



IHO Input to Part 2 of the Report of the UN Secretary General on Oceans and Law of the Sea

This contribution is provided in response to letter *LOS/SGR/2015* dated 25 May 2015 as the input from the International Hydrographic Organization to Part 2 of the Report of the UN Secretary General on Oceans and Law of the Sea. It addresses developments and issues relating to ocean affairs and the law of the sea, including the implementation of the resolution.

Executive Summary

The International Hydrographic Organization (IHO) is the inter-governmental organization whose principal aim is to ensure that all the world's seas, oceans and navigable waters are surveyed and charted by bringing together the national hydrographic agencies responsible for the conduct of hydrographic surveys, the production of nautical charts and the distribution of Maritime Safety Information (MSI) in accordance with the requirement set out in the International Convention for the Safety of Life at Sea (SOLAS). The current membership of the IHO stands at 85 Member States with 7 other States in the process of joining the Organization.

Although safety of navigation remains a major driver for the IHO, hydrographic products and services are meant to support all activities associated with the seas and oceans. As every human activity conducted in, on or under the sea depends on knowing the depth and the nature of the seafloor and an understanding of the tides and the currents, hydrography is an essential foundation to the development of the Blue Economy. Yet, mankind has higher resolution maps of the Moon and Mars than for most of the seas and oceans. This has a big impact on what mankind can do at sea today in a safe, and economical and sustainable way. It is impeding progress and economic development in many, if not most, States and has a major impact on the effective management, sustainable exploitation, and well-informed policing of the seas and oceans. This situation results notably from the fact that only about half of the States Parties to the SOLAS Convention have arrangements in place to provide adequate hydrographic surveying and nautical chart services. In this context, it is important to continue to call upon States that have not yet done so to consider actively becoming members of the IHO, and urge all States to work with the IHO to increase the coverage of hydrographic information on a global basis.

All coastal States should be encouraged to ensure that their seas and coastal areas are properly surveyed and charted. This will directly support safety of navigation and protection of the marine environment. There are currently 162 States Party to SOLAS 1974, 167 States Party to the UN Convention on the Law of the Sea and more than 180 States that have a recognisable coastline. Perversely, there are only 85 Member States that are Members of the IHO, with a further seven States in various stages of joining the Organization.

Through its active technical and capacity building programmes conducted in close liaison with other international organizations, notably the International Maritime Organization and the Intergovernmental Oceanographic Commission, the IHO supports the development and improvement of hydrographic and nautical charting standards, products and services, especially in digital formats. These capabilities contribute directly to safe navigation, informed marine spatial planning and coastal management and the prevention of natural disasters. They provide also a technical basis for the implementation of the UN Convention on the Law of the Sea.

General

1. The International Hydrographic Organization (IHO) is the inter-governmental organization whose principal aim is to ensure that all the world's seas, oceans and navigable waters are surveyed and charted, through the coordinated endeavours of national Hydrographic Offices as well as the distribution of Maritime Safety Information (MSI). The requirement to provide these services is set out in Regulation 9 of Chapter V of the International Convention for the Safety of Life at Sea (SOLAS) and is therefore an obligation placed on all contracting governments. Regulation 9 requires, among other things, that States:

“... ensure that hydrographic surveying is carried out, as far as possible, adequate to the requirements of safe navigation”. The IHO has been hosted by the Government of Monaco since its creation in 1921 and its current membership stands at 85 Member States with 7 other coastal States in the process of joining the Organization.

2. The reference to “navigable waters” does not mean that the IHO is concerned only about safety of navigation. Although supporting safety of navigation is a major priority for all national Hydrographic Offices, their products and services, in some way or another, support all activities that take place on, in or under the sea. This was highlighted in the two most recent themes for World Hydrography Day: “Hydrography - underpinning the Blue Economy” in 2013, “Hydrography - much more than just nautical charts” in 2014. The IHO is one of the important actors underpinning the sustainable development of the oceans.

3. Hydrography involves measuring the depth of the water (bathymetry) and fixing the position of all the navigational hazards that lie on the seafloor, such as wrecks and rocks. This is done mainly with specialized ships and boats operating echo sounders and sonars, but also using survey aircraft fitted with lasers. Useful information is increasingly being derived from satellite observations. Hydrography also involves measuring the tide and the currents.

