



IHO Capacity Building Programme

A Federal Hydrographic Strategy for the The United Arab Emirates



December 2013

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Abbreviations

ALB	Airborne Laser Bathymetry
AtoN	Aids to Navigation
BA	British Admiralty Chart (UKHO)
dwt	Dead Weight Tonnage
EEZ	Exclusive Economic Zone
ENC	Electronic Nautical Chart
FHC	Federal Hydrographic Co-ordinator
FHCC	Federal Hydrographic Consultative Commission
FHO	Federal Hydrographic Office
GNSS	Global Navigation Satellite Systems
ICZM	Integrated Coastal Zone Management
IHB	International Hydrographic Bureau
IHO	International Hydrographic Organization
IMO	International Maritime Organization
Lidar	Light Detection and Ranging
LOA	Length overall
MBES	Multi Beam Echo Sounder
MENAS	Middle East Navigational Aids Service
MID	Ministry of Infrastructure Development
MSDI	Marine Spatial Data Infrastructure
MSI	Maritime Safety Information
MSP	Maritime Spatial Planning
NTA	National Transport Authority
NtoM	Notices to Mariners
PCA	Primary Charting Authority
RHC	Regional Hydrographic Commission
RNC	Raster Nautical Chart
ROPME	Regional Organization for the Protection of the Marine Environment
RSAHC	ROPME Sea Area Hydrographic Commission
SBES	Single Beam Echo Sounder
SOLAS	United Nations Convention for the Safety of Life at Sea
ToR	Terms of Reference
TTW	Territorial Waters
UAE	United Arab Emirates
UKHO	United Kingdom Hydrographic Office
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
WGS84	World Satellite Datum 1984

Executive Summary

Background

The United Arab Emirates became a member of the IHO on 2nd March 1992 and a member of IMO in 1984; it is the current Chairman of the Regional Hydrographic Commission. However, despite this impressive record it has not, due to a variety of factors, established a national hydrographic structure. The need for such a structure is clear with hydrographic effort being expended in almost all of the seven emirates of the federation and from the fact that very little of the data arising from this effort finds its way into the nautical products required by mariners operating in the UAE's waters; in addition the safety of navigation in the environmentally sensitive waters of the UAE and its neighbours is potentially at risk. Without a well-established and robust federal hydrographic structure the UAE will continue to be non-compliant with the hydrographic aspects of SOLAS.

The fact that UAE federal authorities recognize this situation is highlighted by a previous proposal in 2006 to form a federal structure and the current moves by the UAE government to rectify the situation to the benefit of the safety of navigation and the efficient management of the waters of the UAE as a whole. The IHO was requested by the UAE to arrange for a Technical Visit to assess the current situation and propose options for a federal hydrographic structure; this report is the product of the Technical Visit.

The UAE government intends, following the RSAHC in mid-February, to convene a National Hydrographic Awareness seminar where the seven emirates can be informed of and debate the options for a federal hydrographic structure. The options contained in this report may be used as a basis for that discussion.

Federal Hydrographic Structure Options

It is considered that there are three key elements to creation and sustain a federal hydrographic structure for the UAE; they are the National Transport Authority (NTA), the Federal Hydrographic Consultative Commission (FHCC) and the Federal Hydrographic Office (FHO). To remove the direction of the FHO from the NTA it is proposed that there should be a board of management for the FHO reporting to, but not necessarily a part of, NTA. Within NTA it is considered that there should be an officer with the title of the Federal Hydrographic Officer to act as the focal point within NTA for hydrographic matters.

There are three options for a federal hydrographic structure proposed within this report. Each option allows for the internal liaison between the individual emirates, the FHO and NTA. Similarly, each option allows for the effective and essential liaison with external authorities and agencies without which hydrographic services within the UAE cannot develop effectively nor can the UAE take its proper place within the international hydrographic community or fulfil its international obligations.

Principal Conclusions

The principal conclusions of the IHO Technical Visit team are:

- That the UAE does not comply fully with the hydrographic obligations of SOLAS;
- That the UAE, whilst expending considerable hydrographic effort, does not make efficient use of hydrographic data either at the emirate or federal level;
- That the UAE should establish as a matter of urgency a federal hydrographic structure;
- That the UAE should arrange for the urgent transfer of hydrographic data to the primary charting authority at the earliest opportunity to ensure that the nautical charts and publications covering the UAE are brought to an acceptable modern standard and maintained.



REPORT



1. Introduction

The International Hydrographic Organization (IHO) is an intergovernmental technical organization, currently comprising 81 Member States. The IHO seeks to ensure that all States with coastlines and maritime interests provide adequate and timely hydrographic data, products and services, thereby advancing maritime safety and efficiency in support of the protection and sustainable use of the marine environment. The IHO is the recognised competent authority of the United Nations for hydrography and nautical charting. The International Hydrographic Bureau (IHB), based in Monaco, is the secretariat of the IHO.

The IHO has encouraged the establishment of Regional Hydrographic Commissions (RHCs) to coordinate hydrographic activity, development and cooperation at the regional level. The RHCs are made up predominantly of IHO Member States; however, other regional States also participate as Associate Members. RHCs are not constituent bodies of the IHO, but work in close harmony with the Organization to help further its ideals and programme. RHCs meet at regular intervals to discuss such things as mutual hydrographic and chart production problems, plan joint survey operations, and resolve schemes for medium and large scale International Chart and ENC coverage in their regions. The United Arab Emirates (UAE) is a full IHO member and the Chair of the ROPME Sea Area Hydrographic Commission (RSAHC).

