Publication P-7

Annual Report 2022

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IHO

International Hydrographic Organization

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FOREWORD

The year 2022 heralded in the second century of existence of the International Hydrographic Organization (IHO). It also marked a return to more normal operations following the two-year period of stringent COVID-19 constraints. Most of the IHO working groups and committees, such as the annual session of the Council, were once again organized as in-person meetings in recognition of the fact that virtual and hybrid meetings will never fully replace personal encounters. Face-to-face discussions are vital for an international organization whose members span all time zones as they can accommodate differing communication styles and national positions and perspectives. At the same time, thanks to technology, virtual meetings have become an effective tool for joint deliberations on the IHO project team and working group level. Such meetings not only expand our tool box, they are also in line with this year's theme "Hydrography - contributing to the UN Ocean Decade." The avoidance of undue travel are a sign of our ambition to decrease our CO_2 footprint.

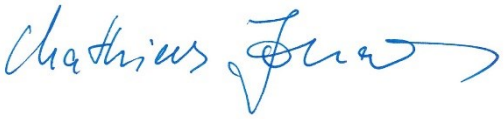
Nevertheless, this small measure is just one aspect of the IHO's commitment. The IHO and the world's hydrographic offices continue to transition towards a data-centric approach which will feed not only nautical charts, but also a marine spatial data infrastructure that supports the sustainable use of marine resources, earth system modelling and environmental protection. In fact, most people working in hydrography know very well that good ocean data, open and accessible to most, can be used to inform a variety of decisions ranging from storm preparedness to helping develop the Blue Economy.

Based on this expertise and the vision to do more in terms of fostering innovations and partnerships within our network, the IHO took the first steps to enter the larger ocean science scene. Our active, joint participation with numerous Member States in the UN Oceans Conference in Lisbon provided an opportunity to explain how our core strengths, notably ocean mapping, capacity building and technical standardization in hydrography, can contribute to these global initiatives. However, thinking globally is really nothing new for the IHO. One can follow a thread from 1922, with the revolution in hydrographic surveying capability thanks to the introduction of hydro-acoustic methods for measuring water depths in a so far unseen quality and quantity, to 1972, when the first steps were taken toward the creation of an international series of INT charts, all the way up to November 2022 with the endorsement by the International Maritime Organization (IMO) of S-100 ECDIS, which can be considered electronic chart navigation 2.0.

The reference to a dedicated navigation device should not be construed as limiting the scope of the IHO to surface navigation. The S-100 technology holds the potential to integrate all relevant disciplines of ocean data and to support the full ocean stakeholder´s community including, but not limited to, economists and environmentalists. The IHO is now on firm regulatory ground to turn this vision into a mission. The Directing Committee has every confidence that this will become a reality thanks to the expertise, capacity and vigour of the now 98 Member States distributed over all continents, increasingly aware that the transition to a new universal standard, flexible and adaptable to the needs of the entire international maritime community, can no longer be postponed. Special mention should be made of the education and training projects sponsored by the IHO, IHO Member States and donor Foundation, in the fields of hydrography, cartography and the *Empowering Women in Hydrography* project. Altogether, between courses and internships more than 40 opportunities were offered to 30 IHO Member States.

The year 2022 also marked the end of the second triennium of the IHO Council. The Council session is the culmination of the IHO working year. Coming together at the IHO Secretariat, Council Members reflect on progress made and take decisions for the next steps in technical standardization and capacity building support. We would like to offer our compliments to Dr Geneviève Béchard, National Hydrographer of Canada, for her capable leadership as Council Chair through a period impacted so much by the COVID-19 constraints. The Council has addressed all of the items it was tasked with from the second Assembly and the IHO is now well prepared for the forthcoming 3rd Session of the Assembly as an **in-person** event in 2023!

Monaco, 1st March 2023


Abri Kampfer	Dr Mathias Jonas	Luigi Sinapi
Director	Secretary-General	Director

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INTRODUCTION

The Secretariat is pleased to present the Annual Report of the activities of the Organization for 2022. 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.

Work Programme & Strategic Plan

The conduct of the IHO Work Programme was permanently overseen by the Council. As a result of the 2nd Assembly's approval of the revised Strategic Plan, each item of the Work Programme was associated with the respective goals and targets. Despite the COVID constraints most programmed work items were met. The detailed review of the IHO Work Programme items addressed at Council meetings resulted in concrete proposals for decisions and actions, which are now brought forward to the 3rd Assembly for consideration and subsequent approval.

Budgetary and financial situation

The Council has permanently overseen the budget and the financial situation by consideration of the respective annual reports of the Secretary-General and the endorsement of annual budget estimates during the inter-Assembly period.

This Report consists of two Parts to address the two principal items as explained above:

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 suitable, Part 1 of the Report follows the same structure and uses the same headings as in the approved Work Programme.

Part 2 – Finance

Part 2 provides the financial statement and accounts for 2022.

A significant part of the operational budget is allocated to travel. This supports the travel expenses of the Secretariat Staff engaged on IHO activities. Due to the ongoing COVID-19 constraints, numerous travel activities were suspended and therefore substantial savings could be made noting the global rise of the cost for air tickets. A list of Secretariat travel in 2022 is shown in **Annex D**.

Performance Monitoring

The second Assembly tasked the Council to monitor closely the appropriateness and applicability of the proposed Strategic Performance Indicators and amend them if deemed necessary (Decision A2/20). Under the aegis of the responsible Committee chairs, both HSSC and IRCC managed a comprehensive review of the proposed indicators and submitted proposals for endorsement at Council. The annual Status Report on Performance Monitoring forms **Annex B** to the IHO Annual Report (Publication P-7). This Annex also includes a set of SPI´s for Work Programme 1 *Corporate Affairs,* which are based on the proposals made by the Secretary-General and endorsed by Council.

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ANNEXES

PART 2 - FINANCE

ANNUAL REPORT SUMMARY

Work Programme 1

In the spirit of the theme for World Hydrography Day 2022 - *Hydrography - contributing to the United Nations Ocean Decade* - the IHO continued to support the UN Ocean Decade in a variety of topics. Together with several Member States and partners, the IHO organized a side-event at the UN Ocean Conference in Lisbon and participated in the Seabed 2030 side-event. This ensured hydrography was discussed at this global gathering, which was timely as many international organizations and participants mentioned the importance of mapping the ocean. Another achievement was the endorsement of the Canada-IHO *Empowering Women in Hydrography* project as an official Ocean Decade Action.

This year´s Conference organized as part of the Informal Consultative Process of the UN Division for Ocean Affairs and the Law of the Sea (DOALOS) focused its discussions on the theme "Ocean observing and was deliberately scheduled around World Ocean Day. IHO contributed to the topic and emphasised that the shape of the seabed influences a variety of ocean processes: the movement of pollutants, ocean circulation and climate, and provides habitats for marine species.

Nearly three years after the approval of the IHO Strategic Plan 2021-2026, thanks to the joint efforts of the Secretariat's staff and the HSSC and IRCC subordinate bodies, the Strategic Performance Indicators (SPIs) necessary to measure the achievement of the 3 Goals and 9 Targets of the Strategic Plan have been quantified.

The IHO continued to see the increase in reach of its digital communications. In 2022, the IHO website had a total of 863,322 page views, and the LinkedIn page grew to 6525 followers in January 2023.

During the IHO Council meeting in October, which closed the second Council triennial, representatives of 26 countries and Observers discussed preparations for the Assembly, progress with the transition to digital data services with the implementation of S-100, as well as hydrography's contribution to global initiatives such as the Digital Twin of the Ocean. The Council also welcomed the accession of Albania to the Convention on the International Hydrographic Organization and thereby becoming the 98th Member State.

Work Programme 2

The International Maritime Organization's (IMO) Maritime Safety Committee (MSC106) adopted a new MSC resolution on Performance Standards for Electronic Chart Display and Information Systems (ECDIS), thereby making the use of S-100 and its related products a reality for improving safety of navigation. S-100 ECDIS will be legal to use after 1 January 2026 with a transition phase until 1 January 2029 when all new systems must comply with the new IMO Resolution on ECDIS Performance Standards. The IHO proposal to IMO was based on the IHO S-100 timeline and it is now of utmost importance to keep to the timeline for the broad introduction of S-101 and associated S-100 product specifications.

The Dual Fuel Concept for S-100 ECDIS was formulated, based on the coexistence of S-57 and S-101 ENCs for a period of transition and the ongoing use of older systems in the field. In order to assist Hydrographic Offices in their production arrangements during this period the S-57 ENC to S-101 Conversion Guidance was made available in its first edition. Another milestone event was the adoption of the new S-100 Edition 5.0.0, the result of four years of extensive testing and development and which includes major improvements compared to the previous version. Approval of the first editions of Product Specifications for Interoperability (S-98), the Catalogue of Nautical Products (S-128) and a new edition of S-99 (Management of the S-100 GI Registry) is equally noteworthy as, together with S-100, they form part of the critical framework of the S-100 Implementation strategy.

The joint IHO-Singapore Innovation and Technology Laboratory launched its first project in March 2022. The development of the S-131 Marine Harbour Infrastructure Database aims to improve the exchange of information between harbours and hydrographic offices through the creation of a neutral repository of harbour information. Established in October 2021, the Laboratory currently has three running projects and one pending project.

Being one of the most popular and widely used IHO standards, it is notable that an update of Publication S-44 Edition 6.1.0 Standards for Hydrographic Surveying was released. This latest revision saw a further adjustment to the often used survey order table which allows a modular approach to both specifying and assessing the quality of bathymetric datasets. In turn, this facilitates the use of a wider variety of data collection techniques as it is easier for data managers to describe the measurement uncertainty by individual parameter rather than just by survey order.

Work programme 3

Progress in ocean mapping continued this year. Thanks to the support provided by the Nippon Foundation GEBCO Seabed 2030 project, Crowdsourced Bathymetry Initiative and others, the 2022 GEBCO Grid has now reach 23.4% coverage, which represents an area equivalent to the size of Europe, or slightly larger than the Sahara Desert.

The publication of Guidance on Crowdsourced Bathymetry (B-12 Ed 3.0.0) will also facilitate this work among a wider group of stakeholders. The publication has enabled many nations to revisit their national policies on allowing Crowdsourced Bathymetry and will act as an essential reference tool as we seek to grow the initiative with the adhesion of additional coastal states.

The year 2022 saw a lot of momentum in the IHO Empowering Women in Hydrography (EWH) project. In addition to being endorsed as a UN Ocean Decade action, the Secretariat announced the launch of a mentoring programme and conducted a survey to gain information on the percentage of female employees and female leaders in Hydrographic Offices. 44 Member States have answered so far and results show that 20% of leadership positions are occupied by women.

Work on Marine Spatial Data Infrastructure progressed with the Open Geospatial Consortium (OGC) and the UN-GGIM and the International Seminar on United Nations Global Geospatial Information Management.

Thanks to the efforts of the Korean Hydrographic and Oceanographic Agency (KHOA) and the work of the ad-hoc Project Team, the IHO E-Learning Center is in the final implementation phase and due to become fully operational very soon.

With the easing of the COVID-19 pandemic, activities included in the 2022 Capacity Building Programme and those not carried out in the previous two years were conducted for the benefit of Regional Hydrographic Commissions and their members in 2022. The Capacity Building Strategy was revised and approved by the IHO Council. The total funds for CBWP non-earmarked projects limits the attribution of funds to the activities submitted by the RHCs and will continue to be significant in the future.

A key output of the collaboration with IMO and WMO in support of safety of navigation was the finalization of the revised joint IMO/IHO/WMO Manual on Maritime Safety Information drafted by the World-Wide Navigational Warning Service Sub-Committee, which is formed by representatives of all three international organizations.

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 2022

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

***** *Rights of membership suspended*

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IHO SECRETARIAT
2022-2023

Directing Committee

MATHIAS JONAS

Secretary-General

LUIGI SINAPI

Director Inter Regional Coordination & Support Programme

ABRI KAMPFER

Director Technical Programme

Managerial Staff

LEONEL MANTEIGAS

Assistant Director Coordination & Capacity Building

SAM HARPER

Assistant Director Survey & Operations

YONG BAEK

Assistant Director Digital Technology

YVES GUILLAM

Assistant Director Charting & Services

Technical, Administrative and Service Staff

ISABELLE ROSSI

Head Translator

CAROLINE FONTANILI

Executive Support Officer

SANDRINE BRUNEL

Finance Administration Officer

SARAH JONES-COUTURE

Public Relations & Communication Officer

DAN COSTIN

Information Technology Officer

JEFF WOOTTON

Technical Standards Support Officer

LORÈNE CHAVAGNAS

Capacity building, Secretariat & Registration Assistant

ARESKI MAACHE

General Suport Assistant

ISABELLE BELMONTE

Digital Publication & Web Assistant

ASTRID ALONSO

Digital Communication Assistant

TRACY BOWENS

Empowering Women in Hydrography Assistant /Outreach & Communication Assistant

REMY ROQUEFORT

GIS & Graphic Arts Assistant

Associate Professional Officers

INSUNG PARK

Standards Support

KAZUFUMI MATSUMOTO

GIS and IT Projects

JAVIER FERNANDEZ

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 Council

For more than two years the activities of this Council were cast against the backdrop of the COVID-19 pandemic. The 2nd IHO Assembly and the 4th and 5th meeting of the IHO Council was virtual and abbreviated. During this period Council members had to learn to work differently and this will continue to influence how we work for years to come. As VTCs became more commonplace IHO bodies benefitted from supplementary meetings that could be easily arranged and executed. In another way, however, it became clear that the body is most productive to address strategic issues when working together and in-person. The Chair of the Council, Dr Geneviève Béchard, expressed her satisfaction that members were finally able to meet in person for the 6th meeting of the IHO Council from 18 – 20 October at the IHO Secretariat in Monaco.

The main reference for all Council activities in the inter-assembly period have been the A-2 Decisions allocated to the Council. Despite the COVID-19 pandemic, Council has made significant progress on the items it was tasked by Assembly. Two key objectives which we are reporting on have been firstly: the effective implementation of the revised Strategic Plan and secondly: the launch of the decade of implementation of delivery of S-100 services.

During the course of its business the Council produced a number of decisions leading to concrete directions for action by the Secretariat, HSSC and IRCC. The detailed review of the Work Programme items addressed at Council meetings resulted in concrete proposals for decisions and actions, which are now brought forward to the Assembly for consideration and subsequent approval.

Cooperation with International Organizations

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

Antarctic Treaty Consultative Meeting (ATCM)

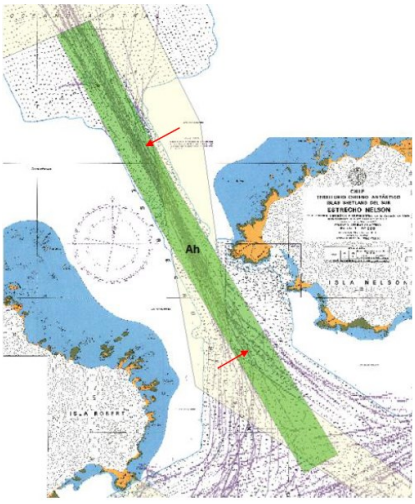
The 18th Conference of the IHO Hydrographic Commission on Antarctica was held as a hybrid event, from 24 to 26 May 2022, in Berlin, Germany, in conjunction with the XLIV Antarctic Treaty Consultative Meeting (ATCM). The meeting was held at the Dorint Hotel with a VTC platform operated by the IHO Secretariat with some contracted IT support.

The Conference was chaired by Dr Mathias Jonas, Secretary-General of the IHO, supported by Assistant Director Yves Guillam, HCA Secretary and Ms Caroline Fontanili (IHO Secretariat) as

rapporteur. Forty registered delegates from 17 Member States out of 24 (Argentina[1], Australia[1], Brazil, Chile, Colombia[1], Ecuador, France, Germany, India[1], Italy, Norway, Peru[1], Republic of Korea[1], South Africa[1], Spain[1], United Kingdom, and USA), two Observers (IAATO[2], SCAR[1]) and one subject matter expert (GEBCO IBCSO Project Representative), attended the meeting.

On the first day, the HCA Chair visited ATCM XLIV and took the opportunity to re-establish some traditional partnership links. Meanwhile, Mr Lee Truscott (UKHO), Chair of the Hydrographic Priorities Working Group (HPWG) and the Region M International Charting Coordination Working Group (ICCWG), ran a fruitful technical workshop that had not been arranged for some years, in particular due to the pandemic. Participants in this informal workshop had many opportunities to share their views on a significant number of technical proposals and options (amendments to Maritime Shipping Routes, charting options, etc.).

Highlighting the unique character of this Commission in the IHO, the unique situation of Antarctica in the world (governance, environment, remote situation, geography, etc.), the Chair opened the meeting announcing the entry into force of the revised HCA Statutes. Amendments approved by HCA Members by correspondence since HCA-17 make the revised HCA Statutes now fully aligned with the IHO Resolution 2/1997 - *Establishment of Regional Hydrographic Commissions (RHC)* – the Antarctic Treaty System[3], the last ATCM Resolutions and the IHO Strategic Plan 2021-2026. Subsequently, the HCA agreed that, with a wider scope of responsibility than INT charts and ENC production, Art. 8.e of the General Regulations of the IHO on the HCA needed to be amended. It was agreed to submit a proposal for Council's endorsement prior to final submission to the 3rd Session of the Assembly for approval of IHO Member States.



BC 'Ah' – Nelson Strait (INT9151 BR/CL)
Amended reflect AIS traffic and underlying data quality

Using traffic density analysis, the HPWG Chair provided an outstanding review of the adequacy of the Maritime Shipping Routes in the Peninsula and a compilation of the updates received from Members on INT charts and ENC production, together with production options for some areas (corridors, Deception Island, etc.).

Beyond the traditional survey and charting issues, the HCA engaged in the preparation of the future. Anticipating the outcome of IRCC-14 on the recommendations from the WENDWG with regard to the S-100 Implementation Roadmap per region, HCA agreed to establish an HCA S-100 Implementation Working Group. Some actions are planned to prepare the governance and production strategies for the top priority S-100 based products (S-101, S-102, S-104, S-111, S-122, S-124, S-128, and S-411).

[1] By VTC.
[2] Recorded presentation.
[3] Antarctic Treaty, Article II 1.(c) states that "*scientific observations and results from Antarctica shall be exchanged and made freely available*".

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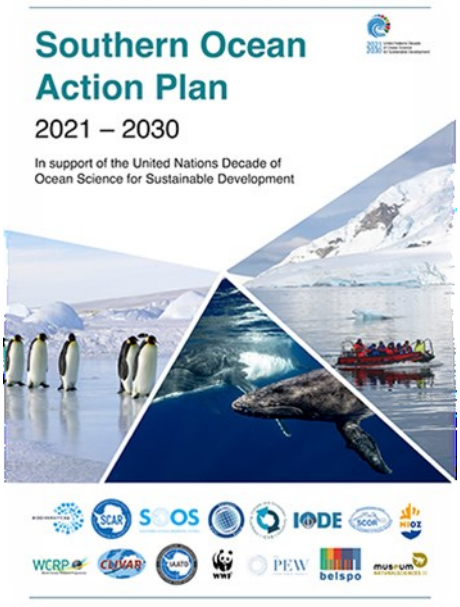
The national reports provided by HCA Members were very informative and well received. The investments in progress by several nations in the development of their own National Polar Strategic Plans, supported by the future commissioning of new Polar Research Vessels, were duly acknowledged. HCA Members were encouraged to share all data collected by these new assets and to provide them either to the IHO DCDB or Seabed 2030 Regional Data Centres. The HCA Secretariat proposed a new straightforward procedure to submit survey coverage metadata for being displayed in HCA GIS which was agreed by the HCA Members.

The HCA Chair re-opened the discussion on the issue raised by the publication of an article[4] in National Geographic recognizing a 5th ocean in the world (the so-called "*Southern Ocean*") while a Note on the Oceans in the foreword of IHO Publication S-23, indicates why this body of water has been omitted in S-23, Edition 3, 1953. Noting the wide usage of "*IBCSO*"[5] by GEBCO for instance, HCA agreed to consider the possibility of submitting an IHO Resolution at the next Assembly.



Reporting on the highest-ever recorded temperature following a heat wave in March 2022 in Antarctica (+40°C above March average in Concordia), the HCA Secretariat offered to have an open brainstorming discussion on the involvement of the IHO in general, and HCA in particular, on scientific matters in relation to climate change. No precise action was identified except for the time being, the analysis of the SCAR's Recommendations for Action available in their recent report: *Antarctic Climate and the Environment: A Decadal Synopsis and Recommendations for Action*.

[4] https://www.nationalgeographic.com/environment/article/theres-a-new-ocean-now-can-you-name-all-five-southern-ocean.

[5] Source: www.gebco.net; "*The International Bathymetic Chart of the **Southern Ocean** (IBCSO) is endorsed by international organizations such as the Intergovernmental Oceanographic Commission (IOC) of UNESCO, the **International Hydrographic Organization (IHO)**, and the Scientific Committee on Antarctic Research (SCAR) as an Expert Group under the GeoSciences Group.*"

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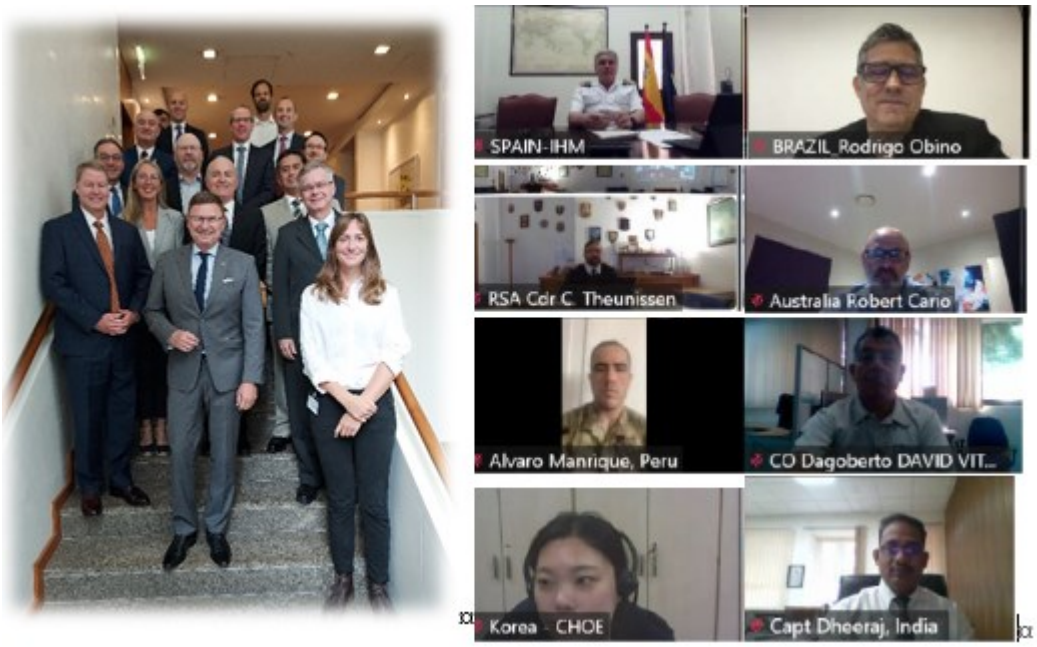

Some of the participants of HCA-18

<u>Comité International Radio Maritime (CIRM)</u>

CIRM was represented in the IHO drafting group that produced the draft amendments to the ECDIS Performance Standards (MSC232(82)) and joined the IHO as a co-sponsor in the submission to IMO in June 2022.

<u>European Union Initiatives (INSPIRE and EMODnet)</u>

On 6 May 2022, the European Commission and the International Hydrographic Organization (IHO) celebrated the tenth Anniversary of the Memorandum of Understanding between the two Organizations at the headquarters of the European Union's DG Mare. The event was attended by the European Commissioner for environment, oceans and fisheries - Mr Virginijus Sinkevičius and representatives of the Directorates General of the European Union, whilst for the IHO, Director Luigi Sinapi and representatives of twelve European Hydrographic Offices were present. Participants underlined the results achieved in 10 years of fruitful cooperation between the two Organizations, thanks to the commitment of the European Hydrographic Offices and the IHO-EU Network Working Group, as well as the impact of the EU initiatives in the field of Hydrography. The IENWG which was initiated for the implementation of the MoU, identifies EU activities and processes on matters of interest to Hydrographic Offices (HOs).

Relations with the EU progressed well during the reporting period, in particular through the development of the Coastal Mapping Project in relation with the bathymetry portal of the European Marine Observation and Data Network (EMODnet) which has become the principal source of bathymetric data of European sea basins incorporated into the global GEBCO grid.

Another positive example for collaboration was on the One Ocean Summit under French EU Council Presidency in February 2022. The Secretary-General was participating in the panel discussion: Critical Ocean Knowledge Needs for Sustainable Ocean Management.

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

Joint IHO/IALA Workshop on S-100/200 Development and Portrayal

The joint IHO/IALA Workshop on S-100/200 Development and Portrayal was held from 5 to 9 September 2022, hosted by the Norwegian Coastal Administration (NCA) in Ålesund, Norway. The workshop was very well attended by 78 participants from 17 countries and the IHO Secretariat, represented by Director Abri Kampfer, Assistant Director Yong Baek and Technical Standards Support Officer Jeff Wootton.

Mr Arve Dimmen, Director of Navigation Technology and Maritime Services, Norwegian Coastal Administration (NCA) welcomed participants on behalf of the NCA to Ålesund. He noted the current problems in the world and highlighted the need for meetings such as this to continue international collaboration and highlighted to participants the impact that the digital revolution has now upon traditional Aids to Navigation (AtoN). The Arctic infrastructure currently being monitored by Norway was highlighted as well as the relationship that this NCA work has with the Workshop objectives.

Director Abri Kampfer congratulated the organizers of the Workshop and welcomed the joint effort of IALA and IHO coming together in one event. He recalled the remarkable work that was conducted under the difficult conditions during the recent pandemic, particularly development of the road map for S-100 implementation.

The “Introduction to S-100” presented by the HSSC Chair Magnus Wallhagen gave an overview of what S-100 means for the maritime community, identified benefits and described the main building blocks of the S-100 framework. Prioritized S-100 products were described and how they could interact with each other. A timeline for the prioritized S-100 products was presented as well as how IHO cooperation with the IMO and other international Organizations will ensure that the implementation of the future S-100 ECDIS will be as smooth as possible. The presentation indicated the different forums involved within IHO contributing to S-100 development with an organizational overview of the technical Working Groups.

Workshop plenary session

Assistant Director Yong Baek provided participants with an overview presentation on the IHO Geospatial Information (GI) Registry; and provided an overview of the S-100 Framework supporting

documents, in particular S-97 - *IHO Guidance for Creating S-100 Product Specifications*. Technical Standards Support Officer Jeff Wootton gave presentations on the processes and lessons learned in the development of S-101 - *ENC Product Specification*; and portrayal from an IHO perspective, focussing on the challenges of the emerging requirement for the interoperability of multiple S-100 based products in ECDIS.

The Workshop established three working groups: *WG1 - initializing and productizing of S-100 series data*; *WG2 - S-201, S-124 and S-125 development*; and *WG3 - S-98 interoperability and marine AtoN portrayal*. The Workshop participants considered the various presentations that were given during the plenary sessions and the work conducted within the WGs and it was concluded that:

- Cooperation between the two international Organizations is important to proceed with marine digitization; and in order to inform the shipping domain of the cooperation efforts between the two bodies.
- Continued coordination and closer collaboration between IHO, IALA and other relevant bodies is essential to achieve globally harmonized solutions for S-100/200 development and portrayal. This could be achieved by the use of rapporteurs at the IALA committee level.
- The transition from S-52 to S-101 portrayal is being progressed by IHO. IALA may have comments which can be put forward following the IALA ARM16 Committee meeting. This requires presentation of the draft portrayal symbols at the IALA ARM Committee meeting.
- It was agreed that S-201 should be the update source data transfer standard for Aids to Navigation (AtoN) data for use by hydrographic authorities.
- A clear and concise understanding of the purpose and use of S-125 was agreed upon. It was agreed that S-125 would be a suitable replacement for the List of Lights and Fog Signals and act as a bridging mechanism.
- The joint IHO/IALA development of S-125 should continue and the dataset should include, at a minimum, the same AtoN data contained in the S-101 Product Specification.
- As there are differences in the frequency of when S-101 data can be issued, which is to the best of the ability of the producing authority and service provider, the S-125 dataset should be updated at a frequency necessary to support navigational safety
- Content in S-124 and S-125 should be coordinated on a regional level, in order to minimize data duplication.
- Integration of S-125 into ECDIS is a medium term outcome but it will need immediate action in order to meet that goal.
- IMO approved communication requirements (GMDSS) cannot efficiently communicate S-100 based data to mariners. In order to rapidly deliver time critical information to navigational equipment a secure broadband connection to the vessel is required in accordance with relevant IEC standards.
- There is a need for a range of marketing communication, covering the necessity to adopt S-100 digital services, in a way that reaches a wider audience, especially policy makers, to emphasise the benefits such as reduced emissions, reduced costs, optimized loading and improved safety of life at sea.
- The skeleton that can form the basis of an IALA model course was defined. The proposed framework should be considered by the IALA academy for the creation of S-100 training material and promotion.
- S-97 is an IHO document, but S-100 is e-Navigation universal. Therefore, S-97 could be updated to capture non IHO-context better. The Workshop suggested that a formal procedure on how S-97 updates are triggered and communicated is set up.
- The IALA Secretariat should consider submitting an input paper to the S-100 Working Group before their December 2022 meeting recommending that an impact assessment should be made, on whether the S-100 Version 5.0.0 release requires an update of S-97.

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- IALA should consider updating the relevant Guideline on S-200 management to include version control and update procedures etc.
- IALA should consider requesting the S-100P to include the S-200 suite of data product specifications as part of their test-bed.
- IALA considers developing a roadmap covering the S-200 product suite.

Moreover, the Workshop suggested that IHO representatives inform about the updates on S-1xx Product Specifications to the IALA ARM committee; closer collaboration in IALA ARM WG with IHO is required; and new symbol/portrayal should be sent to IHO.

Participants of the Joint IHO/IALA workshop on S-100/200

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.

Maritime Safety Committee (MSC)

IMO -MSC105

The 105th session of the Maritime Safety Committee was held remotely from 20 to 29 April 2022, chaired by Mrs Mayte Medina (United States). The Vice-Chair of the Committee, Mr Theofilos Mozas (Greece), was also present. The session was attended by delegates representing Members and Associate Members; representatives from the United Nations Programmes, specialized agencies and other entities; observers from intergovernmental organizations with agreements of cooperation and observers from non-governmental organizations in consultative status. The IHO was represented by Director Abri Kampfer and Mr Christopher Janus, the Chair of the World-Wide Navigational Warning Service Sub-Committee (WWNWS-SC).

The Secretary-General of IMO, Mr Kitack Lim, welcomed participants and delivered his opening address, noting that the global maritime community remains seriously concerned about the safety and welfare of seafarers, the safety of ships and the impact on shipping operations in the wake of the ongoing

armed conflict in Ukraine. At the start of the conflict, the IMO SG immediately established an Emergency Task Force in the Secretariat to deal with the fall-out and, further to the decisions of the 35th extraordinary session of the Council, the Secretariat has worked tirelessly, engaging with all stakeholders to address the safety and security issues for global maritime shipping and support seafarers.

The Committee adopted the agenda and agreed to be guided in its work, in general, with consideration of all agenda items in total or in part by correspondence together with the comments received on those proposals as well as any resulting modifications to the proposed actions. The Committee established three Work Groups (Cost implications for MSI and SAR information providers concerning the recognition of multiple GMDSS mobile satellite services, Development of a goal-based instrument for Maritime Autonomous Surface Ships (MASS) and Development of further measures to enhance the safety of ships relating to the use of fuel oil) and two drafting groups (Amendments to mandatory instruments and Decisions of other IMO Bodies)

The Committee established the Drafting Group on Decisions of other IMO Bodies and instructed it, to draft an MSC resolution for consideration by the Committee, taking into account the impacts of the ongoing military conflict in Ukraine on the safety and security of shipping, the physical and mental wellbeing of seafarers, the marine environment and global supply chains. As the overwhelming majority of members supported the draft resolution, the Committee approved the revised report of the Drafting Group (MSC 105/WP.12/Rev.1) in general and adopted resolution MSC.495(105) on Actions to facilitate the urgent evacuation of seafarers from the war zone area in and around the Black Sea and the Sea of Azov as a result of the Russian Federation invasion of Ukraine.

The Committee recalled that MSC 104 had approved draft amendments to chapters II-1, III, IV and V of, and the appendix (Certificates) of the annex to the 1974 SOLAS Convention, concerning the modernization of the Global Maritime Distress and Safety System (GMDSS), with a view to adoption at MSC105. The Committee agreed that the aforementioned draft amendments proposed for adoption at this session, should be deemed to have been accepted on 1 July 2023 and enter into force on 1 January 2024, in accordance with the Guidance on entry into force of amendments to the 1974 SOLAS Convention and related mandatory instruments. The Committee established the Drafting Group on Amendments to Mandatory Instruments, chaired by Mr N. Boldt (Germany), and instructed it, taking into account comments made and decisions taken in plenary to prepare the final text of draft amendments. Having considered the report of the Drafting Group, the Committee approved it in general and adopted amendments to several mandatory and non-mandatory instruments.

The Committee established a MASS Working Group, chaired by Mr H. Tunfors (Sweden), and instructed it, taking into account comments and decisions made in plenary, to finalize, as a priority, the road map, consider the need for the holding of the first meeting of a Joint MSC-LEG-FAL MASS Working Group prior to MSC 106 by reviewing the draft terms of reference. As part of the road map for developing a goal-based Code for MASS, the Working Group agreed to work towards the entry into force of a mandatory MASS Code by 1 January 2028, despite the short period for gaining experience with the application of a non-mandatory Code. Having also noted that the road map should be considered to be a living document, which may require regular updating and modification at the Committee's future session and that the planned actions under the work plan may be revised as the draft MASS Code matures, the Committee approved the Road map for developing a goal-based Code for MASS.

The Committee established a MASS Correspondence Group under the coordination of the Marshall Islands and instructed it, taking into account the comments and decisions made at MSC 105, to consider key principles and common understanding of the purpose and objectives for the new instrument and commence the development of a non-mandatory goal-based MASS Code, taking into account the potential gaps and themes identified, the scope and framework of the non-mandatory Code. The Committee also requested the Coordinator of the MASS Correspondence Group to provide a verbal status report at MSC 106. In addition to the above, the Committee authorized virtual meetings for the intersessional correspondence group as and when considered appropriate by the Coordinator, so as to facilitate the otherwise very difficult task of exchanging and considering written responses on this complex matter

The Committee established the Working Group on Cost Implications for MSI and SAR Information Providers, chaired by Mr T. Ski (Norway), and instructed it, taking into account comments made and decisions taken in plenary, as well as all documents submitted under this agenda item, to consider options to address cost implications for MSI and SAR information providers concerning the dissemination of information over multiple RMSSs, and advise the Committee, as appropriate.

The Committee approved the report of the Working Group in general. The Committee urged MSI providers to make the necessary efforts to provide MSI on all RMSSs, and recognized their efforts for safety of navigation and safety of life at sea, which are of paramount importance. The Committee, having noted that the Working Group had not been able to conclude on any particular option to address cost implications for information providers concerning the dissemination of information over multiple RMSSs invited information providers, as a provisional approach, to explore cost reduction options, taking also into account the offer by Iridium that they had deferred charging MSI information providers for the last two years to facilitate the onboarding process and that rescue coordinating centres were not being charged; and that Iridium would continue to defer charging to Member States that had informed IMO about having financial difficulties for the implementation of the Iridium SafetyCast service.

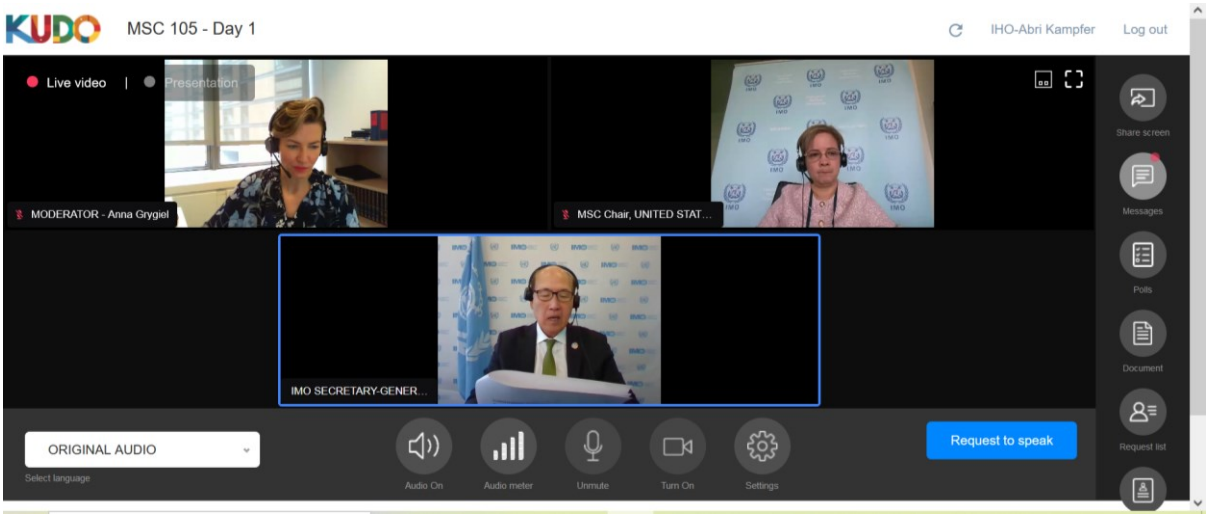
The Committee invited Member States to request technical assistance from the IMO Secretariat, as appropriate, and invited interested parties to actively participate in the deliberations of the NCSR Sub-Committee concerning technical solutions for the dissemination of MSI and SAR related information over multiple RMSSs, including interoperability and interconnectivity issues. Furthermore it also invited interested parties to actively participate in further deliberations on cost implications, with a view to arriving at a definitive solution, including the possibility of requesting financial assistance from the IMO Secretariat and, if necessary, considering the need to establish a mandatory fund. The Committee instructed the NCSR Sub-Committee to further consider the cost options, identify advantages and disadvantages, and advise the Committee, as appropriate

The Committee considered a document (Panama et al.) proposing the development of guidelines for the use of Electronic Nautical Publications (ENPs). Consequently, the Committee agreed to include in its post-biennial agenda an output on "Development of guidelines for the use of electronic nautical publications (ENP)", with two sessions needed to complete the item, assigning the NCSR Sub-Committee as the associated organ.

The Committee considered a document (Austria et al.) proposing a new output to amend the revised ECDIS Performance Standards (resolution MSC.232(82)) to facilitate a standardized digital exchange of vessels' route plans and inviting the Committee to consider either approving this proposal as a new output or adding this work under an existing output. The Committee recalled that NCSR 9 was expected to work on amendments to resolution MSC.232(82) under existing output 7.14 (Revision of ECDIS Guidance for good practice (MSC.1/Circ.1503/Rev.1) and amendments to ECDIS Performance Standards (resolution MSC.232(82)) which had been approved for a different purpose, i.e. to update guidance for good practice and ECDIS performance standards for the introduction of the next generation of Electronic Navigational Charts (ENC).

Consequently, the Committee agreed to include in its post-biennial agenda an output on "Amendments to the revised ECDIS performance standards (resolution MSC.232(82)) to facilitate a standardized digital exchange of ships' route plans", with one session needed to complete the item, assigning the NCSR Sub- Committee as the associated organ. Additionally, the Committee agreed that NCSR 9 could recommend inclusion of this output in its biennial agenda so as to start to work on it at NCSR 10.

The Committee agreed that, based on the decisions taken under various agenda items, working and drafting groups on development of a goal-based instrument for MASS and amendments to mandatory instruments could be established at MSC 106.



MSC 105 in session

IMO-MSC106

The 106th session of the Maritime Safety Committee was held from 2 to 11 November 2022, chaired by Mrs Mayte Medina (United States). The Vice-Chair of the Committee, Mr Theofilos Mozas (Greece), was also present. The session was attended by Members and Associate Members; representatives from the United Nations Programmes, specialized agencies and other entities; observers from intergovernmental organizations with agreements of cooperation; and observers from non-governmental organizations in consultative status. The IHO was represented by Director Abri Kampfer.

The Secretary-General of IMO, Mr Kitack Lim welcomed participants and delivered his opening address, noting that the global maritime community remains seriously concerned about the safety and welfare of seafarers, the safety of ships and the impact on shipping operations in the wake of the ongoing armed conflict in Ukraine. He mentioned that despite the challenges the establishment of the Humanitarian Maritime Corridor and the Black Sea Grain Initiative in July has shown what can be achieved with the cooperation of all involved parties under the support and leadership of the United Nations. He paid a visit to the port of Odessa in late August to see first-hand how ship safety and port management are being implemented, and the critical role played by seafarers. He strongly urged all Member States to cooperate to ensure that the safety of shipping and seafarers in this vital initiative is not compromised.

The Committee adopted the agenda and agreed to be guided in its work, in general, with consideration of all agenda items in total or in part by correspondence together with the comments received on those proposals as well as any resulting modifications to the proposed actions. The Committee established three Work Groups – among them the one for development of a goal-based instrument for Maritime Autonomous Surface Ships (MASS.

With respect to the Joint MSC-LEG-FAL Working Group on MASS (MASS-JWG), the Committee recalled that its first meeting was (MASS-JWG 1) from 7 to 9 September 2022. Following the successful IMO Seminar on Development of a Regulatory Framework for MASS, which had taken place on 5 and 6 September 2022, MASS-JWG had agreed to organize another seminar with a focus on legal issues, including UNCLOS, expected to take place back to back with the next MASS-JWG meeting.

The Committee noted that the MASS Working Group had encountered difficulties in its work for developing functional requirements because of the lack of concept of what constituted a MASS, i.e. the question of when a ship would be considered a MASS and whether that relates only to an uncrewed ship (fully autonomous or remotely controlled) or whether this would include ships with some (reduced) crew on board; and had agreed that the matter needed clarification in order for

functional requirements to be developed in a consistent manner. Having recognized the large amount of work required for the further development of the MASS Code and drawing from the experience in splitting the work up among participating Member States as part of the regulatory scoping exercise, the Committee noted that some Member States and international organizations had communicated their interest in assisting in developing the goals and functional requirements for various sections of the draft MASS Code. In this regard, the Committee requested further volunteers interested in co-developing sections of the draft MASS Code to make their interest known to the Coordinator of the intersessional MASS Correspondence Group. Taking into account the progress made by the Group at this session, the Committee approved the *Revised road map for developing a goal-based Code for MASS.* Following the further development of the draft MASS Code by the Group, and in order to avoid any duplication of work, the Committee agreed to revised terms of reference for the MASS Correspondence Group established at MSC 105 under the coordination of the Marshall Islands.

The Committee approved, in general, the report of the ninth session of the Sub-Committee on Navigation, Communications and Search and Rescue. Of particular interest was the discussions and outcomes regarding BeiDou Message Service System (BDMSS), approval of MSC.1/Circ.1503/Rev.2 on ECDIS – Guidance for good practice and adoption of resolution MSC 530(106) on Performance standards for Electronic Chart Display and Information Systems (ECDIS).

The Committee recalled that MSC 99 had considered an application by China for the recognition of the BeiDou Message Service System (BDMSS) for use in the GMDSS (MSC 99/12/1) and referred it to the NCSR Sub-Committee for evaluation, also authorizing the Sub-Committee to invite IMSO to conduct the technical and operational assessment, as appropriate. After consideration, the Committee agreed that China Transport Telecommunication Information Group Co. Ltd. (CTTIC), through BDMSS, had satisfied the criteria established to receive recognition as a mobile satellite communication service provider in the GMDSS and recognized the maritime mobile satellite services provided by CTTIC through BDMSS for use in the GMDSS. The committee adopted a resolution on *Statement of recognition of the maritime mobile satellite services provided by CTTIC through BDMSS*.

The Committee approved MSC.1/Circ.1503/Rev.2 on ECDIS – Guidance for good practice. The Committee considered the draft MSC resolution on Performance standards for Electronic Chart Display and Information Systems (ECDIS) presenting, inter alia, a phased introduction of new IHO data product specifications (i.e. S-98, S-100 and S-101) for ECDIS, together with two documents by IACS, proposing consideration of consequential amendments to SOLAS regulation V/19.2.1 regarding the use of Electronic Nautical Publications (ENP) through ECDIS, which was incorporated as an ECDIS function in the draft MSC resolution, proposing modifications to the draft MSC resolution in order to clarify the application statement, in particular, the use of the expression "installed on or after [date]"; and a document by China commenting on the draft MSC resolution and proposing consideration of a number of actions to evaluate the feasibility of the proposed implementation dates according to the development of S-100 based data product specifications and IEC standards; develop a mechanism for further revisions to ECDIS – Guidance for good practice (MSC.1/Circ.1503/Rev.2) to address onboard ECDIS updates; and review and consider human element issues, including training requirements and possible amendments to the STCW Code or MSC.1/Circ.1503/Rev.2.

During the consideration the majority of the delegations that took the floor indicated that it would be premature to consider amendments to SOLAS regarding the use of ENP through ECDIS at this stage. Views were also expressed that a formal proposal for a new output would be necessary to give appropriate consideration to the matter. The proposed modifications to the cover page of the draft MSC resolution were supported in general. In connection with document submitted by China, the delegation of China advised that, following consultations with IHO after the submission of the document, China had agreed on the implementation dates set out in the draft MSC resolution noting that IHO would continue to monitor the implementation and provide regular updates to the NCSR Sub-Committee.

IHO advised that the implementation dates proposed in the draft MSC resolution had been carefully considered with relevant stakeholders and were part of an implementation roadmap agreed by IHO

Members. The majority of the delegations that took the floor supported the draft MSC resolution and the proposed implementation dates to give effect to the new IHO product specifications. A view was expressed, however, that human element aspects had not been appropriately considered and that an adequate transition period should be further assessed. Following consideration, the Committee agreed to the modifications proposed by IACS to clarify the application statement and adopted resolution MSC 530(106) on Performance standards for electronic chart display and information systems (ECDIS). In doing so, the Committee invited IHO to keep IMO informed on the process development of the IHO S-100 framework standard.

The Committee agreed to include development of amendments to SOLAS chapters IV and V and performance standards and guidelines to introduce VHF Data Exchange System (VDES), Development of performance standards for a digital navigational data system (NAVDAT), Consideration of descriptions of Maritime Services in the context of e-navigation and Development of generic performance standards for shipborne satellite navigation system receiver equipment from the post-biennial agenda in the biennial agenda of the NCSR Sub-Committee for 2022-2023 and the provisional agenda for NCSR 10.

The Committee also recalled that MSC 105 had agreed to include in the post-biennial agenda an output on "Amendments to the revised ECDIS performance standards (resolution MSC.232(82)) to facilitate a standardized digital exchange of ships' route plans", with one session needed to complete the item, and had invited NCSR 9, time permitting, to consider the scope of the output and report back to the Committee Having agreed with the advice by NCSR 9 that the scope of this output should be limited to amendments necessary to facilitate a standardized digital exchange of ships' route plans and that the work should be based on the ECDIS Performance standards adopted at this session, the Committee renamed it as "Amendments to ECDIS Performance standards to facilitate a standardized digital exchange of ships' route plans" and included it in the 2022-2023 biennial agenda of the Sub-Committee.

The Committee agreed that, based on the decisions taken under various agenda items, working and drafting groups on MASS, Fuel oil safety, GBS and amendments to mandatory instruments may be established at MSC 107.

MSC 106 in session

Sub-Committee on Navigation, Communications and Search and Rescue (NCSR)

IMO NCSR 9

The Sub-Committee on Navigation, Communications and Search and Rescue is a subordinate body of the Maritime Safety Committee (MSC) of the International Maritime Organization (IMO). The 9th session of the Sub-Committee on Navigation, Communications and Search and Rescue (NCSR) was held remotely from 21 to 30 June 2022, chaired by Mr N. Clifford (New Zealand). The Vice-Chair of the Sub-Committee, Mr A. Schwarz (Germany), was also present. The session was attended by

Members and Associate Members; representatives from the United Nations and specialized agencies; observers from intergovernmental organizations with agreements of cooperation; and observers from non-governmental organizations in consultative status. The IHO was represented by Director Abri Kampfer, Assistant Director Sam Harper and Mr Christopher Janus, the Chair of the World-Wide Navigational Warning Service Sub-Committee (WWNWS-SC). Several representatives of Hydrographic Offices also attended the meeting as a member of their national delegation.

Ships Routeing

The Sub-Committee noted that MSC 104, following the recommendation of NCSR 8, had approved the holding of a meeting of the Experts Group on Ships' Routeing in advance of the plenary session of NCSR 9 to give preliminary consideration to all proposals submitted to NCSR 9 under the agenda item on "Routeing measures and mandatory ship reporting systems", and to advise the Sub-Committee on any necessary measures and/or systems to be adopted. In this context, the Sub-Committee noted that the meeting of the Experts Group on Ships' Routeing was held remotely from 13 to 17 June 2022 and that its report would be considered. The Sub-Committee adopted the agenda and agreed to be guided in its work.

The Sub-Committee considered the documents submitted under the agenda item *Ships Routeing*, taking into account the preliminary consideration of the Experts Group on Ships' Routeing and the preliminary assessment of proposals on ships' routeing and ship reporting systems, and approved, with a view to adoption by MSC 106 (November 2022) and implementation six months after its adoption, the following:

- Amendments of existing TSS and associated measures "In the approaches to the ports of Odessa and Ilichevsk" and "Between the ports of Odessa and Ilichevsk", Ukraine.
- Establishment of a recommended route off Cape Shio-no-Misaki, Japan.
- Amendments of the area to be avoided in the region of San Miguel, Santa Rosa, Santa Cruz and Anacapa Islands off the coast of southern California and traffic separation scheme "In the Santa Barbara Channel".
- Establishment of a no anchoring area in the southern portion of Pulley Ridge off the coast of Florida.
- Recommendation on navigation for containerships in traffic separation schemes "Off Vlieland", "Terschelling-German Bight", "Off Friesland" and "German Bight western approach".

Communication

The Sub-Committee established and released the Working Group on Communications, chaired by Mr A. Schwarz (Germany), and instructed it to advise the Sub-Committee, taking into account comments and decisions made in plenary to give preliminary consideration to several agenda items such as the further development of the long-range identification and tracking of ships (LRIT) and GMDSS.

Having considered the Working Group's report, the Sub-Committee noted and agreed to the recommendations of the Working Group on Communications.

Navigation

The Sub-Committee established and released the Working Group on Navigation, chaired by Mr J. Brouwers (Netherlands), and instructed it, taking into account decisions, comments and proposals made in plenary, to give preliminary consideration to several agenda items and advise the Sub-Committee.

The Working Group on Navigation invited the Sub-Committee to approve their report in general, and in particular:

- to note the Group's consideration on proposals from Brazil and United Kingdom. The Group could not conclude on any of the proposals due mainly to time constraints but concurred with the outcome of the Experts Group on Ships' Routeing on these three proposals;
- agree to the draft amendments to SOLAS chapter XIV and the Polar Code parts I-A and I-B, and invite the Committee to approve them for subsequent adoption with a view to entry into force on 1 January 2026;
- endorse the check/monitoring sheet for the process of amendments to SOLAS Chapter XIV and the Polar Code, and forward it to the Committee;
- agree with the view of the Group that the certificate showing compliance with the newly introduced requirements of the Polar Code part I-A, chapters 9-1 and 11 should be left to discretion of the flag Administration;
- agree to draft Assembly resolution on Guidelines on places of refuge for ships in need of assistance, and invite the Committee to approve it;
- note that the Group did not agree on the inclusion of the proposed manoeuvre into the IAMSAR Manual;
- agree to the draft MSC circular on ECDIS Guidance for good practice, to be disseminated as MSC.1/Circ.1503/Rev.2, and forward it to the Committee for approval;
- approve the draft MSC resolution on Performance Standards for Electronic Chart Display and Information Systems (ECDIS) and forward it to the Committee (MSC 106, November 2022) for adoption;
- agree with the Group's recommendation that the scope of the output "Amendments to the revised ECDIS Performance Standards (Resolution MSC.232(82)) to facilitate a standardized digital exchange of ships' route plans" should only be limited to amendments necessary to facilitate a standardized digital exchange of ships' route plans and that the work should be based on the new revised standards to be adopted by MSC 106, thus requiring the output to be renamed accordingly;
- note that the Group did not agree on the unified interpretation, of provisions of IMO safety, security, environment, facilitation, liability and compensation-related conventions as proposed by two submissions.

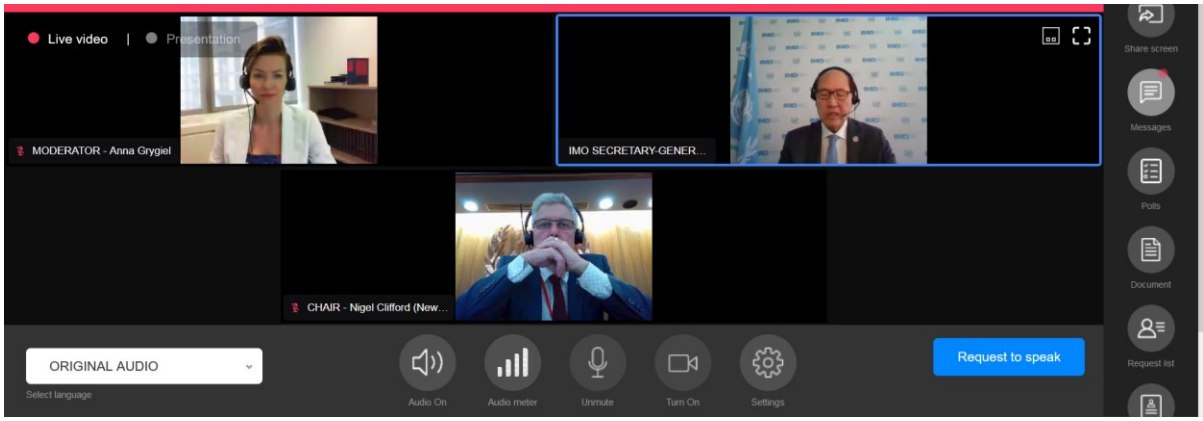
Having considered the Working Group's report, the Sub-Committee noted and agreed to the recommendations of the Working Group on Navigation.

Search and Rescue

The Sub-Committee established and released the Working Group on Search and Rescue and other Technical Matters, chaired by Mr S. Shepard (Australia), instructing it to take into account decisions, comments and proposals made in plenary to give preliminary consideration to the following agenda items and advise the Sub-Committee.

The Working Group on Search and Rescue and other Technical Matters invited the Sub-Committee to approve their report on numerous MSI and WWNWS issues – among them to agree that the available EGC-API developed by the IHO WWNWS-SC EGC-API Correspondence Group is a cost effective and fully integrated solution for the shore-to-ship dissemination of MSI and SAR-related information.

Having considered the Working Group's report, the Sub-Committee noted and agreed to the recommendations of the Working Group on Search and Rescue and other Technical Matters.



Opening session of NCSR 9

Technical Cooperation Committee (TCC) IMO-TC 72

The Technical Cooperation Committee (TC) is the IMO body that considers matters within the scope of the implementation of technical cooperation projects for which the IMO acts as the executing or cooperating agency and any other matters related to the IMO's activities in the field of technical cooperation. The 72nd session of the TC (TC 72) was held in a hybrid format from 17 to 20 October 2022. Mr Laurent Parenté (Vanuatu) chaired the meeting. Director Luigi Sinapi and Assistant Director Leonel Manteigas represented the IHO by remote participation.

In his opening remarks, the Secretary-General of IMO, Mr Kitack Lim, expressed the pleasure to see most participants in person. The Technical Cooperation Committee have an important role in the actual period of transitions in the maritime sector, in particular decarbonization, automation and digitalization. The main milestones achieved during the year were the adoption of the Capacity-Building Decade 2021-2030 Strategy by the 32nd Assembly and the celebration of the first International Day for Women in Maritime, which was held on 18 May 2022. In relation with the TC72 Agenda the expectation about a proposal on the establishment of a regional presence office in the MENA region, the comments on the development of some e-learning courses, the proposal for the institutionalisation of an IMO Gender Award and the work on the development of SMART indicators were enhanced.

IMO Secretary-General K. Lim Chair, TC Chair Laurent Parenté (Vanuatu) and IMO Director TC X. Zang.

The Committee was informed on the developments related to the establishment of a blue safe maritime corridor to allow the safe evacuation of seafarers and ships from the high-risk and affected areas in the Black Sea and the Sea of Azov. The Secretary-General also informed on the Initiative on

the Safe Transportation of Grain and Foodstuffs from Ukrainian Ports (referred to as the "Black Sea Grain Initiative") that was signed by the Russian Federation, Türkiye, Ukraine and the United Nations (UN) and enabled the resumption of exports from Ukraine of grain, other foodstuffs and fertilizer, through a safe maritime humanitarian corridor.