4. Hydrographic information is essential for the safe, efficient and sustainable conduct of every human activity that takes place in, on or under the sea. Without hydrography, no ship sails; without hydrography, no port is built; without hydrography; no offshore infrastructure is developed; without hydrography, no environmental plan is implemented; without hydrography, no shore is defended, no island protected; without hydrography, no search and rescue operation is attempted, without hydrography, no maritime boundary is delimited. Therefore, hydrography is inherent to the three dimensions of the sustainable development of the oceans, ensuring that the marine environment is respected and that no adverse economic or social impact is incurred.

5. As has already been reported in the IHO contribution to Part 1 of the Report of the Secretary-General on the Oceans and Law of the Sea, mankind has higher resolution maps of the Moon and Mars than for most of the seas and oceans. Accordingly, the theme for World Hydrography Day 2015 is “*Our seas and waterways - yet to be fully charted and explored*”

6. The recent activities of the IHO that are relevant to ocean affairs and the law of the sea concern four areas: developing standards, guidance, products and services; building capacities; raising awareness on the role of hydrography; and contributing to the promotion of the marine dimension in global agendas.

Developing standards, guidance, products and services

7. The IHO develops and adopts standards and guidance that ensure that hydrographic information is available and can be delivered to users through appropriate harmonized and interoperable products and services. The current maintenance of existing standards and the development of new ones are driven by the need to continue to satisfy the SOLAS requirements of enhancing safety of navigational, and more recently, supporting the implementation of “e-navigation”, which is being led by the UN’s International Maritime Organization (IMO). Both elements require easy access to standardized high quality digital geographic information that can support marine spatial management. Accordingly, the new generation IHO standards provide for digital products and services under the framework of the IHO standard known as S-100 - *Universal Hydrographic Model*. An improved version of S-100 has been published and a number of S-100 based product specifications are being developed by the IHO and other partner organizations, many of which are now at the test data set stage. S-100 has been recognized by the International Maritime Organization (IMO) as the baseline standard for creating a common maritime data structure for e-navigation data access and services.

8. The IHO is also developing and maintaining guidelines to assist stakeholders in implementing the requirement of international instruments such as UNCLOS and SOLAS. An example of which is the 5th Edition of the Manual on Technical Aspects of the UN Convention on the Law of the Sea (TALOS Manual - IHO Publication C-51) published in June 2014. The TALOS Manual is maintained jointly by the IHO and the International Association of Geodesy (IAG). Its purpose is to provide guidance in order to ensure maximum international standardization of the technical aspects of UNCLOS. Edition 5.0.0 was

introduced at the 25th meeting of States Parties to the Convention on the Law of the Sea (UN-SPLOS25 in June 2015). The Manual can be downloaded free from the IHO website¹.

9. IHO standards and guidelines intended to assist coastal States meet their obligations and requirements fall under three main themes:

- nautical charts, issued on paper or in digital format (Electronic Navigational Charts), which are produced by national Hydrographic Offices to support safe navigation in accordance with the requirements of SOLAS;
- the maritime component of spatial data infrastructures being developed at the national and regional levels, which includes in particular high resolution bathymetry (depth data) compiled by national Hydrographic Offices;
- the global reference bathymetric data sets developed and made available through the GEBCO project (General Bathymetric Chart of the Oceans) operated jointly by the IHO and the UN's Intergovernmental Oceanographic Commission (IOC).

10. The IHO continues to encourage and support its Member States to achieve an adequate global coverage of nautical charts and to contribute to the development of maritime spatial data infrastructures. To assist in prioritizing charting improvements and resource allocation, the IHO is promoting the use of risk assessment methodology.

11. The current worldwide coverage of Electronic Navigational Charts is approaching the corresponding paper chart coverage. Further progress is hindered by the lack of reliable survey data and the allocation of appropriate resources and priority by the governments of many coastal States. While most of the world's established shipping routes are relatively safe navigationally because of widespread use by many ships over many years, the advent of larger vessels and the need for vessels to travel to new destinations, in particular with regard to the expansion of the cruise industry, are not being supported by adequate surveys and charts. In that respect, the polar regions are a major area of concern. The IHO ensured that the relevant risks and precautionary measures have been reflected in the International Code for Ships Operating in Polar Waters (Polar Code) which was adopted in 2014 by the IMO. The IHO also prompted the 37th Antarctic Treaty Consultative Meeting to adopt a Resolution on Strengthening Cooperation in Hydrographic Surveying and Charting of Antarctic Waters.

