Subject: Request for input on Trends, Developments and Challenges for IMO's strategic framework for 2018-2023

References:
A. IMO Circular letter No.3574 dated 14 August 2015

1. This overview is submitted by the Secretariat of the International Hydrographic Organization (IHO) in response to Reference A that seeks information related to the trends, developments and challenges facing the IMO and the maritime community for the 2018-2023 period in order to develop your Organization's strategic framework for that period.

Introduction
2. Almost every human activity that takes place in, on or under the sea requires some knowledge of the hydrography of the area - in other words, knowledge of the shape and nature of the seafloor, its characteristics and its hazards. These activities include:

- safety of navigation
- maritime defence and security
- marine resources - minerals, fishing
- maritime trade
- coastal zone management
- seaborne tourism
- environmental protection and management
- search and rescue
- maritime boundaries and policing
- marine science
3. The national Hydrographic Services or Authorities of coastal States provide an essential service to the transport infrastructure. National Hydrographic Services support safe and efficient navigation, foster national maritime development, help to safeguard life and property at sea, facilitate the protection of the marine environment and support the administration and sustainable development of the national maritime zones. National Hydrographic Services also support national security and maritime defence.

4. The Hydrographic Services of some coastal States are amongst the oldest governmental institutions, several having been established in the 18th Century. To date, they have contributed significantly to the expansion of world trade. These Services have been most successful in their mission of improving the safety and efficiency of maritime trade, so that nowadays, like other utilities, they are most often taken for granted.

5. Nevertheless, there is continuing concern that too few coastal States are supporting hydrography at the national level, despite the fact that there are many areas of the world that still lack adequate nautical charts and supporting services. This poses a real and continuing threat to safety of life at sea and to the well-being of the marine environment. Furthermore, many Governments of coastal States are unaware of the important contribution that hydrography and nautical charting services can make to their national economic development.

Discussion

Benefits of Hydrography

6. Investment in a national Hydrographic Service improves safety at sea, increases the protection of the marine environment and advances national development. This means more efficient and safe maritime transport, leading to improved international and coastal trade.

7. In addition to supporting maritime trade, hydrography underpins almost 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.

8. In many coastal States, a national Hydrographic Service exists. Some have greater capability than others. However, there are still a significant number of countries where the Government may not yet have appreciated the advantages to be gained from supporting such a level of capability and no recognisable national service is available. These Governments may also be unaware of their international obligations to ensure that appropriate levels of hydrographic and nautical charting services are in place for their waters, in particular, the obligations under Regulation 9 of Chapter V of the Convention on the Safety of life at Sea (SOLAS V/9) and relevant parts of the UN Convention on the Law of the Sea (UNCLOS).

9. More than 90% of international trade in the world is carried by sea. Maritime commerce is a basic enabler for the economies of most nations. Many areas and ports in the world do not have accurate nor adequate nautical chart coverage. Modern nautical charts are required for safe navigation through the waters of a country and to enter its ports. A lack of adequate nautical charts inhibits or prevents the development of maritime trade.

10. The shipping industry seeks efficiency and safety. Poorly charted areas and a lack of relevant information causes voyages to be longer than necessary, and may prevent the optimum loading of ships, thus increasing overall costs. The saving of time and money resulting from the use of shorter and deeper routes and the possibility to use larger ships or load ships more deeply generate important economies for national industry and commerce. It is also noteworthy to consider that Chapter V of the
SOLAS Convention considers a ship unseaworthy if it does not carry up-to-date charts necessary for its intended voyage.

11. Modern charts also provide information required to create the routeing systems established in accordance with international Conventions and to meet the economic interests of a coastal State.

The State of Surveying and Charting Worldwide

12. Despite the efforts of the 85 countries that belong to the IHO and a combined fleet of about 400 hydrographic survey vessels, with additional hydrographic launches, plus aircraft and helicopters, less than 10 percent of the world’s seas, oceans and navigable waterways are surveyed to modern standards. There are higher resolution maps of the Moon, Mars and Venus than for most of the world’s sea and ocean areas. The numbers of government owned surveying vessels has actually declined by one-third over the last three decades. This reduction has not been matched or overtaken by a compensating increase in capacity through the use of more efficient technology or through governments opting to use commercial surveying contractors.