The Committee noted the information provided on the work of other IMO bodies whose decisions have a bearing on the work of the Committee, such as the technical cooperation response to facilitate the implementation of energy efficiency requirements in MARPOL Annex VI and resolution MEPC.304(72) on Initial IMO Strategy on reduction of greenhouse gas (GHG) emissions. The work undertaken by the Secretariat to support the implementation of the energy efficiency requirements in MARPOL Annex VI and the Initial Strategy on GHG emissions reduction by the developing countries was noted.

In relation with the Integrated Technical Cooperation Programme (ITCP) activities, information was provided on the summary of the achievements and outputs of the activities implemented under the regional and global programmes and an overview of the financial resource delivery of both the ITCP and the thematic long-term projects. An update was also received on the Secretariat's progress on the proposals of the Correspondence Group on Measuring the Impact of Technical Cooperation in Training and Capacity-building and on the IMO External Auditor's performance audit on the ITCP. The ITCP implementation during 2021 continued to be affected by restrictions associated with the COVID-19 global pandemic.

IMO persisted with remote delivery methods to continue its technical assistance and made an effort on the development of e-learning courses to ensure wide outreach, achieving a 50% delivery of the planned ITCP activities for 2021. This comprised of 102 activities, including 44 training courses, seminars and workshops held at national, regional and global levels. The training events covered a wide range of topics resulting in the training of approximately 1,592 participants world-wide in 2021. In addition, 216 fellows completed fellowships at the World Maritime University (WMU), the IMO International Maritime Law Institute (IMLI) and other maritime training institutions. Further, 358 officials attended events aimed at developing and harmonizing regional strategies on maritime technical issues. The participation of women in senior official activities and fellowships was 63% and 54%, respectively. The total expenditure on technical cooperation activities in 2021 reached $10.5 million, representing a financial delivery rate of 48%. Expenditure on ITCP activities and major projects came from 22 sources of funding, with the TC Fund being the most significant at $4 million, representing 38% of the overall total funds expended.

In relation with the IMO External Auditor's performance audit on the ITCP, the External Auditor had recommended that the Organization enhance its result-based management, especially in correlation with the programme logical framework elements of the ITCP, and plan more systematically and clearly its expected results and related indicators and performance measures.

Regarding the implementation of the Long-term Resource Mobilization Strategy, the activities carried out, lessons learned and the way forward for the implementation were reported. The progress made in mobilizing resources and partnerships for thematic long-term TC projects and in implementing projects since TC 71 was noted as follows:

- An agreement between IMO and the United Nations Environment Programme (UNEP) and the financial support from Norway to jointly organize a Maritime Zero- and Low-Emission Innovation Forum.
- An agreement between IMO and Norway to support Phase III of the project on Safe and Environmentally Sound Ship Recycling in Bangladesh (SENSREC).

Member States were encouraged to actively participate in and support the implementation of the resource mobilization strategy and knowledge partnership mechanism.

In relation with the Resource Mobilization and Partnerships, in October 2022, there were 86 operational partnerships, 26 new partnership arrangements had been established, of which 23 were financial arrangements totalling some $2,300,000. The delegation of China informed on the Global Innovation and Knowledge Center for Sustainable Transport that can be used as a platform to

strengthen various forms of cooperation with a view to jointly contributing to the sustainable development of global shipping. The Republic of Korea reported on the Global On-Board Training (GOBT) Programme for Fostering Competent Young Seafarers held in Busan. The Pacific Community (SPC) informed on the current initiatives being undertaken to improve the overall safety of navigation in the Pacific region. The total contribution received towards the sustainable financing of the ITCP amounted to $3,406,089.

On the development of SMART indicators for data collection regarding the 2030 Agenda for Sustainable Development, there were two categories of elements that would require further consideration by the Working Group, being the first those indicators for which the Secretariat did not have statistics and the second the corruption in the maritime sector. The Working Group was re-established to finalize the development of SMART indicators, milestones and targets for data collection within IMO's mandate for technical cooperation.

Related to the long-term strategy for the review and reform of IMO's technical cooperation (The Capacity-Building Decade 2021-2030 Strategy) the Committee was informed of the key developments against each of the Strategy's four work streams during the period January to June 2022. A visual representation of IMO's TC priorities and strategies for assisting Member States to enhance their overall maritime development capability will be published as a new brochure. Information was provided on other key developments with regard to continued efforts to support Member States in maritime development, including efforts to establish the Regional Presence Office (RPO) in the Pacific Islands region and deliberations on a new RPO for the Middle East and North Africa (MENA) subregions to be situated in Egypt. Also, there was a number of training and development initiatives to strengthen the global training network, including a range of strategic initiatives in collaboration with the World Maritime University (WMU) and the IMO International Maritime Law Institute (IMLI).

On the agenda item about Regional Presence and Coordination, the IMO Regional Presence Scheme is currently made up of five (5) Regional Presence Offices. The Committee was informed on the technical cooperation activities delivered under the IMO Regional Presence Scheme in Africa, East Asia, the Pacific Islands and the Caribbean in 2021 and acknowledged the important work of the Regional Coordinators and the IMO Technical Cooperation Officer for the Pacific in the implementation, facilitation and coordination of numerous activities.

In relation with the global technical cooperation programme on the IMO Member State Audit Scheme (IMSAS) the programme had continued to assist Member States, supporting their preparation for the audit. Since the establishment of this global programme in 2006, and up to June 2022, a total of 1,492 individuals from 162 Member States and Associate Members had been trained through 73 ITCP activities. The TCC would continue working with WMU within the framework of the IMO-WMU e-learning pilot project, to develop an e-learning training course for IMSAS auditors.

On the agenda item “Capacity-Building: Strengthening the Impact of Women in the Maritime Sector” an update was received on the activities delivered through IMO's Women in Maritime programme in 2021, the result of the Women in Maritime survey, jointly implemented by IMO and the Women's International Shipping & Trading Association (WISTA International) in 2021 with the objective of examining and analysing statistics on the proportion and distribution of women working in the maritime sector, ranging from support roles to executive level positions. A second Survey will be conducted in 2024. It was agreed to encourage Member States, international organizations, IGOs, NGOs, women regional associations and regional organizations to continue promoting and addressing issues and challenges facing women in the maritime industry.

IHO Assistant Director Leonel Manteigas informed the Committee that the IHO *Empowering Women in Hydrography* project was recently approved as an action of the United Nations Decade of Ocean Science for Sustainable Development 2021-2030 and the IHO is eager to collaborate with the IMO in strengthening the impact of women in the maritime sector.

IHO Assistant Director Leonel Manteigas intervening at the IMO TC72

On the agenda item "Global Maritime Training Institutions" the World Maritime University summarized the main activities undertaken in 2021 and the Annual Report for 2021 can be found at https://www.wmu.se/docs/annual-report-2021. The IMO International Maritime Law Institute (IMLI) also provided information on the main activities undertaken during 2021. The Committee noted with satisfaction the activities of WMU and IMLI during 2021 and, in particular, the continued delivery of its academic programmes during a period impacted by the COVID-19 pandemic.

The biennial status report of the Technical Cooperation Committee for the 2022-2023 biennium was approved and it was decided to defer the election of its Chair and Vice-Chair at this session, to the start of its next session in 2023.

Intergovernmental Oceanographic Commission (IOC)

The 55th meeting of the IOC UNESCO Executive Council was held in Paris from 13 to 17 June 2022, at the UNESCO headquarters. In addition to the IOC members and observers, the IHO Secretariat participated at the Council as Observer, and was represented by Director Luigi Sinapi and Assistant Director Samuel Harper. The Vice Chair of the GEBCO Guiding Committee, Marzia Rovere (Italy), also attended.

After the welcome speech of the Deputy Director General of UNESCO, Mr Xing QU, who addressed the IOC Council participants on the importance to protect the Oceans in this special Decade and how Ocean data can guide Institutions and Governments and inspire the young generation. Dr Vladimir Ryabinin, IOC Executive Secretary, reported on the work accomplished since the Thirty-first session of the IOC Assembly (July 2021–May 2022).

IHO participating at the 55th IOC Council & part of the presentation of IOC Report since the Thirty-first session of the IOC Assembly (July 2021–May 2022)

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The pilot edition of the "State of the Ocean Report 2022" was presented. It highlighted the need for objective data which can be used as a benchmark to monitor changes in the marine environment, and stated that although society is aware in principle of what is happening in the ocean and what should be done about it, the quantitative description of the ocean is incomplete and, as a result, current knowledge is insufficient to effectively inform solutions to the ocean issues that humanity is facing. The data on the physics and features of the ocean, gathered by IHO Member States, can be used to target actions and increase the impact of initiatives.

Director Sinapi provided an update on the General Bathymetric Chart of the Oceans (GEBCO), a joint programme between the IHO and IOC UNESCO, which aims to produce a high definition map of all the worlds' oceans. In addition, he informed the Executive Council of the creation of the Sub-Committee on Education and Training (SCET) and the GEBCO Governance review. The terms of reference for the creation of the SCET and the Governance review were endorsed by the Council members and the results will be reported by the IOC Executive Secretary to the IOC Assembly in 2023.

Assistant Director Harper presented the opportunity for the IHO Secretariat to participate in the discussion on the challenges of operating ocean observing systems within the Marine Science Research provisions of UNCLOS, and to share the IHO experience in promoting the Crowdsourced Bathymetry initiative.

Participants also discussed the new Ocean Decade Progress Report and considered opportunities for future collaboration and contributions, as the Intergovernmental Oceanographic Commission of UNESCO is the "home" of ocean science within the UN, and is uniquely positioned to initiate and coordinate a much needed periodic publication to inform the world about the current state of the ocean, and to do so in a more dynamic way than was previously possible.

International Organization for Standardization (ISO)

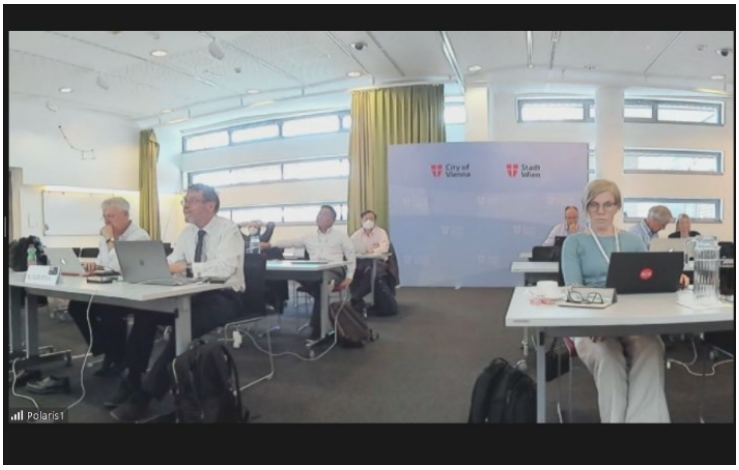
The 54th meeting of ISO/TC211 was held in Vienna, Austria in a Hybrid format due to the ongoing global COVID-19 pandemic and the associated travel restrictions in place from 9 May to 13 May 2022. It was chaired by Peter Parslow (UK) and was attended by 27 members (Australia, Austria, Canada, Chile, China, Denmark, Finland, France, Germany, India, Japan, Republic of Korea, Malaysia, Netherlands, New Zealand, Norway, Poland, Russian Federation, Saudi Arabia, Slovenia, South Africa, Spain, Sweden, UK, USA, Ireland and Peru) and 12 liaison member organizations and committees (ISO, OGC, CalConnect, CEOS, DGIWG, FAO, ICA, IEEE, IHO, OSGeo, ISO/TC46 and ISO/TC154). The IHO Secretariat was represented by Assistant Director Yong Baek.

ISO/TC211 is a technical committee in the field of standardization of digital geographic information which aims to establish a structured set of standards for information concerning objects or phenomena that are directly or indirectly associated with a location relative to the Earth. Their standards may specify, for geographic information, methods, tools and services for data management (including definition and description), acquiring, processing, analysing, accessing, presenting and transferring such data in digital/electronic form between different users, systems and locations.

Seven Working Groups under ISO/TC211 reported on their activities since the last plenary meeting in 2021, Working Group 1 – framework and reference model, Working Group 4 – geospatial service, Working Group 6 – imagery, Working Group 7 – information communities, Working Group 9 – information management, Working Group 10 – ubiquitous public access and joint Working Group 10 – GIS-ITS.

Since the last plenary meeting of ISO/TC211, there were two publications from the Working Group 6, ISO/TS 19130-3:2022 Geographic information – Imagery sensor models for geopositioning – Part 3: Implementation schema published Mar.9, 2022 and ISO 19115-2:2019/Amd 1:2022 Geographic information – Metadata – Part 2: Extensions for acquisition and processing – Amendment 1 published Mar.20, 2022.

Assistant Director Yong BAEK reported on IHO activities under the liaison session of the Working Group 7, mainly on progress with S-100 edition 5.0.0 extensions with real time functionality, encryption, interoperability framework and harmonized portrayal, discovery metadata and language packs and its relations to the ISO standards. In addition, the latest updates on the publication of S-100 based Product Specifications and IHO contribution to the revision of the Guide to the role of standards in Geospatial Information Management of UN-GGIM were presented.



ISO/TC211 54 in session

<u>International Seabed Authority (ISA)</u>

The IHO collaborates with ISA based on a Memorandum of Understanding established in 2016. This Memorandum enables the IHO to provide advice and comment to the Secretariat of the ISA, particularly in relation to improving access to bathymetric data upon which the ISA manages its contracts in The Area. In May 2022 the collaboration of the two organizations culminated in a formal data submission agreement aiming to the provision of bathymetric data gathered by ISA contractors in their respective license areas to for inclusion in the IHO Data Centre for Digital Bathymetry (DCDB) Archive.

ISA made an initial contribution of ~7,000 GB of multibeam echosounder (MBES) data, and ancillary data, to contribute to the objectives of the UN Decade of Ocean Science and eventually to IHO´s and IOC-UNESCO´s joint General Bathymetric Map of the Oceans (GEBCO) programme. This initial contribution covers the ISA backlog of approximately 15 years of data recording. Going forward, the ISA estimates an annual contribution of approximately 750 GB of bathymetric data each year. ISA´s commitment and the resulting data contributions are of significance to fill the gaps of the GEBCO grid in deep water regions under ISA coordination.

<u>United Nations (UN)</u>

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

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). At the time of reporting UN-GGIM runs altogether 17 subgroups formed by regional commissions, topical and thematic groups.

The 12th session of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) was the first in-person meeting after two meetings held in 2020 and 2021 in a scaled down virtual format.

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On average more than 256 participants attended the event, representing 73 UN Member States and 111 observing organisations – amongst them the IHO, represented by the Secretary-General of the IHO, Dr Mathias Jonas.

In the preliminaries of the Conference the Group of Standard Development Organizations (SDO) formed by ISO, OGC and IHO conducted a side event which was organized and moderated by the IHO. Under the title *"Bringing Land and Sea together – How standardization helps to implement the Integrated Geospatial Information Framework in Coastal States"* this event presented the approach of the maritime domain how marine geodata can be operationalized by means of IGIF paradigms and presented case studies demonstrating how World Bank's IGIF methodology is applied in developing island/coastal Nation States. Dr John Nyberg (USA), Chair of the UN-GGIM Working Group on Marine Geospatial Information, informed the participants about the progress made in the layout of the interpretation of the IGIF for hydrography (IGIF-H). Kathrine Kelm (UK) of the World Bank, and Dr Gerald Wang (UK) of UKHO introduced the methodology of OGC/IHO/World Bank collaboration on the IGIF-MSDI Maturity Model, and Chris Body (Australia) informed about the recent developments on ISO´s project to harmonise IHO marine administration with ISO land administration domain model.

Speakers panel of the Side Event "Bringing Land and Sea together"

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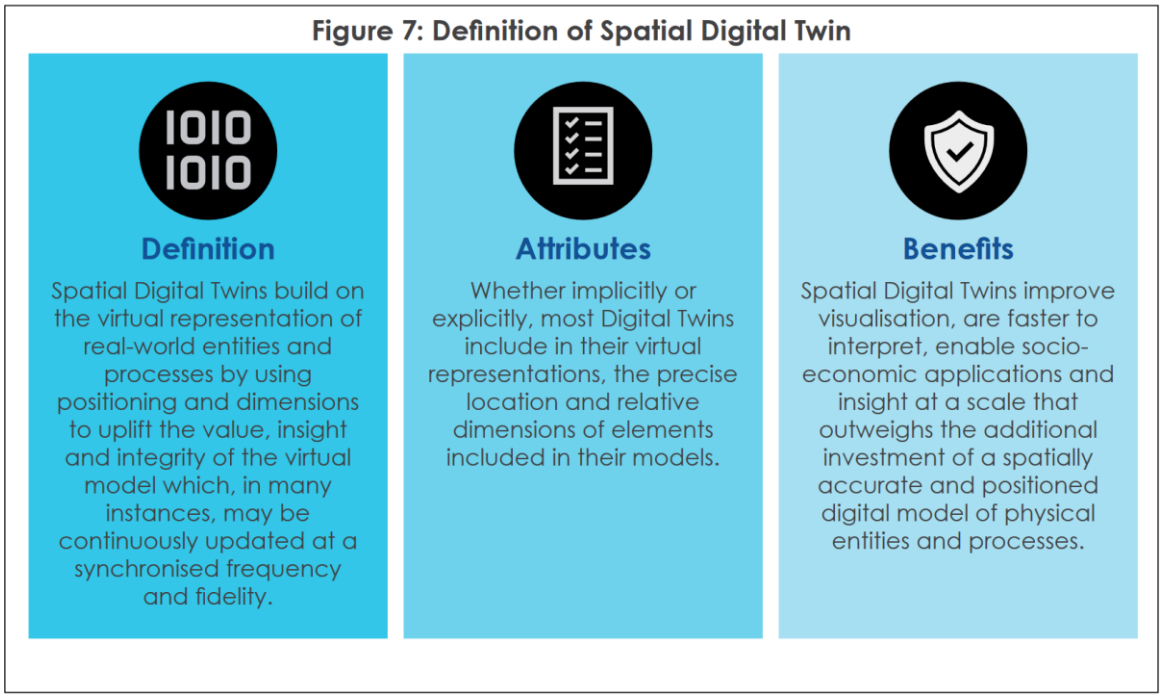
An important item of note for the conference participants was the Secretariat´s report on the resolution 2022/24 entitled 'Enhancing global geospatial information management arrangements' recently adopted by the ECOSOC Council. The resolution represents a significant endorsement of the Committee's work and value over the past decade. It acknowledges the achievements and progress made by the Committee and reiterates the importance of strengthening and enhancing the effectiveness of the Committee, particularly for the achievement of its operations focused on the Sustainable Development Goals (SDGs) and the Integrated Geospatial Information Framework (IGIF), to strengthen and ensure its continued effectiveness and benefits to all Member States. However, the resolution fell short in a number of key areas; namely in the provision of expanded conference management and services for the Committee, and resources to strengthen the Secretariat. In the immediate future, the Committee of Experts will undertake practical action to implement resolution 2022/24 and to mobilize resources as the global role and relevance of the Committee of Experts continues to grow and expand. These expanding roles will include supporting the implementation of the Committee's global geospatial frameworks; establishing the Global Geospatial Knowledge and Innovation Centre (GGKIC) in Deqing, China and the Global Geodetic Centre of Excellence (GGCE) in Bonn Germany; the convening of the second United Nations World Geospatial Information Congress (UNWGIC) in Hyderabad, India, and in continuing to lead and set the agenda in global geospatial information management.

The twelfth session of the Committee of Experts addressed several emerging and critical issues related to geospatial information management globally. Numerous substantive activities have since been undertaken and, as follow-up, they were reported back and deliberated upon at this twelfth session. These include as new elements Geospatial Knowledge Infrastructure and the Digital Twin. The latter is of special relevance in view of the global aspirations to establish the Digital Twin of the Oceans. In the course of the Committee deliberations, it was pointed out on several occasions that standardization and interoperability (as supported by the S-100 framework for the marine domain) is key for this emerging trend.

Figure 7: Definition of Spatial Digital Twin



Source: WGIC POLICY REPORT: 2022-01 Spatial Digital Twins: Global Status, Opportunities, and the Way Forward

Of special relevance for the IHO work programme was the report given under Agenda Item 13 *Marine geospatial information* by the Working Group on Marine Geospatial Information, and Agenda Item 15 *Implementation and adoption of standards for the global geospatial information community*.

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The Working Group on Marine Geospatial Information, established by UN-GGIM 7 in 2017 under the co-leadership of Dr John Nyberg (USA) and Ms Pearlyn Pang (Singapore), reported to the Committee of Experts for the fifth time. Ms Pang presented the report.

The growing membership of the Working Group and expanding knowledge on the value of marine geospatial information reflects the overall growing engagements and how the oceans unite and connect diverse stakeholders across the full spectrum of the marine domain, including the oceans and seas, coastal zones and deltas, inland water bodies and waterways.

Over the past year, the Working Group's top work item has been to advance the IGIF through its thematic implementation called the Operational Framework for Integrated Marine Geospatial Information, in short IGIF-H, for IGIF Hydro. The group intends for the two-part document to leverage the guidance offered in the IGIF and to provide practical guidance for countries to apply the nine strategic pathways in the water or marine domain, ultimately working towards the vision of integrating water into the global geospatial information ecosystem for our desired future. This year, the Working Group was ready to present IGIF-H Part One, an executive summary of the Operational Framework for the Committee's consideration and support.

The Working Group remained engaged with the global geospatial community and with international and regional organisations including the International Hydrographic Organization (IHO), Open Geospatial Consortium (OGC) and the Pacific Community. The group´s work has contributed from a water-themed perspective through various outreach opportunities, notably the webinar series on marine geospatial information last October and the first UN-GGIM International Seminar on Effective and Integrated Marine Geospatial Information Management in May this year jointly organised by the Working Group, the IHO Marine Spatial Data Infrastructures Working Group, and the OGC Marine Domain Working Group, and hosted by the Maritime and Port Authority of Singapore. The outcomes of these activities and contributions from expert representatives, coupled with the 2020 white paper on readily available and accessible marine geospatial information, have driven marine knowledge and the advancement of IGIF-H. The Working Group recommended the outcome document of the International Seminar, the Singapore Statement on Effective and Integrated Marine Geospatial Information Management for due recognition by the Committee of Experts.

The Working Group report also confirmed to continue to recognise, and work with, the GEBCO Seabed 2030, UN Decade of Ocean Science and IHO Innovation and Technology Laboratory. These are important initiatives that contribute towards advancing international goals in the marine domain in addition to raising awareness and strengthening the effective use and integration of marine geospatial information for the benefit of humanity.

The report on the Implementation and adoption of standards for the global geospatial information community (Agenda Item 15), was brought to the attention of the Committee by the IHO representative, Dr Mathias Jonas. In the referenced report the three organizations elaborated on their collective efforts made since UN-GGIM Committee meeting in August 2021. He provided details of the Open Geospatial Consortium's work on the development of modernized open API standards and the integration of geospatial information, statistics and other data to address access to, and integration of, location information related to Earth observations, disaster preparedness and response, health, marine spatial data interoperability, the environment and climate change. As listed in detail in the full report, the work of OGC community included a strong focus on improving connections of OGC standards with IHO Standards and ISO Standards.

The report also described the work of technical committee 211 and its continued progress in the development of the multi-part standards ISO 19152 Land Administration Domain Model, the ISO 19144 series on land cover and ISO 19160 on addressing the increased use of the ISO Geodetic Registry.

Lastly, this report presented the advances made by the International Hydrographic Organization on the S-100 Universal Hydrographic Data Model to support the creation and maintenance of interoperable maritime data product services that are compliant with the ISO 19100 series of geographic information standards and the projected work with coastal nations to engage on using the IGIF-MSDI Maturity Roadmap for real-world (Marine) SDI development.

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Among other relevant items the organizations' report also provided an overview of the work done regarding the use of geospatial standards in supporting the measurement and monitoring of the Sustainable Development Goals, highlighted the continued support to the standards pathway for the Implementation Guide of the IGIF; and discussed practical examples on the implementation of geospatial standards that help further strengthen the Standards Guide.

United Nations Division on Ocean Affairs and Law of the Sea (UN-DOALOS)

In 1999, the UN General Assembly decided to establish the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea (the Consultative Process) in order to facilitate the annual review by the General Assembly, in an effective and constructive manner, of developments in ocean affairs and the law of the sea by considering the report of the Secretary-General on oceans and the law of the sea and by suggesting particular issues to be considered by it, with an emphasis on identifying areas where coordination and cooperation at the intergovernmental and inter-agency levels should be enhanced (resolution 54/33).

The Division for Ocean Affairs and the Law of the Sea (DOALOS) of the Office of Legal Affairs (OLA) has been providing an ongoing programme of assistance to States and intergovernmental organizations in the field of oceans and the law of the sea since the adoption of the United Nations Convention on the Law of the Sea in 1982. DOALOS is the designated body to conduct the annual meetings of the Informal Consultative Process. This year´s meeting focused its discussions on the theme "Ocean observing". The event was deliberately placed next to World Ocean Day and offered the opportunity to be part of the celebrations at the UN building.

Around 30 UN Member States, the EU and a dozen of IGOs and NGOs contributed to the deliberations. The IHO was represented by Secretary-General Dr Mathias Jonas. He contributed as panellist to Segment 2 "International cooperation and coordination in advancing ocean observing and addressing related challenges". By means of his presentation titled "Mapping the Ocean to deliver base line information for all specific observations & interoperable ocean data in support of the digital twin" he stressed that the shape of the seabed influences a variety of ocean processes: the movement of pollutants, ocean circulation and climate, and provides habitats for marine species. Yet we still know very little about the ocean floor. The first part of his presentation focused on actions how the global situation can be improved and why UNCLOS is affected. In the second part he presented a way forward towards the digital twin of the ocean through IHO´s S-100 standardization framework for customized data products addressing a wide range of marine geospatial data across domains.

The panel discussions were dominated by the presentation of global oceanographic observing systems like GOOS, operated under the auspices of IOC-UNESCO, and the ARGO program.

The practical operational issues of both programs, in view of the UNCLOS legal framework for Marine Scientific Research and its application in the EEZ, was of particular relevance for similar issues of IHO´s Crowd Source Bathymetry program. GOOS operators criticized the UNCLOS MSR process being incompatible with the operational reality of sustained ocean observing because of:

- No consistency in the practice among coastal states for MSR clearance
- National MSR procedures often not sufficiently flexible to adapt to changes in operations

- MSR procedure is non-trivial and time consuming
- Sometimes disproportionate demands that are costly and/or impossible to comply to
- It is not unusual to receive consent for MSR at a very late stage.

This triggered intense discussions about the future evolvement of the applying UNCLOS regulations, hence numerous Coastal States insisted on their granted sovereignty rights being in control of all MSR activities in their respective areas of jurisdiction. The management of ARGO floats intruding into EEZs was highlighted as practical solution based on individual consent between the ARGO operators and the affected Coastal State.

The meeting delivered valuable insight about the current situation in ocean observation which is funded 40% through project money. This unsustainable arrangement was identified as one of the main obstacles to evolve to a more integrated observation environment as required to meet the aspirations articulated under the goals of the UN Decade for Ocean Science.

Another important item to note was the presentation of Mercator Ocean International - A Global Ocean Prediction Centre, sponsored by six European Countries, namely Italy, Spain, Portugal, France, Norway and UK. This organization is underway to become an IGO and has created a clear strategy to develop the prediction of ocean processes based on all satellite and in-situ observation capabilities to the next level. Three domains which are of relevance for the ocean decade and consequently for IHO were identified: Blue Ocean (physics), White Ocean (sea ice) and Green Ocean (Biogeochemistry).

The yearly theme of the Informal Consultative Process is to be set every December by means of an UN General Assembly Resolution for the forthcoming year. The Secretariat will decide on future participation according to the relevance of the particular theme.

United Nations Ocean Conference

The 2nd UN Ocean Conference took place in Lisbon, Portugal from 27 June to 1 July 2022. With the goal of ensuring that seabed mapping and hydrography were appropriately represented and that the IHO's leadership in these domains was recognised, the IHO Secretariat co-organized two events during the week. It also took the opportunity to meet various actors within the field of ocean science and meet with MS representatives.

Secretary General Mathias Jonas, Assistant Director Sam Harper, and Public Relations and Communication Officer Sarah Jones Couture attended the conference, organized the first side-event and helped raise the visibility of the IHO and its work.

Sam Harper, Dr Mathias Jonas and Sarah Jones Couture

The IHO in partnership with the Stockholm Environment Institute organized a side-event on seabed mapping & marine data to support multifunctional spatial planning on Tuesday 28 June 2022. Organized in partnership with IOC-UNESCO, Sweden, the African Union Commission, and the United Kingdom, the event looked at the role of marine data to inform the competing needs of a broad range of ocean stakeholders. Participants discussed activities, innovations and challenges, as well as technologies and monitoring systems. It examined how improved data could inform the organization of the marine space to ensure a more sustainable use of ecosystems. Co-moderated by Dr Karina Barquet, Team Leader: Water, Coasts and Ocean, at the Stockholm Environment Institute and IHO Assistant Director Sam Harper speakers included:

- Dr Mathias JONAS, Secretary-General, IHO: keynote address
- Dr Vladimir RYABININ, Executive Secretary, IOC UNESCO
- Rear Admiral Rhett HATCHER, UK National Hydrographer, UK Hydrographic Office, United Kingdom
- Helen ÅGREN, Ambassador for the Ocean, Swedish Ministry for Foreign Affairs, Sweden
- Linda Etta, Blue Economy Coordinator, African Union Commission
- James Joliffe, Space and Oceans Unit, Organisation for Economic Co-operation and Development, OECD
- Nadine Monsanto, Director for Blue Economy, Belize
- Dr Philip Osano, Director SEI Africa: concluding remarks

The event was well attended and the room was at capacity.

The IHO side-event on seabed mapping.

On Wednesday 29 June, the IHO also co-organized with the Nippon Foundation GEBCO Seabed 2030 project a side event on Mapping for people and planet. Moderated by Dr Dawn Wright (Esri, US) and Kiliparti Ramakrishna (WHOI, US), speakers included Tinah Martin (Lamont-Doherty Earth Observatory, Madagascar), Nina Jensen (REV Ocean, Norway), Lisa Levin (Scripps, US), David Millar (Fugro, US), Oliver Steeds (Nekton, UK), Tion Uriam (Ministry of Information, Communications & Transport, Kiribati) and Rick Spinrad (NOAA, US). IHO Secretary-General Dr Mathias Jonas provided closing remarks.

A secondary aim of attending the UN Ocean Conference was to maintain and build the IHO's strategic network and understanding of developments within the field of ocean science and the UN Ocean Decade.

The essential role that ocean mapping plays in underpinning ocean science and related activities is becoming a mainstream concept. The presence of the IHO at the conference showcased the hydrographic community's domain expertise, providing extensive opportunities to build our network and gather an understanding of emerging trends and initiatives within the UN Ocean Decade and broader 2030 Agenda.

During the conference, the IHO delegation met with representatives of the WMO, the Pacific Community, as well as MS representatives such as Portugal, Mauritius, Monaco and the UK. A specific item for further investigation is:

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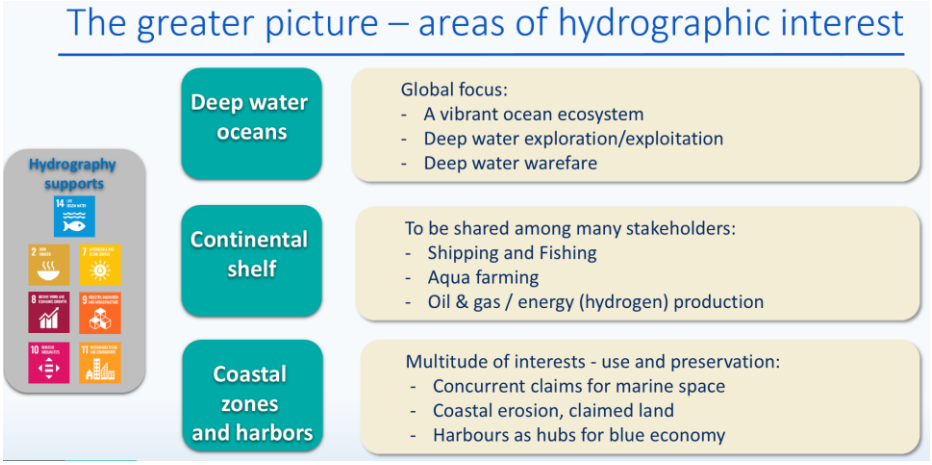
Inclusion of depth as an Essential Ocean Variable (EOV). Within the framework of the UN Ocean Decade, significant attention is being paid to the importance of data to inform science and decision making. Whilst the importance of bathymetry is well understood, it is also the case that it is often left out of discussions relating to taking an infrastructure approach (i.e. sustainable funding and greater focus) to 'Ocean Observing'. Whilst different observing systems collect various different data, the Global Ocean Observing System (GOOS) steering committee has identified a number of Essential Ocean Variables (EOVs) in order to prioritise investment through the Ocean Decade. In discussion with key stakeholders, it was suggested that depth could be added to the list of EOVs, with the IHO and IOC as leads under the auspices of GEBCO.

Participants at the UN Ocean Conference

International and Other Observers Organizations

Canadian Hydrographic Conference and IFHS Hydro Conference

IHO Secretary-General Dr Mathias Jonas contributed with key note speeches to both events which were held in Ottawa, Canada (6-9 June 2022) and Monaco (5-8 December 2022) respectively. He presented his views on Global strategic considerations and resulting trends in hydrography and highlighted the ambitions of the IHO in view of the different subjects raised.



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27th International Federation of Surveyors (FIG) Congress Hydro 2022

The International Federation of Surveyors (FIG) held its 27th Congress (FIG 2022) at DoubleTree by Hilton Hotel & Conference Centre in Warsaw, Poland from 11 to 15 September 2022. About 840 people attended the congress, including 60 students and 40 young professionals. The Congress with the motto "Volunteering for the Future - Geospatial Excellence for a better living" had 49 sessions and received 370 abstracts. The IHO Secretariat was represented by Assistant Director Leonel Manteigas with the objective to strengthen the cooperation with this Federation that has several objectives in common with the IHO, in particular its Commission 4 - Hydrography.

"FIG was founded on 18 July 1878, in Paris, by delegates from seven national associations - Belgium, France, Germany, Great Britain, Italy, Spain and Switzerland - and was known as the Fédération Internationale des Géomètres. This has become anglicised to the International Federation of Surveyors. It is a UN-recognized non-governmental organization (NGO), representing more than 120 countries throughout the world, and it aims to ensure that the disciplines of surveying and all who practise them meet the needs of the markets and communities that they serve."

The cooperation between IHO and FIG has a long history based on the shared areas of interest clearly demonstrated by the fact that one of the 10 Commissions of FIG is called Hydrography. One area of continued collaboration for several decades is education with the recognized need to develop and maintain international standards of competence for the hydrographic surveying profession. Decision 10 of IHO XIth International Hydrographic Conference (1977) and Resolution 1 of FIG Commission 4 during the XVth FIG Congress stated the objective to establish a Joint IHO-FIG Advisory Board that was the origin of the actual FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC). In 1978, this Board that was initially created with three members from the IHO and three members from FIG held is first meeting. A Memorandum of Understanding (MoU) between IHO and FIG was established in 2003 to provide a framework for continuing cooperation between the two organizations.

FIG President Rudolf Staiger addressing the Congress in the Opening Ceremony.

The activities associated with the FIG 2022 Congress started the week before with the 1st Session of the FIG General Assembly (4 September) and the FIG Council Meeting (9 September). On 10 and 11 September there were several activities such as Workshops, Practices as side events to the General Assembly sessions.

The Opening Ceremony took place on Sunday 11 September. During the Opening, there were key addresses from Mr Piotr Uściński, Ministry of Economic Development and Technology, Ms Alicja Kulka, Surveyor General, Head Office of Geodesy and Cartography, Dr Rafał Trzaskowski, President of Warsaw, Prof Janusz Walo, President of Polish Association of Surveyors (SGP) and Dr Krzysztof Bakuła, Co-Congress Director, SGP. FIG President Rudolf Staiger was the Keynote speaker. The week of the Congress consisted of the sessions of the General Assembly, meetings of the 10 Commissions, sponsor presentations, meetings with the candidates for the positions of Chair and Vice-Chair and the respective elections, keynote sessions and technical sessions.

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IHO Assistant Director Leonel Manteigas delivering a presentation.

IHO Assistant Director Leonel Manteigas delivered a presentation on Session "TS04A: Challenges and Sustainable Solutions in Hydrography for Better Living" of Commission 4 with the Title "The Universal Hydrographic Data Model S-100: A Revolutionary Approach to the Nautical Cartography and Maritime Services".

Participants in the FIG Commission 4 meeting.

In some technical sessions related to education, reference to hydrography and the IBSC was made several times. IHO Assistant Director Leonel Manteigas participated in all sessions of Commission 4 and was invited for the meetings of Commission 4 by the Chair, Professor Mohd Razali, and the future Chair, Dr Eranda Gunathilaka (Sri Lanka). The meeting discussed the activities executed in the last year with the participation of some members in workshops and seminars, the participation in the revision of IHO S-44, the outcomes of the e-Working Week 2021, the changes in the IBSC Members from FIG as well as the IBSC Meetings, the future evolvement of the IHO International Hydrographic Review and the Commission's Work Plan. The need to develop increasing outreach of hydrography within the FIG was also debated in particular during the events organized with the Young Surveyors.

During the 3rd Session of the FIG General Assembly, a new President, Dr Diane A Dumashie (UK) and two new Vice Presidents, Dr Daniel Steudler (Switzerland) and Prof Sr Winnie Shiu (USA) were elected for the coming term 2023-2026.

IHO Assistant Director Leonel Manteigas congratulating
Dr Diane A Dumashie, elected future FIG President for 2023-2026

XIII Trans-Regional Seapower Symposium

The XIII edition of the Trans-Regional Seapower Symposium (XIII T-RSS), organized by the Italian Navy, was held in Venice, Italy from 5 to 7 October 2022, in "Ex-Squadratori" hall within the historical Arsenal of Venice. The Italian Navy Ships Amerigo Vespucci and San Marco, both moored alongside Canale della Giudecca in front of the historical Arsenal of Venice, hosted bilateral and thematic meetings. Delegates from 60 Navies and 100 Organizations attended the symposium in person. A streaming session of the entire Symposium was also provided by the Italian Navy. Director Luigi Sinapi represented the IHO with the objective to present the tasks and mission of the IHO and the role of Hydrography today, highlighting the main challenges the IHO is facing this particular decade entirely dedicated to the Ocean and its sustainable development.

XIII Trans-Regional Seapower Symposium – Arsenal of Venice and ITN Amerigo Vespucci

The XIII T-RSS is a worldwide-awaited, open and inclusive forum where dialogue, discussion and sharing of perspectives link different worlds. Navies, industries, public institutions, academia and international organizations were engaged in across-the-board debates involving the diverse community of players of the national and international maritime cluster. The 13th edition main theme, "*A blue cluster approach in the ocean decade*", stems from a shared belief of the undisputed central role played by the maritime domain in the global dynamics of security and economic sustainable growth. In fact, in a systemic, international and multi-domain perspective, it is envisaged to identify, develop and share possible solutions to issues of common interest through an interdisciplinary governmental and policymakers' approach to achieve proper action focus and full effectiveness in favour of the international maritime community.

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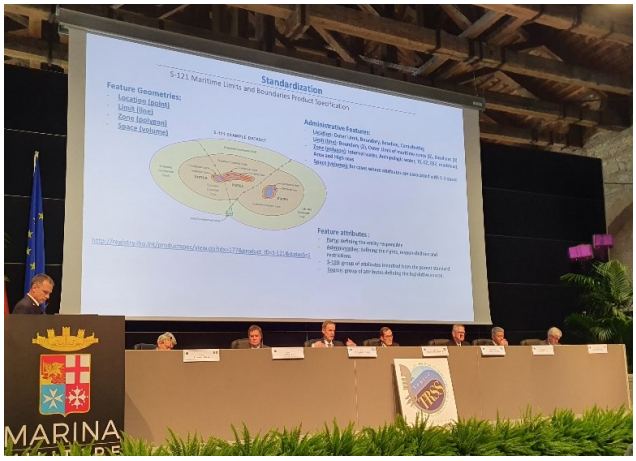
XIII T-RSS opening ceremony

The Symposium was opened by the Major of Venice Mr Brugnaro, Chief of Italian Navy Adm Credendino, the Italian Minister of Defence Hon Guerini, Director General of the Italian Ministry of Foreign Affairs Amb. Sequi, Secretary-General of IMO, Mr Lim from remote, EU Commission Vice-President Mr Borrell from remote, President of Fincantieri Gen Graziano and President of Leonardo, Mr Profumo. All emphasized the centrality of the seas and oceans, the importance of dialogue and cooperation and the necessity of a holistic approach to the Ocean from all the stakeholders, as the Ocean is a resource to preserve for the future generations and to use to contrast the climate change. The blue cluster approach is paramount to contribute to the security of shipping in the world's hotspots and to preserve biodiversity.

The symposium then developed into the following three thematic panels:

- *1st Panel - Protecting our Oceans, for a sustainable, resilient, and inclusive Blue Economy*. The objective of the panel was to share experiences and solutions for an effective contribution of the military sphere to the protection of the maritime environment, integrated in a transversal approach, both national and inter-governmental. In this regard, the conceptual connotation of the panel favoured an inter-agency approach that lends itself to involving other relevant institutional actors.
- *2nd Panel - Developing technology and capabilities in a competitive age*. The panel's objective was to identify, within the framework of general technological progress, the lines of development with the greatest impact on navies, as well as possible best practices to be put in place in order to identify at an early stage the technologies that could provide a competitive advantage in the action on the maritime domain understood in its broadest sense.
- *3rd Panel - From Naval Power to Maritime Power: integrating efforts in a whole-of-nation multidimensional approach*. The objective of the panel was to gather the different perspectives of the various actors of the Blue Domain - military and non-military - in order to appreciate different perceptions and main lines of development of maritime power, as well as to identify a possible model in which to inscribe the increased tasks of the Navies, defining how they can contribute, in a synergic way with all the articulations of the State and other international structures, to the security of the Blue Commons and to global prosperity.



1st Panel – UN DOALOS Director Dr Jares presentation

Noteworthy within the 1st Panel was the speech of U.N. DOALOS Director Dr Vladimir Jares, who recalled the importance of UNCLOS which, after 40 years since its inception, is still an effective and up-to-date tool in maintaining global order on the seas. In this regard, Dr Jares mentioned the important collaboration between DOALOS and the IHO on the S-121 – Maritime Limits and Boundaries Product Specification, inviting the States to start experimenting such useful product.

IHO Director Luigi Sinapi presented in the 2nd Panel on "*Hydrography: A Capabilities Multiplier for Sustainable Development*", highlighting how Hydrography actively contributes to the sustainable development and Blue Economy of countries, regions, and even the entire planet, through the main challenges that the IHO is facing in the current decade (2021-2030): Mapping the Ocean, the implementation of a new and universally recognized way of representing the marine environment: the Universal Hydrographic Data Model S-100, and then the commitment to the largest initiative ever launched in favour of the Oceans: the United Nations Decade of Ocean Science for Sustainable Development (2021-2030). In fact, Hydrography plays a key role as a capabilities multiplier for all in protecting our Oceans, and for a sustainable, resilient, and inclusive Blue Economy.

XIII T-RSS 2nd Panel – Presentation by IHO Director Luigi Sinapi

In his closing speech, the Chief of Staff of the Italian Navy, Adm. Enrico Credendino, remarked how the entire maritime community is urged to collectively commit to better cope with the new challenges ahead, first of all "*protecting our Oceans, developing technology and Whole-of-nation multidimensional approach*".

The three panels highlighted how the global economy is indissolubly linked to the sea, and every new challenge opens up opportunities, above all the necessity of a greater cooperation among all the stakeholders in the maritime domain. Emerging technology development brings new opportunities but also new challenges. Navies possess all the necessary high-level qualities for this technical, scientific and cultural challenge, and must embrace technology to maintain a competitive advantage, alongside the skills of "*naval diplomacy*", an instrument of cooperation, dialogue and union among the peoples.

Finally, along with the conclusions that were drawn during the discussions, the Chiefs of the Navies, gathered in Venice for the thirteenth Trans - Regional Maritime Symposium, drafted a *"Joint Statement to raise the attention of the international community on the need to commit every effort to address the maritime dimension with a holistic, transversal and inclusive approach. The centrality of the oceans and of the seas and the need for their protection as fundamental values to develop and sustain virtuous dynamics for the prosperity and the wellbeing of our people and for the entire globe must be advocated"*.

Public Relations and Outreach

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

Communications with the Government of Monaco, in particular the Department of External Relations and Cooperation, was regular and productive throughout the reporting period. Thanks to the established collaboration procedures the accession of two new Member States was successfully managed during the reporting period, namely Angola and Albania. The Democratic Republic of Congo and Republic of Vanuatu were reinstated as full members.

Her Excellency Madame Isabelle Picco, Permanent Representative of the Government of Monaco to the United Nations provided particularly good support in assisting the Secretary-General during his attendance at meetings in the UN Headquarters.

Promote the IHO through Publicity and public relations initiatives

The outreach of IHO themes is more than ever based on digital provisions. Social media such as linkedIn, facebook and twitter have become relevant communication channels in parallel to the IHO website. The website of the International Hydrographic Review underwent a full relaunch providing now substantially extended functionality. The use of VTC and hybrid formats for meetings hosted by the Secretariat have become common practice.

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

World Hydrography Day

World Hydrography Day was celebrated under the theme "Hydrography – contributing to the UN Ocean Decade". The Secretariat organized various forms of communication outreach, some in conjunction with "Monacology", a marine science based event to raise children's awareness about the environment and sustainable development and the Monaco Ocean week.

International Hydrographic Review

The International Hydrographic Review, the scientific journal published by the IHO, has a new editor. Dr Patrick Westfeld began his new functions on 5 January 2022. He brings with him solid technical knowledge, coupled with good experience with academia and scientific publishing.

Since 2017, Dr Westfeld has been head the R&D section of the Nautical Hydrography Department at BSH, the Federal Maritime and Hydrographic Agency of Germany. The activities of his section "Geodetic-Hydrographic Techniques and Systems" range from conceptual issues pertaining to hydroacoustic and imaging sensor technologies, sensor integration and modelling, algorithmic development and software implementation up to and including application-specific implementation and practical transfer in their production environment.

During his tenure, he would like to strengthen the content and increase the number of high-quality peer-reviewed articles received on a regular basis. He intends to build bridges with neighbouring disciplines, and would like to increase the visibility and standing of the IHR. His ideas to achieve this include registering the IHR for journal ranking lists, introducing DOI, and feeding relevant repositories with new IHR content.

Encourage new membership of the IHO

Following the invitation of the *National Service of Naval Hydrography (SNHN)* of the Navy, the IHO paid a High Level Visit to the Plurinational State of Bolivia on 5 and 6 September, during which hydrographic services for inland waterways were discussed. The landlocked nation borders on several lakes, including Lake Titicaca, the highest navigable lake in the world, and also has rivers which form part of the Amazon Basin. These play a vital role in the transport of people and goods in the region. The IHO Secretariat was represented by Director Luigi Sinapi.

IHO Director Luigi Sinapi and SNHN Executive Director General Captain Torrez Alvarez during the visit to Guaqui Naval Base and navigation on Lake Titicaca

The visit enabled IHO Director Luigi Sinapi to learn more about the status of hydrography within the country, as well as to highlight the benefits of hydrography and IHO membership for a country whose economy is so closely linked to its navigable waterways and lakes. During the visit to the *Guaqui navy base on Lake Titicaca* the hydrographic and maritime capacities of the Plurinational State of Bolivia were presented, highlighting the importance of up-to-date knowledge of these waterways which directly or indirectly connect Bolivia to the Atlantic and Pacific oceans, and to its neighbours Chile, Peru, Brazil, Argentina and Paraguay.

The SNHN activities

The Plurinational State of Bolivia has a Hydrographic Service capable of ensuring, by means of up-to-date cartographic products complying with international hydrographic and cartographic standards, the safety of navigation in Lake Titicaca and navigable inland waterways, in cooperation with the neighbouring States of South America, and actively participates in the work of the South West Atlantic Hydrographic Commission (SWAtHC) as an Observer. The bathymetric updating and production of traditional and electronic nautical cartography contributes to the safety of navigation

and development of the country's port infrastructures, complying with the IHO's international hydrographic and cartographic standards.

Discussions focused on the regional and international benefits and opportunities in the potential accession of the country to the IHO, highlighting the extent to which, for a non-coastal state, the national economy can benefit from improved knowledge of its navigable waters. The Plurinational State of Bolivia possesses a hydrographic capacity that can ensure safety of navigation in the country's inland waters. Bolivia's membership in the IHO would represent an opportunity for sustainable development and for the economy of those waterways for the entire country, thanks to the benefits and opportunities offered both at the regional level through participation in the Regional Hydrographic Commissions of South America, and at the international level through the IHO's Capacity Building programme and participation in the various IHO Working Groups and Organs, including the Assembly.

Meeting with the Chief of Staff of Bolivian Navy – Admiral Efrain Franck Salazar

Meeting at the Ministry of Foreign Affairs

Meeting with the Minister of Defence – Av. Edmondo Novillo Aguilar

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The visits to the hydrographic and navigation infrastructures of the Bolivian Navy, to the Chief of Staff of the Bolivian Navy, to the Ministry of Defence and the Ministry of Foreign Affairs confirmed the country's interest in hydrography and in continuing discussions to join the IHO. In fact, the Plurinational State of Bolivia is ready to begin the process of joining the IHO, recognizing the importance of Hydrography and the work done by its Naval Hydrographic Service. The competent authorities under the Ministry of Defence, in collaboration with the Ministry of Foreign Affairs and with the support of the IHO Secretariat, will take all necessary steps for Bolivia to join the IHO.

Visit to the Bolivian Navy's International Register of Ships (RIBB)

On completion of the Visit, the *Bolivian Navy's International Register of Ships (RIBB)* was visited. It has recently certified by the International Maritime Organization (IMO). Becoming an IHO member state would be a logical next step for the Plurinational State of Bolivia.

Management of the IHO Secretariat

Information and Operations Management

IT-Infrastructure of the Secretariat

As an ongoing requirement for any modern IT infrastructure, hardware and software equipment were under permanent maintenance and modernization. The further digitalization of administrative and production processes at the Secretariat is progressing.

The internal IT personnel 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. An ongoing challenge was the provision of mature hard- and software infrastructure for remote and hybrid meeting formats. Investments were made in video production software.

In-kind contributions were received from Member States hosting applications such as the DCDB (USA), S-100 Registry and IHO E-Learning Center (both by Republic of Korea). The Secretariat´s operational maintenance of the S-100 Registry, forming the core digital component of the S-100 framework, absorbs one third of the time of the appointed staff expert. Digital tools such as the online meeting registration system and the "formstack" system, enabling the digital management of Member States responses to Circular Letters, are performing well thanks to the technical and operational support of project officers from Japan and Republic of Korea.

A notable new addition was the S-100 ECDIS full mission bridge system demonstrator delivered by the Republic of Korea for testing and demonstration purposes for future S-100 compliant data sets.

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-6 - Assembly Proceedings, P-7 - IHO Annual Report, S-11 Part B – INTernational Chart Web Catalogue, associated web services and user manuals and M-3 - IHO Resolutions.

Communication between the IHO Secretariat and Member States through Circular Letters

During the year, the Secretariat published 47 Circular Letters (CLs) in English, French and Spanish and three Finance Circular Letters in English and French. In addition three Council Circular Letters in

preparation of the sixth Meeting of the IHO Council and eleven Assembly Circular Letters in preparation of the third Assembly were issued.

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.

GIS Infrastructure

As part of the global GIS infrastructure used in the Secretariat (Country Information System, the Catalogue of National Web portals, etc.), INToGIS is the one-stop-shop platform designed by the IHO Secretariat in 2014 to modernize the catalogue of INTernational charts, and developed and maintained since 2015 by the Republic of Korea. It is operational and widely used since 2016 by Member States, the Regional Hydrographic Commissions, the Charting Regions Coordinators and the IHO Secretariat, to display and manage, the Web Catalogue of INTernational Charts and ENCs (S-11 Part B). Several additional layers are available (World Port Index, European Waters Traffic Density (EMODnet), CATZOC data, etc.). The 2nd version in force is named INToGIS **II.** Charts and ENCs queries, gap analysis and ENC overlapping functions are available.

The USA provided a beta-version of a worldwide coverage of traffic density for experimentation and testing. This version aims to support the work of the Regional Hydrographic Commissions in their assessment of the adequacy of ENC coverage and quality in dense traffic areas, including in Polar regions.

The WENDWG has opened the discussion on the subsequent development of INToGIS III, using S-128 standard as far as possible, in order to allow HOs and other users to manage and visualize S-1xx products coverage in the future. This new functionality offered through the IHO GIS toolbox should become a key component of the Roadmap for the S-100 Implementation Decade.

The IHO Secretariat also pursued efforts for the integration of different web services in support of SCUFN activities, between different partners and supporting organizations (KHOA, NOAA). This task aims to be more efficient, more transparent, more visible, more accessible, more interoperable to all and Member States in particular, but also beyond the borders of the IHO community.

One challenging task launched this year was the design of the IHO SCUFN Digital Archive (the repository of all naming proposals, index maps, reports, 3D maps, etc.) hosted by the IHO Secretariat and connected to the official GEBCO Gazetteer. After a fire in a major data centre which occurred in Europe in March, noting the possible weakness of the current server infrastructure in the IHO Secretariat, it was decided to move to a modernized and more robust solution that is under development by KHOA, as component of the SCUFN Operational Web-services.

Changes in IHO Secretariat Staff

Until September 2022, the Secretariat comprised 20 Members of Staff, supplemented by three officers seconded by Member States to work on specific projects otherwise beyond the resources of the Secretariat. The total number of staff remained unchanged compared to the previous year. One staff position is currently pending replacement, but the job description may be redefined from administrative work towards IT system maintenance.

Ms Ghislaine Fauchois, Manager, Finance and Administration left for retirement after 12 years' service in September 2022. She was internally replaced by Ms Sandrine Brunel. Registration and operational management tasks for Capacity Building was concentrated in one post under Ms Lorène Chavagnas. This gave leeway to hire Ms Tracy Bowens as Empowering Women in Hydrography Assistant / Outreach Communication Assistant to permanently aggregate the EWH's content for all digital and printed media streams served.

Translation Service

Ms Perrine Brieda-Sauveur, Assistant translator left the Secretariat in March 2022 for family reasons after five years' service. She was not replaced. Instead, under supervision of the Head Translator Ms Isabelle Rossi, translation support is now provided by external contractors (Mr David Giraudeau for French and Mr Máximo J. Tobías Rubio for Spanish). The use of modern translation software assists to maintain high quality and expedient translations into both languages.

Secondment of Personnel to the IHO Secretariat

One officer each from the Korea Hydrographic and Oceanographic Agency – Mr Insung Park - and the Hydrographic and Oceanographic Department of the Japan Coast Guard - Mr Kazufumi Matsumoto - have been posted to the Secretariat throughout the year.

An officer from the Directorate of Hydrography and Navigation of Peru - Captain Javier Fernandez – has been seconded to the Secretariat since January 2022.

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 the 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 14th meeting of the Hydrographic Services and Standards Committee (HSSC) was held in Denpasar, Bali, Indonesia, in a hybrid format (VTC) from 16 to 19 May 2022, hosted by Pushidrosal, the Hydrographic and Oceanographic Centre of the Indonesian Navy.

The meeting was chaired by Mr Magnus Wallhagen (SMA[6], Sweden) and attended by 123 registered participants from 35 Member States (Australia, Bangladesh[7], Belgium, Brazil[2], Canada[2], Chile, China, Denmark, Ecuador, Egypt, Estonia, Fiji, Finland[2], France[2], Germany[2], India[2], Indonesia[2], Italy, Japan, Mexico, Netherlands, New Zealand, Norway[2], Peru[2], Poland, Portugal, Republic of Korea[2], Romania[2], Singapore[2], South Africa, Spain[2], Sweden[2], Turkey, United Kingdom[2], and United States of America[2]) and 7 Partner Organizations (OGC[2], CIRM, INTERTANKO, ICPC[2], RTCM, ISO, IALA) and 4 subject matter experts (IC-ENC[2], PRIMAR, SevenCs, and IIC Technologies[2]). The IHO Secretariat was represented by Director Abri Kampfer (HSSC Secretary) and Assistant Director Yves Guillam (HSSC Assistant Secretary) in-person, Mr Yong Baek (Assistant Director) and Mr Jeff Wootton (Technical Standards Support Officer) via VTC.

