission were encouraged to submit their bathymetric data to the IHO Data Centre for Digital Bathymetry, including the data collected to update the existing sheets of the International Bathymetric Chart of the South East Pacific (IBCSEP). Colombia suggested that the Region should seek to benefit from the Seabed 2030 Project.

The Members of the Commission were encouraged to identify members of staff familiar with MSI issues that could be trained as trainers for future MSI courses. The Members of the Commission confirmed their commitment to progress the revision of the Spanish version of the IHO Manual on Hydrography. The Members of the Commission were invited to inform Panama, through the Chair, of all hydrographic training opportunities that become available, including on-the-job training.

The Statutes of the Commission were amended to align the term of office of the Chair with the three-year cycle of the IHO Council, the seat allocated to the Commission being assigned to the Chair. The Spanish name of the Commission was amended to conform to the usual form “Comisión Hidrográfica Regional” instead of “Comisión Regional Hidrográfica”. At the suggestion of the IHO Secretariat the Commission decided to terminate the Commission website which had not been updated since 2015 and to simply maintain the Commission section on the IHO website, in liaison with the IHO Secretariat.

South-West Atlantic Hydrographic Commission

The 11th Conference of the South-West Atlantic Hydrographic Commission (SWAtHC) was hosted by the Brazilian Hydrographic Service (Directorate of Hydrography and Navigation (DHN)), on 6 and 7 March. Eighteen delegates attended the meeting, chaired by Vice-Admiral Marcos Sampaio Olsen, Director of the DHN. All three IHO Member States of the Commission, Argentina, Brazil and Uruguay, were represented together with the Associate Member, Paraguay, and the Observer State, Bolivia. Two industry stakeholders (IMS and Kongsberg Maritime) participated in the meeting as Observers. The IHO Secretariat was represented by Assistant Director Alberto Costa Neves.

Argentina, Brazil, Uruguay, Paraguay and Bolivia reported on their national activities since the 10th Conference. Argentina reported the status of surveys, the development of its Maritime Spatial Data Infrastructure (MSDI) and its insertion in the national SDI, and its contributions to the GEBCO project. Brazil highlighted its contributions to capacity building provided to international students from developing nations, the modernization of its hydrographic survey fleet, the new cartographic plan based on risk assessment, the implementation of satellite derived bathymetry plan, and the progress of its MSDI. Brazil also reported on progress as the host of the IC-ENC branch covering South America which is now fully operational.

Uruguay reported progress in conducting surveys, cooperation with Argentina for a new INT Chart 2010 and the need to overcome the shortcomings in the national legal framework that restrict the provision of data beyond that contained in nautical charts. Paraguay provided an update on surveying and charting its waterways with the support from SWAtHC Members, its needs for capacity building assistance and work in support of the Paraguay-Parana Waterway Committee. Paraguay also requested support to progress the implementation of the recommendations provided by the Technical

Visit report conducted in 2014. Bolivia reported on the surveys conducted by the National Hydrographic Service in its inland waters, including the highest navigable lake in the world, Lake Titicaca, surveyed in cooperation with Peru, and the access routes to the Amazon and to the Paraguay-Parana waterways, surveyed in cooperation with Brazil.

Assistant Director Costa Neves provided a briefing on the main IHO activities of relevance to the Commission including the changes arising from the entry into force of the amendments to the Convention on the IHO, the status of the membership and the possibilities for Bolivia and Paraguay to join the IHO, the developments in the geospatial information infrastructure in the Secretariat, the status and possibilities of the IHO Capacity Building Programme, the progress on crowd-sourced bathymetry and the developments at the IHO Data Centre for Digital Bathymetry, the preparation for the 1st Session of the IHO Assembly and the establishment of the IHO Council.

Participants of the 11th SWAtHC Conference

Uruguay, as Chair of the SWAtHC Planning Committee, reported on the intersessional work conducted through the Committee, addressing notably the maintenance of the regional INT Chart and ENC schemes and the progress achieved so far. The production reached 77% of the INT Chart schema and 80% of the ENC schema. The Commission noted that there are no significant overlapping ENC cells and no charted areas designated as CATZOC "unassessed". The Commission also endorsed the procedure for quality assurance of INT Charts as agreed by IRCC (Action IRCC7/27).

The Planning Committee updated the Commission on the engagement of the Members of the SWAtHC with the Inland ENC Harmonization Group (IEHG) and the plans to hold its next meeting in Brazil in October 2017. The Commission considered the work plan of the Committee for the next intersessional period focusing on the continuation of chart production, the use of risk assessment for prioritization of surveys and charts and the implementation of Capacity Building activities funded by the IHO CB Fund and self-funded.

The Commission received reports on the work of the Inter-Regional Coordination Committee, Capacity Building Sub-Committee, Worldwide ENC Database Working Group and Hydrographic Services and Standards Committee and considered the impacts for the region. The industry representatives briefed the Commission on taking full advantages of multi-beam data acquisition and how static and dynamic data streams impact the way the maritime community interact with charts.

Argentina presented a proposal for the development of a geoportal for the SWAtHC to support the work of the Commission which approved the development of a prototype before its formal adoption.

Brazil informed the Commission on developments in e-Navigation and its impact to the hydrographic services.

The Statutes of the Commission were amended to reflect the changes to the Convention on the IHO, to incorporate the inland waterways flowing into the South-West Atlantic and to enable Paraguay and Bolivia to join the SWAtHC as full members following their accession to the IHO.

The 3,400 km of the Paraguay-Parana Waterway serving the five States in the region, linking the heart of the continent to the Atlantic Ocean.

During the meeting participants had the opportunity to visit the new Brazilian Hydrographic Vessel *Vital de Oliveira*, built and operated by a national consortium formed by the Navy, the Ministry of Science and Technology, Universities and Industry. *Vital de Oliveira* called in Monaco during the 1st Session of the IHO Assembly in April. In accordance with the statutes of the Commission, the chairmanship was transferred to Uruguay within forty-five days from the closing of the Conference.

USA-Canada Hydrographic Commission

The 40th meeting of the United States of America – Canada Hydrographic Commission (USCHC) was held on 20 March in Galveston, Texas, USA. USCHC40 took place in conjunction with the US Hydrographic Conference 2017. The meeting was co-chaired by Mr Denis Hains, the Director General CHS and Rear Admiral Shepard Smith, the Director, Office of Coast Survey of the USA. Twenty-one representatives from the USA and Canada attended the meeting. Observers from France, UK and Canadian Ocean Mapping Research and Education Network (COMREN) were also participated in the meeting.

Each Member State provided reports and presentations on their organizations and accomplishments in the past year. Additional briefs were provided on the activities of the national charting, WENDWG, MSDIWG, Crowd-Sourced Bathymetry Working Group, IHO/IOC GEBCO Project and Seabed 2030 Project. Several technical presentations were made that were complementary to the discussions.

The preparations of first IHO Assembly was discussed at the meeting and Canada's representation at the IHO Council was also agreed. Member States revised and then signed new USCHC statutes at the 1st Session of the IHO Assembly.

WEND Working Group

The 7th meeting of the Worldwide ENC Database Working Group (WENDWG) took place in Washington, District of Columbia, USA, hosted by the Office of Coast Survey of the National Oceanic and Atmospheric Administration (NOAA), from 31 January to 2 February, in conjunction with the 2nd joint meeting of the Regional ENC Coordinating Centres (RENC), IC-ENC and PRIMAR. The meeting was chaired by Mr Jamie McMichael-Phillips (United Kingdom). Twenty-one delegates from twelve Member States (Argentina, Brazil, Canada, China, Finland, France, Italy, Japan, Norway, Turkey, United Kingdom, United States) representing eleven Regional Hydrographic Commissions (ARHC, BSHC, EAHC, EAtHC, MACHC, MBSHC, NHC, NSHC, SAIHC, SWAtHC, USCHC), the Chairs of the IC ENC Steering Committee and PRIMAR Advisory Board and the directors of both RENC attended the meeting. Director Mustafa Iptes and Assistant Director Yves Guillam (Secretary) represented the IHO Secretariat.

Participants of the 7th WENDWG Meeting.

The meeting noted that most of the decisions and actions arising from the 6th meeting of the WENDWG were implemented or complete. As a result, the meeting concentrated on the main work items of the WENDWG 2016-17 programme of work, and the actions assigned to the WENDWG by the Inter-Regional Coordination Committee (IRCC) at its 8th meeting in 2016.

The WENDWG agreed that there was a need to draw the attention of the 1st Session of the IHO Assembly (IHO-A1) to some important issues. An ad hoc drafting group prepared the key messages that could be included in the oral presentation of the Chair of the IRCC. This included drawing attention to the steps that should be taken by RHCs and ENC producers to minimise overlapping ENCs coverage, particularly where it could impact on the safety of navigation. The status of ENC coverage was reviewed based on a report provided by the United Kingdom, taking note also of the report prepared by the IHO for the 4th Session of the IMO Sub-Committee on Navigation, Communications and Search and Rescue (NCSR 4/25/5). The meeting acknowledged the set of actions and related issues raised from the 8th meeting of the Hydrographic Services and Standards Committee (HSSC-8) regarding the use of the ENC/ECDIS Data Presentation and Performance Check for Ships by port State Control authorities.

The representatives of the RHCs reported on the progress made on ENC Scheming in their charting region. They were informed by the IHO Secretariat that IHO Member States will soon be requested to approve a new Edition of S-11 Part A - *Guidance for the Preparation and the Maintenance of International (INT) Charts and ENC Schemes*. The inclusion of ENC schemes in the guidance is intended to reinforce the need to implement ENC scheming at the regional level. The situation varies significantly from one region to another and it is currently unclear if there is a common understanding on this matter, notwithstanding the fact that the establishment of regional ENC schemes has been designated by the IRCC and monitored over the last five years through the IHO performance indicators associated with the IHO Strategic Plan.

Industry participation in RHC meetings

In addition to being represented at IHO meetings through various Non-Governmental International Organizations (NGIO), representatives from industry participated as invited Expert Contributors in most RHC meetings, where they provided valuable contributions to regional capacity building initiatives and to the work of the individual coastal States.

Contribute to improving the framework of IHO response to marine disasters

During the 1st Session of the IHO Assembly Japan proposed a revision of the IHO Resolution 1/2005 *IHO Response to Disasters* that tasked IRCC to consider the proposal. IRCC9 requested the EAHC Chair to liaise with Japan to consult with Member States and with the SWPHC Chair to review the Resolution.

Increase participation by non-Member States

One of the important strategic goals of the IHO is to increase the participation of non-Member States in IHO activities. Taking the opportunities of attending regional and other international meetings and events, in particular during the RHC, UN headquarters and IMO meetings held during the year, the IHO Secretary-General, Directors and Assistant Directors visited and briefed high level governmental officials directly and through their diplomatic representatives as part of the IHO awareness-raising campaign. Non-Member States of the IHO were also encouraged and invited to participate in the RHC meetings, CB initiatives and relevant IHO meetings. The awareness-raising campaign is also conducted during the CB Technical and High-Level Visits.

- ***High Level visit to Seychelles***

IHO Director Mustafa Iptes paid a high level Capacity Building visit to Mahé Island, Seychelles from 9 to 12 May to brief senior governmental officials on the role of the IHO and the significance of national hydrographic programmes, particularly for those countries with a significant dependence on maritime activities.

In the first part of his programme, Director Iptes visited the Seychelles Maritime Safety Administration (SMSA) and called on Captain Joachim Valmont, Director General of SMSA. Director Iptes also visited the Headquarters of the Seychelles Coast Guard and had a meeting with Lt. Colonel Leslie Benoiton, Acting Commander of the Coast Guard.

In the second part of the programme, Director Iptes visited the Ministry of Tourism, Civil Aviation, Ports and Marine where he met Mr Garry Albert, Principle Secretary of the Ministry. He provided an overview briefing to the Seychelles National Hydrographic Committee covering the role and activities of the IHO and the importance of hydrography in the context of the "Blue Economy".

Director Iptes and the National Hydrographic Committee of Seychelles.

In the third part of his programme, Director Iptes called on HE Vincent Meriton, Vice-President of the Republic of Seychelles at the State House in Victoria where he presented the activities of the IHO and underlined the importance of hydrography and hydrographic services to any coastal State and discussed the benefits of becoming a Member State of the IHO. Director Iptes also had a meeting on the role of hydrography on underpinning the blue economy with Mr Philippe Michaud and Mr Raymond F. Chang Tave who are Special Advisers at the Blue Economy Department of the Vice President's Office.

Director Iptes exchanges gifts with HE Vincent Meriton, Vice-President of the Republic of Seychelles.

Director Iptes was informed that Seychelles, as a maritime State in the Indian Ocean region, has a positive desire to join the IHO. Subsequently, Seychelles joined the IHO as of 29 December 2017.

- ***Accession of New Member States***

The accession of Malta, the Republic of Vanuatu and the Republic of Seychelles to the IHO Convention as IHO Members brought the IHO Membership to 88 Member States.

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Capacity Building Management

The IHO Capacity Building programme is a strategic objective of the organization that considers the hydrographic maturity of coastal States and provides targeted training, technical assistance and awareness-raising seminars aimed at improving the status of hydrographic surveying and nautical charting and the delivery of maritime safety information in regions, particularly for developing countries.

The IHO Capacity Building programme is funded from the IHO budget and is supplemented by additional financial support from Member States (currently the Nippon Foundation of Japan, and the Republic of Korea) with in-kind support from Member States and from industry. However, considering the growing demands for IHO Capacity Building activities, more funds and contributions are required. For this reason, the Secretary-General and Directors continued the Secretariat's campaign to find new donor States and funding organizations.

The level of activity of the IHO Capacity Building (CB) Programme decreased in 2017. Expenditure in the IHO 2017 CB Work Programme (625 952 Euros) was 18% smaller than the budget for the previous year. The ongoing financial support is provided by the Nippon Foundation of Japan, the Republic of Korea and by a contribution from the IHO budget with in-kind support from Member States and from industry. In 2017, 80% of the budgeted work program was executed and paid for.

One Director, one Assistant Director and some other members of the staff were directly engaged in supporting the CB programme. The limited human resources available in the Secretariat constrained the performance of the CB Programme.

Capacity Building Sub-Committee (CBSC)

The 15th Meeting of the IHO Capacity Building Sub-Committee (CBSC15) took place in Paramaribo, Suriname hosted by the Maritime Authority Suriname (MAS) from 7 to 9 June. The meeting was chaired by Mr Thomas Dehling (Germany) and attended by 28 participants representing the 15 Regional Hydrographic Commissions (RHC), 14 Member States and one observer organization. The opening ceremony was attended by the Chair of the MAS Supervisory Board, Mr. Theo Vishnudatt. The IHO Secretariat was represented by Director Mustafa Iptes and Assistant Director Alberto Costa Neves (CBSC Secretary).

The CBSC is responsible for the continuous assessment of the status of hydrographic surveying, nautical charting and maritime safety information in nations and regions where hydrography is developing and for the establishment and maintenance of close relationships with national agencies and international organizations in terms of Capacity Building.

The Sub-Committee considered the impact of the revised IHO Strategic Plan (2017) and of the IHO Capacity Building (CB) Strategy and considered that the CB Strategy is fit for purpose. The impact of using e-learning to deliver some components of CB training was considered in light of the outcomes of the 1st Session of the IHO Assembly and it was agreed that the next revision of the Strategy should highlight the importance of this option.

The meeting reviewed the status of cooperation with other international organizations and the need to improve liaison with the International Maritime Organization (IMO) to properly assess and deliver Capacity Building in an effective way under the UN concept of "Deliver as One".

The meeting adopted three new CB Procedures covering the CB Management Plan, the assessment of the status of CB Phases of coastal States and the certificate of completion of CB activities. The need to improve the preparation and execution of technical visits was considered as a key element for work of the Sub-Committee and a draft CB Procedure is being developed to ensure visits are properly conducted. The meeting highlighted the importance of the implementation of a National Hydrographic Coordinating Committee to support the development of the national infrastructures and ways to reflect this in the CB Procedures. The improvements in the set of CB Procedures are a key element to ensure the CB Work Programme contributes to the objectives of the IHO in an optimal way.

The reports from the Regional Hydrographic Commissions indicated an increase in the level of in-kind contributions from developed Member States in support of developing countries and the continuation of the generous support from the Republic of Korea and from the Nippon Foundation of Japan to the IHO CB Fund. The meeting was informed of the support from USA/NOAA with a Chart Adequacy Evaluation Workshop for foreign personnel and on the developments in the Training, Research and Development Center of the East Asia Hydrographic Commission. The meeting also noted the progress in developing an e-learning course on Maritime Safety Information, the support provided to Cabo Verde in preparation for the IMO Mandatory Audit Scheme and the progress in the South-West Pacific with the support of New Zealand's Pacific Region Navigation Initiative (PRNI) and risk assessment methodology and of other Member States in the region.

Participants of the 15th meeting of the IHO Capacity Building Sub-Committee (CBSC15)

The Sub-Committee also noted the progress made in regional and national projects related to Capacity Building, including the development of open-source tools for risk assessment by New Zealand, a case study from Italy in developing a hydrographic service in Uganda, the creation of the Canadian Ocean Mapping Research and Education Network, the creation of the Suriname Aids to Navigation Academy, outcomes of the hydrographic definition study in the Maritime Organization of West and Central Africa (MOWCA) and the support from UK to the Organization of Eastern Caribbean States (OECS), to the Commonwealth Marine Economies (CME) Programme and to the Overseas Territories Seabed Mapping Programme.

The meeting updated and adjusted the 2017 CB Work Programme and approved the 2018 CB Management Plan and the 2018 CBWP considering the priorities identified by the Sub-Committee, the available resources and potential additional resources.

The meeting re-elected Mr. Thomas Dehling (Germany) as the CBSC Chair and elected Capt. Lamberto Lamberti (Italy) as the Vice-Chair for the period of 2017-2020.

Manage Capacity Building Fund

The Republic of Korea and the Nippon Foundation of Japan made significant financial contributions to the CB Fund during the period of this report.

Many other IHO Member States contributed significant in-kind resources to the CBWP, by providing the venue, instructors, local support, or other resources to ensure the effective implementation of CB activities. A statement of accounts for the CB Fund is contained in Part 2 of this Annual Report.

- ***Develop and maintain a Capacity Building Management System***

The Secretariat, with the support of the Republic of Korea, continued to develop a more robust Capacity Building Management System using databases and online services, but at a very slow pace due the resource limitations.

Meetings with other organizations, funding agencies, private sector and academia

- ***Joint IHO/IMO/WMO/IOC/IALA/IAEA/FIG/IMPA Capacity Building (CB) Coordination Meeting***

The 10th Joint IHO/IMO/WMO/IOC/IALA/IAEA/FIG/IMPA Capacity Building (CB) Coordination Meeting was held on 7 to 8 November, at the International Association of Aids to Navigation and Lighthouse Authorities (IALA) Headquarters in Saint-Germain-en-Laye, France. The annual meeting brought together nine representatives from the IHO, IMO, WMO, IOC, IALA and IMPA. The IAEA and FIG were not represented at the meeting. The IHO was represented by Mr Thomas Dehling (National Hydrographer of Germany), Chair of the Capacity Building Sub-Committee (CBSC), and IHO Assistant Director Alberto Costa Neves, CBSC Secretary.

The International Maritime Pilots Association (IMPA) was represented in the meeting for the first time and has been a permanent member of the Joint Group. IMPA represents the international community of pilots, over 8,000 members in forty eight countries, to promote effective safety outcomes in pilotage as an essential public service. IMPA is recognized as an observing organization at the IHO and at the IMO. The participation of IMPA is particularly significant for the assessment component of CB for assisting in identifying areas where more capacity is required from a users' perspective.

In his opening speech, IALA Secretary-General Francis Zachariae highlighted the importance of coordinating the efforts of international organizations for building and developing capacity in the maritime and marine community. These efforts are in line with the UN concept of "Delivering as one" for coherent and coordinated work when supporting developing countries. This external support for providing effective support to these countries has the benefit of creating conditions for enhanced communication and cooperation within the country.

Participants presented the strategies and the management of their respective CB projects, reported on their CB activities since the last meeting and shared lessons learned, best practices, standardization procedures and experience in dealing with funding agencies. The IHO representatives reported on developments including the impact of the IHO CB Strategy, the status of joint projects and the overall CB achievements. The joint work also promotes the awareness for the benefits of working with the international community for a sustainable development of the national infrastructure.