- **Less than 10% of the World’s coastal seas and oceans have been surveyed and charted to the same or better resolution than maps of the Moon and Mars.**
  (International Council for Science - SCOR)

- **Worldwide, the number of government survey vessels has declined by 35% in the last 30 years - contract surveys, improved equipment capability and other options have not filled the gap.**
  (IHO Year Books 1979-2011)

- **In many parts of the World the quality and coverage of hydrographic surveys require significant improvement.**
  (XVIIIth IHO Conference Resolution 2012)

13. The wide use of accurate satellite positioning and electronic chart systems has aggravated the issue of inadequate surveys. Most existing nautical charts are based on hydrographic surveys which were generally conducted using the best position-fixing technology available at the time. This means that the accuracy of surveys conducted before the advent of GNSS systems in the late 1980s is generally less accurate than current navigation with GNSS. The consequence is that, although a modern vessel may know its position to an accuracy of better than 10 metres, the positions of objects on the seabed may only be known to an accuracy of 20 metres or much worse, depending on the age of the latest survey and/or its distance from the coast. This means that the charted detail on an electronic navigational chart (ENC) may not be as accurate as the GNSS position of the ship displayed on its Electronic Chart Display and Information System (ECDIS). Mariners trained with modern navigation equipment tend to overlook the fact that caution is needed when planning and navigating to ensure that there is a sufficient safety margin between charted hazards and the ship’s intended route to allow for the precision of charted features.

14. IHO statistics\(^1\) show that the coverage of survey data is particularly poor in the Caribbean, Indian and Pacific Oceans and the Polar regions, but all areas of the World are affected to some extent, including the waters of many, if not most, modern, developed States.

Examples of unsurveyed areas or areas requiring better data in the 0-200m depth zones are:

- SW Pacific > 95%
- Polar regions > 95%
- Caribbean > 80%
- W. Africa > 80%
- Australia 45% / 20% to be re-surveyed
- UK 29%

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\(^1\) IHO Publication C-55 - Status of Surveying and Charting Worldwide
IHO figures indicate that at least 50% of the World’s coastal waters are unsurveyed or are inadequately surveyed. This unsatisfactory situation must be recognized by all States with maritime interests and acted upon. Improving this unsatisfactory situation requires the involvement of every State with maritime interests. It is a collective problem. It is estimated, at the current rate of progress, the remaining survey effort would take about 600 ship years to complete.

Total Value of Hydrography to a National Economy

A great variety of benefits flowing from the work of a national Hydrographic Service have been identified in the preceding paragraphs. It is clear that hydrographic information forms a vital and valuable part of the national transport infrastructure as well as the national spatial data infrastructure.

It is difficult to quantify the full economic and commercial benefits that flow from a national hydrographic programme, but several studies by IHO Member States indicate that the cost versus benefit ratio of investing in hydrography is more than 1:10. It is also true that the volume of global maritime trade is growing continuously, and that, the exploitation and sustainable development of national maritime zones become a major preoccupation of governments and industry.

For most ships, 30 cm extra depth shown on a chart allows at least 2,000 tonnes more cargo to be carried. Passengers from a typical modern cruise ship spend over $250,000 in port every day.

The economic importance of national hydrographic programmes can easily be emphasized by posing the question:

What would be the economic implications if there were no hydrographic services?

Answers would include:

- Poor or dangerous maritime facilities resulting in reduced maritime trade
- Underdeveloped fishery activities
- Poor development of marine recreation and boating
- Poor protection of coastal areas from maritime disasters (tsunamis, typhoons etc…)
- Difficulty in managing and developing the coastal zone
- Limited support to national and international shipping affecting safety, the environment and mariners' lives
- It will be difficult to support and progress the exploitation of marine resources
- Inability to properly delimit, declare and enforce national maritime boundaries

These answers all highlight the need to provide hydrographic services in a coastal State.

Mankind is turning increasingly to the sea for additional resources. Over 90% of world trade is carried by sea. Ships are getting bigger and more numerous. They are also looking towards newer routes with larger vessels - access to polar routes and the prospect of larger vessels transiting the world’s major inter-ocean canals will place renewed reliance on out of date or inadequate charts. The growth in mariculture, offshore energy and structures continue to increase. The lack of up to date and adequate nautical charts introduces significant risks to the environment, to prosperity and to ultimate success.

Maritime Safety Information (MSI)

The maritime safety information service of the Global Maritime Distress and Safety System (GMDSS) is the internationally and nationally coordinated network of broadcasts containing...