VAdm Nurhidayat, Chief Hydrographer of Pushidrosal, welcomed the participants in Bali and highlighted the importance of this meeting for the development of new S-100 based standards. He informed the participants that this international event was strongly supported by the Indonesian Government in support of Bali's citizens who suffered a lot from the economic consequences of the pandemic. On behalf of the IHO Member States and IHO Secretariat, Director Abri Kampfer expressed his gratitude to Pushidrosal for hosting such important IHO events.

[6] Swedish Maritime Administration.

[7] In-person.

"If we are alone we can go fast, if we are together we can go far"
(VAdm Nurhidayat in his opening address).

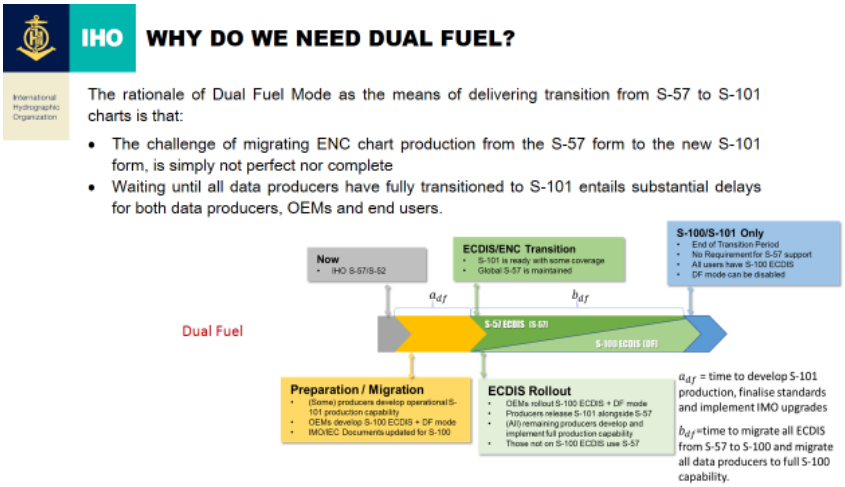
The HSSC Chair started the meeting and indicated his intention to capture, from the reports of the Chairs of the HSSC Working Groups, the possible amendments to the Roadmap for the S-100 Implementation Decade to be submitted at the 6th meeting of the Council (C-6) as well as the inputs for the 3-year IHO Work Programme that will be submitted at the 3rd Session of the Assembly in 2023.

All the HSSC's Working Groups and Project Teams reported on progress made over the year and on outstanding achievements, since 9 major IHO standards were submitted this year either for endorsement or approval, for new editions or in their 1st edition: S-100, S-98, S-99, S-102, S-57, S-58, S-65, S-44 and S-128. The standards approved as Edition 1.0.0 are now ready for experimenting and testing in liaison with industry partners. This is the case for S-98, which is a core component of the S-100 Implementation Roadmap, as it deals with *Data Product Interoperability in S-100 Navigation Systems*. This standard determine how S-100 based products such as S-102 - *Bathymetric Surface*, S-104 - *Water Level Information for Surface Navigation*, S-111 - *Surface Current and* S-124 - *Navigational Warnings*, will work together with S-101 ENCs and are displayed on the S-100 ECDIS.

The HSSC ISO 9001 Cell and the S-101 Project Team raised the awareness of the committee on possible resilience issues of the IHO Geospatial Information Registry. Recommendations for establishing a more robust situation in the long term are under consideration.

For most Hydrographic Offices, the main question is how and when they should start investing resources in the transition phase for moving from S-57 ENCs production to S-101 ENCs development, and other S-100 based products?

This was addressed on several occasions. To pave the way, a 1st version of a governance document named "*Dual-Fuel Concept for S-100 ECDIS*" was endorsed by HSSC for submission to the IHO Council in October.



Work items and guidelines for ENC conversion from S-57 to S-101 and vice-versa are now on track for being developed towards operational stages.

Following up on a pending proposal made by the Republic of Korea at the 2nd Session of the Assembly for amending several existing IHO Resolutions in order to promote the S-100 concept, the IHO Secretariat suggested a consolidated way forward that was endorsed by the Committee.

With regard to a proposal made by the United States (US) to task the NCWG for establishing minimum guidelines for automated paper chart output from ENC, noting the other priorities, the HSSC invited the US to keep the NCWG informed. A number of IHO Member States were however in support of the US statement to reconsider what the Future of the Nautical Paper Chart should be.

HSSC also decided that the term "*hydrospatial*" shall not be included in the Hydrographic Dictionary as it was definitely not a technical term. This term should be considered only as a slogan which can be used solely to promote hydrography and its associated aspects.

Participants endorsed a revision of S-44 - *IHO Standards for Hydrographic Surveys* - submitted by the new Hydrographic Surveys Working Group (HSWG). This new Edition includes clarifications on several terms (reference frame/system, uncertainty component, etc.) and some insertions (total vertical uncertainty equation, etc.). The HSSC also welcomed the establishment of 2 new Project Teams within the HSWG, one in charge of the revision of C-13 - *Manual on Hydrography* and the second on Satellite Derived Bathymetry.

The new Maritime Autonomous Surface Ships (MASS) Navigation Project Team, responsible for the analysis of MASS navigation requirements on current hydrographic standards, provided a very promising update on its work plan.

The representatives of IEC, CIRM, IALA, and OGC, among others, provided very good updates on matters affecting the IHO and HSSC in particular, all being essential to prepare the evolution of the IHO S-100 eco-system.

IEC International Electrotechnical Commission	IMO process around S-421 Route plan Introduction of S-100 into IEC 61174 ECDIS standard
CIRM	Preparation of NCSR-9: -Revision of MSC.1/Circ.1503/Rev.1 -ECDIS performance standard MSC.232(82) is being amended to introduce support for S-101 ENCs HD ENCs, a solution to address limited availability of depth data in current ECDIS.

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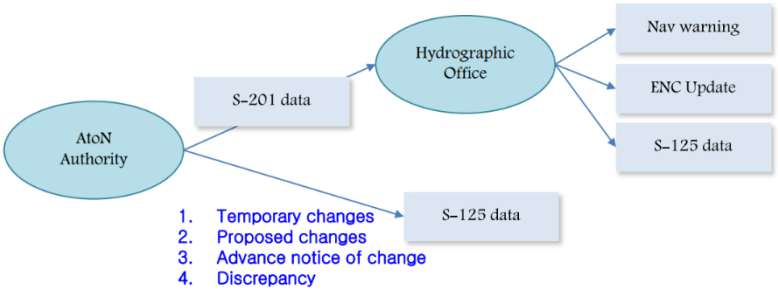
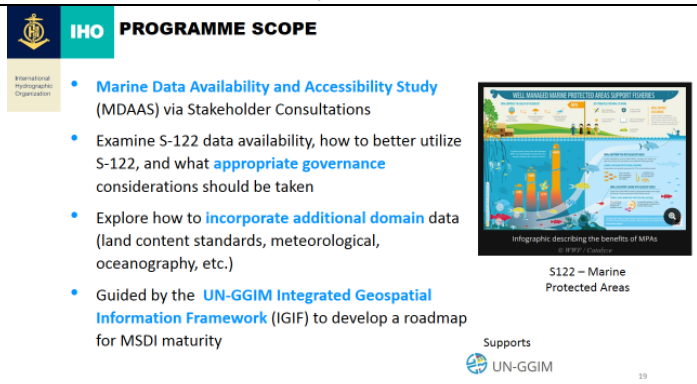


S-125 derived from S-201 data
Joint IALA/IHO Workshop on S-100/200 development and portrayal in Ålesund, Norway 5-9 September 2022.



The IHO-OGC Federated MSDI Pilot

This HSSC meeting was the first in person gathering after two years of pandemic, offering opportunities to participants to debate and discuss in the margins. The participants unanimously applauded Pushidrosal for their hospitality and the excellent hosting arrangements.

Participants in HSSC-14

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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 HSSC Working Groups

6th S-100 WG

The 6th Meeting of the S-100 Working Group was planned to be held as a Hybrid meeting in Monaco, however it was decided to hold the meeting from 10 to 14 January 2022 by Video-teleconference (VTC) due to the ongoing situation of the COVID-19 pandemic.

The meeting was chaired by Ms Julia Powell (USA), supported by Ms Elizabeth Hahessy (Denmark, Vice-Chair). 110 delegates from 24 Member States (Australia, Belgium, Brazil, Canada, China, Denmark, Egypt, Finland, France, Germany, Greece, India, Italy, Japan, Netherlands, Norway, Portugal, Republic of Korea, Romania, Singapore, Spain, Sweden, Turkey, United Kingdom and USA), 39 Expert Contributors. The IHO Secretariat was represented by Director Abri Kampfer, Technical Standards Support Officer Jeff Wootton and Assistant Director Yong Baek.

The Chair opened the meeting informing participants that due to the VTC format, the discussion items focused on proposals for S-100 Edition 5.0.0; S-98 Edition 1.0.0; S-102 Edition 2.1.0; and the Dual Fuel Governance Document, with other remaining items to be considered during the meeting only if time allowed.

Some participants at S-100WG-6

One of the most important work items for the S-100WG6 meeting was to review new proposals for S-100 Edition 5.0.0, which were discussed over the first two days. The meeting approved Part 16 – *Interoperability*, Part 16A – *Harmonized Portrayal of S-100 Products* and Part 17 – *Discovery Metadata for Information Exchange Catalogue* for S-100 Ed. 5.0.0 as new parts. In addition, proposals to revise S-100 Parts for Vertical Datums, Metadata Temporal Attributes, Supporting Resources, Distribution of S-100 Based Products (Part 4), GML (Part 10), Units of Measurement Information and Drawing Process (Part 9) were accepted. The details of these proposals are available on the S-100WG6 meeting page.

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The meeting decided to finalize S-100 Ed. 5.0.0 with the above accepted proposals with any remaining issues to be resolved by correspondence; and if needed, a special technical editing session will be held at the end of February 2022 in order to prepare S-100 Ed. 5.0.0 for submission to the HSSC14 meeting in May 2022.

In addition, amendments to S-100 Part 2 – *Management of Geospatial Information Registers*; and S-99 Edition 2.0.0 – *Operational Procedures for the Organization and Management of the IHO Geospatial Information Registry* were approved, taking into consideration the currently implemented operational procedures of the IHO Geospatial Information Registry.

The S-100WG Chair presented a draft Edition 1.0.0 of S-98 – *Data Product Interoperability In S-100 Navigation Systems*, consisting of four different interoperability levels and three Annexes (Annex A - *Operational Contexts, Scenarios and Use Cases*; Annex B - *Validation Checks*; and Annex C - *Harmonised User Experience for ECDIS and INS*), highlighting Annex C that has been introduced since the last S-100WG meeting to support the extraneous concepts of IHO S-52 in the S-100 ecosystem for navigational equipment. The meeting approved S-98 Edition 1.0.0 for submission to HSSC14 for endorsement and plans to demonstrate S-98 functionality to the HSSC and IHO Council meetings.

The S-102 Project Team Chair provided the background for Edition 2.1.0 of the S-102 Product Specification – *Bathymetric Surface*, which improves readability and focuses on navigational usage, noting however that it does not preclude non-navigational usage. Key updates of S-102 Edition 2.1.0 are the removal of tracking list, physical transfer as a delivery method and the resolution of S-102 metadata. This revision of S-102 will be submitted to HSSC14 for endorsement.

The meeting reviewed the progress of the development of the Dual Fuel Governance Document that has the following aims:

-Recognise and define each of the stakeholders and users of S-100 ECDIS. Capture all the relevant details at a high level and describe the “changes” required across the entire ecosystem.

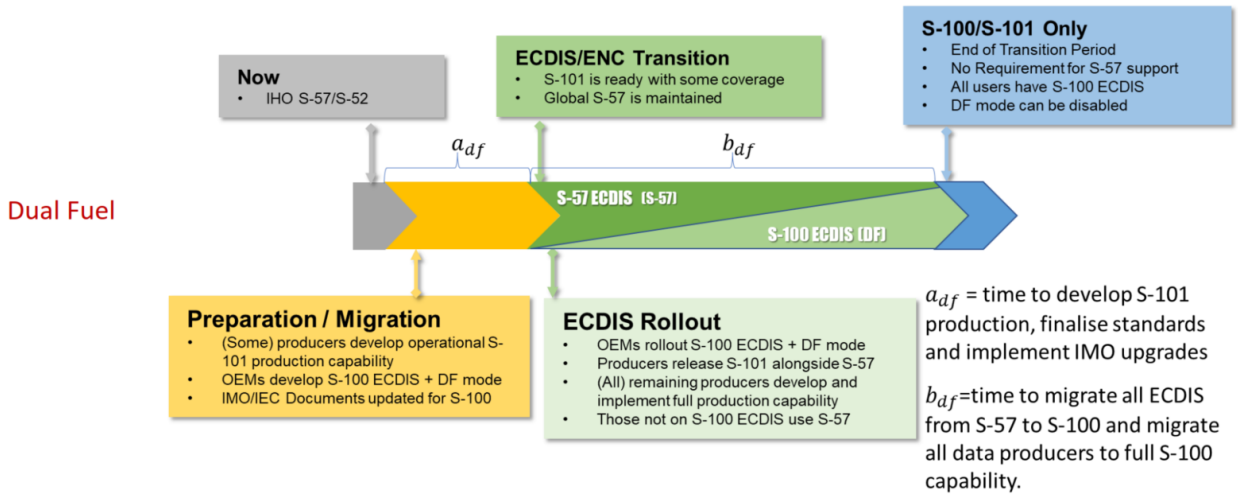
-Describe the S-100 ECDIS and the Dual Fuel “concept”.

-Detail the IHO’s transitional period.

-Fill in the detail between the IMO processes, the defining standards, the producing entities and the supporting stakeholders.

-Define how primary supporting bodies can support distribution and any likely changes.

-Define summary information suitable for communication with IHO Member States, stakeholders and the community, defining S-100 ECDIS focused on the IMO Performance Standard.



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The draft Governance Document will undergo a final review period by the S-100WG for completion by mid of February 2022 for submission to HSSC14 for endorsement.

S-100WG re-elected Julia Powell (USA) as Chair; and Elizabeth Hahessy (Denmark) and Iji Kim (Rep. of Korea) as Co-Vice Chairs.

7th S-100 WG

The 7th Meeting of S-100 Working Group (S-100WG7) and the 2nd IHO Geospatial Information Registry Workshop were held at the IHO Secretariat, Monaco from 5 to 9 December and from 12 to 13 December 2022 respectively. Both the S-100WG7 meeting and the Workshop were conducted as face to face meetings and also arranged as a live streaming event.

The S-100WG7 meeting was chaired by Ms Julia Powell (USA), supported by Co-Vice Chairs Ms Elizabeth Hahessy (Denmark) and Ms Iji Kim (Republic of Korea). 63 delegates from 26 Member States (Australia, Brazil, Canada, Chile, China, Denmark, Egypt, Finland, France, Germany, Greece, India, Indonesia, Italy, Japan, Malta, Netherlands, New Zealand, Nigeria, Norway, Portugal, Republic of Korea, Romania, Sweden, United Kingdom and USA), 4 External Liaisons (International Electrotechnical Commission (IEC), Inland ENC Harmonization Group (IEHG), International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) and NATO Geospatial Maritime Working Group (GMWG)), and 25 Expert Contributors were registered for the meeting. The IHO Secretariat was represented by Director Abri Kampfer, Assistant Director Yong Baek and Technical Standards Support Officer Jeff Wootton.

Welcome address and Plenary session for S-100WG-7

Director Abri Kampfer in his welcome address reported on the IMO approval for S-100 to be included in a Revision to the ECDIS Performance Standards; and that S-100 ECDIS will be operational for use on vessels from 1 January 2026 and from 1 January 2029 all new-builds must comply with the new IMO Resolution on ECDIS Performance Standards. He encouraged Member States to achieve substantial coverage of S-101 and related products by 2026, referenced the S-100 Roadmap and requested increased active contribution by Member States in S-100 related Working Groups and Project Teams.

The Chair opened the meeting informing participants that major items to be discussed at the meeting were proposals for Corrections and Clarifications for inclusion in S-100 Edition 5.1.0; approval of S-101 Edition 1.1.0; S-98 Interoperability Progress; S-164 Test Data Set Development; and S-100 Validation. Subsidiary S-100WG Project Team (S-102 and S-129) meetings would follow the S-100WG7 Plenary as side events.

During a session on matters arising from IHO Council and HSSC, the revised S-100 Implementation Roadmap and the S-100 timeline was reviewed; recognizing the prioritized S-100 based Product Specifications and critical framework Standards such as S-98 (Data Product Interoperability in S-100 Navigation Systems) and S-128 (Catalogue of Nautical Products); and especially noting that

Edition 1.0.0 of S-164 (IHO Test Data Sets for S-100 ECDIS) should be published by the end of 2023. Further discussion took place regarding responsibility for S-98 Interoperability Catalogue (IC) development in order to test Edition 1.0.0 of S-98. The meeting agreed to establish an S-98 Sub-Group and submit a request to HSSC for approval of the establishment of this Sub-Group.

The S-101 ENC Project Team reported progress made on S-101 development and requested S-100WG approval of S-101 Edition 1.1.0 components in two steps: Step1 being S-101 Main Document and DCEG approval at the meeting; and Step2 being Catalogues, Validation Checks and Test Datasets approval via WG letter in March 2023. The S-100WG approved Step1 during the meeting and agreed to proceed with the approval of Step2 through S-100WG Letter in early 2023.

The meeting reviewed 21 proposals for Edition 5.1.0 of S-100; and agreed on the incorporation of approved proposals in a final redline draft Edition 5.1.0 of S-100. However, for those proposals requiring further technical detail these will be discussed at the next S-100 Test Strategy Meeting (TSM9) in March 2023 and reported to the S-100WG for inclusion in the final draft of Edition 5.1.0 of S-100 for submission to HSSC15 (June 2023) for approval; or deferral to a future Edition of S-100.

The progress report for Edition 1.0.0 of S-98 and development of S-164 were presented and the meeting tasked the S-100 TSM to review and determine the way forward for S-98 "*unresolved comments*"; the IHO Secretariat to create one landing page for S-164; and the S-164 Sub-Group to draft an initial package of Edition 1.0.0 of S-164 for review at S-100 TSM9.

The 2nd Workshop of the IHO Geospatial Information (GI) Registry, which was held following the S-100WG7 meeting, was opened by Assistant Director Yong BAEK, who informed participants that the purpose of the Workshop was to provide an introduction to the Registry structure; demonstrate and review the Proposal Process and GI Registry Roles; and demonstrate the GI Registry tools included in the S-100 Tool Kit.

Technical Standards Support Officer Jeff Wootton, as the GI Registry Manager, presented the structure and interface of the GI Registry and facilitated discussion on possible improvements to the GI Registry interface and development of a "conventions and guidelines" document for the GI Registry. Through live demonstration and individual interaction on site, participants gained clearer knowledge and experience on the concept and structure of the GI Registry; and the considerations for the proposal submission and approval processes relevant to the roles within the GI Registry and its component Registers.

7th ENCWG and 9th S-101 Project Team

The 7th meeting of the ENC Working Group (ENCWG7) combined with the 9th meeting of the S-101 Project Team (S-101PT9) was held in Wellington, New Zealand from 21 to 25 November 2022 in a hybrid format.

The ENCWG sessions of the meeting were chaired by Mr Thomas Mellor (United Kingdom) and the S-101PT sessions of the meeting were chaired by Mr Thomas Richardson (IC-ENC, United Kingdom). 87 delegates from 30 Member States (Australia, Belgium, Brazil, Chile, China, Denmark, Egypt, Estonia, Finland, France, Germany, Greece, India, Indonesia, Italy, Japan, Netherlands, New Zealand, Nigeria, Norway, Portugal, Republic of Korea, South Africa, Spain, Sri Lanka, Sweden, Türkiye, United Arab Emirates, United Kingdom and USA); 2 External Liaisons (International Electrotechnical Commission (IEC) and Inland ENC Harmonization Group (IENC)); and 17 Expert Contributors attended the meeting. The IHO Secretariat was represented by Technical Standards Support Officer Jeff Wootton, who acted as Secretary for the combined meeting; and Assistant Director Yong Baek (remote participation).

The combined meeting commenced with an opening address by the Hydrographer of New Zealand, Mr Adam Greenland, followed by a traditional Māori welcome by the staff of Toitū Te Whenua Land Information New Zealand. The programme for the combined meeting was structured as such that the first half of the meeting covered the ENCWG Agenda (days 1 and 2), followed by the S-101PT Agenda (days 3 and 4) and any residual items on day 5.

The ENCWG Chair introduced the major items to be discussed at the ENCWG portion of the meeting which were aligned with the Decisions and Actions from the HSSC14 meeting (May 2022), including amendment of the ENCWG Terms of Reference; the development of a New Edition of S-64 - *IHO Test Data Sets for ECDIS*; the merging of S-66 - *Facts about Electronic Charts and Carriage Requirements* and S-67 - *Mariners' Guide to Accuracy of Depth Information in Electronic Navigational Charts (ENC)* into a single IHO Publication, also aiming to incorporate ENC and ECDIS related information papers; and development of IHO ECDIS Cyber Security Guideline. Additional discussions focused on the development of a Revision of S-65 Annex A - *High Density (HD) ENC Production and Maintenance Guidance*; standardization for the automation of the production of HDENC bathymetry; proposed changes to S-58 – *ENC Validation Checks*; ENC conversion (S-57 to S-101 and S-101 to S-57) and reports on the results of data conversion tests by Member States; and clarifications to S-52 Annex A - *IHO ECDIS Presentation Library*.

The structure of the document resulting from the merging of IHO Publications S-66 and S-67 was agreed and it was further agreed that the merged document would be designated as IHO Publication S-67 - *Mariners' Guide to the Use of ENC Data in ECDIS*. It was further agreed that the proposed IHO ECDIS Cyber Security Guideline would be included in this Publication.

The Working Group, both in session and during a break-out session, discussed the development of Edition 1.1.0 of S-65 Annex B – *S-57 ENC to S-101 Conversion Guidance* to align to the pending Edition 1.1.0 of S-101; and the commencement of the development of guidance for the conversion of S-101 ENCs to S-57. It was agreed that the S-101 to S-57 Conversion Guidance document would be designated as IHO Publication S-65 Annex C; and the document would be developed under the remit of the S-57 to S-101 Conversion Sub-Group, which is to be renamed the ENC Conversion Sub-Group.

Reports were presented by the IHO-Singapore Laboratory and the S-57 Sub-Group; and update reports provided on S-62 - *List of IHO Data Producer Codes* and S-63 - *IHO Data Protection Scheme*. Several proposals relating to the S-57 framework and data encoding were discussed; and an issue raised by the IMO in regard to references to IHO Publication S-61 - *Product Specification for Raster Navigational Charts (RNC)* included in the drafting of the new IMO Resolution MSC. 530(106) - ECDIS Performance Standards was resolved by the removal of redundant text. IHO Publication S-61, Annex A will be updated to refer to the Appendix 7 of IMO Resolution MSC. 530(106).

ENCWG7 in person participants

The S-101PT Chair commenced the S-101PT portion of the meeting, stating that the principle outcome of the meeting was to achieve Project Team approval of the Product Specification Main document and Annex A – *Data Classification and Encoding Guide* (DCEG) for Edition 1.1.0 of S-101 for submission for approval of the S-100WG at S-100WG7 (December 2022). This is considered to

be a key milestone in achieving the timeline for S-101 development as outlined in the S-100 Roadmap. Changes to S-101 Annex A were discussed and approved as part of the delivery of the S-101 DCEG Sub-Group report; and an extended editing session was conducted whereby the S-101 Main document review comments submitted by Project Team members were discussed, adjudicated and applied to the document.

Update reports were presented from the S-101 Portrayal, Data Validation Checks, Dataset Load/Unload and Scales, and Test Dataset Sub-Groups. Significant progress was reported in all areas of S-101 development, with the development of the S-101 Edition 1.1.0 Feature and Portrayal Catalogues to be commenced on approval of the S-101 Edition 1.1.0 Main document and DCEG by the S-100WG. It is intended to publish S-101 Edition 1.1.0 in March 2023.

Several proposals for amending or extending S-101 were submitted to the meeting, for inclusion in the next Edition of S-101. The meeting agreed that at least one further Edition (1.2.0) of S-101 for the purposes of implementation and testing would be required before an operational Edition (2.0.0) is published; and significant discussion took place on the steps required to achieve operational release of S-101 in line with the S-100 Roadmap, with the subsequent decision to hold two S-101 Project Team face to face meetings during 2023.

S-101PT9 in person participants

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Nautical Cartography

This element addresses the developments related to nautical cartography for charts specifications of ENCs and paper nautical charts, the maintenance of the relevant IHO standards, specifications and publications, and the provision of technical advice as appropriate.

Conduct meetings of Nautical Cartography Working Group (NCWG)

8th NCWG

The 8th meeting of the Nautical Cartography Working Group (NCWG8) was held in Wollongong, Australia from 15 to 18 November 2022 in a hybrid format.

The meeting was chaired by Mr Mikko Hovi (Finland), supported by Mr Nick Rodwell (UK, Vice-Chair and acting Secretary). 33 delegates from 19 Member States (Australia, Brazil, Canada, China, Denmark, Finland, France, Greece, India, Indonesia, Italy, Netherlands, New Zealand, Portugal, Republic of Korea, South Africa, Sri Lanka, United Kingdom and USA) and 6 Expert Contributors attended the meeting. The IHO Secretariat was represented by Technical Standards Support Officer Jeff Wootton.

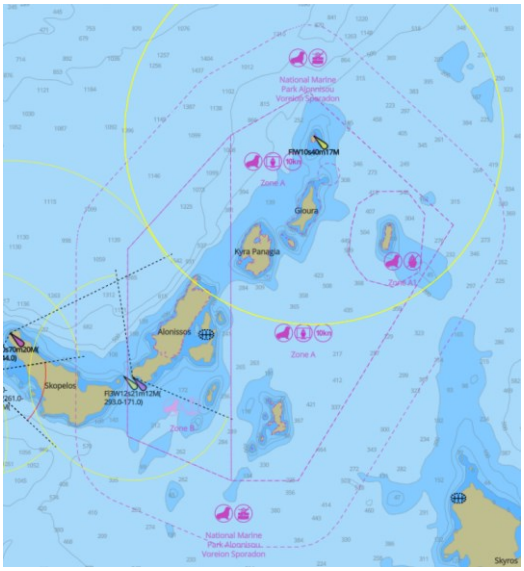
NCWG8 in person participants

Some NCWG8 on-line participants

The Chair opened the meeting, welcoming delegates to this first opportunity for the NCWG to meet face to face in three years. In her opening remarks, Australian Hydrographic Office acting Director Ms Hilary Thompson stressed the importance of nautical cartography for both paper and digital charting; and highlighted the coming challenges with the introduction of S-100 ECDIS in ensuring a consistent and cognitive end-user experience in a multi-product environment.

The Chair briefed the meeting on the Decisions and Actions affecting the NCWG from the HSSC14 meeting held in May 2022 and C-6 held in October 2022. Of particular note were discussions at both HSSC and Council related to the future of the paper Nautical Chart. While the decision taken at A-2 by which the priority is to develop guidelines for the automated production of paper Charts meeting S-4 (as the Standard for minimum Chart content) chart content requirements from S-101 ENC data were confirmed by both HSSC and Council, it was reported that a proposal had been submitted to both HSSC and Council to establish a minimum Standard for fully automated paper Chart output from ENC. The proposal was not endorsed, however the Council did endorse an offer of the USA to document use cases and develop associated guidelines, as well as identify challenges with S-4, to achieve automated production of derived paper charts from ENC content databases and report to the NCWG/HSSC for consideration.

The meeting received a report from Canada, as the lead for the Baseline Symbology Project Team (BSPT), on progress in the development of set of symbols for automated paper chart production from S-101 ENC data. The BSPT Terms of Reference were reviewed and a set of deliverables for the Project were agreed; and the Project Team was tasked with developing a Project Plan specifying the milestones, timeline and deliverables for the Project. A member of the NCWG was appointed to the IHO Geospatial Information (GI) Registry, Portrayal Register Domain Control Body, which is responsible for evaluating all portrayal proposals to the GI Registry.



Marine Protected Area symbols overlaid on ENC

Informative presentations were made by the Centre for Coastal and Ocean Mapping - Joint Hydrographic Center, University of New Hampshire (CCOM-JHC/UNH) on efforts for the development of symbology for new S-100-based Product Specifications; and continuing investigations into new alternatives for the representation of data quality indicators (equivalent to S-57 CATZOC) for bathymetric data on ECDIS displays. Significantly, for the first time in the development of new alternatives for the representation of data quality indicators, a comprehensive user survey was conducted of professionals working with Charts (mariners, cartographers, hydrographers). The results of this survey will be used to inform further development.

A number of specific cartographic proposals related to INT1 and S-4 were considered by the meeting, a number of which were directly related to ENC encoding and portrayal. The meeting agreed to include a lower priority task to begin addressing any inconsistencies between S-4 and the ENC related Standards.

Digital Data Protection and Authentication

The IHO Secretariat continued to carry out the role of administrator of the S-63 scheme for S-57 ENCs. In addition, the S-100 scheme application described in S-100 Part 15 is now available on the IHO website to allow for agreements with the Original Equipment Manufacturers (OEM) and Data Servers for S-100 based data sets in order to implement S-100 data dissemination. Both data protection schemes are administered in panel during the transition period.

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The administrator function involves processing applications and providing technical support and the individual and unique digital certificates and codes that are required to allow ENC/S-100 data servers, OEMs and software developers to encrypt and de-encrypt ENCs as part of the services or equipment that they provide. The S-63 Security Scheme currently includes 64 Data Servers and 395 OEM's.

Data Quality

The 17th meeting of the Data Quality Working Group (DQWG) was held as a remote video-teleconference (VTC) event, from 8 to 9 February.

The meeting was chaired by Mr Edward Hands (Norway). Thirty-eight delegates representing 17 Member States (Brazil, Canada, China, Denmark, Finland, France, Germany, India, Indonesia, Italy, Netherlands, Norway, Portugal, South Africa, Sweden, United Kingdom and United States), 2 representatives of the RENCs (IC-ENC[8], PRIMAR), 5 expert contributors (IEHG[9], Portolan Science, SevenCs, Teledyne-Caris and University of New Hampshire) attended the meeting. The IHO Secretariat was represented by Director Abri Kampfer, Technical Standards Support Officer Jeff Wootton and Assistant Directors Yong Baek and Yves Guillam.

The Chair welcomed the participants with the hope that the next meeting would be in-person. With a new Chair and Vice-Chair at the helm of the DQWG since May 2021 only, the Chair indicated that the main objectives of the meeting were to share an updated overview of all the tasks in progress.

This covered the following topics:

- The drafting of Part 4.c of the new Edition of S-100 Product Specification;
- The development of a template for the Data Quality chapter of S-1xx Product Specifications;
- The continuous review (from a data quality point of view) of new and amended Product Specifications including Feature Catalogues. This is to be planned in particular for the upcoming Edition 1.0.2 of the S-101 Product Specification;
- The development of Guidelines and Recommendations to HOs based on best practices to allocate CATZOC values (or S-101 ZOC values) from survey data qualified in application of Edition 6.0.0 of S-44 - IHO Standards for Hydrographic Surveys.

The meeting commended the University of New Hampshire on their work and tests in support of this high priority item. The meeting agreed to put some resources on this task in order to accelerate the availability of these Guidelines in 2023.

Following up on an action decided at the last meeting, the DQWG also commended PRIMAR for their ENC database content analysis, showing the distribution of CATZOC values in different Usage Bands (and vice-versa).

Assistant Director Yves Guillam indicated that this outcome (or equivalent) could likely be re-used to support the work on the development of SPI[10] 1.2.2. PRIMAR accepted in principle to assist in an experimentation for one RHC, based on technical specifications to be prepared by the Secretariat.

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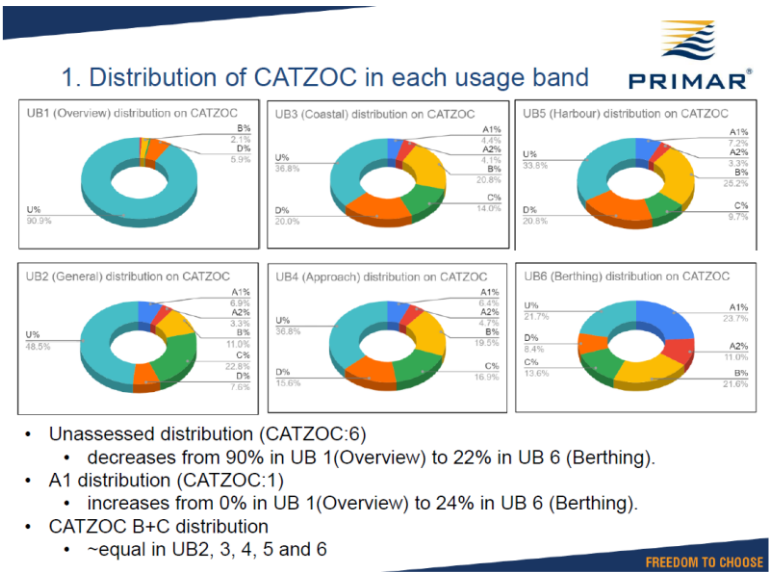
[8] *Chair of the S-101 Project Team.*

[9] *Inland ENC Harmonization Group.*

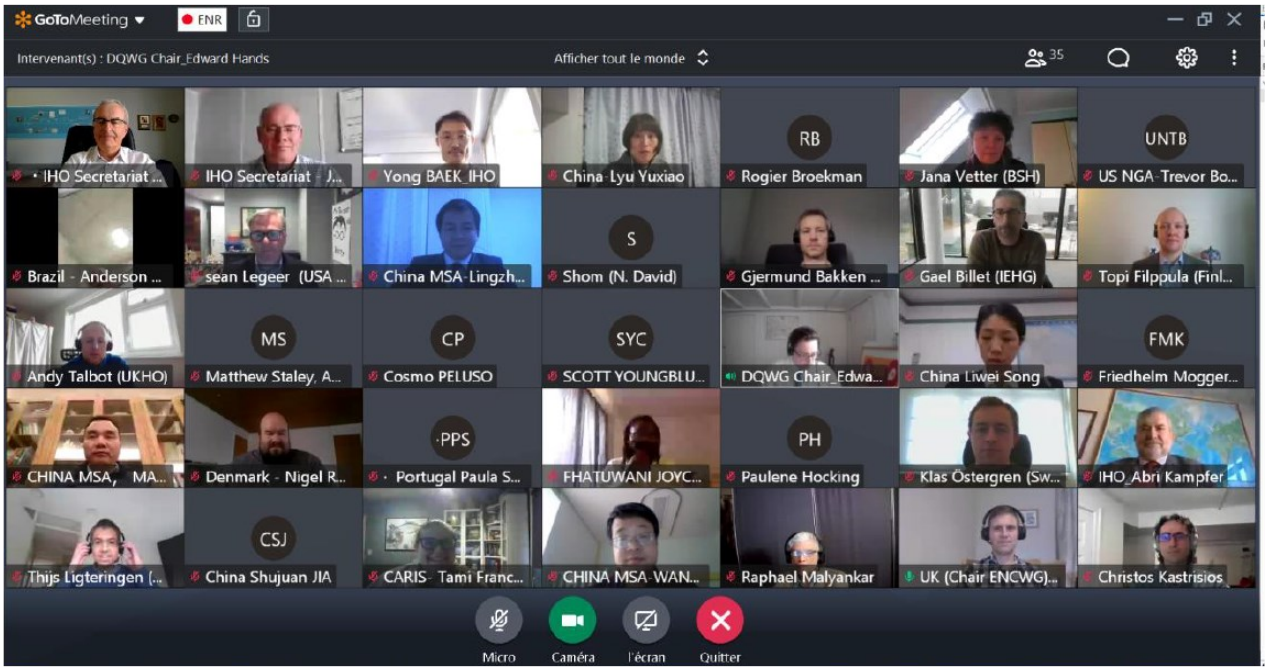
[10] *Strategic Performance Indicator 1.2.2 of the IHO Strategic Plan 2020-2026: Percentage of navigationally significant areas (e.g. charted traffic separation schemes, anchorages, channels) for which the adequacy of the hydrographic knowledge is assessed through the use of appropriate quality indicators.*



China reported on the availability of the Chinese version of the Publication S-67 - *Mariners' Guide to Accuracy of Depth Information in ENCs*. This version was uploaded on the IHO website > Publications > Standards. A proposal from the ENCWG to rename S-67 as "*IHO S-67 Mariners' Guide to use of ENC data in ECDIS*" in order to provide more authoritative Mariner information and guidance, was endorsed at the meeting. A joint proposal will be submitted to the HSSC for endorsement by the end of March.

The need to capture the requirements from the MASS Project Team and to provide recommendations in support of autonomous shipping initiatives was highlighted. This is relevant for the pending guidance to Member States to populate appropriate POSACC / SOUACC values in existing S-57 ENCs for relevant spatial objects in preparation of the conversion to S-101 ENCs.

No nomination was received for the position of Secretary.



Some participants in the DQWG-17 VTC meeting

Nautical Publications

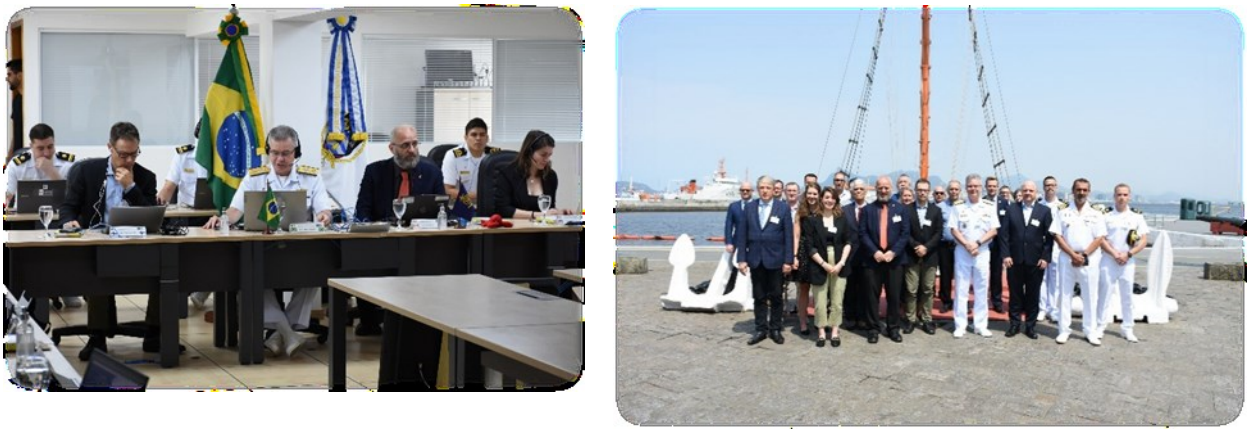
This element addresses the developments related to the preparation of nautical publications, the maintenance of the relevant IHO standards, specifications and publications, and the provision of technical advice as appropriate.

Conduct meetings of Nautical Information Provision Working Group (NIPWG)

9th NIPWG VTC

The 9th meeting of the Nautical Information Provision Working Group (NIPWG) was held in Niteroi, Brazil from 13 to 16 September 2022, kindly hosted by the *Diretoria de Hidrografia e Navegação* (DHN) and arranged as a hybrid event.

The meeting was chaired by Mr Eivind Mong (Canada), supported by Ms Laura Hall-King, Secretary (United Kingdom). Forty-five delegates (17 in-person, 28 by VTC) from 21 Member States (Australia, Brazil, Canada, China, Colombia, Denmark, Finland, France, Germany, Greece, India, Italy, Japan, Netherlands, Nigeria, Norway, Poland, Republic of Korea, Spain, United Kingdom and United States) and ten expert contributors (4 in-person, 6 by VTC) were registered in the meeting. The IHO Secretariat was represented by Assistant Director Yves Guillam (VTC).



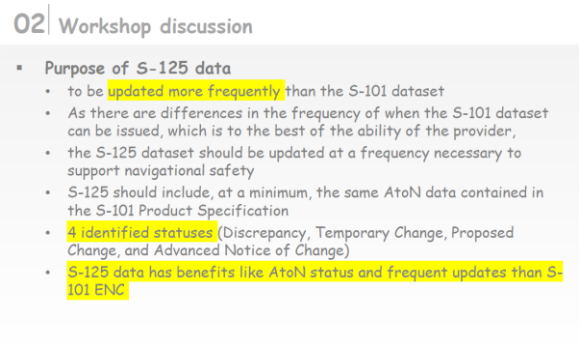
Welcome address and in-person participants in NIPWG-9

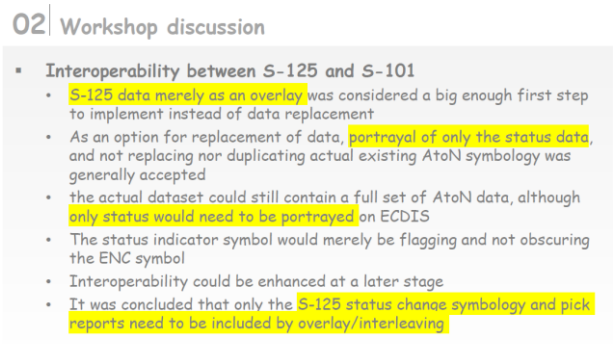
After a welcome address by VAdm Renato Garcia Arruda (DHN Director), the Chair presented the main objectives of the meeting, from considering the progress made on the various actions from the HSSC to the development of the S-100 based products that are in the remit of NIPWG.

The Chair also took some time to brief new NIPWG Members with a short history on the path from standardization of nautical publications (in paper) to the point of development of current S-100 based product specifications. This was very welcome for putting everyone on the same page and for raising the awareness on the identified uncertainties that remain to be resolved.

The main outcomes of the IALA-IHO Workshop on S-100 / S-200 Product Specification Development and Portrayal held in Norway the week just before NIPWG-9, were also shared with all Members to put them quickly at the same level of knowledge than the NIPWG Chair Group[11]. This was particularly relevant for S-125 for which the concept of Nautical Publication Information Overlay was introduced as a possible solution for being used in S-100 ECDIS.

[11] Who participated actively in the IALA-IHO Workshop.



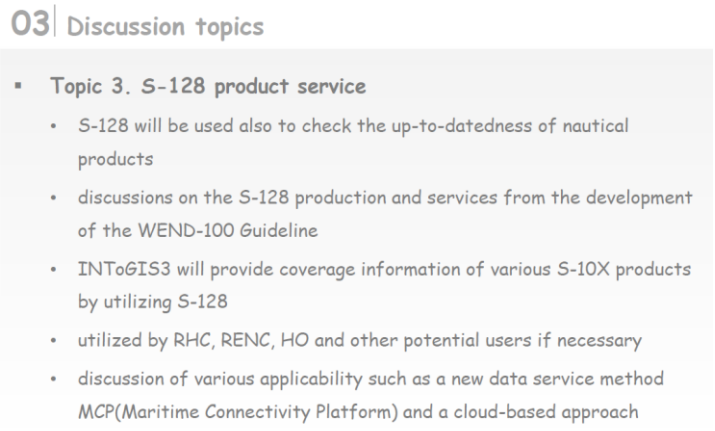


Some important discussion points on S-125

Following up on a task from the HSSC, the NIPWG considered a draft proposed paper on the "*intended use and distribution of S-1xx products*". This paper, which needs to be reviewed by all members from now, aims to show the most common sources of data used in each product and to highlight the data dependencies in an S-100 complex environment.

Presentations from the US (NGA) and the UK (UKHO), respectively on the new World Port Index web services and on the new generation of Digital Sailing Directions, generated fruitful discussions. They also highlighted the needs for national strategies to ensure that the new generation of products will remain interoperable or at least compatible with the current development of S-1xx products at international level.

The new NIPWG internal arrangements in task groups (TGs) for progressing the developments of every single S-1xx products under NIPWG's remit proved to be very efficient. The different task groups (S-122, S-123, S-125, S-128, S-131…) had several VTC technical meetings prior to NIPWG9. The TGSs provided their status reports, not only on technical matters which are progressing very well, but also on key discussion points that are critical to move forward (scope, use cases, coverage limits and responsibilities, test beds, authoritative S-100 service coverage, digital signature *versus* encryption, etc.).



Some important discussion points on S-128

This is particularly important for S-128 which appears to become one of, if not THE, cornerstone of the S-100 implementation phase. For S-128, the UK shared the concerns they foresee for the RENCs, the End-User Service Providers/VARs, and ECDIS Providers. PRIMAR shared its draft vision on the various options to implement this new "catalogue of nautical *products/services*".

A significant number of discussion points were identified for most of the products. Many complex questions still need to be addressed, clearly worded…and then answered.

Following up on a former NIPWG action, France submitted an interesting discussion paper with a proposed classification of S-1xx products against those listed in SOLAS V/27 *("…nautical publications such as sailing directions, lists of lights; notice to marines, tide tables, all other nautical publications…*"). With reference to IHO Resolution 5/2022, needless to say that there is no obvious equivalence between existing NP1 and NP2 and S-1xx products and services. It was agreed that NIPWG had to prepare a draft statement promoting the need to cooperate across governments and

to identify the best organization to provide *data services* to ensure the best possible whole service for the end user.

The NIPWG Chair commented on the amendments proposed to the IMO Resolution MSC.232 (82) – *ECDIS Performance Standards*. NIPWG agreed to prepare for HSSC-15 some clarifications on the definition of "*Electronic Navigational Data Service (ENDS)*" which is introduced in these amendments. Despite a couple of late and additional comments made by IACS[12] submitted to MSC106, it is expected that these amendments and the associated calendar will be approved in November. In the discussion on the IACS' comments, the NIPWG Chair supported by the Chair of IEC TC 80 prepared the wording recommended to be used by the IHO for a verbal intervention at MSC106.

Some NIPWG-9 Participants (in-person and VTC)

[12] International Association of Classification Societies

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Tides and Water Levels

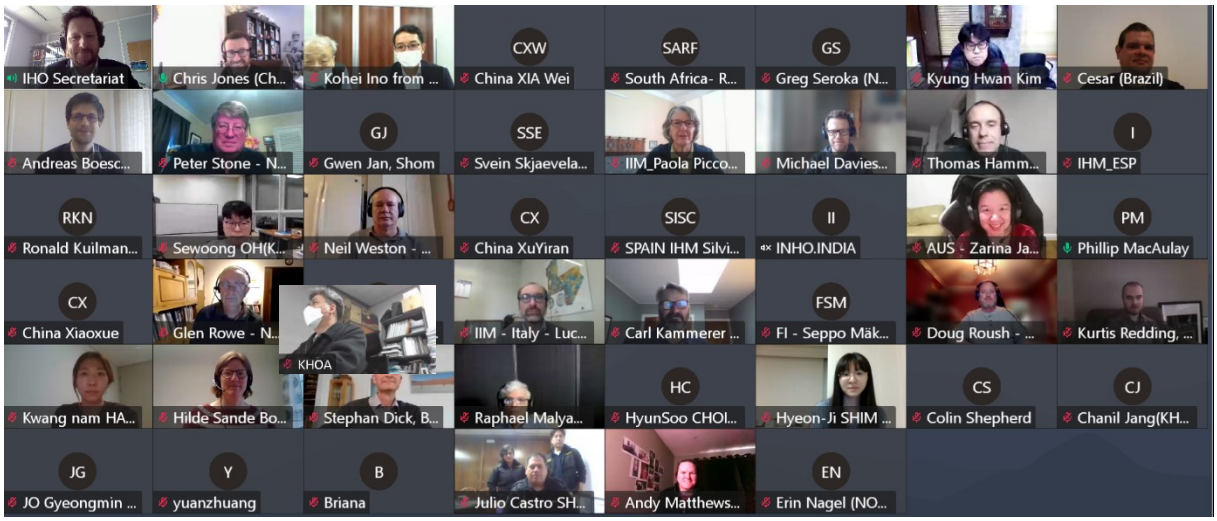
This element addresses developments related to tidal and water level observation, analysis and prediction and other related information including vertical and horizontal datums, the maintenance of the relevant IHO standards, specifications and publications, and the provision of technical advice as appropriate.

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

6th TWCWG

The Tides, Water Level and Currents Working Group (TWCWG) has been tasked by the IHO Hydrographic Services and Standards Committee (HSSC) to monitor and develop the use of tidal, water level and current information as well as to advise on tidal, water level and current observation, analysis and prediction.

Due to the ongoing global COVID-19 pandemic and the associated travel restrictions in place, the 6th meeting of the Tides, Water Level and Currents Working Group (TWCWG6) originally planned to be held in South Africa, was held as a virtual meeting from 5-7 April under the chairmanship of Mr Chris Jones. The meeting was attended by 50 delegates from 18 IHO Member States and observers from Center for Coastal and Ocean Mapping/Joint Hydrographic Center – University of New Hampshire (CCOM/JHC - UNH), the Secretariat of the Intergovernmental Oceanographic Commission of UNESCO (IOC) and the Chair of the IOC Global Sea Level Observing System Group of Experts (GLOSS). Assistant Director Sam Harper represented the IHO Secretariat.



Some of the participants at the TWCWG6 meeting

The Chair provided an update on the interaction and discussions which had taken place with other IHO subordinate bodies, in particular NIPWG, DQWG, HSWG, CSBWG and S-100WG.

A significant amount of TWCWG6 was devoted to reviewing the draft versions of the S-100 based Product Specifications for which the group is responsible – S-104 (*Water Level Information for Surface Navigation*) and S-111 (*Surface Currents*).

S-104 Ed. 1.1.0. The target for delivery was agreed as end of 2022. Remaining activity identified included the update of external metadata, finalizing exchange set format, adding additional vertical datums, adding a Validation Checks annex as well as other minor updates to sample dataset to align embedded metadata with S-100 Ed 5.0.0.

S-111 Ed 1.2.0. The target for delivery was agreed as end of 2022. Remaining activity identified included the alignment of non-uniform time interval data with the provision on S-104, updates file naming conventions, the inclusion of Use Case examples and the updating of various UML diagrams.

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In addition this specific activity, the group agreed to prepare a list or survey of the what (and how) Member States' water level data (S104) and surface current data (S-111) are created (i.e. Astronomical Prediction, Model Forecast, Discrete Points, Gridded, coverage, duration, update frequency, etc.). It was also noted that further discussion was required regarding setting 'priority order' in the data type and the provision of further guidance on handling long term datasets (i.e. as per national tide tables etc.) in S-104 & S-111 formats.

The International Association for the Physical Sciences of the Oceans (IAPSO) gave a presentation on a project they are leading to produce a formal 'Best Practice Guide' for tidal analysis. It was agreed that there was significant synergy with the work and mandate of the TWCWG and that the group should be appropriately represented. It was noted that care must be taken not to duplicate effort.

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 did not meet in 2022, however work to review the 6000+ definitions has now been completed. All of the terms in the Hydrographic Dictionary have been entered in the IHO GI Registry and the HDWG is now represented on the Domain Control body to ensure that any new terms are properly considered. The 3rd HDWG meeting is planned for 2023 with the key focus being on the future management and format of the Hydrographic Dictionary.

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.

Organize and prepare the Advisory Board on the Technical Aspects of the Law of the Sea (ABLOS) annual business meeting

The Advisory Board on the Law of the Sea (ABLOS) is a joint board of the International Hydrographic Organization (IHO) and the International Association of Geodesy (IAG) with the objective to provide information and advice on technical aspects of the Law of the Sea.

Due to the ongoing global travel restrictions, the ABLOS held its 29th Business Meeting (BM) from 4-6 October 2020 In Hybrid format. The three sessions were chaired by the ABLOS Chair, Ms Izabel KING JECK (IHO – Brazil). The sessions were attended by all the ABLOS members and IHO and IAG appointed observers from Australia, Brazil, Chile, Denmark, France, India, the Republic of Korea, Sweden and the United Kingdom. During the meeting, the Chairpersonship was handed over to the current Vice-Chair Dr Juan Carlos BÁEZ SOTO (IAG – Chile), with Fiona BLOOR (IHO – UK) elected to Vice Chair.

The BM opened with a reflection on the role and relevance of the work of ABLOS; it was noted that beyond the traditional technical advice provided by the group, activities such as Biodiversity Beyond National Jurisdiction (BBNJ), the 30 by 30 Initiative, Marine Scientific Research (MSR) provisions under UNCLOS and their relevance to Crowdsourced Bathymetry, to name but a few, necessitated consideration.

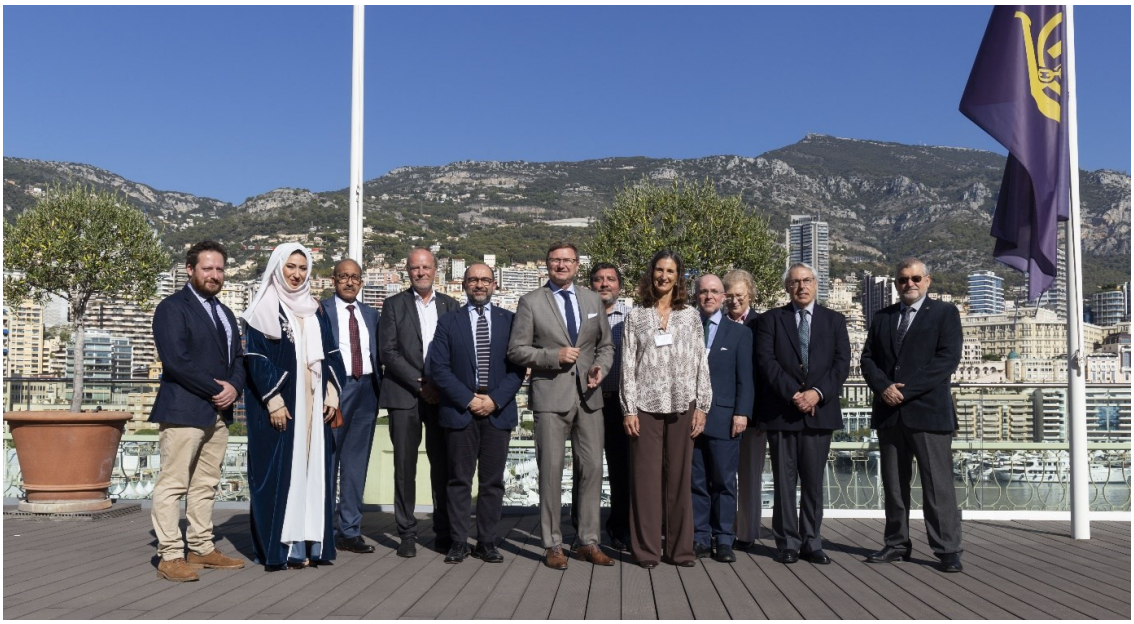
At the previous BM, it had been decided that the 11th ABLOS Conference would be postponed until October 2022, however this was further deferred until October 2023 in order to deconflict with other

events being held in Monaco and to ensure there was enough participation. The participants of the BM further discussed arrangements for the conference and agreed the working title of *'Ocean Geosciences and Law of the Sea: Setting the Course for the Next Century'.* It was decided that the provisional list of session topics would remain the same at this stage:

- Advances in the definition and management of maritime space
- Divisions between land and sea
- Developments in the division of the Oceans (maritime delimitation issues)
- UNCLOS in a digital age: evolving technologies, fresh challenges, digital charting, new surveying techniques, VMS etc.
- Going Deep or Mining the Deep or Plumbing the Depths
- BBNJ and innovations in protecting marine resources and preserving the marine environment
- Defining and regulating the outer continental shelf
- Setting future agendas in oceans governance: scientific and technical considerations
- Empowering women in Ocean Geosciences and Law of the Sea

Further details regarding the conference will be released in due course by the organising committee and published on the IHO and ABLOS websites.

The participants reflected on the publication of C-51 – *A Manual on Technical Aspects the United Nations Convention on the Law of the Sea - 1982* – Edition 6.0.0. It was agreed that the draft text for Ed.7.0.0 would be developed in time for BM30 and onward submission to HSSC16 in 2024.



In person participants of the ABLOS BM29 meeting

Hydrographic Surveys Working Group (HSWG)

2nd HSWG

The Hydrographic Surveys Working Group (HSWG) has been tasked by the IHO Hydrographic Services and Standards Committee (HSSC) to act as the focal point for hydrographic surveying industry engagement with the IHO and maintain and promote the use of IHO publications S-44 *Standards for Hydrographic Surveys* and C-13 *Manual on Hydrography.*

Due to the ongoing global COVID-19 pandemic and the associated travel restrictions in place, the 2nd meeting of the Hydrographic Surveys Working Group (HSWG2) was conducted as a fully virtual

meeting from 15 to 18 February 2022 under the chairmanship of Mr David Parker (UK). The meeting was attended by 55 delegates from 22 IHO Member States (Belgium, Brazil, Canada, China, Croatia, France, Germany, India, Ireland, Italy, Latvia, Mexico, Netherlands, New Zealand, Norway, Portugal, Republic of Korea, South Africa, Spain, Sweden, UK and USA) and a range of Expert Contributors from industry and academia. The IHO Secretariat was represented by Director Abri Kampfer and Assistant Director Sam Harper.