A high level visit to the UAE was conducted by Director Mustafa Iptes in late October 2013. Although the UAE has been a member of the IHO since 1992, and has good hydrographic capacity (survey vessels, modern equipment, staff, finance, etc.), there is, as yet, no formal federal Hydrographic Office and or hydrographic structure. The purpose of the visit of Director Iptes to the UAE was, therefore, to advise on and encourage the further development of national hydrographic activities with particular focus on the establishment of a federal Hydrographic Service.

Following the visit of Director Iptes, an IHO Technical Visit to the UAE was brought forward and conducted in the period 7-13 December 2013 by an IHO team comprising Mr DAVID WYATT, IHB Assistant Director Survey and Operations, and Mr BOB WILSON, SONUS International Hydrographic Consultancy Ltd. This report has been written with the express intention of assisting the UAE federal government to strengthen and develop coordination of its national hydrographic effort to meet its current and future needs and, in turn, to meet its international maritime obligations under the UN Convention for the Safety of Life at Sea (SOLAS). The report comprises a description of the visit, major conclusions and a number of recommended actions for consideration by the UAE federal government.

2. Technical Visit

The Technical Visit was conducted at two levels; the federal level and the emirate level. On the federal level the team met with the National Transport Authority, the UAE Navy and the Military Survey Department. At the emirate level the team only had time to meet with a few key administrations in the Abu Dhabi emirate, namely Abu Dhabi Department of Transport and Abu Dhabi Ports. Whilst only a few Abu Dhabi emirate agencies were visited, it was felt important that a view of a federal hydrographic structure should be gained from the emirate level.

The details of those attending the various meetings are shown at Annex B - List of Contacts.

3. United Arab Emirates Hydrographic Assessment

3.1 General Remarks

The United Arab Emirates (UAE) is a constitutional federation of seven emirates; Abu Dhabi, Dubai, Sharjah, Ajman, Umm al-Qaiwain, Ras al-Khaimah and Fujairah; the federation was formally established on 2 December 1971. In March 1984 the UAE, as part of its membership of IMO, became a full state party to the UN SOLAS Convention and all of its provisions; the provisions of SOLAS relating to hydrography and nautical charting are reproduced at Annex C. The fundamental provision within these regulations is that:

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.

Each of the individual emirates has a coastline and hence maritime interests. These maritime interests relate directly to the major wealth creation within the UAE and to the vast majority of its imports. The UAE federal and Emirate governments have awareness, to varying degrees, of the fundamental importance and benefits of hydrography and nautical charting to the UAE; what is lacking is an effective coordination of effort and output.

It was not possible during the Technical Visit to determine accurately the awareness of the State's obligations under SOLAS Regulations other than at the federal level and that within the largest emirate, Abu Dhabi, where it is clear that there are aspirations and strong support for effective coordination of the federal hydrography effort.

The UAE does not have a federal hydrographic authority and therefore has no mechanism to ensure full compliance with SOLAS in the field of hydrography. There is no coordinated maritime safety information structure in the UAE; this has been, by tradition, left to the Middle East Navigational Aids Service (MENAS) based in Bahrain. Nautical charting priorities are left to the United Kingdom whilst hydrographic survey priorities are addressed at emirate level without any specific reference to the safety of navigation. Through the National Transport Authority it is hoped that this situation will change and be coordinated across the broad front of federal hydrography.

3.2 National Transport Authority

The National Transport Authority (NTA) was established in accordance with Federal Law No.1 Article (4) of 2006. Cabinet Resolution No.52 of 2006 delegated to the NTA a number of areas of responsibility, under this resolution those that apply to maritime affairs encompass the following:

1. To propose the general policies, bill laws and regulations on marine services, land transport in coordination with the competent authorities and to supervise implementation of the same.
2. To ensure compliance of the overseas navigation regulations with the international standards applicable by the States in general and to take the necessary procedures to apply the same.
3. To develop the rules regulating navigation in the State ports for good traffic and provision of the proper marine facilities and to develop programs for maintenance the land roads inside the ports and promoting their services, in agreement and coordination with the local competent authorities.
4. To issue all the licenses, permits and certificates on the navigation and the international sea and land transport services between the Emirates and to specify the issuance conditions and collection of the prescribed taxes, fees and rates.
5. To develop the overseas navigation rules particularly the nationality conditions, registration rules and flag fixing and the powers by the State on the ships carrying its flag and rules for the good navigation conditions and safety of people and to have the ship equipped with the necessary systems for avoiding accidents and to maintain its communications means.
6. To draw the plans necessary for organization and improvement of the land and sea transport means between the Emirates for easy and developed transport.
7. To represent the State in the international and regional conferences relevant to the Authority's discipline.
8. To prepare projects or propose joining the international treaties in connection to the Authority's discipline.
9. Any other disciplines assigned to the Authority under any law or resolutions passed by the Cabinet.