The meeting recognized the importance of the IMO as the mother-ship of the maritime community with its membership of 172 States, numerous observers and very relevant ensemble of international conventions. It also recognized the importance of the other international organizations in working with the IMO Technical Cooperation Committee to provide support to coastal States in their preparation for the IMO Member State Audit Scheme (IMSAS) and in responding to the deficiencies identified in areas where other organizations have a mandate (e.g. WMO, IHO and IALA in SOLAS Chapter V).

The IHO representatives informed the meeting of the continuous efforts of the IHO to communicate to the IMO and its Member States by providing papers to the IMO/TC, in addition to those presented in a joint manner. The paper submitted to the IMO/TC 67 recalled the work done by the IHO for the benefit of IMO Member States that are not members of the IHO, in support of fulfilling their obligations arising from SOLAS. It also indicated a reduction in the level of CB support available from the IHO for those IMO Member States that are not members of the IHO, due to the adoption of the IHO CB Strategy in 2014.

The meeting recognized the importance of joint attention to improving the availability of online resources to complement the face-to-face training and workshops, to integrate the organizations' calendars for CB activities with a view on "delivering as one", to develop impact assessment strategies to monitor the effectiveness of the CB efforts. Participants reviewed the outcome of the recent meeting

of the WMO/IOC Joint Commission on Oceanography and Marine Meteorology (JCOMM) and the benefits of performing coordinated assessments in NAVAREAs and METAREAs, and the possibility of using IOC Ocean Teacher for hosting online training developed by other organizations (e.g. the Maritime Safety Information training sponsored by the IHO/CBSC).

Participants of the 10th Joint IHO/IMO/WMO/IOC/IALA/IAEA/FIG/IMPA Capacity Building Coordination Meeting at the IALA Headquarters.

The meeting considered the synergies for the execution of the CB programmes for 2017/2018, the possibilities for improving the exchange of information related to the needs assessments in coastal States, the possibility of developing and maintaining a page for the CB Group with the objective of improving the visibility and awareness of the joint efforts for "delivering as one".

The meeting continued the work 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. Initial targets were identified at regional and national levels and the organizations agreed to work intersessionally to select the region/country and to outline the scope of work. Participants also considered the assessments made by the organizations regarding the lack of implementation of national MSI infrastructures in accordance with the recommendations of the Joint IMO/IHO/WMO Manual on Maritime Safety Information and agreed to work with the relevant bodies to take action and reduce the gap in some developing countries.

Participants took advantage of the meeting for advance coordination of specific activities, in particular those related to the Joint Technical Visit to Sudan (IMO, IHO and IALA) and possibly to Guatemala, El Salvador and Dominican Republic.

- ***Other meetings***

The 7th meeting of the IHO/ROK Programme Management Board (PMB7)

The 7th meeting of the IHO - Republic of Korea (ROK) Programme Management Board (PMB) was hosted by the Korea Hydrographic and Oceanographic Agency (KHOA) in Busan, Republic of Korea (ROK) from 27 to 28 February. The meeting was opened by Mr Chaeho Lim, Director of the Nautical Chart Division of the KHOA. The IHO was represented by Director Mustafa Iptes and Assistant Director Alberto Costa Neves (Secretary). Mr Maxim Van Norden, Coordinator of the Hydrographic Science Master's Degree Programme at the University of Southern Mississippi (USM), USA and relevant KHOA Staff also attended the meeting as invited contributors. The meeting was chaired by Director Iptes.

The meeting reviewed the progress and achievements of the various training and education activities sponsored by the ROK. The annual financial contribution from the ROK forms a significant part of the Capacity Building (CB) Fund used to support the annual IHO CB Work Programme (CBWP). Since its inception the ROK contribution has supported education programmes in hydrography and cartography, training for trainers' (TFT) courses, seminars and short courses on hydrographic surveys, ENC quality assurance, marine spatial data infrastructures, law of the sea, and tides and water levels, amongst others.

The PMB considered the management aspects of supporting trainees on the Category "A" Hydrography Programme at the USM and the Category "B" Nautical Cartography Programme at the KHOA in order to effectively deliver high level education and training to participants from developing countries. During the meeting the selection board for the 2017-2018 edition of the Category "A" Master Programme was established and selected one candidate from Romania. The meeting discussed ways to help ROK training alumni continuing their professional development and engaging in IHO projects. The alumni might also investigate how to take advantage of social media to create an environment of cooperation between them.

The PMB was informed that the financial contribution from the ROK to support CB activities in 2017 will, exceptionally, be less than in previous years due to the requirement to support the Korean Seconded Officer at the IHO Secretariat in 2017. The ROK also expressed its interest in continuing the support to further develop the Capacity Building Management System (CBMS) by working with the IHO Secretariat.

The meeting was also briefed on CB activities being conducted by the East Asia Hydrographic Commission Technical, Research and Development Center (TRDC) and its developments of e-learning to better assist the international hydrographic community.

Participants of the PMB7

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Recognition Ceremony for the Master of Science Degree in Hydrographic Science (USM)

Two students sponsored by the Republic of Korea (ROK) through the IHO capacity building programme successfully completed a Master of Science (MS) Degree in hydrographic science at the University of Southern Mississippi (USM), United States, in August. The two successful students were from the national hydrographic services of Malaysia and Philippines. They were part of the 18th graduating class of the USM degree that comprises the two IHO capacity building programme students, nine other students from the United States and a doctoral student from Nigeria. It was the fourth year that the ROK has funded participants on the programme.

The MS degree in hydrographic science meets the Category "A" recognition requirements of the International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) operated jointly by the International Federation of Surveyors (FIG), the IHO and the International Cartographic Association (ICA).

The recognition ceremony for the class of 2017 was held at the Gulf Park Campus of the USM in Long Beach, Mississippi, on 3 August in the presence of Dr Rodney D. Bennett, President of the USM. The ceremony was introduced by Mr Maxim F. van Norden, Coordinator, Hydrographic Science Programmes, USM. Opening remarks were provided successively by Dr Karen S. Coats, Dean of the USM Graduate School, Captain (USN) Ronald Shaw, representing Rear Admiral John Okon, Commander, Naval Meteorology and Oceanography Command, Director Gilles Bessero, representing the IHO, and Mr Yong Huh, Director, Oceanographic Forecast Division, Korea Hydrographic and Oceanographic Agency (KHOA). A keynote address was delivered by Dr Steven R. Moser, Provost and Senior Vice President for Academic Affairs, USM. The ceremony was concluded with the presentation of the Hydrographer of the Navy Education Award and Category "A" Certificates.

Graduates with their certificates of recognition Left to Right: Mr Yong Huh, Director, Oceanographic Forecast Division, KHOA, Lt Abdul Halim bin Ahmad Nordin, Royal Malaysian Navy, National Hydrographic Centre, Lt Gilbert Avila Alviola, National Mapping and Resource Information Authority, Hydrography Branch, Philippines, Mr Gilles Bessero, Director, IHO

Liaison Visit to the 9th Course of the IHO- Nippon Foundation CHART Project

Director Mustafa Iptes and Mr Kentaro Kaneda (Project Officer seconded to the IHO Secretariat from Japan) visited the United Kingdom Hydrographic Office (UKHO) on 28 September to meet and brief the trainees attending the 9th course of the IHO - Nippon Foundation CHART (Cartography, Hydrography and Related Training) Project. The project, funded by the Nippon Foundation of Japan, provides training in marine cartography and data assessment, which is recognized at the Category B

level by the FIG-IHO-ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers. The course was hosted by the UKHO and composed of five modules, each module varying from two to five weeks in length. The 9th course started on 4 September and ended on 15 December. It was attended by students from Algeria, Ecuador, Fiji, Malaysia, Thailand, Ukraine and Venezuela.

Director Iptes discussed various topics with the students. In response, the students described their experiences and thanked the Nippon Foundation, UKHO and IHO for the opportunity to develop their knowledge and expertise in the field of nautical cartography. Director Iptes delivered a presentation highlighting the areas of influence and the value of hydrography and the responsibilities of Governments in relation to the provision of hydrographic data, information, products and services. The important coordination and standardization role of the IHO and its Capacity Building programme were also described. The students were encouraged to keep in touch with each other and to maintain an alumni relationship after they return to their home countries.

Trainers and trainees of the 9th CHART Course with Director Iptes.

Follow-up of CB activities and initiatives

The IHO Secretariat, on behalf of the CBSC, continuously monitored CB activities and initiatives. One Director and one Assistant Director were engaged in this work. Additionally, the Secretary-General, both Directors and the Assistant Directors continuously monitored CB activities undertaken in the RHC areas for which they provide an overview and advisory function. One Category B Staff was part-time engaged in the execution of the CBWP activities.

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

The FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) is a joint board of the International Federation of Surveyors (FIG), the International Hydrographic Organization (IHO), and the International Cartographic Association (ICA). The IBSC is responsible to promote, develop and maintain international standards of competence for hydrographic surveyors and nautical cartographers, to maintain publications and documents resulting from the tasks carried out by the Board, to review training and education programmes seeking recognition and to conduct onsite visits to institutions holding recognized programmes.

The 40th meeting of the IBSC was held in Wellington (New Zealand, hosted by the Land Information New Zealand (LINZ), from 20 to 31 March. Adam Greenland, New Zealand National Hydrographer and Chair of the IBSC, welcomed the Board at LINZ. The meeting was attended by the ten Members of the Board (one by video-conference). Assistant Director Alberto Costa Neves (IBSC Secretary) represented the IHO Secretariat.

IBSC Members at LINZ following the welcome ceremony.

The Board reviewed and recognized five programmes for hydrographic surveyors (three at Category "A" and two at Category "B", including two new programmes) and two for nautical cartographers (Category "B" level including one new programme) at its annual meeting. At the time of IBSC40 meeting, there were 60 recognized programmes and two schemes of individual recognition from 29 countries around the world.

The Board also reviewed progress made since 2012 in the revision of the Standards of Competence for Hydrographic Surveyors and Nautical Cartographers. The Board was able to complete the work on the IHO Publications S-5A and S-5B Standards of Competence for Category "A" and Category "B" Hydrographic Surveyors. Both publications are in force since 2016 and the submissions of hydrographic programmes to IBSC40 were against the new set of Standards and the feedback from the submitting institutions allowed the Board to work on revised Editions 1.0.1

The Board considered the feedback received Member States for the draft Publications S-8A and S-8B Standards of Competence for Category "A" and Category "B" Nautical Cartographers and endorsed the draft Editions 1.0.0 of both publications which were then submitted to the Inter-Regional Coordination Committee (IRCC9) for endorsement. The Guidelines for the Implementation of the Standards of Competence for Hydrographic Surveyors and Nautical Cartographers was also completed as a reference document for institutions organizing programmes against S-5A, S-5B, S-8A and S-8B.

The Board called in LINZ for a courtesy visit to the Deputy CEO, Ms Jan PIERCE, who highlighted the current developments and status of the Geospatial Strategy, the elevation monitoring, the satellite based augmentation system, vertical reference datum and the risk assessment conducted around New Zealand. Board Members briefed LINZ Staff on the nature of the work done by the Board and the Secretary explained how the IBSC relates to the IHO, Inter-Regional Coordinating Committee, Regional Hydrographic Commissions and Capacity Building. The Board took advantage of the presence of alumni of recognized programmes at LINZ to interact and gather feedback and experiences following their graduations.

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Provide guidance to training institutions

The IHO Secretariat provided training institutions and other inquirers with guidance regarding the recognition and provision of training and education, when requested. This most often occurred as a result of the preparation for the recognition review processes for the IBSC, and during the preparation of CB projects, as well as during seminars and RHC meetings.

Maintain IBSC Publications (C-6, C-47, S-5A/B and S-8A/B)

The Secretariat worked on the structure and information gathering to update the IHO Publications C-47 - *Training Courses in Hydrography and Nautical Cartography* and C-6 *Reference Texts for Training in Hydrography*. Both to be submitted to the IBSC when completed.

The IBSC completed the development and revisions of the standards, specifically the significant revision of S-5 - *Standards of Competence for Hydrographic Surveyors* and S-8 - *Standards of Competence for Nautical Cartographers* into a new framework of separate Standards: S-5A, S-5B, S-8A and S-8B *Standards of Competence for Category "A" and "B" Hydrographic Surveyors and Nautical Cartographers*. The revision process continued during the year by correspondence and through three working group meetings (Bandung, London and Singapore). The new Edition of S-5A entered into force on 1 January and Member States approved the new Editions of S-8A and S-8B that subsequently entered into force on 2 October.

Capacity Building Assessment

Technical and Advisory Visits

Execution of the technical and advisory visits planned in 2017 are summarized in the following table:

Nº	Activity	RHC	Implementation
1	Technical visit to Gambia	EAtHC	Led by France (Shom) 23-29 July 2017
2	High-level visit to Seychelles	NIOHC	Led by IHO Secretariat 8-12 May 2017
3	Technical implementation visits to Dominican Republic and El Salvador	MACHC	Led by IHO Secretariat with USA/NGA El Salvador on 4-7 December 2017 and Dominican Republic planned for 23-26 January 2018
4	Technical visit to Azerbaijan	MBSHC	Led by Turkey 11-15 December 2017
5	Technical visit to Cambodia	EAHC	Led by Malaysia 3-5 April 2017
6	Haiti follow-up visit	MACHC	Led by USA with Brazil and France 19-22 June 2017
7	Technical Visit to Cabo Verde	EAtHC	Led by France (Shom) with Portugal 27 March-1 April 2017

Capacity Building Provision

Raise awareness on the importance of hydrography

The IHO Secretariat continued to work on a schedule of visits to improve global awareness of hydrography, engage external stakeholders such as the United Nations, IMO, IALA, the European Commission, funding agencies, academia and industry in general. This included visits to high level authorities in several countries, participation in RHC meetings, participation in various seminars and conferences, and the active promotion of IHO activities in specialized magazines and journals.

- ***Revise M-2 – The Need for National Hydrographic Services***

The Edition 3.0.6 IHO Publication M-2 was not updated in 2017. The accession of new Member States in 2017 will be reflected in a future revision.

Technical workshops, seminars, short courses

Execution of the seminars, workshops and short courses planned in 2017 are summarized in the following table:

Nº	Events	RHC	Implementation
1	IHO-ROK Category "A" Programme	Secretariat	Led by USM, Hattiesburg, USA 1 August 2017-1 August 2018
2	ROK Category B Programme (third phase)	Secretariat	Led by KHOA, Busan, ROK 3-28 July 2017
3	IHO-Nippon Foundation CHART Project	Secretariat	Led by UKHO, Tauton, UK 4 September-15 December 2017
4	Training for Trainers - Basic Hydrography	EAHC	Led by KHOA, Busan, ROK 4-15 December 2017
5	MSI E-learning guided sessions.	EAtHC	CANCELED
6	MSI Course	MACHC	Led by UKHO, Barbados 26-30 June 2017
7	MSI Course	NIOHC	Led by UKHO, Fish Hoek, South Africa 5-7 September 2017
8	MSI Course	SAIHC	Combined with P-07
9	SW Pacific Region Industry Survey Project	SWPHC	CANCELED
10	MBES training for Fiji	SWPHC	POSTPONED
11	Seminar on Raising Awareness of Hydrography	MACHC	Led by UKHO, Varadero, Cuba 27-28 November 2017
12	HydroMOWCA study follow-up	EAtHC	Led by SHOM 5-9 March 2017/7-10 May 2017
13	Workshop on ENC production and distribution	MBSHC	Led by ONHO, Istanbul, Turkey 2-6 October 2017
14	E-learning on specifications for hydrographic surveys	EAtHC	CANCELED
15	Hydrographic Survey for Disaster Management and Relief	EAHC	Led by KHOA, Jakarta, Indonesia 11-15 September 2017
16	Bathymetry training course using RTK technology	SWAtHC	Led by DHN, Niteroi, Brazil 2-6 October 2017

Nº	Events	RHC	Implementation
17	Workshop on Bathy Database	SEPRHC	Led by CIOH, Lima, Peru 23-27 October 2017
18	Use of GNSS for tide correction for survey	EAHC	POSTPONED
19	Lidar and Satellite Derived Bathymetry Workshop	EAHC	Led by JHOD 30 January 2018 - 01 February 2018
20	Advanced Chart Production (Bangladesh)	NIOHC	Led by UKHO, Chittagong, Bangladesh 17-21 September 2017
21	Workshop offshore surveys (geophysical analysis and identification of seamounts)	SEPRHC	Led by CIOH, Cartagena, Colombia 23-27 October 2017
22	Digital Photogrammetry with satellite images	SWAtHC	Led by SHN, Buenos Aires, 30 October - 3 November 2017
23	Workshop on Technical Aspects of Maritime Boundaries	MBSHC	Led by ONHO, Istanbul, Turkey 27 November 2017 - 1 December 2017
24	Advanced Chart Production (Myanmar)	NIOHC	Led by UKHO, Yangon, Myanmar 21-25 August 2017
25	Solomon Islands Nautical Cartographer Development	SWPHC	CANCELED
26	Basic ENC & ENC Production	RSAHC	CANCELED
27	Data management WORKSHOP	SWAtHC	Led by SOHMA, Montevideo, Uruguay 20-24 November 2017
28	PNG Hydrographic Risk Assessment	SWPHC	CANCELED (NOT FUNDED)
29	Regional Course in Basic Hydrography and Hydrog. Governance for Lusophone Africa	EAtHC SAIHC	CANCELED (NOT FUNDED BY THE IMO)
30	Regional Seminar on Safety of Navigation in the South West Pacific	SWPHC	CANCELED (NOT FUNDED BY THE IMO)
31	GEBCO Training Project on Ocean Mapping	UNH	Led by UNH, Durham, USA August 2017-August 2018
32	E-learning experimentation (MSI) (former 2016 CBWP P-06)	EAtHC	Led by SHOM (DONE)

The IHO Secretariat, in conjunction with IBSC and CBSC, to encourage the development and delivery of new Hydrographic and Nautical Cartography Programs, including the establishment of new Hydrographic Schools where that regional capacity does not exist. Report to the IHO on the results. Through the work of the IBSC, CBSC and IHO Secretariat, new programmes continued to be developed as indicated by the new submissions to the IBSC concomitant with the re-submissions.

Likewise the IHO Secretariat, with the support of CBSC and RHCs, awareness of multilateral or bilateral projects with hydrographic and/or cartographic components, and to provide advice to governments, project managers and funding agencies on the importance of including a hydrographic Capacity Building Component. Report to IHO annually on the results obtained. The IHO Secretariat assisted in the development of several regional projects including in the South-West Pacific (liaison with Land Information New Zealand (LINZ)), the Caribbean region (liaison with The Organisation of Eastern Caribbean States (OECS) and with the UKHO) and the West African region.

Technical visits continued to be the principal way of identifying areas where bilateral agreements may help to further develop the provision of hydrographic services in order to help satisfy SOLAS V/9. The CBSC also approved CB Procedure 11 for the Assessment of the Capacity Building Phase Stage of Coastal States, which includes the status of bilateral agreements.

Coordination of Global Surveying and Charting

Publication C-55: Status of Hydrographic Surveying and Nautical Charting worldwide

During the report period the Secretariat received more updates and confirmations to the entries in C-55.

The following table lists the countries for which updates to existing C-55 entries were received in 2017:

IHO Member States	Non-IHO Member States
Algeria	Antigua and Barbuda
Argentina	Azerbaijan
Brazil	Bahamas
Cameroon	Barbados
Canada	Belize
Cyprus	Benin
Democratic People's Republic of Korea	Comoros
Denmark	Congo
Egypt	Côte d'Ivoire
Fiji	Djibouti
France	Equatorial Guinea
Georgia	Eritrea
Germany	Gabon
Greece	Gambia
Indonesia	Ghana
Jamaica	Guinea
Malta	Iraq
Morocco	Kazakhstan
Netherlands	Kiribati
New Zealand	Lebanon
Norway	Libya
Oman	Lithuania
Pakistan	Madagascar
Philippines	Mauritania
Portugal	Nauru
Seychelles	Niue
Singapore	Palau
Suriname	Saint Vincent & the Grenadines
Sweden	Senegal
Syria	Somalia
Ukraine	Sudan

IHO Member States	Non-IHO Member States
United Kingdom of Great Britain and Northern Ireland	Togo
United States of America	Tuvalu
Uruguay	
Vanuatu	
Viet Nam	

Updates for the Antarctic region were not provided in 2017.

