



## **REPORT**

**Technical Visit**

**to**

**THE KINGDOM OF BAHRAIN**

**04 - 06 May 2008**

# **FINAL REPORT**

## **Technical Visits to the Kingdom of Bahrain (IHO Work Program 2008, Tasks 2.2.1; 2.3.1 and 4.2.5) 04 - 06 May 2008**

### **I.- General Information.**

One of the strategic issues identified by the International Hydrographic Organization (IHO) and highlighted in the Strategic Plan is Capacity Building (CB). CB consists in the process by which the IHO assesses and assist in sustainable development and improvement of the State, to meet the objectives of the IHO and the hydrographic, cartographic and maritime safety obligations and recommendations described in the United Nation Convention of the Law of the Sea (UNCLOS), Safety of Life at Sea Convention (SOLAS) and other international instruments. This is essentially the building of an effective national hydrographic capability, where it does not exist, or the improvement of the facilities in place. Under this scope, technical visits' objectives are to assess and prioritize the requirements and needs, as well as to raise awareness on the importance of hydrography and its contribution to development.

The IHO Program 2 “Capacity Building” addresses principally Member State's requirements to fulfil their roles. It has to be acknowledged that there are still several States that do not have any hydrographic capability, and therefore IHO needs to support and encourage those countries to establish such capability. It is one of the IHO's mission to achieve a global coverage of effective hydrographic services and therefore the establishment of new Hydrographic Offices and the reinforcement of existing ones shall be strongly encouraged.

In this line, the IHO Work Program for 2008 has included the task to carry out Technical Visits to several countries, including the Kingdom of Bahrain. The need to include these technical visits in the IHO Work Program was identified and agreed at the 2nd ROPME Sea Area Hydrographic Commission (RSAHC); considered positively by the IHO Capacity Building Committee and finally approved by Member States. This was followed by a direct coordination between the Bahrain Hydrographic Survey Directorate and the International Hydrographic Bureau.

In May 2007 the IHB held a meeting with the Kingdom of Bahrain delegation to the XVIIth International Hydrographic Conference and discussed about organizing a Technical Visits to Bahrain. In January 2008 the decision was taken to foster this initiative and the coordination started. Late January 2008 it was jointly defined the main objective of the visit and a suitable program and timing. The visit took place 04 to 06 May 2008.

### **II.- Participant and Program**

The participant was Capt. Hugo GORZIGLIA, IHB Director; co-ordinator of the RSAHC and Director in charge of Capacity Building (CB) matters. The program of the visit is provided in **Annex A**.

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## III.- The Technical Visit

### **1. The Hydrographic Survey Directorate (HSD). General comments.**

The Kingdom of Bahrain has been an IHO Member since 22 October 1992 and is member of the RSAHC where it participates actively at its meetings. Nevertheless, there are no records of Bahrain's participation on other IHO technical bodies .

The Hydrographic authority for Bahrain was established in 1978, as a Section within the Survey Directorate of the Ministry of Housing. The former Hydrographic Survey Office, today the Hydrographic Survey Directorate (HSD) was established in 2004 as part of the Survey & Land Registration Bureau.

It is understood that the mission of the HSD is to conduct hydrographic surveys, produce digital and paper nautical charts and prepare relevant nautical publications in support to the mariner. Hydrography has very low visibility in the national governmental context. During the visit it was not possible to get and study a text of the national regulation establishing the institutional arrangements for the HSD. This situation prevented the IHO Representative to learn about the HSD mission, objectives, functions, representation and inter-relation with other national agencies. The perception was that these elements have not been defined yet, but later information provided by HSD Acting Director indicated that the information was available only in Arabic language. Also it was not possible to find a document containing a National Maritime Policy that could have provided a guide on what Bahrain, as a maritime country, expects from the Hydrographic Survey Directorate, as a national technical agency.

The Head of the Survey & Land Registration Bureau is His Excellency Shaikh Salman Bin Abdulla Al Khalifa; the Director General of Survey is Mr. Naji Sibt Salim Sibt; the Acting Chief of the HSD is Mr. Khalid Abdulla Al-Sager and the Head of Marine Survey is Cdr. (RDN) Ole Gravgaard.

The IHO representative was introduced with a complete diagram of the former Hydrographic Survey Office, dated 29 July 2007, establishing the staff authorized by the Civil Service Bureau, approved by the corresponding Ministry. This document identifies a total of 19 people in different positions and with different activities; nevertheless the situation is that the HSD today has only 10 people, with only 6 with hydrographic related background. It resulted evident that there is a misconnection between the expectations of the role anticipated for the HSD with a staff of 19, and the present situation. Without a regulatory document setting the mission, objectives and functions of the HSD, it is not possible to define the required capabilities that shall exist.

The fleet of three boats, including a nice 19 meters catamaran constitute a valuable asset in terms of hydrographic platforms, unfortunately with the extremely reduced staff, any plan to conduct a hydrographic survey requires the participation of almost all the human resources available. This situation does not facilitate the execution of other important activities in parallel, such as data processing and chart production and maintenance. In fact, the Hydrographic Information & Map Production Group identified in the approved structure diagram is unmanned. The lack of: a cartographer, a multibeam surveying and processing expert, a data management expert, an experienced electronic technician (as a minimum) and at least a couple more of trained hydrographers, seems to be the most severe shortcoming of the HSD to advance in the effective and efficient provision of sustainable basic hydrographic products and services as required by SOLAS, and to support national development projects in the coastal zone.

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The technology used for hydrographic data gathering seems to be appropriate, provided that the existing plans to incorporate a multibeam unit and to set a tide gauge network are to be implemented in the short term. It is our opinion that the incorporation of these elements will

increase the capabilities of the HSD, provided that new trained personnel is made available. With the existing staff it does not seem to be viable to get benefits from this investment.