Whilst not explicit within Cabinet Resolution 52/2006, under points 1 and 2 above, there is implicit authority for the NTA to assume the federal responsibility for the discharge of hydrographic services under SOLAS V/9: NTA is also the authority representing the UAE at the International Maritime Organization (IMO). In ensuring the effective federal discharge of SOLAS V/9, point 1 of the list requires NTA to 'propose the general policies, bill laws and regulations on marine services, land transport in coordination with the competent authorities and to supervise implementation of the same' thereby providing authorization to coordinate the federal hydrographic effort. In this coordinating role it can, and it is recommended that it should, propose federal legislation for the establishment of a federal hydrographic structure and enhance its own terms of reference under Cabinet Resolution 52/2006 to include hydrography. The remaining points in Federal Law No.1 strengthen the case for NTA action.

A general discussion on a national hydrographic structure is at Annex D with a detailed discussion of a federal hydrographic structure for the UAE at Annex E.

3.3 Emirate Authorities

It is clear that throughout the emirates of the UAE there is awareness for the need for hydrography but to varying degrees. The UAE is possibly unique in its governance with each emirate having an autonomous infrastructure similar to, but separate from, its neighbours with an overarching federal structure. Each emirate has its own group of maritime stakeholders, for example oil, gas, ports and tourism. In turn many of these stakeholders within each emirate contract for, or provides from its own resources, hydrographic services. Of the emirates, Dubai is the only emirate government with a significant hydrographic capability or expertise with the Geodesy and Hydrographic Section and the Coastal Zone and Waterways Management Section of Dubai Municipality. Dubai Municipality is also alone in being the only emirate to produce its own nautical charts. Individual organizations within individual emirates are aware of hydrography but the majority are unaware of how to discharge their collective responsibility under SOLAS.

During the IHO Technical Visit it was only possible to visit a very few maritime stakeholders in the Abu Dhabi emirate.

3.4 Military Survey Department

In 1974 the UAE Armed Forces formed a Military Survey Department (MSD) which, in 2009, was part commercialized as Bayanat. The MSD developed a comprehensive level of expertise and experience which has been transferred to Bayanat and it is the new company's intention to continue this tradition of service by building and delivering world-class geospatial services to serve a wide range of customers in the UAE and abroad. MSD and Bayanat jointly have a comprehensive hydrographic data gathering and cartographic capability which works in partnership to deliver the geo-spatial needs of the UAE armed forces.

3.5 Bayanat

Bayanat was established in 2009 as a division of Mubadala which itself was established in 2002 by the Government of Abu Dhabi as a principal agent in the diversification of Abu Dhabi's economy. His Highness Sheikh Mohamed Bin Zayed Al Nahyan, Abu Dhabi's Crown Prince and Deputy Supreme Commander of the Armed Forces, is Chairman of the Board of Directors.¹ The new company retains the remit to fulfil the military's requirement for spatial data and has a large component of military personnel that has been seconded to the company. Bayanat has a major spatial data gathering presence in Abu Dhabi and is charged with delivering geo-spatial data for the UAE Ministry of Defence throughout the UAE. This close relationship between Bayanat and MSD must be considered in any discussion of a federal hydrographic structure.

3.6 Maritime Safety Information

There is no clearly established Maritime Safety Information (MSI) infrastructure within the UAE that coordinates its activities with the Worldwide Navigation Warning Service (WWNWS) implemented globally by the IMO, IHO and WMO.

The UAE falls within NAVAREA IX of the WWNWS with Pakistan as the Area Coordinator with warnings coordinated, issued and monitored by the Pakistan Navy Hydrographic Office. The NAVAREA Coordinator's

¹ <http://www.mubadala.com/en/who-we-are/overview>

report, presented to the 5th meeting of the RSAHC, states that the correspondence status with the UAE is through the Middle East Navigational Aids Service (MENAS) rather than a UAE federal office. MENAS has no authority for MSI in the UAE and merely acts as a post box for data which may or may not then be passed to the NAVAREA IX Coordinator. MSI data is not just required by the NAVAREA IX Coordinator but the Primary Charting Authority, UKHO. Data received by the NAVAREA IX Coordinator may or may not be broadcast as a navigational warning; it most probably will not be passed on to any other authority, so, MSI data for charting currently does not reach UKHO and consequently, as time progresses, minor but important chart correcting information is not acted upon and charts are degraded.

It is strongly recommended that UAE's MSI coordination is improved as a matter of urgency with direct communication established with the NAVAREA IX Coordinator. It is further recommended that steps are taken to ensure agencies within the UAE pass MSI data direct to UKHO in addition to providing this data to the NAVAREA IX Coordinator.



Figure 1 NAVAREA IX Limit

3.7 Hydrographic Surveying

Until 1971 hydrographic surveying within the waters of the UAE was conducted by the British navy, oil and gas authorities and a limited number of civil engineering companies working in the coastal zone. Post-independence there has been almost no coordinated federal hydrographic effort. Hydrography has been left to individual emirates and with the exception of Dubai, the vast majority of effort being conducted by the oil and gas sector with civil engineering surveys as required for coastal development projects.

As discussed at 3.3 there are a number of maritime stakeholders within each emirate all requiring hydrographic services. Consequently there is a significant amount of fragmented and duplicated hydrographic data gathering being conducted with the waters of the UAE for which there is no federal repository. Given this extensive data gathering programme it has to be asked if the use of this data is effective and if each emirate could separately and jointly make more efficient use of the data for its own purposes and to discharge federal SOLAS responsibilities.