The primary focus of the meeting was to develop an updated version of S44, progress the development of a new version of C-13 Manual on Hydrography, and progress development of Satellite-Derived Bathymetry Best Practice Guidelines. Plenary sessions ran for all of days one and four, and a part of days two and three, which also included significant break-out sessions for the S44 Drafting Team, Manual on Hydrography Project Team and Satellite Derived Bathymetry Project Team.

The S-44 Drafting Team, led by Megan Greenaway (USA), met for the first time at two breakout sessions during the HSWG2 meeting. The main objectives were to identify which S-44 proposed updates should be applied and to make a recommendation for editorial implementation. There were a total of 35 updates and most were implemented. The next steps will be to distribute an updated edition 6.1.0 to HSWG for final review ahead of submission to HSSC14 for endorsement in May 2022 before onward promulgation to IHO member states for approval.

The C-13 Manual on Hydrography Project Team (MHPT), led by Nikolas Rocher (Brazil), met for the first time during HSWG2, holding two dedicated breakout sessions. The principle aim of the sessions was to discuss and plan the update of C-13. The MHPT noted that this will be a significant undertaking and agreed that taking a modular approach would be the most efficient means of tackling the task. The MHPT also recognised the need for cross-referencing C-13 updates with the other IHO publications, particularly in this instance, the IBSC's S-5B standards. In order to further understand what the stakeholders expect from the coming C-13 document, the MHPT has drafted a comprehensive questionnaire, the results of which will guide the intended scope of readership, the depth of the technical details and which new technologies should be referenced.

The Satellite-Derived Bathymetry best practice Project Team (SDBPT), chaired by Knut Hartmann (Eomap), held two breakout sessions during HSWG2. It was the 3rd SDBPT meeting with the main objective being to structure the activities and responsibilities for developing the Satellite-Derived Bathymetry Best Practice Guidelines. Teams of subject matter experts, timelines and structure were defined and good progress is expected within Q1 and Q2 2022. Both sessions were well attended with more than 20 participants each from 16 countries. The breakout session hosted guest speakers from the satellite providers Planet and Airbus who provided a valuable overview of the current capabilities of the satellite fleets.

Some of the participants at the HSWG2 meeting

In closing the meeting, the Chair thanked the participants, the Project Teams and Drafting team for all the hard work put through the meeting. He emphasized the good progress that HSWG is making

with S44, C13 and SDB. Intersessional works will follow and HSWG3 will be scheduled soon. Preference was expressed for future meetings to be in-person and it was concluded that, if possible, HSWG3 will be held in an in-person-format with an online attendance available. The planned timeframe for the next meeting will be in September or October, date and venue still to be confirmed.

3rd HSWG

The Hydrographic Surveys Working Group (HSWG) has been tasked by the IHO Hydrographic Services and Standards Committee (HSSC) to act as the focal point for hydrographic surveying industry engagement with the IHO and maintain and promote the use of IHO publications S-44 *Standards for Hydrographic Surveys* and C-13 *Manual on Hydrography.*

The 3rd meeting of the Hydrographic Surveys Working Group (HSWG3) was held in Person at the ixBlue Campus, Paris, France, under the chairmanship of Mr David Parker (UK). The meeting was attended by 30 delegates from 15 IHO Member States (Belgium, Brazil, Canada, Finland, France, Germany, India, Ireland, Italy, Portugal, Romania, Spain, Sweden, UK and USA) and a range Expert Contributors from industry and academia. The IHO Secretariat were represented by Assistant Director Sam Harper.

Introducing the meeting, the Chair summarized the intentions for HSWG3, noting that S-44 v 6.1 is now approved by member states and ready to be published. The main focus of HSWG3 was progressing the work on updating C-13, The Manual on Hydrography, and the guidance document on Satellite Derived Bathymetry (SDB). He noted that it was also his intent to review the S-44 update process and discuss the promotion of S-44. Finally, it was stressed that there is a standing responsibility to encourage and enable engagement between the IHO and Member States, community and industry to give the best possible interaction between all parties.

S-44. Following a recap of the process leading to approval of S-44 Ed.6.1.0, the update process was reviewed and agreed to be every 2 years, with HSWG preparing the review throughout the first year and half and approving all changes by December in order to have the new update ready for presentation to the following HSSC.

C-13. Following an initial recorded update on progress to date from Nikolas Rocher (Brazil), Ian Davies (UK) led the Project Team through a review of the questionnaire that had been prepared to gauge the interest, scope and intended audience of a revised C-13 publication. It was accepted that the publication should continue to be a reference guide to support the S-5 and S-8 syllabi, but that careful consideration should be given to its potential utility beyond a mere teaching aid. The format of the final publication was also discussed and whilst the functionality of e-publications was well noted, it was agreed that this should be re-visited once further progress had been made. The group undertook to finalise the questionnaire and with the help of the IHO, distribute as soon as possible in time to inform the work of HSWG4.

SDB Best Practice Guide. The SDB Project Team (SDBPT) continued to make progress on the development of the SDB Best Practice Guide. For the remaining work required, individual chapters were assigned lead authors. The long term status of the document was discussed and it was agreed that a new formal Bathymetric Publication

could be proposed to HSSC (potentially B-13). Completion of the SDB best Practice Guide is scheduled for early 2023 to allow review at HSWG4 ahead of submission to HSSC15.

Other Matters. Noting the inter-linkages with other IHO bodies, presentations and discussion on key issues were had relating to the Data Quality Working Group, the Hydrographic Dictionary Working Group, the Tides, Water Levels and Currents Working Group, the S-100 Working Group, The GEBCO Technical Sub-Committee on Ocean Mapping and the Crowdsourced Bathymetry Working Group. It was noted that the HSWG would need to be proactive in reaching out to these groups to provide support and a number of associated actions were assigned.

Technical outreach, advice and guidance in relation to IHO Standards, specifications and guidance

7th Conference of Digital@Sea Asia Pacific

The 7th Conference of Digital@Sea Asia Pacific was held in Seoul, Republic of Korea September 15-16 2022. The conference was attended by more than 100 participants from International Organization such as IMO, IHO, IALA as well as institutions and academics from 20 countries in Europe and Asia Pacific, including the UK, Denmark and Australia. The IHO Secretariat was represented by Director Abri Kampfer and Assistant Director Yong Baek.

The kick off session began with an opening from CHO Seung-hwan, Minister of Oceans and Fisheries (MOF) of the Republic of Korea, focused on international cooperation to promote maritime digitalization and recent maritime policies and technologies with regard to maritime digital services, information sharing platforms and next-generation maritime digital communication.

IHO Director, Abri Kampfer congratulated the Organizers of the Digital@Sea Asia-Pacific 2022 Conference for this initiative following on the successful online conference last year and it should promote technical exchange as well as multilateral cooperation on various region. In his congratulatory remarks, the theme of the Conference, “Harmonious cooperation for global maritime digitalization” indicates direction and requires international cooperation for the harmonious, and he hope that international efforts will be made in a joint digital framework. An all-embracing digital data model in place for all kind of marine geoinformation based on IHO´s S-100 framework will allow fully interoperable data streams to feed evolving technology for the benefit of the maritime industry.

Assistant Director Yong BAEK presented about the IHO Roadmap for the S-100 Implementation Decade (2020-2030) constitutes a transition plan aiming to the regular and harmonized production and dissemination of S-100 based products. The Roadmap is composed of seven items – *1.Operational infrastructure, 2.Technical standardization, 3.Coordinated implementation of services, 4.Synchronization with IMO, 5.Collaboration with industry, 6.Capacity building of hydrographic offices and 7.Development of Global distribution capability*. In addition, it also includes three Annexes for collaboration and timelines with IMO & Industry, S-100 Product Specifications Timelines and WEND-100 principles.

In the last session, MOF Director Taeseong Jung, IHO Director Abri Kamper, IALA Secretary General Francis Zachariae and AMSA CEO Mick Kinley signed on Memorandum of Understanding on the establishment of the global digital testbed clusters, for digital solutions and services in the maritime domain. The cooperation among Participants is to demonstrate the value of established services in different areas of the world by facilitating the development and implementation of Maritime digital solutions and services that includes:

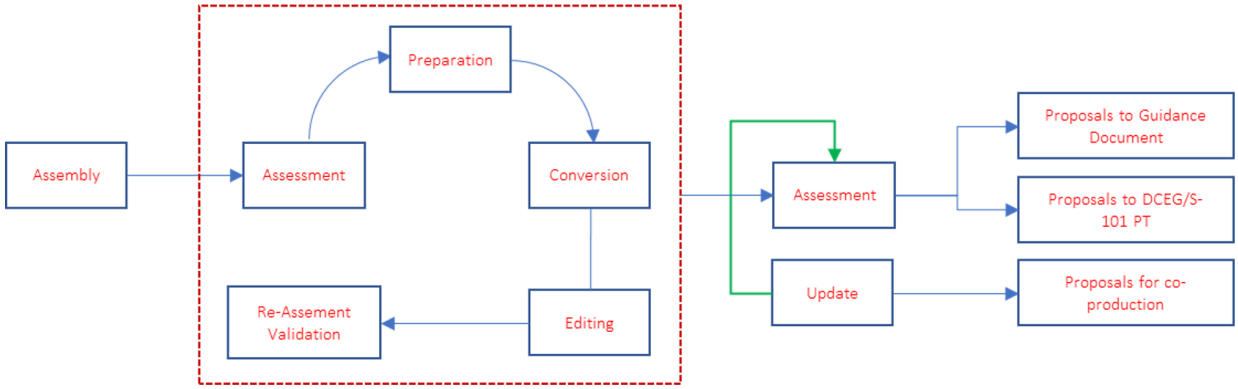
- establishing and using the Global Digital@Sea Testbed Clusters;
- sharing information and cooperating to facilitate the development of maritime digital solutions at the series of Digital@Sea Conferences, Digital@Sea Capacity-building Workshop, and the relevant international organizations;
- researching and developing a common harmonized framework and infrastructures for establishing the Global Digital@Sea Testbed Clusters by expanding the existing Global e-Navigation Testbed

Signing Ceremony of MoU of the Global Digital Testbed Cluster

3rd & 4th IHO Lab

3rd and 4th Meeting of IHO-Singapore Lab Governing Board were held on 16 March 2022 and 7 October 2022 respectively as virtual events.

The two meetings reviewed the progress of the two projects approved by the previous meeting; *S-131 Marine Harbor infrastructure Database project* and *S-57 ENC to S-101 Conversion project*. The concept of the Conversion project is to build, execute and report on a conversion "pipeline" comprising data and software tools and outcomes to be provided for improving S-101 conversion guideline.



Project deliverables in two phases

S-131 Infrastructure Database project has been progressed on API development, a cloud infrastructure and domain name on Amazon Web Services (AWS) and GUI development in order to populate Port information into the web portal for testing.

The Governing Board (GB) approved two new projects; *Creation and Test-bedding of ECDIS capable of displaying S-102 Bathymetric Surface datasets project* which aims to create a display of S-101 Electronic Navigational Chart (ENC) and S-102 Bathymetric Surface datasets on S-101 ENCs and *Proof of Concept - IHO & IALA collaboration to Demonstrate Interoperability of S-101 and S-125 at Sea Using Wireless Updating via 4G/5G Telecoms Link,* which is to test the interaction of

S-124 Navigational Warning services and S-125 Marine Aids to Navigation services to better understand the interaction and to validate the proposed methodology under development by various groups under the IHO and IALA umbrellas.

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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 among States on a regional basis, and between regions; establish cooperation to enhance the delivery of capacity building programmes; monitor the work of relevant 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 meetings of IRCC

The 14th meeting of the Inter-Regional Coordination Committee (IRCC-14) was held in Denpasar, Bali, Indonesia, in a hybrid format from 6 to 8 June 2022, hosted by Pushidrosal, the Hydrographic and Oceanographic Centre of the Indonesian Navy. The meeting was chaired by Mr Thomas Dehling (Germany) and attended by 95 registered participants, 39 in person and 56 by VTC, from 39 Member States. The IHO Secretariat was represented by Director Luigi Sinapi and Assistant Director Leonel Manteigas.

VAdm Nurhidayat, Chief Hydrographer of Pushidrosal, conveyed a welcome message from Admiral Yudo Margono, Chief of Indonesian Navy, expressing how it was a great honour in hosting the event. He remarked that Hydrography supports the foundation data and information for the implementation of our respective mission and vision, especially for archipelagic States like Indonesia. Indonesia's government has put a strong vision and commitment to the maritime sector, and believes that not only in Indonesia but globally, the Ocean is recognized as the means to achieve our common ends and goals.

On behalf of the IHO Member States and IHO Secretariat, Director Luigi Sinapi expressed his gratitude to the Indonesian Navy and Pushidrosal for hosting such an important IHO meeting, highlighting that IRCC represents a real opportunity for Regional Hydrographic Commissions (RHCs) to discuss issues and initiatives of common interest in the fields of Hydrography, Nautical Cartography, Capacity Building, Ocean Mapping and many others. IRCC-14 has a special value and importance, because the proposals and decisions taken within this forum will be brought - through the forthcoming 6th meeting of the Council scheduled for October 2022 - directly to the attention of the 3rd Session of the IHO Assembly. Director Sinapi provided the IHO Secretariat Report, mentioning the most important achievements in IHO outreach, the new IHO projects, and the initial information on the 3rd Session of the IHO Assembly, planned in April 2023.

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Some participants at IRCC-14

The HSSC chair presented the progress on the S100 Roadmap, highlighting that the operational edition of S-101 will be ready in 2024. HSSC endorsed the draft Ed.1.0 of the governance document, named Dual-Fuel Concept for S-100 ECDIS, ready to be endorsed by C-6 and then submitted to A-3 for approval. He also highlighted the importance of next NCSR meeting to introduce the S-100 in the IMO regulations, critical to the success of the Roadmap of the S-100 Implementation Decade. HSSC agreed that the term "Hydrospatial" is not a technical term so it shall not be included in the Hydrographic Dictionary and will consider the requests from the IHO e-Learning centre for providing contents, as appropriate.

The RHC and HCA Chairs focused their reports on the most important regional key achievements, key findings and lessons learned and on proposals to bring to IRCC's attention. The main concerns were related to the need to complete the IHO Strategic Plan gap analysis and the determination of SPI values at regional level, as well as the collaboration and coordination in the implementation of the S-100 Roadmap. Some RHCs' Chairs mentioned the progress in the GEBCO programme and the need to increase the Capacity Building fund at regional level and the inter-regional cooperation to benefit from the IHO CB activities. RHC Chairs were invited to discuss how HOs can assume a geo-coordinating role to help ensure provision of data on a regional level. The SWPHC Chair was requested to investigate possibilities to organize a workshop on environmental emissions from shipping (COP26 outcome) and on Cyber Security, and to liaise with the HSSC to provide contents. IRCC noted the proposal by HCA regarding the recognition of the Southern Ocean by means of an IHO resolution to be proposed to A3, and invited HCA to initiate the debate on how the climate change related activities can be further investigated and what can be the role of the IHO.

The Sub-Committee on the World-Wide Navigational Warning Service (WWNWS-SC) Chair informed on the approval of the IMO NAVTEX Manual for submission to NCSR 9 and on the SPI 3.1.1 (target 90%). At the end of 2021 the indicator was at 62%, based on how many Coastal States provided information internally the NAVAREAs (143 Coastal States out of 230). A new version of the joint IMO/IHO/WMO Manual on MSI for navigational warnings is expected in January 2024. The endorsement of S-124 Ed. 1.0.0 is expected by September 2022 with a subsequent submission to HSSC for approval. IRCC Chair will report to C-6 on the MS concerns on the Iridium SafetyCast implementation and mandatory use, with the related additional costs for Coastal States.

The Capacity Building Sub-Committee (CBSC) Chair presented the CB Work Program (CBWP) and the significant impact of the COVID-19 pandemic on the CB activities. The generous financial contributions from Republic of Korea and Nippon Foundation from Japan were recognized, as well as

the contribution of Canada to the Empowering Women in Hydrography (EWH) project. The 1st year EWH project's activities were presented, as well as the ones planned for the 2nd year. The Committee invited the IHO Secretariat to issue a CL in liaison with CBSC Chair and IRCC Chair to be informed on the percentage of employees of Hydrographic Offices that are female and the percentage of women currently in leadership roles. The progress of the IHO e-learning center at KHOA was presented. The revised Capacity Building strategy was approved by the Committee, for the endorsement by the Council and adoption by the Assembly. The Committee recognized the significant effort from CB coordinators to assess the needs in their regions and the establishment of a new C-55 Project Team to focus on the content of C-55 to better reflect both the requirements for safety of navigation and the use of hydrographic data for non-navigational purposes.

The Worldwide ENC Database Working Group (WENDWG) Chair reported on the S-101 Scheming guidelines, noting that the consensus for a Global Common Grid Scheme was not reached yet. The first iteration of the 'Guidelines on the implementation of the WEND-100 principles' version 1.0 is ready to be included as an appendix to Annex 3 of the Roadmap of the S-100 Implementation Strategy and for Council's endorsement. WENDWG agreed on the proposed way forward on the development of INToGIS III which will use S-128, to allow hydrographic offices and other users to visualize S-1xx product coverage in the future. A WEND-100 Product Matrix to help ensure that UN-GGIM framework pathway principles are being considered as new S-1XX products become available. It was recommended that a S-1xx Coordinator role is established in the RHCs, either as separate from the Chart Coordinator's role or as a combined one.

The Marine Spatial Data Infrastructures Working Group (MSDIWG) Chair reported on the Joint IHO-Singapore Innovation and Technology Laboratory launch in October 2021 and on the MSDIWG 13 meeting that was organized as a joint meeting together with the Marine Domain Working Group (MDWG) of the Open Geospatial Consortium (OGC). He also reported on the UN-GGIM Working Group on Marine Geospatial Information (WG-MGI), combined with an International Seminar on United Nations Global Geospatial Information Management in May 2022. The importance of the FAIR (Findable, Accessible, Interoperable, Re-usable) data principles for the Hydrographic Offices were enhanced and the MSDIWG intends to provide guidance on how IHO MS can use the FAIR principles in their work and develop an HO MSDI FAIR principles check list. The concept of Maritime Digital Twins was included in the MSDIWG work plan that intends to provide recommendations on how MSDI and HOs can be part of Digital Twins in the future. The process to update the IHO Publication C-17 to have a better alignment and integration with IGIF and IGIF-H was initiated. The meeting was informed on the two-step project to develop an MSDI portal that should serve as a focal point to access to datasets: 1st Step will be based on the existing solutions present in INTOGIS and a possible 2nd Step will be evaluated, consisting in the establishment of an IHO marine data hub network. A Questionnaire for getting the relevant information and datasets on the future IHO MSDI portal to be implemented in 2024, will be sent out to the IHO MS if deemed appropriate.

The IHO-EU Network Working Group **(**IENWG) reported on the 10th Anniversary of the signature of IHO-EC MoU celebrated on 6 May 2022, the main contribution of the IHO to the European programmes in the last 10 years, the re-use of scientific data, the interoperability between EMODnet and the IHO standards, the Maritime Spatial Planning-MSP becoming a major topic interesting Europe, and then the EU Directive on Public Sector Information. With reference to this last, the use of Open Data and re-use of Public Sector Information with potential impact on the resources of the Hos, were discussed.

The FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) reported that at the IBSC45 meeting 13 submissions were received. Three submissions were recognized and for the remaining 10, the Board offered 10 inter-sessional revisions. The RHCs were invited to encourage Member States and submitting institutions to engage with the IHO Secretariat and consult the Guidelines, FAQs and the White Paper (IHR-Nov-2017 – Article: Maintaining the Standards of Competence for Hydrographic Surveyors and Nautical Cartographers) early in the process of preparing submissions for programme recognition. The revised IBSC Terms of Reference with the increase of 2 more members from the International

Cartographic Association (ICA) were approved. The Board mentioned that 3 Interns from the EWH-project participated in the IBSC45 successfully.

The Crowdsourced Bathymetry Working Group (CSBWG) Chair reported on the last meetings and on the achievements of CSBWG and DCDB. The WG approved the IHO Publication B-12 - Guidance on Crowdsourced Bathymetry Edition 3.0.0. The new edition was endorsed by IRCC and will be submitted to IHO Member States for approval. The meeting was informed on the RHC Seabed 2030/CSB Coordinators and on the CSBWG Work Programme. The RHCs were invited to encourage all Member States to respond to IHO CL 21/2020 to enable provision of CSB data collected from ships within waters subject to their national jurisdiction into the public domain. The IHO Data Centre for Digital Bathymetry Director reported on the difference between the coverage of the GEBCO 2021 grid with 20.6% of seafloor mapped and the estimated global seafloor coverage held in the DCDB multibeam archive that is calculated to be about 12%. The meeting was also informed on the improvements and updates of the DCDB Map Viewer and the planned enhancements of the DCDB Infrastructure. The CSB geographical filter for incoming data that takes into account Coastal States' positions on the distribution of CSB collected in their areas of responsibility was described, as well as the GEBCO Gazetteer developed by KHOA. CSBWG will investigate the establishment of a Seabed 2030/CSB Coordinator Collaboration Team within the CSBWG.

The GEBCO Guiding Committee Chair reported on the status of Seabed 2030 in May 2022 and on the creation of a new GEBCO Sub-Committee on Education and Training – SCET, the GEBCO Governance Review Project Team led by IHO and IOC as GEBCO parent organizations, and GEBCO Strategic Plan Drafting Team to align GEBCO to the IHO Strategic Plan. The two biggest challenges of GEBCO remain "To share more existing bathymetric data" and "How to get the remaining 77% of our planet's unmapped ocean seafloor mapped". The Committee encouraged the RHCs to actively contribute with new data to GEBCO. The IRCC Chair presented a proposal to measure the SPI allocated to IRCC. The proposal was approved by the Committee, and will be reported to the Council by the IRCC Chair. The IHO Secretariat, RHCs and IRCC subordinate bodies were invited to derive figures on the SPI allocated to IRCC.

Following the proposal from SWPHC, the Committee decided to organize an IRCC workshop on how to engage with international and regional agencies, development partners and coastal states to support knowledge and understanding of hydrography and the value associated with open data policies in respect of marine geospatial information.

Cooperation with Member States and attendance at relevant meetings

The objective of this element of the Work Programme 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 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.

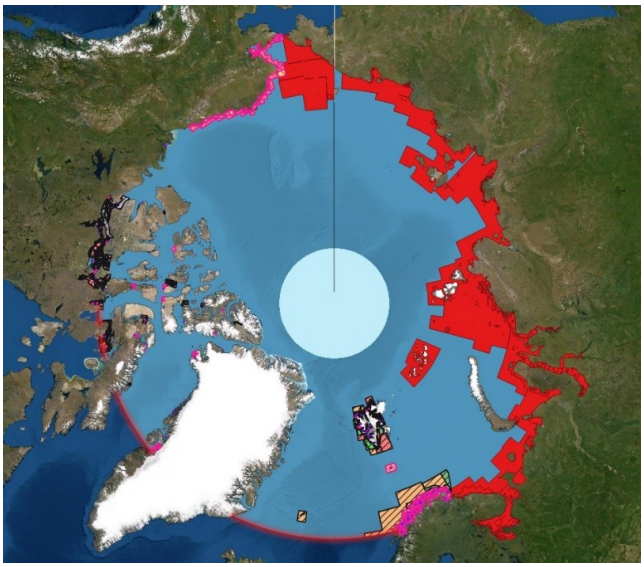
Conduct Regional Hydrographic Commission meetings (RHC)

Arctic Regional Hydrographic Commission (ARHC)

The 12th Conference of the Arctic Regional Hydrographic Commission (ARHC) was held in St. John's NL, Canada, from 13 to 16 September 2022. Twenty four participants representing four ARHC Members (Canada, Denmark, Norway, and the USA and four Associate Members (Finland, Iceland, Italy and United Kingdom) participated in the Conference. The ARHC Conference was

chaired by Dr Geneviève Bechard, Canadian Hydrographer. The IHO Secretariat was represented by Secretary-General Dr Mathias Jonas.

The ARHC Members were informed by the Secretary-General of the strategic issues that will be on the agenda of the upcoming 6th meeting of the Council and the ongoing preparations of the 3rd Assembly in May 2023. By means of his presentation, he put special emphasis on the parallel activities of the Hydrographic Commission on Antarctica in view of a coordinated approach for the implementation of future regional S-100 based data services. Dr Jonas highlighted the overarching importance of IMO's expected adoption of the revised ECDIS Performance Standards which will enable the development of S-100 ECDIS and the consequences for hydrographic services which will result from this decision - expected in November 2023. He also elaborated on the recent activities of the Secretariat to engage with various UN bodies in support of the UN Ocean Decade.



A series of slides to illustrate the calculated approach to measure the strategic performance indicator 1.2.2: Percentage of navigationally significant areas (e.g. charted traffic separation schemes, anchorages and channels) for which the adequacy of the hydrographic knowledge is assessed through the use of appropriate quality indicators through colour coded CATZOC values for ENC of usage bands 3, 4 and 5 concluded the report.

Sources:
IC-ENC & PRIMAR files
August 2022

All participants reported on their national activities in the Arctic region since the last Conference. The Conference took note of items such as uncrewed survey technology, national survey programs, ENC provision, and the implementation of national SDI solutions and other themes of relevance for all Hydrographic Offices of the region. Special focus was given to the collaboration of ARMSDIWG with ARCTIC-SDI for the purpose of the adoption of full authority for dissemination of all marine datasets covering the arctic region. This discussion will continue with the chair and the relevant bodies of the Arctic Council. A lively discussion arose about the technical and legal implications on the production of paper charts from ENCs, which coincides with UK's announcement to withdraw its global paper chart services by 2026. The Commission noted the newest proposal for the application of a regular ENC grid for the high North and agreed on a concerted approach with the Hydrographic Commission on Antarctica. As a result of an intense discussion about the future coverage of the region with S-100 data products, the Commission endorsed Norway as regional S-100 Implementation Coordinator. One of the first activities will be a regional survey on the preparedness of the ARHC members for the future S-100 based data services for the region. This survey will be conducted on the basis of the WEND IGIF-H matrix which was presented by the WENDWG Chair Dr John Nyberg, USA.

Embedded into the conference agenda was an open forum organized by Paul Brett, associate vice-president (research and strategic partnerships) of St. John's Memorial University's Fisheries and Marine Institute and Member of the GEBCO Steering Committee to interface the participants with local academia, industry and campaigners engaged with hydrographic issues. Under the title "Challenges, Engagement, Innovation, and beyond Navigation" numerous guests presented their approaches in citizen science on hydrographic aspects of the North to address the specifics of ice conditions and indigenous knowledge. On the first day the group of participants paid a visit to the simulation branch of the Institute. Attendees were invited to simulation exercises with remotely controlled manipulators as nowadays common for remotely operated underwater vehicles.

Dr John Nyberg, USA practices underwater cable movement by means of remotely controlled robotic tools.

A second day was devoted to innovation science and technology demonstrations. The major partner was Kraken Robotics which presented their cutting edge technology in hydroacoustic for object detection and survey. The local office of Fugro provided insight on the practices of data handling after acquisition. Both days were regarded as of great value by all participants in helping to understand the potential this region holds for innovation in hydrography.

The Product Manager explains the payload options of the Kraken's ROV Katfish-180

At the end of the meeting, Ms Pia Dahl Højgaard, National Hydrographer of Denmark, was elected as the new Chair of the ARHC.

Baltic Sea Hydrographic Commission (BSHC)

The 27th Conference of the Baltic Sea Hydrographic Commission (BSHC27) was held in Stockholm, Sweden, kindly hosted by the Swedish Maritime Administration, as a hybrid event from 20 to 22 September, under the Chairmanship of Mr Magnus Wallhagen (Sweden). A total of twenty six attendees from seven of the eight full members of the Commission (Denmark, Estonia, Finland, Germany, Latvia, Poland, and Sweden) and associate member Lithuania were represented at the Conference. The United Kingdom and USA attended as Observers. The IHO Secretariat was represented by Director Abri Kampfer.

The conference adopted the agenda and reviewed the status of the Actions of the 26th BSHC Conference. The review of the IHO Work Programme commenced with feedback on the 5th Council meeting (C-5). Sweden is the Council representative on BSHC mandate for three years since C4 (2020) until C6 (2022). The main outcomes and actions relevant to the BSHC were communicated. In his capacity as HSSC Chair, the Chair furthermore informed the Conference of the work that is on-going before C6. These include S-100 implementation priorities and prioritized product specifications and the proposed implementation timeline. The interaction with IMO NCSR to enable the revised ECDIS Performance Standards that will enable the S-100 ECDIS was elaborated upon. Director Kampfer further reported on the IHO Work Programme and the Organization's activities during the previous year and provided an update on the programme and planned activities for the 3rd Assembly to be held in May 2023. In relation to the measuring of Strategic Performance Indicators (SPI), some slides to demonstrate the effort of the IHO Secretariat – in accordance with IHO CL 23/2022 - *IHO Strategic Plan 2021 - 2026 Determination of figures to calculate the Strategic Performance Indicators (SPI) assigned to IRCC* - in using CATZOC information to provide data for SPI 1.2.2 (Percentage of navigationally significant areas (e.g. charted traffic separation schemes, anchorages and channels) for which the adequacy of the hydrographic knowledge is assessed through the use of appropriate quality indicators) was shared.

All Members present provided National Reports informing on projects and developments of interest since the last Conference. Lithuania reported on the ongoing process to obtain approval to become an IHO Member States. In addition to their National Report Finland reported that their new Nautical Chart Production System (AHTI) with an automatic depth contouring and (semi-) automatic sounding selection tools are in operative use at the Finnish HO. A high density contours can now be applied for the major merchant fairways and ports in large scale ENCs (Berth, Harbour and Approach) products. The first set of ENCs including additional contour intervals and respective depth areas was published in January 2022 from the northern part of the Bay of Bothnia. It was also reported that the new nautical publication *Sailing Directions for Finnish Waters* has been published since December 2021.The publication contains general information about maritime transport channels and navigation in specific fairways.

The Commission reviewed on-going regional initiatives in particular the activities of the Monitoring Re-survey Working Group (MWG). The main tasks for the MWG has been to encourage the member states to continue the up-to-date surveys of their waters and to continue to update and enhance the Re-Survey database. At the HELCOM Ministerial meeting on 20 October 2021 the Commission adopted the updated HELCOM Baltic Sea Action Plan (BSAP). This is a remarkable milestone for BSHC, which now has the strong political commitment signed by Government representatives and the EU Commission. BSAP sets a timeline for hydrographic surveying in the Baltic Sea. The work of MWG is not limited to seabed coverage for areas used by commercial shipping in the Baltic Sea as the aim is that the entire Baltic Sea will be surveyed aiming to full seabed coverage according to IHO standards categories of S-44. MWG will continue to monitor the progress of the HELCOM Re-survey Scheme and update the Re-Survey Database.

The Chair of the Chart Datum Working Group (CDWG) reported that since February 2022, all work in the Chart Datum Working Group has been set on hold, after a decision taken by the member states of BSHC. The CDWG14-meeting is now planned to be held 28-29 March 2023 in Gothenburg (physical meeting only). One of the most important items in the working group is to review national plans and status of implementation of the Baltic Sea Chart Datum 2000. Due to the pause in the work, not all countries have been able to contribute to the implementation status of 2022. However, it can be concluded that most member states after all have made actions to implement the common

vertical datum. A good geoid model for the whole Baltic Sea is an essential component for the Baltic Sea Chart Datum 2000. As an outcome of the former EU co-financed FAMOS-projects (Finalising Surveys for the Baltic Motorways of the Sea), gravity surveys and improvement of the geoid model for the Baltic Sea are still ongoing.

At the 26th BSHC Conference, it was decided to establish a Strategic Correspondence Group (BS-SCG) to analyse the Commission's work with regard to the revised IHO strategic plan. The BS-SCG is chaired by Mr Magnus Wallhagen (Sweden) and he provided feedback on the progress so far. The Conference agreed on the continuation of the BS-SCG with the aim to complete its work by BSHC28. Denmark reported on the work from the NHC strategic workshop held in 2021. Potential users were divided into 5 different user groups, the user groups were again divided into 12 different subgroups. The Workshop participants developed 12 matrices covering all subgroups, specifying the different datasets that it expected would be of interest for the subgroups. It was recommended that this document should be seen as a living document that can create the framework for internal and regional discussion about the user needs in a forward-looking perspective.

Sweden, as BSHC's representative to the IHO-EU network (IENWG), presented the highlights of the work done in the IENWG and reported that the discussion on the question of high value datasets is ongoing. The Baltic Sea Bathymetric Database Working Group (BSBDWG) chair reported that since the last conference the portal has been up and running without interruptions on the portal itself. The earlier issues with timeouts on downloading of datasets has been solved. Alarms to identify any malfunctions in the Domain Name Server has been implemented. Presently work is ongoing to move the portal to new, updated and faster servers where the updated 500 and 200m DTM will be published. He reported further cooperation with GEBCO, Seabed2030 and EMODnet.

Baltic Sea and North Sea Marine Spatial Data Infrastructure Working Group (BS-NSMSDIWG) report provided an overview of the last online meeting attended by member from the North Sea Hydrographic Commission and the Baltic Sea Hydrographic Commission. External stakeholders also attended the meeting. The overall aim of the meeting was to create a common MSDI framework and to receive input from external stakeholders on items relevant from a regional MSDI approach and to discuss the framework for the ongoing S-122 pilot project in the Baltic- and North Sea as part of the OGC Federated Marine Spatial Data Infrastructure Pilot (FMSDI). The meeting evaluated BS-NS MSDI work plan for 2021 to 2024, with a focus on how the BSHC and NSHC can benefit from a regional approach to MSDI. The next meetings of the BS-NSMSDIWG is planned to be arranged as one day online meetings.

The Baltic Sea MSI Working Group (BSMSIWG) chair reported on the increasing number of Navtex warnings. The statistics clearly show a steady increase of navigational warnings transmitted over the Navtex system. This is of some concern, as the 10 minute time slot for each transmitter is not always possible to maintain. The chair of the BSMSIWG requested every MS to review their procedures for Navtex transmissions as messages need to be short and concise. As an alternative MS should consider if updated information could be published in Notice to Mariners.

The BSHC WEND WG representative (Finland) provided feedback on the outcomes of the 12th WENDWG and reported that the expanding role of the RHC INT Chart Coordinators was discussed. The Working Group decided to propose that the IRCC recommend that new S-1xx Coordinator roles to be established in the RHCs either as separate from the Chart Coordinator or as an additional duty of the Coordinator who will be responsible for considering the progress and coordination of S-1xx products as they become available, starting with the pathways outlined in the WEND Product Matrix. The Chair of the Baltic Sea International Charting Coordination Working Group (BSICCWG) (Finland) reported that no face to face meeting was held since BSHC26 and all communication and tasks have been carried out by circulars and e-mail. BSICC has organised a MAGVAR-survey in summer 2022 (at the initiative and assistance of the Estonian Transport Administration). Summary of that questionnaire will be presented at the next BSICCWG -meeting. The next BSICCWG (face-to-face) meeting is planned to take place in May 2023 in Rostock.

At the end of the meeting Mr Rainer Mustaniemi (Finland) was elected as the Chair of the BSHC and Mr Olavi Heinlo (Estonia) as the Vice-Chair.

Participants of the 27th BSHC Conference

East Asia Hydrographic Commission (EAHC)

The 14th Conference of the East Asia Hydrographic Commission (EAHC) was held from 27 – 28 September in Tokyo, Japan.

Forty seven participants representing eight out of the ten EAHC Members (Brunei Darussalam, Indonesia, Japan, Malaysia, Republic of Korea, Philippines, Singapore and Thailand), one Associate Member (Vietnam) and three observers (Australia, United Kingdom and United States of America) participated in the Conference in person. China (including Hong Kong) participated remotely. IHO's MSDI Working Group was represented by Ms Pearlyn Pang, Singapore.

The EAHC Conference was chaired by Dr Masayuki Fujita, Chief Hydrographer of Japan. Dr Mathias Jonas, Secretary-General of the IHO represented the IHO Secretariat. He delivered a report about the relevant issues undertaken under the three pillars of the IHO work Programme namely, Corporate Affairs, Hydrographic Services and Standards and Inter-regional Cooperation and Support since the EAHC13 conducted in 2018. He focused on the methodology to measure progress in survey and mapping of navigable waters by means of agreed Strategic Performance Indicators. In relation to the measuring of Strategic Performance Indicators (SPI), he presented best practice examples for Baltic Sea And East Atlantic region to demonstrate the effort of the IHO Secretariat – in accordance with IHO CL 23/2022 - *IHO Strategic Plan 2021 - 2026 Determination of figures to calculate the Strategic Performance Indicators (SPI) assigned to IRCC*. The examples utilize CATZOC information to provide data for SPI 1.2.2 *Percentage of navigationally significant areas* (e.g. charted traffic separation schemes, anchorages and channels) for which the adequacy of the hydrographic knowledge is assessed through the use of appropriate quality indicators.

The Secretary-General highlighted the future obligations of Hydrographic Offices resulting from IMO´s recent decisions paving the way towards the acceptance of S-100 based data products for ECDIS. In the course of his report he explained the ongoing preparations of the upcoming sixth IHO Council to be held in October 2022 and the third Assembly in May 2023, both to be held in Monaco. He finally informed the Member States about the recent improvements of the IHO Secretariat´s GIS services and reminded the attending nations to report details of their respective services on an annual frequency, facilitating the IHO Secretariat in keeping the relevant database and the IHO publications P-5 and C-55 up to date. The Conference discussed proposals to update the EAHC statutes dating from 1980. Japan, serving as the permanent EAHC Secretariat, presented a

proposal of predominantly editorial nature and a slightly adapted governance structure to coordinate the work of the subordinate project teams. Numerous participants suggested to align as much as possible to the applicable IHO Resolution 2/1997 as amended. The Conference agreed on another iteration to be presented at the forthcoming EAHC Steering Committee meeting in 2023.

The Commission was informed about the historic achievements of the Commission in the course of the celebrations of the 50th Anniversary in 2021. Further items of note were the reports reflecting the work of the EAHC subordinate Working Groups, for example in MSDI.

Recent achievements in Capacity Building and the implementation phase of the East Asian RENC operated by Hong Kong, China were considered in greater detail. The head of the EA RENC renewed the offer to collaborate with all members of the region in ENC distribution matters and announced the start of the service preparations for future S-101 distribution.

Participants of the 14th Conference of the East Asia Hydrographic Commission in Tokyo, Japan

The Member States present delivered their respective national reports and addressed the full range of activities covered by the duties of hydrographic offices in the region. Special emphasis was given to capacity building and the uptake of S-101 ENC production in the years to come. So far no regional coordination for this new production line is established under this Commission. As a first step, the Commission agreed to apply the IGIF-H matrix template to the respective national capacity and plans for S-100 based data products and services. The results to be forwarded to the EAHC Secretariat prior to the forthcoming EAHC Steering Committee in 2023 to compile the greater picture for S-100 transition preparedness in this region.

In the closure of the Conference the Chair of the EAHC was formally handed over to the Vice-Chair, Vice Admiral Nurhidayat, National Hydrographer of Indonesia.

Eastern Atlantic Hydrographic Commission (EAtHC)

The 17th Conference of the Eastern Atlantic Hydrographic Commission (EAtHC-17) was held from 28 to 30 September 2022, in Mindelo, São Vicente, Cabo Verde, hosted by the *Instituto Marítimo e Portuário* (IMP) in Cabo Verde, in a full hybrid format with simultaneous interpretation in French and English. The Conference was preceded, from 26 to 27 September 2022, by an IHO Capacity Building Fund sponsored Regional Awareness Seminar on the theme: "*Working with NAVAREA II and your Primary Charting Authority*". The Conference was chaired by RAdm Mário José Simões Marques, Director General of the Hydrographic Office of the Portuguese Navy (IHPT).

The Conference was attended by about 65 delegates: 50 (in-person) plus 15 (through video teleconference -VTC). Six IHO Member States of the Region out of 8 (France, Ghana, Morocco, Nigeria, Portugal, Spain), 9 Associate Members out of 9 (Cabo Verde, Congo, Côte d'Ivoire, Guinea, Guinea-Bissau, Mauritania, Senegal, Togo, United Kingdom) and 4 Observers out of 8 (Angola, Gabon, Gambia, USA) were registered in the meeting. Due to some logistic issues (flights availability, internet connectivity), some registered delegates were unfortunately unable to be present or connected and some others had their arrival delayed. Representatives of IOC Africa, the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) and the RENC, PRIMAR, also attended the meeting together with two industry stakeholders (Kongsberg Maritime, SevenCs). Director Abri Kampfer and Assistant Director Yves Guillam represented the IHO Secretariat.

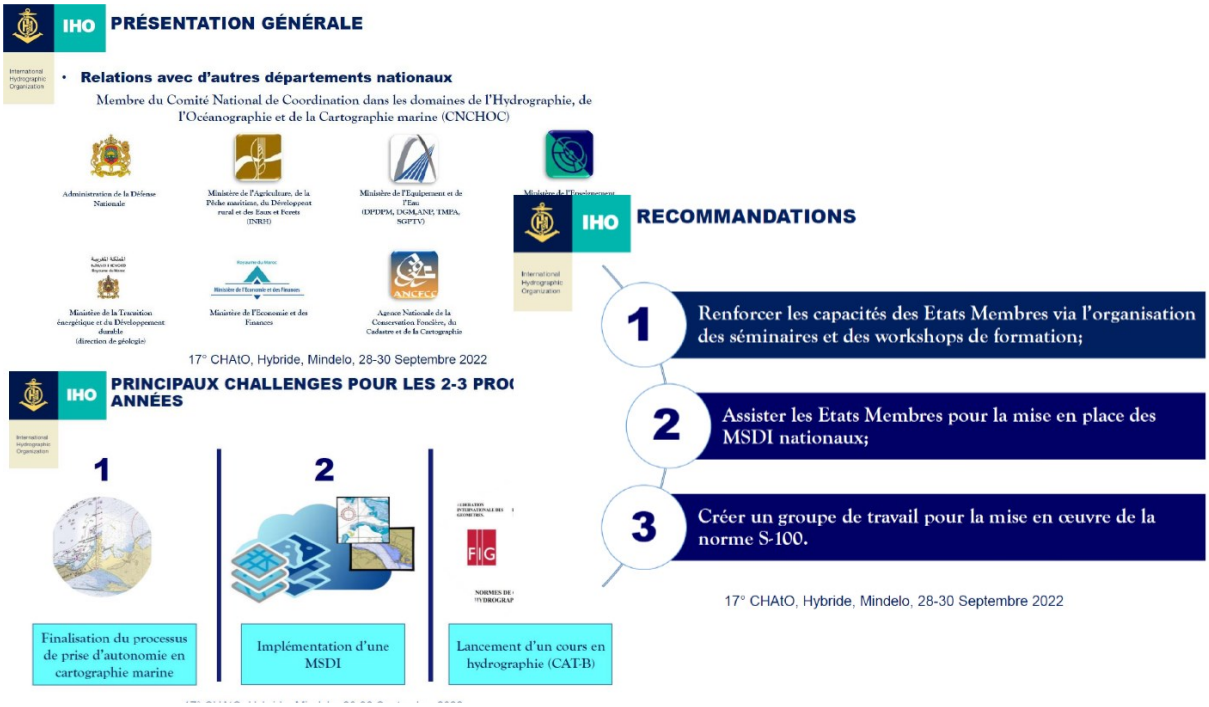
In-person participants of the 17th Conference of the EAtHC

P-7

The Conference was opened by Mr Abraão Vicente, Minister of the Sea of Cabo Verde via a video recording and Mr Seidi dos Santos, President of Board of Directors (IMP). In their address, Cabo Verde announced their intention to become an IHO Member State, the creation of a hydrographic cell in 2023 and their will to increase their hydrographic capacities to improve the safety of navigation, to protect the marine environment as well as their rights in the waters under their jurisdiction.

The conference adopted the agenda and reviewed the status of the Actions of the 16th EAtHC Conference. Director Kampfer reported on the IHO Work Programme and the Organization's activities during the previous year and provided an update on the programme and planned activities for the 3rd Assembly to be held in May 2023. Reports on the outcomes of all recent IHO Committees and Workgroups were provided by Member State representatives.

The Conference reviewed not less than 15 national reports, a record in the history of the EAtHC! Thanks to the Chair, most of the presentations were structured in a very effective format: top 3 achievements since the last conference, top 3 issues or shortfalls, top 3 plans affecting the region, top 3 challenges for the next 3 years and top 3 recommendations to the EAtHC.



Morocco's National Report (excerpts)

The national reports delivered by the representatives of coastal States located in Africa highlighted several important and recurring issues such as:

- Awareness of political authorities on the priorities and assets on hydrographic matters to be defined, in the long term, in order to meet increasing requirements (safety of navigation, coastal management, dredging monitoring, pipes detection…).
- Maintenance issues for hydrographic equipment, and modest but necessary investments to be made (tide gauges, etc.),
- Training of technicians, the incumbent hydrographers currently working in many hydrographic units of African ports being close to retirement age.

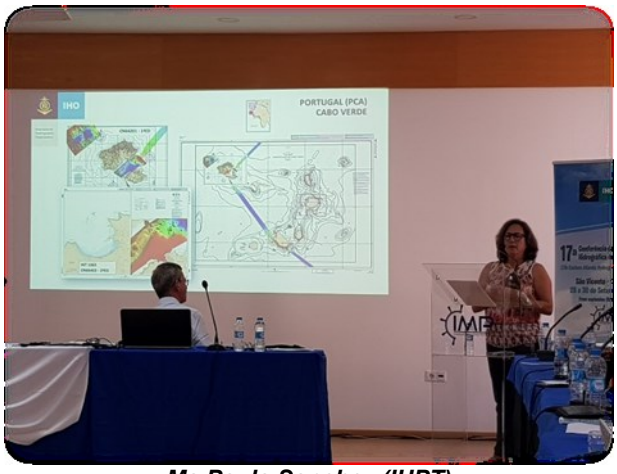
The EAtHC reported on the Technical Visits in the region undertaken under the Capacity Building Programme. Director Abri Kampfer informed that High Level visits can be considered by the IHO Secretariat in addition, on request. However, in accordance with the new Capacity Building Strategy (still to be considered at the next Council meeting), the Capacity Building Coordinator reported that

any subsequent visit in the region will be considered under the condition of progress made on the recommendations reported in former technical visits reports.

The EAtHC also addressed the bilateral and regional cooperation agreements in force (with MOWCA[13] and PMAWCA[14] in particular) to assess whether they need to be denounced or reinvigorated. The EAtHC welcomed the offer from Cabo Verde, for Western Africa, and Congo, for Central Africa, since they already have established links with these Intergovernmental Organizations, to act as focal point of contact in order to re-establish the dialogue.

The seminar "*Working with NAVAREA II and your Primary Charting Authority"* was chaired by France with contributions from Portugal and the UK. All the participants shared their concerns and experiences in the management of Maritime Safety Information, in data exchange with the NAVAREA II Coordinator (France) and/or their Primary Charting Authority (PCA). The IHO Secretariat reiterated a well-known recommendation in the EAtHC on the establishment of a National Hydrographic Committee, since it appeared that those Coastal States (such as Togo) who have established their own national hydrographic committee are in a much better situation for meeting their SOLAS obligations.

The NAVAREA II Coordinator (Shom, France) leading a session on navigational warnings



Ms Paula Sanchez (IHPT) on the role of Portugal as PCA

The Commission welcomed the offer made by Morocco to host the 18th Conference of the EAtHC in Casablanca, May 2024. RAdm Mário José Simões Marques closed the Conference expressing his gratitude to all participants, his thanks to the IHPT team for the Secretariat of the Conference, and the outstanding hospitality and efficient support of the IMP in Mindelo. France took over as Chair of the EAtHC, with Morocco as Vice-Chair.

Meso American - Caribbean Sea Hydrographic Commission

The 23rd Meeting of the Meso American & Caribbean Sea Hydrographic Commission (MACHC23) was held at the TREX / Moonshot Labs facility, Saint Louis, Missouri, USA from 28 November to 2 December 2022, with 85 participants representing 14 Member States, nine Associate Members, two observer States, five observer organizations and 13 industry members. Director Luigi Sinapi and Assistant Director Leonel Pereira Manteigas represented the IHO Secretariat.

An IHO Capacity Building Seminar on Raising Awareness on Hydrography and Marine Spatial Data Infrastructures (MSDI) was held on 28 November before the Conference.

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[13] Maritime Organization of West and Central Africa.

[14] Ports Management Association of West and Central Africa.

On 29 November, after the pre-conference meetings of the MACHC working groups, the Conference started with the welcome address of the MACHC Chair, Admiral Renato Arruda (Brazil), who expressed his gratitude to the host organization and thanked all participants, as well as the ones attending by VTC. Mr John Lowell from the National Geospatial-intelligence Agency (NGA), Mr Matthew Borbash from the U.S. Navy, Admiral Bejamin Adams and Mr Brett Markham (NGA) as host Country's representatives, welcomed the participants and expressed their satisfaction with the number and diversity of the participants. They resumed the objectives and the challenging topics to be discussed during the meeting. The benefits of data sharing were mentioned as well as the experiences towards the goals and objectives of the commission.

IHO Director Luigi Sinapi greeted all participants, thanked Brazil for chairing the MACHC and the host Country for the long support to the IHO. He expressed the importance of the meeting for the region and its member states, and encouraged all to consider the key activities to the hydrographic community such as the S-100 Roadmap, the Capacity Building programme, the IHO Crowdsourced Bathymetry initiative and the Seabed 2030 project.

The U.S. Army Corps of Engineers informed the meeting on the importance of the Mississippi River Commission with a special focus on the diverse partnerships involved and some projects related with low water events and their prediction.

IHO Director Sinapi provided an overview of the IHO membership enhancing the fact that IHO Secretariat stands ready to assist non-member States to become IHO members. He reported on the highlights of the 6th Meeting of the Council, the decision to develop guidelines for the automated production of paper charts and the approbation of the guidelines on the implementation of the WEND-100 principles. He underlined the approval at the last meetings of the IMO NCSR and MSC, on the transition period for S-100 ECDIS to become legal to use after 1 January 2026 and that systems must comply from 1 January 2029. The Council also endorsed the Dual Fuel Concept for S-100 ECDIS Executive Summary and the IRCC proposals for measuring the SPIs. The approved CBWP activities for 2021 and 2022 was mentioned and all were encouraged to commence testing of the SafetyCast system. An update was provided on the Crowdsourced Bathymetry Working Group activities as well as on the GEBCO support through Seabed 2030. All were invited to review their entries in the IHO Yearbook and on C-55.

The Meeting proceeded with the update on the outcomes from 6th Meeting of the Council and the IRCC14 meetings. The WEND S-100 Product Matrix, the responses to the Survey on the Production of High Density ENCs the S-101 Scheming guidelines were highlighted. The feedback from the MSDIWG provided guidance on how a Hydrographic Office can use the FAIR data principles in their work and develop a MSDI FAIR principles check list. The revised IHO Capacity Building Strategy was approved and a CBSC Project Team was established to revise C-55. Publication B-12 IHO Guidance on Crowdsourced Bathymetry Edition 3.0.0 was endorsed and the GEBCO 2022 grid with 23,4% coverage was presented.

The IMO/IHO World-Wide Navigational Warning Service NAVAREA IV / XII reported on the IHO MSI Key Performance Indicator - SPI 3.1.1 with a target of 90% of Coastal States capable to provide MSI by 2026 and reported that in 2022 there was an increase in the MSI received from the National Coordinators by 56%. A MSI training course was held in Colombia.

Participants at the MACHC23 meeting

Due to the large number of Members and Associated Members, the presentation of national reports was divided into three groups and each group provided a report on the common points. On the main achievements of the previous year, Unmanned Aerial Vehicles used by some countries to map the shoreline, the acquisition of new survey technology, the support provided to some countries in the region and the MSP and MSDI governance in some countries were mentioned.

Mr Colin Young, IMO Regional Coordinator, reported on the IMO's E-navigation Strategy Implementation Plan (SIP) and the adoption of resolution MSC.467(101), Guidance on the definition and harmonization of the format and structure of maritime services in the context of e-navigation. The MSC 106 adopted resolution MSC.530(106) Performance Standards for Electronic Chart Display and Information Systems (ECDIS) and approved a revision of MSC.1/Circ.1503/Rev.1 ECDIS Guidance for Good Practice, which will be published as MSC.1/Circ.1503/Rev.2, encouraging ship operators, masters and deck officers on ECDIS-fitted ships to use this guidance. He also informed on the activities, outputs and preliminary indications of the Carib-SMART project that seeks to develop, design and secure regional endorsement, at the level of CARICOM.

Mr Minsu Jeon from IALA informed on the developments of the S-200 series of products and the test-bed developed on the import and export of S-201 data model and the portrayal, as well as on the recent joint IALA/IHO workshop on S-100 and S-200 development and portrayal. The strategy of IALA consists in developing and coordinating the product specifications with a focus on the technical service, promoting the S-200 test-bed and inviting members to participate and continue in close cooperation with IHO through regular joint workshops and technical cooperation meetings to harmonize the development of terms and definitions of AtoN.

The Hydrographic Society of America (THSOA) explained to the Commission how to become a member. The US Hydro 2023 conference will be held on 12 to 16 March 2023 in Alabama, USA.

Mr Jim Rogers, Chair of the MACHC MSDI, reported on the key accomplishments, mentioning the new members and the approach to other RHC MSDI WG to share best practices and knowledge. The MMSDIWG work-plan and the website were updated. The inventory pages with additional layers were enhanced as well as the most recent engagements and partnerships. The MMSDIWG Actions were summarized and the MS were asked to visit the page and update the Inventory-additional layers survey. The intention was expressed to continue with the incorporation of the UN GGIM principles and to have a workshop with the UN GGIM. Brazil also reported on the progress of the respective Marine Spatial Data Infrastructure (IDEM DHN).

Mr Rafael Ponce from Open Geospatial Consortium (OGC), Marine DWG Co-Chair, informed on the OGC Community, the respective standards and FAIR principles as well as different trends. The IHO-OGC collaboration on marine spatial data and innovation in the Marine Domain was stressed, highlighting the joint meetings with the IHO MSDIWG and the UN GGIM WG. The IHO-OGC Federated MSDI Pilot and its Phase 3 were described as well as the Digital Twin Challenge: Integration of Land and Marine data for Coastal Protection Planning, Critical Infrastructure Protection, and Resilience – all presented at the meetings in Singapore along with the respective outcomes.

NGA presented the developments of the Global Maritime Traffic Density Service (GMTDS): Mapping Global Maritime Vessel Traffic, which is a service that enables International Maritime Stakeholders to access tangible analysis of evolving marine traffic patterns, providing decision-makers with actionable information to help prioritize ocean areas for nautical product coverage.

The MACHC International Charting Coordination (MICC) reported on the respective activities and the ENCs availability progress. On the S-100 update, it was mentioned that the IC-ENC has dedicated a Learning Management System Dashboard discussion forum for MACHC. The ENC scheme was displayed as well as the MACHC Members production plan of S-100. It was also requested that Members provide authorization for the RENC's to provide CATZOC information to IHO. The MACHC ENC Gridding Scheme and the previous MACHC Actions and decisions in relation with the Scheme was mentioned, and the meeting was informed on the MICC CL Survey Questions. Finally, it was requested to endorse a phased implementation of the UKHO Rescheme plan for Usage Band 1.

The WEND-100 Matrix and the scores obtained by MACHC in the different products were presented. With reference to the S-100 Coordinator Role, it was concluded that the MACHC should have an S-100 coordinator, and that the S-57 and S-101 coordinators should be represented by the same person (the MICC Coordinator).

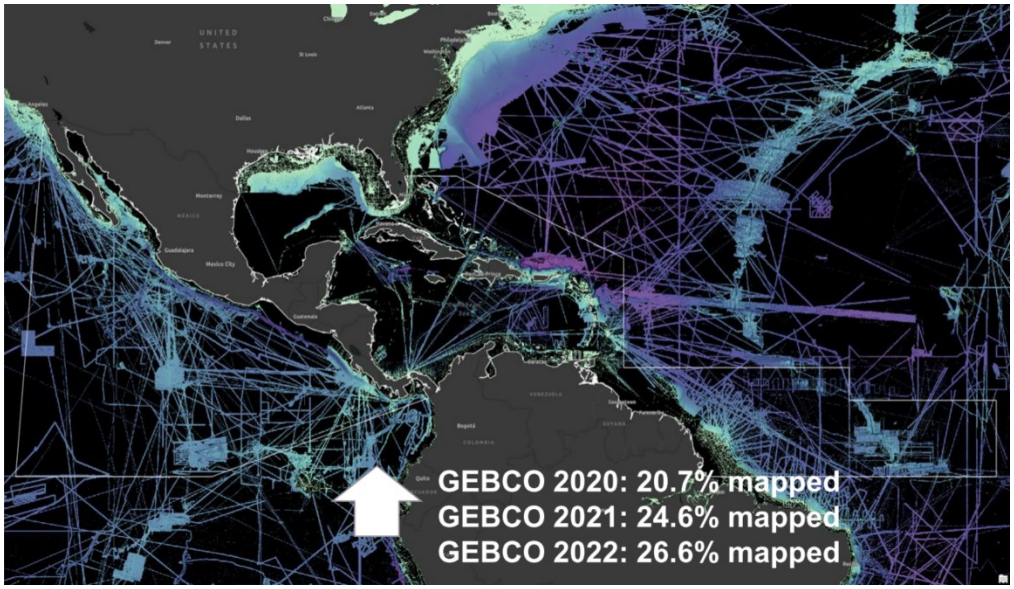
The Capacity Building (CB) Coordinator communicated the main points of the CBSC20 intersessional and CBSC20 meetings, enhancing the CB calendar, the approval of the CB Strategy and the activities completed by the *Empowering Women in Hydrography* project. The meeting was informed on the progress made by the e-Learning Center and the CB funded activities, as well as on the activities to be proposed for 2024. The Spanish Hydrographic Office presented the offer of courses funded by the Spanish government.

