

This report and Capacity Building Plan is for support to Haiti Service Hydrographique et de Navigation d'Haiti (SEMANA) to sustain the beginning of a development program in Hydrographic Survey and Nautical Charting. Development of this capability within Haiti is a key component in long term rebuilding and the chained job creation that extends from development of maritime capabilities.

More than 85% 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.

The shipping industry seeks efficiency and safety. Poorly charted areas and a lack of relevant information will cause 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 Safety of Life At Sea (SOLAS) Convention considers a ship unseaworthy if it does not carry up-to-date charts necessary for its intended voyage. Many insurance, legal, and safety questions arise from lack of adequate nautical charts. The devastation of a maritime accident is underscored by the recent wreck of the COSTA CONCORDIA, even though not attributable to charting, the accident shows how significant safety in the marine environment is to our daily lives.

Modern charts also provide information required to create the routing systems established by international conventions and to meet the economic interests of a coastal State.

THE IMPORTANCE OF HYDROGRAPHY FOR INFRASTRUCTURE DEVELOPMENT

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.

Without hydrography:

- 1 no ship sails safely

- 2 no port is built
- 3 no coastal infrastructure is developed
- 4 no marine environmental plan is implemented
- 5 no coast or island is defended
- 6 no marine rescue is attempted
- 7 no inundation model is developed
- 8 no maritime boundary is delimited or enforced

THE NEED FOR A NATIONAL HYDROGRAPHIC SERVICE

The Hydrographic Offices or Authorities of coastal States provide an essential service to national transport infrastructure. National Hydrographic Offices 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 defense.

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

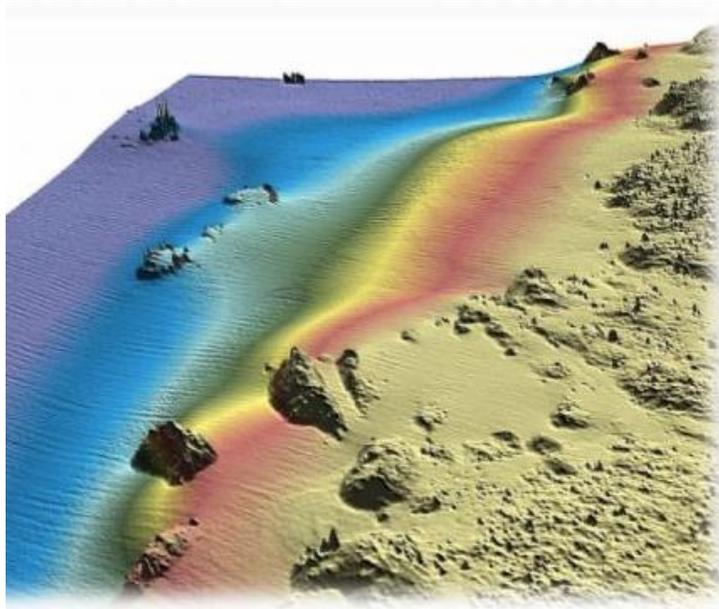
However, there is concern in the maritime community that too few coastal States are supporting hydrography at the national level, despite the fact that there are many areas of the world that still lack adequate nautical charts and supporting services. This poses a real and continuing threat to safety 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.

This publication is intended to provide a summary of the rationale for supporting and investing in hydrography and nautical charting at a national level. It describes the benefits to national development. It also provides suggestions about how a national Hydrographic Service can be established, how to define individual national requirements, and how to decide upon an appropriate level of involvement. It is written for a wide audience, catering, it is hoped, to all those that have an interest in the safe and efficient navigation of ships, protection of the marine environment and more generally to the improvement of the global economy through improving the wealth and prosperity of individual States.

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.

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 defense and security, and coastal disaster management.

In many coastal States, a national Hydrographic Service already exists. In Haiti Service Maritime et de Navigation d'Haiti (SEMANAH) has begun its work to increase navigation safety and marine commerce. The Workshop described herein is a first step. However, in other countries, the Government may not yet have appreciated the advantages to be gained from supporting such a level of capability. Governments may also be unaware of the international obligations to ensure that appropriate levels of hydrographic and nautical charting services are in place for their waters.



