

Why a National Hydrographic Office ?

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Abstract

This paper is intended to generate discussion concerning the need and justification for a maritime state to have a national hydrographic office tailored to the real needs of the state and its population. Some examples are given illustrating the influence and relationship of hydrography in several areas that are separate from shipping and defence. The existence of a National Hydrographic Committee or similar body is highlighted as the most appropriate coordination mechanism. Finally the role of the International Hydrographic Organisation (IHO) in supporting the development of a sustained hydrographic capability and capacity is described



Résumé

Cet article tend à susciter des discussions sur la justification et la nécessité pour un Etat maritime d'être doté d'un Service hydrographique national adapté aux besoins réels d'un Etat et de sa population. Des exemples sont donnés pour illustrer l'influence et les relations de l'hydrographie dans plusieurs domaines distincts de la navigation et de la défense. L'existence d'un Comité hydrographique national ou organe similaire est soulignée comme étant le mécanisme de coordination le plus approprié. En conclusion, le rôle de l'Organisation hydrographique internationale (OHI) à l'appui du développement de moyens et de capacités hydrographiques durables est décrit.



Resumen

La intención de este artículo es suscitar discusiones relativas a la justificación y a la necesidad de que un Estado Marítimo tenga un Servicio Hidrográfico nacional adaptado a las necesidades reales del estado y de su población. Se proporcionan algunos ejemplos que ilustran la influencia y la relación de la hidrografía en varias áreas distintas de la navegación y la defensa. Se destaca la existencia de un Comité Hidrográfico Nacional o de un organismo similar como siendo el mecanismo de coordinación más apropiado. Finalmente, se describe el rol de la Organización Hidrográfica Internacional Organización (OHI) en el apoyo al desarrollo de capacidades hidrográficas sostenidas.

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1.- Background

Assessing the status of worldwide hydrographic surveying and nautical charting we can conclude that despite over 90% of international trade being conducted by sea, reliable maritime cartographic coverage has not yet been reached globally. Indeed in several areas within Central America, the Caribbean Sea, the South West Pacific, Africa and some regions in Asia there is a risk to shipping operations due to the lack of chart coverage. Despite the understanding of the close relation and influence that exists between the ocean and climate change and being aware of the severe effects of different natural hazards, the origin of which seems to be strongly related to global change, as a society we do not give sufficient priority to understanding the characteristics of oceans and seas. Moreover, despite the evident deterioration of the marine environment due to the increase of our populations living in the coastal regions and the increase of activities that discharge effluents into the sea, we, as a society do not give sufficient priority to the need to have reliable hydrographic information to adopt the most efficient and effective preventive and remedial measures to ensure clean, productive and well managed seas.

Man has long considered the sea as a natural avenue that facilitates connectivity between different human groups, mainly to exchange their goods. Therefore, hydrography and the representation of its results in a nautical chart has for several hundred years been part of that life contributing to mankind's development as well. Due to its importance, the sea has also been the scene of disputes over its control. We can say that hydrography traditionally has contributed to both, commercial and naval operations.

Nowadays in addition to its original application, hydrography is called on to contribute to many other activities playing key roles in maritime delimitations; exploitation of marine living and non-living resources; tourism and sports; and others activities, all needing to be properly regulated, managed and controlled. These require hydrography to contribute to the sustainability and protection of the marine environment.

It is evident that some organisation needs to have the responsibility, at a national level, for conducting hydrographic surveys and producing nautical charts. Going further there is also a need to manage the building and managing of hydrographic data bases for the preparation of special products required by those responsible for regulating, managing, controlling and operating in and on the oceans and seas.

This fact that is very well understood by many nations and without any doubt countries with a maritime tradition are conscious of the vital role the sea plays in their economies. Regrettably this is not the case for many

other countries that do not give priority even to the development of a basic hydrographic capability.

Probably the relationship between hydrography and safety of navigation is more evident due to international regulations, than the existing relationship with other activities. In fact, the SOLAS (Safe Of Life At Sea) Convention - under the aegis of the International Maritime Organization (IMO) -, provides clear regulations with regard to safety to navigation and all related elements. Particularly Regulation 9 "Hydrographic Services", identifies what contracting Governments shall undertake. In brief, as detailed in this regulation they should 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. Thus, the main purpose is to guarantee as much as possible, safe navigation taking into account the recommendations and resolutions of the International Hydrographic Organization (IHO). Through the coordination between hydrographic offices, the IHO aims to ensure that hydrographic and nautical information is made available on a worldwide scale as timely, reliably, and unambiguously as possible.