Colombia presented the workshop on MSI, funded by the Capacity Building Fund, which was hosted in September 2022, with the participation of 10 people from different countries and three different RHCs (MACHC, SWAtHC and SEPRHC).

Mr Greg Brouk, (NGA) presented the U.S. National Strategy related to the use of remote sensing and the partnerships with the industry.

The meeting received a presentation on the main activities of the SEPRHC, a neighbouring region that informed on previous meetings and the most important executed Capacity Building activities.

The Seabed 2030 and CSB Coordinator, Ms Cecilia Cortina, reported on the IHO recommendations and the importance of the regional contribution to the Ocean Decade Challenge 8 – *Develop a comprehensive digital representation of the ocean*. She also mentioned the evolution of the available seabed data in the region (see Fig.2), concluding with the work-plan for 2023.



Evolution of the available seabed data in MACHC

The meeting approved the establishment of a MSI Working Group in MACHC that was proposed by WWNWS and chaired by the USA.

For the positions of MACHC Chair and Vice Chair it was decided that the UKHO will ascend to Chair and Suriname as Vice-Chair. On the election of MACHC representatives to IHO Council, Jamaica and Netherlands were selected.

Mediterranean and Black Seas Hydrographic Commission (MBSHC)

Following the invitation from the Directorate of Aviation and Maritime Transport of the Ministry of Infrastructure and the Geodetic Institute of Slovenia, the 23rd Conference of the Mediterranean and Black Seas Hydrographic Commission (MBSHC) took place from 30 March to 1 April 2022 in Ljubljana, Slovenia, as a hybrid event. Seventy-five registered participants from seventeen Members of the MBSHC (Algeria[1], Bulgaria[15], Croatia[1], Cyprus[1], Egypt[1], France, Georgia, Greece, Italy, Lebanon, Malta[1], Morocco, Romania, Slovenia, Spain, Tunisia[1], Turkey), three Associate Members (Israel, United Kingdom and the United States of America) attended the event, together with five Observers (Albania, IC-ENC and PRIMAR, the two Regional ENC Coordinating Centres (RENC), the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), the Mediterranean Scientific Commission (CIESM)), and stakeholders from industry (Fugro, GeoAcoustics, iXblue, Kongsberg Maritime and SevenCs[1]). The IHO Secretariat was represented by Director Luigi Sinapi and Assistant Director Yves Guillam.

The Conference was chaired by Captain (Dir) José Daniel Gonzalez-Aller Lacalle, Director of the *Instituto Hidrográfico de la Marina* (IHM), and opened by Mr Srecko Jansa, Director General of Navigation and Maritime Transport of Slovenia. In response, Director Sinapi congratulated Slovenia for the outstanding arrangements for this conference, offering many opportunities for the delegates physically present to exchange views directly. In addition to the important challenges under the responsibility of the MBSHC in view of the 3rd Session of the IHO Assembly, Director Sinapi, noting the ongoing situation in the Black and Azov Seas, invited the MBSHC to carefully monitor the situation in the eastern part of the Region in order to provide any potential contribution to maintain the safety of navigation and safeguard the protection of the environment.

[15] In VTC mode.

The Chair presented the work of the ad hoc drafting group in charge of the revision of the MBSHC Statutes, established after the previous Conference (MBSHC-22) to consider the application of the revised IHO Resolution 2/1997. With the quorum reached, the new Statutes of the MBSHC, which include some changes on the voting and decision-making procedures suggested by the Secretariat, were approved. Anticipating the endorsement of the recommendations from the WENDWG[16] by the IRCC, the MBSHC also decided to start the process for the establishment of the MBSHC-S1xx Working Group, the scope of which being to provide practical recommendations to the MBSHC in support of the S-100 Implementation Roadmap. In the absence of terms of reference and clarity on the objectives and timelines, some concerns were raised by Malta on this matter.

Director Sinapi commended Spain for their efforts to deal with urgent matters in charting coordination since MBSHC-22 when the position of Coordinator of the Charting Region F became vacant. The Commission tasked the Region F ICCWG[17] to consider the extension of its scope to S-101 ENCs in the revision process of its own terms of reference (TORs). MBSHC approved the re-establishment of the Region F database in the Aegean Sea in INToGIS, as it was on 14 February 2022 (cancellation of the “blanking” of INT charts in INToGIS in the Aegean Sea made by the IHO Secretariat).

[16] Actions WENDWG12/21 and /33 refer.
[17] Region F International Charting Coordination Working Group.

The MBSHC approved the designation of Greece as Region F IRCC Coordinator and Turkey as Vice-Coordinator until MBSHC24. The MBSHC also agreed on the rotation on these positions after MBSHC24 (2024) and until MBSHC25 (2026), with Turkey becoming Region F Coordinator and Greece Vice-Coordinator. It was also agreed that the Region F ICCWG supported by the BASWG[18], will re-consider the INT charts and ENC charting schemes in the Black and Azov Seas globally when the situation in the region is stabilized.

Greece became Region F Charting Coordinator

In addition to the standing agenda items (reports on HSSC and IRCC activities, NAVAREA III, crowd-sourced bathymetry, capacity building, etc.), very enlightening presentations were delivered by Associate Members and Observers/Industry participants, introducing different promising topics such as:

- Mapping marine geological risks in the Mediterranean region (IHO/CIESM);
- Chart On Demand (COD) & Certified Printed ENC (CPENC) (NGA, USA);
- The Potential of Artificial Intelligence in Phase Measuring Bathymetric Sonar Data Processing (GeoAcoustics);
- Remote Hydrography Concept (iXblue).

At the end of the Conference, Ms Vinka Kolić, Director of the Hydrographic Institute of the Republic of Croatia and Vice-Chair of the MBSHC, took over the chairpersonship of the Commission. Captain (Dir) José Daniel Gonzalez-Aller Lacalle closed the Conference expressing his gratitude to all participants and to Slovenia's representatives in particular for their outstanding and effective hospitality during the Conference.

Nordic Hydrographic Commission (NHC)

The 65th Meeting of the Northern Hydrographic Commission (NHC65), was held from 26 to 27 April 2022 in Handelsstedet Ramsvik, Sjernarøy, Norway.

The meeting was chaired by Evert Flier (Norway), Vice-Chair of NHC, on behalf of the Chair, Birte Noer Borrevik (Norway). Nine delegates from five Member States (Denmark, Finland, Iceland, Norway, and Sweden) participated in the meeting. The IHO Secretariat was represented by Secretary-General Dr Mathias Jonas.

[18] Working Group on the Safety of Navigation in the Black and Azov Seas.

Group photo of the participants at the NHC65 Meeting

The meeting commenced with welcome words from the Chair, Birte Noer Borrevik, Director Norwegian Hydrographic Service. On completion she handed over the chairing duty to the Vice-Chair. The meeting proceeded with the approval of the agenda and the matters arising from the previous NHC64 Meeting and the respective list of actions.

Secretary-General Dr Jonas reported on the general arrangements of the IHO and decisions made by 5th IHO Council affecting the work of the Commission. He reminded on the main goals of the IHO Strategic Plan and S-100 Roadmap and the task to the Member States to proceed with their implementation. The Secretary-General also invited the NHC to examine its respective instruments to ensure compliance with the recommendations of the IHO Resolution 2/1997 as amended by A-2.

The Commission reflected on the need to select one of its members to become a Council member in the inter-Assembly period 2023 – 2026. It was decided that Norway will be selected.

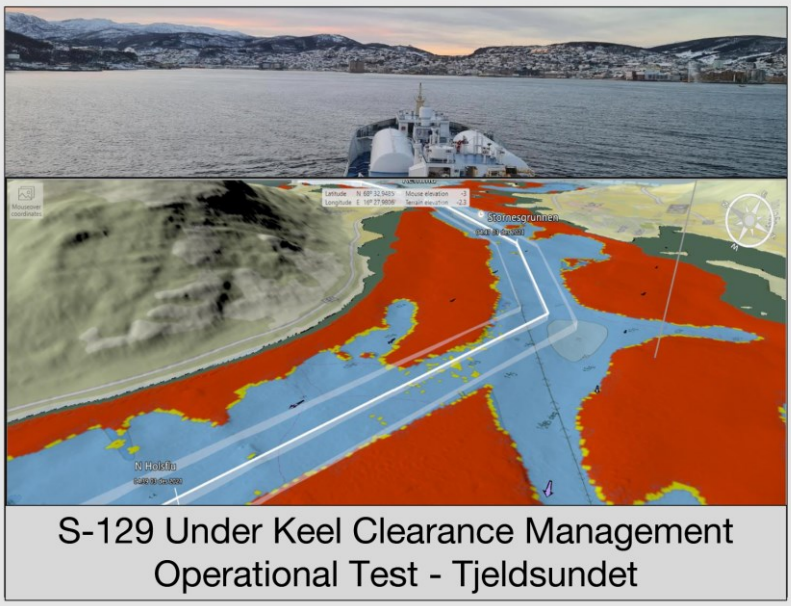
A longer discussion arose about the provision of free hydrographic data. It was confirmed that “free” should be interpreted as accessible for everyone but not necessarily free of charge. In this context Denmark informed that the agency is working on the release of a 50 m grid for waters under national jurisdiction. Norway echoed this announcement with similar resolution of 50 m for deep waters and 30 m for shallow waters. Sweden confirmed that it remains with restrictions on the data for territorial waters and only providing a 300 m resolution for public use. Bathymetric data of the Swedish EEZ are free and unlimited also in resolution. Finland has responded to the public request with a grid derived from nautical charts. Finally, Iceland stated all processed bathymetric data as freely available and not limited in resolution, but not free of charge.

On reflection of a recent workshop hosted by the Canadian Hydrographic Office about the human resources to be recruited by HO´s in the future, the Commission members expressed their views on the subject based on their respective national perspective. There was commonality that IT/GIS skills have priority over the traditional qualifications as surveyor or cartographer. New stakeholder groups’ interactions also call for lawyers, economists, data scientists and project managers. Joint consideration was made on the question; How to attract new personnel?

As part of the respective national reports, the Commission members informed about their recent relevant achievements. Norway presented a collaborative approach with the port of Stavanger aiming at improving efficiency of harbour operations through the enhanced use of dense bathymetric data for incoming and outgoing pilotage.

Sweden and Finland jointly reported about a project to set up S-104 and S-111 services for the Baltic region. Norway presented the promising results of its S-100 Demonstrator Project for S-129 Underkeel Clearance Management in Norwegian waters. The Commission discussed how such show cases could be better communicated to promote the expanding production and use of S-100 complaint data products. The Commission decided to suggest that the envisioned IHO GIS Portal should become an active element of this promotion.

Finland reported on the start of the regular production of HD ENCs for the major merchant fairways and ports in large scale ENCs, i.e. Berthing, Harbour and Approach products. MSDIWG Chair Jens-Peter Hartmann (Denmark) presented the S-122 (Marine Protected Areas) showcase which results in a data set covering the North Sea and the Baltic Sea. The Commission agreed to promote this approach to be adopted by other regions, aiming to compose a global dataset to be provided via the future IHO MSDI Portal.


S-129 Under Keel Clearance Management
Operational Test - Tjeldsundet

The Commission received reports on recent activities of the relevant IHO subordinate bodies such as WEND and GEBCO Guiding Committee.

At the end of the meeting Pia Dahl Højgaar (Denmark) took over the role of Chair from Birte Noer Borrevik (Norway).

North Indian Ocean Hydrographic Commission

The 21st Conference of the North Indian Ocean Hydrographic Commission (NIOHC) was held in Bali, Indonesia, from 22 to 25 August, under the chairmanship of Vice Admiral Nurhidayat, National Hydrographer of Indonesia. Participants were welcomed at the opening ceremony by Admiral Yudo Margono, Chief of Naval Staff Indonesian Navy.

NIOHC Member State representatives from Bangladesh, Egypt, India, Indonesia, Myanmar, Pakistan, Sri Lanka, Thailand and the United Kingdom attended the meeting together with representatives of Associate Members Australia, France, Mauritius, Oman, Seychelles and USA. The Russian Federation, was present as an Observer State. Representatives of the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) and several industry stakeholders also attended as invited observers. Director Abri Kampfer and Assistant Director Sam Harper represented the IHO Secretariat.

The NIOHC21 meeting was preceded by a half day seminar on Raising Awareness of Hydrography which focused on the current status of S-100 related activities. The seminar was attended, in addition to NIOHC members, associates and observers, by the Maldives. The INT Chart Coordination Working Group (NICCWG) held a meeting in the afternoon of 22 August, after which a report was prepared for the NIOHC21 conference.

The NIOHC received reports from Member States, Associate Member States and the IHO Secretariat as well as summary reports on the 14th meetings of the IHO Hydrographic Services and Standards Committee and the Inter Regional Coordination Committee. Director Kampfer briefed the Commission on current IHO activities and the preparations for the forthcoming sixth Council meeting and third session of the IHO Assembly. The meeting also received reports on progress and issues related to the work of the Marine Spatial Data Infrastructures Working Group, relevant activities that had taken place in the International Maritime Organization, including relevant outcomes of the 9th meeting of the IMO Sub-Committee on Navigation, Communications and Search and Rescue (NCSR 9) and an up-date from the Worldwide ENC Database Working Group, and reports from the NAVAREA VIII and NAVAREA IX coordinators. The future requirements for Capacity Building (CB) in the region were discussed, but the preparation of future submissions was deferred until the forthcoming intersessional period.

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

Participants of the NIOHC21 Conference.

North Sea Hydrographic Commission (NSHC)

The 35th Meeting of the North Sea Hydrographic Commission (NSHC35), initially planned to be held in March 2020, then partly substituted by VTC meetings in the interim because of COVID-19, was finally held on 5 to 6 April 2022 in Reykjavik, Iceland.

The meeting was chaired by Árni Þór Vésteinsson (Iceland). Twenty-seven delegates from ten Member States (Belgium, Denmark, France, Germany, Iceland, Ireland, Netherland, Norway, Sweden and United Kingdom) participated in the meeting. The IHO Secretariat was represented by Secretary-General Dr Mathias Jonas.

Group photo of the participants at the NSHC35 Meeting

The meeting commenced with welcome words by Georg Lárusson, Director General of the Icelandic Coast Guard and the IHO Secretary-General provided his opening remarks. The meeting proceeded with the approval of the agenda and the matters arising from the previous NSHC34 Meeting and the respective list of actions.

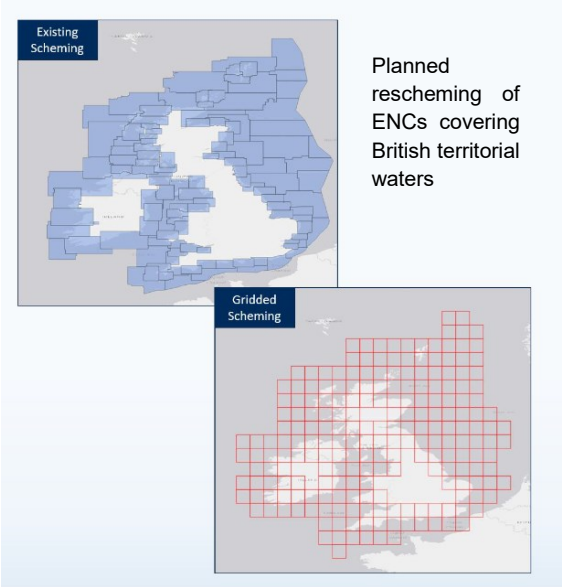
Secretary-General Dr Jonas reported on the general arrangements of the IHO and operations of the IHO Secretariat. He continued with some statistics on Member States participation to IHO subordinate bodies during the pandemic lock down and the resulting progression made in terms of the IHO Work Plan with an impact on Regional Hydrographic Commissions. He reminded the main goals of the IHO Strategic Plan and S-100 Roadmap and the task set on the Member States to proceed with their implementation. The Secretary-General also invited the NSHC to examine its respective instruments to ensure compliance with the recommendations of the IHO Resolution 2/1997 as amended by A-2.

The Commission devoted a good amount of time on the first day to discuss “what does the future have in store for hydrography and where do MS wish to see IHO in few years’ time”. Based on a presentation given by the Secretary-General, the commission agreed that new technology in data acquisition and management, in combination with an ever-growing request for customized hydrographic information, will leverage the need for new data services under the data centricity paradigm. As a result of this discussion and the associated Agenda items the Commission expressed its commitment to be ambitious in developing regional data services based on matured IHO S-1xx data product specifications for navigational use. The targeted launch date will be mid-2025. The NSHC also confirmed to strive for harmonisation across the package of S-1xx products to support the increased use of hydrographic data for the benefit of society. These will be distributed, where appropriate, through navigational service channels or other appropriate regional data service providers.

As an amending action, NSHC, coordinated through Belgium, will launch a questionnaire to identify, in addition to S-101 by 2025, which other S-1xx products can be available for production, maintenance, and service provision by MS as part of a regional package. The questionnaire will help to identify the scope of the initial package (e.g., S-101, S-104, S-111, etc.) and, in the best case, a regionally aligned delivery timeline. The outcome of the questionnaire will be shared for consideration by NSHC Member States to finally form a proposal if and how data services for the named S-1xx products can be installed for the region.

The Commission noted and discussed numerous reports of subordinate regional bodies such as the North Sea International Chart Committee, Tidal Working group, Resurvey Working group, the Baltic Sea North Sea MSDI WG and the North Sea WEND WG. A notable implementation of the suggestions of the overarching IHO WEND WG was the implementation of a gridded ENC scheme in German and British waters which may serve as best practice example for other regions.

The Commission finally endorsed the proposal for establishment of a Maritime Safety Information (MSI) Working Group becoming part the NSHC portfolio of subordinate bodies to address the substantial changes in terms of transmission technology information packaging these services are currently facing.



Planned rescheming of ENCs covering British territorial waters

At the end of the meeting Magnus Wallhagen (Sweden) took over the role of Chair from Árni Þór Vésteinsson (Iceland).

ROPME Sea Area Hydrographic Commission (RSAHC)

The 9th ROPME Sea Area Hydrographic Commission (RSAHC9) meeting was held in Muscat, Oman from 15 to 17 November 2022. The meeting was chaired by Captain Yahya bin Mohammed Al Balushi, Head of Oman National Hydrographic Office (ONHO) and attended by 32 registered participants. Five RSAHC Member States (Iraq, Islamic Republic of Iran, Saudi Arabia, Sultanate of Oman and Pakistan) were represented, as well as France, UKHO, IALA, AMNAS (Arabian Maritime Navigation and Aids Services), MENAS (Middle East Navigation Aids Service) and Industry (IXBlue, Kongsberg, Teledyne Geospatial, FUGRO and EOMAP). The IHO Secretariat was represented by Director Luigi Sinapi.

The meeting was preceded by an Opening Ceremony in the presence of the Undersecretary of the Ministry of Transport, Communications and Information Technology of Oman, H.E. Eng. Khamis Al Shamakhj. In the opening speeches, the Undersecretary, the Director of OHNO and the IHO Director stressed the importance of the 9th RSAHC meeting for the region and the Persian Gulf countries after a long interruption due to the COVID-19 pandemic, highlighting how sea-related matters play a fundamental role in the life and development of all Persian Gulf countries. The RSAHC9 meeting falls in a particular period of the IHO's operational life, just after the recently concluded 6th IHO Council Meeting and just ahead of the third session of the IHO Assembly, which is the principle decision making organ of the IHO to discuss and approve the IHO Work Programme and Budget for the next three years and to endorse and improve the numerous initiatives already underway. The IHO Director highlighted the key IHO activities of regional and international significance to the hydrographic and maritime community, such as the implementation of the S-100 Roadmap following the latest positive news from the IMO on the implementation dates of the S-100 ECDIS, the IHO's renewed commitment to the UN Decade of Ocean Sciences for Sustainable Development (2021-2030) as the largest initiative ever launched in favour of the oceans at the international level, the hydrographic Capacity Building programme, which remains a topic of great sensitivity for the International Hydrographic Organization, and then the IHO Crowdsourced Bathymetry initiative and Nippon Foundation GEBCO Seabed 2030 project.

RSAH9 meeting, visit to the OHNO and visit to AMNAS

On the occasion of the Sultanate of Oman's hosting the 9th meeting of the RHAHC, His Excellency Eng. Saeed bin Hamoud bin Saeed Al Mawali, Minister of Transport, Communications and Information Technology, received IHO Director Sinapi on 16 November 2022 at the Ministry's HQ, in the presence of Captain Yahya bin Mohammed Al Balushi, Head of the National Hydrographic Office of Oman. During the meeting, they highlighted the role played by the organization to ensure the safety of international navigation through the development of standards, in addition to matters of maritime interest. On 16 and 17 November 2022, the IHO Director paid a visit to ONHO and AMNAS, where the capacities of the two offices were described.

Visit of the IHO Director to the Ministry of Transports, Communications and Information Technology

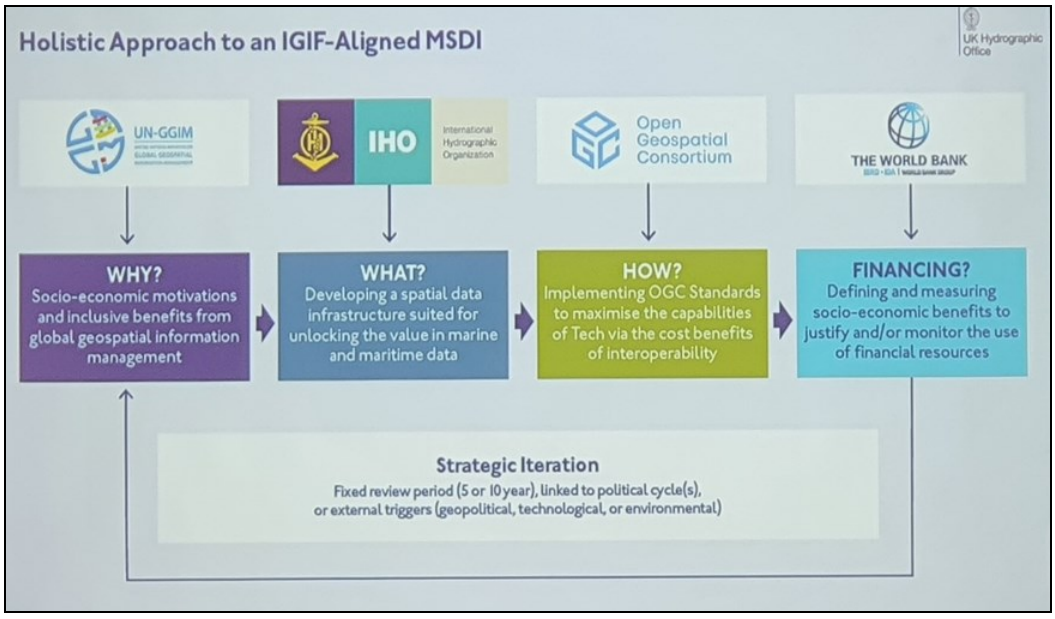
The Regional Hydrographic Commission welcomed Iraq as a new Member State of the IHO. Iraq has undertaken to sign the RSAHC statutes to become a Member of the Regional Hydrographic Commission. Following this signing, the RSAHC will be able to count all Persian Gulf coastal States among its members. Despite the absence of four States of the Region (Bahrain, UAE, Kuwait, and Qatar), the meeting represented an important opportunity to consolidate the cooperative relationship between the Persian Gulf States, both bilaterally and regionally.

Particular attention was paid to Capacity Building issues, highlighting an agenda full of appointments and initiatives sponsored internationally by IHO and IALA. On the whole, between 2022 and 2023, a joint IHO-IALA Technical Visit to the IR of Iran (originally planned in 2022 and then postponed to the second semester of 2023), a High Technical Visit to Iraq (following the

adhesion of Iraq to IHO) and two IALA Technical Missions to Saudi Arabia and Bahrain have been planned, two candidates from the Region participated in 2022 in the GEOMAC course in Cartography Cat. B course sponsored by the Nippon Foundation at the UKHO and the Hydrography Cat. B course at the KHOA in the ROK. Personnel from the RSAHC participated in 2022 to a MSI course organized by NIOHC, highlighting the importance of collaboration between the Regional Hydrographic Commissions as a further opportunity for Persian Gulf States to utilize the activities of the IHO's Capacity Building programme. At the proposal of Iran, the RSAHC Chair will send a Circular Letter to all members of the Region to seek their willingness to provide financial support to the Capacity Building programme.

During the discussion of national reports, the need for greater effort in the areas of education and training in hydrography and cartography was highlighted, exploiting all the opportunities provided both internationally and nationally, through bilateral agreements with the countries of the RSAHC and neighboring regions. In the area of MSI, Pakistan - as the coordinator of NAVAREA IX - reported to regularly use, in addition to the Inmarsat System, the Iridium Satellite System for the dissemination of nautical information throughout the region of responsibility, as the second recognized mobile satellite service (RMSS) approved by the IMO. All the promulgated MSI warnings are available on website.

In the area of MSDI, RSAHC is in line with the principles of the UNGGIM - IGIF and now ready to start working towards the creation of a MSDI at regional level, similarly to other Regional Hydrographic Commissions. The RSAHC Chair will send a Circular Letter to the members of the Region for the creation of a regional MSDI Working Group. In this regard, the IHO Director encouraged the national representatives present at the meeting to participate more actively in the IHO MSDI WG.



The holistic approach to MSDI iaw the UNGIM-IGIF pathways

During the meeting of the ICCWG, the INT Chart and ENC regional coordinator urged the representatives of the RSAHC Members to update the Chart Catalogue S for Region I directly into the IHO IntoGIS II system, in accordance with the IHO publication S-11 Part B, and to send reports on INT charts and schemes more promptly. Furthermore, in accordance with the WEND principles and IHO Resolution 1/2018, he brought to attention the need for greater collaboration at bilateral level between those coastal States or Primary Charting Authorities of the Region concerned, whose ENCs are affected by overlaps. Finally, in line with the WEND S-100 Principles and recommendations, the RSAHC Chair will send a Circular Letter to invite all members of the Region

to propose a candidate for the new role of S-100 Services Coordinator or the expansion of the role of Regional Chart Coordinator to include S-1xx products.

Southern Africa and Islands Hydrographic Commission (SAIHC)

The 18th Conference of the Southern African and Islands Hydrographic Commission (SAIHC), hosted by the Instituto Nacional de Hidrografia e Navegacao (INAHINA) in Maputo, Mozambique, was held in a hybrid format from 10 to 12 May 2022. A 1-day Hydrographic Awareness Seminar preceded the 18th SAIHC Conference.

The Conference was chaired by RAdm Peter Sparkes (United Kingdom). Forty-six delegates from 8 Member States (Angola, France, Kenya, Mauritius, Mozambique, Norway, South Africa and United Kingdom), six Associate Member States (Comoros, India, Madagascar, Malawi, Namibia and Portugal), three Observer Organisations (International Association of Lighthouse Authorities (IALA), Port Management Association of Eastern and Southern Africa (PMAESA) and South African Maritime Safety Authority (SAMSA), eight Industry Observers (Kongsberg Maritime, GeoSurvey, GeoSystems, Teledyne CARIS, SevenCs, Subtech, Unique Group, Underwater Survey) and two Observer Member States (USA and Uganda), participated in the meeting. The IHO Secretariat was represented by Director Abri Kampfer.

Some participants at the SAIHC18 Conference

The Conference commenced with welcome words by the SAIHC Chair, RAdm Peter Sparkes (UK), followed by the address of the Vice-Chair, Mr Ferhan Khan JUHOOR (Mauritius) and IHO Director Abri Kampfer. The keynote address was delivered by Permanent Secretary Ms Dina Tava' Ribeiro on behalf of the Ministry of Transport of Mozambique.

The meeting proceeded with the approval of the agenda and the matters arising from the previous SAIHC 17 Conference and the respective list of actions. Director Kampfer provided an overview of the SAIHC membership enhancing the fact that in the region there are still five non-member States, which are all Member States of the IMO. They were invited and encouraged to become IHO members. He indicated that the growth in IHO Membership is not equally reflected in the

participation in the work of the Committees and Working Groups and encouraged participation, particularly in the technical working groups. The IHO Country Information system has been upgraded to include administrative information and facilitate the maintenance of the IHO publications such as Yearbook (P-5) and Status of Hydrographic Surveying and Charting Worldwide (C-55). Countries in the SAIHC Region were invited to review their entry in the publications on an annual basis and provide the IHO Secretariat with the appropriate updates through the IHO Online Form system.

The Meeting proceeded with the update on the outcomes of the 5th Council, IRCC13, HSSC13, WENDWG10 and MSDIWG meetings. The ICCWG Chair, Alfons Van Craeynest (South Africa) gave an overview of the outcomes of the 9th ICCWG meeting. Within the Region H Chart Scheme, out of a total of 127 INT charts, 115 INT Charts have been produced with a further 12 still schemed for production. A total of 264 ENCs provide coverage of Region H. There is still ongoing discussions with regards to ENC overlaps within region H and a SAIHC ENC gridded scheme could be an opportunity to relieve overlap issues.

The SAIHC Capacity Building Coordinator, Lucy Fieldhouse (UK) provided an update on CB activities, available opportunities and on the activities of CBSC Project Groups. Feedback was provided on completed and in-progress funded CB activity in SAIHC region in 2022, current IHO CB opportunities including the upcoming Cat B Programme. The proposed activities within the SAIHC 3 Year Plan (2022-2024) was presented and inputs were requested to the plan and any wider CB activities that the SAIHC Region can benefit from.

The African Great Lakes & Rivers Sub-Working Group (AGL&RSWG) Interim Chair, Nick Swadling (UK), gave an update on activities carried out by the group since its creation at SAIHC17. Good attendance from interested nations was achieved and regional organisations such as PMAESA and the Lake Victoria Basin Commission were invited to improve knowledge in the group. There was excellent collaboration with the World Bank and Royal Haskoning which resulted in access to new survey data for lake ports. Discussions focused on existing and future charting requirements, including possible renewing coverage with an ECS and how to open up the flow of safety information. Discussions are underway to establish a new AGL&RSWG Data portal, supporting visibility of new navigational products and improved safety.

The meeting received briefings from the Members, Associate Members and Observing Organizations, focusing on achievements, challenges, lessons learned, capacity building needs and opportunities for engagement. Industry members provided presentations on their contribution to technological developments, regional survey projects and charting, and capacity building. Their contribution to the work of the Commission and of the coastal states was well appreciated.

The NAVAREA VII Coordinator (South Africa) provided an update on NAVAREA VII activities in the region since the last meeting. There was a Notable reduction in the number of SafetyNET Messages / Coastal Navigational Warning Messages promulgated in the 2020/21 reporting period compared to 2019, though normal operational functions continued during COVID-19. An agreement between South Africa and Iridium has not been signed yet, though broadcast trials conducted since April 2021 have been successful to date. A contingency exercise is planned in 2022 to test the joint contingency plan which exists between South Africa, France and Australia.

The Chair of the GEBCO Guiding Committee (Norway) gave a presentation on GEBCO and the Seabed 2030 project. GEBCO is a community of professional all over the world, collaborating irrespective of background or politics. The IC-ENC, General Manager summarized the IC-ENC S-100 work plan, their structure and development of online support and learning opportunities offered, including S-100 introductory training. He also summarised the latest S-100 developments. Regarding how the operation of current ENC analysers will be affected by S-101 improvements and whether this will require upgrades to COTS tools, it was confirmed that IC-ENC are testing analysers and that this may result in add-ons. It is yet to be decided how a hydrographic office will structure its ENC production and may vary by nation. Some hydrographic offices may wish to create an all-ENC portfolio within S101, and validation and convert back to S57, or the opposite. Automation of this conversion is in its research phase. Alternatively, a hydrographic office could hold their ENCs in both.

France presented an update on its transition to S-100. It is the intention to develop S-101 (ENCs), S-124 (warnings) and S-128 (catalogue for nautical products) as a priority. Shom intends to make available all the 900 FR ENCs in S-101 format as soon as the first ECDIS able to exploit S-100 products are available, i.e. from 2025 according the IHO S-100 roadmap. Shom participates in UKHO-Shom ECDIS System collaborative project and other innovation lab experiments. UK summarized the UKHO priorities and roadmap for S-100 and gave some examples of S-100 work completed, including S-101 and S-102 trial data sets, which are available on the UKHO Admiralty portal.

The Chair indicated that the UK would be available to continue with the Chairmanship of SAIHC and invited Members to put forward nominations. None were received before or during the meeting and therefore the Chair (UK) and Vice Chair (Mauritius) will continue in their respective roles.

South-East Pacific Regional Hydrographic Commission (SEPRHC)

The 15th meeting of the South-East Pacific Regional Hydrographic Commission is planned to be held in Chile in 2023.

South-West Atlantic Hydrographic Commission (SWAtHC)

The 16th meeting of the South West Atlantic Hydrographic Commission (SWAtHC-16) was held in Montevideo, Uruguay, in a hybrid format from 30 to 31 August 2022, hosted by SOHMA, the Oceanographic, Hydrographic and Meteorological Service of the Uruguayan Navy. The meeting was chaired by Commodore Valentín Alejandro Sanz Rodriguez (Argentina) and attended by 56 registered participants, 30 in person and 26 by VTC. All IHO Member States of the Commission (Argentina, Brazil and Uruguay) were represented, as well as the Associate Member State, Paraguay and the Observer State, Bolivia. In addition, Spain participated at the meeting as an invited State. The meeting was also attended by representatives of the Industry (Kongsberg Maritime, Norbit Subsea, Teledyne Geospatial, Xylem and Hypack). The IHO Secretariat was represented by Director Luigi Sinapi.

Some participants at SWAtHC16

The SWAtHC-16 meeting was preceded by a Workshop on Hydrographic Awareness, held on 29 August. The Workshop was opened by Captain José Domínguez, Director of SOHMA. The workshop's agenda included presentations on the capabilities and activities of the Hydrographic

Offices of Argentina, Brazil and Uruguay, professional presentations on waterway surveys, maritime safety and beaconing, as well as presentations of hydrographic survey techniques and data collection equipment by the Industry.

Workshop on Hydrographic Awareness, 29th August 2022 – Opening remarks

The SWAtHC-16 meeting was opened by the Chair, Commodore Valentín Alejandro Sanz Rodriguez (Argentina), who welcomed the participants, thanked Uruguay and SOHMA for hosting the meeting after three years from the last in-person meeting held in 2019, highlighting the high participation from all the States of the SWAtHC (Members, Associate and Observer). The Director General of Naval Material (DIMAT), Rear Admiral Otto Gossweiler welcomed the participants on behalf of the Uruguay Navy, recognizing the importance of SWAtHC for the entire South American Region and Uruguay. Director of SOHMA, Captain Jose' Dominguez, welcoming the participants, highlighted the commitment of Uruguay and SOHMA in creating a large Marine Protected Area along the Uruguayan coasts, in line with the Global Ocean Alliance, which is leading an international movement to protect 30% of the world's land mass (land and ocean) by 2030.

IHO Director Luigi Sinapi expressed his gratitude to the Uruguay Navy and SOHMA for hosting such an important meeting for the Southern West Atlantic Region, mentioning that the meeting is an opportunity for the Commission to discuss the numerous initiatives involving the Regional Hydrographic Commissions prior to the 6th Council Meeting planned in October, especially on the implementation of the IHO Strategic Plan and the measurement of the Strategic Performance Indicators, the S-100 Roadmap and the future of paper charts. Director Sinapi provided the IHO Secretariat Report, mentioning the most important achievements in IHO outreach, the new IHO projects, and the initial information on the 3rd Session of the IHO Assembly, planned in May 2023.

The meeting proceeded with the update on the outcomes of the 5th Council and IRCC14 where, in addition to the topics mentioned in the IHO Secretariat Report, it was highlighted that SWAtHC is committed in the development of a definition of hydrographic interest, the S-100 Products implementation Roadmap and the Strategic Performance Indicators for the Region. Following the recommendations of the Worldwide ENC Database Working Group (WENDWG) issued with the WENDWG CL 2/2022 and the importance of the establishment of a S-1xx Coordinator role in the RHCs, the Commission approved to assign to the Planning Committee of SWAtHC (a Committee established during the second meeting of the Commission in 2008 and composed of one representative of each Hydrographic Office which is a member of SWAtHC) the role of S-1xx Coordinator and refer to the next WENDWG about the implementation of S-100 Products implementation Roadmap at regional level. Furthermore, it was pointed out that the current overlaps between the Argentinean and Uruguayan ENCs are being resolved, complying now with the applicable IHO Resolutions.

The Regional Capacity Building Coordinator, Captain Helber Carvalho (Brazil) reported on the most recent CB activities, provided an overview on the status of the CB Work Programme at regional level,

the PT E-learning related to the future IHO E-learning Center and the IHO-CANADA Empowering Women in Hydrography project within the Region, highlighting the excellent support that the HOs regularly receive from the Industry in building hydrographic capacities at national and regional level.

Following the report on the last WWNWS meeting, Argentina, as NAVAREA VI coordinator expressed the concern, fully shared by Brazil, about the mandatory implementation of the new IridiumSafetyCast satellite system, highlighting not only problems related to the costs of the new system, but also to possible errors in the transmission of MSI information. This concern will be represented at the next Council-6 by the IRCC Chair, on behalf of the RHCs.

Waterways surveys in South West Atlantic Region

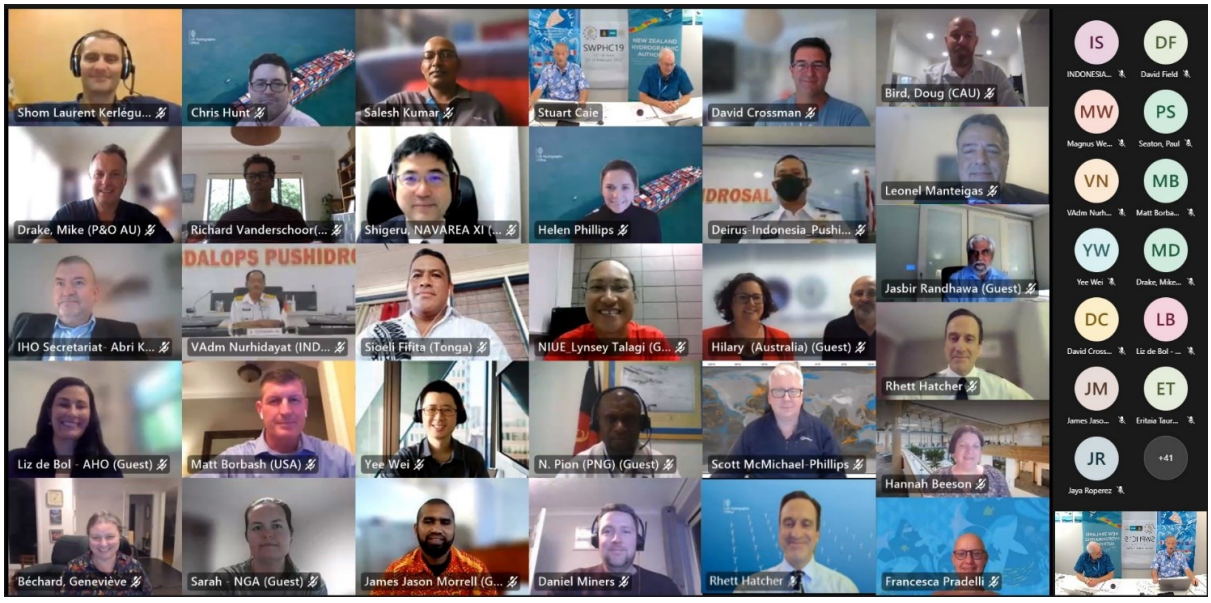
The national Reports of the 5 States present (Brazil, Argentina, Uruguay, Paraguay and Bolivia) and Spain as the invited State highlighted the excellent collaboration and mutual support in the hydrographic and cartographic sectors within the Region, and a very high level of attention to South America's inland waters, lakes and the 1263 km of waterways that connect the 5 countries of the Region and contribute significantly to the economic development of the area. In this regard, the recent results of the work of the Inland ENC Harmonisation Group (IEHG) were reported, postponing the decision on the adoption of the I-ENC as the Region's official charts for inland waters to the next SWAtHC meeting. The two non-coastal States, Paraguay and Bolivia, emphasised the importance of collaboration in the hydrographic and cartographic sectors, as well as in training, for which they are totally dependent on the training opportunities offered by neighbouring States. In this regard, the importance for both non-coastal States to become members of the SWAtHC and the IHO was recognised. In this regard, Bolivia stressed the importance of the next two visits that it will be subject to, a High-Level Visit by the IHO and a Technical Visit by the SWAtHC, respectively, to discuss at the governmental level the process of Bolivia's accession to the IHO, an intention already declared during the previous SWAtHC15 meeting, and to identify which sectors at the hydro-cartographic level most need capacity building interventions.

2022 SWAtHC's contribution to GEBCO

During the meeting an update on the activities of GEBCO, Crowd Source Bathymetry (CSB) and Seabed2030 was provided by the CSB/GEBCO/Seabed2030 Regional Coordinator, highlighting that the coastal States of the Region actively contribute to the GEBCO programme, through the regular submission of existing bathymetric data in national databases and new data from hydrographic campaigns. Argentina, Brazil and Uruguay committed to responding within the deadline to IHO CL 25/2022 regarding the approval of the new Edition 3.0.0 of IHO Publication B-12 - Guidance for Crowdsourced bathymetry, and noted, although they responded positively to IHO CL 21/2020 (Acceptance of Crowdsourced Bathymetry activities and provision of resultant datasets in national waters of jurisdiction), that there are internal governmental rules to be respected for those who conduct surveys in waters of national jurisdiction.

South West Pacific Hydrographic Commission

The 19th meeting of the South West Pacific Hydrographic Commission (SWPHC) initially planned to be held in Vanuatu, was held in a VTC format from 23 to 25 February 2022. Representatives from Australia, Fiji, France, New Zealand, Papua New Guinea, Samoa, Solomon Islands, United Kingdom and United States attended the meeting. Indonesia, Kiribati and Niue were represented as Associate Members. Three NAVAREA Coordinators, several observer organizations and industry delegates were also present. Director Abri Kampfer and Assistant Director Leonel Manteigas represented the IHO Secretariat.



Participants in the 19th SWPHC Meeting

The meeting commenced with a “Te reo Māori karakia & mihi” (formal greeting) and the SWPHC Chair Mr Adam Greenland (New Zeeland) welcomed the participants. Mrs Jan Pierce, Deputy Secretary of LINZ, reflected on the UN Decade of Ocean Science for Sustainable Development and the IHO Strategic Plan that raised the importance of Hydrographic information for the management of resources. She also mentioned the importance of several initiatives such as Seabed 2030, UN Global Geospatial forum, International Geospatial Information Framework that give focus to open data and connecting users to marine data. IHO Director Abri Kampfer provided his opening remarks mentioning the celebration of the centenary of the IHO and stressed that is the second remote SWPHC Meeting which highlights the importance of essential technology to maintain the possibility to continue to work in these trying times. He highlighted the importance of the Joint IHO/Singapore Innovation & Technology Laboratory and some of the achievements, such as the Roadmap v2.0 for the S-100 Implementation. He thanked for the organization of the meeting with a very rich agenda and wished a successful meeting to the participants.

The meeting proceeded with the matters arising from the previous SWPHC18 Meeting, the respective list of actions and the comments provided by the members regarding the SWPHC Statutes.

IHO Director Kampfer provided an overview of the SWPHC membership, emphasising the fact that IHO Secretariat stands ready to assist non-member states to become IHO members. He reported on the outcomes of the 5th Meeting of the Council and the proposals from HSSC, IRCC and the Secretariat for delivery of the Strategic Performance Indicators (SPIs) mentioning the IRCC letter 01/2021. The HSSC’s governance document on the ‘dual fuel’ concept, the Empowering Women in Hydrography project, the IHO e-Learning Center at ROK, the modernisation of GMDSS and the recognition of the Iridium SafetyCast service were mentioned as important developments. Assistant Director Leonel Manteigas provided a detailed update on the IHO Empowering Woman in Hydrography project activities in progress.

The Meeting proceeded with the update on the outcomes from the IRCC13 and HSSC13 meetings, mainly focused on the actions and recommendations to SWPHC. The need to share experiences on the S-100 implementation strategies, the SPI attributed to IRCC and HSSC and the decision for the application of ISO 9001 principles in the development of S-101 product specification was emphasised. The S-100 Implementation priorities and timeline as well as the challenge in the future production of S-101 in conjunction with S-57 was discussed.

The WENDWG Chair presented the WENDWG12 meeting highlights such as the WEND-100 principles and the S-1XX implementation Guidelines that will determine how the WEND-100 principles will be applied to each specification. He also mentioned the need for a Regional S-1XX Coordinator and a proposal for the INT Chart Coordinator to become the S-1XX Coordinator.

The MSDIWG Vice-Chair presented the most important topics of the MSDIWG12 meeting including the focus on data discoverability and FAIR principles, the SPIs included in the MSDIWG work plan and the importance to consider S-100 as a universal data model to be used for other use cases, not just navigation. She also enhanced the Webinar series organized last year and the upcoming in-person seminar in Singapore in the same week of the MSDIWG12 meeting and back-to-back with the UN GGIM MGI and the OGC MDWG meetings.

The main outcomes of the National Reports were summarized with the respective achievements and challenges, enhancing the continued investment in technology, partnerships and collaboration for data collection, the engagement with the MSDI groups and the contribution with the Seabed2030 project. A common aspect was the impact of the COVID-19 pandemic in the Members activities and the transitioning to S-100 as an important challenge.

The meeting received presentations on the activities of IALA and the SPC (Pacific Community). The IALA representative mentioned the technical webinar series available on IALA YouTube, Guideline on sustainable structural design for AtoN, the education opportunities, mostly online at present, and the future transition of IALA to an Inter-governmental Organization. The SPC provided a presentation about its Geoscience, Energy and Maritime Division, including projects developing capacity in the region in the continental shelf submissions, geodetic reference frames, geodetic

survey operations and tide predictions. SPC is looking to create a new vision and get a permanent observer to SPC from the EU.

The SWPHC Working Groups provided their respective reports, starting with the update from the International Charting Coordination Working Group (ICCWG), mentioning the new INT Charts and the new Navigational Purposes 1 and 2 ENCs produced since the last meeting as well as the proposals for new INT Charts and the ENC overlap situation. The SWPHC MSDIWG Chair provided an update on the WG activities since the last SWPHC meeting mentioning the update in the IHO map of SDI Portals, the increase of the members, the activities in the Workplan and expressed the intention to seek opportunities to reach out to other regional organizations.

Three NAVAREA Coordinators presented their reports from areas X, XI and XIV. The Members were encouraged to nominate points of contact to NAVAREA XI and a standardized template for MSI Reports was requested from the IHO WWNWS sub-committee.

The meeting proceeded with the review of the gap analysis of the SPIs of the IHO Strategic Plan 2021-2026. SWPHC established a Work Plan & Priorities Working Group that presented the steps to form the Work Plan including: a stakeholder's analysis, Theory of Change methodology and an analysis of the SWP contributions to IHO working groups. The Chair of the SWPHC SPIs Sub-

Group introduced the report to revise the SPI in accordance with the IRCC CL01/2021 including the focus of the group, informing that there would be a repeat of the gap analysis to support SPI baselines.

The SWPHC Hydrographic Leaders programme aimed to create a network of leaders in the region, was presented, explaining the selection process and the content of the program and how it will develop further.

The Meeting received a presentation on the "impact of S-100 on all nations", about the value of data being shared and how data can be structured to enabling sharing. It enhanced the fact that S-100 products will have several layers with a multitude of products for mariners and other stakeholders. Focused on the implementation of UNGGIM Integrated Geospatial Information Framework (IGIF) & Open Data – a presentation informed on how information is a fundamental part of a national infrastructure. The IGIF methodology was explained and some examples of usage and resources were provided. A presentation was also provided about the Operational Framework for Integrated Marine Geospatial Information Management which supplements the IGIF, with examples of where value proposition could lie and about the importance of a national geospatial leadership board to support interagency collaboration. It was enhanced that National policy and legal considerations need to be given to enable the concept ‘collect once, use many times. The Meeting also received a presentation on the benefits of open data being free and available for society, the economy and the environment.

With the intention to start a regional discussion on the value and benefits of geospatial information, the framework and sharing data, a panel session discussed the following questions:
- What can we do to advance adoption/implementation of the IGIF and Open Data in our region?
- How do we collectively work in the region to share data leading to Open Data - open by default, a reality?

With regards to SWP Disaster Response an overview of SPC’s Pacific Resilience Project, including acquisition of LiDAR data and training in its use, was provided. An update on the Disaster Response Framework was provided. The Meeting was also informed that there is an approved CB activity to run an emergency exercise to test the framework, planned to be held in conjunction with SWPHC21 in 2024.

The Meeting also received an overview and update on the Seabed 2030 Project that still aims for 100% sea floor mapped by 2030. Five Project Work Packages are in progress covering data; systems & tools; technology innovation; mapping activities; and management. The GEBCO 2021 grid released for WHD 2021 have now 20.6% of the ocean floor mapped. The Seabed 2030, South and West Pacific Ocean Regional Centre also presented an update on Seabed2030, reporting that in the region 13% of area has data collected. The Centre has been engaged with countries to

discover and exchange data and working with vessels to plan transits to maximise 'mapping the gaps' and ensuring private vessels provide data back to the data's sovereign nation.

Related with the New Zealand's response to the UN Decade of the Oceans presentation, the composition of the NZ National Commission for UNESCO and its approach was included. The Commission provides advice to the NZ Government on UNESCO matters and is the conduit between international and domestic activities in relation to the Decade. UNESCO and International Oceanographic Commission as well as the NZ and Pacific projects submitted to the Decade were enhanced.

In the session dedicated to the Crowdsourced Bathymetry (CSB) and the IHO Data Centre for Digital Bathymetry (DCDB) an update on activities, including how to contribute with data to the Centre and how to access the viewer of the Data Centre, were provided. The SWPHC CSB/Seabed 2030 Coordinator provided an update on the activities specific to the SWPHC, including data trackers and the webinar series. Members were also encouraged to respond to IHO CL 21/2020 and IRCC CL 01/2020 to release their data.

The meeting had a session dedicated to the industry with presentations from Fugro, IIC Technologies, EOMAP, iXblue Pty Ltd, P&O Cruises Australia and SevenCs.

An update on the Highlights of the CBSC19 and CBSC19 Intersessional Meetings was received from the SWPHC CB Coordinator. CBSC worked to align the CB Strategy to the IHO Strategic Plan, and due to the Pandemic situation decided to allow that the activities not executed in 2021 be moved to 2022. Members were encouraged to view the CB calendar for VTC activities on the IHO website. An overview of SWPHC future funded activities and activities undertaken during the last year was also provided as well as those that will be moved to 2022 and the SWPHC 3-year Capacity Building Plan.

The meeting received an update on the work of the Commonwealth Marine Economies (CME) in the region provided by the UK. The Pacific Regional Navigation Initiative (PRNI) also informed on the work in the region, including recent charting and the focus on the 3 programmes in progress.

The meeting re-elected Mr Adam Greenland (NZ) to continue as Chair of the SWPHC and Fiji to continue in the Vice-Chair position.

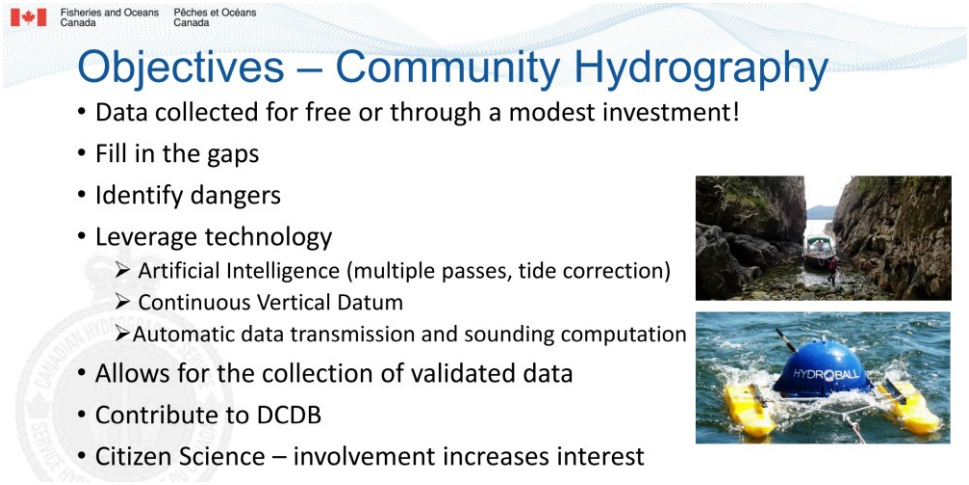
USA-and Canada Hydrographic Commission (USCHC)

The 45th Meeting of the US/Canada Hydrographic Commission (USCHC45), was held from 9 to 10 June 2022 in Ottawa, Canada.
The meeting was chaired by Dr Geneviève Béchard, National Hydrographer of Canada and Co-Chair RDML Benjamin Evans, NOAA Director, NOAA Office of Coast Survey. All together twenty-three participants from the two Member States (US, Canada) and associated Members (Australia and United Kingdom) participated in the meeting. The IHO Secretariat was represented by Secretary-General Dr Mathias Jonas.

Group photo of the participants at the USCHC45 Meeting

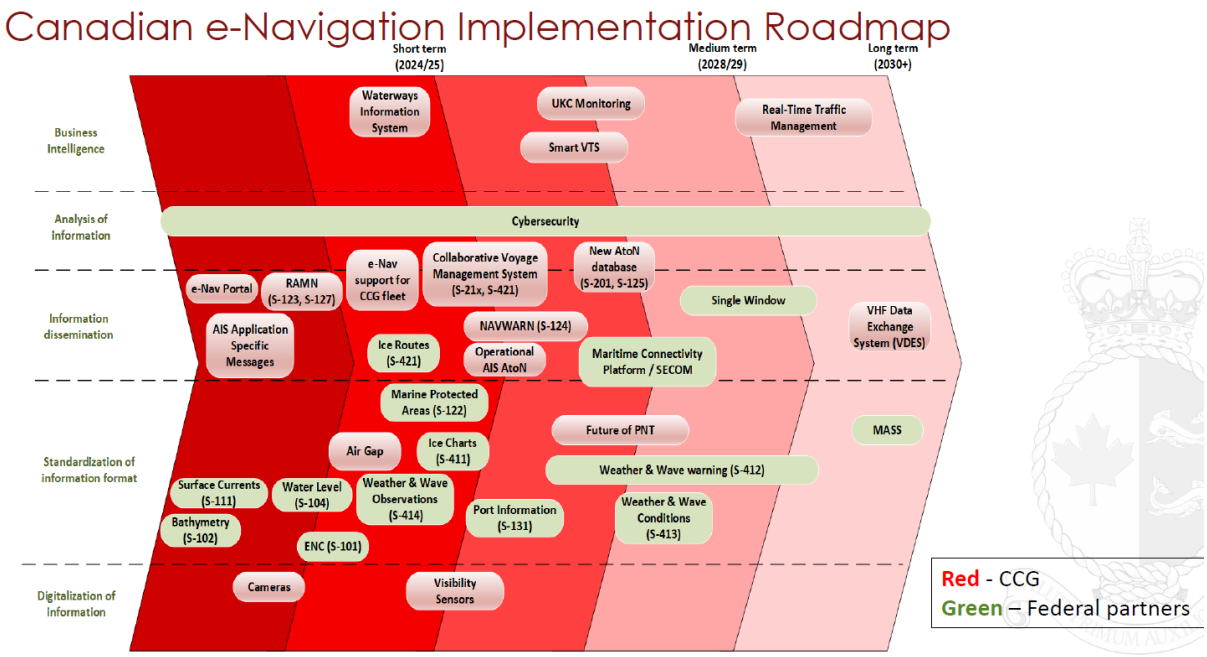
The meeting commenced with welcome words from the Chair and the Co-Chair. Both reminded the participants with sadness of the untimely passing of Rick Brennan, former NOAA Director, only weeks after his take over in May 2021. The meeting proceeded with the approval of the agenda and the matters arising from the previous USCHC44 Meeting and the respective list of actions.