International Obligations to Provide Hydrographic Services

International Convention on the Safety of Life at Sea

In July 2002, a revised Chapter V of the International Convention on the Safety of Life at Sea (SOLAS) entered into force.

Regulation 9 of SOLAS Chapter V specifies very clearly the hydrographic services which have to be provided by Contracting Governments. The provision of these hydrographic services is, in effect, an obligation for the Contracting Governments under an International Treaty Law.

SOLAS CHAPTER V - REGULATION 9

Hydrographic Services

1. 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.
2. In particular, Contracting Governments undertake to co-operate in carrying out, as far as possible, the following nautical and hydrographic services, in the manner most suitable for the purpose of aiding navigation:
 - 2.1. to ensure that hydrographic surveying is carried out, as far as possible, adequate to the requirements of safe navigation;

2.2. to prepare and issue nautical charts, sailing directions, lists of lights, tide tables and other nautical publications, where applicable, satisfying the needs of safe navigation;

2.3. to promulgate notices to mariners in order that nautical charts and publications are kept, as far as possible, up to date; and

2.4. to provide data management arrangements to support these services.

3. Contracting Governments undertake to ensure the greatest possible uniformity in charts and nautical publications and to take into account, whenever possible, relevant international resolutions and recommendations.*

4. Contracting Governments undertake to co-ordinate their activities to the greatest possible degree in order to ensure that hydrographic and nautical information is made available on a world-wide scale as timely, reliably and unambiguously as possible.

Regulation 4 of SOLAS Chapter V places an obligation on Contracting Governments to ensure that appropriate navigational warnings are issued.

SOLAS V/4 – Navigational Warnings

Each Contracting Government shall take all steps necessary to ensure that, when intelligence of any dangers is received from whatever reliable source, it shall be promptly brought to the knowledge of those concerned and communicated to other interested Governments. *

In 2011, there were 159 States signatories to the SOLAS Convention and therefore committed to acknowledge the obligations contained in SOLAS Chapter V; and in the case of hydrography, the obligations contained in Regulation 9 and 4 of Chapter V.



The Power of Hydrography

Efficient and Safe Maritime Transport Control

More than 85% of international trade in the world is carried by sea.

Coastal Zone Management and Development

Coastal zone management and development include the ability to assess the feasibility of constructing new ports and the maintenance and development of existing ones, dredging operations for the maintenance of minimum depths and for the establishment, monitoring and improvement of channels.

Exploration and Exploitation of Marine Resources

Although intended primarily to support safety of navigation, the often extensive databases built up over the years by national Hydrographic Offices or institutions,

together with their various products and services, are of considerable economic value in assisting the management and exploitation of natural marine resources.

Environmental Protection and Management

An essential prerequisite for the protection of the marine environment is safe and accurate navigation.

Marine Science Marine science depends largely on bathymetric information.

National and Marine Spatial Data Infrastructures

All governments have recognized that good quality and well managed spatial data is an essential ingredient to economic and commercial development, and environmental protection.

Maritime Boundary Delimitation

Good hydrographic data is an essential and fundamental requirement for the delimitation of the maritime boundaries detailed in the United Nations Convention on the Law of the Sea

Maritime Defense

Navies are major users of nautical chart products for surface, submarine, anti-submarine, mine-hunting and air-sea naval operations.

Tourism

Good charts are particularly important for the development of the economically important

Recreational Boating

The recreational boating community represents a very large percentage of users of the sea

Seafloor, Boundaries, and Territory Management

Good Hydrography allows for the management of the seafloor riches, international boundaries and territorial limits for conservation, preservation, and exploitation.