The software and programs used in the different processes are the same used by the great majority of Hydrographic Offices and this situation is considered as a strength of the HSD. It has to be acknowledged that in the digital world, progress is being achieved in a very dynamic mode; therefore, the maintenance of the licenses requires a permanent attention. It was felt that keeping licenses updated is not considered a priority, in fact the approved budget does not consider this item.

The production of the 11 nautical charts is made in house and distributed through bilateral agreement with UKHO and NGA, covering international demand. To cope with local needs the HSD has a print on demand capability and provides a convenient service. The total revenue due to the sale of charts does not return to the HSD, but to the central government.

With regard to Marine Safety Information, Notices to Mariners are channelled to the Middle East Navigation Aids Service (MENAS) for diffusion, through the General Organization of Sea Ports. The HSD does not directly provide this service. Nevertheless through bilateral agreements with UKHO and NGA, new bathymetric information is provided – when available -, to keep updated the nautical charts of Bahrain produced by these two organizations.

The budget allocation is for a period of two years, and its amount based on the activities and investment that the HSD proposes. This situation obliges to focus the administration of the HSD just on a short term program. This situation is considered an important limitation, as the development of hydrographic capabilities requires an orientation that a medium and long term planning shall provide.

## **2. Meeting with stakeholders**

A meeting with the main stakeholders was organized by the HSD and took place at the Topographic Survey Directorate on the 5th of May. The following institutions were present:

- Central Planning Unit (Ministry of Works)
- Urban Planning (Ministry of Municipalities and Agriculture Affairs)
- Survey & Land Registration Bureau
- Public Commission for Protection of Marine Resources
- General Organization of Sea Ports
- Coast Guard Directorate
- Royal Bahraini Navy
- Hydrographic Survey Directorate
- Middle East Navigation Aids Service (MENAS)
- APM – Terminals
- BAPCO
- University of Bahrain

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Mr. Naji Sibt Salim Sibt, General Director of Survey of the Survey & Land Registration Bureau welcomed the participants and highlighted the importance of the meeting which brought together most of the organizations in the country concerned with hydrography. He introduced the IHO representative who made a presentation covering the following main points:

- a) Objective of the Technical Visit to the Kingdom of Bahrain
- b) General concepts of Hydrography
- c) The international scenario related to Hydrography
- d) The International Hydrographic Organization
- e) SOLAS V Regulations 4 and 9 States' general responsibilities
- f) Challenges and Conclusions
- g) Discussion

As it has been indicated, the presentation ended with a few conclusions highlighting several topics that Bahrain's authorities might wish to consider. The text of the conclusions is provided in **Annex B.**

After some exchange of opinions, Mr. Naji Sibt invited Mr. Suva to give a presentation on the project "National planning development strategies - Marine spatial planning", a coordinated initiative constitutive of one of the first national efforts to face development with a systematic approach as regard to the marine area, where the management of spatial data of different layers is a must. This project has not been finalized yet and the objective of its presentation was to inform participants about its existence and the level of progress so far reached.

This presentation was followed by one offered by Mr. Dominic Mc Polin, Executive Coordinator with the Ministry of Works & Housing, who referred to the importance of developing policies in different fronts, as a must to provide guidance on the way forward, considering the great pressure that the developing boom is putting to Bahrain administration. He expressed concern that policies were established as a consequence of the development and not the opposite way. This situation does not facilitate a systematic and standardizes approach to deal with development projects in the wider scope. Considering that there are huge projects under development in the coastal area, this situation impacts the HSD as the natural authority provider of official hydrographic information or authority that shall certificate the hydrographic information provided by the private sector.

Finally Cdr. Ole Gravgaard referred to the present weak situation of the HSD and the need to enhance the existing capabilities to be able to provide the expected service that the Directorate shall offer as a contribution to national development.

## **3. Visits paid. Briefing of the discussions.**

### **3.1 General Organization of Sea Ports.**

The IHO representative visited the Director General of the Organization of Sea Ports who would not be able to attend the IHO presentation due to other commitments (trip to London, to participate at the MSI Committee Meeting at the IMO). The Director General represents the Kingdom of Bahrain at the International Maritime Organization (IMO).

(**Note:** Later, the Director General made a great effort and participated in the IHO presentation, despite of his very heavy agenda and imminent trip to London on the same day. This attitude is deeply appreciated).

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The IHO representative explained the objective of the technical visit and highlighted the importance that hydrography has for a maritime country such as the Kingdom of Bahrain. He continued indicating the efforts the IHO is making - also with the support of IMO - to help countries in achieving SOLAS V, mainly Regulation 9, through its technical bodies, such as the Capacity Building Committee, coordinating training and opportunities to improve capabilities. Finally he expressed that the presentation he was going to be offered to all stakeholders will include the message that for maritime States, hydrography shall be considered as a national strategic objective.

The Director General was absolutely updated on the very good relationship that exists between IMO and IHO and on the main topics capturing the attention of both organizations. He expressed a strong support to and recognition of the hydrographic activity and the willingness of his organization to work close to the HSD.

He then referred to the on going project to have a new container port in Bahrain with capability to receive ships of 15 meters draft. Discussing about the dredging operations and control associated to this project, he made especial emphasis that his organization's policy was to have the HSD involved in the certification of final surveys, ensuring that all hydrographic data be provided by the consultants to the HSD.

The IHO Representative paid a visit to Mr. Jassim Ahmed Al-Qaseer, General Director. After having exchange information on the objective of the IHO Technical Visit to Bahrain and the role the General Directorate for Protection of Marine Resources has, a very fruitful conversation took place.

Fishing activity is very important due to the number of families whose only incomes have its origin in the daily catch. As important as fishery, the protection of marine wildlife and its exploitation as recreational, scientific and tourism activities call for a conscious study of the marine environment as a system.

The incredible coastal zone development, in terms of reclamation and dredging, is modifying the environment and therefore the ecosystem requires adjusting to the new scenario. It was agreed that a detailed knowledge of the sea bottom through appropriate hydrographic surveys would provide source information that might help in the adoption of suitable administrative measures and orient the development of the coastline producing a minimum impact on the biomass.

