

The International Hydrographic Organization Posturing for the Future

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SUMMARY

Recent developments in international regulations and social policy have brought hydrography into greater prominence as a key component of economic, environmental and social development. The coming into force of new regulations in Chapter V of the International Maritime Organization Convention on Safety of Life at Sea (SOLAS V) has obligated Coastal States to provide hydrographic information to the mariner. The Commission on the Limits of the Continental Shelf received the first claim for an extended continental shelf as provided for under the United Nations Convention of Law of Sea (UNCLOS) Article 76. The World Summit on Sustainable Development (WSSD) brought further focus on the need to enact an implementation plan that provided for sustainable economic, environmental and social development. The International Hydrographic Organization is addressing the importance of hydrography to these watershed events.

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1. INTRODUCTION

Hydrography has a rich heritage and claims a rightful place in history as an enabler for the rapid economic and social advances made in the eighteenth and nineteenth centuries. Culture and the economy flourished as early explorers opened new trade routes and fostered cultural exchanges. The data collected by these early mariners remain an important source of navigational information on many current nautical charts. The last half of the twentieth century has seen remarkable advances in technology that has revolutionized hydrographic survey. Precise positioning and complete coverage of bathymetric features provides a certitude of hazard identification here to fore unrealized but the number of charts based on data collected with these new techniques is a fraction of the requirement. The advent of Electronic Charting Systems, most notably Electronic Chart Information and Display Systems (ECDIS) can markedly enhance safety of navigation and efficiency of maritime operations but its wide spread use is inhibited by lack of coverage, lack of availability, lack of consistency and complicated access to Electronic Navigational Charts (ENC). The United Nations has merged the two issues of the plight of the developing countries and the deterioration of our natural environment into action plans for sustainable development for the future. Hydrography plays a key role in the advancement of developing nations and the monitoring and protection of the environment.

The International Hydrographic Organization recognizes the historical and future importance of hydrography and is embarking on new initiatives to ensure hydrographic capabilities are employed in support of emerging needs.

2. SAFETY OF NAVIGATION

Hydrography has always been employed primarily to support safety of navigation. Initially, the pilot or master closely guarded hydrographic data for his own use but the staggering loss of life and impact on commerce due to inadequate navigational information lead to founding of the International Hydrographic Bureau in 1921 and a movement to more openly share hydrographic information for the universal protection of life at sea. Recent regulations have gone beyond encouraging the sharing of data to the requirement for Coastal States to collect, produce and distribute hydrographic information.

2.1 Convention on Safety of Life at Sea

In July 2002 changes to Chapter V of the International Convention on Safety of Life at Sea (SOLAS V)¹ went into force. Two distinct points within Chapter V are of critical importance to Hydrographers.

2.1.1 Obligation to Collect, Produce and Distribute Hydrographic Information

Regulation 9 requires that Contracting Governments “Undertake to arrange for the collection and compilation of hydrographic data and the publication, dissemination and keeping up to date of all nautical information necessary for safe navigation,” “Take into account, whenever possible, relevant international resolutions and recommendations” adopted by the IHO to achieve the greatest uniformity and standardization in collection techniques, data management and product display, and “Undertake to coordinate their activities to the greatest degree in order to ensure that hydrographic and nautical information is made available on a worldwide scale as timely, reliably and unambiguously as possible.”

The magnitude of this obligation cannot be understated. Even Member States with well-developed and resourced Hydrographic Services may be burdened in meeting this requirement, but States with no or rudimentary hydrographic capabilities face a severe challenge in satisfying their obligation.

2.1.2 Electronic Chart Display and Information Systems

Regulation 19 allows an Electronic Chart Display and Information System (ECDIS), with suitable back up, to meet the chart carriage requirements stipulated under SOLAS. This regulation provides an exceptional opportunity to enhance the safety of navigation and efficiency of maritime operations by using ECDIS for voyage planning, execution and recording.

ECDIS integrates various navigation sensors and nautical information to provide continuous, real-time and accurate positioning. The mariner’s attention is no longer focused on obtaining and plotting the vessels position but on evaluating the current situation and determining future actions. Because the ENC database is “smart” – that is it can be interrogated for additional information, integrated with other parameters and set to respond to thresholds set by the mariner, the ECDIS can warn of dangers or indicate planned maneuvers along the projected path of the vessel. Integration of RADAR displays and Automatic Identification Systems within the ECDIS display further contributes to safety of navigation and particularly collision avoidance. These features can be used effectively in confined waters and in ports, especially during periods of poor visibility.

The classification Society DNV, has found that the chance of going aground falls by 40% when using ECDIS. Also, the Canadian Coast Guard reports that a third of all grounding and collisions could be avoided by using ECDIS.