Whilst the contribution of hydrography is clear to those involved in providing safe transportation and navigation, as indicated earlier, it is not so evident to the common public. The availability of this critical data and information also has a vital role as support to the development of other activities of national social and economic importance related to the coastal zone and near shore areas.

2.- Governmental and Private Sector Hydrographic Information demand.

Hydrographic information is a national asset required by both, governments and private sectors. We cannot conceive any activity conducted in the sea or the development of any coastal or offshore project without hydrographic information. It is a government responsibility to administer, regulate, and control the use of the inland waters, interior waters, territorial seas, exclusive economic zones and the continental shelf. How can government officials achieve this without knowing the characteristics of these environments? How can the private sector promote initiatives in these areas in the absence of hydrographic information? Clearly the lack of hydro-cartographic information constitutes a major limitation to achieve progress.

We will not concentrate on the importance of hydrography with regard to safe navigation but rather we will concentrate on other activities, some of them normally under government's responsibility and others more in connection with the private sector.

2.1.- Governments' responsibility.

a. Maritime delimitation.

As it is on land, each country needs to establish, agree and set its international boundaries. In the case of the delimitation with other countries, the limit must be drawn on a commonly accepted nautical chart and that chart must be the product of a hydrographic survey complying with international agreed standards. Probably the hydrographic survey will be a joint operation but what if one of the countries involved does not have at all any hydrographic capability?

When establishing the limits of the territorial sea, contiguous zone, economic exclusive zone or the extension of the continental shelf (*Fig. 1*), if it applies, the maritime state must base such delimitations on standard procedures where depths, distances, characteristics of the sediments, cartographic projections and representations must be considered. Finally lines representing such limits must be represented on nautical charts to make the mariner aware of its location. This information is required by fishermen, the security forces and others who require to have knowledge of which area in which they are located. For each area, different regulatory measures apply but how can such measures and cartographic presentations be made in the absence of a national hydrographic capability? To have this capability the relevant ministry, perhaps the ministry of Foreign Affairs, must establish a hydrographic unit as part of its structure.

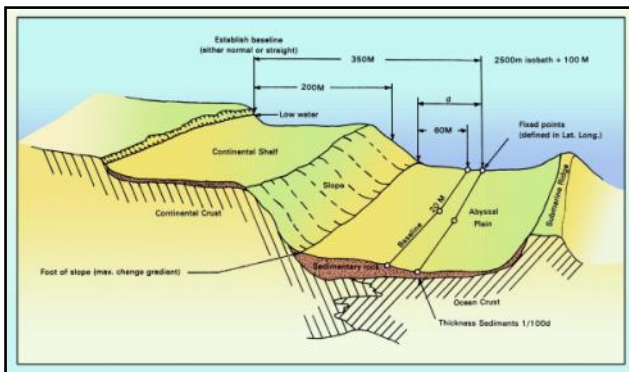


Fig. 1 Maritime delimitation

b. Natural hazard preparedness.

Coastal zone management is a subject on its own due to its complexity and multiple related and dependent factors. One of the aspects that call for special attention is the effect of natural hazards such as tsunamis and storm surges (*Fig. 2*). These events are of a very different origin however the point is that the coast is impacted by the rise of the water level and waves. They respectively have caused great loss of lives and damage to coastal communities with tremendous economic

effect. Sadly, recently in Chile, the impact of such events has occurred again to remind us of their power. It is probably not completely possible to attempt to stop nature delivering its energy. The risk will always exist, but we can only adopt measures to reduce the effects by an appropriate policy of preparedness.

The direction and amplitude of the energy that approaches from the sea towards the shoreline is driven by the bathymetric characteristics of the place. Therefore if we know the bathymetry, we can run models to determine the expected run-up under certain conditions. The result will be the identification of areas of greater or lesser risk. To decide on what important information is required to decide on where a settlement should or should not be established. In the absence of a national hydrographic capacity, will the National Emergency Agency establish a hydrographic unit in time to provide this vital information for preparedness?



Fig. 2 Natural hazard.

c. Oil spills combat.

If we are part of a conscious society we must care of the environment, and that also includes the sea. There have been many severe maritime accidents resulting in oil spills in past years and such events must certainly be expected to occur again, requiring the action of concerted action to combat these disasters and reduce as much as possible their impact on the marine environment. Examples of accidents (*Fig 3*), are unfortunately quite common, however their effects have been assessed with the overall costs impossible to determine due to the long lasting impact of the accident. It is not the cost of pumping or sweeping the beaches, it is the cost of losses that are not recovered that take many years to be assessed.