Establishing baselines

Delimiting sea areas such as the Territorial Sea, the Exclusive Economic Zone, and the continental shelf

Identifying traffic separation schemes

Identifying sea lanes for transit and innocent passage routes

Deploying submarine cables and pipelines

Conducting drilling on the seafloor

Conducting marine scientific research

Cost versus benefit ratio of investing in hydrography is more than 1:10

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

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

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

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

The Workshop

From 5 to 16 September 2011 the Haiti Hydrographic Surveying and Nautical Charting Work Shop was implemented. This was a Capacity Building event sponsored and funded by the Pan American Institute of Geography and History (PAIGH) Committee on Institutional Strengthening and Technical Cooperation (ISTC), the International Hydrographic Organization (IHO) Capacity Building Subcommittee (CBSC) and IHO Meso American Caribbean Regional Hydrographic Commission(MACHC). Significant additional support to this project was made available by the Republic of Korea Hydrographic and Oceanographic Affairs to the IHO Capacity Building Program.



IHO and PAIGH

The Pan American Institute of Geography and History (PAIGH) is a specialized organization of the Organization of American States (OAS). The International

Hydrographic Organization (IHO) represents the world's hydrographic offices in matters of safety of navigation, charting and marine commerce.

This was the first collaborative work between PAIGH and IHO under an MOU signed in February of 2011. Funding for the project comes from both organizations and goes to logistics support for equipment shipments, travel, and personnel support for instructors.

PAIGH, IHO, and Industry Partners CARIS USA and Kongsberg Maritime

PAIGH and IHO have joined with industry partners CARIS and Kongsberg Maritime. CARIS has temporarily provided SW and computer hardware for data collection, processing, chart production. Kongsberg Maritime has temporarily provided a single beam echo sounder, side scan sonar, and engineering support for installation on board the Haitian Coast Guard platform. Hemisphere has provided DGPS receivers for installation on board the platform. HYPACK has provided the hydrographic data collection software for the survey operations and processing.

National Partners Republic of France and the Republic of Korea

The national hydrographic office of France, Service Hydrographique et Oceanographique de la Marine (SHOM) provided two weeks of on site and course preparation time by a professional hydrographer and a nautical cartographer. They traveled to Haiti to deliver the IHO approved curriculum. SHOM also developed the final training program curriculum in cooperation with IHO, produced and / or adapted most of the training material, and contributed to the coordination and preparatory work between sponsors (CARIS, SHOM, and Kongsberg for sensor interfaces).

Through its capacity building program to the IHO capacity Building Sub Committee The Republic of Korea Hydrographic and Oceanographic Administration provided significant funding support to this project.

The partnership that we have formed to do this is very strong, the dedication of the entities involved is evident, and the sum result of this of this project is far greater than what is provided by each partner.

National Partner

Our Haitian partner agency is Service Maritime et de Navigation d'Haiti (SEMANAH) which is providing a boat, fuel, crew, class facilities, ground

transportation, customs clearance for equipment, and whatever other local support that is necessary. 12 persons from SEMANAH attended the training.



This training was designed to enable Haitians to be able to conduct a simple hydrographic survey operation and process single beam hydrographic data sets that they collect. We will be leading them to be able to update or produce a nautical chart which is the ultimate goal for a national hydrographic office. This WS will not get them fully to that point but it is the first step.

Issues barring continuing success:

What is an issue for us and the continuing success of the after WS follow up is that Haiti does not own hydrographic surveying equipment or software for processing or production of Nautical Charts and follow on capacity building to create an operating Hydrographic Office. We have been fortunate in that companies have been willing to temporarily donate what they have done but this is not a permanent solution. By the end of the year the equipment will be reclaimed by its owners and our trained Haitian colleagues will be out of work.

Haiti Hydrographic Surveying and Nautical Charting Work Shop

The estimated costs for supporting equipment and SW acquisition and training for Haitian Hydrography are:

Equipment Acquisition:	\$130,000 (1st year) (this is for SB/SSS and support equipment. Boat not included)
Software Acquisition:	\$50,000 (1st and 2nd years)
Training	\$30,000 (1st, 2nd, 3rd years)
Education:	\$50,000 (1st 2nd, 3rd, 4th, 5th years)
Consulting:	\$100,000 (ongoing)

A program to incorporate the equipment and software suites into training and education will be developed over three to five years.

Consulting will be an ongoing process and diminish as Haiti capacity develops.

International Hydrographic Office (IHO)

Haiti has applied for IHO Membership.



Haiti Hydrographic Surveying and Nautical Charting Work Shop