Modelling techniques to forecast the future conditions after completing coastal development projects require hydrographic and oceanographic information. Tidal stations in the installation process could also be used to install other sensors and help monitoring the basic parameters that could be used for studies of circulation and the effect of the new reclamations and coastal construction to be built.

In brief, it was considered that hydrography is vital to ensure reliable studies that shall guide development of the coastal zone. These measurements shall be conduct jointly by the different interested governmental agencies with the responsibility to manage resources and environment. It was not evident that Bahrain has implemented so far a zonification strategy to ensure the best use and protection of the coastal zone, recognized as a "limited resource". Nevertheless it was made know to the IHO representative that a Study entitled "National Planning Development Strategies" is underway and considers, among others, the marine environment and a coastal modelling study. The HSD shall have a leading role in this effort, providing valuable hydro-cartographic data sets to support other national agencies responsibilities.

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## **4. Main Technical Matters Discussed.**

### **4.1 Human Resources.**

Following a detailed visit to the premises of HSD and discussions had on this topic, it was evident for the IHO Representative that the lack of human resources is one of the most serious problem the HSD is facing.

It has to be considered that the oil industry as well as the hydrographic industry (developers of specific hydrographic hardware and software) are hiring many hydrographers and the “production” of these experts is not covering the worldwide needs. Very few universities in the world run hydrographic courses or diplomas, and mainly the experts come from Hydrographic Offices that have been obliged to organize hydrographic training programs to satisfy their national and internal needs. In brief, it is not easy to find hydrographic surveyor ready to be hired.

If a hydrographic surveyor is recruited, the next problem Hydrographic Offices phase is the continuity of these experts. The application of traditional contracts and some times restricted administrative regulations work against the permanency of the hydrographic surveyor that probably will choose the best offer of the market. This situation requires from the administration the application of innovative contracts that could motivate hydrographic surveyors to settle at the Hydrographic Office.

In the long term probably the solution is to prepare at the national universities a small but well trained staff, to whom the working conditions shall be attractive. Another option is to outsource hydrographic activities, but at least a small core national group must exist in order to ensure sustainability of the hydrographic services a maritime nation must provide in accordance to SOLAS. A maritime country, in our opinion, must have knowledgeable national experts to set the terms of reference of out sourced work and to be able to certify the quality of the products contracted.

In order to provide a way out to the dramatic situation at the HSD, it was agreed that as a first and urgent measure, the HSD would define the profile of the minimum required experts. The IHB would then invite IHO Member States to investigate the availability of such experts in their countries, so that interested persons contact directly HSD for eventual contracts, in the mode of secondments and permanent staff.

NOTE: This initiative was done while this report was under preparation.

### **4.2 Training Requirements.**

The very few existing technical staff at the HSD has received in the past an appropriate training, but due to the technological development, they require an update. The hydrographic software industry improves their products and hydrographic surveyors are required to receive refresher courses.

Three training areas were identified as priorities:

- Caris HIPS , GIS and HOM
- Multibeam processing and
- Data base management.

Three alternatives were discussed:

- a) To send existing technical staff abroad to attend courses or on the job training opportunities
- b) To organize one or all of these courses in Bahrain.
- c) To recruit experts with updated knowledge on the subjects identified.

The pros and cons of these three alternatives were discussed. It was felt that under the existing conditions the best and more efficient solution would be to organize courses in Bahrain. This initiative needs to be worked-out by the HSD in order to submit a proposal to the next RSAHC Meeting, October 2008, and further submitted to the Capacity Building Committee, seeking for support. It was felt also that a joint effort, the IHO and the RSAHC, could provide a good solution.

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Sending abroad part of the reduced staff is an alternative that shall be explored in the light of the hydrographic surveying work program of the HSD. Nevertheless the training will have to be just for one individual, compared with running the course in house where many others could benefit, making the ratio cost-benefit, much more attractive.

Recruiting experts already well trained shall be considered anyway no matter alternatives a) or b) are selected.

## 4.3 Hydrographic Equipment & Software.

The hydrographic equipment and software available are in line with the general practice in other hydrographic offices. The future incorporation of a multibeam system is considered a very good new and shall provide the strength of being able to gather high quality bathymetric information for the benefit of nautical charting production as well as for other applications of interest to other national agencies. The program of reinstalling 7 new tide gauges around the country is also considered of importance. As indicated before, these tide stations provide a very important infrastructure, the network of which could consider the deployment not only of tide sensors but as well, other physical and environmental parameters could be measured and transmitted in real time for an appropriate monitoring.

As regard to software used in the different processes, it was felt that no importance was given to fund keeping the licences updated. This approach is not recommended as the improvement of the tools developed and the support to keep systems working properly ensure effectiveness of the processes. In our opinion savings in this item at the end of the day become higher expenditures as chances are that data could be lost, process could be slow and the results not be reliable.

## 4.4 ENC cells. and coordination.

The HSD has made an agreement with the IC-ENC (UK) for the distribution of ENC cells corresponding to Bahrain waters, produced by HSD.

The discussion on this matter was with regard to the necessary coordination that Bahrain should do with neighbouring countries, considering that for any particular cell, only there must be one producer nation, avoiding to have the mariner exposed to two cells of a same area. This situation and considering that cells have by definition a rectangular form, requires coordination to set the limits between adjacent countries.

It was suggested that at the next RSAHC a complete report on ENC production of Bahrain waters should be provided aiming at establishing an ENC scheme for the RSAHC region.

## 4.5 Marine Safety Information (MSI).

The IHO representative was informed that the HSD does not manage the MSI system for Bahrain, but it contributes to it through the provision of relevant information to the General Organization for Sea Ports, gathered during the hydrographic surveys operations. The General Organization for Sea Ports passes the information to the Middle East Navigation Aids Services (MENAS), for distribution at a regional level

MENAS distributes the information passed to it by means of MENAS Notice to Mariners and by NAVTEX transmitted via Bahrain Radio.