Additionally, ECDIS can greatly enhance the efficiency of maritime operations. No longer must the navigator laboriously pour through Notice to Mariners, extracting pertinent changes and annotating those changes on a paper chart. Within the ECDIS, changes to the ENC are compiled and displayed through routine electronic changes received via e-mail, internet or on electronic media. For voyage planning, the necessary portfolio of charts at the appropriate scale is quite literally at the navigator’s fingertips from the ECDIS console. Additional information such as tide tables, list of lights, and sailing direction are similarly retrievable

from the ECDIS console. During the voyage, the vessel's position is continuously plotted on the chart display and logged, along with other information the mariner may wish to enter manually or automatically.

3. JURIDICAL BOUNDARIES

Surveyors are essential experts in the establishment of juridical boundaries. However, historically land surveyors established these boundaries; even maritime boundaries such as the delimitation of territorial waters or Exclusive Economic Zones (EEZ). These maritime boundaries are simply extensions of the shoreline or baseline that can be determined without getting one's feet wet. But law now enables a Coastal State to claim additional maritime areas provided bathymetric and geophysical measurement support such a claim.

3.1 United Nations Convention on Law of the Sea, Article 76

Article 76 of the United Nations Convention on Law of the Sea (UNCLOS)² allows the Coastal State to exercise certain rights and assume specific responsibilities over their adjacent continental shelf even if it extends beyond the nominal 200 nautical mile EEZ. However, to claim such an extension, the Coastal State must delineate the extent of its continental shelf. In most instances these claims must be supported by bathymetric and geophysical measurements that require a hydrographic survey of the area, usually performed with current technology to modern hydrographic standards. The Commission on Limits of the Continental Shelf reviews these claims and provides recommendations and opinions as to their validity. Party States to UNCLOS have ten years from their accession to the treaty to submit their extended claims and that should be of concern when scoping the resources required by a Coastal State's Hydrographic Service.

4. SUSTAINABLE DEVELOPMENT

The world is faced with a bimodal problem. The environment is suffering from indiscriminate development and wasteful consumption of resources while large segments of the world's population do not have access to adequate water, food, energy, sanitation or health care. The opportunity exist to build a more secure future by embracing a more sustainable form of development that will improve lives today, and build a better world for our children and grandchildren.

4.1 World Summit on Sustainable Development (WSSD)

In September 2002, the UN sponsored the WSSD in Johannesburg, South Africa. The presentation of the IHO before the plenary session emphasized that a fundamental aspect of sustainable development is the safe and efficient maritime operations worldwide that is underpinned by effective and adequately resourced hydrographic services of all Coastal States. WSSD focused on developing countries and it is these countries that, in general, lack the capability to provide and maintain adequate nautical charts and information to ensure safe and economic maritime operations.

5. THE IHO - POSTURING FOR THE FUTURE

In order to survive, an organization must react to changes around it and adopt strategies to meet new challenges. As an intergovernmental organization, the IHO accommodates change at a deliberate pace but it is aggressively developing the strategies that will endure it remains the world's authority on hydrographic matters.

5.1 Transforming the Organization

For the past two years, the IHO has been heavily involved in a Strategic Planning effort with the goal of reworking the IHO Convention to ensure the relevance of the Organization in the new millennium. This effort has addressed several aspects of the governance of the Organization to ensure a more representative and responsive Organization. An Extraordinary International Hydrographic Conference will be convened in April 2005 to debate and adopt changes to the Convention and related documents. While there is no intention to change the inter-governmental status of the Organization, it is acknowledged that all would benefit by a better exchange of information and expertise between the IHO and other related organizations such as FIG.

5.2 Assessing the Status of Hydrography

Fundamental to satisfying many of the objectives of the IHO is a current and complete understanding of the status of hydrography and charting throughout the world. IHO Special Publication 55 "*The Status of Hydrographic Surveying and Nautical Charting, Worldwide*" has undergone extensive updating in the last year. The analysis of this publication will form the basis for capacity building projects and ENC production stimuli. The information contained in S-55 addresses IHO response to IMO regarding the adequacy of charts in remote areas and the UN mandate to perform a Global Marine Assessment.

5.3 Building Capacity

Clearly supported by the analysis of S-55 and understandable from a cursory examination of global economic development, large numbers of Coastal States require significant assistance in building the capacity to provide the mariner with adequate nautical information while operating in waters adjacent to their coasts. The IHO is addressing these needs on several fronts.

5.3.1 IHO Capacity Building Committee

The IHO has newly reconstituted its Capacity Building Committee (CBC) and is developing strategies that will ensure the greatest impact from the resources available. The CBC will assess and prioritize the needs and develop realizable projects for IHO support and implementation. While small, targeted projects are envisaged from the internal funds of the IHO, larger projects will capitalize on existing international partnerships that can secure funding from international donor agencies. One example of an internal IHO capacity building project is the West Africa Action Team that has performed assessments of sixteen West

African countries' capacity to provide nautical information. In the current phase of this project, workshops are scheduled to build awareness of the obligation these countries have to provide such information and develop plans that will lead to the initial steps toward fulfilling these obligations.

