

THE MOST SIGNIFICANT IMPROVEMENT OF NAVIGATION SERVICES SINCE SOLAS

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The IHO has positioned itself and the world's hydrographic offices for important expanded roles in the coming decades, not only in modernizing navigation services, but also in the global effort to understand, mitigate, and adapt to the changing climate.

When the IHO Member states approved the "Protocol of Amendments to the Convention on the International Hydrographic Organization" in November 2016, it marked a new era for the IHO. Member States had recognized that the needs of the global hydrographic community had outgrown the governance structures of the IHO that had been in place for nearly a century. The new structure of the IHO is modeled more closely on intergovernmental organizations under the UN umbrella, which includes a periodic Assembly and a standing Council. The role of the Council is to oversee the ongoing operations of the IHO and its subsidiary bodies to advance the strategic goals of the organization as directed by the Assembly. It is made up of 30 IHO Member States with a broad geographical diversity.

This inaugural Council was formed after the first IHO Assembly in 2017, and met annually in person. We focused on three main goals. First, to develop an identity and culture for the Council and institute processes to promote our effectiveness in coordination with the other IHO bodies. Second, to position ourselves within the existing structures of the IHO, the Secretariat, the Inter-Regional Coordination Committee (IRCC) and the Hydrographic Standards and Services Committee (HSSC). Third, to develop proposals for the strategic direction of the IHO. To maintain the ability to work effectively, the Council deliberately kept the size of the Council meetings small, limited to two participants from each Council Member State and one participant from Observer States. There were very few prepared statements, and discussions are fluid, with a high degree of participation. In short, the Council spent time thinking together. The result was a major step forward for the IHO-represented by a new strategic plan in line with global priorities and technological trends.

The IHO has envisioned a new generation of digital-native navigation services, coordinated globally, which will ultimately supersede the current system of digitized traditional products. This has been in the works for a while, as IHO working groups have been developing the S-100 family of standards that will underlie these services. As these standards have been published in the past few years, we have seen a number of nations around the world begin to provide initial services providing high resolution depth, continuous predicted tides, and voyage-scale surface currents. In their first phases, these services will make large ship transits of our ports safer and more efficient. In later phases, they will support optimized ship routing

which could significantly reduce the fuel costs and carbon footprint of global shipping. These algorithmically-addressable services, integrated into a machine-to-machine distribution system, also support the emerging generation of uncrewed ships and systems at sea.

The seabed and operational oceanographic data collected by hydrographic offices to support safe navigation is also foundational to the sustainable development of our oceans and coasts, and to modeling of the earth system. The new strategic plan envisions a new era where hydrographic data is collected, packaged, and made available for science, resource management, and business, and where data collected for other purposes can be used to improve navigation services. This is absolutely critical for our coastal communities to prepare for inundation from tsunamis, sea level rise, subsidence, and storm surge. We cannot manage fisheries, protect critical habitat, or build offshore wind farms without seabed maps and coastal circulation models. Lastly, the grand challenge of our generation is to stabilize the earth's climate to avoid catastrophic consequences for humanity and the global environment. We cannot model the earth's climate system without global circulation models, which in turn require accurate boundary conditions of ocean depth and seabed roughness. This is our contribution.

We are not in this alone. The new strategic plan calls for much deeper engagement of the IHO and hydrographic offices with allied initiatives, such as the UN Decade of Ocean Science for Sustainable Development, the GEBCO/NF Seabed 2030 project, and the Open Geospatial Consortium for data interoperability. These partnerships are critical to achieving IHO's strategic goals, and this engagement is included prominently in the IHO strategic plan.

The Council recognized that the global hydrographic community is not well-positioned to meet these goals without significant capacity building. Even as our core expertise of hydrography and cartography continue to become more complex, the broader expectations on our field, outlined in the IHO strategic plan also require new expertise in data management, geographic information systems, and S-100 standards. In addition, we need to create a bigger tent by making international hydrography more inclusive. This is still a male-dominated field in general, and leadership within IHO is largely drawn from Europe and North America. Council recognized these trends and endorsed a redoubled effort for capacity building, as well as an innovative program to support the development of women leaders in hydrography.

The IHO is a lean organization, with only around 20 staff, with most of the work of the organization done with in-kind donations of expertise and labor by member states and expert contributors. Member state dues to IHO are a tiny fraction of the dues paid to other intergovernmental organizations. Nonetheless, the cost of core IHO activities has continued to rise, to the point where the effectiveness of the organization has begun to suffer. Although COVID-related restrictions have temporarily masked this trend, this systemic imbalance is a risk to the long-term effectiveness of the IHO. Working with the Secretary General, the Council recommended to the Assembly that member state dues could be annually raised by 1% per year as needed. This is still a small amount, but it is necessary to ensure the goals of the organization are met.

In 1912, the sinking of the Titanic inspired the first global convention of the Safety of Life at Sea (SOLAS). Among the sweeping changes to the maritime industry this required was standardization of hydrographic and meteorological services. At the time, the dawn of radiotelegraphy inspired standardized navigation warning, meteorological and ice services, which have saved countless lives in the intervening century. We are now embarking on another global transfor-

mation of navigation services not seen since the passage of SOLAS, While the full impact will not be known for decades, it holds the potential to have a similarly dramatic impact not only on life at sea, but on life on earth.

I am thrilled that my dear colleague, Dr. Geneviève Béchar, the Director General of the Canadian Hydrographic Service, has been elected to succeed me as the chair of the IHO Council. Her visionary leadership and collaborative style will ensure that the second triennium of the Council will continue the momentum we started in the first.