MENAS Notices to Mariners promulgate all navigational information of a permanent or semi-permanent nature received from Governmental Nautical Authorities, Ports and Harbor Authorities, Oil Companies and others engaged in off-shore operations, Ships' Masters and other sources. After having reviewed the Notice to Mariners issued by MENAS in the last 12 months, the IHO representative became concerned by the absence of Notice to Mariners in the region. Particularly

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it was a surprise that despite the very active work that is taking place in the Bahrain coast, there was not one Notice to Mariner informing the work in progress to enlarge the Port.

With regard to NAVTEX, MENAS acts as a sub-area Coordinator for NAVAREA IX (Pakistan). It became also of concern that after having examined the NAVTEX Navigational Warnings as dated 01 April 2008, only 6 warnings are in force, of which three correspond to last year.

It seems that in the theory a system to issue Notice to Mariners exists, but it seems evident that it does not work at all and the Mariner is not aware of what is going on and could affect navigation safety.

This comment is provided after having reviewed MENAS provision of Notice to Mariners and NAVAREA IX Coordinator system. The subject calls for a deeper study by the HSD aiming at the adoption of procedures that ensure timely and reliable provision of information to the mariner. In the IHO's representative view, MSI system is not working in Bahrain.

## 4.6 Spatial Data Infrastructure.

The importance and value of data and the information generated with these data was highlighted. Nowadays the concept of spatial data infrastructure is becoming top priority due to the great amount of data today's systems are able to collect.

In this context it seems convenient to distinguish at least two issues: one is the archiving of big volumes of data and the second, is how to use the data in an integrative way, together with other sets of data. Both problems are not easy to treat but an attempt is needed in order to preserve data and information that constitute a national heritage.

The initiative to establish a National Data Center in Bahrain shall be strongly supported. This Center shall contain hydro-cartographic as well as oceanographic data, among others coming from other national agencies. The way in which hydro-cartographic data needs to be filed and archived shall be of concern to the HSD and this topic should be considered when dealing with data base management. For the oceanographic data, the experience with the Intergovernmental Oceanographic Organization should be strongly considered.

As regard to the use of different layers of information, the system established shall be of such a characteristic that the exchange of data and information be ensured. For this to happen, the standardization and adoption of open procedures are required. The HSD might wish to keep an eye on the progress of the IHO Working Groups dealing with these subjects in order to implement methodologies as universal as possible.

## 4.7 ISO certification.

It was made known to the IHO Representative the efforts made in the past to get ISO Certification of different processes at the HSD. As we discussed, it seems important to review this matter and if found that updates are required, then it is recommended to proceed with the preparation of the documentation to seek for a re-certification. This is not a priority subject, but shall be considered in the medium term work plan.

## 4.8 National Hydrographic Committee (NHC) or equivalent national coordination body.

The objective of a NHC is to be able to provide professional advice to the government in coordinating hydrographic, cartographic, and oceanographic and safety to navigation activities. On the one hand we can identify that there are governmental agencies providing data and on the other, agencies acting mainly as users of the data. A body that could identify priorities from a national perspective, not from an institutional perspective shall benefit the results expected. There shall be always a need for having a foreign affairs component as well as a finance one.

The composition of a NHC could be, as for example, as follow:

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## a) Providers of data

- hydrographic component
- cartographic component
- oceanographic component
- meteorological component
- national data centers
- academia

## b) Users of Data/Information

- National Planning/Development Agency
- Foreign Affairs
- Tourism Agency
- Fishing Administration
- Mining or Natural Resources Administration
- Defence
- Transport/Ports
- Environment
- Education

Following the scope given by several Hydrographic Offices, the NHC might me tasked to:

- a) Propose the national policy framework.
- b) Nautical Cartographic Plan
- c) Hydrographic Plan
- d) Aids to navigation national plan
- e) Oceanographic national plan
- f) Contribute to establish national regulations.

It was indicated that very often the creation of such a national committee begins by informal meetings of the organizations or persons involved. For example, the Bahrain stakeholders ‘ meeting organized on the occasion of the IHO representative visit to Bahrain, was a sort of NHC or equivalent. Two or three meetings a year of all these stakeholders does not seem to be expensive, if we consider the great benefits this coordination shall have to the administration of the nation. In Annex C I am providing an example on how a NHC can be established.

## **4.9 Use of new technology.**

Under this subject, we consider the issue of importing new technologies to the hydro-cartographic processes. It is very common to consider that the problem is solved when new equipment, hardware or software is incorporated in the processing system, but that is not necessarily true.

Some factors need to be kept in mind, as for example the importance to consider training together with buying an equipment or instrument. Moreover, after the equipment has been used for some time, a second step in training is needed, probably the best way will be participating at a seminar where other experts will gather to exchange the problems and the solutions found to solve them. These “hands on” workshop have been recognized as an excellent tool for this purpose.

When buying new technology the administration needs to be aware that if it is an instrument or equipment, it will not last forever and probably its logistic expectation (life) is ensure for no more than 3 to 5 years. Therefore it is important to consider its widest possible use. (25 hours a day).

The allocation of resources to ensure the maintenance is also vital. Many initiatives do not consider the maintenance cost and at the end of the day, the technology dies. This is particularly

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important with regard to the tidal stations. Installing the network is much easier than keeping it working for long.

This matter was discussed during our meetings and constitutes a practical as well as warning message.

## 4.10 Participation on IHO activities

One of the last subjects discussed was the convenience of having an active role in the IHO activities. At a minimum, it was recommended to take part on the RSAHC meetings, and contribute to initiatives of national as well as regional benefit, especially as regard to capacity building.

Also it was commented the importance to be aware of the progress the IHO technical bodies are having on matters under development, as for example: standards and spatial data infrastructure. It was made clear that it was difficult to participate directly on all bodies, but at least contributions through written reports and comments on the initiatives under discussion were mostly welcome.