To help in managing this type of disaster, it is necessary to have knowledge of bathymetry, currents, tides, winds, as well as other marine parameters. difficult. One important aspect is that if there is not an up to date nautical chart of the area of the disaster then operations will be surely more difficult.



Fig. 3 Oil spill.

Will the ministry of Environment have a hydrographic unit to provide this hydrographic intelligence?

2.2.- Private Sector interest.

a. Fish Farming.

Fish and seafood farming is an activity that takes place predominately in the sea (*Fig. 4*). It has to be regulated and the area requires special conditions from an environmental point of view, including suitable bathymetry. How can the private sector go ahead with fish farming projects? Certainly it needs to comply with any regulations set by the authorities, but how do the authorities establish such policies if no environmental information is available? Bathymetry is just one parameter, but that information and its representation on a chart are required. Is it the fish farmer who will establish a hydrographic unit to get the information? Will governmental officers consider that information valid? Will the ministry of Fisheries need a hydrographic unit to deal with this matter?



Fig. 4 Fish farming.

b. Tourism.

Tourism is a very wide title for this paper so we will concentrate on just a little segment: the leisure boating marinas (*Fig. 5*).

Marinas provide sheltered conditions for leisure yachts and boats, and have many activities associated with them. The provision of services and logistic support such as re-fueling, restaurants, maintenance, shops, just to mention a few, offer the opportunity for different employment. Therefore in the selection of the location to build a marina, several factors have to be taken into consideration; one of which is the hydrographic conditions. The infrastructure to be developed must have as a main objective to provide the best and safest conditions for small craft.



Fig. 5 Tourism.

The engineering studies to be conducted before any decision is adopted must include hydrographic surveys and charts of the area. Later, when in operation, the variation of the hydrographic conditions shall need to be monitored in order to maintain sufficient and safe depths for the vessels using the marinas.

Who would like to take the risk of not considering hydrography in the development of a marina? Will the necessary hydrographic studies conducted be used for the preparation of an official nautical chart of the area? Will the private sector produce such a nautical chart and assume the responsibility for its quality? Will the ministry of Tourism require a hydrographic unit to validate whatever hydrographic information is produced by the private sector?

b. Cable laying

Normally submarine power and communications cables are laid under a contract that is provided by the private sector. This engineering operation requires a very detailed representation of the sea floor, therefore specialist hydrographic surveys are conducted in order to decide on the most suitable track for the cable.

However due to the importance of the work, the position of the cable must be shown on the nautical chart to avoid any disruption caused by ships anchoring or fishing vessels conducting deep trawling. In this case the private sector needs hydrographic information before the laying the cable and afterwards to provide assurance to the mariner that he be made aware of the existence of the cable as it is indicated accurately on the nautical chart. If the preliminary survey is conducted by the private sector, will that information be used in the preparation of the official nautical chart and if hydrographic information already exists from different reasons, would it not be economically important to make that information available to the private sector, especially if it is of national interest?

Who keeps the records of previous hydrographic surveys? Is that information a national asset?

3.- Why a National Hydrographic Service.

As we have outlined in the previous paragraphs hydrographic information has an immense value for many activities. In this paper we have just provided examples of some of those activities, but it is easy to imagine that this is valid for many other uses of the sea. We think that it is not effective and not efficient to have a hydrographic capability in each national agency that requires hydrographic information. This would create a cost that can neither be afforded nor justified. The development of individual hydrographic capabilities does not appear rational provided that a national hydrographic service exists aimed at offering reliable and timely service to all governmental stakeholders in a coordinated way.

There are no fixed structures to describe the exact organization, structure, components, mission and objectives of a national hydrographic service. Such a national agency needs to be tailored to provide the expected services that all the identified stakeholders require so as to support their individual missions and objectives. It must be seen as a national service of strategic importance capable of supporting the development of the highest maritime national objectives.

It does not mean that due to the lack of a national hydrographic capability, hydrographic activity does not take place in a country. That is an error, as the government hires some work and the private sector also executes some works. The problem is that without a National Hydrographic Service, there is no uniform quality control and quality assurance on the information generated through these individual efforts. Moreover, the data and formation is not maintained and kept conveniently archived for future national uses.

A maritime nation, with its strong dependency on the sea, cannot be exposed to not being capable of deciding and controlling any project at sea. It is true that conducting hydrographic surveys and producing nautical charts are activities that can be contracted, but it must

to have the capability to understand and establish technical specifications and standards that must be followed; regulate the hydrographic activities conducted in national waters and control the accomplishment of those regulations.