National Reports were presented in sequence from US and Canada. Notable progress was made in the definition and rework of ENCs in gridded schemes. Both reports highlighted the efficient cross border coordination to solve cartographic issues resulting from the new schemes. As an item of note, US reported on the unrestricted availability of a global AIS dataset named GMTDS to assist prioritization of survey planning. The meeting continued with the reports of the respective national representatives in various IHO related activities, namely updates on the WENDWG deliberations, the IHO MASS project team, the "Empowering Women in Hydrography" project and GEBCO/Seabed2030. Canada reported about the findings of the workshop on identifying the capabilities of the "Hydrographer of the future" and a new citizen science element named "Community Hydrography". This program is designed to equip ambitious amateurs with low cost hydroacoustic equipment for towed survey in very shallow waters. The response is so far positive and providing tangible results in terms of quality and coverage.



A lively discussion arose about the production of paper charts from ENCs. All four hydrographic offices that were present have firm plans for implementation to meet their national requirements. A standardization under the IHO framework was regarded as desirable and may be proposed to be adopted to the HSSC work plan by event of C-6.

A number of specific presentations presented the progress of S-100 compliant data services in the region. Canada presented a concise plan to bring altogether 18 data products into service to make e-navigation a reality in domestic waters. Valuable information can be found under https://e-navigation.canada.ca.



US and Canada confirmed to agree on the selected member of the third Council for the period 2023 – 2026 in due course. In order to assist with this decision, the Secretary-General IHO provided the current tonnage list in place to identify Member States eligible for the first ten Council seats.

Before closing the meeting Dr Béchard handed other the chair´s role to RDML Benjamin Evans.

Conduct meetings of IRCC subordinate Working Groups

WEND Working Group

The 12th meeting of the Worldwide ENC Database Working Group (WENDWG), was held from 22 to 24 February 2022 at the IHO Secretariat in Monaco, in hybrid format, with eleven IHO Member States' representatives physically present out of 62 registered participants. The meeting was chaired by Dr John Nyberg (United States of America). Delegates from 27 Member States (Argentina, Australia, Brazil, Canada, China, Colombia, Croatia, Denmark, Finland, France, Germany, Greece, India, Indonesia, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Republic of Korea, South Africa, Spain, Sweden, Turkey, United Kingdom and United States of America), the Chairs of the S-100WG, MSDIWG[19], the Chairs of the IC-ENC Steering Committee and PRIMAR Advisory Committee and the directors/managers of the RENCs/RECC attended the meeting. Director Luigi Sinapi and Assistant Director Yves Guillam (Secretary) represented the IHO Secretariat.

[19] Marine Spatial Data Infrastructures Working Group.

Some participants of the WENDWG12 hybrid meeting.

Following the opening address by Director Luigi Sinapi who highlighted the responsibilities of the WENDWG in the broader context of the IHO Strategic Plan, of the IRCC role and the Roadmap for the S-100 Implementation Decade, the Chair welcomed the participants and went through the agenda to review the objectives of the meeting in particular those requested by the IRCC and the Council.

The WENDWG noted the outcome of the survey made in 2021 on High Density ENCs (HD ENC) and the possible impact of the development of S-102 (IHO CL 42/2021 refers). This outcome was questioned through a joint proposal (Australia, UK) promoting the urgent production of HD ENCs now, since the S-1xx products and S-100 ECDIS will unlikely be operational before 5 to 10 years. While considering that HD ENCs was not an IHO strategic objective, the meeting acknowledged the important user needs for improved safety contour usability and invited Member States to consider the role that HD ENCs can play before S-100 ECDIS becomes widely available as well as S-102.

Following the adoption of the WEND-100 Principles in 2021, two main topics were considered:

-The development of S-101 ENC Scheming Guidelines;

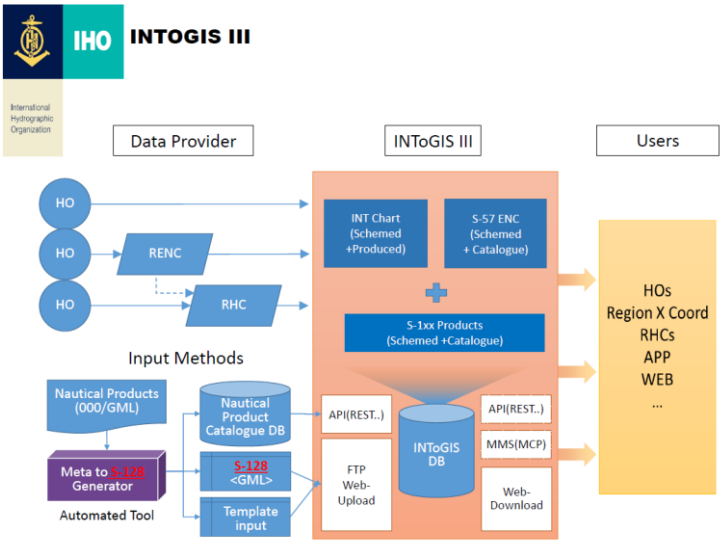
-The development of S-1xx Products Implementation Guidelines.

In order to put these questions in context before discussion, the S-100WG Chair was first invited to update the participants on a structural study, still in progress before submission to HSSC: the *Dual Fuel Concept Governance Document*. Once endorsed by the relevant Committee(s), this document is intended to become a component of the *Roadmap*.

The lead of one drafting group (Japan) provided a status report of the intersessional work on S-101 ENC Scheming Guidelines. It was acknowledged that consensus for a Global Common Grid Scheme, as long term objective, could not be reached yet due to significant objections. The meeting agreed that representatives of Regional Hydrographic Commissions in the WENDWG should beforehand address the issue in their regions, and then report on their regional S-101 ENCs production/distribution strategies (status quo, new grid, etc.) at the next meeting.

The status on the complex task for developing the S-1xx Implementation Guidelines was reported by the lead (Netherlands) of the second drafting group. A face-to-face side meeting and a working hybrid session were very beneficial to progress. It was agreed to focus and prioritize the remaining work on the “SOLAS” user category and on the top priority S-1xx products as defined in the *Roadmap* (S-101, S-102, S-104, S-111, S-124 and S-128). This is expected to done for submission prior to IRCC-14.

The importance of implementing S-128-compliant cataloguing functions in the *Roadmap* was recognized by the participants. For the IHO Secretariat's GIS infrastructure, this will be done through the next version of INToGIS web services, namely INToGIS III, thanks to the support provided by KHOA (Republic of Korea). It was noted that this concept was also in the interest of the MSDIWG.



Towards INToGIS III for an IHO discovery interoperable webservice of S-1xx products

In conclusion of very fruitful discussions, the WENDWG agreed to recommend in its report to IRCC that RHCs should now include a standing agenda item in their forthcoming Conferences/Meetings, by which they engage in the development of a regional organizational pathway (UN-GGIM IGIF compliant[20] for every S-1xx top priority products).

The WENDWG acknowledged that the combined effort by the RHCs (possible nomination of a S-100 Coordinator by Region for instance + development of IGIF / per RHCs / per S-1-xx Product) is an important way forward to contribute to the *Roadmap* to reach a worldwide coverage soon after the standards are adopted in their operational version.

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. The CB Technical Visits and High-level Visits are an important instrument to continue the campaign to raise the awareness to developing Countries, Member and non-Member States of the IHO. Unfortunately, the COVID-19 pandemic still impacted negatively on the 2022 Capacity Building Work Programme (CBWP) execution, resulting in the postponement of some of the activities and projects, which have been postponed to the 2023 CBWP. From the 14 CB Technical Visits planned for 2022 only 4 were executed to Benin, Senegal Bolivia and Comoros, additionally was executed a High Level Visit to the Plurinational State of Bolivia.

Accession of a New Member States and Suspension of a Member

The accession of Albania to the IHO Convention as new IHO Member State in May 2022 brought the IHO Membership to 98 Member States.

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 and workshops aimed at improving the status of hydrographic surveying and nautical charting and the delivery of maritime safety information in regions,

[20] Integrated Geospatial Information Framework (IGIF): https://ggim.un.org/IGIF/

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, Republic of Korea and Canada with funds for the Empowering Woman in Hydrography project) with in-kind support from Member States and from industry. Particular attention has been focused on the e-Learning, in order to optimize the limited funds available and also allow increase in the participation to the educational and training programmes from the Member States. In that regard, the 2nd IHO Assembly approved the proposal from the Republic of Korea to establish an IHO e-Learning Center at the KHOA and the Capacity Building Sub-Committee established a Project Team to install the Center with the technical and financial support from Republic of Korea.

The level of activity of the IHO Capacity Building (CB) Programme was clearly affected by the COVID-19 pandemic in 2020 and 2021 showing in 2022 a restart of the activities but some activities still need to be carry on to 2023. Expenditure in the IHO 2022 CB Work Programme (CBWP) of the non-earmarked funds totalized 193,866 Euros in 2022, value that is significantly higher than the 15,657 Euros in 2021. Considering all activities, from the 1,317,414 euros of available funds the expenditures of the 2022 CBWP summed 889,138 Euros (67% of execution), also significantly higher than the 192,097 euros in 2021. Since in 2022 the execution of some CB activities still affected by the COVID-19 pandemic, Decision 9 of the CBSC20 meeting approved that the 2022CBWP funded activities not executed in 2022 can be moved to the 2023CBWP. The budget assigned to 2022 has benefited from the funds attributed by the IHO Secretariat, from the funds not used in CBWP2021 and also from additional funds made available by the Republic of Korea for capacity building activities for the Regional Commissions (the so-called non-earmarked activities)

One Director, one Assistant Director, one CB Assistant and some other members of the staff were directly engaged in supporting the CB programme.

Capacity Building Sub-Committee (CBSC)

The 20th meeting of the Capacity Building Sub-Committee (CBSC) was held in Denpasar, Bali, Indonesia, in a hybrid format from 1 to 3 June 2022, hosted by Pushidrosal, the Hydrographic and Oceanographic Centre of the Indonesian Navy.

The meeting was chaired by Mr Evert Flier (Norway) and attended by 50 registered participants 22 in person and 28 by VTC, from 23 Member States. The IHO Secretariat was represented by Director Luigi Sinapi and Assistant Director Leonel Manteigas in-person.

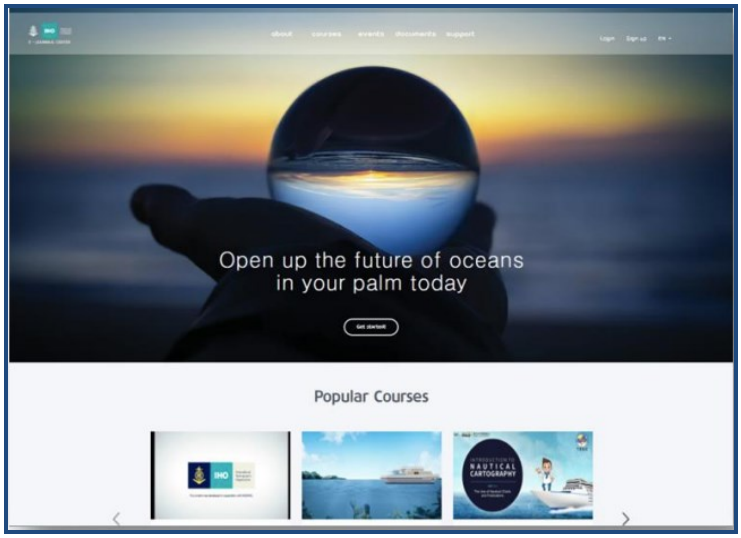
Vice Admiral Nurhidayat, Chief Hydrographer of Pushidrosal, welcomed the participants in Bali and highlighted the importance of this meeting considering that several Capacity Building programmes and activities such as training, Category A and B courses and technical visits in each RHC, were delayed in implementation for the past two years due to the outbreak of COVID-19. He informed the participants that this international event was strongly supported by the Indonesian Government in view of the relevance of the subject matter of the Committee. On behalf of the IHO Member States and IHO Secretariat, Director Luigi Sinapi expressed his gratitude to the Indonesian Navy and Pushidrosal for hosting such important IHO meeting, highlighting the resilience and ability of the CBSC members and Capacity Building regional coordinators to deal constructively with the challenges of the pandemic and the smooth running of the CB activities over the past two years.

Participants of CBSC-20

The Sub-Committee recognized that in 2022 the CB Fund received the regular contribution from the IHO budget (both regular annual contributions and eventual contributions from budget surplus) and donations made by governments, particularly from the Republic of Korea (ROK), Nippon Foundation and Canada. In 2022, ROK assured an additional contribution of 80K€ for the non-earmarked activities of the CBWP2022.

The CB finance situation could be more difficult in 2023 with the expected reduction of the non-earmarked funds, so it was recognized that it will be very important to share resources and projects and invest in the remote activities. The meeting discussed the 2023 CB Management Plan (CBMP). Considering the projects with the highest score after the evaluation process and the funding available, the projects to be funded were selected and the 2023CBWP was approved by the Sub-Committee. Discussion at CBSC20 highlighted the importance of engagement at the correct levels to build awareness of the importance of Hydrography. This supports the inclusion of Phase 0 into the IHO CB Strategy which focusses on the awareness of the importance to develop Hydrographic Governance. Engagement with the correct stakeholders, on a ministerial level, is vital for the successful delivery of Technical and High-Level Technical Visits and the recipients of Technical Visits are reminded that their assistance in identifying these stakeholders is critical.

The Sub-Committee noted the high number of courses sponsored by Nippon Foundation and Republic of Korea. The improvement in COVID-19 restrictions allowed the postponed 2020 - 12th course of the GEOMAC Project to be completed in 2022 with the next two courses (13th and 14th) scheduled to commence in August 2022 for completion in December 2022 held at the UKHO and sponsored by the Nippon Foundation. Furthermore the regular execution of the Category "A" Hydrographic Survey Program at USM, sponsored by ROK, and the Training for Trainers (TFT) project and a Category "B" Hydrographic Survey Program held at KHOA.



IHO e-Learning center website – http://elearning.iho.int

KHOA reported on the Capacity Building Management System (CBMS), which will be ready for the experimentation phase from 1 July 2022 for CB coordinators to test the system and report if they face difficulties until the end of the year.

During the first year of the Empowering Women in Hydrography (EWH) project, all the planned activities were successfully conducted: development of the EWH webpage, one internship on the outreach at the IHO Secretariat, three internships related with the review process of submitted programmes to the IBSC, the planning of three at-sea experiences made available by NOAA, the submission to the 'Call for Decade Actions No. 02/2021' as part of the United Nations Decade of Ocean Science for Sustainable Development, a webinar on Gender-balance and empowering leaders and women role-models interviews among women volunteers from all position in the hydrographic community. The success of the project requires other Member States to actively participate and to contribute above and beyond the initial funding from Canada. To understand what progress is made regarding gender diversity within the hydrographic community, it is necessary to identify the current status within Member States. It was therefore proposed to inquire the percentage of employees of Hydrographic Offices that are female and the percentage of women in leadership roles.

CBSC recognized that C-55 is an important external IHO document, used by IMO as source for the status of survey and cartography worldwide in supporting the IMSAS programme, and will also be a source of data in measuring the Strategic Performance Indicators (SPI) of the IHO Strategic Plan 2021-2026. A new C-55 Project Team has been established to focus on the content of C-55 to better reflect both the requirements for safety of navigation and the use of hydrographic data for non-navigational purposes. Once the content is agreed upon, the technical solution required to collect, manage and display this data will need to be developed in collaboration with the IHO Secretariat.

The CBSC adjusted the Capacity Building Strategy which is now aligned with IHO Strategic plan 2021-2026. The Strategy has been amended to include Phase 0 addressing hydrographic governance and the addition of a fifth step, Monitoring of Effectiveness (MoE), to the existing four steps of CB (Awareness, Assessment, Analysis and Action). CBSC will ask IRCC14 to approve and endorse the new strategy for adoption at the 3rd Session of the IHO Assembly.

The CBSC-20 meeting was the first in person gathering after two years of pandemic, offering opportunities to participants to debate and discuss in the margins. The participants unanimously applauded Pushidrosal for their hospitality and the excellent hosting arrangements.

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

The 12th Coordination Meeting of the IHO-ROK Programme Management Board (PMB12)

The meeting, comprising representatives from the Republic of Korea (ROK) and the IHO Secretariat and the Chair of Capacity Building Sub-Committee, and the representative from the University of Southern Mississippi (USM) as an observer, was held in accordance with the Memorandum of Understanding between the ROK and the IHO on Support for the IHO Capacity Building Programme on 11 February 2022 via VTC due to the COVID-19 pandemic.

The ROK confirmed its continuing support for the FIG/IHO/ICA recognized Category "A" Master of Science in Hydrographic Science Programme at the USM, USA, and selected two successful candidates. The PMB also agreed to hold the KHOA Category "B" Hydrography Programme for 10 in-person students in 2022, in Busan, ROK and to postpone the IHO-ROK Category "A" Alumni Workshop in the ROK to September 2023 which marks the 10th year of supporting students to attend the Programme.

IHO-NF GEOMAC Project

Originally started as Japan Capacity Building Project (2009-2013), and then the Cartography, Hydrography and Related Training (CHART) Project (2014-2019), now the Geospatial Marine Analysis and Cartography (GEOMAC) project (2020-2022) aims at providing education for young nautical cartographers with cutting-edge knowledge and it is funded from 2020 to 2022, thanks to the generous support from the Nippon Foundation of Japan. This capacity building project has connected the nautical cartography community, currently 119 fellows from 55 countries. The skill and knowledge of this community contributes to solving regional and global challenges beyond the SOLAS obligation.

The purpose of the GEOMAC Project is to provide appropriate education and training in Nautical Cartography for technical personnel in developing countries, to develop and enhance skills and knowledge in navigational chart production (ENC and paper charts). In addition, due to the rapid change of technology in Hydrography and Nautical Cartography, necessary competences, skills and knowledge for practitioners has been consistently upgraded and the curriculum, therefore, includes a cutting-edge module for Ocean mapping, other international cooperation projects and Marine Spatial Data Infrastructures (MSDI) as the realm of Nautical Cartographers.

This programme consists of eight modules and is conducted by the experienced instructors of the UKHO in Taunton (UK) and other institutions (Map the Gaps and Oceanwise Limited). This programme from the United Kingdom Hydrographic Office (UKHO) has been recognized by the FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) since 2014 and is the core of the project. Currently, seven participants join the programme every year. After completing this programme, participants will obtain the competencies to carry out nautical cartographic tasks at the Category "B" level.

In 2022, there were 3 programmes exceptionally due to the long-lasting pandemic. The 1st-year programme which was planned in 2020 was postponed and held from February to May 2022. And the 2nd-year programmed which was planned in 2021 was postponed and held from August to December 2022 in conjunction with the 3rd-year programme.

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.

Capacity Building Assessment

Technical and Advisory Visits

Execution of the technical and advisory visits executed in 2022 are summarized in the following table:

Nº	Activity	RHC/Org.	Implementation
	High Level Visit to Bolivia	IHO/SWAtHC	5-6 September 2022
A-01	Technical visit to Benin	EAtHC	Led by SHOM, France 28 January - 4 February 2022
A-08	High level and Technical Visit to Comoros	SAIHC	Led by SHOM, France 14 - 22 October 2022
A-12	High-level and Technical Visit to Senegal (former 2020 A-08 and 2021 A-05)	EAtHC	Led by SHOM, France 8 - 15 April 2022
A-16	Technical Visit to Bolivia (former 2020 A-02 and 2021 A-09)	SWAtHC	Led by DHN, Brazil 15-16 November 2022

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, UN-GGIM, IMO, IALA, the European Commission, funding agencies, academia and industry in general. Unfortunately, due to the COVID-19 pandemic, some of the planned courses, workshops and seminars were cancelled and carried on to 2022. This included visits to high level authorities in several countries, participation in RHC meetings, participation in various seminars and conferences.

Revise M-2 – The Need for National Hydrographic Services

The IHO Publication M-2 was updated in 2018 as Edition 3.0.7, and is being updated with the accession of the new Member States.

Technical workshops, seminars, short courses

Execution of the seminars, workshops and short courses planned for 2022 are summarized in the following table:

Nº	Events	RHC	Implementation
P-07	Bathymetric database management	SEPRHC	Led by INOCAR, Guayaquil, Ecuador 28/11/2022-02/12/2022
P-08	Workshop on MSDI Development & Implementation	MBSHC	Led by UNHO, combined with P42 05-09 December 2022 Istanbul, Turkey
P-34	Seminar on Raising Awareness of Hydrography (from 2021 P-12)	SWAtHC	Led by SHOMA, Montevideo, Uruguay 29 August 2022
P-35	Seminar on Raising Awareness of Hydrography (from 2021 P-13)	NIOHC	Led by UKHO, Bali, Indonesia 22 - 26 August 2022
P-36	Workshop on MSI implementation and development (from 2021 P-14)	SEPRHC	Led by CIOH, Cartagena de Indias, Colombia 26-30 September 2022
P-38	Raising Hydrographic Awareness (for SAIHC Associate and Non-Members) (from 2021 P-16)	SAIHC	Led by UKHO, Maputo, Mozambique 05 - 12 May 2022
P-39	Seminar on Raising Awareness of Hydrography (from 2021 P-17)	MACHC	Led by UKHO, St Louis, Missouri 28/11/2022-02/12/2022
P-40	Port and Shallow Water Survey Course (from 2021 P-18)	SWAtHC	Led by DHN, Rio de Janeiro, Brazil 10-14 October 2022
P-41	Hydrographic Data Managements to Support Disaster Relief (from 2021 P-19)	EAHC	Led by China MSA, hybrid (Shanghai,online) 25-28 October 2022
P-42	Workshop on Cartographic Data Management (from 2021 P-21)	MBSHC	Led by UNHO, combined with P08 05-09 December 2022 Istanbul, Turkey
P-44	MSI & MSDI Regional Seminar (former 2020 P05 and 2021 P-32)	EAtHC	Led by SHOM, Mindelo Cabo Verde 26-30 September 2022

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 2022:

IHO Member States	Non IHO Member States
Angola	Antigua and Barbuda
Brazil	Bahamas
Cameroon	Barbados
Colombia	Belize
Cyprus	Benin
Denmark	Cabo Verde
Dominican Republic	Comoros
France	Congo
Germany	Côte d'Ivoire
Guyana	Djibouti
Iran	Equatorial Guinea
Ireland	Gabon
Jamaica	Grenada
Latvia	Guinea
Lebanon	Guinea Bissau
Mauritius	Lithuania
Monaco	Madagascar
Morocco	Mauritania
Netherlands	Panama
Norway	Saint Kitts & Nevis
Poland	Saint Lucia
Portugal	Saint Vincent & the Grenadines
Republic of Korea	Sao Tome & Principe
South Africa	Senegal
Spain	Togo
Suriname	
Sweden	
Trinidad and Tobago	
United Kingdom of Great Britain and Northern Ireland	

Maritime Safety Information

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

The Joint meeting between the World Meteorological Organization (WMO) Advisory Group on the Worldwide Met-Ocean Information and Warning Service (WWMIWS) Sub-Committee (AG-WWMIWS-SubC) and the International Hydrographic Organization (IHO) World-Wide Navigational Warning Service Sub-Committee (WWNWS) was held on 12, 13 and 16 September 2022 at WMO Headquarters, Geneva, Switzerland. This meeting brought together the METAREA and NAVAREA communities with 80 participants, mostly in person. Representatives from the International Maritime Organization (IMO), International Mobile Satellite Organization (IMSO) and Satellite Communication companies attended as well. The joint session was chaired by Ms Justyna Wodziczko (Vice-Chair AG-WWMIWS-SubC, Norway) and Mr Christopher Janus (Chair WWNWS, United States). The IHO Secretariat was represented by Assistant Director Sam Harper.

During the joint sessions of the meeting, various areas of mutual interest to NAVAREA and METAREA communities were discussed. Key outputs included:

- Improved understanding of roles and responsibilities, particularly towards providing services and assistance to coastal states within their own MET/NAV Area;
- Consideration of the need to have contingency plans and awareness of METAREA and NAVAREA working together in country, and as well, working with neighbouring ones;
- Progress the revision of the Joint IMO/IHO/WMO Manual on Maritime Safety Information;
- Focus on emergency response responsibilities (e.g. in response to volcanic hazards) inlight of the multiple hazards that ships at sea can face on a voyage;
- Identified gaps and need for establishing the framework for the recognition and operational implementation of future services in the Global Maritime Distress and Safety System (GMDSS) for the provision of maritime safety information (MSI).

The Sub-Committee received Maritime Safety Information (MSI) self-assessment reports from 19 NAVAREAs, the Baltic Sea Sub-Area and a national report from China. A recurring theme was the status of implementation of the Iridium SafteyCast System, which a number of NAVAREAs are still working towards. It was noted that a key outcome of MSC105 was that the use of all Recognised Mobile Satellite Services (RMSS) is now mandatory. The IMO made it clear that if any member state was experiencing issues with the implementation of SafetyCast, regardless of the nature of the issue, they should contact the IMO to discuss what support could be provided.

The IMO provided a brief overview of the IMO Global Integrated Shipping Information System (GISIS) GMDSS Master Plan, focusing on Annexes 7 & 8. He noted it was an IMO Member State (MS) decision to consolidate information digitally, and the GISIS was the implementation of this decision. He reminded all on the obligations resulting from signing the International Convention for the Safety of Life at Sea (SOLAS convention) and the obligation to share the information on the structures and systems established to fulfil these obligations, which included keeping the information up to date.

The outcomes from the 20th meeting of the Document Review Working Group were discussed. The final draft of the revised joint IMO/IHO/WMO manual on Maritime Safety Information was a significant focus of the meeting ahead of its planned submission to NCSR10 in 2023. The Sub-Committee approved the draft text and onward submission.

Briefings on the activities of the IMO NAVTEX and the IMO Enhanced Group Call (EGC) Coordinating panels were provided by their respective chairs as well as developments in the provision of mobile satellite GMDSS services from Inmarsat and Iridium.

The meeting also received a progress report on the development of the S-124 Product Specification on Navigational Warnings from the Chair of the S-124 Project Team. He noted provided an update on the proposed schedule to complete Ed.1.0.0, with the intention to submit to HSSC15.

The IMO EGC Coordinating Panel Chair provided a comprehensive presentation report on the activities of the Panel, including details of the report to NCSR 9 and items requested to be addressed by NCSR 8, with details of ongoing activities.

Inmarsat gave an update on the Inmarsat SafetyNET and SafetyNET II Services, including a brief on the system and its history. A view of future developments, especially within the L-Band satellite constellation was provided along with an explanation of how FleetSafety integrates with other systems such as RescueNET. Some of the limitations with the original SafetyNET system were explored together with a comparison to SafetyNET II, highlighting the improvements and extra functionality such as the development of the API.

Iridium provided a presentation on Iridium SafetyCast service, its usage by shipping and the implementation progress. It was noted that the service had been fully operational since December 2020 and the operational state across the NAV and MET Area communities was reviewed. The offer of assistance in implementing the service was reiterated.

The sessions considered progress reports on the delivery of MSI training courses, and discussed the processes for reporting the status of MSI provision at Regional Hydrographic Commission meetings and methods for identifying to the Capacity Building Sub-Committee the regions and coastal States most in need of training and assistance. Two comprehensive briefs were provided covering e-learning MSI training courses developed by NAVAREA VII and NAVAREAs IV-XII.

Members of the WWNWS14 Meeting

Ocean Mapping Programme

Due to the ongoing disruption caused by the COVID-19 pandemic, the normal GEBCO meeting schedule was adjusted to accommodate travel restrictions and to progress work items. As a result the Annual Subcommittee Meetings, Map the Gaps Symposium and the 38th GEBCO Guiding Committee meeting (which would ordinarily be held concurrently) were held separately. Given the number of new office holders and the time elapsed since a physical meeting had been held, there was a strong desire to hold GGC38 as a hybrid event, allowing for those who were able to meet in person. This resulted in GGC38 being deferred until April 2022, with a virtual intersession meeting held in February to allow core business items to be progressed. Given it is the intention to return to the normal meeting schedule for 2022 onwards, GGC39 was scheduled for October 2022, with the plan to return to a single set of annual meetings for 2023. This summary provides an update on the

key activities of the GEBCO Guiding Committee (GGC38 and GGC39), its sub-ordinate bodies and projects.

Summary of meeting dates and locations held in 2022:

- GGC Intersession Meeting 01 2022: 2 Feb 22 (VTC)
- GGC38: 20 – 22 Apr 22 (IHO, Monaco – Hybrid)
- TSCOM: 26 Oct 22 (Southampton, UK – Hybrid)
- SCRUM: 26 Oct 22 (Southampton, UK – Hybrid)
- SCOPE:26 Oct 22 (Southampton, UK – Hybrid)
- SCET: 26 Oct 22 (Southampton, UK – Hybrid)
- 2022 Map the Gaps Symposium: 27 – 28 Oct 22 (Southampton, UK - Hybrid)
- GGC39: 31 Oct – 1 Nov 22 (Southampton, UK – Hybrid)
- SCUFN: 28 Nov – 2 Dec 22 (IHO Secretariat, Monaco)

The IHO Secretariat was represented at the annual meetings by Director Luigi Sinapi, Assistant Director Sam Harper (Secretary) and Public Relations and Communications Officer Sarah Jones-Couture.

Personnel Changes. During 2022, a number office holders reached the end of their tenures. These, together with their replacements are summarised as:

Position	Incoming	Outgoing	Tenure
IHO appointed GGC member	Dr Geoffroy Lamarche	Mr Sam Harper	2021-2026
IHO appointed GGC member	Ms Yerinelys Santos Barrera	Capt. Rodrigo Obino	2022-2027
IOC Appointed GGC member	Mr Paul Brett	Dr Martin Jakobsson	2021-2026
Chair TSCOM	Mr George Spoelstra	Dr Thierry Schmitt	2022-2025
Vice-Chair TSCOM	Ms Federica Foglini	Ms Caitlyn Raines	2022-2025
Chair SCRUM	Ms Aileen Bohan	Dr Vicki Ferrini	2022-2025
Vice-Chair SCRUM	Cdr Hugo Montoro	Ms Aileen Bohan	2022-2025
Chair SCOPE	Mr Tim Kearns	*	2022-2025
Vice-Chair SCOPE	Dr Eunmi Chang	*	2019-2022

*Following the resignation of the SCOPE Chair, one of the two Co Vice-Chairs, Dr Eunmi Chang assumed the role of Acting Chair, whilst the other Co Vice-Chair, Mr Tim Kearns assumed the role of sole Vice-Chair. Mr Tim Kearns was subsequently elected to the Chair position, starting a new term with Dr Eunmi Chang stepping down as acting Chair and reassuming her role as Vice-Chair.

GEBCO Guiding Committee (GGC). The GGC met twice in 2022 under the Chairmanship of Mr Evert Flier. A key focus of the GGC in 2022 was to review GEBCO's governance and to develop a dedicated strategy to guide activity to 2030 and beyond. Both of these activities had become especially important given the growing visibility of the Nippon Foundation-GEBCO Seabed 2030 Project (SB2030). Both of these work items were commissioned at GG38 for delivery in 2023. During GGC39, a strategy workshop was held facilitate the input from GGC members. Another key

piece of work was the development of a GEBCO Code of Conduct; initially commissioned in 2021, the final document in the form of a 'Çharter' was delivered to and endorsed by GGC39.

SCUFN. SCUFN currently has two IOC appointed membership vacancies following the automatic resignation of post of Capt Alekseev after more than two years of non-participation and the pending resignation of the current Chair Dr Hyun-Chul Han at the next meeting. IOC has issued a call for replacement SCUFN members. It is expected that the current Vice Chair will assume Chair responsibilities commencing at SCUFN36 in 2023.

SCUFN has received 343 new and deferred proposals of which 140 have been accepted, 36 not accepted, 32 pending, 117 deferred, 17 withdrawn and 1 adopted. The SCUFN Secretary has been extremely proactive in requesting all proposers that have had their naming proposals accepted to provide the associated data to the DCDB.

One of the key enduring challenges for SCUFN is increasing pressure from some parties for political statements by observers and formal interventions via diplomatic channels. This activity is putting SCUFN members under undue pressure as well as affecting the output of the group.

TSCOM. Given the change of leadership in TSCOM, the group has undertaken an initial review of stakeholder requirements to ensure that work items can be prioritized appropriately. In parallel, the group has expressed a desire to grow the membership/participation to give better geographical representation and a broader spectrum of stakeholders.

Key work areas have included the provision of feedback and review on SRTM15+, the continued work of the Metadata Working Group including the support to the IHO CSBWG, the work of the Cookbook Editorial Board and the work of the GEBCO Website Working Group. TSCOM continues to collaborate extensively with the IHO DCDB team, with a number of virtual workshops and DCDB industry day planned for 2023.

A new Working Group on Opportunistic Mapping Resources has been created under the leadership of Erin Heffron. The aim of the working group is develop, test and deliver resources that promote the acquisition of seabed data by the seafloor mapping community in areas identified as gaps in the current coverage. In pursuing this work, significant engagement with the Nippon Foundation GEBCO Seabed 2030 Project (SB2030) team and other GEBCO Sub-Committees has been undertaken to avoid any duplication of effort.

New and emerging activities include work on an Undersea Feature Detection tool, validation of bathy data from Deep Argo Float activity, the development of variable-resolution grids and improved interaction with the Seabed 2030 team.

SCRUM. Key activities for SCRUM has been the update of the SCRUM pages on the GEBCO website and the development of outreach materials. SCRUM participates in the GEBCO Web Page Working Group meetings. New content has been added to the SCRUM YouTube channel from regional engagement efforts undertaken over the year. Materials were developed and disseminated for use at regional IHO and IOC meetings covering GEBCO, and other regional engagement opportunities; coordinated participation in regional IHO and IOC meetings has resulted in 11 out of 12 Regional Hydrographic Commission meetings having dedicated GEBCO/Seabed2030 presentations. SCRUM has worked closely with members of the IHO CSBWG to identify SB2030/CSB coordinators for RHCs and to coordinate participation at RHC meetings. To date, coordinators have been identified for 13 RHCs and 3 still to be determined.

The GEBCO 2022 Grid included new regional data submissions assembled by the Seabed 2030 Regional and Global Data Assembly and Coordination Centers (RDACCs and GDACC). SCRUM members contributed to the review of the draft product using a web application in advance of its release. Modifications were made to the web application for gathering input to help guide and prioritise future mapping activities, and this was posted on the SCRUM web page. The committee discussed the relevance of this application and felt it was a good way to solicit input from the broad community, but questioned whether or not it is being used. If it is to be continued SCRUM members have input on additional features that could be added, but feel that further development should only be undertaken if this information is actually being used.

SCOPE. A key focus for SCOPE in 2022 has been delivery of the Map the Gaps Symposium, held at the National Oceanography Centre (NOC), Southampton, UK. This in person event was well attended and successfully delivered despite having to change location midway through due to a fire in a nearby building.

Other activities have included the planning for a GEBCO wide communication strategy, further refinements to the GEBCO website, development of an update GEBCO world map, and development of education materials. The group have also undertaken work on updating B-10 *The History of GEBCO* and producing a new large format GEBCO map in time for the 120th Anniversary.

SCET. At IRCC14, the GGC proposed the creation of a new GEBCO Sub-Committee on Education and Training (SCET), which was endorsed. The aim of SCET is to develop and coordinate the education and training strategy of the GEBCO Programme. In addition, SCET aims to raise awareness amongst academic institutions of gaps in education and training that may impact on the progress and development of ocean mapping and in particular, the objectives of the GEBCO Programme. SCET presented their initial Work Plan to GGC39 which largely focused on a gap analysis of training and education requirement.

Seabed 2030. The Seabed 2030 project continues to act as an accelerator for data identification and ingestion into the GEBCO Grid. Good progress has been made with the release of the 2022 GEBCO grid representing improved total coverage of 23.4% - and increase of 2.8% from the 2021 grid which represents an area the size of Europe or Sahara Desert. The Seabed 2030 Project is organised into five discrete work packages which are listed below:

- Work Package 1 – Data
- Work Package 2 – Process Improvements
- Work Package 3 – Innovation
- Work Package 4 – Mapping Activities
- Work Package 5 – Management

The Nippon Foundation – GEBCO Training Programme. The program is in its 19th year having supported 107 scholars, from 43 countries with their studies at UNH. COVID-19 has significantly disrupted the program in 2020, 2021 and 2022 with international travel restrictions and lockdowns at the University of New Hampshire. Through a combination of online remote teaching and flexibility of scheduling the course has been able to continue, albeit with a different experience for some of the students.

The in person participants of GGC39

SCUFN

At the end of their previous virtual meeting in November 2021 (SCUFN34 VTC03) SCUFN agreed to arrange the 35th meeting of the IHO-IOC GEBCO Sub-Committee on Undersea Feature Names (SCUFN) in 2022, due to the backlog of proposals and the uncertainties with regard to the possibility of having the next meeting early 2022 in St. Petersburg, Russian Federation, exceptionally into two parts:

-Part 1 – hosted by the Intergovernmental Oceanographic Commission of UNESCO (IOC), at their headquarters in Paris (hybrid format), from 14 to 18 March 2022;

-Part 2 – hosted by the IHO Secretariat in Monaco (in-person format), from 28 November to 2 December 2022.

The meetings were chaired by Dr Hyun-Chul Han (IOC Representative) from the Korean Institute of Geoscience and Mineral Resources (KIGAM – Republic of Korea). Assistant Director Yves Guillam (SCUFN Secretary) represented the IHO Secretariat. Technical support for running the meetings was provided by the IHO staff (Mr Rémy Roquefort)[21], and the Project Officer (Mr Insung Park) seconded to the IHO by the Republic of Korea.

-Part 1 was attended by about 51 registered participants (18 in-person), with 10 SCUFN Members out of 12 (5 in-person). Observers, and subject matter experts from, Brazil, China, India, Indonesia, Japan, Malaysia, New Zealand, Philippines, Republic of Korea, United States of America, Viet Nam, Marine Regions (also Chair of the S-130 Project Team) and Mr Toshihiko Chiba from the Marine Policy and Regional Coordination Section of the IOC also participated in this Part 1.

-Part 2 was attended by about 24 registered participants, with 8 SCUFN Members out of 12 and observers or subject matter experts from China, Türkiye, Japan, Philippines, United States of America, and Viet Nam, the US Advisory Committee on Undersea Feature Names (ACUF) and Marine Region.

SCUFN had a significant number of naming proposals to consider in 2022. Most of them were pending proposals from previous meetings, which were re-submitted after correction or the provision of complementary data and information. Reaching a total number of 334, and in chronological order of reception by the Secretariat, the breakdown of these proposals was: Indonesia (10), USA (88)[22], Philippines (12+9), Germany (15), Republic of Korea (1), China (11+23+60), New Zealand (9), Viet Nam (67), Malaysia (11), Japan (14), and Brazil (4).

With a majority of naming proposals of features located in the South China Sea (SCS), both meetings were affected by strong statements from the representatives of the Coastal States, claiming priority for naming features within the limits of their EEZ, and ECS… most of these limits being disputed by others. The participants were reminded by the Secretary that in accordance with clause I.A of B-6, the international recognition of naming proposals by SCUFN was legitimate as long as the features were located *outside the external limits of the territorial sea*.

Since 2014, many naming proposals, although technically reviewed and accepted by SCUFN in general, have therefore been kept as "*pending*" in application of the clause D.III in Publication B-6[23] by which proposers are invited to engage in *mutual consultation* for features located *in mutual areas of interest*. It turned out that there was at least an implicit consensus by the interested parties not to apply this clause since it is not applicable when limits are precisely disputed. These *pending* proposals are stored for two years only in the SCUFN archive and the GEBCO Gazetteer database, then *deleted* if the issue is not solved. In other words, all efforts for improving marine knowledge and GEBCO products are wiped out!

[21] For one day in Paris.

[22] From Caladan Oceanic.

[23] Standardization of Undersea Feature Names – Guidelines.

Unsolved PENDING names in the GEBCO Gazetteer for the South China Sea?
Not anymore

As a consequence, some participants suggested to apply the SCUFN Rule of Procedure 2.10 (ROP 2.10) for the SCS (undersea feature name proposals that are politically sensitive are not considered). SCUFN agreed that it was a radical option that would simplify SCUFN work for sure, but would certainly flag the full SCS as a "no-go" area for feature naming, creating a precedence in the future for some other disputed areas in the world.

In order to avoid this side effect, and after considerable discussions during Part 1, a vote (secret ballot) on the applicability of ROP 2.10 was arranged[24] and SCUFN Members voted almost unanimously for going ahead with the technical review of the naming proposals located in the SCS.

Most of the proposals were accepted from a technical point of view, but also challenged by a coastal State requesting the application of clause I.D of B-6, since they had already named them (principle of anteriority). Since it was unclear whether these names were already recognized by the scientific community, a sub-group was set up at Part 1 to clarify the criteria by which this principle of anteriority should be used (peer-review international scientific publications for instance). The setting up of this sub-group, supported by approved TORs, was not completed at the start of Part 2, since the members did not reach a consensus in the drafting process of the TORs.

To avoid a second postponement of final decisions affecting all the pre-technically-accepted names made at Part 1, SCUFN agreed at the beginning of Part 2:

- -on the main objective of the meeting, being the resumption of the entire backlog, otherwise it would not be possible to accept new proposals in 2023 and onwards;
- -on the decision-making process, which was in good spirit, to only use the Rules of Procedure and Guidelines in force at the beginning of the meeting, providing the acceptance of their intrinsic uncertainties.

Despite numerous statements again, a consensus based on the principle of equal treatment of the proposals wherever the feature is located was reached to move forward.

Out of 334 proposals, 263 names were finally ACCEPTED[25] , thanks also to the work achieved by correspondence by SCUFN Members and the Secretariat, between Part 1 and Part 2. Some were rejected for technical reasons and very few still require some mutual consultation due to conflicting naming proposals affecting the same feature: for these cases, in a good will spirit, SCUFN suggested to the proposers to submit a joint proposal at the next meeting.

[24] In application of SCUFN ROP 2.9.

[25] And/or APPROVED for those names already pre-ACCEPTED in March 2022 at Part 1.

Despite this substantial progress this does not mean that the road is clear for future proposals. One participant argued that the implicit principle “first come-first served basis” provided a privilege to the nations and organizations who support the activities of their SCUFN Members as they know before all, what and where is submitted for being reviewed. The Secretary reported on the procedure to inform the coastal States who are listed with a “*” in the SCUFN List of Naming Authorities maintained by the Secretariat on the SCUFN webpage. He also invited SCUFN Members not to encourage implicitly and unconsciously some sort of surveying-undersea feature naming *race*, as the consequences for SCUFN would become totally unmanageable.

SCUFN also made significant progress on some internal corporate matters and dilemma (future of the *Cookbook on Generic Terms*, *Repository of Typical Cases* for decision-making, horizontal strategy for naming features and bathymetric grid resolution, open initial discussion on the possible wave(s) of naming proposals and their impact on SCUFN when automated feature detection tools become robust, naming strategies and minor features, spelling or generic term identified errors in already-named features and their propagation in scientific publications in the future if not modified by SCUFN,…). The work by correspondence was also regulated (no silence procedure, ROP 2.9 applies).

At the end, the Chair thanked Dr Marie-Françoise Lalancette (IHO branch) for her contribution and welcomed the incoming Members (Dr Oke Dwiyana and Dr Hyun Suk Lee). The Vice-Chair and Secretary thanked Dr Han, stepping down from his Chair position, for his long commitment and expertise in SCUFN since 2009 and his outstanding achievements as Chair since 2018. The Chair thanked the IHO staff for their excellent support and hospitality during the week, including for the antigenic self-tests. Dr Ohara, Vice-Chair, will be Acting Chair until the SCUFN-36 meeting included in 2023. The Acting Chair thanked Australia for their offer to host the next meeting in November 2023.

Participants in SCUFN-35, Part 1

Participants in SCUFN-35, Part 2

Conduct meetings of the Crowdsourced Bathymetry Working Group (CSBWG)

The working group held its 12th meeting (virtual), from 7-10 March 2022, hosted by the IHO Secretariat in Monaco. The meeting was led by the Chair and Vice-Chair and attended by over 55 participants from 15 member states (Canada, China, Denmark, Georgia, Germany, India, Lebanon, Mexico, New Zealand, Norway, Portugal, South Africa, Suriname, United Kingdom and the United States) as well as representatives from 26 industry and academic bodies. IHO Director Luigi Sinapi and Assistant Director Sam Harper (Secretary) represented the IHO Secretariat.

The focus of CSBWG12 was to further progress the work on finishing the new edition of B-12 ahead of submission to IRCC, but time was given to receive updates on CSB project and coordination activities.

Revision of IHO Publication B-12. The B-12 drafting team lead deliberations section by section, in an effort to gather final consensus on the text and work through any remaining issues. Key areas that were discussed related to issues of data quality, feedback for contributors and getting the level of the guidance right for the intended non-technical audience. Ultimately, consensus was achieved. Following a final editorial review by the Chair team post meeting, the CSBWG agreed to put B-12 to the WG for endorsement before submission to IRCC14.

Report to IRCC13 and update on CSB related activities. The 55 participants reviewed and approved the report of the 11th CSBWG meeting and received a general progress brief from the Chair, including a recap of her report to IRCC13. This was followed by a broad range of updates on Current CSB related activities. Briefings were received from the DCDB, CIRM and the NOAA Assist Service, FarSounder on technology development, The Great Barrier Reef project, SeaID on Data Logger development plans and SevenCs.

Engagement with Regional Hydrographic Commissions. A series of briefings were provided by the CSB-GEBCO-Seabed 2030 Regional Coordinators present at the meeting including updates on activity for the SAIHC, SWPHC, ARHC, NSHC, BSHC and EAHC. It was reaffirmed by the working group that these roles would provide the key conduit for communicating relevant information to the Regional Hydrographic Commissions. It was noted that similar activity should be explored through the network of IOC regional centres.

Formalisation/Certification of Trusted Nodes. The Great Lakes Observing System (GLOS) reported that they had just established a Trusted Node. In doing so they had considered what could be done to elevate or formalize this status. Initial ideas centred on specific TN Branding, a public register and the concept of having TNs for specific regions or sectors. The Chair led a discussion where the merits of the idea were noted but it was also considered there could be unintended consequences of over formalizing the process or raising the bar to entry for potential TNs. The group acknowledged that the idea merited further conversation and it was noted as a topic for future meetings.

Review of Terms of Reference and Strategic Planning. Noting the completion of the work on updating B-12, it was agreed to revisit any updates required to the ToRs at CSBWG13 when the focus would be strategy and the group will have a better idea of priorities going forward.

Some of the 55 participants connected for the CSBWG12 remote meeting.

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. Significant work has been undertaken to improve the searching, viewing and accessibility of the DCDB data, further work is planned to enhance the viewer functions as well as data discovery and accessibility. Under the auspices of the CSB data ingest pipeline, work has been undertaken on the pre-approval system that allows caveats provided by Member States (MS) to be taken into consideration; this masked data is sorted separately and remains inaccessible until such time as permission to release it has been received.

The IHO and NOAA have been working on a revised MoU to represent the support provided in hosting and running the DCDB. It is intended that this MoU will be completed during 2023.

B-6 - Standardization of undersea feature names

Edition 4.2.0 of Publication B-6 on the Standardization of Undersea Feature Names entered into force in October 2019. This publication provides guidelines for naming features, a naming proposal form and a list of generic terms with definitions with significant clarifications and improvements compared to the previous Edition that was issued in 2013. Work is currently underway to update this publication with a decision as to whether this will be by way of a Revision or new Edition to be decided.

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), NOAA), is maintained by the IHO Secretariat through contract support to the former SCUFN Secretary. This will not last for ever. In order to improve the IHO Secretariat's capacity to deal with such issues, a training of IHO Secretariat's personnel on the use of the Gazetteer for database maintenance, took place on 2nd and 4th March 2022 at the IHO Secretariat's premises in Monaco. Two officers from the IHO Secretariat were involved in this training. The programme of the training sessions is as follows:

1. General presentation (a. Specific Term, b. Generic Term, c. Proposer, d. Discoverer, e. Associated Meeting, f. Origin of Name, g. Additional Information, h. Physical characteristics: Min Depth, Max Depth, Total Relief, Dimensions, i. Geometries: Point, Line, Polygon, Multi Points/Lines/Polygons)

2. Status of names **(**EDIT, PENDING, READY, APPROVED, DELETED)

3. Uploading information from new name proposals

4. Uploading geometries in SHP format

5. Entering geometries provided as series of Lat-Long (use of WKT converter)

6. Standardizing the presentation of texts

7. Managing the administration pages (a. Privileged Users: Editors or Administrators, b. Meetings, c. Contacts, d. Generic Terms)

8. Exporting UFN data

In the light of the training sessions, a number of improvements to the Gazetteer application were identified. They are summarized in Annex B. All improvements have been implemented in the new version 4.3.7 of the Gazetteer that was deployed in August 2022 with success.

The GEBCO Gazetteer database itself was updated in accordance with the final decisions made at the three video-teleconferences SCUFN meeting held in 2021 (SCUFN34/VTC01, VTC02, and VTOC03) as well as at the hybrid meeting held in March 2022 (SCUFN35.1).

The IHO SCUFN Digital Archive development as part of the SCUFN Operations Web Services (developed by KHOA) progressed well. The two main functionalities are:

1. User function (Archive list inquiry according to the number of meetings by year, Search function by using meta information, Provide Document viewer / Download function, Provides shortcut function for important documents such as Report, Decision and Action, Basic Documents
2. Administrator function (Provide function of archive management, Registration and modify the Document number and meta information, Upload/modify/delete/download file,Register/modify/delete attachments such as hyperlinks and photos other than document files).

A review of the User functionalities in the current version of the SCUFN OWS Digital Archives component, revealed significant progress in this development and very good adequacy of the functions performed with the above plan and, more generally, with the user's expectations. Some improvements are under consideration.

B-9 - GEBCO Digital Atlas

Traditionally IHO publication B-9 - *GEBCO Digital Atlas* (GDA) has been released as 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. However, the modern incarnation of the Digital Atlas is a series of data layers that are held in the DCDB, and downloadable from the GEBCO Website. At the 39th meeting of the GEBCO Guiding Committee, a decision was taken to recommend the withdrawal of B-9, and replace it with the equivalent datasets. The issue will be discussed at IRCC15 where a decision will be made as to the future of the formal B-9 publication.

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 is undergoing a complete overhaul under the leadership of the new Editor in Chief, Ms Christie Reiser of NOAA. It is the intention that the new edition will be published as an eBook to improve access and the user experience

Contribute to outreach and education about ocean mapping

The Sub-Committee on Communications, Outreach and Public Engagement (SCOPE) has continued to deliver a range of outreach activities in line with its annual work plan. A key feature of this is the annual GEBCO 'Map the Gaps' symposium which was held alongside GGC39, hosted by the National Oceanographic Centre (NOC) in Southampton, UK. Other outreach activities are planned for 2023, however much work has been paused whilst the new GEBCO Strategy is being developed. Finally, an updated GEBCO World Map and a revision of B-10 – *History of GEBCO* – to mark the 120 years of GEBCO in 2023 are being worked upon for release in 2023.

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.

During 2022 work has continued to enhance the GEBCO website, which has included the transfer from the DCDB of the IBC mapping pages and the GEBCO community contact email list. Further work is planned to integrate the individual Sub-Committee pages into the main website to provide a single harmonised window into the GEBCO Project.

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 36 Member States and thirteen

Expert Contributors participated in this activity during the period of this report. The IRCC strongly encouraged RHCs to promote MSDI and to explore the potential of the MSDIs.

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

The 13th Meeting of the IHO Marine Spatial Data Infrastructures Working Group (MSDIWG) took place in a hybrid format from 9 to 13 of May 2022 in Singapore, and was organized by the Maritime and Port Authority of Singapore. The meeting was chaired by Mr Jens Peter Weiss Hartmann (Denmark). The MSDIWG 13 meeting was a joint meeting with the Open Geospatial Consortium (OGC) and the UN-GGIM Working Group on Marine Geospatial Information (WG-MGI). 52 delegates from 26 Member States (Australia, Brazil, Brunei Darussalam, Canada, China, Colombia, Denmark, Egypt, Germany, Greece, India, Indonesia, Italy, Netherlands, New Zealand, Nigeria, Norway, Oman, Portugal, Republic of Korea, Romania, Singapore, Spain, Thailand, United Kingdom and United States) and 17 representatives of observer organizations and industry members attended the meeting, in total 70 participants with 22 attending in-person. Assistant Director Leonel Manteigas represented the IHO Secretariat in person.

From 10 to 12 May 2022, the International Seminar on United Nations Global Geospatial Information Management, with the theme “Effective and Integrated Marine Geospatial Information” took place. The seminar was arranged and hosted by the Maritime and Port Authority of Singapore with the intention to provide a forum for deliberating key considerations for integrated marine geospatial information within a data ecosystem for effective policies, decisions, programmes and projects to achieve national development priorities and the 2030 Agenda for Sustainable Development.

Participants of the MSDIWG13

Being a joint meeting, it was opened by the Chair of the MSDIWG Mr Jens Peter Hartmann, Mr Rafael Ponce Co-Chair of the OGC Marine Domain Working Group and Dr John Nyberg Co-Chair of the UN Working Group on Marine Geospatial Information. All expressed their satisfaction to attend the meeting in-person, and thanked the Maritime and Port Authority (MPA) of Singapore for the organization of the meeting. Mr Thai Low, Chief Hydrographer of Singapore MPA, expressed his pleasure to host the meeting in Singapore and thanked all participants for attending.

New members since the last MSDIWG meeting were welcomed, namely PP Chakraborty (India), Nicola Pizzeghello (Italy), Telmo Dias (Portugal) and Yidda Handal (Honduras) as an observer.

The meeting reviewed the Actions from the last meeting and the outcomes from C-5, IRCC13 and HSSC13. The IRCC Chair invited the MSDIWG to apply ISO 9001 Principles in its work plan, and to discuss how the MSDIWG can liaise with the other relevant IHO subordinate bodies, concluding that it would be necessary to develop a strategy to increase such liaison.

The meeting received the national reports on the status of MSDI and Maritime Spatial Plans (MSP) from USA, Denmark, Portugal, United Kingdom, Singapore, Republic of Korea and Indonesia. In relation with the regions, regional reports were presented from the Baltic Sea and North Sea Hydrographic Commissions, the Arctic Hydrographic Commission, the Eastern Atlantic Hydrographic Commission and the South-West Pacific Hydrographic Commission.

The Seabed 2030 Director enhanced the progress on the coverage of seabed mapping, moved from the 6% at the beginning of the project (in 2017), to the actual 20.6% (June 2021), having almost 4/5 of the seabed still to be mapped. He reported on the latest improvements of the Regional Centres, the development of the statistics routines, the scripts and grids as well as the refinement of the App for data visualization. He also mentioned the Tech Strategy White Paper in preparation, the Grid Stats improvements, and the refined/demo new-generation CSB loggers, describing the most recent mapping activities.

The IHO Data Centre for Digital Bathymetry (DCDB) reported on a data pipeline that allows the public to contribute, discover and download CSB data via a web-based map viewer interface. The importance to respond to IHO CL 11/2019 was highlighted, but the legal problem that several HOs are facing to share their data, was recognized. It was decided that MSDIWG and UNGGIM WG MGI should work together to identify common use-cases for bathymetry data residing in DCDB and Seabed 2030.

The IHO E-Learning Center's main goal is to support the IHO community with e-Learning opportunities and to increase the capacity building activities with its implementation. Four courses are already available in the Center. In 2022 it is intended to proceed with the test phase. The Learning Management System (LMS) was presented and it is expected to have four different kinds of courses, namely Open, Regular, Certified and Special. The system allows to have different languages for the same course in terms of sounds and subtitles. The MSDIWG was asked to test the MSDI training material available at the IHO E-Learning Center.

The IHO-Singapore Innovation and Technology Laboratory was officially launched on 26 October 2021 in Singapore. The Lab developed some improvements to facilitate the presentation of proposals. The future work programme includes 2 projects: S-57 to S-101 conversion and S-131 on marine harbour infrastructure database. A future potential project will be to create a test-bed S-100 ECDIS capable of displaying S-101 and S-102 datasets.

The meeting was informed on the IGIF-MSDI Maturity Roadmap. It is a project involving the IHO, OGC and World Bank, which intends to provide guidance for those within governmental departments or agencies that are actively planning MSDI implementation. The methodology and contribution from each organization, as well as the pathway and balance between governance and technology, were presented. It was also summarized to whom the project is addressed and why it is necessary. The design is based on the World Bank IGIF methodology with the IHO and OGC contribution and aims to have a language that can be understood by non-technical people.