## IV. Conclusions and Recommendations of the Technical Visit.

As a result of the discussions, the IHB representatives would like to offer the following conclusions and recommendations to the hydrographic authorities of the Kingdom of Bahrain:

1.- The Kingdom of Bahrain has a privileged geographic position and being a maritime country is not taking full advantage of being an IHO Member State. It is therefore recommended that Bahrain considers playing a much more active role within the IHO RSAHC and the IHO technical committees and working groups. At the level of the RSAHC there are several matters to be discussed and agreed, among others, the situation of ENCs in adjacent areas; training and mutual support.

2.- The IHB Technical Visit was very well organized by the HSD, capturing the attention of several national agencies with some relation to hydrography that participated in the meeting with the IHO representative. All parties seems to have sympathy for the establishment of a national coordination body (NHC or equivalent) to deal with hydrographic and other related matters, as for example the idea of a national data centre and the development of spatial data infrastructure. Such Committee shall include representatives of all the agencies present in the meeting, plus others such as the meteorological national component and the national agency representing Bahrain at the Intergovernmental Oceanographic Organization (IOC).

3.- The availability of skilled human resources at the SHD is a key factor. The new and complex technologies in use by hydrographic offices demand a permanent effort to keep personnel abreast of methodologies, protocols, processes and quality control of the final products, just to mention a few aspects. Main training areas required are ENCs, MultiBeam and Data Management matters. It is recommended to consider the opportunities offered by the Capacity Building Committee and to submit projects for consideration by the CBC through the RSAHC Chairman. Another important aspect is to ensure, as far and as quick as possible, a radical increase of the existing staff and the adoption of especiall measures to ensure their permanency. In order to do so, it is recommended to consider the adoption of exceptional administrative regulations aiming at protecting the HSD from loosing trained and experienced personnel.

4.- The HSD is willing to get in house training on Caris software. This is an initiative that could be organized and offered to other countries in the region can be further discussed between HSD and the IHB for its implementation. An effort such as this complies with the objectives of the IHO and therefore is supported by the Organization. If any support is required from the IHO Capacity Building Committee, it is recommended that this initiative be submitted to the CBC for

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consideration at its meeting in late May (2008), through the Chairman of the RSAHC or directly due to the time constrain.

5.- The access to new technology needs to be complemented with the adequate training and the assurance of hardware and software maintenance, and human and financial resources for operation. In this sense it is important to develop a short, medium and long term programme that shall be based on the mission, functions and obligations the government shall defined for the HSD. As these aspects are not defined, it is recommended that the HSD develop a proposal of regulation that after having been approved by the government shall constitute the framework for the preparation of the mentioned programmes. In this endeavor the IHB can be of great help and after some basic definitions this task can be worked jointly between the HSD and the IHB. Annex D provides some information to be analyzed and Annex E a Proposal on the elements that are to be included in a short, medium and long term programme.

6.- The provision of MSI service seems to be organized but not working, probably due to a lack of communication between some of the parties involved. This shortcoming affects safety to navigation and the situation shall be assessed in detail and studied with high priority. Unless I missed something, it is not clear to me that the mariner is receiving timely the relevant information on the huge work is taking place in the coast on Bahrain.

Monaco, 29 May 2008.



Hugo Gorziglia  
Captain – Chilean Navy  
IHB Director

## Annexes:

- “A” IHB Technical Visit Program.
- “B” Conclusions within the IHB Presentation.
- “C” Organization of a National Hydrographic Committee - Example
- “D” Hints to consider when establishing a National Hydrographic Office (NHO) - Example.
- “E” Proposal of Elements to be considered in a short, medium and long term Programme.

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## ANNEX A

### IHB TECHNICAL VISIT PROGRAM

**Saturday 03 May 2008**

Time	Event
2315	Arrive to the Kingdom of Bahrain.

**Sunday 04 May 2008**

Time	Event
0800-1130	Hydrographic Survey Directorate. Meeting to discuss HSD capabilities. Cdr. (RDN) Ole Gravgaard
1200-1330	Visit to General Organization of Sea Ports. Mr. Essa Abdulla Yateem, Director of Maritime Affairs.
1430	Lunch with General Director of Survey, Mr. Naji Sabt Salim Sabt;

**Monday 05 May 2008**

Time	Event
0800-1030	Hydrographic Survey Directorate. Meeting to discuss HSD capabilities. Cdr. (RDN) Ole Gravgaard
1100-1400	Meeting in conference room – S&LRD Presentation by IHB to all Stakeholders.

**Tuesday 06 May 2008**

Time	Event
0800-0900	Meeting with Director General of the Public Commission for Protection of Marine Resources, Mr. Jassim Ahmed Al-Qaseer.
1000-1230	Hydrographic Survey Directorate. Meeting to discuss HSD capabilities. Cdr. (RDN) Ole Gravgaard
1230-1500	Preliminary IHB verbal report of HSD capabilities with General Director of Survey, Mr. Naji Sabt Salim Sabt and Personnel of the HSD.
2200	Departure to Airport to return at 0015 back to the IHB.

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## ANNEX B

### CONCLUSIONS WITHIN THE IHB PRESENTATION

1. The International Hydrographic Organization provides all maritime countries the opportunity to benefit from its experience in improving or establishing national hydrographic capabilities.
2. The development of hydrographic surveying, nautical charting and marine safety information capabilities need to follow a systematic approach. The participation in the different IHO bodies should facilitate the development of National capabilities.
3. Being the main purpose to contribute to safety to navigation and protection of the marine environment, hydrographic information strongly contributes to many other initiatives of economic interest.
4. Capacity building is a key issue to achieve development. IHO structure considers Regional Hydrographic Commissions to address regional problems for which a collective solution could be explored, identified and put in place.
5. National hydro-cartographic and safe to navigation planning should be worked out with the participation of all end users of these products. The participation of the academia and the private sector is recommended.
6. One authority is needed to coordinate this national effort therefore the establishment of a National Hydrographic Committee or similar body should be strongly considered.
7. The lack of hydrographic information precludes national authorities to adopt the best possible technical and administrative regulations aiming at the development and welfare of their citizens in a sustainable manner. Establishing and funding a national hydrographic Agency, hydrographic surveys and related studies shall not be considered as an expenditure but as an INVESTMENT, and a real national asset of STRATEGIC importance.
8. Due to its vital contribution to the socio-economic development, Hydrography should be considered a **National Strategic Objective**.