Given the complex federation of emirates and their internal organizations it was not possible to assess the state of hydrographic surveys within the UAE. However, from commercial sources it is known that significant survey programmes have taken place in recent years, e.g. Dubai's waters completely surveyed by airborne laser bathymetry methods using the TENIX LADS system on at least two occasions in the past ten years and the approaches to Khalifa Port in the past three years. Current survey projects include a further resurvey of Dubai's waters, bathymetric surveys as part of work by Proteus for the Abu Dhabi Environmental Authority and others in Abu Dhabi's waters by Bayanat.

3.8 Nautical Charting

The nautical charts of the UAE are, as a result of history, published and maintained by the UKHO, as the primary charting authority (PCA). The UKHO, therefore, by default fulfils the charting aspects covered under SOLAS but without any formal agreement between either the UAE as a nation State or with individual emirates. UKHO does have an effective Cooperation Arrangement with Abu Dhabi Ports Authority which ensures effective large scale charting of ports in Abu Dhabi.

All the UK charts covering the waters of the UAE have been metricated (in essence recompiled to show depths in metres and using modern chart symbology) and brought on to a satellite datum (WGS84) such that they can be used with global navigation satellite systems (GNSS).

The following table shows the current publication date of charts covering the UAE, the reference of the last notice to mariners (NtoM) and the total number of NtoMs affecting the chart since publication; table correct to 23 December 2013.

It can be seen that UKHO has committed a great deal of effort to the charting of UAE's waters with, of the 18 charts listed, only one being more than three years old with eight published in 2011, seven published in 2012 and two in 2013. Whist the charts are modern the data from which they are compiled is not.

BA Chart	Title	Published (Last NtoM/Year)	NtoMs issued since Publication
2444	Eastern Approaches to Jazirat Das and Jazirat Halul	20 Sept 2012 NM 5262/13	8
3175	Jazirat Al Hamra' to Dubai (Dubayy) and Jazireh-ye Sirr	20 Sept 2012 NM 4276/13	7
3176	`Ajman to Sir Abu Nu`ayr	20 Sept 2012 NM 4522/13	8
3177	Outer Approaches to Abu Dhabi	19 Aug 2010 NM3467/13	14
3178	Approaches to Mubarraz Terminal including Zaqqum Traffic Separation Scheme	7 Jul 2011 NM 5262/13	9
3179	Jazirat Das to Ar Ru`ays	11 Aug 2011 NM 5262/13	12
3405	Ports in Ajman Sharjah and Umm al Qaywayn	26 Sep 2013	0
3412	Hamriyah to Mina' Seyaha	17 Feb 2011 NM 4276/13	8
3413	Oil and Gas Terminals in Qatar and the United Arab Emirates	25 Apr 2013 NM5228/13	2
3414	Dubai (Dubayy) and Approaches	17 Feb 2011 NM1701/13	4
3709	Port of Fujairah (Fujayrah and offshore Terminals)	4 Oct 12 NM1387/13	1
3713	Approaches to Abu Dhabi (Abu Zaby)	21 Apr 2011 NM3467/13	2
3715	Abu Dhabi (Abu Zaby) Sas an Nakhl and Musaffah	21 Apr 2011 NM3467/13	2
3723	Approaches to Khawr Fakkan and Fujairah (Fujayrah)	4 Oct 2012 NM1387/13	1
3739	Jebel Ali (Mina Jabal Ali) and Approaches	13 Dec 2012 NM2523/13	1
3752	Approaches to Khalifa Port and A Approaches to Khalifa Port	13 Dec 2012 NM2523/13	1
3780	Approaches to Jabal az Zannah and Ar Ru'ays	21 Jul 2011 NM4090/13	3
3951	Sir Bani Yas to Khawr al `Udayd	20 Jan 2011 NM5264/13	11

Figure 2 BA Chart MSI Update Data

The current state of surveys used to compile the UKHO charts of UAE's waters, and the ones which the great majority of ships entering UAE's waters will use for navigation, are summarized in the table below. It will be seen from the data provided that the majority of the waters of the UAE charted by the primary charting authority for the UAE, UKHO, are based on surveys up until the mid-1970s. In the Oman Sea surveys are from the US government up until 1998. A large number of large scale commercial surveys have been incorporated into these charts in the immediate port approaches and harbours. What is clear from the summary below is that a considerable number of UAE government surveys conducted for a wide variety of purposes have not been used to update the charting of the waters of the UAE.