12. The IHO has prepared a new edition of publication S-66 – *Facts about Electronic Charts and Carriage Requirements* – the preparation of which was undertaken by a focused project team. This new edition reflects the changes that have occurred since the first edition was published in January 2010.

Building capacities

13. Capacity building continues to be an important component of the IHO Work Programme. The IHO defines capacity building as the process by which the Organization assesses the status of current arrangements and assists States to achieve sustainable development and improvement in their ability to meet hydrographic, cartographic and maritime safety obligations with particular reference to recommendations in UNCLOS, SOLAS, and other international instruments. The scope encompasses all hydrographic needs as it underpins every other activity associated with the sea, including safety of navigation, protection of the marine environment, national infrastructure development, coastal zone management, marine exploration, marine resource exploitation (minerals, fishing, etc.), maritime boundary delimitation, maritime defence and security, and coastal disaster management.

14. A revised version of the IHO Capacity Building Strategy was reviewed and endorsed by the International Hydrographic Conference (equivalent to an Assembly in other intergovernmental organizations) in 2014. This updated version stipulates that the focus should be on achieving enduring output which will benefit safe navigation, safety of life at sea, protection of the marine environment and economic development, rather than on creating enabling infrastructure per se.

15. The IHO Capacity Building programme is funded from the IHO budget and is supplemented by additional support from Member States; however, considering the growing demands for IHO Capacity Building activities, more funds and contributions are required. Expenditure in the IHO CB programme

¹ www.iho.int.

(about 400,000€ in 2015) continues to grow year on year. Active coordination with other agencies involved in capacity building, ensures that the priorities and joint policies that can reinforce each capacity building programme are assessed and progressed. The 8th annual Joint IHO/IMO/WMO/IOC/IALA/IAEA/FIG Capacity Building Coordination Meeting was held in November 2014, at the FIG Headquarters in Copenhagen (Denmark). Participants from the IHO, IMO, WMO, IOC, IALA and FIG committed to offer mutual assistance in obtaining high level contacts in countries where the member organizations need to improve awareness and to work as much as possible under the United Nations theme of "Deliver as one". The meeting agreed that information should be shared on the establishment of regional training hubs and advances in distance/e-learning; furthermore, the meeting saw benefits in further information exchange between member organizations.

Raising awareness on the role of hydrography

16. The theme of the World Hydrography Day (WHD) for 2014 was "Hydrography - much more than just nautical charts" highlighting the significant value of hydrography to all human activities that take place in, on or under the sea. A number of WHD events were held by Member States of the IHO including in Bangladesh, Brazil, Chile, Japan, Mauritius, Monaco, Nigeria, Poland, Spain, United Kingdom and USA.

17. The theme for the celebration of World Hydrography Day 2015 (WHD-2015) - "Our seas and waterways - yet to be fully charted and explored" - aims to raise awareness and attract support for improving the currently unsatisfactory situation regarding the lack of hydrographic data in many parts of the world, including coastal waters as well as in the deep ocean. The IHO estimates that more than 50% of the world's coastal waters remain unsurveyed, while the depth has only been measured directly in less than 10% of the deeper ocean areas. The 2015 theme offers the opportunity to highlight both the missed opportunities and the potential risks involved in the continuing development of the so-called "Blue Economy" and all other human-related activities taking place at sea, at a time when mankind still has a relatively limited knowledge of the nature and the shape of much of the seafloor and the hazards that lie upon it. The theme also provides the opportunity to promote and encourage innovative supplementary data gathering initiatives to address the current shortfall in useful bathymetric data, including crowd-sourcing and satellite derived bathymetry that are being actively considered by the IHO, its Regional Hydrographic Commissions and its Member States.

18. Raising awareness on the role of hydrography was also the objective of technical assessment and advisory visits made by the IHO in 2014-2015 to Jordan, Lebanon, Nicaragua and Samoa.

Promoting the marine dimension in global agendas

19. The IHO Secretariat has contributed directly to two agenda items of the UN Committee of Experts on Global Geospatial Information Management (UN-GGIM): the global map for sustainable development and the implementation and adoption of standards for global geospatial information.