The IHO Secretariat continued to update publication C-55 - *Status of Hydrographic Surveying and Nautical Charting Worldwide* based on the submissions received from Member States. The current edition of C-55 is generated from a database that is continuously updated as an online service accessed from the download section of the IHO website. The IHO Secretariat continued to investigate ways to display the current database in a GIS environment and to seek new ways to use geo-information to represent the status of surveys and charting around the world. A prototype is currently available to the Secretariat for trial.

RHC to coordinate ENC schemes, consistency and quality

In 2017, Ed. 3.0.0 of the IHO Publication S-11 Part A - *Guidance for the Preparation and Maintenance of International (INT) Chart and ENC Schemes* – was approved by the IHO Member States and issued. The new Edition incorporates guidance relating to the preparation and maintenance of ENC schemes. RHCs 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. With the support provided by the RENCs (IC-ENC and PRIMAR), these topics are considered at every meeting of the WENDWG.

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

The purpose of the IHO INT chart series is to define and produce a set of medium and large-scale charts that are specifically designed for planning, landfall and coastal navigation and access to ports used by ships engaged in international trade. The designation of the limits and scale for each INT chart and the designation of which country will be the primary producer of each INT chart are managed by the relevant RHC.

As a result of the operational use of the INToGIS web services by most of the charting regions, the S-11 Part B (Catalogue of INT Charts) database quality increased significantly in 2017. The following table summarizes the status of the INT chart scheme at the end of 2017, according to the new S-11 Part B INT Chart Web Catalogue:

Region	Coordinator	Commission	Scheduled	New publications reported in 2017	Published Total	Regional Database Version
A	USA/NOS	USCHC	15	0	15	3.0.0
B	USA/NOS	MACHC	82	2	49	3.0.1
C1	Brazil	SWAtHC	51	1	36	3.0.2
C2	Chile	SEPRHC	44	0	7	3.0.0
D	UK	NSHC	217	2	217	3.0.5
E	Finland	BSHC	302	2	292	3.0.8
F	France	MBSHC	248	4	172	3.0.3

Region	Coordinator	Commission	Scheduled	New publications reported in 2017	Published Total	Regional Database Version
G	France	EAtHC	172	1	141	3.0.3
H	South Africa	SAIHC	125	6	99	3.0.4
I	Iran (I.R of)	RSAHC	143	0	100	3.0.1
J	India	NIOHC	172	2	144	3.0.2
K	Japan	EAHC	294	0	240	3.0.0
L	Australia	SWPHC	67	6	62	3.0.2
M	UK	HCA	117	4	84	3.0.4
N	Norway	ARHC	12	1	9	3.0.1
1 :10 Million	IHO Sec.		25	0	24	3.0.0

Total of INT charts scheduled: 2086

Total of INT charts produced in 2017: 32 (1.5% of the total scheduled)

Total of INT charts published by end 2017: 1691 (81.0% of the total scheduled)

In August 2015, a two-year trial procedure for the review of new INT charts, to be implemented by the relevant Regional INT Chart Coordinators, was decided. In order to support the work of the Chart Coordinators, a "*basic quality assurance check-list for review of INT charts*" was prepared by the IHO Secretariat in liaison with the NCWG. Following this experimentation, amendments to existing related IHO Resolutions for the *Monitoring of INT Charts* were proposed and endorsed in 2017, by the IRCC and the IHO Council.

Maritime Safety Information

Conduct Meetings of the World-Wide Navigational Warning Service Sub-Committtee (WWNWS)

The 9th meeting of the WWNWS-SC (WWNWS9) was hosted by the South African Navy Hydrographic Office and held at the Park Inn, Newlands, Cape Town, South Africa, from 28 August to 1 September under the chairmanship of Mr Peter Doherty of the United States of America. Commander Christoff Theunissen, acting Hydrographer of South Africa, welcomed the meeting which was attended by 51 delegates from twenty-one IHO Member States, the Secretariat of the World Meteorological Organization (WMO), the Secretariat of the International Mobile Satellite Organization (IMSO), the Chairs of IMO NAVTEX and International SafetyNET Coordinating Panels, Inmarsat, Iridium, South African Maritime Safety Agency (Maritime Rescue Coordination Centre) (SAMSA (MRSCC)), Security of Navigation, Stabilisation, Advice and Training (including AWNIS) (SONSAT), Telkom Maritime Radio and the IHO Secretariat. The delegates included representatives of nineteen NAVAREA Coordinators, one Sub-Area Coordinator and five National Coordinators. The IHO Secretariat was represented by Assistant Director David Wyatt.

The Sub-Committee reviewed the WWNWS documentation prepared at the 15th meeting of the Document Review Working Group (DRWG), received MSI self-assessment reports, and assessed the MSI Capacity Building training courses delivered during the year. The delegates received a number of briefings on developments in the provision of mobile satellite Global Maritime Distress and Safety System (GMDSS) services.

Two long serving members, Mr Alain Rouault (France), 7 years, and Mr Svante Håkansson (Sweden), 20 years, informed the meeting that they would be standing down from their positions as NAVAREA II and Sub-area Ib respectively and retiring. Mr Peter Doherty, USA, was re-elected as Chair for the period 2017 to 2020 and Mr Trond Ski, Norway, was elected as vice-Chair.

WWNWS Document Review Working Group, Maintain and extend the following IHO standards, specifications and publications: S-53 and relevant IHO Resolutions in M-3

The WWNWS relies on various IMO/IHO documents to provide guidance for the promulgation of internationally coordinated NAVAREA and Coastal warnings, including the SafetyNET and NAVTEX systems, which each have their own guidance document.

The Document Review Working Group (DRWG) met in the week after the fourth session of NCSR and commenced editorial amendments to the IMO Resolutions A.705(17), as amended - *Promulgation of Maritime Safety Information*, and A.706(17), as amended - *World-Wide Navigational Warning Service*, The outcomes of NCSR4 relevant to the WWNWS-SC were reviewed. The proposed future editorial amendment cycle to the MSI documentation was discussed, noting the need to take into account the proposed amendments to the SOLAS Convention, the outcomes of the Modernization of the GMDSS and the expected recognition of Iridium as a mobile satellite service provider in the GMDSS.

It was decided at WWNWS9 that the 16th meeting of the Document Review WG ((DRWG16) will continue the review of the IMO resolutions A705(17), as amended, and A706(17), as amended, and prepare proposed amendments for consideration at WWNWS10 in 2018 and subsequent submission to NCSR6 in 2019. At the same time the Joint IMO/IHO/WMO Manual on MSI would be reviewed in coordination with the International SafetyNET Manual and the IMO NAVTEX Manual. It was agreed that Inmarsat would provide proposed amendments to the Inmarsat SafetyNET Users' Handbook for consideration at DRWG16. Iridium agreed to continue to develop appropriate documentation to support its proposed GMDSS service.

Liaise with IMO and WMO on the delivery of MSI within the GMDSS

The WWNWS-SC, with support from the IHO CB Programme, continued to deliver its comprehensive training course that provides practical guidance to relevant authorities in countries that are drafting navigational warnings or broadcasting MSI. The Sub-Committee received updated information on the delivery of MSI training. The meeting was informed that MSI courses had been conducted in 2017 in Barbados for members of the Meso-American and Caribbean Hydrographic Commission (MACHC) and in Fish Hoek, South Africa, for members of the North Indian Ocean Hydrographic Commission and the Southern African and Islands Hydrographic Commission.

A critical issue for the continued success of the MSI course was the availability of qualified trainers; the Chair noted the only French instructor was due to retire at the end of October 2017 and the lack of Spanish speaking instructors meant that the course can only be delivered in English at present.

The WWNWS-SC reviewed the relevant matters considered and decisions taken during the 97th session of the IMO Maritime Safety Committee (MSC97) and the fourth session of IMO NCSR. The contents of the relevant Annexes of the Master Plan on the modernization of GMDSS were reviewed.

Improve the delivery and exploitation of MSI to global shipping by taking full advantage of technological developments

WWNWS9 considered self-assessment reports from all 21 NAVAREAs. There was a pleasing high level of consistency of service described in all of the reports. A number of issues were highlighted, which required further investigation.

The Secretariat of the WMO provided a comprehensive brief on the activities of the Organization over

the past year, which included the work of the six regional associations and working groups and their activities, the continuous emergency response capability, the activities of the regional training and global training centers, as well as the preparations for the 5th meeting of Joint Commission on Oceanography and Marine Meteorology (JCOMM-5).

The Secretariat of IMSO provided a presentation on the activities of IMSO and an update on the technical assessments of the Iridium system and the Inmarsat Fleet Broadband system as they seek recognition as new GMDSS mobile satellite service providers.

The Chair of the IHO S-124 Correspondence Group updated the Sub-Committee on the progress in the development of the S-124 Navigation Warning Product Specification based on S-100. NAVAREA XIV highlighted that the transfer of responsibility for MSI from Land Information New Zealand (LINZ) to Rescue Coordination Centre New Zealand (RCCNZ) had been completed. NAVAREA XIV also provided a live demonstration of the systems in use for assessing and processing information by operations room personnel to help decision making and the issuing of warnings.

Ocean Mapping Programme

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 (GGC) 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 Undersea Feature Names (SCUFN), a Sub-Committee on Regional Undersea Mapping (SCRUM), and a Nippon Foundation/GEBCO Training Project Management Committee. Additional ad hoc working groups are convened as necessary. Through the work of its 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. The progress of the GEBCO Project is reported below.

A series of meetings related to the IHO-IOC GEBCO (General Bathymetric Chart of the Oceans) project were held in Busan, Republic of Korea from 13 to 17 November:

- 13 and 14 November: Joint meeting of the Technical Sub-Committee on Ocean Mapping (TSCOM), the Sub-Committee on Regional Undersea Mapping (SCRUM) and the Outreach Working Group (OWG);
- 15 November: GEBCO Symposium; and
- 16 and 17 November: 34th Meeting of the GEBCO Guiding Committee (GGC).

The IHO Secretariat was represented at the joint TSCOM, SCRUM and OWG meeting by Assistant Directors Anthony Pharaoh and David Wyatt who were joined by Director Mustafa Iptes for the GEBCO Symposium and the meeting of the GGC.

GEBCO Symposium

For the eleventh consecutive year, the GEBCO project organized a symposium, formerly the "GEBCO Bathymetric Science Day" on the theme of 'Map the Gaps'. The symposium, which included poster sessions and contributions from a broad spectrum of institutions involved in all aspects of ocean mapping, featured 24 presentations on a diverse range of topics.

Director Iptes addressing the GEBCO Symposium

Conduct meetings of relevant GEBCO bodies

- ***GEBCO Guiding Committee***

The majority of the IHO representatives on the GEBCO Guiding Committee were present with only Rear Admiral Patricio Carrasco (Chile) and Dr Graham Allen (United Kingdom) who were unable to attend. Representatives of Canada, France, Germany, Israel, Japan, Republic of Korea, United Kingdom, USA, IOC and IHO attended the meeting as observers as well as a representative from Fugro as an expert contributor.

The Chair, Mr Shin Tani (IHO - Japan), introduced the agenda and programme. The GGC received brief reports from its Sub-Committees and Working Groups and endorsed the work which they had undertaken. The GGC also received reports from key personnel performing functions on behalf of GEBCO as well as reports from its parent bodies - IHO and IOC, on activities since the previous meeting.

The Chair of the Sub-Committee on Undersea Feature Names (SCUFN) highlighted the number of members who were reaching the end of their terms and the challenge of finding suitably qualified replacements. He presented proposed revision to the SCUFN Terms of Reference (ToRs) and Rules of Procedure (RoPs), which were aimed at clarifying the procedures for future meetings. The GGC did not approve the amendments and advised the Chair SCUFN to continue to operate under the current ToRs and RoPs with an option to review the situation prior to the next GGC meeting.

Participants of the GEBCO Guiding Committee-34 meeting

The GGC discussed outreach and ways to raise the profile of the GEBCO project among the different stakeholder and user communities including the IHO and the IOC Member States, the maritime and scientific community and the general public. It was noted that different strategies would be required for each of these groups and that it was a key component of the GEBCO activities, which involved and influenced all aspects of the future of the GEBCO Project. The GGC agreed to elevate the status of the Outreach Working Group (OWG) to a new Sub-Committee in order to reflect the importance of external relations and communications. It was agreed that revised ToRs and RoPs should be drafted along with a new communications strategy. The GGC devoted considerable time to discussions on the Seabed 2030 Project, including its structure, governance, oversight and reporting. The Seabed 2030 Project Establishment Team requested GGC endorsement to continue the development of the project, including the selection of a Project Director and the necessary structure to oversee the project.

The GGC also reviewed its current financial situation in relation to proposed planned projects. The Committee addressed the budget submissions from its subordinate bodies and approved revised allocations to ensure a contingency balance of 13,000 € was maintained for 2018 to cover emergent items. The IOC confirmed the annual allocation of 10,000 € to the GEBCO Project and it was agreed that this should be used to commence work on upgrading and improving the GEBCO website. The draft consolidated GEBCO Work Plan and budget will be reported to the 10th meeting of the IHO Inter-Regional Coordination Committee (IRCC) and the 51st meeting of the IOC Executive Council, for consideration and endorsement.

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

TSCOM, SCRUM and OWG in plenary session

P-7

The joint meeting of TSCOM-SCRUM was co-chaired by Dr Karen Marks (USA), Chair of TSCOM, and Dr Vicki Ferrini (USA), Chair of SCRUM.

Update reports were provided on the following regional mapping projects: Indian Ocean Bathymetric Compilation (IOBC), North Atlantic Seabed Mapping Project, International Bathymetric Chart of the Arctic Ocean (IBCAO) and International Bathymetric Chart of the Southern Ocean (IBCSO).

The participants considered in detail the proposed Seabed 2030 Project. The Seabed 2030 Project Establishment Team presented the activities undertaken during the period since GGC33, which were discussed in detail during the breakout sessions. A number of challenges and gaps were identified, which needed further investigation. It was recognized that the relationship with the GGC and with other bodies required refinement. Professor Hyo Hyun Sung, Chair of the OWG, presented a detailed update on activities, initiatives and considerations and during the subsequent discussions the participants discussed ways to expand the communications beyond the education focus and how the OWG should support and complement the Seabed 2030 project.

- ***Sub-Committee on Undersea Feature Names (SCUFN)***

The 30th meeting of the IHO-IOC GEBCO Sub-Committee on Undersea Feature Names (SCUFN) was hosted by the *Istituto Idrografico della Marina* (IIM), in Genoa, Italy, from 2 to 6 October.

SCUFN is tasked with the determination of the names of undersea features to appear in the products of the IHO-IOC General Bathymetric Chart of the Oceans (GEBCO) project and on international nautical charts. These names, also widely used in scientific publications, are made available in the GEBCO Gazetteer of Undersea Features Names (www.gebco.net → Data and products → Undersea feature names → view and download). The meeting, chaired by Dr Hans Werner Schenke (IOC representative) from the Alfred Wegener Institute for Polar and Marine Research (AWI – Germany), was attended by 26 participants, which consisted of nine of the 12 SCUFN members (four IOC and five IHO representatives), four members of the SCUFN Project Team on Undersea Feature Names (UFN PT) and 11 observers, including Mr Shin Tani (Chair of the GEBCO Guiding Committee) and Mr Tetsushi Komatsu (IOC Secretariat). Assistant Director Yves Guillam (SCUFN Secretary) and Project Officer Atilio Aste (Seconded Officer from Peru) represented the IHO Secretariat.

The meeting was opened by Captain Luigi Sinapi, Director of the IIM, who welcomed all the participants and stressed that SCUFN work is very important and strategic in order to support not only the GEBCO maps and other GIS products, but also the GEBCO Seabed 2030 project, aiming to develop a new global high resolution map of the oceans. The Chair of SCUFN introduced a new SCUFN Member: Mr Felix Frias Ibarra (Mexico, IOC representative). In accordance with the SCUFN Terms of Reference, the Secretary informed the meeting of eight anticipated changes to the membership due to occur after the meeting and mainly in 2018. He presented the timeline for the IHO and IOC Secretariats to prepare calls for nominations to fill vacancies, drawing the attention on the need to balance continuity and renewal in the selection process.

The Sub Committee considered new proposals for 113 undersea feature names, submitted by various bodies and supporting organizations from Brazil (9), China (41), Japan (36), Republic of Korea (4), Republic of Palau (17), New Zealand (2) and USA (4). The Sub Committee pursued the fast-track procedure in its review for the new proposals made by New Zealand (7) related to names that already appear on nautical charts. Finally, the Sub Committee considered the report from the New Zealand Geographic Board on the outcome of previous fast-track proposals, evaluated (10) or submitted (23) in 2016 at SCUFN29.

In addition to consideration of the naming proposals, the Sub Committee considered several "corporate" issues, including:

- The endorsement of an amendment to the SCUFN Rules of Procedure that will be submitted for approval by the GEBCO Guiding Committee at its 34th meeting,
- Benefits of participating on a more regular basis in the Sessions of the United Nations Group of Experts on Geographical Names (UNGEGN),
- Cooperation between Marine Regions, SCUFN and UFN PT to de-conflict naming and positions between different sources and contribute to the UFN data modelling,
- Development of a preliminary test case of the current IHO Geospatial Information Registry using the UFN Data Motel (S-57) taking into account the current concept definitions in force in Ed. 4.1.0 of Publication B-6 - *Standardization of Undersea Feature Names (Guidelines, Proposal Form, Terminology)*,
- Preparation of Ed. 4.2.0 of Publication B-6, which will include the integration of the fast-track procedure for existing names which are already charted and improvements of the proposals submission in digital format (geometry, additional maps, etc.),
- The current and future status of the maintenance and improvement of the GEBCO Gazetteer interface by the National Oceanic and Atmospheric Administration (NOAA) of the United States,
- The development of a prototype on integrated SCUFN web services and database by the Republic of Korea,
- The increasing resources needed to incorporate SCUFN naming decisions into the GEBCO Gazetteer and the fact that this can only be achieved by contracting out some work during the inter-sessional period.

Finally, the SCUFN Generic Term Group was also invited to prepare for the next meeting, a "straw man" paper proposing a general strategy and possible guidelines defining the optimal horizontal resolution between undersea features that are eligible for naming. The aim is to rationalize the naming process in some areas, to better manage the number of internationally-recognized features named while new technologies offer more possibilities, limit the clutter in mapping, and improve consistency with associated existing features.

Participants of the SCUFN-30 meeting

Ensure effective operation of IHO Data Centre for Digital Bathymetry (DCDB)

Since its inception, the IHO Data Centre for Digital Bathymetry (DCDB) has become a prominent repository of digital oceanic bathymetry and is used by IHO Member States and other ocean science communities. The IHO DCDB facility is generously hosted and operated by the National Oceanographic and Atmospheric Administration (USA) on behalf of the IHO Member States.

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/filtered via a web map interface, and freely downloaded. The map interface can be accessed from: http://maps.ngdc.noaa.gov/viewers/bathymetry/.

Conduct meetings of the Crowdsourced Bathymetry Working Group (CSBWG)

- ***Crowdsourced Bathymetry***

As a result of Decision 8 of the EIHC-5, the IRCC established a Crowdsourced Bathymetry Working Group (CSBWG) at its seventh meeting.

The Crowdsourced Bathymetry Working Group (CSBWG) has been tasked by the Inter-Regional Coordination Committee (IRCC) to develop an IHO publication that provides guidance on the collection and use of Crowdsourced Bathymetry (CSB). This document will provide guidelines and advice on various considerations that should be taken into account when collecting CSB data for inclusion in the global bathymetric data set which is maintained in the IHO Data Centre for Digital Bathymetry (DCDB).

The working group held its fourth meeting at the Center for Coastal and Ocean Mapping & NOAA/UNH Joint Hydrographic Center University of New Hampshire, Durham, United States on 13 and 14 February. The Chair of the CSBWG, Ms Jennifer Jencks (USA, Director of the DCDB), chaired the meeting which was attended by representatives from six Member States (Canada, Italy, Nigeria, Norway, Philippines and USA), and observers and expert contributors from GMATEK, Inc./World Maritime University and Sea-ID. Secretary-General Robert Ward and Assistant Director David Wyatt represented the IHO Secretariat.

Participants of the 4th meeting of the CSBWG between sessions

The CSBWG received verbal reports from the coordinators of its correspondence groups that had been tasked with drafting specific sections of the Guidelines. During the meeting the various draft sections of the guidelines were developed further. The first draft Guidelines was presented to the IRCC at its 9th meeting in Paramaribo, Suriname, in June 2017. The IRCC endorsed the first draft, which was issued for comments of the member States and stakeholders.