BA Chart	Title	Source Data Review
2444	Eastern Approaches to Jazirat Das and Jazirat Halul	The majority of the chart is based on medium to small scale British government surveys to 1971 and commercial surveys until 1991.
3175	Jazirat Al Hamra' to Dubai (Dubayy) and Jazireh-ye Sirr	The majority of the chart covering UAE waters is based on medium to small scale British government surveys to 1973 and commercial surveys until 1986.
3176	`Ajman to Sir Abu Nu`ayr	The majority of the chart is based on medium to small scale British government surveys to 1988 and commercial surveys until 2010 (approach to Jebel Ali).
3177	Outer Approaches to Abu Dhabi	There are a number of data sources for this chart. However, with the sole exception of the approach to Khalifa port, the major data sources date from 1952 to 1985.
3178	Approaches to Mubarraz Terminal including Zaqqum Traffic Separation Scheme	The majority of this chart is based on British government surveys to 1971 and undated, miscellaneous and unspecified sources likely to be older than 1971.
3179	Jazirat Das to Ar Ru`ays	The majority of the chart is based on medium to small scale British government surveys to 1970 and commercial surveys until 1995.
3405	Ports in Ajman Sharjah and Umm al Qaywayn	The majority of the chart is based on large to medium scale British government surveys to 2000 and commercial surveys until 2009.
3412	Hamriyah to Mina' Seyaha	This chart of the immediate coastal and inshore waters off Dubai is based on British government surveys to 1970.
3413	Oil and Gas Terminals in Qatar and the United Arab Emirates	Approximately 50% of the chart is based on medium to small scale British government surveys to 1970 and the majority of the remainder is commercial surveys to 2003 apart from a small area surveyed by the Japanese at a scale 1:50000 of 1972.
3414	Dubai (Dubayy) and Approaches	This chart of Dubai's inshore waters is based on British government surveys to 1970.
3520	Khawr Kalba and Dawhat Diba to Gahha Shoal	The majority of the chart is based on medium to small scale British government surveys to 1986.
3709	Port of Fujairah (Fujayrah and Offshore Terminals)	The majority of the chart is based on medium to large scale United States government surveys to 1993.
3713	Approaches to Abu Dhabi (Abu Zaby)	This chart is based on medium scale British government surveys to 1971.
3715	Abu Dhabi (Abu Zaby) Sas an Nakhl and Musaffah	This chart is compiled from a great many surveys at mainly large scale in the channels and waterways with survey data to 2010 and at medium scales in the inshore waters with survey data to 1978.
3723	Approaches to Khawr Fakkan and Fujairah (Fujayrah)	The majority of the chart is based on medium to large scale United States government surveys to 1993.
3739	Jebel Ali (Mina Jabal Ali) and Approaches	This chart of Jebel Ali and its approaches is based mainly on British government and commercial surveys to 1970.
3752	Approaches to Khalifa Port and A Approaches to Khalifa Port	The immediate port approach is based on large scale commercial survey data up until 2012. The remaining waters covered by this chart are covered by British government surveys up until 1969.
3780	Approaches to Jabal az Zannah and Ar Ru'ays	Approximately 60% of the chart is based on medium scale British government surveys to 1955 half of which is a lead line 1:25000 survey of 1933, and the remainder is commercial surveys to 1986.
3951	Sir Bani Yas to Khawr al `Udayd	Approximately 50% of the chart is based on medium scale British government surveys to 1960 some of which are lead line surveys of 1933, 35% is from a US government chart based on large scale surveys to 1991, commercial surveys to 1982 covers 10% and the rest is miscellaneous information to 1976.

Figure 3 BA Chart Source Data Summary

As was stated in paragraph 3.7, there has been, and is today, significant hydrographic data gathering within the waters of the UAE and the UAE is to be congratulated on this data gathering programme. However, from a SOLAS perspective, very little of this modern data has found its way onto the nautical charts of the UAE's waters thereby potentially hazarding shipping coming to and transiting through UAE waters.

Dubai is used here as an example as it is known that extensive surveying has been conducted over the past ten years and is in progress now. In the diagram below, taken from the current published chart of the waters off Dubai (BA3176 Ajman to Sir Abu Nu-ayr) it can be seen that, with the exception of the approach to Jebel Ali and to the northeast of Sir Abu Nu-ayr, the majority of the data upon which this chart is based is taken from small to medium scale survey data from 1961 to 1988. A worse situation is that with BA3412 (Hamriyah to Mina' Seyaha), charting the immediate coastal and inshore waters off Dubai which is based solely on British government surveys between 1969 and 1971. With the provision of Dubai Municipality hydrographic survey data to the primary charting authority (UKHO) this situation could improve markedly and the UAE could have high quality charting of its waters. This situation might well be replicated throughout a large part of UAE's waters.