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## ANNEX “C” Organization of a National Hydrographic Committee EXAMPLE

### CONSIDERING

That by (*Decree or Law etc*) XX of 19XX the (*name that corresponds*) is established, with the responsibility for producing (*all hydrographic surveying or nautical cartography or Maritime Safety etc....*)

That by (*Decree or Law etc*) XX of 19XX the Service (*name that corresponds*) is established with the principal mission to protect the sovereignty in the marine areas of (*Name of the Country*) and to ensure that the maritime laws in territorial and international waters are properly respected in accordance with the Marine Conventions and Treaties in force.

That the SOLAS Convention of the International Maritime Organization stipulates in its Rule 9, that Contracting Governments undertake to co-operate in carrying out, as far as possible, the following nautical and hydrographic services in accordance with the resolutions and recommendations of the International Hydrographic Organization

That, in addition to SOLAS Rule 9, Resolution N° A.958(23) of the International Maritime Organization Assembly invites Contracting Governments to establish hydrographic offices where they do not exist, in consultation with IHO

That Resolution A/RES/58/240 2003 of the United Nations Assembly, based on the UNICPOLOS recommendation, encourages intensified efforts to build capacity for developing countries to improve hydrographic services and production of nautical charts

That the International Hydrographic Organization supports the initiatives for the establishment and creation of the above-mentioned Committee and undertakes to offer technical support for the implementation of the programmes of the Committee.

### IT IS RESOLVED

**FIRST:** To establish the HYDROGRAPHIC AND OCEANOGRAPHIC COMMITTEE OF (*Name of the country*), formed by the following institutions:

1. xxxxxxxxxxxxxxxx
2. xxxxxxxxxxxxxxxx
3. xxxxxxxxxxxxxxxx
4. xxxxxxxxxxxxxxxx.

**SECOND:** Each institution member of the Commission will nominate a representative. These delegates will be elected within one month following the signature of the present Agreement.

**THIRD:** The Committee will elect its Chairperson and Vice-Chairperson, with a term that will be decided. A technical coordination meeting will be held annually.

**FOURTH:** Other public institutions stating in written their interest to participate and collaborate in the objectives of the Committee may join it. Their membership will be decided by agreement of the Committee members.

**FIFTH:** The Commission will be responsible for:

- a) developing the National Cartographic Scheme and for monitoring its execution and update.

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- b) coordinating and planning the necessary hydrographic surveys for the development of this cartographic scheme.
- c) identifying and recommending the necessary action with respect to training of the staff and purchase of equipment for the execution of the programmes.
- d) coordinating the development of the national maritime safety.
- e) submitting an annual report to the parent organizations.

**SIXTH:** The Commission will submit for the consideration of the relevant authorities a recommendation concerning the incorporation of (*name of the country*) as a member of the INTERNATIONAL HYDROGRAPHIC ORGANIZATION.

**SEVENTH:** This Agreement will enter into force on the date of its signature.

xxxx of xxxx of 200x

Signature of the relevant authorities

## **TERMS OF REFERENCE FOR THE NATIONAL HYDROGRAPHIC COMMITTEE OF “ANYWHERE”**

### **INTRODUCTION**

**Anywhere** recognises its obligations under SOLAS V/4&9 to make arrangements for the following hydrographic services:

- a. The timely collection and promulgation of urgent navigational safety information through navigational warnings (using MSI/GMDSS arrangements) and notices to mariners.
- b. The conduct of hydrographic surveys which are adequate to meet the requirements of safe navigation.
- c. The publication of nautical charts and associated publications.

### **ROLE**

The role of the National Hydrographic Committee is to assist the [appropriate Maritime Administration or Authority] to develop Anywhere's policy and plans for the delivery of these hydrographic services.

### **SECRETARIAT**

[A department or authority with appropriate insight] will provide the secretariat for the NHC.

### **MEMBERS**

The following departments and authorities will provide representatives to attend the NHC:

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a. Ministry of Transport.

b. Maritime Authority.

c. Port Authority.

d. Defence Force.

e. Surveys Department.

f. Fisheries Department.

g. ....

## FREQUENCY

The committee will meet three times in a year, and for special purposes as deemed necessary.

## FUNCTIONS

To develop **Anywhere's** policy for the delivery of hydrographic services, taking into account the requirements of all sectors of the maritime community.

To determine inter-departmental responsibilities, [including budgetary provision].

To review **Anywhere's** entry in the IHO S-55 data-base.

To review the arrangements for MSI:

- passage of information to ---HO for charting action;
- passage of information to NAVAREA ---;
- Local and Coastal Navigational Warnings;
- GMDSS/NAVTEX.

To assist in the development of a prioritised national survey plan.

To review arrangements with ---HO for the publication of charts and associated publications covering **Anywhere's** waters.

To make arrangements for **Anywhere's** representation at [the Regional Hydrographic Commission], including the preparation of the national report.

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## ANNEX “D”

### **HINTS TO CONSIDER WHEN ESTABLISHING A NATIONAL HYDROGRAPHIC OFFICE (NHO) “EXAMPLE”**

#### **GENERAL COMMENTS:**

##### **WHY DO WE WANT TO ESTABLISH A NHO?**

- BECAUSE WE HAVE A NATIONAL UNDERSTANDING OF THE CONTRIBUTION HYDROGRAPHY CAN OFFER TO NATIONAL DEVELOPMENT?
- BECAUSE WE WANT TO HAVE A NATIONAL AGENCY RESPONSIBLE FOR THE PROVISION OF HYDROGRAPHIC SERVICES AS RECOMMENDED BY SOLAS CONVENTION?
- BECAUSE WE WANT TO CONCENTRATE EXISTING NATIONAL EFFORTS TODAY DISPERSED IN JUST ONE AGENCY?
- BECAUSE WE NEED A NATIONAL TECHNICAL REGULATORY BODY?

