WHY A NATIONAL HYDROGRAPHIC SERVICE?

Prepared by Hugo M Gorziglia, IHO
Presented by Gordon Johnston, United Kingdom

Abstract. This article is intended to generate discussion around the need and justification for a maritime state to have a national hydrographic office tailored to its real needs. Giving some examples, it is made known the influence and relationship of hydrography and several activities, different that shipping and defence, has. The existence of a National Hydrographic Committee or similar body is highlighted as the most appropriate coordination mechanism. Finally it is recalled the role of the IHO in supporting hydrographic capability development.

Key words: National Hydrographic Services, cooperation, Capacity Building

1 BACKGROUND

Assessing the worldwide hydrographic surveying and nautical charting status we can conclude that despite over 90% of international trade being conducted by sea, reliable cartographic coverage has not yet been reached everywhere and still several areas within Central America and the Caribbean Sea, the South West Pacific, Africa and some regions in Asia represent a risk for shipping operations. 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 priority to learning and better understanding the characteristics of oceans and seas. Moreover, despite the evident deterioration of the marine environment due to the increase of population living in the coastal region and the increase of activities that discharge different elements to the sea, we, as a society are not keen to consider, with sufficient priority, the need to have reliable hydrographic information to adopt the most efficient and effective preventive and remedial measures to ensure clean seas.

Since the very early days of man's presence the sea has been considered as a natural avenue that allows interconnectivity between different human groups, mainly to exchange their goods. Therefore, hydrography and the representation of its results in a nautical chart have always been part of life and have contributed to mankind's development as well. Due to its importance, the sea has also been the scene of disputes of its control. We can say that hydrography traditionally has contributed to both, commercial and naval operations.

Nowadays and without losing its original main application, hydrography is called to contribute to many other activities including playing a key role in maritime delimitations; exploitation of marine living and non-living resources; tourism and sports; and others, all needing to be properly regulated, managed and controlled, aiming at sustainability and protection of the marine environment.

It is evident that somebody needs to have the responsibility, at a national level, of conducting hydrographic surveys and producing nautical charts, also of building and keeping hydrographic databases for the preparation of special products required by those in charge of regulating, managing, controlling and operating in and on the oceans and seas.

This fact that is very well understood, - especially by countries with a maritime tradition, conscious on the vital role the sea plays for their economies -, but not so by many other countries that do not give it priority, even to the development of a basic hydrographic capability.

Probably the relationship between hydrography and safety to navigation is more evident than the existing relationship with other activities, due to international regulations. 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 a contracting Government 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. As can be appreciated, 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 at ensuring that hydrographic and nautical information is made available on a worldwide scale as timely, reliably, and unambiguously as possible.

In this case and as indicated earlier, the contribution of hydrography is evident, but it is not so evident to the common public, that the availability of this data and information has also a vital role to support in the development of other activities of national, social and economic importance.

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 sea, exclusive economic zone and 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 strong limitation to achieve progress.

We will not, in this paper, concentrate on the importance of hydrography with regard to safe navigation, shipping and related activities. As was indicated, this sector easily understands the contribution that hydrography makes to its development. On the contrary, we will concentrate on some other activities, some of them normally under government's responsibility and others more in connection with the interests of the private sector.

2.1 Governments' responsibility

a) Maritime delimitation

As it is on land, each country needs also to establish, agree and set its international borders and boundaries. In the case of the delimitation with other countries, the limit must be drawn on the 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 any hydrographic capability? When establishing the limits of the territorial sea, contiguous zone, economic exclusive zone or the extension of the continental shelf, -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 users aware. The mariner, the fisherman, the security forces and others, must be aware whose area and jurisdiction they are in, as for each area, different regulatory measures frequently apply. How are such measures and cartographic presentations made in the absence of a national hydrographic capability? To have this capability will the ministry of Foreign Affairs establish a hydrographic unit as part of its structure?

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. Being both of a very different origin, the point is that the coast is impacted by the rise of the water level and waves, respectively that have caused great lost of lives and damage to coastal communities with tremendous economic effect. Probably it is nonsense to aim at stopping nature delivering its energy, the risk always exists, but we can adopt measures to reduce the effects by an appropriate policy of preparedness. The direction 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 zonification of areas of greater or lesser risk. This represents, especially for coastal communities, important information required to support the decision 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 to provide this vital information for preparedness?

c) Oil spills and Contamination

If we are part of a conscious society we must take care of the environment, and that also includes the sea. There have been accidents and spills and nothing indicates that these will not happen again. Severe maritime accidents with oil spills that have required the action of concerted brigades to combat it can still make demands on the time, personnel and funds available to coastal areas. It must be an aim to reduce as much as possible the impact of such events on the marine environment, mainly close to the coast. Examples of accidents, unfortunately there are quiet a few, the effects of which have been assessed, have produced varying conclusions and ended with costs impossible to determine due their long lasting effect. It is not the cost of pumping or sweeping the

beaches, is the cost of the consequential losses to the habitat, flora and fauna as well as local trade and commerce that are not recovered. To help in managing this type of disaster, bathymetry, currents, tides, winds, as well as other parameters are required. One important aspect that has been recognized is that without suitable data and a nautical chart in the area of the disaster; operations will be surely more difficult. Will the ministry of Environment have a hydrographic unit to provide hydrographic intelligence?