The working group held its fifth meeting at the Secretariat of the International Hydrographic Organization, Monaco, on 5 and 6 December. In the absence of the Chair of the CSBWG, Ms Jennifer Jencks (USA, Director of the DCDB), the Vice-Chair, Mr Serge Gosselin (Canada), chaired the meeting which was attended by representatives from eight Member States (Canada, Denmark, France, Italy, Nigeria, Norway, Portugal, UK and USA), and observers and expert contributors from the Baltic and International

Maritime Council (BIMCO) and Sea-ID. Secretary-General Dr Mathias Jonas, Director Mustafa Iptes and Assistant Director David Wyatt (Secretary) represented the IHO Secretariat.

During the meeting the various draft chapters of the guidelines were developed further, taking into account the feedback received in response to IHO Circular Letter 49/2017. The final draft version of the B-12 Guidelines was made available on the IHO website prior to the presentation to the IRCC at its 10th meeting in Goa, India, in June 2018. Subject to the endorsement of the IRCC, this will be followed by consideration by the IHO Council at its 2nd meeting and submitted for adoption by the IHO Member States towards the end of 2018. The participants also considered the future tasks which could be addressed by the WG in response to the discussions undertaken by IHO member States at Assembly-1 and Council-1 and initial proposed draft revisions to the ToRs were developed for further consideration.

It was agreed that that the Chair, Vice-Chair, Editor and chapter leads should meet to coordinate the final proofing of the document to be submitted to IRCC10, immediately after the Canadian Hydrographic Conference in Vancouver.. It was further agreed that the next meeting of the working group should progress the work in preparing Edition 2.0.0 and review the outcomes of IRCC10 with respect to Council-1 instructions on expanding the scope of the tasks to be undertaken by the CSBWG.

- ***Encourage the contribution of bathymetric data to the IHO DCDB***

The GEBCO Ocean mapping programme is dependent upon the availability of bathymetric data and undersea feature information. In order to achieve its goals, GEBCO proactively collects, stores and disseminates bathymetric data for the world's oceans. GEBCO has worked towards improving its participation in regional mapping activities and has also appointed representatives to participate in selected RHC meetings.

Traditionally GEBCO has focused on areas deeper than 200 m, however, it is now actively collecting data in shallow water areas to support activities such as coastal zone management and the mitigation of seaborne disasters such as storm surges and tsunami inundation. IHO Member States are encouraged to contribute bathymetric data in shallower coastal areas to support the production of higher resolution gridded data products.

Maintain IHO bathymetric publications

- ***B-4 - Information concerning recent bathymetric data***

The IHO DCDB is a recognized international repository for all deep ocean bathymetric data (greater than 100 m) collected by hydrographic, oceanographic and other vessels. It has also received significant contributions of crowdsourced bathymetric data. These data can be viewed from: https://maps.ngdc.noaa.gov/viewers/csb/ and http://maps.ngdc.noaa.gov/viewers/bathymetry/.

The DCDB data are publically available and used for the production of improved and more comprehensive bathymetric maps and grids, particularly in support of the GEBCO Ocean Mapping Programme.

The DCDB has been working with the private sector to provide a facility for mariners to log bathymetry (position, depth, and time) data using their Electronic Chart Systems, and forward this data to DCDB. Crowdsourced Bathymetry can be provided in GeoJSON format, amongst others.

- ***B-6 - Standardization of undersea feature names***

Edition 4.1.0 of Publication B-6 on the Standardization of Undersea Feature Names entered into force in September 2013. It provides guidelines for naming features, a naming proposal form and a list of generic terms with definitions. A draft new Edition of B-6 was developed through contract support to include the outcome of the work done by the SCUFN Generic Term Sub-group and some editorial corrections. The SCUFN agreed to put on hold the preparation of the new Edition, due to the development and experimentation of the fast-track procedure for already-charted existing features. The sub-committee decided to consider further any short term requirements for clarifications.

In order to address the need to harmonize under the S-100 framework the undersea feature names definitions that already exist in B-6, in the Feature Concept Dictionary of the IHO GI Registry, in the S-57 Feature Catalogue and in the IHO Hydrographic Dictionary S-32, the SCUFN developed a proposal to create an Undersea Feature Names Project Team (UFNPT). Following its endorsement by the HSSC, the establishment of the project team was initiated in 2017.

- ***B-8 - GEBCO Gazetteer of Undersea Feature Names***

The database of the on-line GEBCO Gazetteer of Undersea Feature Names, developed by the IHO DCDB (co-located at one of the US National Centers for Environmental Information (NCEI)), was maintained by the IHO Secretariat through contract support. Some maintenance issues and the requirements for possible upgrades were further investigated.

- ***B-9 - GEBCO Digital Atlas***

IHO publication B-9 - *GEBCO Digital Atlas* (GDA) is a two-volume DVD and CDROM set which contains: the GEBCO global bathymetric grid at 30 arc-second intervals; the GEBCO One Minute Grid global bathymetric grid, a global set of digital bathymetric contours and coastlines, the GEBCO gazetteer of undersea feature names and a software interface for viewing and accessing the data sets. The GEBCO grids are generated by combining quality-controlled ship depth soundings with depth interpolations between sounding points guided by satellite derived gravity data. The grid is available for download from the GEBCO website. No update was issued in 2017.

- ***B-11 - GEBCO Cook Book***

The GEBCO Cook Book (IHO publication B-11) is a technical reference manual that has been developed to assist and encourage participation in the development of bathymetric grids. It is an important GEBCO reference document that is used by academic institutions and hydrographic organizations. The Cook Book covers a wide range of topics such as data gathering, data cleaning, examples of gridding, and provides an overview of different software applications used for producing bathymetric grids.

The Cook Book was first released as IHO Publication B-11 in April 2012 and as an IOC guide document in October 2012. No updates/revisions were made to the publication in 2017.

Contribute to outreach and education about ocean mapping

GEBCO continues to promote the importance of bathymetric data to the international community.

The GEBCO Outreach Working Group considered how to improve the GEBCO website in order to make ocean mapping more interesting / enticing for scholars and students. The WG discussed what content could be added to make it a valuable resource for student projects, and considered how this could be harmonized with Seabed 2030 Project developments. It was highlighted that the communications strategy was the overall priority for GEBCO and it was recommended that a short strategy document be developed to provide guidance of how to take forward the identified tasks, the immediate priorities of which were listed as: branding clarity, web page design, web page implementation, social media strategy/implementation/engagement and outreach strategy.

In addition, the IHO-IOC GEBCO Cook Book continues to be used as an important educational resource for ocean mapping students.

GEBCO Website kept current and updated regularly

The GEBCO website provides access to information about GEBCO's products, services and activities. The website can be viewed at http://www.gebco.net.

GEBCO bathymetric maps and data sets can be downloaded from the website. These continue to be accessed by a wide user community that includes commercial and academic sectors and the general public.

The GEBCO website also provides access to the world grid via a Web Map Service (WMS). The GEBCO's website has been maintained and updated on behalf of GEBCO by the British Oceanographic Data Centre (BODC) since July 2008.

Marine Spatial Data Infrastructures

This element addresses the developments related to the hydrographic component of Spatial Data Infrastructures (SDI), the maintenance of the relevant IHO publications, and the provision of technical advice as appropriate. Thirty-three representatives from 28 Member States and eleven Expert Contributors participated in this activity during the period of this report.

Conduct meetings of the Marine Spatial Data Infrastructures Working Group (WMSDIWG)

The Marine Spatial Data Infrastructures Working Group (MSDIWG) supports the IHO work programme activities related to Spatial Data Infrastructures (SDI) and/or Marine Spatial Data Infrastructures (MSDI), monitors SDI activities and trends and promotes the use of IHO standards and Member States' marine data in SDI activities. The MSDIWG is also tasked to liaise with other relevant bodies to increase awareness of marine spatial data, to identify ways for the IHO to contribute to the development of SDI/MSDI in support of Member States, to identify possible solutions to any significant technical issues related to interoperability between maritime and land based inputs to SDI and to identify any IHO capacity building requirements related to MSDI.

The eighth meeting of the MSDIWG took place in Vancouver, Canada, hosted by the Canadian Hydrographic Service (CHS), from 31 January to 2 February, preceded by a meeting of the Open Geospatial Consortium (OGC) Marine Domain Working Group (Marine DWG). The meeting was chaired by Mr Jens Peter Hartmann (Denmark). Thirteen delegates from nine Member States (Argentina, Brazil, Canada, Denmark, Germany, Malaysia, Republic of Korea, United Kingdom and United States) and eight observers and expert contributors from the OGC, Global Spatial Data Infrastructure Association (GSDI), Teledyne Caris, ESRI, IIC Technologies and OceanWise attended the meeting. Assistant Director Alberto Costa Neves represented the IHO Secretariat.

Participants of the 8th MSDIWG Meeting

The meeting was informed of the conclusions drawn from the CHS survey on Member States' MSDIs, and in particular those observations related to the preparation of metadata and to governance. The meeting then considered the best ways to help Member States and Regional Hydrographic Commissions (RHCs) to further develop their MSDIs. The meeting also agreed to seek funding for the development of a Common Operating Picture in collaboration with the OGC and GSDI. The need for more in-depth feedback from Member States through the RHCs was considered fundamental for the MSDIWG to identify the means to support the objectives of the IHO, to provide examples of the benefits of MSDI and the drawbacks of not having such a system in the near future.

Participants were informed of progress on the draft edition 2.0.0 of IHO Publication C-17 - *Spatial Data Infrastructures: "The Marine Dimension" - Guidance for Hydrographic Offices* and considered ways of keeping it up to date and relevant. The meeting invited the OGC Marine DWG to consider preparing a conceptual model for MSDI as well as a concept note addressing the impact of the "cloud" concept.

Member States' national reports informed the meeting on the developments related to MSDI pilot projects intended to demonstrate the feasibility of a national MSDI, how best capture consistent metadata, data formats and visualization, the development of applications that support different users, the organization of a consistent policy and governance framework and the development of national geoportals and web services. Most participants highlighted an increase in awareness of the value of geospatial data and the trend towards data-centric services, rather than focusing on products; and the need to educate national agencies on how best to organize their databases.

The meeting was informed of the developments of regional MSDI, and in particular the one covering the Arctic region. This reflected the contribution of Member States to the establishment of a regional MSDI using open data and standards for interoperability of dependable geospatial data for the benefit of the wider community. Participants were informed about the Ecological Marine Units (EMU), smart telemetry as part of an MSDI, the use of variable resolution surfaces for improving efficiency when handling big data, and other developments in the Baltic and North Seas, EMODnet, and the marine cadaster.

An updated MSDIWG Work Plan for 2018-2020 was produced to reflect the actions and tasks agreed at the meeting that are required to achieve the objectives set for the MSDIWG by the IRCC. The meeting was also informed of the improvements to the IHO website with an updated GIS layer to display examples of SDI and MSDI around the world, currently available at the MSDIWG web page.

- **Open Geospatial Consortium - Marine Domain Working Group (OGC - MDWG)**

The 8th meeting of the MSDIWG was preceded by a meeting of the OGC Marine DWG (30 January) attended by over 22 people and hosted by the CHS and the OGC. In accordance with its usual practice in the OGC, the Marine DWG has three Co-Chairs (Teledyne Caris, USA-NGA and UKHO) who together provide a strong hydrographic background. The meeting was informed of the established Memorandum of Understanding between the IHO and the OGC and its key elements that stress coordination in relation to common standards, best practices, lessons learned, future developments and engagement with stakeholders.

The meeting considered the content of a possible conceptual model for an MSDI, the types of OGC services that might be useful in the exchange of hydrographic and seafloor survey data such as chart features and high resolution bathymetric coverage through standardized interfaces, the mechanisms for identifying parameters that would benefit from further standardization and the creation of the relevant Standards Working Groups to address the gaps in the existing OGC, IHO and International Association of Oil and Gas Producers (IOGP) standards baseline.

Participants discussed the potential for interoperability pilots and testbeds that would help to define the workflows and infrastructure necessary to ensure that marine geospatial data can be used for purposes other than navigation. The presentations delivered during the meeting will be made available by the OGC in an open website and the link will be available in the MSDIWG webpages.

The MSDIWG developed a draft edition 2.0.0 of the IHO Publication C-17 *Spatial Data Infrastructures: "The Marine Dimension" - Guidance for Hydrographic Offices*. The draft was endorsed by IRCC9 and by the 1st meeting of the IHO Council and then submitted to the member States for approval.

The MSDIWG continued to maintain the following syllabi for MSDI and associated learning subjects:

- *Syllabus for MSDI orientation, Syllabus for Fundamentals of a Marine Spatial Data Infrastructure (MSDI)*,
- *Syllabus for Database Design,*
- *Data Management and MSDI for Practitioners*, and
- *Syllabus for Marine Spatial Data Infrastructure (MSDI) for Managers*.

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New and Revised IHO Publications

The following new IHO publications or revised editions were issued during 2017 and are available from the IHO website.

DATE	Announced Via CL	TITLE
02/05	32	**S-100** – Adoption of Edition 3.0.0 - IHO Publication: *Universal Hydrographic Data Mode*l
03/05	34	**P-7** - IHO Publication: *Annual Report of the IHO for 2016*
09/06	36Rev1	**S-65** - Adoption of the Edition 2.1.0 of IHO Publication: *Electronic Navigational Charts (ENC's) "Production, maintenance and distribution guidance"*
22/05	37	**S-58** – Adoption of Edition 6.0.0 of IHO Publication: *ENC Validation Checks*
19/06	41	**S-11 Part A** – Adoption of Edition 3.0.0 of IHO Publication: *Guidance for the preparation and maintenance of International (INT) Chart and ENC Schemes*
23/06	42	**S-4** – Adoption of Revision 4.7.0 of IHO Publication: *Chart Specifications of the IHO*
1/07	Clarification Version	**S-52 (Annex A to)** – Clarification version of IHO Publication: *IHO ECDIS Presentation Library Edition* – October 2014 with clarifications Edition 4.0(.2)
1/07	Clarification Version	**S-64** – Clarification version of the IHO Publication: *IHO Test Data Sets for ECDIS* Edition 3.0(.2)
22/08	48	**P-6** – IHO Publication: *Report of Proceedings of the 1st Session of the IHO Assembly*
02/10	54	**S-8A** – Adoption of Edition 1.0.0 of IHO Publications: *Standards of Competence for Category "A" Nautical Cartographers*
		S-8B – Adoption of Edition 1.0.0 of IHO Publications: *Standards of Competence for Category "B" Nautical Cartographers*
01/12		**S-11 Part B** – Edition 3.0.35 of IHO Publication: *International Chart Web Catalogue*

NB: The following publications are continuously updated:

- B-8 - Gazetteer of Geographical Names of Undersea Features
- C-55 - Status of Hydrographic Surveying and Nautical Charting Worldwide
- P-5 - IHO Yearbook
- S-32 - Hydrographic Dictionary
- S-62 - List of Data Producer Codes

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Status Report on Performance Monitoring (2017)

Background

The introduction of IHO performance indicators was firstly decided in 2009 by the 4th Extraordinary International Hydrographic Conference (EIHC-4), together with the adoption of the IHO Strategic Plan. The revised performance indicators was endorsed in 2017 by the 1st IHO Assembly (A-1), together with the adoption of the new IHO Strategic Plan-2017, which are provided at Table 1.

The implementation of performance indicators is described in the IHO Strategic Plan as follows:

The implementation of Performance Indicators is based on a two level approach. *Strategic* level PIs are established by the Assembly as a *top down* process, and *working* level PIs are established by the HSCC and IRCC and their subordinate bodies as a *bottom up* process:

- **Strategic Level PIs (SPIs):** a small number of PIs associated with the objectives of the IHO (1 or 2 SPIs per objective), to be agreed by the Assembly and managed by the Secretary General and the Council;
- **Working Level PIs (WPIs):** PIs associated with the Strategic Directions to be agreed and managed by the HSSC and IRCC and their subsidiary organs.

In this perspective cross-references between the objectives, the Strategic Directions and the PIs are arranged in the following way:

Objectives => Strategic PIs => Strategic Directions => responsible organs => working level PIs

NOTE: The 1st IHO Assembly (A-1) tasked the Council to conduct a comprehensive review of the Strategic Plan and to provide a draft revised Plan, as appropriate, in time for the consideration of the 2nd ordinary session of the Assembly (A-2). The Council was empowered to establish a working group for this discrete purpose. Accordingly, the Council at its first meeting in October 2017 decided to establish the Strategic Plan Review Working Group (SPRWG) which will also review the current Performance Indicators indicated at Table 1, together with Strategic Plan. In this respect, **the implementation of Performance Indicators are pending status and subject to outcome of the SPRWG**.

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Table 1

STRATEGIC PERFORMANCE INDICATORS

(Pending status and subject to outcome of the SPRWG)

Objective	Strategic PIs		Reporting Period	Related Strategic Directions
a. To promote the use of hydrography for the safety of navigation and all other marine purposes and to raise global awareness of the importance of hydrography.	**SPI 1**	Number and percentage of Coastal States providing ENC coverage directly or through an agreement with a third party. (Previous year figures in brackets)	Yearly	1.5; 2.5; 3.1; 3.2; 3.3; and 3.4
b. To improve global coverage, availability and quality of hydrographic data, information, products and services and to facilitate access to such data, information, products and services.	**SPI 2**	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.	Quarterly	2.1; and 4.2
	SPI 3	Percentage of Coastal States which provide hydrographic services, directly or through an agreement with a third party, categorized by CB phases, as defined by the IHO Capacity Building Strategy.	Yearly	
c. To improve global hydrographic capability, capacity, training, science and techniques.	**SPI 4**	Percentage of "acceptable" CB requests which are planned. (= *Percentage of submitted CB requests that were approved*)	Yearly	1.3; 2.3; 2.4; 3.4; and 4.4
	SPI 5	Percentage of planned CB requests which are subsequently delivered		

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Objective	Strategic PIs		Reporting Period	Related Strategic Directions
d. To establish and enhance the development of international standards for hydrographic data, information, products, services and techniques and to achieve the greatest possible uniformity in the use of these standards.	**SPI 6**	Number of standards issued (including new editions), per category: - hydrographic standards to enhance safety of navigation at sea, - protection of the marine environment, - maritime security, - economic development.	Yearly	1.3; and 1.4
e. To give authoritative and timely guidance on all hydrographic matters to States and international organizations.	**SPI 7**	Number of potential new IHO MS (indicated by the start of the application process) relative to the number of "non-IHO" IMO MS.	Quarterly	1.1; 1.2; 2.6; and 4.1
f. To facilitate coordination of hydrographic activities among the Member States.	**SPI 8**	Increase in participation / membership in RHCs.	Yearly	2.1; and 4.3
g. To enhance cooperation on hydrographic activities among States on a regional basis.	**SPI 9**	Percentage of available / agreed ENC [production] schemes.	Yearly	2.2; 2.3; and 4.3

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List of IHO Secretariat Travel (2017)