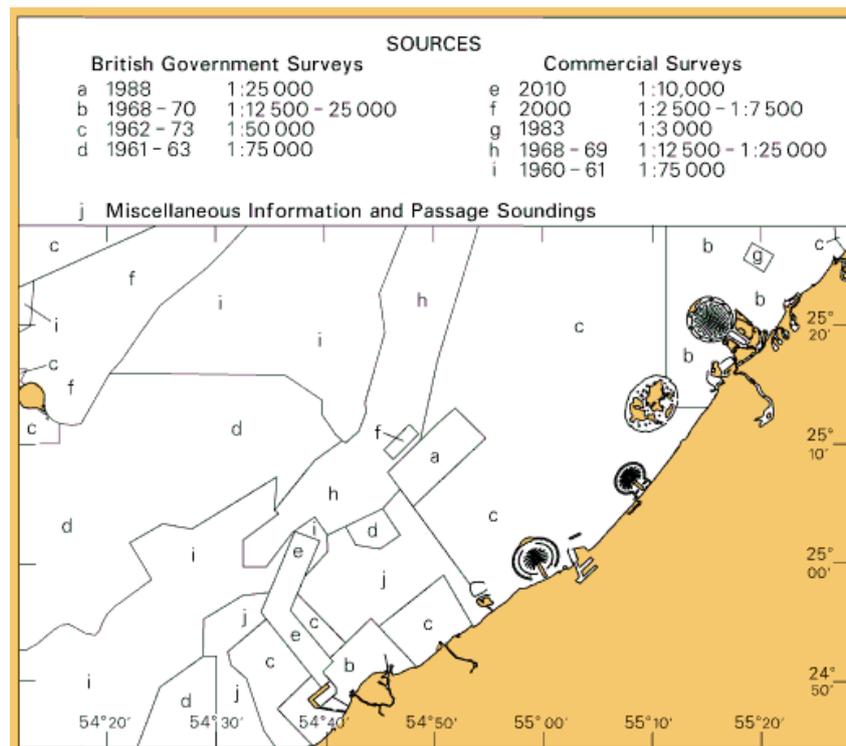


Figure 4 BA 3176 Source Data Diagram

The UAE is strongly urged and recommended to review all survey data of waters of the United Arab Emirates and relay to the PCA (UKHO) all data not shown on the current charts as soon as possible.

3.9 Future UAE Nautical Chart Programme

It is considered that there are three areas of charting concerning the UAE: charts to comply with SOLAS; defence products; local specialist products such as those produced by Dubai Municipality for internal use.

Charts applicable to the discharge of SOLAS obligations are produced by UKHO. IHO does not, at this stage, consider it practicable for UAE to assume this responsibility with a national chart series. It is recommended that UKHO remains UAE's primary charting authority with the UAE ensuring a steady supply of new data to keep the charts well maintained. It is also recommended that the UAE considers entering into a federal bilateral agreement with UKHO for royalty payments on the use of UAE data.

The local production of nautical charts and other geo-spatial uses for either civil or military purpose is perfectly feasible and the UAE should, with the establishment of a Federal Hydrographic Data Centre, consider standardizing such national products across all emirates.

3.10 Hydrographic Development Plan

Following assessment during the IHO Technical Visit it is recommended that UAE's key hydrographic objectives should be:

- The immediate improvement in the flow and quality of MSI to the NAVAREA IX Coordinator;
- The promotion of a federal hydrographic awareness seminar;
- A review of federal hydrographic options outlined in this report;
- A decision taken on the format of a federal hydrographic structure;
- The development of a plan to legally establish and implement the federal hydrographic structure;
- Federal and then emirate legislation to create the federal hydrographic structure;
- Implementation of the federal hydrographic structure.

4. Options for the Way Ahead

The Technical Visit team had extensive discussions with the National Transport Authority, the UAE Navy, MSD, Bayanat and some Abu Dhabi government agencies; several key elements affecting the creation of a federal structure for the UAE came out during these discussions. The first point is that NTA is the federal authority responsible for the discharge of SOLAS. NTA is both aware of this and, more importantly, the need to establish a functioning federal hydrographic structure; this has been discussed in the past (2006) and was almost presented to the Cabinet. The second point is that the UAE is a federation and as such each emirate must have an equal voice in any federal structure; to do so will require a coordinating body – the Federal Hydrographic Coordinating Commission (FHCC) – such that the voices of the maritime stakeholders in each emirate are heard at the federal level. Thirdly NTA is adamant that an independent, Federal Hydrographic Office (FHO) should be established. Here the FHCC will have the role of monitoring the FHO's compliance with the obligations under SOLAS and advise NTA and FCO accordingly. Therefore, any plan for a federal structure must include as its elements NTA, FHCC and the FHO.

The options for a way ahead are discussed at Annex F.

5. Conclusions and Recommendations

The principal conclusions of the IHO Technical Visit team are:

- That the UAE does not comply fully with the hydrographic obligations of SOLAS;
- That the UAE, whilst expending considerable hydrographic effort, does not make efficient use of hydrographic data either at the emirate or federal level;
- That the UAE should establish as a matter of urgency a federal hydrographic structure;
- That the UAE should arrange for the urgent transfer of hydrographic data to the primary charting authority at the earliest opportunity to ensure that the nautical charts and publications covering the UAE are brought to an acceptable modern standard and maintained.

The recommendations of the IHO Technical Visit team are:

It is recommended that the relevant authorities consider the following actions:

1. That the NTA should propose federal legislation for the establishment of a federal hydrographic structure and enhance its own terms of reference under Cabinet Resolution 52/2006 to include hydrography. **Ref 3.2 paragraph 3, page 8.**
2. That the UAE establishes a federal MSI focus and direct communications with NAVAREA IX Coordinator as a matter of priority. **Ref 3.6 paragraph 3, page 9.**
3. That steps are taken to ensure agencies within the UAE pass MSI data direct to UKHO in addition to providing this data to the NAVAREA IX Coordinator. **Ref 3.6 paragraph 3, page 9.**
4. That the UAE reviews all survey data of waters of the United Arab Emirates and relays to the PCA (UKHO) all data not shown on the current charts as soon as possible. **Ref 3.8 final paragraph, page 12.**