OGC explained its actual priorities, which are the data discovery, land and sea integration, technology solutions, and then authenticity and provenance. The interoperability and use of standards for maximum re-use are considered very important. The IHO/OGC Recipe Book for use cases was mentioned.

The meeting was informed on the OGC Federated MSDI Baltic use case phase related to "Marine Protected Areas" from an MSDI perspective, the examination of S-122 for broader use cases, the S-122 encoded MPA data via OGC API (Application Programming Interface), and then a better interoperability between IHO and OGC. The question was raised whether the S-122 product specification needs enhancement or if a MSP product specification that includes MPAs with other elements would be necessary. The OGC API Model was explained, as well as that the use of API changes the model bringing authenticity and identifying provenance, data aggregation, data exchange, etc. The OGC update on IGIF-H (Hydro) was mentioned, as well as the need to have a simplification of its content. It was decided that OGC will provide guidelines or a "Recipe Book" and showcase(s) for Hydrographic Offices to implement OGC APIs. An OGC API - Feature Link will be made available in the Body of Knowledge, and OGC will share the links to the latest OGC APIs for dissemination within the MSDIWG.

The FAIR (Findable, Accessible, Interoperable, Re-usable) data principles were discussed, and the different ways on how they can be used to develop a check list for the Member States were described. OGC will propose a FAIR Principles checklist in the next joint meeting. The meeting discussed also on the best way to have common definitions, and OGC will lead this work involving some MSDIWG Members.

The UN GGIM MGI presented the outcomes of the seminar that will be a part of the UN GGIM MGI minutes. More information related to the seminar and respective documents can be found at: https://ggim.un.org/meetings/2022/3rd-WG-MGI.

The draft document IGIF-H - Operational Framework for Integrated Marine Geospatial Information Management was presented. The meeting was divided into groups to discuss the chapters of the strategic pathway of IGIF-H and to provide contributions to be shared with all participants for further contributions.

The need to update Publication C-17 and align it to other IHO publications and UN-GGIM IGIF Water and IGIF-H was discussed. The new C-17 should also refer to other useful information such as the training material, Body of Knowledge, OGC Concept Development study, IHO Strategic Plan and it should include also sections on the FAIR principles and S-100. It was also agreed that the format of the new C-17 should be easy to be updated and maintained. On this regards, a C-17 drafting group was established to provide a first version of the new C-17 by the next meeting.

The meeting received a presentation on the future geospatial information ecosystem and marine digital Twins which "is a virtual representation of an object or system that spans its lifecycle, is updated from real-time data, and uses simulation, machine learning and reasoning to help decision-making". The MSDIWG will work together with OGC on how this topic can be approached. The EU Digital twin of the ocean was mentioned, as well as the pdf document published to explain "what is it" and how it works and who can benefit from it. The meeting decided that the MSDIWG will investigate the role of MSDI in Maritime Digital Twin, how to proceed and the possibility to establish a pilot project together with the IHO-Singapore Innovation and Technology Laboratory. An input paper is planned to be provided at MSDIWG14.

The WENDWG reported on the work to produce a Product Matrix-Test that will provide metrics related to S-101 and potentially other products, to be shared with RHCs. The Product Matrix-Test is in an early phase and it is based on a questionnaire that will provide information on which stage of implementation the product is. Each area will have a score and in the end the Matrix will compute an overall score related with the product implementation. When the metrics are mature, the WENDWG will provide them to MSDIWG for contributions.

The meeting also discussed the IHO Strategic Plan and the SPI 2.1.1 - "Build a portal to support and promote regional and international cooperation in marine spatial data infrastructures (MSDI)". Some examples of contents were provided based on the available information such as C-55, S-122, and information available from the INToGIS, etc. Use of this content will require a minimum of resources and can be relatively easy to be implemented by the IHO Secretariat. Since this will reproduce some of the catalogues available in the IHO website, it was suggested by some members to create a data HUB network. MSDIWG decided that the first step will be to build an IHO MSDI Portal with the available data, and then to evaluate the possibility, challenges and resources necessary to create a data HUB network and then to discuss in a future workshop. On the IHO MSDI Portal, a questionnaire will be prepared to be sent to the MS by the IHO Secretariat.

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 45th meeting of the IBSC was held in the Instituto Hidrográfico de la Marina (IHM), Cádiz, Spain, in a Hybrid Format due to the COVID-19 pandemic, from 28 March to 8 April 2022. It was chaired by Mr Ron Furness (Australia, ICA) and attended by all ten Members of the Board, five in-person and five by VTC. IHO Assistant Director Leonel Manteigas (IBSC Secretary) represented the IHO Secretariat. IHO Director Luigi Sinapi did an intervention on the second day of the meeting to welcome the Members, enhanced their commitment to proceed the work of the Board in these

difficult times, highlighting the importance of the Board for the education of the Hydrographers and Nautical Cartographers.

IHO Director Luigi Sinapi, Board Members and the interns of the EWH project at the IBSC45.

In accordance with the Joint IHO-Canada Empowering Women in Hydrography Project (EWH), in the first week of the meeting, three interns of the EWH-IBSC internship participated in-person at the IBSC45 meeting. All the interns work in institutions with IBSC recognized programmes. During the Internship, they received some training in the submissions' review process and provided a presentation to the Board on the respective findings. The level of their participation in the discussions of the Board related with the submissions was intense, providing relevant contributions that proved the important impact of this project to an eventual collaboration in a future submission preparation from the respective institutions. The Board appreciated the presence and the collaboration of the interns and invited them to also provide comments on the Guidelines in order to have an opinion from an external perspective. They provided a presentation on this topic, highlighting several recommendations and comments. After this successful project, the Members stated their interest in having other internships in the next meetings.

The IBSC Members with the Vice-Director of the IHM and the Director of the School and the interns of the EWH project at the IBSC45

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On the afternoon of 6 April, the Board was invited to visit the Instituto Hidrográfico de la Marina and was received by the Director and his staff.

The Hybrid format increased the level of challenge of the meeting, as normally the Board meets for more than 7 hours per day. Due to the Hybrid format and the different time zones of the participants (Board members and delegates of submitting institutions), the daily duration of the meeting and the related discussions were reduced to 5 hours of plenary meeting, with some additional hours of work done by the respective in-person and VTC groups.

During the meeting the Board assessed 13 applications for recognition of hydrographic (9) and cartographic (1) programmes and (3) schemes of individual competency recognition received from 9 Countries. Two of the submitted schemes were not recognized before. Out of the 13 submissions, 3 were "Recognized", 7 "Could be recognized" receiving conditions to meet and 3 were "Not recognized". However, in the effort to allow more programs to be recognized, in addition to the 7 submissions with conditions to be recognized, the Board offered to the 3 non-recognized submissions the possibility to submit new versions intersessionally.

During the meeting it was also necessary to discuss and approve other important working items such as the Board Work Programme and establish a list of priority Institutions to be visited when the situation allows. Due to the need to increase the number of members of the Board, the IBSC will propose to IRCC a new version of the Terms of Reference to include two additional members from ICA.

The IBSC Members present in Cádiz with the Director of the IHM and his staff

IHO-EU Network Working Group (IENWG) - EC-IHO11 meeting – 10th Anniversary of the MoU between the European Commission and the IHO

The event celebrating the "Tenth Anniversary of the Memorandum of Understanding between the European Commission and the International Hydrographic Organization (IHO)" was held on 6 May 2022 at the headquarters of the European Union's DG Mare in Brussels (Belgium).

The event was chaired by the Director of SHOM, Ingénieur General Laurent Kerleguer and attended by Mr Virginijus Sinkevičius, European Commissioner for Environment, Oceans and Fisheries, representatives of various Directorates General of the European Union (EU) and IHO representatives of twelve European Hydrographic Offices (Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Netherland, Norway, Poland, Portugal, Romania, Sweden). Director Luigi Sinapi represented the IHO Secretariat.

The event was opened by the respective speeches of Commissioner Sinkevičius and Director Sinapi, who underlined the results achieved in 10 years of intense cooperation between the two

Organizations, thanks to the commitment of the European Hydrographic Offices and the IHO-EU Network Working Group (IENWG). The IENWG was activated for the implementation of the MoU between the European Commission and IHO and for identifying EU activities and processes on matters of interest to Hydrographic Offices and the value of the EU initiatives in the field of Hydrography.

"The hydrography community has the ability and know-how to develop a coherent plan for ensuring safe navigation. But if we want to use the data to inform and shape other policies, such as coastal protection or spatial planning, we need a conversation with those who need this information. With other communities observing the ocean for fisheries management, for environmental monitoring and for offshore licensing", Commissioner Sinkevičius said to seal the cooperation between the two institutions. "It is important to continue in the wake of the existent MoU, have a look at the future and work to update the MoU on the basis of the new challenging endeavours in favour of the Ocean and a renovated beneficial reciprocity between the EU and the IHO", Director Sinapi said to underline the importance of initiatives such as the MoU, in the context of a renewed regional and global interest for the Ocean.

European Commissioner for Environment, Oceans and Fisheries, Mr Virginijus Sinkevičius and IHO Director Luigi Sinapi at the meeting, and for the signing of the commemorative poster for the 10th Anniversary of the signature of the IHO-EU MoU.

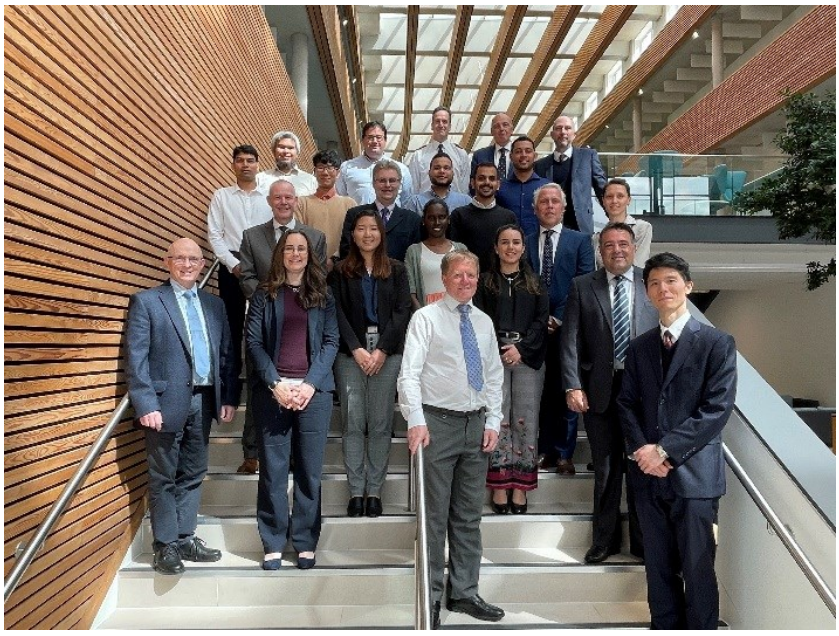
The opening of the event concluded with the signing of a commemorative poster of the first 10 years of the signature of the MoU between the European Commission and IHO, and the intention to continue the activities of common interest for sustainable development of the seas of interest to the European Union.

The meeting continued with the interventions of the representatives of the European Hydrographic Offices and of the different Directorates General of the European Union, through presentations focused on the ongoing and future projects of the European Union on EMODNET bathymetry, Coastal mapping, and the EU Directives on Maritime Spatial Planning, Ocean Observation, Marine Strategy Framework, and Sustainable Mobility. IHO initiatives on the new Universal Data Model S-100 and the increase of use of data and products from the IHO and Hydrographic Offices were presented as well.

Liaison Visit to the 12th Course of the IHO-Nippon Foundation GEOMAC Project, United Kingdom Hydrographic Office, Taunton, UK

IHO Director Luigi Sinapi, Assistant Director Leonel Manteigas and Project Officer Kazufumi Matsumoto visited the United Kingdom Hydrographic Office (UKHO) on 4 May 2022 to meet and brief the trainees attending the 12th course of the IHO - Nippon Foundation GEOMAC (Geospatial Marine Analysis and Cartography) project. The project, funded by the Nippon Foundation of Japan, provides training in marine cartography and data assessment, which is recognized by the FIG-IHO-ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) as Cartography Category "B" course. The course was hosted by the UKHO and is composed of six modules, each module varying from one to three weeks in length. The 12th course ran from 7 February 2022 to 27 May 2022 and was attended by trainees from Colombia, Dominican Republic, Guyana, Indonesia, Malta, Romania and Uruguay.

The Team of the IHO Secretariat discussed various topics with the trainees. In response, the trainees 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 and the relevant fields. Director Sinapi delivered a presentation highlighting the roles of IHO, importance of hydrography, the recent relevant topics around hydrography and capacity building activities. The impact of the CHART/GEOMAC project was also described and presented in detail by Project Officer Matsumoto. The trainees were encouraged to keep in touch with each other and to maintain alumni network and relationships after they return to their home countries.



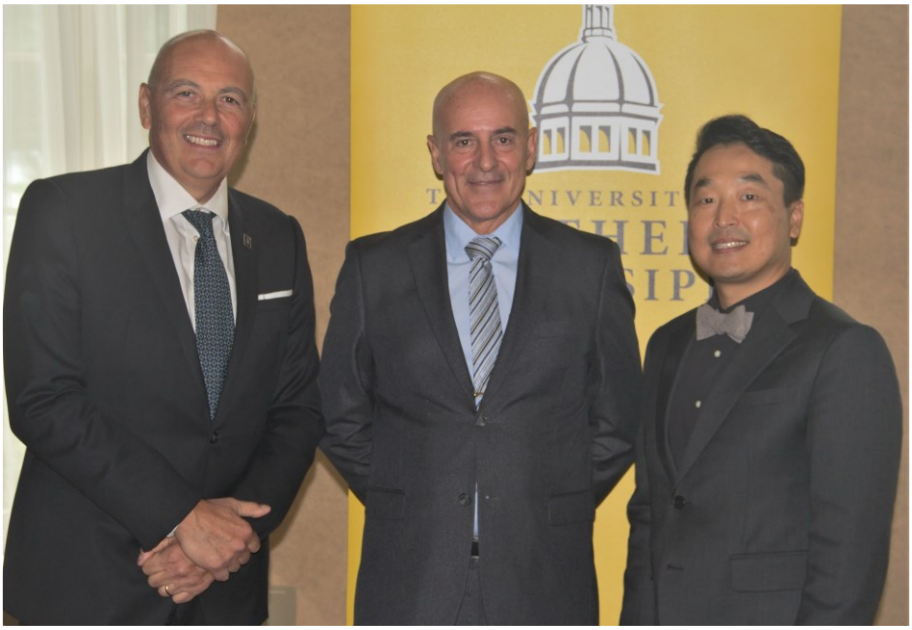
The trainers and trainees of the 12th GEOMAC Course with the IHO visiting Team.

Visit to the USM Hydrographic Science Research Center and the Graduation Ceremony of the Category "A" Master of Science in Hydrographic Science at the University of Southern Mississippi, USA, 28 to 29 July 2022

The Graduation Ceremony of the Category "A" Master of Science in Hydrographic Science and Category "B" Bachelor of Science in Marine Science (Hydrography) was held at the University of Southern Mississippi (USM), USA on 29 July 2022. Three students from Bangladesh, Philippines, and Thailand graduated from the Category "A" Master of Science in Hydrographic Science Programme under the IHO-Republic of Korea (ROK) Programme of Technical Cooperation.

Participants at the graduation ceremony at USM

The ceremony was hosted by USM President, Dr Joseph S. Paul. Seven students graduated from the M.S. in Hydrographic Science this year, including three supported by the IHO-ROK Programme and one by the U.S. Navy. Three students graduated from the B.S. in Marine Science. 2 representatives from sponsoring countries (Mr Sangkil Lee, Counselor of ROK Embassy in the U.S. and Mr Matt Borbash, Deputy Hydrographer of U.S. Navy) attended the ceremony. The IHO Secretariat was represented by Director Luigi Sinapi in person after three years of absence due to the pandemic.



IHO Director Luigi Sinapi, USM Coordinator Alberto P. Costa Neves and ROK Counselor Sangkil Lee

Since 2000, the USM has been organizing the Category "A" Master of Science course in Hydrographic Science, recognized by the IBSC (FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers). The IHO-ROK Technical Cooperation Programme under the Memorandum of Understanding between the IHO and ROK commenced with supporting students to attend the course from 2013 to contribute to the IHO Capacity Building Programme. The number of successful graduate students from the programme totals 20, including those from the 2021-2022 academic year, from 12 IHO Member States (Bahrain, Bangladesh, Estonia, Jamaica, Malaysia, Mauritius, Mexico, Nigeria, Philippines, Romania, Thailand and Tunisia).

The President of USM congratulated the graduates and introduced the programme while underlining the increasing demand for competent and highly qualified hydrographers in many fields such as government agencies and industry. IHO Director Luigi Sinapi thanked the USM and the Republic of Korea for this successful program since the 2013-14 academic year, highlighting the importance of the role of the graduates occupying prominent positions within and outside the International Hydrographic Community, at national, regional and international level, and stressed the successful international collaboration between the IHO, ROK and USM. Counsellor Mr Lee from the ROK Embassy to the U.S.A. echoed the significance of collaboration of the three organizations behind the Category A programme at the USM and pledged continued support for the Capacity Building programme on behalf of Mr Byeon, Director General of Korea Hydrographic and Oceanographic Agency (KHOA). Mr Borbash, Deputy Hydrographer of U.S. Navy presented the 'Hydrographer of the Navy Education Award' to Mr Marlon E. Estropia (Philippines), one of the IHO-ROK scholars, as Mr Estropia had shown outstanding performance during the 2021-22 academic year.

Mr Estropia (Philippines) with the "Hydrographer of the Navy Education Award"

The ceremony was preceded by a visit to the Stennis Space Center, Mississippi, on 28 July 2022, where the U.S. Naval Meteorology and Oceanographic Command, the USM School of Ocean Science and Engineering and the USM Hydrographic Science Research Center are situated. The visiting group included IHO Director Luigi Sinapi and Counselor Mr Lee, Republic of Korea. During the visit to U.S. Naval Meteorology and Oceanographic Command, the representatives participated in various information sharing exercises targeting familiarization of operational capabilities within naval oceanography and hydrography. The IHO's visit reaffirmed a partnership with the U.S. Navy spanning over 100-years, contributing to safe navigation of seas and oceans through oceanographic and hydrographic research.

Visit to U.S. Naval Meteorology and Oceanographic Command

At the USM facilities, representatives from the IHO, the Republic of Korea and the USM discussed how academic institutions could participate and contribute to IHO-led initiatives, such as the Joint IHO-Singapore Research and Innovation Laboratory, Seabed 2030, crowd-sourced bathymetry and satellite-derived bathymetry.

29th PRIMAR Advisory Committee (PAC29) meeting and Meeting at the Croatian Hydrographic Office (HHI) on 10th November 2022 - Split, Croatia 8-10 November 2022

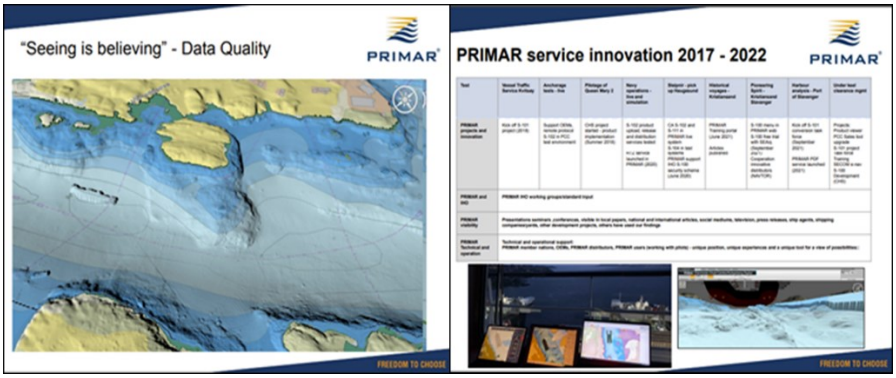
The 29th PRIMAR Advisory Committee (PAC29) meeting was held in Split, Croatia from 8 to 9 November 2022, at the Hydrographic Office of Croatia (HHI) in a hybrid format. The meeting was chaired by Ms Vinka Kolic (Croatia) and attended by 37 registered participants, 28 in person and 9 by VTC. Thirteen PRIMAR Member States were represented, as well as the representatives of PRIMAR RENC. The IHO Secretariat was represented by Director Luigi Sinapi.

Participants at PAC29 at the entrance of the Croatian HO

The agenda of the meeting was mainly focused on the actions to be put in place related to the implementation of the IHO S-100 Implementation Roadmap. Particular attention was given to Capacity Building for PRIMAR members in the activities of conversion from S-57 to S-101 format and vice-versa. PRIMAR stated that this is of fundamental importance to the RENC and is ready to support IHO's Capacity Building programme in the specific area of the new S-100 standard. In this regard, the function of Hydrographic Offices is fundamental to ensure the transition to the new Standard, and the training activity for HOs will be extended to all those S-1xx products foreseen as "First Step" products in the IHO S-100 Implementation Roadmap.

PRIMAR's support for HOs will also focus on the process of transition to S-100 Edition 5.0.0 including the upgrade of the IHO Scheme Administrator application, the regular ENC production compliant with S-101 Edition 1.2.0, as well as the S-128, as an additional navigational aid product and the catalogue of products to provide a machine readable way to verify the up-to-dateness of the data in ECDIS data producers. Besides, PRIMAR will provide Dual-Fuel S-57/S-101 test services to support IHO in promoting the S-100 Implementation Roadmap.

During the discussion on the new PRIMAR Strategic Plan, aligned with the IHO Strategic Plan, it was assured that PRIMAR will provide CATZOC values to the IHO Secretariat for measuring *SPI 1.2.2 - Percentage of navigationally significant areas for which the adequacy of hydrographic knowledge is assessed through the use of appropriate quality indicators*, unless contrary positions are taken by PRIMAR Member States, and similar to what has already been implemented by IC-ENC. Furthermore, at the joint proposal of the Swedish representative/Chair of the HSSC and the IHO Director, PRIMAR proposed as an action the drafting of a Memorandum of Understanding (MoU) between PRIMAR and the IHO Secretariat on the support that the RENCs can provide in the field of S-100 Products/Services development within the IHO S-100 Implementation Roadmap as well as in Capacity Building for IHO Member States. The proposal immediately met with the approval of the PRIMAR Member States representatives present at the meeting. A similar proposal could be extended to the other RENC, IC-ENC, in order to have uniformity of approach by the IHO and the RENCs.



PRIMAR services 2017-2022

On 10 November 2022, a meeting was held, at the initiative of the Croatian Hydrographic Office (HHI), at the HHI between the Croatian Ministry of the Sea, Infrastructure and Transport, the HHI, the IHO Secretariat and the European and Croatian Maritime Pilots' Associations (EMPA and CMPA), with the aim of raising awareness of the importance of the S-100 Universal Hydrographic Data Model and its related products, as well as the importance of fully involving end-users, such as the Maritime Pilots' Associations, in the test-bed phase of such products. The IHO Director and the National Hydrographer of Croatia gave presentations on S-100 and the importance of the new products for the safety of navigation, as well as on the need to involve, from the outset, the organizations and associations of end-users in the testing phase before moving on to the implementation phase of the new S-1xx products.

The meeting culminated with the signing of an agreement between the HHI and the CMPA to initiate a test-bed phase in Croatian port waters of the new S-1xx products, addressing S-101 and S-102 as a priority. On the side-lines of the meeting, a discussion between the Chairman of EMPA Captain Erik Dalege, Germany, and the IHO Director on the option of a future Memorandum of Understanding (MoU) between the IHO and IMPA (International Maritime Pilots' Association) on the experimentation and test-bed of the S-1xx products, within the framework of the S-100 Implementation Strategy (2021-2030) should be noted.

Participants at the meeting of 10 November 2022 and signature of the MoU between HHI and CMPA

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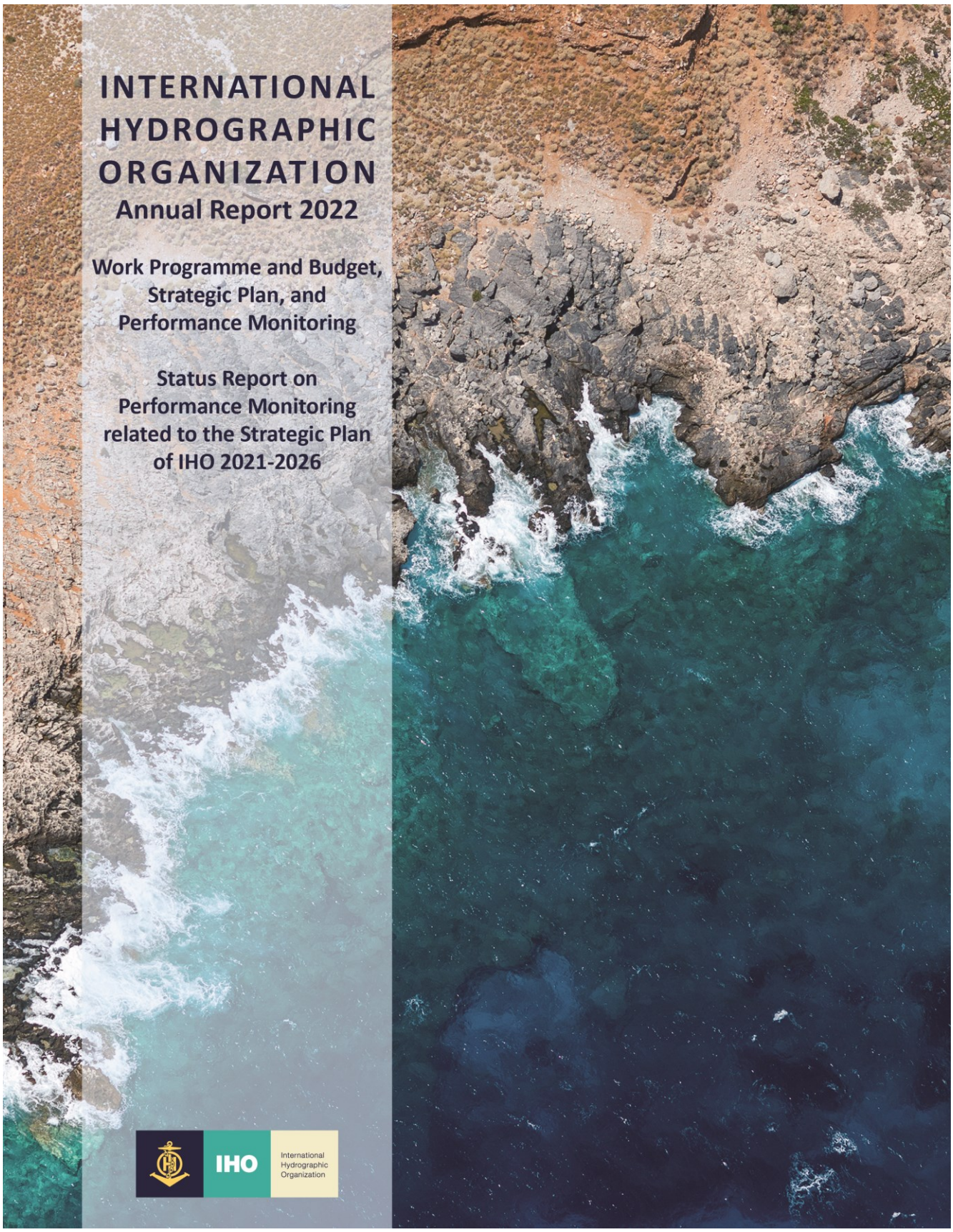
New and Revised IHO Publications

The following new IHO publications or revised editions were issued during 2022 and are available from the IHO website.

DATE	ANNOUNCED VIA CL	TITLE
21/09/2022	CL38/2022	Adoption of amendments to IHO Resolutions 7/1919, 1/1987, 1/2007 and 2/2012
14/10/2022	CL39/2022	Adoption of Publications S-57, S-58 and S-99
19/10/2022	CL40/2022	Adoption of edition 2.1.0 of IHO Publication S-102 - Bathymetric Surface Product Specification
24/10/2022	CL41/2022	Adoption of Edition 6.1.0 of S-44 – IHO Standards for Hydrographic Surveys and Edition 3.0.0 of B-12 – Guidance for crowdsourced bathymetry
12/12/2022	CL45/2022	Adoption of edition 5.0.0 of IHO Publication S-100 – Universal Hydrographic Data Model

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


INTERNATIONAL
HYDROGRAPHIC
ORGANIZATION
Annual Report 2022
Work Programme and Budget, Strategic Plan, and Performance Monitoring
Status Report on Performance Monitoring related to the Strategic Plan of IHO 2021-2026
IHO
International Hydrographic Organization

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Background

The IHO Strategic Plan 2021 – 2026 comprises four sections:

I **Preamble** – introduction to the IHO, its vision, mission, and objects. The wording is drawn from the Convention on the IHO.

II **Challenges** – overview of the strategic context within which the IHO and Member States operate now and will operate in the near future and how this may impact activities.

III **Goals** – targets for 2026 and Strategic Performance Indicators.

IV **Implementation Framework** – briefly outlines how the plan is enacted and how progress with respect to the plan is reviewed and monitored.

To face the challenges described under section II, the plan is structured through three overarching goals, focusing the exercise of its mission during this period. Under the three goals, the Organization has identified targets to be reached by 2026.

The Strategic Plan is design to focus on three most relevant goals to be addressed in the two trienniums but is not a comprehensive description of the full scope of IHO activities, which is fully covered in its Work Programme. Therefore the second Assembly also endorsed the alignment of the 2021 and three-year IHO Work Programme 2021-2023 with the Strategic Plan, while keeping the current structure of the Work Programme to facilitate the operational work and implementation by the Secretariat.

Progress monitoring
Success in achieving the Strategic Goals and Targets is measured by Strategic Performance Indicators (SPIs). The Council determines the method for calculating the performance indicators. The alignment of those indicators to the relevant elements of IHO´s Work Programme demonstrates the interrelation between ambitions of the Strategic Plan, the Work Programme and the Secretariat´s operational work.

Council oversees the implementation of the strategic goals and targets
The 2nd Assembly instructed the Council to monitor closely the appropriateness and applicability of the proposed SPI and amend them if necessary. In doing so, the application of the SPIs was allocated to the Secretary-General for Work Programme 1, the Hydrographic Standards & Service Committee (HSSC) for Work Programme 2 and the Interregional Coordination Committee (IRCC) for Work Programme 3 respectively.

In view of the overarching importance of the Strategic Plan to achieve the goals and targets of the Organization, the Council measures the effective implementation of the Strategic Plan through annual review of the SPI reported for the three Work Programmes, by keeping in mind to apply the principles of ISO 9001 as an important theme of the Council activities for the intersessional period towards the third Assembly in 2023.

IHO bodies striving to measure success
The fifth meeting of the Council in October 2021 was the first opportunity to reflect over the implementation of the goals and targets of the Strategic Plan 2021-2026 since its inception. The Secretary-General and the Chairs of HSSC and IRCC reported about their experimentations with the assigned SPIs in particular for meeting Goals 2 and 3.

The Council approved the suggestion to measure the notable activities under Work Programme 1 in four categories as SPIs.

- Global outreach
- Regional outreach
- Stakeholder's specific outreach
- Consultations

With the IRCC dedicated workshop on SPIs (April 2022) followed by the approval at IRCC-14 of the SPIs' definitions and metrics, the IHO established in 2022 the conditions to fully monitor the implementation of the Strategic Plan through 15 SPIs. Most of the SPIs are processed by the IHO Secretariat itself with data kindly provided by Member States, WGs, RHCs and RENCs. The metrics of a couple of SPIs are still under consideration.

GOAL 1 Evolving the hydrographic support for safety and efficiency of maritime navigation, undergoing profound transformation.

On-going transformation in navigation, such as e-navigation, autonomous shipping, reduction of emissions, lead to profound evolution of hydrographic services, in a context of high demands for digital data.

Targets supporting Goal 1

- Deliver standards for hydrographic data and specifications of hydrographic products; support their regular production; and coordinate regional and global services for their provision.
- Develop standards, specifications and guidelines in the areas of data assurance, including cyber security and data quality assessment.
- Use capacity building and training to develop and increase the ability of Member States to support safety and efficiency of maritime navigation.

Strategic Performance Indicators validating the targets supporting Goal 1

SP 1.1.1 Percentage of Member States having operationalized production and distribution of hydrographic data products and services based on IHO Universal Hydrographic Data Model (S-100), under an implementation framework of coordination and agreed timelines.

SP 1.1.2 Number of hydrographic data products and services based on Universal Hydrographic Data Model that cater for the new requirements: autonomous shipping, reduction of emissions.

SP 1.2.1 Percentage of hydrographic data products and services based on S-100 model that are covered by IHO standards, specifications and guidelines on cyber security.

SP 1.2.2 Percentage of navigationally significant areas (e.g. charted traffic separation schemes, anchorages, channels) for which the adequacy of the hydrographic knowledge is assessed through the use of appropriate quality indicators.

SP 1.3.1 Ability and capability of Member States to meet the requirements and delivery phases of the S100 implementation plan.

Strategic Performance Indicators for Goal 1

Work Programme Tasks related to SPI 1.1.1 and 1.1.2

1.1 Co-operation with International Organizations and participation in relevant meetings
1.4 Work Programme & Budget, Strategic Plan and Performance Monitoring
2.1 Programme Coordination
2.2 Foundational Nautical Cartography Framework
2.3 S-100 Framework
2.4 S-57 Framework
2.5 Support the implementation of e-navigation and Marine Spatial Data Infrastructures (MSDI)
3.4 Coordination of Global Surveying and Charting Coverage
3.5 Maritime Safety Information

SPI 1.1.1	Metrics	Member States distribute at least one product based on S-100.						
	2021	0%	2022	2023	2024	2025	2026	60%[2]
	2022		0%	2023	2024	2025	2026	60%[2]
SPI 1.1.2	Metrics	Product Specifications should be operational (e.g. Edition 2.0.0 approved by Member States.)						
	2021	0	2022	2023	2024	2025	2026	10[3]
	2022		0	2023	2024	2025	2026	10[3]

Work Programme Tasks related to SPI 1.2.1 and 1.2.2

1.1 Co-operation with International Organizations and participation in relevant meetings
1.4 Work Programme & Budget, Strategic Plan and Performance Monitoring
2.1 Programme Coordination
2.2 Foundational Nautical Cartography Framework
2.3 S-100 Framework
2.4 S-57 Framework
2.5 Support the implementation of e-navigation and Marine Spatial Data Infrastructures (MSDI)
2.6 Hydrographic Surveying
2.8 Other technical standards, specifications, guidelines and tools
3.4 Coordination of Global Surveying and Charting Coverage
3.5 Maritime Safety Information

SPI 1.2.1	Metrics	10 Product Specifications (same as in SPI 1.1.2) includes cyber security and data quality assessment.						
	2021	0	2022	2023	2024	2025	2026	10[4]
	2022		0	2023	2024	2025	2026	10[4]

SPI 1.2.2	Metrics	Methodology to measure based on CATZOC evaluation under development.						
	2021	/	2022	2023	2024	2025	2026	100%
		% Surface CATZOC/ENC						
	2022 A-USCHC		83.3%	2023	2024	2025	2026	
	2022 B-MACHC		96.1%	2023	2024	2025	2026	
	2022 C1-SWAtHC		99.4%	2023	2024	2025	2026	
	2022 C2-SEPRHC		86.9%	2023	2024	2025	2026	
	2022 D-NSHC		99.5%	2023	2024	2025	2026	
	2022 E-BSHC		92.8%	2023	2024	2025	2026	
	2022 F-MBSHC		88.6%	2023	2024	2025	2026	
	2022 G-EAtHC		80.0%	2023	2024	2025	2026	
	2022 H-SAIHC		93.3%	2023	2024	2025	2026	

[2]Based on 64 of 94 IHO Member States produce S-57 ENCs
[3]They are: S-101, S-102, S-104, S-111, S-122, S-124, S-127, S-128, S-129, S-131
[4]They are: S-101, S-102, S-104, S-111, S-122, S-124, S-127, S-128, S-129, S-131

Work Programme Tasks related to SPI 1.2.1 and 1.2.2

	2022 I-RSAHC	68.2%	2023	2024	2025	2026
	2022 J-NIOHC	68.3%	2023	2024	2025	2026
	2022 K-EAHC	51.4%	2023	2024	2025	2026
	2022 L-SWPHC	98.5%	2023	2024	2025	2026
	2022 M-HCA	79.0%	2023	2024	2025	2026
	2022 N-ARCH	18.0%	2023	2024	2025	2026

Work Programme Tasks related to SPI 1.3.1

1.4 Work Programme & Budget, Strategic Plan and Performance Monitoring

3.2 Regional Hydrographic Commissions and the HCA

3.3 Capacity Building

SPI 1.3.1[1]	Metrics	Ability and capability of Member States to meet the requirements and delivery phases of the S100 implementation plan. Filled IGIF template provided by WEND WG[2]. Figures are "yes/partially/no" per each RHC. Target 50%.						
	2021	/	2022	2023	2024	2025	2026	50%
	2022		Yes	2023	2024	2025	2026	?

[1]The SPI measures the ability and capability to meet the requirements, not the production itself.
[2]WEND WG to provide the template

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GOAL 2 Increasing the use of hydrographic data for the benefit of society.

The ever-growing applications of marine data entails that IHO takes a more prominent role in cultivating the use of hydrographic data through cooperative and collaborative efforts and identifying the need for collecting more data.

Targets supporting Goal 2

- Build a portal to support and promote regional and international cooperation in marine spatial data infrastructures (MSDI).
- Promote new tools and methods to accelerate and increase coverage, consistency, quality of surveys in poorly surveyed areas.
- Apply UN shared guiding principles for geospatial information management in order to ensure interoperability and extended use of hydrographic data in combination with other marine-related data.

Strategic Performance Indicators validating the targets supporting Goal 2

SP 2.1.1 Number of hits downloading data/information from the portal.

SP 2.2.1 Percentage of adequately surveyed area per coastal state.

SP 2.2.2 Number of new applications of the new version of Standards for Hydrographic Surveys (S-44).

SP 2.3.1 Number of HOs reporting success applying the principles in their national contexts.

Strategic Performance Indicators for Goal 2

Work Programme Tasks related to SPI 2.1.1

1.4 Work Programme & Budget, Strategic Plan and Performance Monitoring

3.3 Capacity Building

3.7 Marine Spatial Data Infrastructures

SPI 2.1.1	Metrics	Portal in design phase, download counting technology to be implemented.				
	2021	/	2022	2023	2024	2025	2026
		Number of hits downloading data/information from the portal				
	2022	461	2023	2024	2025	2026

Work Programme Tasks related to SPI 2.2.1 and 2.2.2

1.4 Work Programme & Budget, Strategic Plan and Performance Monitoring

2.6 Hydrographic Surveying

2.8 Other technical standards, specifications, guidelines and tools

3.2 Regional Hydrographic Commissions and the HCA

3.3 Capacity Building

3.4 Coordination of Global Surveying and Charting Coverage

3.6 Ocean Mapping Programme

3.8 International Standards for Hydrographic Surveyors and Nautical Cartographers

SPI 2.2.1	Metrics	Technology to generate percentage figures from C-55 under discussion.					
	2021	See C-55	2022	2023	2024	2025	2026
		Percentage of adequately surveyed area per coastal state					
		Number of Coastal States within the percentage band of adequate surveyed areas (C55)					
	2022 0%<= area< 25%, depth <200m	69	2023	2024	2025	2026	
	2022 0%<= area< 25%, depth >200m	82	2023	2024	2025	2026	
	2022 25%<= area< 50%, depth <200m	25	2023	2024	2025	2026	
	2022 25%<= area< 50%, depth >200m	20	2023	2024	2025	2026	

Work Programme Tasks related to SPI 2.2.1 and 2.2.2

	2022 50%<= area< 75%, depth <200m	20	2023	2024	2025	2026
	2022 50%<= area< 75%, depth >200m	17	2023	2024	2025	2026
	2022 75%<= area< =100%, depth <200m	34	2023	2024	2025	2026
	2022 75%<= area< =100%, depth >200m	21	2023	2024	2025	2026
		Number of RHCs within the percentage band of area mapped (GEBCO)				
	2022 0%<= area< 25%, depth <200m	18	2023	2024	2025	2026
	2022 0%<= area< 25%, depth >200m	12	2023	2024	2025	2026
	2022 25%<= area< 50%, depth <200m	1	2023	2024	2025	2026
	2022 25%<= area< 50%, depth >200m	7	2023	2024	2025	2026
	2022 50%<= area< 75%, depth <200m	0	2023	2024	2025	2026
	2022 50%<= area< 75%, depth >200m	0	2023	2024	2025	2026
	2022 75%<= area< =100%, depth <200m	0	2023	2024	2025	2026
	2022 75%<= area< =100%, depth >200m	0	2023	2024	2025	2026

SPI 2.2.2	Metrics	Number of downloads of S-44. New applications/survey methods/platforms used as a result of S-44 Edition 6.0.0.					
	2021 downloads	59	2022	2023	2024	2025	2026
	2021 applications	0	2022	2023	2024	2025	2026
	2022 downloads		312	2023	2024	2025	2026
	2022 applications		0	2023	2024	2025	2026

Work Programme Tasks related to SPI 2.3.1

1.1 Cooperation with International Organizations and participation in relevant meeting

1.4 Work Programme & Budget, Strategic Plan and Performance Monitoring

3.7 Marine Spatial Data Infrastructures

SPI 2.3.1	Metrics	Extension of P-5 required.					
	2021	0	2022	2023	2024	2025	2026
		Number of HOs reporting success applying the UN shared guiding principles for geospatial information management in order to ensure in their national contexts. % of Yes/Full (from 34 Member States)					
	Representation 2022		72%	2023	2024	2025	2026
	Governance 2022		81%	2023	2024	2025	2026
	Compliance 2022		94%	2023	2024	2025	2026

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GOAL 3 Participating actively in international initiatives related to the knowledge and the sustainable use of the Ocean.

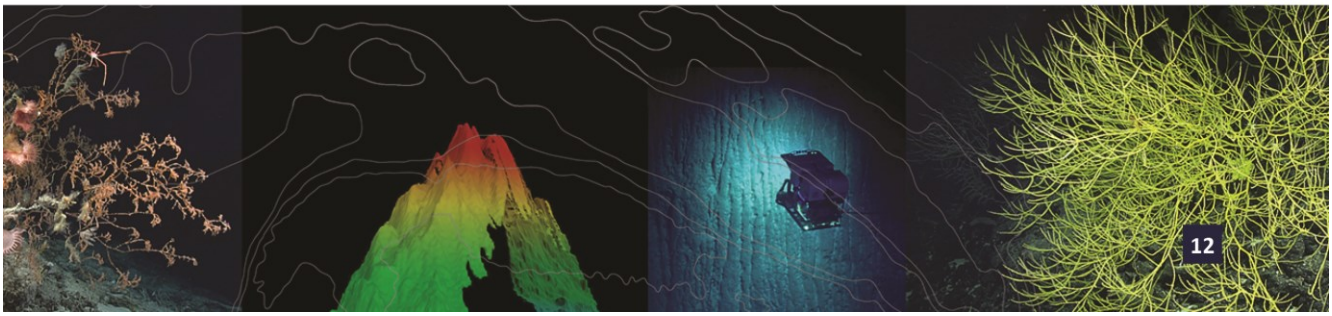
IHO's ambition is to be an effective and recognized contributor to the major Ocean related challenges identified by the international community.

Targets supporting Goal 3

- Collaborate with other bodies who deliver capacity building and training to improve effectiveness of capacity building activities and programmes.
- Improve knowledge of the world's seafloors.
- Implement a comprehensive IHO digital communication strategy in order to enhance its visibility and accessibility to its work.

Strategic Performance Indicators validating the targets supporting Goal 3

SP 3.1.1	Percentage of Coastal States that are able to provide marine safety information (MSI) according to the joint IMO/IHO/WMO manual on MSI.
SP 3.2.1	Amount of data received per year by the IHO Data Centre for Digital Bathymetry (DCDB).
SP 3.2.2	Number of contributors to DCDB who are not hydrographic offices.
SP 3.2.3	Percentage of total sea area that is Seabed 2030 compliant for ingestion into the GEBCO dataset and services.
SP 3.3.1	Number of visits, likes, re-postings, etc. associated to the IHO social media sites.
SP 3.3.2	Volume downloaded from the IHO website and Geographical Information System (GIS).



Strategic Performance Indicators for Goal 3

Work Programme Tasks related to Secretariat's activities addressing Goal 3

1.3 Co-operation with International Organizations and participation in relevant meetings

3.6 Public Relations and Outreach

1.4 Work Programme & Budget, Strategic Plan and Performance Monitoring

Metrics	Notable activities undertaken under the IHO Work Programme 1 2021 in four categories.					
Global outreach 2021	13	2022	2023	2024	2025	2026
Regional outreach 2021	4	2022	2023	2024	2025	2026
Stakeholder's specific outreach 2021	15	2022	2023	2024	2025	2026
Consultations	2	2022	2023	2024	2025	2026
Global outreach 2022		15	2023	2024	2025	2026
Regional outreach 2022		4	2023	2024	2025	2026
Stakeholder's specific outreach 2022		25	2023	2024	2025	2026
Consultations		2	2023	2024	2025	2026

Work Programme Tasks related to SPI 3.1.1

1.1 Co-operation with International Organizations and participation in relevant meetings

1.4 Work Programme & Budget, Strategic Plan and Performance Monitoring

3.1 Programme Coordination

3.2 Regional Hydrographic Commissions and the HCA

3.3 Capacity Building

3.6 Ocean Mapping Programme

3.7 Marine Spatial Data Infrastructures

SPI 3.1.1	Metrics	Percentage of Coastal States that are capable to provide marine safety information (MSI) according to the joint IMO/IHO/WMO manual on MSI [WWNWS and CBSC tasked to develop a collaborative approach how to measure and count.]						
	2021	0	2022	2023	2024	2025	2026	90%
	2022		62%	2023	2024	2025	2026	

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Work Programme Tasks related to SPI 3.2.1, 3.2.2, and 3.2.3

1.1 Co-operation with International Organizations and participation in relevant meetings

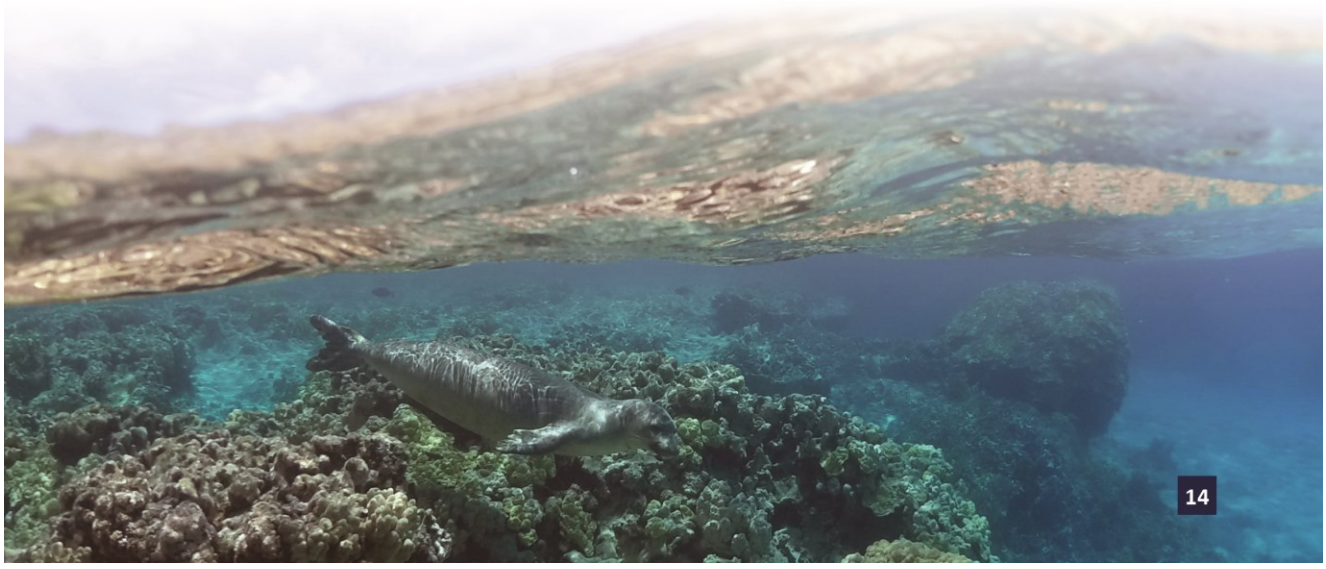
1.4 Work Programme & Budget, Strategic Plan and Performance Monitoring

3.1 Programme Coordination

3.2 Regional Hydrographic Commissions and the HCA

3.6 Ocean Mapping Programme

SPI 3.2.1	Metrics	Amount of data received per year by the IHO Data Centre for Digital Bathymetry (DCDB tasked to start measurement.)					
	2021	/	2022	2023	2024	2025	2026
	Datasets/Surveys 2022		375	2023	2024	2025	2026
SPI 3.2.2	Metrics	Number of contributors to DCDB who are not hydrographic offices (DCDB tasked to measure.)					
	2021	/	2022	2023	2024	2025	2026
	2022		4	2023	2024	2025	2026
SPI 3.2.3	Metrics	Percentage of total sea area that is Seabed 2030 compliant for ingestion into the GEBCO dataset and services [DCDB tasked to start measurement in collaboration with BOC (UK).]					
	2021	/	2022	2023	2024	2025	2026
	2022		23,4%	2023	2024	2025	2026



Work Programme Tasks related to SPI 3.3.1 and SPI 3.3.2

1.2 Information Management
1.3 Public Relations and Outreach
1.4 Work Programme & Budget, Strategic Plan and Performance Monitoring
3.3 Capacity Building
3.4 Coordination of Global Surveying and Charting Coverage
3.6 Ocean Mapping Programme

SPI 3.3.1	Metrics	Followers on LinkedIn, Facebook and Twitter					
	2021	Views					
		4263/177,600	2022	2023	2024	2025	2026
		673/ 2049	2022	2023	2024	2025	2026
		566/77,200	2022	2023	2024	2025	2026
	2022						
			6525/245,573	2023	2024	2025	2026
			954/2711	2023	2024	2025	2026
			973/58200	2023	2024	2025	2026

SPI 3.3.2	Metrics	Volume downloaded from the IHO website and Geographical Information System (GIS)					
Web site page views 2021		380,946	2022	2023	2024	2025	2026
User groups identified 2021		5	2022	2023	2024	2025	2026
Website page views 2022			863,322	2023	2024	2025	2026
Volume downloaded from GIS 2022			/	2023	2024	2025	2026

List of IHO Secretariat Travel (2022)

DATE	NAME	MEETING	DESTINATION	COUNTRY
FEBRUARY				
08 11	JONAS	Ocean Summit	Brest	FRANCE
MARCH				
14 18	GUILLAM	SCUFN 35	Paris	FRANCE
14 15	ROQUEFORT	SCUFN 35	Paris	FRANCE
28 30	SINAPI	MBSHC 23	Ljubljana	SLOVENIA
28 30	GUILLAM	MBSHC 23	Ljubljana	SLOVENIA
28 03	MANTEIGAS	IBSC 45	Cadiz	ESPAGNE
APRIL				
05 06	JONAS	NSHC 35	Reykjavik	ICELAND
25 28	JONAS	NHC 65	Stavanger	NORWAY
MAY				
04 05	SINAPI	GEOMAC	Taunton	UNITED KINGDOM
04 05	MANTEIGAS	GEOMAC	Taunton	UNITED KINGDOM
04 05	MANTEIGAS	GEOMAC	Taunton	UNITED KINGDOM
06	SINAPI	IHO EU MOU 10 years	Brussels	BELGIUM
09 13	MANTEIGAS	MSDIWG 13	Singapore	SINGAPORE
09 13	KAMPFER	SAIHC 18	Maputo	MOZAMBIQUE
16 20	KAMPFER	HSSC 14	Denpasar	INDONESIA
16 20	GUILLAM	HSSC 14	Denpasar	INDONESIA
23 27	JONAS	HCA 18	Berlin	GERMANY
23 27	GUILLAM	HCA 18	Berlin	GERMANY
23 27	FONTANILI	HCA 18	Berlin	GERMANY
JUNE				
01 03	SINAPI	CBSC 20	Denpasar	INDONESIA
01 03	MANTEIGAS	CBSC 20	Denpasar	INDONESIA
06 08	SINAPI	IRCC 14	Denpasar	INDONESIA
06 08	MANTEIGAS	IRCC 14	Denpasar	INDONESIA
06 08	JONAS	UN Open ended ICP on Oceans and LOS	New York	USA
09 10	JONAS	USCHC 45	Ottawa	CANADA
14 16	HARPER	IOC 55 Council	Paris	FRANCE
15 16	BAEK	OGC meeting	Madrid	SPAIN
21 30	KAMPFER	NCSR 9	London	UNITED KINGDOM
27 01	JONAS	UN Ocean Conference	Lisbon	PORTUGAL
27 01	HARPER	UN Ocean Conference	Lisbon	PORTUGAL
27 01	JONES COUTURE	UN Ocean Conference	Lisbon	PORTUGAL

JULY				
05 06	MANTEIGAS	CPLP Seminar	Lisbon	PORTUGAL
12 15	SINAPI	IC-ENC Steering Committee 23	Antwerp	BELGIUM
28 29	SINAPI	IHO-ROK-USM Graduation ceremony	Mississippi	USA
AUGUST				
01 05	JONAS	UNGGIM	New York	USA
22 25	KAMPFER	NIOHC 21	Bali	INDONESIA
29 31	SINAPI	SWAtHC 16	Montevideo	URUGUAY
SEPTEMBER				
05 06	SINAPI	High level visit	La Paz	BOLIVIA
05 09	KAMPFER	Joint IHO/IALA S-100 S-200 Workshop	Aalesund	NORWAY
05 09	WOOTTON	Joint IHO/IALA S-100 S-200 Workshop	Aalesund	NORWAY
05 09	BAEK	Joint IHO/IALA S-100 S-200 Workshop	Aalesund	NORWAY
11 16	MANTEIGAS	FIG Conference	Warsaw	POLAND
12 16	HARPER	WWNWS14/WWMIWS (WMO)	Geneva	SWITZERLAND
13 16	JONAS	ARHC 12	St John's NFL	CANADA
13 17	KAMPFER	Digital Sea	Seoul	REPUBLIC OF KOREA
13 17	BAEK	Digital Sea	Seoul	REPUBLIC OF KOREA
20 22	KAMPFER	BSHC 27	Stockholm	SWEDEN
26 28	JONAS	EAHC 14	Tokyo	JAPAN
26 30	KAMPFER	EATHC 17 + Seminar	Mindelo	CABO VERDE
26 30	GUILLAM	EATHC 17 + Seminar	Mindelo	CABO VERDE
OCTOBER				
04 07	SINAPI	XIII Trans-Regional Seapower Symposium	Venice	ITALY
10 14	HARPER	HSWG 3	Paris	FRANCE
25 28	HARPER	Map the Gaps Symposium	Southampton	UNITED KINGDOM
25 28	JONES COUTURE	Map the Gaps Symposium	Southampton	UNITED KINGDOM
31 01	SINAPI	39 GEBCO GC	Southampton	UNITED KINGDOM
31 01	HARPER	39 GEBCO GC	Southampton	UNITED KINGDOM
NOVEMBER				
02 08	KAMPFER	MSC 106	London	UNITED KINGDOM
07 11	MANTEIGAS	IBSC 2022	Singapore	SINGAPORE
07 10	SINAPI	PRIMAR PAC 29	Split	CROATIA
14 18	WOOTTON	NCWG 8	Wollongong	AUSTRALIA
15 17	SINAPI	RSAHC 9	Muscat	OMAN
21 25	WOOTTON	ENCWG7/S-101PT9	Wellington	NEW ZEALAND
27 03	SINAPI	MACHC 23	St Louis, Missouri	USA
27 03	MANTEIGAS	MACHC 23	St Louis, Missouri	USA

Responsibilities of the Secretary-General and Directors in 2022

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;
- East Asia Hydrographic Commission;
- Nordic Hydrographic Commission;
- North Sea Hydrographic Commission;
- US Canada Hydrographic Commission.

and the following Commission as Chair:

- 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:

- Baltic Sea Hydrographic Commission;
- Eastern Atlantic Hydrographic Commission;
- North Indian Ocean Hydrographic Commission;
- Southern African and Islands Hydrographic Commission;
- South-West Pacific Hydrographic Commission.

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Luigi SINAPI - Director Inter Regional Coordination and Support Programme

- IRCC, and its subordinate bodies, including IBSC and GEBCO;
- Relations with FIG, GEO, 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;
- South-East Pacific Regional Hydrographic Commission;
- ROPME Sea Area Hydrographic Commission;
- South West Atlantic Hydrographic Commission.