DATE	NAME	MEETING	DESTINATION	COUNTRY
JANUARY				
12 13	IPTES	Chart Project Coordination meeting	Taunton	UNITED KINGDOM
23 25	WARD	Defence Geospatial Intelligence Conference	London	UNITED KINGDOM
30	COSTA NEVES	OGC/Marine DWG - MSDIWG	Vancouver	CANADA
30 03	GUILLAM	WENDWG07	Washington	UNITED STATES OF AMERICA
30 03	IPTES	WENDWG07	Washington	UNITED STATES OF AMERICA
30 02	BESSERO	E-navigation Underway International	Copenhagen	DENMARK
31 02	COSTA NEVES	MSDIWG	Vancouver	CANADA
31 02	GUILLAM	WENDWG 7 and Joint RENC s	Washington	USA
FEBRUARY				
13	WARD	Caribbean Senior Maritime Administrators' Meeting	Bridgetown	BARBADOS
13 14	WYATT	CSBWG4 at UNH	Durham, NH	UNITED STATES OF AMERICA
13 15	WARD	CSBWG4 at UNH	Durham, NH	UNITED STATES OF AMERICA
15 16	WARD	High level meeting on SDG14 at the UNHQ	New York	UNITED STATES OF AMERICA
15 16	WYATT	ASMIWG7	Durham, NH	UNITED STATES OF AMERICA
20 22	IPTES	RSAHC 7	Muscat	OMAN
20 22	WYATT	RSAHC 7	Muscat	OMAN
21 24	WARD	EAHC SC4	Tokyo	JAPAN
27 28	COSTA NEVES	PMB7	Busan	REP KOREA
27 28	IPTES	CBWP & PMB7	Busan	REP KOREA
27 03	WYATT	ETMSS, ETSI	Helsinki	FINLAND
MARCH				
06 07	COSTA NEVES	SWAtHC 11	Niteroi	BRAZIL
06 08	WARD	NHC 61	Copenhagen	DENMARK
06 10	BESSERO	NCSR 4	London	UNITED KINGDOM
06 16	WYATT	NCSR 4 & DRWG 15	London	UNITED KINGDOM
15 18	PHARAOH	S100 WG2	Genoa	ITALY
15 18	WOOTTON	S100 WG2	Genoa	ITALY
20 22	PHARAOH	ENCWG2	Genoa	ITALY
20 22	WOOTTON	ENCWG2	Genoa	ITALY
20 31	COSTA NEVES	IBSC 40	Wellington	NEW ZEALAND
27 31	WARD	IOC-WMO JCOMM SOT9	London	UNITED KINGDOM
APRIL				
7	WARD	Visit WMO SG	Geneva	SWITZERLAND
11	IPTES	IHO – NF Final selection Chart course	London	UNITED KINGDOM
18 19	WARD	IALA Diplomatic Conference	Paris	FRANCE
MAY				
08 12	WYATT	TWCWG2	Victoria	CANADA
09	WARD	Briefing SG elect	Rostock	GERMANY
09 10	IPTES	High Level visit	Mahé	SEYCHELLES
22 26	WARD	ATCM40	Beijing	CHINA
29 02	PHARAOH	ISO/TC211	Stockholm	SWEDEN
JUNE				
03 13	WARD	UN Ocean Conference and World bank	New York	UNITED STATES OF AMERICA
05 06	WYATT	IMSO Advisory Committee 39	London	UNITED KINGDOM

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07 09	COSTA NEVES	CBSC 15	Paramaribo	SURINAME
07 09	IPTES	CBSC 15	Paramaribo	SURINAME
07 16	WYATT	MSC 98	London	UNITED KINGDOM
12 14	COSTA NEVES	IRCC 9	Paramaribo	SURINAME
12 14	IPTES	IRCC 9	Paramaribo	SURINAME
13 15	GUILLAM	DQWG 12	The Hague	NETHERLANDS
19 23	IPTES	IOC Assembly 29	Paris	FRANCE
20 22	WYATT	HSPT1	Paris	FRANCE
22	WARD	IOC Assembly 29	Paris	FRANCE
26 29	WYATT	IOC Assembly 29	Paris	FRANCE

JULY

04 06	GUILLAM	MBSHC 20	Herceg Novi	MONTENEGRO
04 06	IPTES	MBSHC 20	Herceg Novi	MONTENEGRO
10 14	WYATT	IMO-ITU EG 13	London	UNITED KINGDOM
12 14	BESSERO	High Level Ministerial and Scientific event.	Lisbon	PORTUGAL
17 19	COSTA NEVES	IMO/TC67	London	UNITED KINGDOM
17 20	IPTES	NIOHC 17	Cairo	EGYPT
17 20	WYATT	NIOHC 17	Cairo	EGYPT
18	BESSERO	IHO- IALA Coordination meeting	Paris	FRANCE
18	PHARAOH	IHO- IALA Coordination meeting	Paris	FRANCE
20	WARD	WHD UK celebrations	London	UNITED KINGDOM
24 28	WARD	IMO Council 118	London	UNITED KINGDOM
25 26	WYATT	HDWG	London	UNITED KINGDOM
31 04	WARD	UN GGIM – Visit UNH	New York - Durham	UNITED STATES OF AMERICA

AUGUST

02 03	BESSERO	USM Graduation Ceremony	Long Beach	UNITED STATES OF AMERICA
07 11	WARD	ISA 23 Conference	Kingston	BARBADOS
07 12	GUILLAM	UNGEGN 30 & UNCSGN 11	New York	UNITED STATES OF AMERICA
21 25	BESSERO	SEPRHC 13	Cartagena	COLUMBIA
22 24	GUILLAM	ARHC 7	Ilulissat	DENMARK
28 01	WYATT	WWNWS 9	Cape Town	SOUTH AFRICA

SEPTEMBER

06 08	KAMPFER	SAIHC 14	St Denis	LA REUNION
06 08	PHARAOH	SAIHC 14	St Denis	LA REUNION
12 14	GUILLAM	IC ENC SC19	Bristol	UNITED KINGDOM
15	JONAS	Visit UKHO	Taunton	UNITED KINGDOM
19 21	JONAS	BSHC	Rostock	GERMANY
19 21	JONAS	S-100 Test strategy Meeting	Arlington, VA	UNITED STATES OF AMERICA
20	JONAS	World ECDIS Day	Hamburg	GERMANY
25 27	WYATT	III4	London	UNITED KINGDOM
27 28	KAMPFER	IENWG	St Mandé	FRANCE
28	IPTES	Liaison Visit Chart Cat B course	Taunton	UNITED KINGDOM

OCTOBER

01 03	JONAS	IMO World Maritime Day	Panama City	PANAMA
02 06	GUILLAM	SCUFN 30	Genoa	ITALY
05 06	IPTES	Our Ocean Conference	St Julians	MALTA
16 20	PHARAOH	IMO/IHO HDGM WG	London	UNITED KINGDOM
23 29	WYATT	JCOMM5	Geneva	SWITZERLAND
25 26	IPTES	GEO 14 Plenary	Washington	UNITED STATES OF AMERICA

NOVEMBER

06 10	GUILLAM	HSSC 9	Ottawa	CANADA
06 08	JONAS	HSSC 9	Ottawa	CANADA
06 10	KAMPFER	HSSC 9	Ottawa	CANADA
06 10	PHARAOH	HSSC 9	Ottawa	CANADA
07 08	COSTA NEVES	IMO/IHO/WMO/IOC/IALA/IAEA/FIG Joint CB Meeting	St Germain en Laye	FRANCE
09 10	JONAS	IALA Seminar on Arctic Navigation	St Germain en Laye	FRANCE
13 17	WYATT	GEBCO XXXIV	Busan	REP KOREA
14 15	JONAS	Hydro International'17	Rotterdam	NETHERLANDS
15 17	IPTES	GEBCO GC 34	Busan	REP KOREA
21 22	IPTES	PRIMAR Advisory Committee 24	Stockholm	SWEDEN
27 02	COSTA NEVES	MACHC 18	Varadero	CUBA
27 02	IPTES	MACHC 18	Varadero	CUBA
27 30	JONAS	IMO Assembly 30	London	UNITED KINGDOM
27 01	PHARAOH	ISO/TC211	Wellington	NEW ZEALAND

DECEMBER

04 07	COSTA NEVES	Technical Visit (following MACHC 18)	San Salvador	EL SALVADOR

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Responsibilities of the Secretary-General and Directors

(up to 31st of August 2017)

Robert WARD – Secretary-General

- Relations with EU, the United Nations including IMO and WMO, international bodies concerned with hydrographic matters in polar regions, Non-Member States of the IHO, and other relevant organizations and bodies as appropriate;
- Matters concerning IHO Membership, Host Government Affairs;
- Public Relations;
- Finance and Budget;
- Strategic Plan, Work Plan;
- Programme Performance Reporting;
- Translation services;
- IHO Publications;
- Administration of the IHO Secretariat, Information Technology;
- Administration of the Personnel of the IHO Secretariat, Staff Regulations;

and the following Regional Hydrographic Commissions:

- Arctic Regional Hydrographic Commission;
- East Asia Hydrographic Commission;
- Meso American - Caribbean Sea Hydrographic Commission;
- South Africa and Islands Hydrographic Commission;
- South West Pacific Hydrographic Commission;

and the following Commission:

- Hydrographic Commission on Antarctica.

Mustafa IPTES - Director (Regional Coordination Programme)

- IRCC, and subordinate bodies, including IBSC and GEBCO;
- Relations with FIG, IOC, the academic sector (education and training), and other relevant organizations, concerning the IRCC programme;
- Capacity Building, Training, Education and Technical Co-operation, including CB Work Programme, CB Fund and budget;
- International Hydrographic Review;
- IHO Assembly;
- Annual Report;

and the following Regional Hydrographic Commissions:

- Baltic Sea Hydrographic Commission;
- Mediterranean and Black Seas Hydrographic Commission;
- North Indian Ocean Hydrographic Commission;
- ROPME Sea Area Hydrographic Commission;
- USA and Canada Hydrographic Commission.

Gilles BESSERO - Director (Technical Programme)

- HSSC and subordinate bodies;
- Relations with ABLOS, IALA, ICA, IEC, ISO, and other relevant organizations, concerning the HSCC programme;
- Technical Support services;
- Stakeholder Liaison;

and the following Regional Hydrographic Commissions:

- Eastern Atlantic Hydrographic Commission;
- Nordic Hydrographic Commission;
- North Sea Hydrographic Commission;
- South East Pacific Regional Hydrographic Commission;
- South West Atlantic Hydrographic Commission.

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Responsibilities of the Secretary-General and Directors

(from 1st September 2017)

Dr. Mathias JONAS – Secretary-General

- Relations with EU, the United Nations including IMO,ISA and WMO, international bodies concerned with hydrographic matters in polar regions, Non-Member States of the IHO, and other relevant organizations and bodies as appropriate;
- Matters concerning IHO Membership, Host Government Affairs;
- Public Relations;
- Finance and Budget;
- Strategic Plan, Work Plan;
- Programme Performance Reporting;
- IHO Council;
- Administration of the IHO Secretariat, Information Technology;
- Personnel Administration of the IHO Secretariat, Staff Regulations;

and the following Regional Hydrographic Commissions:

- Arctic Regional Hydrographic Commission;
- Baltic Sea Hydrographic Commission;
- East Asia Hydrographic Commission;
- Nordic Hydrographic Commission;
- North Sea Hydrographic Commission;

and the following Commission:

- Hydrographic Commission on Antarctica.

Abri KAMPFER – Director (Technical Programme)

- HSSC and subordinate bodies;
- Relations with ABLOS, IALA, ICA, IEC, ISO, and other relevant organizations, concerning the HSCC programme;
- Technical Support services;
- Stakeholder Liaison;

and the following Regional Hydrographic Commissions:

- Eastern Atlantic Hydrographic Commission;
- Southern African and Islands Hydrographic Commission;
- South-East Pacific Regional Hydrographic Commission;
- South-West Pacific Hydrographic Commission;
- US Canada Hydrographic Commission.

Mustafa IPTES - Director (Inter-Regional Coordination and Support Programme)

- IRCC, and subordinate bodies, including IBSC and GEBCO;
- Relations with FIG, IOC, the academic sector (education and training), and other relevant organizations, concerning the IRCC programme;
- Capacity Building, Training, Education and Technical Co-operation, including CB Work Programme, CB Fund and budget;
- IHO Publications
- International Hydrographic Review;
- IHO Assembly;
- Annual Report;

and the following Regional Hydrographic Commissions:

- Mediterranean and Black Seas Hydrographic Commission;
- Meso American - Caribbean Sea Hydrographic Commission;
- North Indian Ocean Hydrographic Commission;
- ROPME Sea Area Hydrographic Commission;
- South West Atlantic Hydrographic Commission.

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Responsibilities of the Staff of the IHO Secretariat in 2017

Managerial Staff

Mr A. PEDRASSANI COSTA NEVES	(Brazil)	ADCC	Cooperation and Capacity Building
Mr Y. GUILLAM	(France)	ADCS	Charting and Services
Mr A. PHARAOH	(South Africa)	ADDT	Digital Technology
Mr D. WYATT	(United Kingdom)	ADSO	Surveying and Operations
Ms G. FAUCHOIS	(France)	MFA	Manager, Finance and Administration

Translators

Ms I. ROSSI	HFrTr	Head French Translator
Ms P. BRIEDA SAUVEUR	FrTr	French Translator
Ms M.P. MURO	SpTr	Spanish Translator

Technical, Administrative and Service Staff

Ms I. BELMONTE	WPE	Website and Publications Editor
Ms S. BRUNEL	AAA	Administrative and Accounting Assistant
Ms L. CHAVAGNAS	OA	Office Assistant
Mr D. COSTIN	ITO	Information Technology Officer
Ms C. FONTANILI	PA	Personal Assistant
Mr A. MAACHE	BSA	Bureau Support Assistant
Mr D. MENINI	CGA	Cartography and Graphics Assistant
Ms M. MOLLET	REG	Registrar, Librarian
Mr J. WOOTTON	TSSO	Technical Standards Support Officer

Associate Professional Officers

Mr Y. BAEK (until March 2017)	(Republic of Korea)	S-100 Registry & Online Registration Projects
Mr. J. KIM (from March 2017)	(Republic of Korea)	Capacity Building, Assistant to Council-1 meeting
Dr K. KANEDA	(Japan)	GIS and IT Projects
Mr L. HERNANDEZ RUBIN (until January 2017)	(Peru)	Spanish Dictionary revalidation project
Mr A. ASTE (from March 2017)	(Peru)	Council Managing Assistant

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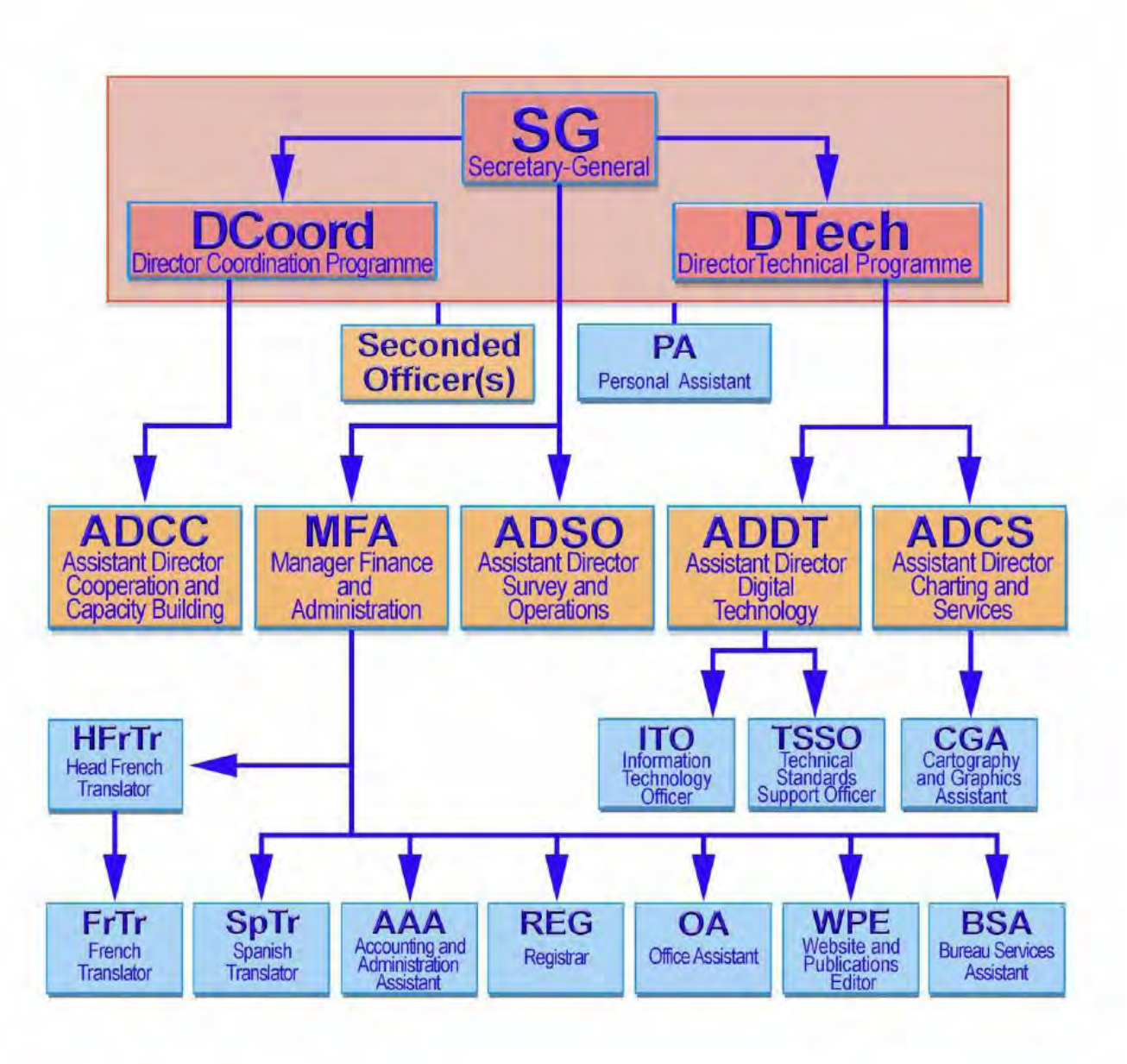
2017
Organizational Diagram of the IHO Secretariat



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LIST OF ACRONYMS

A

ABLOS	Advisory Board on the Law of the Sea
AIS	Automatic Identification System
ARHC	Arctic Regional Hydrographic Commission
ATCM	Antarctic Treaty Consultative Meeting

B

BASWG	Black and Azov Seas Working Group
BSHC	Baltic Sea Hydrographic Commission

C

CB	Capacity Building
CBSC	Capacity Building Sub-Committee
CBWP	Capacity Building Work Programme
CHART	Cartography, Hydrography and Related Training (Project)
CIRM	Comité International Radio-Maritime
CL	Circular Letter
COMNAP	Council of Managers of National Antarctic Programs
CSB	Crowd-Sourced Bathymetry

D

DCDB	Data Centre for Digital Bathymetry
DG Mare	Directorate-General for Maritime Affairs and Fisheries
DHN	*Diretoria de Hidrografia e Navegação*
DQWG	Data Quality Working Group

E

EAHC	East Asia Hydrographic Commission
EAtHC	Eastern Atlantic Hydrographic Commission
EC	European Commission
ECDIS	Electronic Chart Display and Information System
EIHC	Extraordinary International Hydrographic Conference
EMODnet	European Marine Observation and Data Network
ENC	Electronic Navigational Chart
EU	European Union

F

FIG	International Federation of Surveyors

G

GEBCO	General Bathymetric Chart of the Oceans
GGC	GEBCO Guiding Committee
GIS	Geographic Information System

H

HE	His Excellency
HO	Hydrographic Office
HSH	His Serene Highness

HSSC	Hydrographic Services and Standards Committee

I

IAEA	International Atomic Energy Agency
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IAPH	International Association of Ports and Harbours
IBCSO	International Bathymetric Chart of the Southern Ocean
IBSC	International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers
ICA	International Cartographic Association
ICCWG	International Charting Coordination Working Group
IEC	International Electrotechnical Commission
IC-ENC	International Centre for Electronic Navigational Charts
IENWG	IHO-EU Network Working Group
IHB	International Hydrographic Bureau
IHC	International Hydrographic Conference
IHO	International Hydrographic Organization
IMO	International Maritime Organization
IMPA	International Maritime Pilots' Association
IMSO	International Mobile Satellite Organization
INT	International
IOC	Intergovernmental Oceanographic Commission
IRCC	Inter-Regional Coordination Committee
ISA	International Seabed Authority
ISO	International Organization for Standardization
IT	Information Technology

J

JCOMM	Joint Technical Commission for Oceanography and Marine Meteorology
JHOD	Japan Hydrographic and Oceanographic Department

K

KHOA	Korea Hydrographic and Oceanographic Agency

L

M

MACHC	Meso American - Caribbean Sea Hydrographic Commission
MBSHC	Mediterranean and Black Seas Hydrographic Commission
MEIP	Maritime Economic Infrastructure Programme
METAREA	METeorogical Area
MoU	Memorandum of Understanding
MOWCA	Maritime Organization for West and Central Africa
MS	Member State
MSC	Maritime Safety Committee
MSDI	Marine Spatial Data Infrastructure
MSDIWG	Marine Spatial Data Infrastructures Working Group
MSI	Maritime Safety Information
MSP	Maritime Service Portfolio
MSP	Marine Spatial Planning

N

NATO	North Atlantic Treaty Organization
NAVAREA	NAVigational Area
NAVTEX	NAVigational TEXt Messages
NCEI	National Centers for Environmental Information
NCSR	IMO Sub-Committee on Navigation, Communications and Search and Rescue
NCWG	Nautical Cartography Working Group
NGA	National Geospatial-Intelligence Agency
NGIO	Non-Governmental International Organization
NHC	Nordic Hydrographic Commission
NIOHC	North Indian Ocean Hydrographic Commission
NIPWG	Nautical Information Provision Working Group
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NSHC	North Sea Hydrographic Commission

O

OGC	Open Geospatial Consortium

P

PI	Performance Indicator
PMB	Project Management Board

Q

R

RENC	Regional ENC Coordinating Centre
RHC	Regional Hydrographic Commission
ROK	Republic of Korea
RoP	Rules of Procedure
ROPME	Regional Organization for the Protection of the Marine Environment
RSAHC	ROPME Sea Area Hydrographic Commission

S

SAIHC	Southern African and Islands Hydrographic Commission
SCRUM	Sub-Committee on Regional Undersea Mapping
SCUFN	Sub-Committee on Undersea Feature Names
SDI	Spatial Data Infrastructures
SEPRHC	South East Pacific Regional Hydrographic Commission
SHOM	*Service hydrographique et océanographique de la marine*
SOLAS	International Convention for the Safety of Life at Sea
SPI	Strategic Performance Indicator
SWAtHC	South West Atlantic Hydrographic Commission
SWPHC	South West Pacific Hydrographic Commission

T

TALOS	Technical Aspects of the UN Convention on the Law of the Sea
TC	Technical Committee
ToR	Terms of Reference
TSCOM	Technical Sub-Committee on Ocean Mapping
TWCWG	Tides, Water Level and Currents Working Group

U

UAE	United Arab Emirates
UK	United Kingdom
UKHO	United Kingdom Hydrographic Office
UN	United Nations Organization
UNESCO	United Nations Educational, Scientific and Cultural Organization
UN-GGIM	United Nations Committee of Experts on Global Geospatial Information Management
UNH	University of New Hampshire
USA	United States of America
USCHC	USA-Canada Hydrographic Commission

V

W

WEND	Worldwide ENC Database
WG	Working Group
WMO	World Meteorological Organization
WP	Work Programme
WPI	Working-level Performance Indicator
WWNWS	World Wide Navigational Warning Service
WWNWS-SC	WWNWS Sub-Committee

X

Y

Z

PART 2 – FINANCE

Financial statements and accounts for 2017 together with the external auditor report

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Foreword to the Finance Report for 2017

Introduction

1. The Secretary General is pleased to present the statements of the finances and accounts of the IHO for the 2017 fiscal year in accordance with the Financial Regulations of the IHO.