2.2 Private Sector interest

a) Fish Farming

It is true that fish and seafood farming is an activity that cannot take place elsewhere, it has to be regulated and the area requires very special conditions from an environmental point of view, including bathymetry. How can the private sector go ahead with fish farming project? Certainly they need to comply with the regulations set by the authorities. How will authorities establish such policies if no environmental information and its variability are available? We agree that bathymetry is just one parameter, but that information and its representation on a chart is required, as knowledge of it can have a significant effect on establishing suitable sites that in turn may impact the routes used for surface navigation. Is it the farmer who shall 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?

b) Tourism

Tourism is a very wide title for this paper so we will concentrate on just a little segment: the marinas for small vessels. Marinas provide shelter conditions to leisure yachts and boats, and constitute a focus of development due to the many activities that are associated. The provision of services and logistic support such as re-fuelling, restaurants, maintenance, shops; just to mention a few, offer the opportunity of different jobs. Therefore in the selection of the place where to build a marina, several factors are to be taken into consideration; one of which is the hydrographic condition. The infrastructure to be developed has, as the main objective, to provide the best and safer conditions to yachts and boats. 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 be monitored in order to keep the conditions safe for use of the marina. 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?

c) Cable laying

Normally it is under a contract that the private sector works in cable laying. This engineering operation requires a very detailed representation of the seafloor; therefore special hydrographic surveys are conducted in order to decide on the best lay route of the cable. But that is not all. 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 in the nearby or fishing vessels conducting deep trawling. In this case the private sector needs hydrographic information before the laying and afterwards, with the assurance that the mariner will be aware of the existence of the cable as it will be indicated in the nautical chart, probably with some explanatory/regulatory notes. If the preliminary survey is conducted by the private sector, will that information be used in the preparation of the official nautical chart? On the contrary, if hydrographic information already exists due to different reasons, would it not be economic and efficient 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 explained 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 condition is valid for many others. We think that it is not effective and not efficient to have a hydrographic capability in each single national agency that might need hydrographic information. This might have a total cost that cannot be afforded nor justified. The development of individual hydrographic capabilities has no rationality, 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 suggesting the 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 these stakeholders require to comply with 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, no hydrographic activity takes place in a country. That is a mistake, as the government hires some work and the private sector executes some works too. The problem is that without a National Hydrographic Service, there is no standard 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 is a 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 that regulations. All this can only be managed by a centralized 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 receive the advised of 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 to the existence of a National Hydrographic Service, but if established according to the real needs of a country; its

cost shall not be considered expenditure, but an investment. To attempt to use figures does not make any sense as figures are irrelevant due to the different cost of life and its representation in different parts of the world, but we can get a very good feeling 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 live of those in risk in Wonderland?

c) Oil spills

What has been the cost of cleaning beaches impacted by oil spills in Wonderland? What has been the overall operational 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? What is the operational cost of a marina in "Wonderland"? Should not we consider periodic surveys to ensure safety and environmental health?

f) Cable laying

What is the cost of adding 100 meters extra due to the non availability of proper hydrographic information of "Wonderland"? What is the cost of replacement of damage section of the cable due to lack of a nautical chart shown precisely where the c able has been laid-out?

Please compare any imaginable figure associated to the above activities with the budget estimates for some national hydrographic service: 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 must be recognized that establishing a basic National Hydrographic Service of appropriate dimensions will without a doubt contribute to the maritime sector progress of 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 on many other different activities that take place in and on the sea.
2. Hydrographic activities are taking place due to different needs no matter the in-existence of a national hydrographic service. Different governments' agencies spent part of their budget hiring "pieces and bits" without any national coordination.
3. Not being an agency in charge of keeping the data and information collected by different projects, a cost recovery policy cannot be implemented. It is not exploited the idea that data collected can be used for other purposes today and for sure, 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 willingness to offer 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.

BIOGRAPHIES

Captain Hugo Gorziglia is a Director of the International Hydrographic Organisation is based in Monaco at the International Hydrographic Bureau. A Captain in the Chilean Navy Captain Gorziglia spent a distinguished career in the Hydrographic Service before being appointed to Monaco in 2002.

Gordon Johnston is director of Venture Geomatics Limited, an independent technical consulting group in the UK. He is chair of the FIG/IHO/ICA International Board on the Standards of Competence for Hydrographic Surveyors and Nautical Cartographers.

CONTACTS

Captain Hugo GORZIGLIA, Director, International Hydrographic Bureau Monaco, hgorziglia@ihb.mc

Gordon JOHNSTON, Director, Venture Geomatics Limited, UK, gordon.johnston1@orange.net