5.3.2 International Partnerships

The IHO in concert with several other international organizations (i.e. International Maritime Organization (IMO), Intergovernmental Oceanographic Commission (IOC), International Association of Aids to Navigation and Lighthouse Authorities (IAALA), etc.) have developed regional capacity building projects that are seeking or have received funding from donor agencies. Examples of these initiatives include MEDA and MEDCHARTNET in the Mediterranean and Black Seas, Marine Electronic Highway in the Malacca and Singapore Straits, and Gulf of Honduras Pollution Control Project.

5.3.3 UN General Assembly

The fourth meeting of the UN Informal Consultative Process on Law of the Sea (UNICPOLOS) devoted one half of its agenda to the topic of capacity building for the production of nautical charts. The resulting UN General Assembly Resolution 58/240 recognizes that hydrographic surveys and nautical charts are vital for the safety of navigation and life at sea, for the protection of the marine environment, the economy of shipping and sustainable fishing, maritime delimitations and other related maritime activities.

The Resolution makes special mention of the work of the IHO and encourages membership given the capacity of the organization to provide technical assistance, to facilitate training and to identify sources of funds to development hydrographic services. It invites the continuation of the joint work with IMO and challenges those organizations to intensify the necessary efforts to increase the capacity of developing countries, in particular those less developed and those Small Island Developing States (SIDS), to improve hydrographic services and nautical chart production.

5.3.4 GEBCO – Nippon Foundation

The General Bathymetric Chart of the Ocean Project (GEBCO), a joint IHO – IOC endeavor, has entered into an agreement with the Nippon Foundation to provide a postgraduate diploma and follow-on fellowships in ocean mapping for seven candidates per year for the next three years. These candidates will enhance the future of ocean mapping and priority will be given to regions most in need of building this capacity.

5.4 Advancing the Use of ENC's

The IHO Worldwide ENC Database (WEND) Committee has, for the past decade, focused on establishing a set of principles to guide hydrographic offices in the production of ENC's. With increased experience in the use of ENC's in maritime operations, it is now apparent that the focus needs to be on how to better meet the needs and expectations of the mariner with

respect to ENCs. Issues of consistency, coverage, availability and user-friendliness have hindered the wide spread use of ENCs. A WEND Task Group has been charged with formulating solutions to these issues so that the benefits of safety of navigation and efficiency in maritime operations through the use of ECDIS may be realized.

5.5 Expanding the Use of Hydrographic Information

While hydrographic data is generally collected for the purpose of safety of navigation, it is too costly to acquire and too valuable to use for this single purpose. Hydrographic data, especially those collected with modern techniques, form a rich data set that can be used in numerous applications.

5.5.1 Ocean Mapping

Prince Albert 1st of Monaco realized the scientific need to archive bathymetric data, compile bathymetric charts from these data and make available these chart to the scientific community and in 1903, he founded the General Bathymetric Chart of the Ocean Project (GEBCO). His legacy continues with the centennial release of the third edition of the GEBCO Digital Atlas.

5.5.2 Bathymetric Product Specification

The IHO has developed product specifications and standards for the use of hydrographic data in nautical charts. It is currently scoping the requirements for product specifications for bathymetric data in order to standardize the format, content and structure of these data to facilitate its broad use in coastal engineering, coastal zone management, environmental applications and scientific research. These developments are coordinated with the International Standards Organization (ISO).

6. CONCLUSION

The Future holds many challenges for hydrography. There is much hydrography to be accomplished to support more rigorous maritime requirements and with its expanding uses beyond the safety of navigation applications. The International Hydrographic Organization, in its quest to be the world's authority on hydrographic matters, is posturing to meet these challenges.

REFERENCES

¹ International Maritime Organization, *International Convention for the Safety of Life at Sea (SOLAS), 1974, Consolidated Edition 2001*

²United Nations, *The Law of the Sea, Official Text of the United Nations Convention on the Law of the Sea with Annexes and Index*, New York, 1983

BIOGRAPHICAL NOTES

Rear Admiral Barbor's 28 year naval career culminating in overall command of the U.S. Navy's operational hydrography, oceanography and meteorology program. Previously, he commanded a hydrographic survey unit and two marine meteorological forecasting activities, served aboard surface combatants and had naval staff tours afloat and at headquarters activities. Following retirement from the navy, he was the founding director of the Hydrographic Science Research Center at the University of Southern Mississippi and was elected to the Directing Committee of the International Hydrographic Bureau in April 2002.

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