Presentation of the financial statements

2. The financial statements are presented in accordance with applicable International Accounting Standards.

Result for the fiscal year 2017

3. The audited financial statements indicate a positive result for 2017 of 286,552.10€ (see Table 10 (English) and 11 (French)). This result comprises a surplus of 187k€ from the budget implementation, a net extraordinary income of 68k€ and the inclusion of depreciable assets of 25k€.

Budget implementation

4. The above noted surplus of 187k€ resulting from conservative budget implementation comprises an additional income of 69k€ and an underspend of 118k€ in the approved budget.

5. The main sources of additional income are:

   a. Contribution from a Member State that was facing suspension and therefore not anticipated in the approved budget;

   b. Contribution from a new Member State: Vanuatu

   c. A better return on investments than was anticipated in the approved budget

6. The underspend (118k€) is due mainly to the following reasons:

   a. **Staff expenditure**. An increase in the Monaco cost of living of 2% was included in the approved budget, based on historical increases, but the increase actually declared by the Monaco Government was less (1.3%). Additional surpluses arose because staff training expenses were less than budgeted. Unanticipated changes in the situation of some members of staff resulted in savings in home leave expenses.

   b. **IT and building maintenance**. Following negotiations with service providers, savings were achieved in IT and building maintenance, which resulted in less expenditure than was allocated in the budget.

   c. **Travel**. Travel expenses were less than anticipated in the budget because several planned high level visits and technical visits could not be carried out in some countries and changes in venue for some meetings and careful choices in travel arrangements resulted in a reduction of some planned costs.

Extraordinary income and expenditure

7. The extraordinary income (68k€ - see table 3) is composed of the payment of contribution arrears by several Member States and the administration fee provided by donors for some CBF activities.

Supplementary remarks

Outstanding financial contributions from some Member States

When assessing the positive balance sheet result it should be noted that several Member States failed to pay their annual financial contributions in the course of the fiscal year 2017. At the end of the year, 13 Member States had not paid fully their annual contributions. This amounted to 344k€, which is, in effect, income for 2017 yet to be received and represents 11% of the total value of the expected Member States' contributions. The 11% receivables of 2017 compare with 9% for 2016 and 9% for the 5-year average. When these debts are eventually cleared, they will be reflected in the relevant yearly accounts as extraordinary income. Accordingly, and has been the practice in all previous years, the outstanding financial contributions are not being subtracted from the effective budget surplus considered in paragraph 18.

Internal Retirement Fund

8. The Internal Retirement Fund (IRF) supports the IHO's long-established independent retirement plan (pension scheme) for a number of the longer-serving and retired members of the Secretariat staff. The pensions of ten retired members and one current member of staff are covered by the IRF. The IRF is purposely maintained in low-risk investment accounts. In recent years these accounts have provided a low rate of interest due to a general decrease in global interest rates. The investment sum required at the end of 2017 to meet the estimated liabilities of the IRF over its lifetime, increased by 36,139€ to 3,730,959€.

9. The estimated liability on the IRF is calculated and adjusted every year using an actuarial assessment. It is dependent on several factors that are very difficult to predict including the estimate of long-term interest rates, and the longevity of the pensioners in the relatively small cohort of beneficiaries of the pension scheme.

10. In 2016 and 2017 an allocation to the IRF of 65k€ has been made in order to ensure that the level of the IRF remains reasonably balanced against its estimated liability. This allocation to the IRF has been made specifically to take into account the additional liabilities that may arise as a result of changes to the Staff Regulations in 2017, whereby the personalized retirement plans of several more members of staff are now underwritten by the IHO, in conformance with similar arrangements for employees in the Monaco Civil Service. It also takes into account the additional liability for the member of staff who chose to have a pension equivalent to the Caisse Autonome de Retraites (CAR) of Monaco paid by the IHO upon retirement. An allocation to the IRF of 70k€ per year is included in the proposed budget for the next triennial period 2018-2020.

11. Taking into account the long-term nature and variability of the estimate of the liability on the IRF, it is considered that the current and proposed allocations to the IRF will be sufficient to ensure that the most recent increase between the estimated liability and the value of the fund will be reduced progressively, in time to meet the obligations of the fund.

Capacity Building Fund

12. In 2017 the Capacity Building Fund (CBF) provided direct support to training activities as well as supporting the attendance of participants at various technical workshops and seminars. The fund received 1,206k€ (for the period 2017-2019) from the Nippon Foundation of Japan, and 166k€ in external support from the Republic of Korea. Discounting the activities that were approved, but for which there was no budget available, 100% of the technical visits, and 76% of the other assignments in the Capacity Building Work Programme were completed in 2017.

Other Funds

13. **Relocation Fund.** The Relocation Fund is in a healthy position to meet all anticipated expenditure of the relocation of internationally recruited members of staff upon their joining or leaving the IHO Secretariat over the next few years without any need to adjust the budget forecast.

14. **Conference Fund.** The contribution to the Conference Fund from the annual budget will cover the expenses of the triennial Assembly. The costs for the annual Council are allocated separately from this Fund in the operational budget to an annual amount of 20k€ for 2018 to 2020. The Secretariat will propose to rename the Conference Fund into the Assembly Fund prior to Assembly 2 in 2020.

15. **Special Projects Fund.** At the end of the year, the value of the Special Projects Fund was 90,512€. In 2017 the principal use of the Fund was for contract support for S-100 development activities and to cover the travel expenses of members of the International Board of Standards of Competence (IBSC) responsible for developing a new Standards framework to separate the competency requirements of the Cat A and Cat B syllabi.

16. **IBSC Fund.** The IBSC Fund was established in 2010. At the request of the Fédération Internationale des Géomètres (FIG) Secretariat which had administered the Fund on behalf of the IBSC since its establishment, the IHO Secretariat, as secretary of the IBSC, took over the role of treasurer of the Fund in 2015. The Fund holds the income generated by the IBSC through its fees structure, and supports the normal operations of the IBSC that is jointly operated and governed by the IHO, the FIG, and the International Cartographic Association (ICA). The balance of the fund on 1 January 2017 was 18,782.83€. An amount of 22,472.54€ was received in fees from institutions seeking recognition by IBSC, and 16,579.87€ was spent on travel expenses for the Board members to attend meetings. The Fund is in a healthy financial situation, and is self-sufficient, with a positive balance at the end of 2017 of 24,675.50€.

17. **GEBCO Fund.** Based on a proposal of the Nippon Foundation and the GEBCO Guiding Committee, the IHO and the IOC as parent organizations of GEBCO agreed a joint project named SEABED 2030 aiming to increase the detail of global knowledge of the seabed topography of the seas and oceans. Within the framework of the project, the IHO Secretariat accepted to administer the project fund as donated by the Nippon Foundation. In 2017 the Secretariat received $1,030,500 for the administration of the first year of the SEABED 2030 project from the Nippon Foundation. $38,098 were spent for reimbursement of salaries, operational costs and travel expenses of the establishment phase. $992,402 remain for payment of the forthcoming activities of global and regional data centers forming the infrastructural part of the project.

Proposal for allocation of the 2017 budget surplus

18. As indicated above and reported in the audited financial statements, the effective budget surplus for 2017 was 187k€.

19. The Secretary-General considers that the Capacity Building Fund is of crucial value to the Member States and should be given priority in the disbursement of the budget surplus for 2017. Some of the activities in the 2018 CB Work Programme are as yet unfunded, to a value of 280k€.

20. In order to maintain the level of the IRF to broadly match its estimated and potential liabilities for the current and prospective retirees, an allocation from the budget surplus is considered appropriate and prudent (see paragraph 10).

21. **Proposal.** The Secretary-General proposes that the budget surplus for 2017 of 187k€ be distributed as follows:

a. 100k€ to the Capacity Building Fund

b. 50k€ to the Internal Retirement Fund

c. 37k£ to the Special Projects Fund for the preparation of the 1st centenary celebrations of the IHO stretching over a period from 2019 to 2021. The money is allocated to cover the preparatory phase from 2018 to 2020.

Conclusion

22. The Secretary-General is ever mindful of the difficulty in forecasting the income of the Organization, due to non or late payment of financial contributions by Member States and other factors, but by continuing to take a conservative approach to the budget and finances of the Organization, he remains confident in the financial situation of the IHO and its ability to meet all its current obligations.

Yours sincerely,

Dr Mathias JONAS
Secretary-General

International Hydrographic Organization - Organisation Hydrographique Internationale

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Index des états financiers

Tables

Table 1

International Hydrographic Organization - *Organisation Hydrographique Internationale*

Comparative Balance Sheet - *Bilans comparés*

as of 31 December 2017 - *au 31 décembre 2017*

(expressed in thousands of Euros - *exprimé en milliers d'Euros*)

	See notes	2017		2016	
***Immobilisations* - Fixed assets**					
Valeur nette des immobilisations - Net Tangible assets	4		80		78
***Actif circulant* - Curent assets**					
Débiteurs - Debtors	5	577		433	
Trésorerie disponible					
Cash at bank and in hand :	10	6 666		5 193	
		7 244		5 626	
Créditeurs - montants à moins d'1 an					
Creditors - amounts falling due within 1 year	6	-1 909		-1 758	
***Fonds de roulement* - Working capital**			5 334		3 868
Engagements pour les retraites	7	4 106		4 379	
Pension commitments		-4 106		-4 379	
			0		0
Actif net - Net assets			5 414		3 945
***Réserves* - Reserves**					
Capitaux permanents de l'OHI - Accumulated surplus			2 401		2 391
Autres réserves - Other reserves	8+9		3 013		1 555
			5 414		3 945

Table 2

International Hydrographic Organization - *Organisation Hydrographique Internationale*

Comparative Global Income and Expenditure - *Charges et revenus comparés*

as of 31 December 2017 - *au 31 décembre 2017*

(expressed in thousands of Euros - *exprimé en milliers d'Euros*)

	2017	2016
Revenus - Income	3 397	3 182
Charges opérationnelles - Operating costs	-2 858	-2 748
***Résultat opérationnel* - Operating result**	**539**	**434**
Intérêts reçus - Interest received	99	105
Equipement de bureau - Office equipment	-37	-43
Charges financières - Financial costs	-28	-56
Dotations aux fonds dédiés - Transfer to dedicated funds	-288	-158
***Résultat annuel* - Result for the year**	**286**	**281**

Etat d'évolution du financement permanent

Statement of changes in permanent funding

	Capitaux permanents de l'OHI Net members funds	*Réserve de réévaluation* Revaluation Reserve	*Autres réserves* Other reserves (note 9)	Total
***Montants au 1er Janvier 2017* - Available on 1 January 2017**	2 391		1 555	3 945
Résultat de l'année - Result for the year	286		-	286
***Evolution des fonds dédiés* - Evolution of dedicated funds:**				
- *Dépensé à partir des fonds dédiés* - Spent from dedicated funds			1 458	1 458
- *Fonds de retraite interne* - Internal Retirement Fund	-50		-	-50
- *Fonds pour le déménagement des directeurs* - Relocation Fund			-	
- *Fonds pour les conférences* - Conference Fund				
- *Fonds pour le Renforcement des Capacités* - CB Fund	-191			-191
- *Fonds pour les Projets spéciaux* - Special Projects Fund				
***Mouvements dans l'année* - Movements in the year (provisions) :**				
- *Provision Etats membres* - Provision Member States	6			6
- *Variation provision du FRI* - Changes in IRF requirements	-36		-	-36
- *Dotation du fonds de réserve d'urgence* - Allocation to Emergency Reserve Fund	-4		-	-4
***Montants au 31 Décembre 2017* - Available at 31 December 2017**	**2 401**		**3 013**	**5 414**

Table 3

International Hydrographic Organization - *Organisation Hydrographique Internationale*

Profit and Loss Statement - *Compte d'exploitation*

as of 31 December 2017 - *au 31 décembre 2017*

(expressed in thousands of Euros - *exprimé en milliers d'Euros*)

		2017		*2016*
***Revenus* - Income**				
Contributions des Etats Membres - Contributions from Member States		3 135		2 986
Imposition interne - Internal tax		194		170
Ventes de publications - Sales of publications				
Revenus et dépenses exceptionnelles - Exceptional income and expenditure		68		26
		3 397		3 182
***Revenus financiers* - Interest received**				
Intérêts des placements - bank interest		97		105
Intérêts sur contributions échues - Interest on overdue contributions		3		
		99		105
***Charges opérationnelles* - Operating costs**				
Charges de personnel - Personnel costs	2 402		2 274	
Déplacements - Long Distance Travel	244		230	
Entretien des locaux et équipements - Maintenance of premises and equipment	88		101	
Postes et télécommunications - Postage and telephone	30		32	
Assistance technique - Technical support	46		47	
Consultants - Consultancy	1		15	
Autres publications - Other publications	1		1	
Revue H.I - I.H Review	10		10	
Autres coûts opérationnels - Other operating costs	17		15	
Fournitures de bureau - Office stationery	11		9	
Relations publiques - Public relations	6		13	
Charges diverses - Miscelleanous	1		1	
		-2 858		-2 748
***Matériel de bureau* - Office equipment**				
Amortissement des immobilisations - Depreciation	22		22	
Autres achats - Other purchases	14		22	
		-37		-44
***Charges financières* - Financial costs**				
Créances douteuses - Bad debts	28		56	
		-28		-56
***Dotations aux fonds dédiés* - Allocation to dedicated funds**		-288		-158
***Résultat net annuel* - Result for the year**		**286**		**281**

Table 4

International Hydrographic Organization - *Organisation Hydrographique Internationale*

Cash Flow Statement - *Etat de flux financiers*

as of 31 December 2017 - *au 31 décembre 2017*

(expressed in thousands of Euros - *exprimé en milliers d'Euros*)

		2017		*2016*
***Cash Flow opérationnel* - from operating activities**				
Résultat opérationnel de l'année - Result for the year		286		281
***Ajustements pour* - Adjustments for :**				
Dépréciation des immobilisations - Depreciation	22		22	
Cession d'immobilisations - Sale of fixed assets				
Provision du FRI - IRF provision				
Variation des réserves - Change in reserves				
Intérêts bancaires - Bank interest	-97		-105	
Charges financières - Financial expenditure				
Résultat avant variation du fonds de roulement		-74		-83
Result before working capital changes		211		198
Variation des débiteurs - Change in accounts receivable	-144		40	
Variation des créditeurs - Change in accounts payable	-151		-440	
		-296		-400
Flux financier opérationnel - Operating cash flow		-84		-202
Intérêts réglés - Interest paid	0		0	
Ajustement du Fonds de retraite - Retirement fund adjustment	4		467	
		4		467
Flux financier opérationnel net - Net cash from operating activities		-80		265
Flux financier des investissements				
Cash flow from investing activities				
Achats d'immobilisations - Purchase of fixed assets	-22		-13	
Cessions d'immobilisations - Sale of fixed assets	0		0	
Intérêts reçus - Interest received	97		105	
Flux net des opérations d'investissement				
Net cash movement from investment activities		74		91
***Total des flux financiers* - Total cash flows**		-6		356
Disponibilités au 1er janvier de l'année				
Cash at 1st January of the year		9 086		8 730
Disponibilités au 31 décembre de l'année				
Cash at 31st December of the year	Euros	9 080	Euros	9 086

Table 5

International Hydrographic Organization - *Organisation Hydrographique Internationale*
Budget Implementation Summary - *Compte rendu de l'exécution budgétaire*
as of 31 December 2017 - *au 31 décembre 2017*
(expressed in thousands of Euros - *exprimé en milliers d'Euros*)

	2017		
	Budget	**Actual - *Réel***	**Variance**
***Revenus* - Income**			
Contributions des Etats Membres - Contributions from Members States	3 091	3 135	-44
Imposition interne - Internal tax	181	194	-13
Intérêts bancaires - Bank interest	88	97	-9
Intérêts sur contributions échues - Interest on overdue contributions		3	-3
	3 360	3 428	-69
***Charges opérationnelles* - Operating costs**			
Charges de personnel - Personnel costs	2 418	2 402	15
Déplacements - Long Distance Travel	250	244	6
Entretien - Maintenance	111	88	23
Postes et télécommunications - Postage and telephone	35	30	5
Assistance technique - Technical support	50	46	4
Consultants - Consultancy	30	1	29
Autres publications - Other publications	2	1	1
Revue HI - I.H Review	10	10	
Autres coûts opérationnels - Other operating costs	18	17	1
Fournitures de bureau - Office stationery	10	11	-1
Relations publiques - Public relations	21	6	15
Charges diverses - Miscellaneous	1	1	
	2 955	2 858	97
***Dépenses d'investissement* - Capital expenditure**			
Amortissement - Depreciation	20	22	-2
Autres achats - Other purchases	16	14	2
	36	37	-1
***Autres Dépenses d'investissement (>762€)* - Other Capital expenditure (over 762€)**			
Achat d'équipement informatique - Purchase of IT equipement	15	12	3
Achat de mobilier - Purchase of furniture	10	13	-3
	25	25	
***Charges financières* - Financial costs**	50	28	22
	294	481	-187

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Table 6

International Hydrographic Organization - *Organisation Hydrographique Internationale*

Overdue Contributions - *Contributions échues*

as of 31 December 2017 - *au 31 décembre 2017*

(expressed in thousands of Euros - *exprimé en milliers d'Euros*)

	2017	2016	2015	*Total*
Argentina - *Argentine*	28			*28*
Brunei Darussalam	20			*20*
Colombia - *Colombie*	12			*12*
D.P.R. Korea - *R.P.D. Corée*	20			*20*
Fiji - *Fidji*	8			*8*
Greece - *Grèce*	109			*109*
Italy - *Italie*	7			*7*
Kuwait - *Koweit*	40	40		*80*
Mozambique - *Mozambique*	8	8	5	*21*
Syrian Arab Republic- *Rép. arabe syrienne*	20	20		*40*
Trinidad & Tobago	8			*8*
United Arab Emirates - *Emirats Arabes Unis*	28			*28*
Vanuatu	36			*36*
	344	*68*	*5*	*417*