20. A "Guide to the Role of Standards in Geospatial Information Management" and a "Companion Document on Standards Recommendations by Tier" was prepared cooperatively by the Open Geospatial Consortium (OGC), the Technical Committee 211 on Geographic information/Geomatics of the International Organization for Standardization (ISO) and the IHO to assist Member States in implementing and adopting geospatial standards within their national frameworks. This is as relevant for the sea as it is for the land. The Guide supports the growing recognition in both government and the private sector that geography is a vital component of effective decision making and notes that geospatial information must be easy to access and use in order to leverage its value. The Guide explains that standards have a key role in this respect and are essential to delivering authoritative geospatial services and products which meet the requirements of the wider community of users. Standards and conformance provide significant value to society and government, are essential for an expanding national economy and vital to the global competitiveness of both industry and nations. The three authoring organizations are continuing their work by preparing a further supplement to the Guide and Companion Document that identifies real-world examples and value statements illustrating the benefits of adopting and using international geo-data standards.

21. The IHO is a participating organization to GEO, the "Group on Earth Observations". GEO is a voluntary partnership of governments and international organizations which is coordinating efforts to

build a Global Earth Observation System of Systems (GEOSS) in order to exploit the growing potential of Earth observations to support decision making in an increasingly complex and environmentally stressed world. At the plenary sessions of GEO in January and November 2014, the IHO supported the objective of improving global coverage and availability of earth observation data, products and services as a foundation for sustainable growth and expressed its concerns related to the inadequate status of hydrographic surveys and nautical charting in many parts of the world's coastal waters, and most of the world's seas and oceans. The IHO highlighted the need for coordinating and bridging the various programmes and initiatives dealing with the observation of the Earth at the national, regional and international levels, in order to make better use of existing arrangements, avoid duplication, address gaps and improve overall efficiency. The IHO statement also noted that its capacity building programme contributes to the strengthening of the engagement of GEO with developing countries.

Ocean bathymetry

22. The General Bathymetric Chart of the Ocean (GEBCO) project is a joint programme that is executed under the governance of the IHO and the Intergovernmental Oceanographic Commission (IOC) of UNESCO. GEBCO is directed by a Guiding Committee made up of representatives from both IHO and IOC and is supported by a Technical Sub-Committee on Ocean Mapping (TSCOM), a Sub-Committee on Undersea Feature Names (SCUFN), a Sub-Committee on Regional Undersea Mapping (SCRUM), and a Nippon Foundation/GEBCO Training Project Management Committee.

23. Through the work of its organs, GEBCO produces and makes available a range of bathymetric data sets and products, including gridded bathymetric data sets, the GEBCO Digital Atlas, the GEBCO world map and the GEBCO Gazetteer of Undersea Feature Names. The lead GEBCO bathymetric product is a global seabed model at 30 arc second grid interval. A new version of the GEBCO Grid, GEBCO_2014, was released in December 2014. It is a significant update to the previous GEBCO_08 released in January 2009. The grid is presently available in netCDF form with additional formats to be made available; it is also available as a web map service². A significant source of data for this product is the IHO Data Centre for Digital Bathymetry (DCDB).

24. One of the primary objectives of the IHO DCDB is to provide an authoritative source of bathymetry for ocean mapping requirements. In order to achieve this, GEBCO proactively collects, stores and disseminates bathymetric data for the world's oceans. GEBCO has worked towards improving its participation in regional mapping activities and has appointed representatives to participate in selected meetings of Regional Hydrographic Commissions that operate under the umbrella of the IHO. Traditionally GEBCO has focused on waters deeper than about 200m; however, it is now actively collecting data in shallow water areas to support activities such as coastal zone management and development, and the mitigation of marine disasters such as storm and tsunami inundation.

Awareness of hydrography and the future

25. Increased IHO involvement in international initiatives, such as the Group on Earth Observation (GEO) and the United Nations initiative on Global Geospatial Information Management (UN-GGIM) means that there is a relatively small but growing acknowledgement and awareness of the relevance and the underpinning contribution that hydrographic information can make in the context of the post-2015 development agenda and specifically in global geospatial data infrastructures. The collection of crowd-sourced bathymetry, to improve the currently unsatisfactory world's bathymetric data set, is an initiative being led by the IHO to compensate for the declining governmental effort directed at the more remote parts of the world. It is also hoped that progress in the development of satellite derived bathymetry will significantly contribute quality data in shallow areas to complement efforts in the deep parts of the ocean.

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² See www.gebco.net.