#### **SUPPORTIVE NATIONAL LEGISLATION**

TO SUCCEED IT IS VITAL TO HAVE GOVERNMENTAL SUPPORT AT THE HIGHEST LEVEL.  
IN THIS SENSE A NHO REQUIRES A PROPER LEGISLATION ESTABLISHING:

- a. MISSION AND FUNCTIONS
- b. GENERAL ORGANIZATION
- c. DECISION MAKING PROCESS
- d. RESPONSIBILITIES OF KEY STAFF
- e. SOURCE(S) OF BUDGET PROVISION
- f. REPORTING SYSTEM
- g. NATIONAL AND INTERNATIONAL RELATIONS

#### **MISSION**

THE NHO IS THE HIGHEST NATIONAL TECHNICAL AND PERMANENT AUTHORITY AS REGARD TO HYDROGRAPHY, NAUTICAL CARTOGRAPHY AND MARINE SAFETY INFORMATION.

ITS MAIN MISSION IS TO PROVIDE HYDROGRAPHIC, NAUTICAL CARTOGRAPHIC AND MARINE SAFETY INFORMATION, PRODUCTS AND SERVICES AIMING TO CONTRIBUTE TO SAFETY TO NAVIGATION ON BAHRAIN INTERIOR WATERS, TERRITORIAL SEA AND EXCLUSIVE ECONOMIC ZONE.

IT IS ALSO THE MISSION OF THE NHO TO PROVIDE THE INFORMATION AND PRODUCTS REQUIRED FOR THE NATIONAL DEFENCE AS WELL AS THOSE CONTRIBUTING TO SCIENTIFIC RESEARCH AND OTHER NATIONAL AND INTERNATIONAL ACTIVITIES OF BAHRAIN INTEREST. (This is an example)

#### **FUNCTIONS**

- TO PREPARE, PROPOSE AND KEEP UPDATED A NATIONAL HYDROGRAPHIC AND NAUTICAL CARTOGRAPHIC PLAN.
- TO PREPARE, PROPOSE, EXECUTE AND MONITOR ALL HYDROGRAPHIC AND NAUTICAL CARTOGRAPHIC ACTIVITIES.
- PROVIDE STANDARDS FOR THE EXECUTION OF HYDROGRAPHIC SURVEY AND THE PRODUCTION OF NAUTICAL CHARTS

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- CERTIFICATE ALL HYDROGRAPHIC SURVEYS EXECUTED AND NAUTICAL CARTOGRAPHIC PRODUCED BY THIRD PARTIES.
- PROVIDE MARINERS WITH TIMELY AND RELIABLE MARINE SAFETY INFORMATION.

## **GENERAL ORGANIZATION**

a) Model A

DIRECTOR  
TECHNICAL DEPUTY DIRECTOR  
= HYDROGRAPHY  
= CARTOGRAPHY  
= MARINE SAFETY INFORMATION

ADMINISTRATIVE DEPUTY DIRECTOR  
= FINANCES

b) Model B

DIRECTOR  
DEPUTY DIRECTOR  
= HYDROGRAPHY  
= CARTOGRAPHY  
= MARINE SAFETY INFORMATION  
= ADMINISTRATION  
= FINANCES

## **DECISION MAKING PROCESS**

ANNUAL WORK PROGRAM AND BUDGET PREPARATION, SUBMISSION, APPROVAL, EXECUTION.

- + WHAT SOURCES OF INFORMATION TO CONSIDER FOR THE PREPARATION OF THE PROPOSAL?
- + HOW ARE PRIORITIES CONSIDERED?
- + HOW ARE ESTIMATED THE FINANCIAL RESOURCES?
- + TO WHOM THE WP & BUDGET ARE SUBMITTED?
- + WHO DECIDES AT THE END?

## **RESPONSIBILITIES OF KEY STAFF**

- = DIRECTOR (RANK AND SPECIALISM)
- EXTERNAL RESPONSIBILITIES  
(LIABILITY/ PROPOSALS)
- INTERNAL RESPONSIBILITIES  
(MANAGEMENT/INVESTMENT)
  - = DEPUTY DIRECTOR (RANK AND SPECIALISM)
- INTERNAL RESPONSIBILITIES (ADVICE/CONTROL/COORDINATE)
  - = HEADS OF DEPARTMENTS (RANK AND SPECIALISM)
- INTERNAL RESPONSIBILITIES  
(PLANNING/COORDINATE/LEAD/CONTROL/ADVICE)

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## **BUDGET**

- SOURCES
  - NATION'S ANNUAL DIRECT BUDGET
  - MINISTRY OF DEFENCE
  - ANY FUTURE ESPECIAL LAW
  - FROM SALES OF PRODUCTS & SERVICES
  - OTHERS

## **REPORTING SYSTEM**

- ANNUAL REPORT
  - PERFORMANCE MEASUREMENT
  - ACCOUNTABILITY

## **NATIONAL AND INTERNATIONAL RELATIONS**

- NATIONAL HYDROGRAPHIC COMMITTEE
- OTHER NATIONAL BOARDS
- INTERNATIONAL REPRESENTATION

## **NHO INTERNAL DEVELOPMENT**

### **THE FOUR LEG TABLE**

- INFRASTRUCTURE
- TECHNOLOGY
- PERSONNEL
- BUDGET

### **INFRASTRUCTURE**

- THE PREMISES
- CONSIDER WORK FLOW
- COMMUNICATIONS INTERNAL / EXTERNAL
- MEETING/CLASSROOM FACILITIES
- PREPARED FOR "ROUND THE CLOCK" WORK