Suspended IHO Member States	Outstanding Contributions	Payment	Balance
Etats Membres de l'OHI suspendus	*Contributions arriérées*	*Paiement*	*Solde*
Dem. Rep. of the Congo - *Rép. démocratique du Congo*	8,8		*8,8*
Serbia - *Serbie*	24,0		*24,0*
	32,8	*0,0*	*32,8*

Table 7

International Hydrographic Organization - *Organisation Hydrographique Internationale*

Creditors - *Créditeurs*

as of 31 December 2017 - *au 31 décembre 2017*

(expressed in thousands of Euros - *exprimé en milliers d'Euros*)

Contributions reçues d'avance	***Reçues en 2017 pour les prochaines contributions***	***Reçues en 2016 pour les prochaines contributions***
Contributions received in advance	Received in 2017 for future contributions	Received in 2016 for future contributions
Argentina - *Argentine*	7	0
Australia - *Australie*	32	32
Belgium - *Belgique*	52	48
Bangladesh - *Bangladesh*	0	24
Brazil - *Brésil*	5	44
Cameroon - *Cameroun*	13	
Cyprus - *Chypre*	97	97
Egypt - *Egypte*	28	
Estonia -*Estonie*	0	16
Finland - *Finlande*	0	4
France - *France*	56	57
Iceland - *Islande*	12	12
Iran - *Iran*	55	
Ireland - *Irlande*	16	12
Latvia - *Lettonie*	12	16
Mauritius - *Maurice*	12	12
Mexico - *Mexique*	36	40
Montenegro - *Montenegro*	0	2
Morocco - *Maroc*	16	16
Myanmar - *Myanmar*	20	20
Netherlands - *Pays-Bas*	65	0
New Zealand - *Nouvelle-Zélande*	16	12
Nigeria - *Nigeria*	40	20
Oman - *Oman*	8	8
Pakistan - *Pakistan*	16	16
Papua New Guinea - *Papouasie Nouvelle Guinée*	0	12
Poland - *Pologne*	12	12
Portugal - *Portugal*	0	28
Romania - *Roumanie*	12	12
Russian Federation - *Fédération de Russie*	0	22
Saudi Arabia - *Arabie saoudite*	52	0
Singapore - *Singapour*	109	109
South Africa - *Afrique du Sud*	16	12
Sri Lanka - *Sri Lanka*	2	
Suriname - *Suriname*	8	8
Sweden - *Suède*	0	48
Thailand - *Thailande*	44	44
Tonga - *Tonga*	2	
Turkey - *Turquie*	61	61
United Kingdom - *Royaume-Uni*	0	109
Uruguay - *Uruguay*	20	20
	952	1 005

Créditeurs et charges à payer - Creditors and accruals

Plan de pensions - Pensions plan payments	16	-4
Charges à payer - Accruals	96	56
Autres créditeurs - Other		21
	112	73

Table 8

International Hydrographic Organization - *Organisation Hydrographique Internationale*

Notes to the Financial Statements - *Notes relatives aux états financiers*

as of 31 December 2017 - *au 31 décembre 2017*

(expressed in thousands of Euros - *exprimé en milliers d'Euros*)

1 *Principes comptables* - Accounting Policies

(a) *Principes comptables de base* - Basis of accounting

Les états financiers sont préparés selon la méthode du coût historique ainsi que selon les normes comptables internationales (IAS / IFRS).

The financial statements are prepared under the historical cost principle and in accordance with applicable International Accounting Standards.

(b) *Revenus* - Income

Les revenus proviennent essentiellement des contributions des Etats membres de l'OHI.

Income principally represents contributions receivable from Member States.

(c) *Contributions échues* - Overdue contributions

Conformément à l'article 16 du règlement financier, Les droits et prérogatives d'un Etat membre peuvent se trouver suspendus lorsque ces contributions sont échues depuis au moins 2 années.
La décision 24(e) de la première session de l'Assemblée de l'OHI a supprimé l'article 13 du règlement financier concernant les intérêts de retard.
A compter de 2013, une provision complémentaire pour créances douteuses est instituée, afin de refléter les incertitudes géopolitiques de certains Etats membres.

In accordance with Article 16 of the Financial Regulations, Member States can be suspended when contributions are in arrears by at least two years
Decision 24e of the first session of the IHO Assembly deleted article 13 of the financial regulations regarding interest on late payment
From 2013, an additional provision for bad debts has been made, in order to reflect geopolitical uncertainties of some of the Member States.

(d) *Amortissement des immobilisations* - Depreciation of tangible assets

Il est pratiqué un amortissement sur toutes les immobilisations (d'un prix unitaire supérieur à 762 Euros) à hauteur de la valeur totale de l'immobilisation sur sa probable durée d'utilisation selon les taux suivants :

Mobilier	-	*20 % du coût par année (sur 5 années)*
Equipement informatique	-	*33,33 % du coût par année (sur 3 années).*

Provision is made for depreciation of all tangible assets (over 762 Euros in value per article) at rates calculated to write off the cost or valuation over its expected useful life as follows :

Furniture	-	20% per annum on cost (5 years)
IT Equipment	-	33.33% per annum on cost (3 years).

(e) *Transactions en devises* - Foreign currencies

En cours d'année, les transactions libellées en devises sont converties en Euros au taux de change en vigueur à la date de la transaction.
En fin d'année, les dettes et disponibilités libellées en devises sont converties en Euros au taux de change à la date d'établissement du bilan. Les pertes et gains de change sont enregistrés dans le compte de résultat.

During the year, transactions denominated in foreign currencies were converted into Euros at the rate of exchange ruling at the date of the transaction.
At the end of the year, current assets and liabilities denominated in foreign currencies were converted at the rate of exchange ruling at the balance sheet date.
Profit and losses on exchange are dealt with in the profit and loss account.

(f) *Fonds de retraite* - Retirement fund

L'OHI gère un fonds de pension dénommé Fonds de retraite interne (FRI).

Un membre du personnel actif et 10 retraités sont concernés par ce fonds.
La totalité des avoirs destinés à couvrir les engagements de ce fonds font l'objet de comptes bancaires spécifiques sous forme de comptes de dépôt à terme.
L'Organisation retient l'intégralité de l'engagement déterminé sur la base de l'estimation d'une étude actuarielle (voir note 7). A compter de l'année 2005, les pensions ont été réglées à partir des avoirs du FRI, au lieu d'être réglées à partir du budget de l'OHI , comme ce fut le cas de 2000 à 2004.

The Organization operates a benefit pension scheme known as the Internal Retirement Fund (IRF). One current staff member and 10 retirees are covered by this fund.
A proportion of the assets held to meet the pension liability are held in designated bank accounts and investments.
The Organization makes full provision for the estimated liability based on actuarial valuation (see note 7).
From 2005, pensions have been paid from dedicated IRF accounts as opposed to a payment from the IHO budget as in previous years (from 2000 to 2004).

g) Réserve de trésorerie opérationnelle et Fonds de réserve d'urgence
Operating Cash Reserve and Emergency Reserve Fund

L'article 17 du règlement financier indique que le Secrétariat disposera à la fin de chaque année d'une réserve de trésorerie opérationnelle, dont le montant sera d'au moins 3/12èmes du budget opérationnel annuel.
L'article 18 du règlement financier indique que le montant du fonds de réserve ne sera pas inférieur à 1/12ème du budget opérationnel annuel (voir note 10).

Article 17 of the Financial Regulations indicates that the Secretariat will have at its disposal by the end of each year an amount of operating cash reserve, which will correspond to at least 3/12th of the annual operating budget.
According to Article 18 of the Financial Regulations the Emergency Reserve Fund shall not be less than 1/12th of the annual operating budget (see note 10).

h) *Evolution ou changement de procédures internes* - Evolution or changes of internal procedures

A compter de 2007, et en accord avec le commissaire aux comptes, les procédures internes ont évolué dans 2 domaines :
- pour l'amortissement des immobilisations, le Secrétariat retient maintenant la date d'acquisition de l'immobilisation au lieu de commencer à constater l'amortissement à partir du début de l'année suivante.
- les dotations aux fonds dédiés (Conférences, déménagement des directeurs, projets spéciaux, fonds pour le renforcement des capacités, fonds de rénovation et d'amélioration et fonds pour la GEBCO) sont dotées à partir du budget.

From 2007, and in agreement with the independant auditor, internal procedures have been developed in 2 areas:
- regarding the depreciation of fixed assets, the Secretariat now depreciates these assets from the date of acquisition of the asset, as opposed to starting the depreciation the year following that date.
- Allocations to dedicated funds (Conference Fund, Relocation Fund, Special Project Fund, Capacity Building Fund, Renovation and Enhancement Fund & GEBCO Fund) are included in the budget.

***2 Information relative au personnel* - Employee Information**	***2017***	***2016***
***Charges de personnel* - Personnel costs :**		
Secrétaire général et directeurs - Secretary general and directors	494	478
Salaires du personnel - Salaries to Staff Members	1 306	1 214
Cotisations aux régimes de retraite - Payment to retirement funds	370	342
Primes d'assurance - Medical insurance costs	125	122
Allocations au personnel - Allowances	56	40
Autres charges de personnel - Other staff expenses	51	43
Personnel temporaire - Temporary staff		36
Formation - Training		1
	2 402	2 276

L'effectif moyen annuel se décompose comme suit :		
The average number of employees during the year was made up as follows :		
Secrétaire général et directeurs - Secretary general and directors	3	3
Personnel de cat. A - Category A Staff	5	5
Personnel de cat B - Category B Staff	12	11
	20	19

Table 8

3 *Imposition du résultat* - Taxation

Selon l'accord conclu entre l'OHI et le Gouvernement de la Principauté de Monaco, les résultats de l'activité de l'Organisation sont exempts d'imposition.
According to the agreement between the IHO and the Government of the Principality of Monaco, the Organization is exempt from direct taxation.

4 *Immobilisations* - Tangible Fixed Assets

	Mobilier & Instruments Furniture & Instruments	*Biblio-thèque* Library	Total
***Valeurs d'acquisition* - Cost**			
Au 1er janvier de l'année - At 1 January 2017	303	37	339
Solde des mouvements de l'année -Net change during the year *	22	0	22
Au 31 décembre de l'année - At 31 December 2017	325	37	362
* *Achats moins mises au rebut* - Purchases less scrapping of equipment			
***Amortissements* - Depreciation**			
Au 1er janvier de l'année - At 1 January 2017	-262	0	-262
Amortissements de l'année - Depreciation for the year	-20	0	-20
	-281	0	-281
***Valeur nette* - Net book value**			
Au 31 décembre de l'année n-1 - At 31 December of previous year	41	37	78
Au 31 décembre de l'année n - At 31 December of current year	44	37	80

5 *Débiteurs* - Debtors	***2017***	***2016***
Contributions restant dues (nettes de provision) Overdue contributions less provision	379	280
TVA récupérable - VAT recoverable	62	54
Avances au personnel et charges constatées d'avance Prepayments and Staff advances	136	99
	577	433

6 *Créditeurs* - Creditors	***2017***	***2016***
Contributions reçues en avance - Prepaid contributions	953	1 005
Garantie au FRI - Guaranty to the IRF	845	680
Créditeurs et charges à payer - Creditors and accruals	112	73
	1 909	1 758

7 *Engagements pour la retraite* - Pension Commitments	***2017***	***2016***
- *Dépôts à terme du FRI* - IRF Bank deposits	2 886	3 046
- *Disponibilités banque SMC* - SMC Bank deposits	375	653
	3 261	3 699
- *Garantie du Secrétariat* - Secretariat Guaranty	845	680
- *Estimation de l'engagement de retraite du personnel* Estimated net liabilities for existing and former Staff Members	4 106	4 379

Table 8

8 Fonds dédiés (pour des opérations ultérieures) **Dedicated funds for future operations**	***2017***	***2016***
- *Fonds pour les conférences* - Conference Fund	252	374
- *Fonds de déménagement* - Relocation Fund	231	283
- *Fonds de rénovation et d'amélioration* - Renovation and Enhancement Fund	79	79
- *Fonds pour le renforcement des capacités* - Capacity Building Fund	1 146	214
- *Fonds pour les projets spéciaux* - Special Projects Fund	91	86
- *Fonds pour la GEBCO* - GEBCO Fund	881	212
- *Fonds de la bibliothèque de présentation* - Presentation Library Fund	40	32
- *Fonds pour la conférence ABLOS* - ABLOS Conference Fund	08	
- *Fonds IBSC* - IBSC Fund	25	19
9 Réserves **- Reserves**		
- *Fonds de réserve d'urgence* - Emergency Reserve Fund	260	255
	3 013	1 555

10 Réserve de trésorerie en fin d'année **- End of Year Cash Reserve**	***2017***	***2016***
Le montant de trésorerie de fin d'année est un indicateur très utile pour illustrer la solvabilité de l'Organisation, et sa capacité à poursuivre ses opérations durant les 3 mois de l'année suivante (13 semaines). *Un mois supplémentaire se trouve requis pour le fonds de Réserve d'urgence, ce qui signifie un total de 17 semaines.* The end-of-year cash reserve is a very useful indicator of the liquidity of the Organization, and its ability to continue operations in the new year. It should be sufficient for 3 months operations (13 weeks). In addition, a further 1 month is required for the Emergency Reserve Fund; this means a total of 17 weeks.		
Trésorerie de l'OHI - IHO Cash balances	6 666	5 193
(dont positions financières en devises - voir note 11 - including foreign exchange holdings - see note 11)		
Moins - Less		
- *Contributions de l'année suivante* - Contributions received in advance	-953	-1 005
- *Valeur des fonds dédiés* - Dedicated funds	-2 753	-1 299
	2 961	2 889
- *Garantie en faveur du FRI* - Guaranty to the IRF	-845	-680
- *Trésorerie disponible* - Net available Cash	2 116 *	2 209
* *35 semaines de fonctionnement* 35 weeks of operations		
Total du budget de l'année suivante (2018) - Total budget for 2018 :	3 117 *(hors fonds dédiés)*	
- *Besoins financiers totaux (Art.17 & 18)* = ***17 semaines*** Total IHO financial requirements (Art. 17 & 18) = 17 weeks		
Art.17 Réserve de trésorerie opérationnelle (3 mois) : Art.17 Operating Cash Reserve (3 months) :	-779	
Art.18 Fonds de réserve d'urgence (1 mois) : Art.18 Emergency Reserve Fund (1 month) :	-260	
	1 077	*Excédent de trésorerie disponible* Cash surplus

Table 8

11 *Positions financières en devises* - Foreign Exchange Holdings	***2017***	***2016***
Les disponibilités financières comportent des positions en devises étrangères.		
Pour information, la valeur en milliers d'Euros de ces positions en devises en fin d'année sont :		
The Cash balances include financial availabilities held in foreign currencies.		
For information, the value in thousands of Euros of foreign currencies held at the end of each year was :		
- Positions en USD - USD holdings	869	122

Ces positions en devises sont sujettes à revalorisation, en fonction de la variation des taux de change.
These holdings are liable to re-valuation, according to exchange rates fluctuations.

12 *Engagements de caution* - Guarantee commitments

Personne visée: Monsieur Kentaro KANEDA, détaché du service des gardes-côtes japonais auprès du RHI, en qualité de locataire de son domicile
Objet: caution solidaire du locataire portant sur paiement du loyer mensuel de 1 400€
Durée du bail: 3 ans (01/03/2015 - 28/02/2018)
Person concerned: Mr. Kentaro KANEDA, seconded by the Japan Coast Guard to the IHB ;
as Lessee of his apartment
Subject: surety on the tenant's monthly rent payment of € 1,400
Length: Length of lease: 3 years (01/03/2015 - 28/02/2018)

Table 9

FUNDS (Euros)
FONDS (Euros)

CONFERENCE FUND - *Fonds pour les Conférences*

The Conference Fund allows the expenses linked to the Int. Hydrographic Conference/Assembly to be met.
Le fonds pour les Conférences permet la couverture des dépenses de la Conférence hydrographique internationale/de l'Assemblée.

Amount of fund on 1 January 2017 - *Montant du fonds au 1er janvier 2017*	373 660,74 €	
Budget Allocation 2017 - *Dotation budgétaire pour 2017*	20 000,00	
Expenditure - *Dépenses*	-141 575,43	
Amount of fund on 31 December 2017 - *Montant du fonds au 31 décembre 2017*		252 085,31 €

RENOVATION AND ENHANCEMENT FUND - *Fonds de rénovation et d'amélioration*

The renovation fund is is maintained in order to meet any major expenses incurred for modification or renovation purposes of the building, in relation to those expenses not covered by the Government of the Principality of Monaco.
Le fonds de rénovation est maintenu pour couvrir toute dépense importante de modification ou de rénovation des locaux, dont le financement ne serait pas assuré par le Gouvernement de la Principauté de Monaco.

Amount of fund on 1 January 2017 - *Montant du fonds au 1er janvier 2017*	79 292,31	
Amount of fund on 31 December 2017 - *Montant du fonds au 31 décembre 2017*		79 292,31 €

RELOCATION FUND - *Fonds pour le déménagement des directeurs*

This fund is intended to cover the removal and relocation expenses for the internationally recruited members of staff.
Ce fonds est destiné à couvrir les dépenses de déménagement des membres du personnel recrutés sur le plan international.

Amount of fund on 1 January 2017 - *Montant du fonds au 1er janvier 2017*	283 111,04	
Budget Allocation 2017 - *Dotation budgétaire pour 2017*	5 000,00	
Expenditure - *Dépenses*	-56 997,48	
Amount of fund on 31 December 2017 - *Montant du fonds au 31 décembre 2017*		231 113,56 €

ABLOS CONFERENCE FUND - *Fonds pour les conférences ABLOS*

The ABLOS Fund supports the operational costs for the ABLOS conference which is held every other year.
Le fonds ABLOS couvre les dépenses d'une conférence qui se tient tous les 2 ans.

Amount of fund on 1 January 2017 - *Montant du fonds au 1er janvier 2017*	-46,19	
Registrations fees - *Recettes conférence octobre 2017*	14 100,00	
Expenditure - *Dépenses*	-5 629,65	
Amount of fund on 31 December 2017 - *Montant du fonds au 31 décembre 2017*		8 424,16 €

Table 9

GEBCO FUND - *Fonds pour la Carte Générale Bathymétrique des Océans*

This fund was created in 2002 to support approved GEBCO project activities and includes the subventions received every year from the Government of the Principality of Monaco and any other supporting benefactors.
Ce fonds a été créé en 2002 pour couvrir les activités liées à la GEBCO (recettes et dépenses), et inclut les subventions reçues chaque année du Gouvernement de la Principauté de Monaco et d'autres bienfaiteurs.

Amount of fund on 1 January 2017 - *Montant du fonds au 1er janvier 2017*	211 612,04	
Income - *Revenus :*		
Budget Allocation 2017 - *Dotation budgétaire pour 2017*	8 200,00	
Subvention from the Government of Monaco - *Subvention reçue du Gouvernement de Monaco*	8 300,00	
GEBCO Digital Atlas	1 955,00	
Sponsorship GEBCO symposyum	4 866,69	
Transfer from Nippon Foundation - *Transferi de la Nippon Foundation*	855 328,69	
Expenses - *Dépenses :*		
Financial assistance to attend GEBCO meetings - *Assistance financière à des participants*	-12 853,60	
SEABED 2030	-34 011,22	
Future of the Ocean Floor Forum	-162 243,45	
Amount of fund on 31 December 2017 - *Montant du fonds au 31 décembre 2017*		881 154,15 €

PRESENTATION LIBRARY FUND - *Fonds pour la bibliothèque de présentation*

This fund is dedicated to the maintenance of a specific publication (S-52 Annex A - *IHO Presentation Library for ECDIS*). During its 6th meeting, the Hydrographic Services and Standards Committee endorsed the continuation of the fund and recommended that the fund be used to support further development of the portrayal component of the new S-100 based generation of standards [1].

Ce fonds est dédié à l'évolution d'une publication spécifique (Annexe A à la publication S-52 - bibliothèque de présentation de l'OHI pour les ECDIS). Lors de sa 6ème réunion, le comité des normes et services hydrographiques a approuvé la continuation de ce fonds et a recommandé qu'il soit utilisé pour financer le développement ultérieur de la composante présentation de la nouvelle génération de normes basée sur la S-100 [1].