5. That the UKHO remains UAE's primary charting authority with the UAE ensuring a steady supply of new data to keep the charts well maintained. **Ref 3.9 paragraph 2, page 12.**
6. That the UAE considers enter into a federal bilateral agreement with UKHO for royalty payments on the use of UAE data. **Ref 3.9 paragraph 2, page 12 and Annex E Nautical Charts and Publications, page 21.**
7. That the UAE should, with the establishment of a Federal Hydrographic Data Centre, consider standardizing national hydrographic products across all emirates. **Ref 3.9 paragraph 3, page 12.**
8. That the UAE addresses the key hydrographic objectives set out in the Hydrographic Development Plan. **Ref 3.10, page 13.**
9. That the eventual federal hydrographic structure agreed with the UAE is formally established under Federal Law and thus recognized within the federal government framework. Develop and implement the agreed federal approach to hydrography within the UAE. Commence the process for drafting cabinet legislation for the establishment of the FHO/FHCC and FHC in liaison with emirate Executive Councils. **Ref Annex E, Formalizing the Federal Structure, page 19.**
10. That whilst NTA may delegate the powers to discharge federal hydrographic responsibility to the Federal Hydrographic Office it is strongly recommended that NTA retain an officer within its organization with direct responsibility for federal hydrography and liaison on this subject with the MSD, IMO and IHO as NTA remains the legally responsible body under international treaty law. **Annex E, National Transport Authority, page 19.**
11. That the FHC should be the lead officer for federal hydrography within the NTA. **Annex E, Federal Hydrographic Co-ordinator, page 20.**

A list of recommendations following the IHO Technical Visit is contained at Annex A.

Annex A – List of Recommendations

It is recommended that the relevant authorities consider the following actions:

12. That the NTA should, propose federal legislation for the establishment of a federal hydrographic structure and enhance its own terms of reference under Cabinet Resolution 52/2006 to include hydrography. **Ref 3.2 paragraph 3, page 8.**
13. That the UAE establishes a federal MSI focus and direct communications with NAVAREA IX Coordinator as a matter of priority. **Ref 3.6 paragraph 3, page 9.**
14. That steps are taken to ensure agencies within the UAE pass MSI data direct to UKHO in addition to providing this data to the NAVAREA IX Coordinator. **Ref 3.6 paragraph 3, page 9.**
15. That the UAE reviews all survey data of waters of the United Arab Emirates and relays to the PCA (UKHO) all data not shown on the current charts as soon as possible. **Ref 3.8 final paragraph, page 12.**
16. That the UKHO remains UAE's primary charting authority with the UAE ensuring a steady supply of new data to keep the charts well maintained. **Ref 3.9 paragraph 2, page 12.**
17. That the UAE considers enter into a federal bilateral agreement with UKHO for royalty payments on the use of UAE data. **Ref 3.9 paragraph 2, page 12 and Annex E Nautical Charts and Publications, page 21.**
18. That the UAE should, with the establishment of a Federal Hydrographic Data Centre, consider standardizing national hydrographic products across all emirates. **Ref 3.9 paragraph 3, page 12.**
19. That the UAE addresses the key hydrographic objectives set out in the Hydrographic Development Plan. **Ref 3.10, page 13.**
20. That the eventual federal hydrographic structure agreed with the UAE is formally established under Federal Law and thus recognized within the federal government framework. Develop and implement the agreed federal approach to hydrography within the UAE. Commence the process for drafting cabinet legislation for the establishment of the FHO/FHCC and FHC in liaison with emirate Executive Councils. **Ref Annex E, Formalizing the Federal Structure, page 19.**
21. That whilst NTA may delegate the powers to discharge federal hydrographic responsibility to the Federal Hydrographic Office it is strongly recommended that NTA retain an officer within its organization with direct responsibility for federal hydrography and liaison on this subject with the MSD, IMO and IHO as NTA remains the legally responsible body under international treaty law. **Annex E, National Transport Authority, page 19.**
22. That the FHC should be the lead officer for federal hydrography within the NTA. **Annex E, Federal Hydrographic Co-ordinator, page 20.**

Annex B – List of Contacts

Organization	Position	Name Email Tel
National Transport Authority	Executive Director of Land and Marine Transport Sector	Salem Ali Salem Al Zaabi salemalzaabi@nta.gov.ae +971 2 650 6088
	Director Marine Transport	Abdul Wahab Mohamed Al Diwani diwani@nta.gov.ae +971 2 448 2222
	Ports Senior Specialist	Mustafa Elwazani Mustafa.psc@nta.gov.ae +971 2 418 2120
	Marine Expert	Dr Saoud Aljneibi drsaud@nya.gov.ae +971 2 418 2110
	Maritime Specialist	Tayfun Sivas tayfun@nta.gov.ae +971 2 418 2148
Abu Dhabi Department of Transport	Specialist Infrastructure Engineering	Wisseem Kasdaghli Wisseem.kasdaghli@dot.abudhabi.ae +971 2 656 6759
	Waterways Specialist	Ahmed Ali Almheiri Ahmed.almheiri@dot.abudhabi.ae +971 2 656 6601
	Specialist – Hydrographic Survey & VTMS – Waterways Management	Captain Phillip Kadavil Skaria Phillip.skaria@dot.abudhabi.ae +971 2 656 6392
Abu Dhabi Ports Company	Chief Harbour Master	Captain Adil Ahmed Banihammad Adil.banihammad@adpc.ae +971 2 695 2949
	Harbour Master Khalifa Port	Captain John Clayton John.clayton@adpc.ae +971 2 510 9390
	Marine Information Officer	Captain Ahmed Shazly Ahmed.shazly@adpc.ae +971 2 695 2146
Bayanat/MSD	CEO	Khaled Al Melhi Kalmelhi@bayanat.co.ae +971 2 651 9100
	Chief Operating Officer	Dr Adel Al Shamsi alshamsi@uaesurvey.ae +971 50 661 5557
	Head of Hydrographic Survey	Khalid Bin Dasmal +971 2 651 9119 Kdasmal@bayanat.co.ae

Annex C – Extracts of SOLAS Regulations

SOLAS Chapter V

The SOLAS (Safety of Life at Sea) Convention is published by the IMO (International Maritime Organisation). SOLAS Chapter V refers to the Safety of Navigation for all vessels at sea.