### **TECHNOLOGY**

#### **(SOFTWARE / HARDWARE / EQUIPMENT / INSTRUMENTS)**

- DATA GATHERING
  - SURVEYING PLATFORMS
  - POSITIONING
  - DEPTH DETERMINATION
  - TIDES AND CURRENTS (WAVES?)
  - BASIC FIELD PROCESSING AND QC
  - OTHERS
- DATA PROCESSING
  - TIDES AND CURRENTS PROCESSING
  - BATHYMETRIC PROCESSING
  - VALIDATED INFORMATION / DATA BASE
- PRODUCTION (SOFTWARE, HARDWARE AND EQUIPMENTS)
  - PAPER CHART

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- DIGITAL CHART
- ENC
- PUBLICATIONS
- SPECIAL PRODUCTS ON DEMAND
- ARCHIVING (PHYSICAL AND DIGITAL)
  - NATIONAL DATA CENTER
  - EXCHANGE WITH OTHER NATIONAL AND INTERNATIONAL GEOSPATIAL DATA BASES
  - DEDICATED SERVER
- SELECTION AND ACQUISITION PROCEDURES
- BASIC AND ADVANCE TRAINING
- MAINTENANCE
- TECHNICAL SERVICE & SUPPORT (RED LINE)
- RENOVATION/UPDATE PROGRAM
- RAPID DEPLOYMENT UNIT PORTABLE EQUIPMENT

## **PERSONNEL**

- TEAM WORK SPIRIT
- RELIABLE / RESPONSIBLE
- EDUCATION / TRAINING / EXPERIENCE / UPDATED
- MILITARY? CIVILIANS? BOTH?
- PERMANENCY / ROTATION /
- TRAINING PROGRAM / REFRESHMENT COURSES
- HOW MANY IN EACH ACTIVITY? RENOVATION POLICY
- CRITICAL PATHS / MULTIPURPOSE PERSONNEL?
- INTERNATIONAL EXPOSURE
- RAPID DEPLOYMENT UNIT

## **BUDGET**

- MAINTENANCE BUDGET (ALMOST CERO ACTIVITY)
  - OPERATION BUDGET (MAINTENANCE + WP)
  - DEVELOPMENT BUDGET (OPERATION + IMPROVEMENT)
  - BUDGET JUSTIFICATION (COST V/S BENEFITS)
  - ANNUAL BUDGET / FORECASTED BUDGET MEDIUM TERM
-

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## ANNEX “D”

### **PROPOSAL OF ELEMENTS TO BE CONSIDERED IN A SHORT, MEDIUM AND LONG TERM PROGRAMME.**

#### **1.- Short Term (2008-2009).**

##### **1.1 Personnel.**

- a) Increase the existing staff with the experts already identified in number and skills, through secondment and permanent contract.
- b) Explore mechanisms that could be implemented in order to ensure the continuity of hydrographic and cartographic experts at the HSD. Propose changes to the existing regulations to avoid the exodus of well qualified and trained personnel.

##### **1.2 Technology.**

- a) Incorporate multibeam technology and seek for training. Explore the possibility to attend multibeam training course offered by IHO at the Hydrographic School in India in November 2008.
- b) Study the possibility to host a Caris Course in 2009 to cover national as well as regional needs. Submit a proposal to the RSAHC and coordinate with the CBC the provision of partial support. Request IHB support to liaise with Caris.

##### **1.3 Infrastructure**

- a) Prepare and submit national authorities for approval, a document proposing the mission, objectives, tasks and obligations of the HSD. Identify the required resources in terms of staff and budget, in function of a suitable hydro-cartographic work programme. Liaise with the IHB in the preparation of this document.
- b) Continue with the project of installation of Tide Stations. Liaise with other national agencies that could benefit from these stations for the deployment of other sensors of interest. If necessary develop agreements with these Agencies, defining commitments of mutual interest.
- c) Motivate the establishment of a National Hydrographic Committee or other coordination body that could advise on hydrographic surveys and cartographic needs from a national perspective.
- d) Conduct a study on MSI aiming at improving the provision of safety to navigation service, in conjunction with other relevant agencies.

##### **1.4 Budget.**

- a) Based on the existing capabilities, ensure the provision of resources to fund software licenses and the maintenance of systems, equipment and instruments.

#### **2.- Medium Term (2010-2012).**

##### **2.1 Personnel.**

- a) Motivate national universities to deliver programs with a hydro-cartographic content suitable to cover national and regional needs. In this field request the support of the IHB, that through the International Advisory Board and the Capacity Building Fund could be instrumental in supporting such initiative aiming at producing national expertise.
- b) Foster the participation of some of the national experts in the most suitable IHO technical bodies aiming at benefiting from the progress and experience these bodies shall be gaining.

##### **2.2 Technology.**

- a) Continue with punctual training update (refresh courses) relative to the new technologies incorporated.

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- b) Identify and prepare a set of projects that all together shall constitute the next 5 years HSD developing plan.

## **2.3 Infrastructure**

- a) Conduct a Study on the Strength, Weakness, Threads and Opportunities, aiming at the identification of the above-mentioned developing plan, based on the mission, objectives and task assigned to the HSD.
- b) Develop the strategies for the establishment of the hydro-cartographic component of a national data center.

## **2.4 Budget**

- a) Maintain a budget level that ensures the normal operation of the HSD.
- b) Identify the budget required to fund the developing plan.

## **3.- Long Term (2013 and on).**

### **3.1 Personnel**

- a) Be able to run the HSD with national experts, assisted by external expertise on new technologies, whenever this is required.
- b) Have an active participation on IHO technical bodies and contribute to its work.

### **3.2 Technology**

- a) Be able to provide hydro-cartographic services and products required by SOLAS and for other national purposes.
- b) Operate the corresponding layers of the national spatial data infrastructure.

### **3.3 Infrastructure**

- a) Implement the development plan.
- b) Incorporate a new hydrographic survey unit.

### **3.4 Budget**

- a) Achieve the establishment of an appropriate budget to implement the developing plan.
  - b) Establish a mechanism that would ensure long lasting provision of resources to operate and keep development in progress.
-