Responsibilities of the Staff of the IHO Secretariat in 2022

Managerial Staff

Mr L. MANTEIGAS	(Portugal)	ADCC	Cooperation and Capacity Building
Mr Y. GUILLAM	(France)	ADCS	Charting and Services
Mr Y. BAEK	(South Korea)	ADDT	Digital Technology
Mr S. HARPER	(United Kingdom)	ADSO	Surveying and Operations
Ms G. FAUCHOIS (Until September 2022)	(France)	MFA	Manager, Finance and Administration

Translators

Ms I. ROSSI	HT	Head Translator
Ms P. BRIEDA SAUVEUR (Until March 2022)	FrTr	French Translator

Technical, Administrative and Service Staff

Ms A. ALONSO (From August 2022)	DCA	Digital Communication Assistant
Ms I. BELMONTE	DPA	Web and Digital Publications Assistant
Ms S. BRUNEL (Changed October 2022)	CBA/FAO	Capacity Building Assistant / Finance/Administration Officer
M. C. BUZZI (Until July 2022)	DCA	Digital Communication Assistant
Ms T. BOWENS (Since September 2022)	EWH/OCA	EWH/Outreach & Communication Assistant
Ms L. CHAVAGNAS	CBA/SRA	Capacity Building, Secretariat & Registration Assistant
Mr D. COSTIN	ITO	Information Technology Officer
Ms C. FONTANILI	ESO	Executive Support Officer
Ms S. JONES-COUTURE	PRCO	Public Relations & Communication Officer
Mr A. MAACHE	BSA	Bureau Support Assistant
Mr R. ROQUEFORT	GSA	GIS Services and Graphic Arts Assistant
Mr J. WOOTTON	TSSO	Technical Standards Support Officer

Associate Professional Officers

Mr. Insung PARK	(Republic of Korea)	Standards Support
Mr Kazufumi MATSUMOTO	(Japan)	GIS and IT Support
Mr Javier FERNANDEZ	(Perù)	Council Managing Assistant

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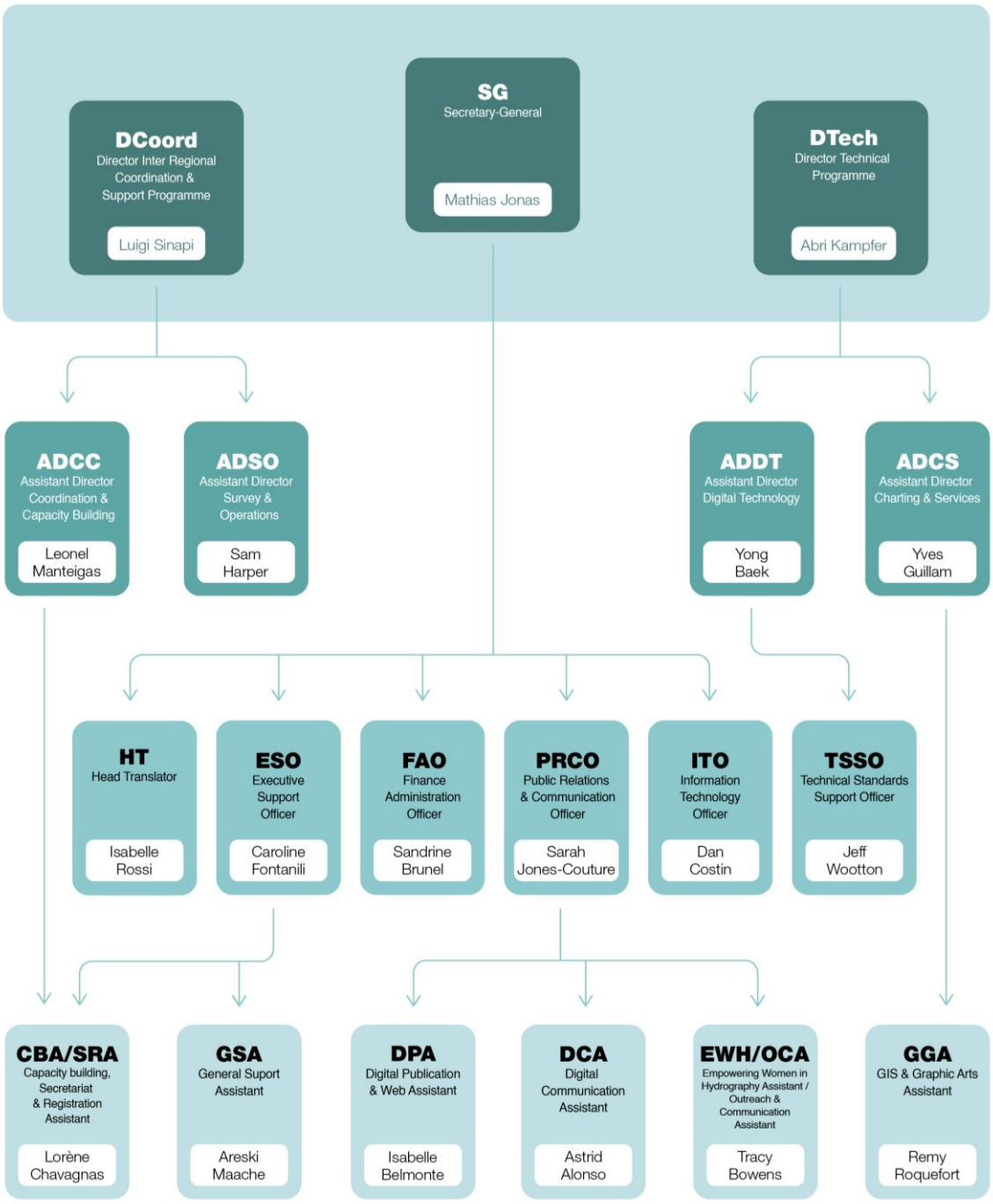
ORGANIZATION CHART **2022**



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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	Crowdsourced 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 2022

Foreword to the Finance Report for 2022

Amended by Secretary-General´s recommendations on the use of the accrued surplus in the budget for 2023 and the appointment of the external auditor.

Introduction

1.This part of the Annual Report 2022 presents the statements of the finances and accounts of the IHO for the 2022 fiscal year in accordance with the Financial Regulations of the IHO.

Result for the fiscal year 2022

2. The auditing of the 2022 IHO`s accounts has been undertaken by the external auditor, CABINET TARAMAZZO. The change of the external auditor from PricewaterhouseCoopers (PwC) to CABINET TARAMAZZO, - Member of the Order of the Chartered Accountants of the Principality of Monaco, was required because of PwC's unilateral cancellation of the contract. Due to the ongoing contract negotiations with CABINET TARAMAZZO at the time of the sixth Council meeting, the replacement of the auditor could not be approved iaw Article 19 (b) of the Financial Regulations of the IHO. The Audit Report is annexed to Part II of this Annual Report.

3. The audited financial statements indicate a positive result for 2022 of 100,697.41 Euros (see Table 9 (English) and 10 (French)). This result comprises a surplus of 36,000 Euros from the budget implementation, an additional income of 129,000 Euros, an underspend of 19,000 Euros in capital expenditure and the inclusion of the amount paid for depreciable assets of 17,000 Euros. The effective budget surplus for 2022 available for investment in 2023 is 101,000 Euros.

Budget implementation

4 It should be noted that the small surplus in 2022 results from the unexpected steep increase in inflation, which heavily affected all running costs, including salaries, travel, health insurance and pension insurance. Recruitment to replace a retired staff member was therefore suspended and the Secretariat is understaffed by 10% which equals to two vacant posts against the nominal head count.

Extraordinary income and expenditure

5 The extraordinary income (129,000 Euros - see table 3) results from the administration fee provided by donors for some Capacity Building activities, the payment of contributions in arrears by Member States and a gain in currency exchange.

Supplementary remarks

Outstanding financial contributions from some Member States

6 When assessing the positive balance sheet, it should be noted that several Member States failed to pay their annual financial contributions in the course of the fiscal year 2022. At the end of the year, 23 Member States had not paid their annual contributions in full. This amounted to 504,000 Euros, which is, in effect, income for 2022 yet to be received and represents 14.18% of the total value of the expected Member States' contributions. The 14.18% unpaid receivables of 2022 is substantial when compared with 6.04% debts for 2021 and 7.73% debts for the 5-year average. When these debts are cleared, they will be reflected in the relevant yearly accounts as extraordinary income.

Internal Retirement Fund and Pension Plan

7 The Internal Retirement Fund (IRF) supports the IHO's long-established independent retirement plan (pension scheme) for a number of retired members of the Secretariat staff. The pensions of nine retired members of staff are covered by the IRF. The IRF is purposely maintained in low-risk investment accounts. The investment sum required at the end of 2022 to meet the estimated liabilities of the IRF over its lifetime, decreased by 207,696 Euros to 3,321,858 Euros. The engagement decreased following a death during 2022.

8 Two allocations were made in favour of the Pension Plan: A first amount of 220,000 Euro and another amount of 250,000 Euro to compensate for inflation effects on future pensions of the locally recruited Secretariat´s staff currently in active service.

Capacity Building Fund

9 In 2022 the activities to build hydrographic capacity as planned in the annual Work Programme Part III were low, due to the aftermaths of the COVID-19 pandemic and the subsequent postponement of some of the earmarked CB activities (i.e. Cat A and Cat B courses). The Secretariat received 507,829 Euros from the Republic of Korea, and 499,957 Euros from Japan. The total expenditure was 904,712 Euros, and the balance at the end of 2022 is 1,663,834 Euros.

Other Funds

10 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.

11 ***Assembly Fund.*** The contribution to the Assembly Fund from the annual budget will cover the expenses of the triennial Assembly. The 2nd session of the Assembly was held virtually, due to the pandemic, which meant that the costs were comparably low. The costs for the annual Council are allocated separately from this Fund in the operational budget to an annual amount of 15,000 Euros for 2021 to 2023. At the end of 2022, 269,839 Euros was available in the Assembly Fund for the planning and execution of the subsequent IHO Assemblies.

12 ***Special Projects Fund.*** At the end of the year 2022, the positive balance of the Special Projects Fund was 292,436 Euros. In 2022 expenses for special projects were associated mainly to Work Programme II and amounted to 41,217 Euros in total.

13 ***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 2022 was 85,111 Euros. An amount of 18,311 Euros was received in fees from institutions seeking recognition by IBSC and 37,949 Euros was spent on travel expenses for the Board members to attend meetings. The Fund is in a healthy financial situation, is self-sufficient, with a positive balance at the end of 2022 of 66,072 Euros.

14 ***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 on a joint project named SEABED2030, 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 2022 the Secretariat received 2,993,011 Euros for the administration of the sixth year of the SEABED2030 project from the Nippon Foundation. At the end of 2022, a balance of 1,508,486 Euros remained in the SEABED2030 account. In 2022, 2,685,477 Euros were spent for reimbursement of salaries, operational costs and travel expenses of the operational phase. An amount of 11,290 Euros was spent for the SCUFN Gazetteer and 238,472 Euros for the Map the Gap Symposium. An amount of 1,948,882 Euros remains for payment of the forthcoming activities of global and regional data centres forming the infrastructural part of the project.

Recommendation of the Secretary-General for the 2022 budget surplus

15 As reported in the audited financial statements, the effective budget surplus for 2022 is 101,000 Euros. As a result of the decision made to hold the third session of the IHO Assembly at the Grimaldi Forum (as explained in detail in Part 1 of this Annual Report under Work Programme I) the Secretariat faces substantial additional costs for the conduct of the session. The extra cost estimate amounts to approximately 100,000 Euros. It is therefore recommended to allocate the effective budget surplus for 2022 entirely to the Assembly Fund. This measure will safeguard the health of the Fund to cover the expected expenses for the fourth session of the IHO Assembly in 2026, which will hopefully be held at the Auditorium Rainier III at no cost for the venue as it has been the previous practice for IHO Conferences and Assembly in the past.

Recommendation of the Secretary-General for the appointment of the external auditor

16 It is recommended that the Assembly approves the appointment of CABINET TARAMAZZO

-to audit the 2022 IHO's accounts ex post facto iaw Article 19 (b)) of the Financial Regulations of the IHO, and

-to audit the fiscal years 2023 – 2025 iaw Article 19 (a) of the Financial Regulations of the IHO.

Conclusion

17 The Secretariat, ever mindful of the difficulty in forecasting the income of the Organization due to none or late payment of financial contributions by Member States and other factors, continues to take a conservative approach to the budget and finances of the Organization. The impossibility to forecast how inflation will develop over the years to come adds extra challenges on the budgetary maintenance of the Secretariat's operations. A modest increase of Member States contributions in 2024 is suggested to maintain good financial health and to enable the return to the nominal headcount to support the Secretariat´s 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 2022 - *au 31 décembre 2022*
(expressed in thousands of Euros - *exprimé en milliers d'Euros*)

	See notes		2022		2021
***Immobilisations* - Fixed assets**					
Valeur nette des immobilisations - Net Tangible assets	4		57		68
***Actif circulant* - Curent assets**					
Débiteurs - Debtors	5	602		230	
Trésorerie disponible					
Cash at bank and in hand :	10	9 623		10 164	
		10 224		10 394	
Créditeurs - montants à moins d'1 an					
Creditors - amounts falling due within 1 year	6	-2 672		-3 260	
***Fonds de roulement* - Working capital**			7 552		7 134
Engagements pour les retraites	7	3 687		4 132	
Pension commitments		-3 687		-4 132	
			0		0
Actif net - Net assets			7 609		7 203
***Réserves* - Reserves**					
Capitaux permanents de l'OHI - Accumulated surplus			3 099		2 717
Autres réserves - Other reserves	8+9		4 827		4 485
			7 926		7 203

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Table 2

International Hydrographic Organization - *Organisation Hydrographique Internationale*

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

as of 31 December 2022 - *au 31 décembre 2022*

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

	2022	2021
Revenus - Income	3 798	3 760
Charges opérationnelles - Operating costs	-3 046	-2 729
***Résultat opérationnel* - Operating result**	**752**	**1 031**
Intérêts reçus - Interest received	31	45
Equipement de bureau - Office equipment	-36	-26
Charges financières - Financial costs	-259	-548
Dotations aux fonds dédiés - Transfer to dedicated funds	-388	-273
***Résultat annuel* - Result for the year**	**101**	**230**

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 2022* - Available on 1 January 2022**	2 817		4 485	7 302
Résultat de l'année - Result for the year	101		-	101
***Evolution des fonds dédiés* - Evolution of dedicated funds:**				
- *Dépensé à partir des fonds dédiés* - Spent from dedicated funds			342	342
- *Fonds de retraite interne* - Internal Retirement Fund			-	
- *Fonds pour le déménagement des directeurs* - Relocation Fund			-	
- *Fonds pour les conférences* - Conference Fund			-	
- *Fonds pour le Renforcement des Capacités* - CB Fund			-	
- *Fonds pour les Projets spéciaux* - Special Projects Fund				
***Mouvements dans l'année* - Movements in the year (provisions) :**				
- *Variation provision du FRI* - Changes in IRF requirements	208		-	208
- *Dotation du fonds de réserve d'urgence* - Allocation to Emergency Rese Fund	-27		-	-27
- *Réserves à distribuer* - Reserves to be distributed				
***Montants au 31 Décembre 2022* - Available at 31 December 2022**	**3 099**		**4 827**	**7 926**

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Table 3

International Hydrographic Organization - *Organisation Hydrographique Internationale*
Profit and Loss Statement - *Compte d'exploitation*
as of 31 December 2022 - *au 31 décembre 2022*
(expressed in thousands of Euros - *exprimé en milliers d'Euros*)

		2022	*2021*
***Revenus* - Income**			
Contributions des Etats Membres - Contributions from Member States		3 485	3417
Imposition interne - Internal tax		185	194
Revenus et dépenses exceptionnelles - Exceptional income and expenditure		129	150
		3 798	3760
***Revenus financiers* - Interest received**			
Intérêts des placements - bank interest		31	45
***Charges opérationnelles* - Operating costs**			
Charges de personnel - Personnel costs	2 613		2539
Déplacements - Long Distance Travel	220		12
Entretien des locaux et équipements - Maintenance of premises and equipment	95		94
Postes et télécommunications - Postage and telephone	21		23
Consultants - Consultancy	38		14
Support administratif pour le Conseil - Administrative support for the Coun	9		5
Autres publications - Other publications	1		1
Revue H.I - I.H Review	10		10
Autres coûts opérationnels - Other operating costs	20		17
Fournitures de bureau - Office stationery	9		6
Relations publiques - Public relations	10		7
Charges diverses - Miscelleanous			2
		-3 046	-2729
***Matériel de bureau* - Office equipment**			
Amortissement des immobilisations - Depreciation	17		19
Autres achats - Other purchases	19		7
		-36	-26
***Charges financières* - Financial costs**			
Créances douteuses - Bad debts	44		13
Provision congés payés - Provision leave days	-36		36
Provision retraites externes - Provision external retirement	250		
		-259	-548
***Dotations aux fonds dédiés* - Allocation to dedicated funds**		-388	-273
***Résultat net annuel* - Result for the year**		**101**	**230**

Table 4

International Hydrographic Organization - *Organisation Hydrographique Internationale*

Cash Flow Statement - *Etat de flux financiers*

as of 31 December 2022- *au 31 décembre 2022*

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

		2022		***2021***
***Cash Flow opérationnel* - from operating activities**				
Résultat opérationnel de l'année - Result for the year		101		350
***Ajustements pour* - Adjustments for :**				
Dépréciation des immobilisations - Depreciation	17		19	
Cession d'immobilisations - Sale of fixed assets				
Provision du FRI - IRF provision				
Variation des réserves - Change in reserves				
Intérêts bancaires - Bank interest	-31		-37	
Charges financières - Financial expenditure				
Résultat avant variation du fonds de roulement		-14		-18
Result before working capital changes		86		332
Variation des débiteurs - Change in accounts receivable	-372		125	
Variation des créditeurs - Change in accounts payable	588		-221	
		216		-96
Flux financier opérationnel - Operating cash flow		302		236
Intérêts réglés - Interest paid	0		0	
Ajustement du Fonds de retraite - Retirement fund adjustment	-285		304	
		-285		304
Flux financier opérationnel net - Net cash from operating activities		17		539
Flux financier des investissements				
Cash flow from investing activities				
Achats d'immobilisations - Purchase of fixed assets	-6		43	
Cessions d'immobilisations - Sale of fixed assets	0		0	
Intérêts reçus - Interest received	31		37	
Flux net des opérations d'investissement				
Net cash movement from investment activities		26		80
***Total des flux financiers* - Total cash flows**		42		619
Disponibilités au 1er janvier de l'année				
Cash at 1st January of the year		9 749		9130
Disponibilités au 31 décembre de l'année				
Cash at 31st December of the year	Euros	9 791	Euros	9749

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Table 5

International Hydrographic Organization - *Organisation Hydrographique Internationale*
Budget Implementation Summary - *Compte rendu de l'exécution budgétaire*
as of 31 December 2022 - *au 31 décembre 2022*
(expressed in thousands of Euros - *exprimé en milliers d'Euros*)

	2022		
	Budget	**Actual - *Réel***	**Variance**
***Revenus* - Income**			
Contributions des Etats Membres - Contributions from Members State	3 413	3 485	-72
Imposition interne - Internal tax	196	185	11
Intérêts bancaires - Bank interest	35	31	4
	3 644	3 701	-57
***Charges opérationnelles* - Operating costs**			
Charges de personnel - Personnel costs	2 691	2 613	78
Déplacements - Long Distance Travel	250	220	30
Entretien - Maintenance	92	95	-3
Postes et télécommunications - Postage and telephone	25	21	4
Consultants - Consultancy	10	38	-28
Support administratif pour le Conseil - Administrative support for the Council	15	9	6
Autres publications - Other publications	1	1	
Revue HI - I.H Review	10	10	
Autres coûts opérationnels - Other operating costs	19	20	-2
Fournitures de bureau - Office stationery	8	9	-1
Relations publiques - Public relations	20	10	10
Charges diverses - Miscellaneous	1		1
	3 142	3 046	95
***Dépenses d'investissement* - Capital expenditure**			
Amortissement - Depreciation	20	17	3
Autres achats - Other purchases	16	19	-3
	36	36	
***Autres Dépenses d'investissement (>762€)* - Other Capital expenditure (over 762€)**			
Achat d'équipement informatique - Purchase of IT equipement	15	1	14
Achat de mobilier - Purchase of furniture	10	4	6
	25	6	19
***Charges financières* - Financial costs**			
Provision clients douteux - Provision for bad debts	50	44	6
Provision congés payés - Provision for leave days		-36	36
Provision retraites externes - Provision external retirement		250	-250
	391	355	36

Table 6

International Hydrographic Organization - *Organisation Hydrographique Internationale*

Overdue Contributions - *Contributions échues*

as of 31 December 2022 - *au 31 décembre 2022*

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

		2022	2021	2020	2019	*Total*
Albania	Albanie	8				***8***
Angola	Angola	8				***8***
Argentina	Argentine	28				***28***
Bahrein	Bahrein	16				***16***
Cameroon	Cameroun	16				***16***
Cuba	Cuba	8				***8***
Dem.Rep. Of Congo	Rep.Dem. Du Congo	8	4			***12***
D.P.R of Korea	Rép. Dém de Corée	20	20			***40***
Fiji	Fidji	8				***8***
Guyana	Guyane	12				***12***
Icelande	Islande	12				***12***
Indonesia	Indonesie	108				***108***
Iraq	Irak	8	4			***12***
Kenya	Kenya	8	8			***16***
Lebanon	Liban	12	12			***24***
Malta	Malte	108				***108***
Mozambique	Mozambique	8				***8***
Pakistan	Pakistan	20				***20***
Qatar	Quatar	28				***28***
Solomon Islands	Iles Solomon	12				***12***
Sri Lanka	Sri Lanka	16				***16***
Tonga	Tonga	8				***8***
Ukraine	Ukraine	24				***24***
		504	***48***	***0***	***0***	***552***

Suspended IHO Member States		Outstanding Contributions	Payment	Balance
Etats Membres de l'OHI suspendus		*Contributions arriérées*	*Paiement*	*Solde*
Serbia - *Serbie*		24,0		***24,0***
Syrian Arab Republic-	*Rép. arabe syrienne*	60,0		***60,0***
		84,0	***0,0***	***84,0***

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Table 7

International Hydrographic Organization - *Organisation Hydrographique Internationale*
Creditors - *Créditeurs*
as of 31 December 2022 - *au 31 décembre 2022*
(expressed in thousands of Euros - *exprimé en milliers d'Euros*)

Contributions reçues d'avance	***Reçues en 2022 pour les prochaines contributions***	***Reçues en 2021 pour les prochaines contributions***
Contributions received in advance	Received in 2022 for future contributions	Received in 2021 for future contributions
Australia - *Australie*	32	32
Belgium - *Belgique*	56	56
Bangladesh - *Bangladesh*	0	28
Brazil - *Brésil*	44	44
Bruneï	0	20
Canada	40	0
Chile - *Chili*	3	0
Cyprus - *Chypre*	101	101
Finland - *Finlande*	32	0
France - *France*	60	60
Iran	0	76
Ireland - *Irlande*	0	16
Jamaica - *Jamaique*	0	12
Latvia - *Lettonie*	16	16
Mexico - *Mexique*	48	48
Morocco - *Maroc*	20	20
Netherlands - *Pays-Bas*	0	65
New Zealand - *Nouvelle-Zélande*	0	16
Oman - *Oman*	8	8
Poland - *Pologne*	12	12
Portugal - *Portugal*	85	85
Russian Federation - *Fédération de Russie*	0	69
Singapore - *Singapour*	109	109
South Africa - *Afrique du Sud*	20	20
Suriname	0	8
Sweden - *Suède*	40	40
Thailand - *Thaïlande*	0	44
United Kingdom - *Royaume Uni*	0	109
	726	1 114

Créditeurs et charges à payer - Creditors and accruals

Plan de pensions - Pensions plan payments		91
Charges à payer - Accruals	594	646
Autres créditeurs - Other	8	7
	602	117

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Table 8

International Hydrographic Organization - *Organisation Hydrographique Internationale*
Notes to the Financial Statements - *Notes relatives aux états financiers*
as of 31 December 2022 - *au 31 décembre 2022*
(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 conformément aux principes comptables de l'Organisation hydrographique internationale qui ne sont pas substantiellement différents des principes comptables généralement reconnus en Principauté de Monaco sauf pour certains points, par exemple:
- Provision pour assurer les pensions au personnel IFR et aux retraités :
conformément aux principes comptables de l'Organisation hydrographique internationale
la provision est intégralement comptabilisée au moyen d'un compte de capitaux propres
tandis que, selon les principes comptables généralement reconnus en Principauté de Monaco
cette provision et sa variation annuelle devraient être comptabilisées au moyen de comptes de pertes et profits
- Quelques différences mineures de présentation

The financial statements are prepared in accordance with the International Hydrographic Organization accounting principles which are not substantially different from the generally accepted accounting principles in Principality of Monaco except for some matters, for example:
- Provision to ensure pensions to IFR staff and retirees: in accordance with the International Hydrographic Organization accounting principles, the provision is fully recorded through an equity account whereas under the generally accepted accounting principles in Principality of Monaco, this provision and its annual variation should be recorded through profit and loss accounts.
- Some minor presentation differences

(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).

Table 8

(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 interne* - Internal retirement fund

L'OHI gère un fonds de pension dénommé Fonds de retraite interne (FRI).
Neuf 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). Nine 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) Provision pour retraites externes - Provision for external retirement

L'OHI a l'obligation d'assurer à ses membres du personnel recrutés localement une pension de retraite au moins équivalente à la CAR. A cet effet, un contrat avait été souscrit auprès d'une compagnie d'assurance, Neuflize Vie. En février 2021, Neuflize Vie a décidé d'annuler ce contrat.
Un nouveau contrat a été souscrit à partir de janvier 2022 auprès d'une autre compagnie d'assurance, GAN VIE, qui assure une pension au moins équivalente à celle versée par la CAR, à la condition que le capital nécessaire au paiement de cette pension soit versé intégralement à GAN au moment du départ à la retraite du salarié.
Cette obligation est calculée et ajustée tous les ans, et s'élève à fin 2022 à 2M€ pour les 35 prochaines années.
The IHO has an obligation towards its staff members locally recruted to ensure a retirement pension at least equivalent to the one served by the CAR. To this effect, a contract had been established with an insurance company, Neuflize Vie. In February 2021, Neuflize Vie decided to cancel this contract.
A new contract has been established with another insurance company, GAN VIE, with effect 1st January 2022 which ensures a payment of a pension equivalent CAR on the condition that the capital needed for the payment of this pension is totally paid by the IHO on retirement of the Staff Member. This engagement is calculated and ajusted every year, and is estimated to be 2M€ at the end of 2022 to be spread over the next 35 years.

h) 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).

i) *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 :

Table 8

- 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 Informatic	***2022***	***2021***
***Charges de personnel* - Personnel costs :**		
Secrétaire général et directeurs - Secretary general and direct	523	501
Salaires du personnel - Salaries to Staff Members	1 318	1 312
Cotisations aux régimes de retraite - Payment to retirement fu	381	374
Primes d'assurance - Medical insurance costs	324	286
Allocations au personnel - Allowances	38	32
Autres charges de personnel - Other staff expenses	3	1
Personnel temporaire - Temporary staff	25	33
Formation - Training	1	0
	2 613	2 539

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 direct	3	3
Personnel de cat. A - Category A Staff	5	5
Personnel de cat B - Category B Staff	12	12
	20	20

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 2022	333	37	370
Solde des mouvements de l'année -Net change during the year *	6	0	6
Au 31 décembre de l'année - At 31 December 2022	338	37	375
* *Achats moins mises au rebut* - Purchases less scrapping of equipment			
***Amortissements* - Depreciation**			
Au 1er janvier de l'année - At 1 January 2022	-301	0	-301
Amortissements de l'année - Depreciation for the year	-17	0	-17

Table 8

	-318	0	-318
***Valeur nette* - Net book value**			
Au 31 décembre de l'année n-1 - At 31 December of previous year	31	37	68
Au 31 décembre de l'année n - At 31 December of current year	20	37	57

5 *Débiteurs* - Debtors	***2022***	***2021***
Contributions restant dues (nettes de provision) Overdue contributions less provision	505	183
TVA récupérable - VAT recoverable	44	39
Avances au personnel et charges constatées d'avance Prepayments and Staff advances	52	9
	602	230

6 *Créditeurs* - Creditors	***2022***	***2021***
Contributions reçues en avance - Prepaid contributions	727	1 115
Garantie au FRI - Guaranty to the IRF	1 343	1 401
Créditeurs et charges à payer - Creditors and accruals	602	744
	2 672	3 260

7 *Engagements pour la retraite* - Pension Commitments	***2022***	***2021***
- *Dépôts à terme du FRI* - IRF Bank deposits	1 978	2 206
- *Disponibilités banque SMC* - SMC Bank deposits	366	524
	2 344	2 731
- *Garantie du Secrétariat* - Secretariat Guaranty	1 343	1 401
- *Estimation de l'engagement de retraite du personnel* Estimated net liabilities for existing and former Staff Members	3 687	4 132

8 Fonds dédiés (pour des opérations ultérieures) **Dedicated funds for future operations**	***2022***	***2021***
- *Fonds pour les conférences* - Conference Fund	274	311
- *Fonds de déménagement* - Relocation Fund	47	47
- *Fonds de rénovation et d'amélioration* - Renovation and Enhancement Fur	62	48
- *Fonds pour le renforcement des capacités* - Capacity Building Fund	1 669	1 667
- *Fonds pour les projets spéciaux* - Special Projects Fund	292	254
- *Fonds pour la GEBCO* - GEBCO Fund	1 949	1 634
- *Fonds de la bibliothèque de présentation* - Presentation Library Fund	59	55
- *Fonds pour la conférence ABLOS* - ABLOS Conference Fund	11	13
- *Fonds IBSC* - IBSC Fund	66	85

9 *Réserves* - Reserves		
- *Fonds de réserve d'urgence* - Emergency Reserve Fund	298	271
- *Réserves à distribuer* - Reserves to be distributed	100	100
	4 827	4 485

10 *Réserve de trésorerie en fin d'année* - End of Year Cash Reserve	***2022***	***2021***

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.

Table 8

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	9 623	10 164
(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	-727	-1 115
- *Valeur des fonds dédiés* - Dedicated funds	-4 420	-4 114
	4 476	4 935
- *Garantie en faveur du FRI* - Guaranty to the IRF	-1 343	-1 401
- *Trésorerie disponible* - Net available Cash	3 132 *	3 535
* *46 semaines de fonctionnement* 46 weeks of operations		

Total du budget de l'année suivante (2023) - Total budget for 2023 :	3 574 *(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) :	-893	
Art.17 Operating Cash Reserve (3 months) :		
Art.18 Fonds de réserve d'urgence (1 mois) :	-298	
Art.18 Emergency Reserve Fund (1 month) :		
Excédent de trésorerie disponible	1 941	
Cash surplus		

11 *Positions financières en devises* - Foreign Exchange Holdings — ***2022*** — ***2021***

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 availabilites 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	1 298	1 482

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 Kasufimi MATSUMOTO, détaché du service des gardes-côtes japonais auprès de l'OHI, en qualité de locataire de son domicile
Objet: caution solidaire du locataire portant sur paiement du loyer mensuel de 1 300€
Durée du bail: 3 ans (17/03/2021 - 17/03/2024)
Person concerned: Mr. Kasufimi MATSUMOTOA, seconded by the Japan Coast Guard to the IHO , as Lessee of his apartment
Subject: surety on the tenant's monthly rent payment of € 1,300
Length: Length of lease: 3 years (17/03/2021 - 17/03/2024)

TABLE 9

BALANCE SHEET

(expressed in Euros)

ASSETS	31/12/2022	31/12/2021	LIABILITIES	31/12/2022	31/12/2021
I. CASH AT BANK AND IN HAND			**I. PROVISION FOR THE PENSIONS**		
IHO - Bank current accounts	2 327 969,58	2 655 203,69	Provision to ensure pensions to IRF staff and retirees	2 020 351,00	2 228 047,00
IHO - Bank deposit accounts	7 293 942,63	7 507 476,13	Provision for external retirement		498 955,00
Petty cash	663,29	1 553,76			
	9 622 575,50	**10 164 233,58**	**II. VARIOUS CREDITORS**		
II. VARIOUS DEBTORS			Value of External Pension Plans	365 936,12	597 591,67
Purchases made in advance	3 050,79	3 194,00	A.M.R.R Supplementary Retirement Scheme	0,00	17 764,73
Outstanding bills	2 000,00	0,00	Accruals (outstanding bills, telex, telephone)	594 104,86	147 517,47
Advance to staff	22 599,99	0,05	Travel claims & wages	2 398,38	0,00
Claim for refunding of VAT	44 351,22	38 531,78	Various creditors	0,00	1 350,00
Interest from Deposit to be received	24 539,47	5 495,40	Deposits received for Conference (stands)	5 210,00	5 210,00
	96 541,47	**47 221,23**		**967 649,36**	**769 433,87**
III. OUTSTANDING CONTRIBUTIONS			**III. CONTRIBUTIONS RECEIVED IN ADVANCE**		
Contributions for the year	486 147,94	189 286,82	Received in advance or in excess	**727 197,60**	**1 114 737,56**
Contributions for previous years	64 389,12	26 158,08			
Contributions for suspended MS	84 271,68	192 928,32	**IV. CAPITAL**		
Provision for doubtful contributions	-129 526,99	-224 723,17	Emergency Reserve fund	297 825,00	271 042,00
Interest remaining due on contributions	0,00	-1 131,77	Reserves to be distributed	100 000,00	100 000,00
	505 281,75	**182 518,28**	Staff Retirement fund (IRF)	1 301 507,32	1 379 258,55
			Conference Fund	269 838,65	310 873,24
IV. INTERNAL RETIREMENT FUNDS ASSETS			Relocation Fund	47 129,35	47 129,35
			Renovation and Enhancement Fund	61 507,92	47 955,42
Retirement cash invested (IRF)	1 978 460,86	2 206 448,94	Capacity Building Fund	1 663 834,18	1 666 789,75
			Special Projects Fund	292 436,00	254 430,53
Retirement cash invested (External Pension Plans)	365 949,62	524 474,63	GEBCO fund	1 948 881,78	1 634 037,06
			Presentation Library Fund	59 062,15	55 062,15
	2 344 410,48	**2 730 923,57**	ABLOS Conference fund	10 747,86	12 747,86
			IBSC Fund	66 072,13	85 110,64
				6 118 842,34	**5 864 436,55**
V. FURNITURE AND EQUIPMENT	338 488,14	332 957,98			
Depreciation of assets	-318 184,85	-301 480,50			
			Net yearly operating profit	100 697,41	229 622,32
VI. LIBRARY	36 663,99	36 663,99	Net Members Fund	2 691 038,77	2 487 805,83
				2 791 736,18	**2 717 428,15**
	56 967,28	**68 141,47**			
				8 910 578,52	**8 581 864,70**
	12 625 776,47	**13 193 038,13**		**12 625 776,47**	**13 193 038,13**

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TABLE 10

BILAN

(exprimé en Euros)

ACTIF	31/12/2022	31/12/2021	PASSIF	31/12/2022	31/12/2021
I. TRESORERIE DISPONIBLE			**I. PROVISION POUR LES PENSIONS DU PERSONNEL**		
OHI - Comptes courants bancaires	2 327 969,58	2 655 203,69	. Provision pour couvrir les pensions du personnel (retraités et actifs relevant du FRI)	2 020 351,00	2 228 047,00
OHI - Comptes de dépôt & placement monétaire	7 293 942,63	7 507 476,13	Provision pour retraites externes		498 955,00
Espèces en caisse	663,29	1 553,76			
	9 622 575,50	**10 164 233,58**	**II. CREDITEURS DIVERS**		
II. DEBITEURS DIVERS			Plans de pensions externes	365 936,12	597 591,68
Prestations effectuées d'avance	3 050,79	3 194,00	Retraite complémentaire A.M.R.R	0,00	17 764,73
Factures non encaissées	2 000,00	0,00	Charges à payer (factures, télécommnucations, etc..)	594 104,86	147 517,47
Avances au personnel	22 599,99	0,05	Salaires et notes de frais	2 398,38	0,00
Demande de remboursement de TVA	44 351,22	38 531,78	Créditeurs divers	0,00	1 350,00
Intérêts sur placements à recevoir	24 539,47	5 495,40	Montants reçus pour la prochaine Conférence (stands)	5 210,00	5 210,00
	96 541,47	**47 221,23**		**967 649,36**	**769 433,88**
III. CONTRIBUTIONS			**III. CONTRIBUTIONS RECUES EN AVANCE** Reçues en avance ou en excédent	**727 197,60**	**1 114 737,56**
Contributions pour l'année en cours	486 147,94	189 286,82			
Contributions échues (années précédentes)	64 389,12	26 158,08	**IV. CAPITAUX PERMANENTS**		
Contributions (Etats membres suspendus)	84 271,68	192 928,32	Fonds de réserve d'urgence	297 825,00	271 042,00
Provision pour contributions	-129 526,99	-224 723,17	Réserves à distribuer	100 000,00	100 000,00
Intérêts restant dus sur contributions échues	0,00	-1 131,77	Fond de Retraite Interne (FRI)	1 301 507,32	1 379 258,55
	505 281,75	**182 518,28**	Fonds pour les conférences	269 838,65	310 873,24
			Fonds pour le déménagement des directeurs	47 129,35	47 129,35
IV. TRESORERIE DES FONDS DE RETRAITE			Fonds de rénovation et d'amélioration	61 507,92	47 955,42
			Fonds pour le renforcement des capacités	1 663 834,18	1 666 789,75
Trésorerie disponible (FRI)	1 978 460,86	2 206 448,94	Fonds pour les projets spéciaux	292 436,00	254 430,53
			Fonds pour la GEBCO	1 948 881,78	1 634 037,06
Trésorerie placée (Plans externes)	**365 949,62**	524 474,63	Fonds de la bibliothèque de présentation	59 062,15	55 062,15
			Fonds pour la conférence ABLOS	10 747,86	12 747,86
	2 344 410,48	**2 730 923,57**	Fonds IBSC	66 072,13	85 110,64
				6 118 842,34	**5 864 436,55**
V. MOBILIER & EQUIPEMENTS	338 488,14	332 957,98			
Amortissement des immobilisations	-318 184,85	-301 480,50			
			Résultat opérationnel net de l'année en cours	100 697,41	229 622,32
VI. BIBLIOTHEQUE	36 663,99	36 663,99	Capitaux nets permanents	2 691 038,77	2 487 805,83
				2 791 736,18	**2 717 428,15**
	56 967,28	**68 141,47**			
				8 910 578,52	**8 581 864,70**
	12 625 776,47	**13 193 038,13**		**12 625 776,47**	**13 193 038,13**

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TABLE 11

International Hydrographic Organization - *Organisation Hydrographique Internationale*
Profit and Loss Statement - *Compte d'exploitation*
as of 31 December 2022 - *au 31 décembre 2022*
(expressed in Euros - *exprimé en Euros*)

		2022		*2021*
***Revenus* - Income**				
Contributions des Etats Membres - Contributions from Member States		3 485 060,80		3 416 647,68
Imposition interne - Internal tax		184 933,59		193 767,20
Revenus et dépenses exceptionnelles - Exceptional income and expenditure		128 503,90		149 558,11
		3 798 498,29		3 759 972,99
***Revenus financiers* - Interest received**				
Intérêts des placements - bank interest		31 033,55		45 124,36
		31 033,55		45 124,36
***Charges opérationnelles* - Operating costs**				
Charges de personnel - Personnel costs	2 613 456,41		2 539 442,42	
Déplacements - Long Distance Travel	219 960,46		11 750,87	
Entretien des locaux et équipements - Maintenance of premises and equipment	95 214,91		93 719,64	
Postes et télécommunications - Postage and telephone	21 094,11		23 080,00	
Consultants - Consultancy	37 787,99		14 399,00	
Support administratif pour le Conseil - Administrative support for the C	8 513,73		4 951,40	
Autres publications - Other publications	726,86		559,00	
Revue hydrographique internationale - I.H Review	10 000,00		10 000,00	
Autres coûts opérationnels - Other operating costs	20 293,26		16 531,79	
Fournitures de bureau - Office stationery	9 263,95		5 979,17	
Relations publiques - Public relations	9 976,59		6 674,72	
Charges diverses - Miscelleanous	153,00		1 896,72	
		-3 046 441,27		-2 728 984,73
***Matériel de bureau* - Office equipment**				
Amortissement des immobilisations - Depreciation	16 704,35		18 663,22	
Autres achats - Other purchases	18 968,29		6 844,49	
		-35 672,64		-25 507,71
***Charges financières* - Financial costs**				
Créances douteuses - Bad debts	44 267,52		13 060,59	
Provision congés payés - Provision leave days	-35 747,00		35 747,00	
Provision retraites externes - Provision external retirement	250 000,00		498 975,00	
		-258 520,52		-547 782,59
***Dotations aux fonds dédiés* - Allocation to dedicated funds**		-388 200,00		-273 200,00
***Résultat net annuel* - Result for the year**		**100 697,41**		**229 622,32**

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International Hydrographic Organization - *Organisation Hydrographique Internationale*

Notes to the Financial Statements - *Notes aux états financiers*

(expressed in Euros - *exprimé en Euros*)

1 Accounting Policies - *Principes comptables*

a) Basis of accounting - *Principes comptables de base*

The financial statements are prepared in accordance with the International Hydrographic Organization accounting principles which are not substantially different from the generally accepted accounting principles in Principality of Monaco except for some matters, for example:

- Provision to ensure pensions to IFR staff and retirees: in accordance with the International Hydrographic Organization accounting principles, the provision is fully recorded through an equity account whereas under the generally accepted accounting principles in Principality of Monaco, this provision and its annual variation should be recorded through profit and loss accounts.
- Some minor presentation differences

Les états financiers sont préparés conformément aux principes comptables de l'Organisation hydrographique internationale qui ne sont pas substantiellement différents des principes comptables généralement reconnus en Principauté de Monaco sauf pour certains points, par exemple:

- Provision pour assurer les pensions au personnel IFR et aux retraités :
conformément aux principes comptables de l'Organisation hydrographique internationale
la provision est intégralement comptabilisée au moyen d'un compte de capitaux propres
tandis que, selon les principes comptables généralement reconnus en Principauté de Monaco
cette provision et sa variation annuelle devraient être comptabilisées au moyen de comptes de pertes et profits
- Quelques différences mineures de présentation

(b) Revenus - Income

Les revenus proviennent essentiellement des contributions des Etats membres de l'OHI.
Le revenu est reconnu sur une base annuelle

Income principally represents contributions receivable from Member States
Revenue is recognized on an annual basis.

(c) Contributions received in advance - *Contributions reçues d'avance*

As of July of the current year, letters for the contributions for the following year are sent to Member States.
Payments of these contributions are accounted for in the account 48731: Contributions received in advance.
Income from these contributions is accounted for on the 1st January of the following year.

A partir du mois de juillet de l'année en cours, les lettres de demandes de contributions pour l'année suivante sont envoyées aux Etats Membres. Les payments reçus sont comptabilisés dans le compte 48731: Contributions reçues d'avance. Le revenu de contributions est comptabilisé au 1er janvier de l'exercice concerné.

(d) 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 suspe
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.

(e) *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, à compter de leur date d'acquisition qui ne diffère pas significativement de la date de mise en service, et 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, from their acquisition date which is not significantly different thant the date they are put into use, and as follows :

Furniture	20% per annum on cost (5 years)
IT Equipment	33.33% per annum on cost (3 years).

(f) *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.

2 Presentation of the IHO - *Présentation de l'OHI*

The International Hydrographic Organization (IHO) is an intergovernmental consultative and technical organization that was established in 1921 to support safety of navigation and the protection of the marine environment. The IHO enjoys observer status at the United Nations (UN) and is recognized as the competent international authority regarding hydrography and nautical charting.
The Secretariat of the IHO is based in Monaco and is headed by a Secretary General assisted by two Directors. They are elected by the IHO Member States at ordinary sessions of the Assembly.
L'organisation Hydrographique Internationale (OHI) est une organisation intergouvernementale consultative et technique, qui a été créée en 1921 en vue de soutenir la sécurité de la navigation et la protection du milieu marin. L'OHI jouit du statut d'observateur auprès de l'Organisation des Nations Unies et elle est reconnue comme étant l'autorité compétente en matière d'hydrographie et de cartographie marine.
Le Secrétariat de l'OHI est basé à Monaco et dirigé par un Secrétaire général et assisté de deux directeurs. Le Secrétaire général et les deux directeurs sont élus par les Etats Membres de l'OHI lors des sessions ordinaires de l'Assemblée.

3 Employee Information - *Information relative au personnel*

Members of Staff of the IHO are ruled by the Staff Regulations, which set out the duties and obligations, the conditions of service and the basic rights of the Members of staff of the IHO
Les membres du personnel sont régis par le Règlement du personnel, qui énonce les devoirs et obligations, les conditions de service et les droits fondamentaux des membres du personnel du Secrétariat de l'OHI.
The average number of employees during the year was made up as follows :
L'effectif moyen annuel se décompose comme suit :

Secretary general and directors - *Secrétaire général et directeurs*	3
Category A Staff - *Personnel de cat. A*	5
Category B Staff - *Personnel de cat B*	12
	20

4 Dedicated funds for future operations - *Fonds dédiés (pour des opérations ultérieures)*

CONFERENCE FUND - *Fonds pour les Conférences*

The Conference Fund allows the expenses linked to the Int. Hydrographic Assembly to be met.
Le fonds pour les Conférences permet la couverture des dépenses de l'Assemblée hydrographique internationale.

Amount of fund on 1 January 2022- *Montant du fonds au 1er janvier 2022*	310 873,24 €	
Budget Allocation 2022 - *Dotation budgétaire pour 2022*	20 000,00	
Expenditure - *Dépenses*	-56 539,61	
Amount of fund on 31 December 2022 - *Montant du fonds au 31 décembre 2022*		274 333,63 €

RENOVATION AND ENHANCEMENT FUND - *Fonds de rénovation et d'amélioration*

The renovation fund 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 2022 - *Montant du fonds au 1er janvier 2022*	47 955,42	
Budget Allocation 2022 - *Dotation budgétaire pour 2022*	20 000,00	
Expenditure - *Dépenses*	-6 447,50	
Amount of fund on 31 December 2022 - *Montant du fonds au 31 décembre 2022*		61 507,92 €

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 2022 - *Montant du fonds au 1er janvier 2022*	47 129,35	
Expenditure - *Dépenses*	0,00	
Amount of fund on 31 December 2022 - *Montant du fonds au 31 décembre 2022*		47 129,35 €

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 2022 - *Montant du fonds au 1er janvier 2022*	12 747,86	
Registrations fees - *Recettes conférence*		
Expenditure - *Dépenses*	-2 000,00	
Amount of fund on 31 December 2022 - *Montant du fonds au 31 décembre 2022*		10 747,86 €

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 2022 - *Montant du fonds au 1er janvier 2022*	1 634 037,06	
Income - *Revenus :*		
Budget Allocation 2022 - *Dotation budgétaire pour 2022*	18 200,00	
Subvention from the Government of Monaco - *Subvention reçue du Gouvernement*	8 300,00	
Transfer from Nippon Foundation - *Transfert de la Nippon Foundation*	2 984 710,50	
Expenses - *Dépenses :*		
SCUFN Gazetter - SCRUM	-11 290,00	
SEABED 2030	-2 446 633,46	
GEBCO Symposium	-238 442,32	
Amount of fund on 31 December 2022 - *Montant du fonds au 31 décembre 2022*		1 948 881,78 €

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 .

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.

Amount of fund on 1 January 2022 - *Montant du fonds au 1er janvier 2022*	55 062,15	
Income - *Revenus :*		
Sales of the publication "Presentation Library" - *Ventes de la publication "Bibliothèque de présentation"*	4 000,00	
Amount of fund on 31 December 2022 - *Montant du fonds au 31 décembre 2022*		59 062,15 €

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 2022 - *Montant du fonds au 1er janvier 2022*	271 042,00	
Additionnal allowance to meet Financial Regulations Art.18 requirements - *Allocation complémentaire pour satisfaire les dispositions de l'article 18 du règlement financier*	26 783,00	
Amount of fund on 31 December 2022 - *Montant du fonds au 31 décembre 2022*		297 825,00 €

INTERNAL RETIREMENT FUND - *Fonds de retraite interne (FRI)*

The Organization operates a benefit pension scheme known as the Internal Retirement Fund (IRF). Nine 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 triennial 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).
L'OHI gère un fonds de pension dénommé Fonds de retraite interne (FRI).
Neuf 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 triennale 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.

Amount of social liability on 01/01/2022 - *Montant de la dette sociale au 01/01/2022*	3 498 218,55
Budget allocation 2022- *Dotation budgétaire 2022*	150 000,00

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.

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

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

Interests received from Deposit Accounts - *Intérêts perçus par le fonds (D/A)*	8 870,60	
Pensions paid from IRF - *Pensions réglées par le fonds (FRI)*	-236 621,83	
		3 420 467,32
Variation of IRF liability during the year - *Variation annuelle de la dette sociale du FRI*		-207 696,00
Balance of IRF on 31/12/2022- *Solde du compte FRI au 31/12/2022*	1 301 507,32	
Provision for the pensions on 31/12/2022- *Provision pour les pensions au 31/12/2022*	2 020 351,00	
Amount of IRF social liability on 31/12/2022 - *Montant de la dette sociale du FRI au 31/12/2022*		3 212 771,32 €

PROVISION FOR EXTERNAL RETIREMENT - *Provision pour retraites externes*

The IHO has an obligation towards its staff members locally recruted to ensure a retirement pension at least equivalent to the one served by the CAR. To this effect, a contract had been established with an insurance company, Neuflize Vie. In February 2021, Neuflize Vie decided to cancel this contract.

A new contract has been established with another insurance company, GAN VIE, with effect 1st January 2022 which ensures a payment of a pension equivalent CAR on the condition that the capital needed for the payment of this pension is totally paid by the IHO on retirement of the Staff Member. This engagement is calculated and ajusted every year. This discounted value (discounted rate 0,8%) of this engagement by the end of 2021 is estimated by the insurance company GAN to be 1,9 M€. The funds already disbursed by december 31, 2022 amount to 1,8 M€.

L'OHI a l'obligation d'assurer à ses membres du personnel recrutés localement une pension de retraite au moins équivalente à la CAR. A cet effet, un contrat avait été souscrit auprès d'une compagnie d'assurance, Neuflize Vie. En février 2021, Neuflize Vie a décidé d'annuler ce contrat.

Un nouveau contrat a été souscrit à partir de janvier 2022 auprès d'une autre compagnie d'assurance, GAN VIE, qui assure une pension au moins équivalente à celle versée par la CAR, à la condition que le capital nécessaire au paiement de cette pension soit versé intégralement à GAN au moment du départ à la retraite du salarié.

Cet engagement est calculé et ajusté tous les ans. La valeur actualisée (taux de 0,8 %) de ces engagements, calculée par la compagnie d'assurance GAN, s'élève au 31 décembre 2022 à 1,9 M€.

Les fonds versés jusqu'au 31 décembre 2022 s'élèvent quant-à eux à 1,8 M€.

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 levés hydrographiques et en cartographie marine nécessaires.

Amount of fund on 1 January 2022 - *Montant du fonds au 1er janvier 2022*	1 666 789,75	
Income - *Revenus:*		
IHO Budget Allocation 2022 - *Dotation budgétaire de l'OHI pour 2022*	100 000,00	
Support from the Republic of Korea - *Soutien reçu de la République de Corée*	507 828,83	
Support from Japan - *Soutien reçu du Japon*	499 957,00	2 774 575,58
Expenses - *Dépenses :*		
Activities supported by the Rep.of Korea - *Activités financées par la Rep. de Corée*	-556 554,42	
Activities supported by Japan - *Activités financées par le Japon*	-333 504,90	
Activities supported by Canada - *Activités financées par le Canada*		
Activities supported by IHO Capacity Building Fund - *Activités financées par le fonds*	-220 682,08	
		-1 110 741,40
Amount of fund on 31 December 2022 - *Montant du fonds au 31 décembre 2022*		1 663 834,18 €

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
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

Amount of fund on 1 January 2022 - *Montant du fonds au 1er janvier 2022*	254 430,53	
IHO Budget Allocation 2022 - *Dotation budgétaire de l'OHI pour 2022*	80 000,00	
Support from 2021 result - *Affectation du résultat 2021*	-	
Expenses in relation to special projects	-41 994,53	
Amount of fund on 31st December 2022 - *Montant du fonds au 31 décembre 2022*		292 436,00 €

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 2022- *Montant du fonds au 1er janvier 2022*	85 110,64	
Fees levied on institutions seeking recognition by IBSC - *Honoraires facturés aux institutions souhaitant obtenir l'homologation IBSC*	21 771,45	
Travel expenses - *Frais de voyages*	-40 809,96	
Amount of fund on 31 December 2022 - *Montant du fonds au 31 décembre 2022*		66 072,13 €

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.

AUDITORS REPORT

RAPPORT DU COMMISSAIRE AUX COMPTES

PASCALE TARAMAZZO

EXPERT – COMPTABLE

MEMBRE DE L'ORDRE DES EXPERTS COMPTABLES DE LA PRINCIPAUTE DE MONACO

Independent auditor's report

International Hydrographic Organization
4, Quai Antoine 1er
98000 Monaco
MONACO

As auditor appointed by the IHO Secretary-General, for the financial years 2022 following the unilateral resignation of PwC in April 2022, and subject to the endorsement of our appointment by the forthcoming meeting of the IHO Finance Committee 1st May 2023, we present our report.

Report on the audit of the financial statements

Our opinion

In our opinion, International Hydrographic Organization's financial statements present fairly, in all material respects, the balance sheet of the Organization as at December 31, 2022, and its profit and loss statement for the year then ended in accordance with the accounting principles selected and disclosed by the Organization as set out in the notes to the financial statements, under the following limitation :

In the context of the new contract with GAN VIE to fully externalize the pension obligations set out by the Staff Regulations for the Organization's local staff and following the provisions taken from the 2021 result of €498,975, settled in the 2022 financial year, we have noted that your financial statements as at 31/12/22 include new flat-rate provisions which have been accounted for by an allocation from the 2021 result of €220,000 and by an allocation taken from the 2022 result for €250,000. The documentation provided to date does not allow us to reconcile these amounts with the totality of the contributions provided for in the contract with the insurer and to measure these contributions to the valuation of a commitment at the end of 2055 updated to 31/12/22.

What we have audited

International Hydrographic Organization's financial statements are comprised of:

- The balance sheet as at December 31, 2022 ;
- The profit and loss statement for the years then ended ;
- The notes to the financial statements.

Basis for opinion
We conducted our audit in accordance with International Standards on Auditing (ISAs).
Our responsibilities under those standards are further described in the Auditor's responsibilities for the audit of the financial statements section of our report.
We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion except the limitation above

Independence
We are independent of the Organization in accordance with the International Ethics Standards Board for Accountants' Code of Ethics for Professional Accountants (IESBA Code). We have fulfilled our other ethical responsibilities in accordance with the IESBA Code.

Basis of accounting and restriction on distribution and use
We draw attention to Note 1"Accounting policies" to the financial statements, which describes the basis of accounting. The financial statements are prepared for the Organization's member states. As a result, the financial statements may not be suitable for another purpose. Our report is intended solely for the Organization's member states and should not be distributed to or used by parties other than the Organization's member states. Our opinion is not modified in respect of this matter.

Other information

The Secretary General is responsible for the other information. The annual Report 2022- Part 2-Finances-Table 3 constitutes the other information for the year ended December 31, 2022. It includes the financial statements referred to here above and our auditor's report thereon as well as the Profit and Loss Statement as of 31 December 2022.

Our opinion on the financial statements does not cover the other information and we do not express any form of assurance conclusion thereon except for the financial statements subject to our auditor's report.

In connection with our audit of the financial statements, our responsibility is to read the other information identified above and, in doing so, consider whether the other information is materially inconsistent with the financial statements.

Responsibilities of the Secretary General and those in charge of governance for the financial statements

The Secretary General is responsible for the preparation and fair presentation of the financial statements in accordance with the accounting principles selected and disclosed by the Organization as set out in the notes to the financial statements, and for such internal control as Secretary General determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, Secretary General is responsible for assessing the Organization's ability to continue as a going concern, disclosing, as applicable, matters related to

going concern and using the going concern basis of accounting unless Secretary General either intends to liquidate the Organization or to cease operations, or has no realistic alternative but to do so.

Those in charge of governance are responsible for overseeing the Organization's financial reporting process.

Auditor's responsibilities for the audit of the financial statements

Our objective are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report the includes our opinion. Reasonable assurance in a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs will always detect a material misstatement when it exists.
Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, the could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.
As part of an audit in accordance with ISAs, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of intern control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Organization's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by Secretary General.

- Conclude on the appropriateness of Secretary General's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Organization's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Organization to cease to continue as a going concern.

- Evaluate the overall presentations, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Date: 19/04/2023

Pascale TARAMAZZO
Le Commissaire aux comptes