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3 typical tonnes per centimetre tables

4 Cruise Line International Association, 2010
information which is necessary for safe navigation, received in ships by equipment which automatically monitors the appropriate transmissions, displays information which is relevant to the ship and provides a print capability.

22. Maritime safety information is of vital concern to all ships. It is therefore essential that common standards are applied to the collection, editing and dissemination of this information. Only by doing so will the mariners be assured of receiving the information they need, in a form which they understand, at the earliest possible time.

23. Many coastal States do not have the necessary national structures in place to provide regular and reliable MSI to their designated NAVAREA Coordinator. The IHO focuses considerable resources, through its Capacity Building (CB) programme, on training and development of operators capable of providing the relevant information necessary to meet their national SOLAS obligations of ‘collection and circulation of nautical information, necessary to maintain existing charts and publications up to date’; however the retention of these trained people within their maritime organizations remains a challenge. It is often the case that those who receive training on the CB MSI course are reappointed to non-maritime roles within 12 months of completing the course.

Capacity Building

24. In the IHO, capacity building is defined 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 SOLAS, UNCLOS 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.

25. Many countries do not yet have appropriate structures and organizations in place to survey and chart their maritime areas or circulate the relevant nautical information. The IHO, increasingly in cooperation with other organizations such as the IMO and IALA, provides capacity building support to developing nations so that they are able to provide suitable services for the mariner and ship operators.

26. The IHO capacity building programme provides advisory and technical visits to developing countries (both IHO Member States and others) on request. The IHO encourages the formation of bilateral, multilateral and multinational agreements between nations and international organizations for technical cooperation in hydrographic projects, including the provision of vessels, equipment, joint hydrographic surveys, training and supervisory expertise. The IHO also maintains close contact with international funding agencies.

IHO Membership

27. The 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 UN and is recognized as the competent international authority regarding hydrography and nautical charting. The IHO is made up of countries that have acceded to the Convention on the IHO. Each Member State is usually represented by its national Hydrographer or equivalent national authority.

28. Most recently, Brunei Darussalam, Georgia and Viet Nam joined the IHO. Malta, Republic of Congo, Solomon Islands and Vanuatu have recently applied to join; whilst Bulgaria, Haiti, Mauritania and Sierra Leone have all received the required number of approvals and only need to deposit their instruments of accession to the Convention with the government of Monaco to become full members. There remains a significant number of coastal States, and in particular some major Flag states that are not Member States of the IHO: among the six IMO Member States declaring a tonnage higher than
only one is a Member State of the IHO and one has applied for membership. In this context, most of these States have significant maritime interests and a dependency on the seas and oceans and are therefore active participants in the IMO. However, these States do not appear to place a priority on hydrography and ensuring that appropriate national hydrographic services and facilities are in place around the World to support their fleet and therefore their interests.

Summary and Conclusions of particular relevance to IMO

29. Hydrography is a fundamental enabler to every human activity that takes place in, on or under the sea. It is therefore a very significant factor in the successful implementation of much of the work of the IMO. Poor hydrographic knowledge threatens all shipborne activities under the purview of the IMO.

30. Much of the World’s seas, oceans and navigable waterways remain unsurveyed or inadequately surveyed to meet modern shipping requirements. Ever larger vessels and vessels operating in less frequented waters are particularly at risk. This may have an impact on the regulatory framework that IMO establishes for such vessels.

31. Many coastal States do not have an effective arrangement in place to ensure that appropriate hydrographic services are in place, as required by SOLAS V/9. The governance and implementation of all aspects of SOLAS is the responsibility of the IMO.

32. The IHO stands ready to assist coastal States to establish or improve their provision of appropriate hydrographic services. This capacity building activity should continue to be coordinated with other intergovernmental organizations such as the IMO and its Technical Cooperation Program.

33. Only half of the Member States of the IMO are also Member States of the IHO. This means, in effect, that 85 IHO Member States are being left to coordinate and address the significant and concerning shortfall in hydrographic knowledge of the World’s seas, oceans and navigable waterways. In particular, it is concerning that several Member States of the IMO with a very significant global tonnage are not Member States of the IHO and are therefore not fully contributing to the efforts to address the unsatisfactory situation where there are higher resolution maps of the Moon, Mars and Venus than there are of many parts of our seas, oceans and coastal waters.

On behalf of the Directing Committee
Yours sincerely,

Robert WARD
President

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5 See A2/A/1.04 (NV.90) – Revised Notice of 2015 Assessment