Amount of fund on 1 January 2017 - *Montant du fonds au 1er janvier 2017*	32 002,15	
Income - *Revenus :*		
Sales of the publication "Presentation Library" - *Ventes de la publication "Bibliothèque de présentation"*	8 000,00	
Amount of fund on 31 December 2017 - *Montant du fonds au 31 décembre 2017*		40 002,15 €

EMERGENCY RESERVE FUND - *Fonds de réserve d'urgence*

As announced in FCCL 6/2003, the amount of the Emergency Reserve Fund shall not be less than 1/12th of the annual operating budget.
Conformément à la lettre LCCF 6/2003 approuvée, le montant du fonds de réserve d'urgence ne devra pas être inférieur à 1/12ème du budget opérationnel annuel.

Amount of fund on 1 January 2017 - *Montant du fonds au 1er janvier 2017*	255 491,67	
Additionnal allowance to meet Financial Regulations Art.18 requirements - *Allocation complémentaire pour satisfaire les dispositions de l'article 18 du règlement financier*	4 233,33	
Amount of fund on 31 December 2017 - *Montant du fonds au 31 décembre 2017*		259 725,00 €

Table 9

INTERNAL RETIREMENT FUND - *Fonds de retraite interne (FRI)*

Amount of social liability on 1st January 2017 - *Montant de la dette sociale au 1er janvier 2017*	3 726 557,03	
Support from 2016 result - *Affectation du résultat 2016*	50 000,00	
Provision 2017 - *Provision 2017*	65 000,00	
The additional support is provided in order to build up the IRF so that it can fund the pensions of the remaining potential IHO pensioners. In 2015 the IHB received the capital sum from the Personalized Pension Plan from a staff member who elected to take a CAR-equivalent pension. In 2016, the obligation towards this pensioner has been calculated on the same basis as the other pensioners in the IRF, and is now included in the IRF From 2016, a provision has been included in the annual budget, to be adjusted every year, to cover the additional liabilities of the Staff Members electing to draw a pension equivalent to the CAR, in accordance with article 9.6 of the Staff Regulations edition 8.0.0 *L'affectation du résultat 2015 a été décidée pour aborder le FRI de telle manière qu'il puisse financer les pensions des derniers retraités potentiels de l'OHI.* *En 2015, le BHI a reçu le capital du Plan de Pension Personnalisé d'un membre du personnel éligible à une retraite alignée sur la CAR financée par l'OHI. En 2016, l'engagement envers ce retraité a été calculé sur la même base que les autres retraités du FRI, et est inclus dans le FRI.* *A partir de 2016, une provision, réévaluée tous les ans, est incluse dans le budget annuel, afin de couvrir les engagements supplémentaires générés par la possibilité pour les membres du personnel de choisir une pension basée sur la CAR, conformément à l'article 9.6 du Règlement du Personnel édition 8.0.0*		
Contributions received from staff - *Cotisations reçues (Secrétariat et membres du personnel)*	13 350,23	
Interests received from Deposit Accounts - *Intérêts perçus par le fonds (D/A)*	43 826,54	
Pensions paid from IRF - *Pensions réglées par le fonds (FRI)*	-203 914,02	
		3 694 819,78
Variation of IRF liability during the year - *Variation annuelle de la dette sociale du FRI*		36 139,00
Amount of IRF social liability on 31 December 2017 - *Montant de la dette sociale du FRI en fin d'année*		3 730 958,78 €

CAPACITY BUILDING FUND (CBF) - *Fonds pour le renforcement des capacités*

Circular Letter 87/2004 defines the CBF as a support to assist developing countries in building human and institutional capacities for the effective development of hydrographic surveying and nautical charting capabilities needed.

La lettre circulaire 87/2004 définit le CBF comme un soutien visant à aider les pays en voie de développement à établir des capacités humaines et institutionnelles en vue du développement efficace des capacités en levé hydrographiques et en cartographie marine nécessaires.

Amount of fund on 1 January 2017 - *Montant du fonds au 1er janvier 2017*	214 251,12	
Income - *Revenus:*		
IHO Budget Allocation 2017 - *Dotation budgétaire de l'OHI pour 2017*	160 000,00	
Support from 2016 result - *Affectation du résultat 2016*	191 000,00	
Support from the Republic of Korea - *Soutien reçu de la République de Corée*	166 429,00	
Support from Japan - *Soutien reçu du Japon*	1 114 035,00	
		1 845 715,12
Expenses - *Dépenses :*		
Activities supported by the Rep.of Korea - *Activités financées par la Rep. de Corée*	-144 478,35	
Activities supported by Japan - *Activités financées par le Japon*	-260 230,00	
Activities supported by IHO Capacity Building Fund - *Activités financées par le fonds de l'OHI*	-295 188,36	
		-699 896,71
Amount of fund on 31 December 2017 - *Montant du fonds au 31 décembre 2017*		1 145 818,41 €

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Table 9

SPECIAL PROJECTS FUND - *Fonds pour les projets spéciaux*

The Special Projects Fund was established in 2012 to cover various special projects, such as the maintenance or drafting of standards, the editing or updating of complex publications, translations, and particular requirements identified by the Committees and other bodies of the Organization. This fund supports in particular the development of the new generation of S-100 based standards [1]

[1] The current generation of IHO standards supporting ECDIS is based on two main standards which are separate: S-57 which defines the contents and the format of ENCs and S-52 which specifies the portrayal of ENCs on ECDIS. The new generation of standards based on S-100 has a different structure: S-100 defines the framework and the general principles to be implemented in specific product specifications (such as S-101 for the next ENC generation) which include portrayal rules when applicable.

Le Fonds pour les projets spéciaux a été établi en 2012 pour couvrir différents projets spéciaux, comme la maintenance ou l'établissement de normes, l'édition ou la mise à jour de publications complexes, diverses traductions, et des besoins particuliers identifiés par les comités et groupes de travail de l'Organisation. Ce fond couvre en particulier le développement de la nouvelle génération de normes basées sur la S-100 [1]

[1] La génération actuelle des normes de l'OHI relatives aux ECDIS est basée sur deux normes principales distinctes : la S-57 qui définit le contenu et le format des ENC et la S-52 qui régit la présentation des ENC sur les ECDIS. La nouvelle génération de normes basées sur la S-100 a une structure différente: la S-100 définit le cadre et les principes généraux applicables aux spécifications de produits particulières (comme la S-101 pour la future génération d'ENC) qui comprennent les règles de présentation éventuellement nécessaires.

Amount of fund on 1 January 2017 - *Montant du fonds au 1er janvier 2017*	85 902,65	
IHO Budget Allocation 2017 - *Dotation budgétaire de l'OHI pour 2017*	30 000,00	
Expenses in relation to WP 3.3.9 - Maintain IHO Publications (C-6, C-47, S-5, S-8)		
Dépenses en connection avec l'élément 3.3.9 du programme de travail : Maintien des publications OHI		
Travel expenses - *Frais de voyages*	-6 790,98	
Portolan project S122 - S123	-18 600,00	
Amount of fund on 31st December 2017 - *Montant du fonds au 31 décembre 2017*		90 511,67 €

IBSC FUND - *FONDS IBSC*

The purpose of the Fund is to support the approved operational expenses of the IBSC.
From 2015, the IHO as secretary of the IBSC, took over the role of treasurer of the Fund.
Le Fonds sert à couvrir les dépenses opérationnelles authorisées du Comité.
A partir de 2015, l'OHI en tant que secrétaire de l'IBSC, a repris le rôle de trésorier du Fonds.

Amount of fund on 1 January 2017 - *Montant du fonds au 1er janvier 2017*	18 782,83	
Fees levied on institutions seeking recognition by IBSC - *Honoraires facturés aux institutions souhaitant obtenir l'homologation IBSC*	22 472,54	
Travel expenses - *Frais de voyages*	-16 579,87	
Amount of fund on 31 December 2017 - *Montant du fonds au 31 décembre 2017*		24 675,50 €

The ABLOS, GEBCO and IBSC funds are all operated as part of the consolidated IHO bank accounts
Les fonds ABLOS, GEBCO et IBSC sont tous gérés par le biais des comptes bancaires consolidés de l'OHI.

Table 10

COMPARATIVE BALANCE SHEETS 31 DECEMBER 2017 AND 31 DECEMBER 2016

ASSETS	2017	2016
I. INTERNAL RETIREMENT FUNDS ASSETS		
Retirement cash invested (IRF)	2 886 213,42	3 046 477,68
	2 886 213,42	3 046 477,68
Long term guaranty from IHO funds	844 745,36	680 079,35
	3 730 958,78	3 726 557,03
Retirement cash invested (External Pension Plans)	**374 629,49**	**652 784,92**
II. VARIOUS DEBTORS		
Purchases made in advance	5 766,25	5 513,45
Outstanding bills	30 561,08	10 170,09
Advance to staff	31 146,88	25 199,67
Claim for refunding of VAT	61 665,76	54 011,41
Interest from Deposit to be received	69 287,43	57 997,28
Various debtors	0,00	0,00
	198 427,40	152 891,90
III. OUTSTANDING CONTRIBUTIONS		
Contributions for the year	344 705,84	294 666,05
Contributions for previous years	72 961,28	68 299,52
Contributions for suspended MS	32 748,04	39 151,66
Interest remaining due on contributions	1 131,77	4 606,64
	449 283,39	406 723,87
IV. FURNITURE AND EQUIPMENT	325 093,59	302 631,19
Depreciation of assets	281 383,85	261 653,28
V. LIBRARY	36 663,99	36 663,99
	80 373,73	**77 641,90**
VI. CASH AT BANK AND IN HAND		
IHO - Bank current accounts	1 685 706,26	793 932,19
IHO - Bank deposit accounts	4 975 492,19	4 388 177,70
Petty cash	5 278,06	10 491,17
	6 666 476,51	5 192 601,06
	11 500 149,30	**10 209 200,68**

LIABILITIES	2017	2016
I. STAFF RETIREMENT FUND LIABILITIES		
Staff Retirement fund (IRF)	1 308 005,78	1 339 743,03
Provision to ensure pensions to IRF staff and retirees	2 422 953,00	2 386 814,00
Actuarial estimate of liabilities	**3 730 958,78**	**3 726 557,03**
Value of External Pension Plans	**373 659,27**	**595 569,53**
II. VARIOUS CREDITORS		
NSM Pension plans	0,00	36 961,05
A.M.R.R Complementary Retirement Scheme	16 549,82	16 074,91
Accruals (outstanding bills, telex, telephone)	96 280,82	56 030,18
Travel claims & wages	130,00	1 541,82
Provision for doubtful contributions	70 072,76	126 800,39
Various creditors	0,00	0,00
Deposits received for Conference (stands)	0,00	19 545,00
Guaranty to the IRF	844 745,36	680 079,35
	1 027 778,76	**937 032,70**
III. FUNDS		
Conference Fund	252 085,31	373 660,74
Relocation Fund	231 113,56	283 111,04
Renovation and Enhancement Fund	79 292,31	79 292,31
Capacity Building Fund	1 145 818,41	214 251,12
Special Projects Fund	90 511,67	85 902,65
GEBCO fund	881 154,15	211 612,04
Presentation Library Fund	40 002,15	32 002,15
ABLOS Conference fund	8 424,16	-46,19
IBSC Fund	24 675,50	18 782,83
	2 753 077,22	**1 298 568,69**
IV. CONTRIBUTIONS RECEIVED IN ADVANCE		
Received in advance or in excess	**952 571,76**	**1 005 185,94**
V. CAPITAL		
Emergency Reserve fund	259 725,00	255 491,67
Provisions for risks	-2 460 307,68	-2 430 572,30
Net yearly operating profit	286 552,10	280 796,25
Net Members Fund	4 576 134,09	4 540 571,17
	2 662 103,51	**2 646 286,79**
	11 500 149,30	**10 209 200,68**

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Table 11

BILANS COMPARES (au 31 décembre 2017 et 2016)

ACTIF	2017	2016
I. TRESORERIE DES FONDS DE RETRAITE		
Trésorerie disponible (FRI)	2 886 213,42	3 046 477,68
	2 886 213,42	3 046 477,68
Garantie long terme du BHI (FRI)	844 745,36	680 079,35
	3 730 958,78	3 726 557,03
Trésorerie placée (Plans externes)	**374 629,49**	**652 784,92**
II. DEBITEURS DIVERS		
Prestations effectuées d'avance	5 766,25	5 513,45
Factures non encaissées	30 561,08	10 170,09
Avances au personnel	31 146,88	25 199,67
Demande de remboursement de TVA	61 665,76	54 011,41
Intérêts sur placements à recevoir	69 287,43	57 997,28
Débiteurs divers	0,00	0,00
	198 427,40	152 891,90
III. CONTRIBUTIONS		
Contributions pour l'année en cours	344 705,84	294 666,05
Contributions échues (années précédentes)	72 961,28	68 299,52
Contributions (Etats membres suspendus)	32 748,04	39 151,66
Intérêts restant dus sur contributions échues	1 131,77	4 606,64
	449 283,39	406 723,87
IV. MOBILIER & EQUIPEMENTS	325 093,59	302 631,19
Amortissement des immobilisations	281 383,85	261 653,28
V. BIBLIOTHEQUE	36 663,99	36 663,99
	80 373,73	**77 641,90**
VI. TRESORERIE DISPONIBLE		
OHI - Comptes courants bancaires	1 685 706,26	793 932,19
OHI - Comptes de dépôt & placement monétaire	4 975 492,19	4 388 177,70
Espèces en caisse	5 278,06	10 491,17
	6 666 476,51	5 192 601,06
	11 500 149,30	**10 209 200,68**

PASSIF	2017	2016
I. ENGAGEMENTS DES FONDS DE RETRAITE		
Fond de Retraite Interne (FRI)	1 308 005,78	1 339 743,03
Provision pour couvrir les pensions du personnel (retraités et actifs relevant du FRI)	2 422 953,00	2 386 814,00
Montant découlant de l'étude actuarielle	**3 730 958,78**	**3 726 557,03**
Plans de pensions externes	**373 659,27**	**595 569,53**
II. CREDITEURS DIVERS		
Plans de pension NSM	0,00	36 961,05
Retraite complémentaire A.M.R.R	16 549,82	16 074,91
Charges à payer (factures, télécommunications, etc..)	96 280,82	56 030,18
Salaires et notes de frais	130,00	1 541,82
Provision pour contributions	70 072,76	126 800,39
Créditeurs divers	0,00	0,00
Montants reçus pour la prochaine Conférence (stands)	0,00	19 545,00
Garantie en faveur du FRI	844 745,36	680 079,35
	1 027 778,76	**937 032,70**
III. FONDS DEDIES		
Fonds pour les conférences	252 085,31	373 660,74
Fonds pour le déménagement des directeurs	231 113,56	283 111,04
Fonds de rénovation et d'amélioration	79 292,31	79 292,31
Fonds pour le renforcement des capacités	1 145 818,41	214 251,12
Fonds pour les projets spéciaux	90 511,67	85 902,65
Fonds pour la GEBCO	881 154,15	211 612,04
Fonds de la bibliothèque de présentation	40 002,15	32 002,15
Fonds pour la conférence ABLOS	8 424,16	-46,19
Fonds IBSC	24 675,50	18 782,83
	2 753 077,22	**1 298 568,69**
IV. CONTRIBUTIONS REÇUES EN AVANCE		
Reçues en avance ou en excédent	**952 571,76**	**1 005 185,94**
V. CAPITAUX PERMANENTS		
Fonds de réserve d'urgence	259 725,00	255 491,67
Provisions pour risques (FRI + MS)	-2 460 307,68	-2 430 572,30
Résultat opérationnel net de l'année en cours	286 552,10	280 796,25
Capitaux nets permanents	4 576 134,09	4 540 571,17
	2 662 103,51	**2 646 286,79**
	11 500 149,30	**10 209 200,68**

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INTERNATIONAL HYDROGRAPHIC ORGANISATION

Registered Office
4, quai Antoine Ier
MONACO

YEAR ENDING 31 DECEMBER 2017

AUDIT REPORT

Frank MOREL
57, rue Grimaldi
MONACO

Frank MOREL
57, rue Grimaldi
MONACO

INTERNATIONAL HYDROGRAPHIC ORGANISATION

4, quai Antoine Ier
MONACO

AUDITOR'S REPORT
For financial year ending 31 décember 2017

❖❖❖

Dear Sir or Madam,

In accordance with the task entrusted to me by the Finance Committee at the International Hydrographic Conference, held from 23 to 27 April 2012, and in application of the provisions of Article 19 of the Financial Regulations of the International Hydrographic Organisation, I am pleased to submit my report on the accounts for the year 2017.

These annual accounts, prepared by the Secretary-General, which reveal a net profit of € 286.552,10.

They have been prepared in the same format and using the same methods of analysis as for the past financial year.

My task, which consists of expressing an opinion on these annual accounts, has been conducted in such a way as to be reasonably sure that they do flot contain any significant irregularities. I have undertaken this task with the care that I considered necessary and I have made random checks on the operations carried out during the 2017 financial year. I have in particular verified the cash in hand and the liquid assets or negotiable securities.

In my opinion, the accounts which are submitted for your approval accurately reflect the financial situation of the International Hydrographic Organisation as at 31 december 2017,

as well as the operations and the result of the 12 month financial period, closed on that date.

Monaco, 25 april 2018

Auditor,

F. MOREL

Table 10

COMPARATIVE BALANCE SHEETS 31 DECEMBER 2017 AND 31 DECEMBER 2016

ASSETS	2017	2016
I. INTERNAL RETIREMENT FUNDS ASSETS		
. Retirement cash invested (IRF)	2 856 213,42	3 046 477,68
	2 886 213,42	3 046 477,68
. Long term guarantee from IHO funds	844 745,36	680 079,35
	3 730 958,78	3 726 557,03
. Retirement cash invested (External Pension Plans)	374 629,49	652 784,92
II. VARIOUS DEBTORS		
Purchases made in advance	5 766,25	5 515,45
Outstanding bills	30 561,08	10 170,00
Advance to staff	31 146,88	25 199,67
Claims for refunding of VAT	61 665,76	54 011,41
Interest from Deposit to be received	69 287,43	57 997,28
Various debtors	0,00	0,00
	198 427,40	152 891,90
III. OUTSTANDING CONTRIBUTIONS		
Contributions for the year	344 705,84	294 666,05
Contributions for previous years	72 961,28	68 299,52
Contributions for suspended MS	32 748,04	39 151,66
Interest remaining due on contributions	-1 131,77	4 606,64
	449 283,39	406 723,87
IV. FURNITURE AND EQUIPMENT	325 093,59	302 631,19
Depreciation of assets	-288 383,35	-261 652,28
V. LIBRARY	36 663,99	36 662,99
	80 373,73	77 641,90
VI. CASH AT BANK AND IN HAND		
IHO - Bank current accounts	1 685 766,26	793 932,19
IHO - Bank deposit accounts	4 975 462,19	4 388 177,70
Petty cash	5 278,06	10 491,17
	6 666 476,51	5 192 601,06
	11 500 149,30	10 209 200,68

LIABILITIES	2017	2016
I. STAFF RETIREMENT FUND LIABILITIES		
Staff Retirement fund (IRF)	1 808 005,78	1 339 743,03
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. Value of External Pension Plans	373 659,27	595 569,53
II. VARIOUS CREDITORS		
NSM Pension plans	0,00	36 961,05
A.M.R.R. Complementary Retirement Scheme	16 549,82	16 074,91
Accruals (outstanding bills, telex, telephone)	96 280,82	56 930,48
Travel claims & wages	130,00	1 841,82
Provision for doubtful contributions	70 072,76	126 800,39
Various creditors	0,00	0,00
Deposits received for Conference (stand)	0,00	19 545,00
Guaranty to the IRF	844 745,36	680 079,35
	1 027 778,76	937 832,70
III. FUNDS		
Conference Fund	252 085,31	373 660,74
Relocation Fund	231 113,56	283 111,06
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Capacity Building Fund	1 145 818,41	214 251,12
Special Projects Fund	90 511,67	85 902,65
GEBCO fund	881 154,15	211 612,04
Presentation Library Fund	40 002,15	32 002,15
ABLOS Conference fund	8 424,16	-46,19
IBSC Fund	24 675,30	18 782,81
	2 753 077,22	1 298 568,69
IV. CONTRIBUTIONS RECEIVED IN ADVANCE		
Received in advance or in excess	952 971,76	2 005 185,94
V. CAPITAL		
Emergency Reserve fund	289 725,00	238 491,67
Provisions for risks	2 460 307,68	2 430 572,30
Net yearly operating profit	286 552,10	280 795,25
Net Members Fund	4 575 134,09	4 540 571,17
	2 662 103,51	2 646 286,79
	11 500 149,30	10 209 200,68

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