All this can only be managed by a centralised agency, the National Hydrographic Service, the characteristics of which shall be decided by the related stakeholders. Its mission and functions shall be considered a national objective and its administration shall be advised by a national hydrographic committee or similar coordination structure, integrated by all the stakeholders.

4.- Economic associated benefits.

It is difficult to assess the economic benefit associated with the existence of a National Hydrographic Service and reliable surveys and charting, but if one was established according to the real needs of a country, its cost should not be considered as an expenditure, but as an investment.

To attempt to use figures does not make any sense as figures may be irrelevant due to the different cost of living and different local and national requirements. Its representation in different parts of the world is not always equitable, but we can get a very good impression if we consider the activities to which we have referred in this paper and make ourselves, citizens of a fictitious country known as “Wonderland”:

a. Maritime delimitation.

What is the value of establishing national borders of “Wonderland”? How much resources are spent in court cases due to the lack of maritime delimitation of “Wonderland”? What value has the resources we are not exploiting due to non availability of a clear maritime delimitation of Wonderland?

b. Natural hazard preparedness.

What is the cost to re-establish a flooded village settled erroneously in a risky coastal zone in Wonderland? What is the cost of the lives and welfare of those in risk in Wonderland?

c. Oil spills combat.

What has been the cost of cleaning beaches impacted by oil spills in Wonderland? What has been the overall operation cost to control oil spills in “Wonderland”?

d. Fish Farming.

What is the impact on food and work availability due to not having decided on potential fish farming areas in “Wonderland”? What is the effect of fish-farming in “Wonderland” due to restrictions in navigable areas?

e. Tourism.

What is the cost of closing a marina in “Wonderland” for a certain period of time due to grounding or inadequate management of the marine space? What is the operational cost of a marina in “Wonderland”? Should not we consider periodic surveys to ensure safety and fit for purpose?

f. Cable laying.

What is the cost of adding 100 meters extra cable due to the non availability of proper hydrographic information of a suitable route in “Wonderland”? What is the cost of replacement of a damaged section of the cable due to lack of a nautical chart showing precisely where the cable has been laid-out?

Compare your own estimated figures associated with the above activities and the annual budget estimates for some national hydrographic services: 1M euros (Sri Lanka); 1.7M euros (Mozambique); 3.5M euros (Chile); 7M euros (Portugal); 11M euros (Finland); 23M euros (Norway); 43M euros (Australia) (Approximate values in millions of euros based on information reported to the IHB for the IHO Year Book). It is clear that quite large differences exist and so it is necessary to review, plan and manage the development of a national hydrographic service with the real national and perhaps regional requirements.

It must also be recognised that establishing a basic National Hydrographic Service of the appropriate dimensions for a nation will, without a doubt, contribute to the maritime sectors development and progress, including our fictitious country “Wonderland”.

5.- Conclusions.

1.- Hydrographic data and information is required to produce nautical charts as well as to contribute to the decision making process required for many other different activities that take place in and on the sea.

2.- Hydrographic activities are taking place due to different needs no matter if there is, or not, a national hydrographic service in existence. Different governments’ agencies may spend part of their budget hiring “pieces and bits” without any national coordination.

3.- Not having an agency in charge of keeping the data and information collected by different projects, a cost recovery policy cannot be implemented. It also prevents any potential exploitation of the data collected being used for other purposes today and again tomorrow.

4.- A National Hydrographic Committee or similar coordination structure, composed by all stakeholders needing hydrographic information is required to define the size, mission, objectives and policies of the National Hydrographic Service, as well as its annual work program.

5.- A National Hydrographic Service is a “must” for any maritime country with the object of offering its citizens the advantages of having the sea as part of its territory.

6.- One of the objectives of the IHO is to tender guidance and advice to Maritime States engaged in setting-up or expanding their hydrographic services.

Biography of the Author

Captain Hugo M. Gorziglia (59), graduated as Navy Officer of the Chilean Navy in 1970. In 1975 got his Hydrographic Engineer diploma and served at the Servicio Hidrográfico y Oceanográfico de la Armada de Chile (SHOA) as Head of the Department of Hydrographic Surveying and the Department of Cartography. In 1987 was nominated Deputy Director and Technical Advisor. In 1994 was nominated Director of SHOA until December 1997. From 1998 till August 2002 he worked as the Advisor for the International Relations at SHOA. In September 2002 was elected Director of the International Hydrographic Bureau (IHB) and in 2007, re-elected for that position. As IHB Director he is, - among others -, strongly involved with all IHO capacity building initiatives.