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:
 - .1 to ensure that hydrographic surveying is carried out, as far as possible, adequate to the requirements of safe navigation;
 - .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;
 - .3 to promulgate notices to mariners in order that nautical charts and publications are kept, as far as possible, up to date; and
 - .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.

The specific parts of SOLAS relating to nautical charts are:

Regulation 2 Definitions

2.2 Nautical chart or nautical publication is a special-purpose map or book, or a specially compiled database from which such a map or book is derived, that is issued officially by or on the authority of a Government, authorized Hydrographic Office or other relevant government institution and is designed to meet the requirements of marine navigation.

Regulation 19 Carriage requirements for shipborne navigational systems and equipment

A revised version of SOLAS V/19 came into force on 1 January 2011 and states:

2.1 All ships irrespective of size shall have:

2.1.4 Nautical charts and nautical publications to plan and display the ship's route for the intended voyage and to plot and monitor positions throughout the voyage. An electronic chart display and information system (ECDIS) is also accepted as meeting the chart carriage requirements of this subparagraph. Ships to which paragraph [2.10] applies shall comply with the carriage requirements for ECDIS detailed therein; 2.1.5 back-up arrangements to meet the functional requirements of subparagraph 2.1.4, if this function is partly or fully fulfilled by electronic means.

Footnote to regulation 2.1.4

Paper nautical charts sufficient to meet the requirements of sub-paragraph .4 and regulation 27 may be used as a back-up arrangement for ECDIS. Other back-up arrangements for ECDIS are acceptable (see Appendix 6 to resolution MSC.232 (82), as amended).

Regulation 27 Nautical Charts and Nautical Publications

Nautical charts and nautical publications, such as sailing directions, lists of lights, notices to mariners, tide tables and all other nautical publications necessary for the intended voyage, shall be adequate and up to date.

Annex D – National Hydrographic Structure

Responsibilities of a Maritime State

Each coastal State has international, regional and national responsibilities. This section outlines some of those that are applicable to the general field of hydrography to highlight the requirement for hydrographic data in its broadest sense across the widest aspect of national interest. International conventions provide a coastal State with the regulations that permit the establishment of the limits of its seas and lay down the obligations placed on a coastal State.

In 1967, Malta's Ambassador to the United Nations made a ground breaking speech highlighting the dangers posed by super-Power rivalry that was spreading to the oceans, pollution that was poisoning the seas, conflicting legal claims and their implications for a stable order and the rich potential that lay on and under the seabed. He ended with a call for 'an effective international regime over the seabed and the ocean floor beyond a clearly defined national jurisdiction. It is the only alternative by which we can hope to avoid the escalating tension that will be inevitable if the present situation is allowed to continue'. An exercise to regulate the seabed became a global diplomatic effort to regulate and formulate rules for all ocean areas, all uses of the seas and all of its resources resulting in the adoption in 1982 of the United Nations Convention on the Law of the Sea (UNCLOS). The convention came into force in 1994; the United Arab Emirates government signed the Convention in June 1997.

Fundamentally UNCLOS states that the sovereignty of a coastal State extends beyond its land territory and internal waters and, in the case of the United Arab Emirates its archipelagic waters, to an adjacent belt of sea, described as the territorial sea. This sovereignty extends to the air space over the territorial sea as well as to its seabed and subsoil. A coastal State's sovereignty over the territorial sea and its wider exclusive economic zone (EEZ) is exercised subject to UNCLOS and to other rules of international law. This sovereignty also brings with it obligations, a key one of these is covered by the International Convention for the Safety of Life at Sea (SOLAS).

The SOLAS Convention is the most important of all international treaties concerning the safety of shipping. The first version was adopted in 1914, in response to the *Titanic* disaster, the present Convention was adopted in 1974 and since 1984 is referred to as 'SOLAS, 1974, as amended'. The United Arab Emirates government is a signatory to SOLAS and has, therefore, under SOLAS Chapter V Regulation 9, undertaken '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.' Similar obligations relating to nautical charting and nautical publications exist under Regulations 2, 4, 19 and 27. Extracts of the regulations are at Annex C.

Need for a National Hydrographic Structure

A maritime state requires a balanced national maritime policy designed to fulfil its international obligations and obtain the national economic benefits that can be derived from its sea area. The development of a national maritime policy requires a sound knowledge of the geographical, geological and geophysical features of the seabed and coast, as well the currents, tides and all other necessary environmental data. All of this data must then be properly processed and stored such that it is readily accessible to government departments to provide for the safe and efficient operation of maritime traffic, coastal zone management, exploration and exploitation of marine resources, environmental protection and maritime defence.

To address adequately those areas discussed above it is necessary to create a National Hydrographic Structure. The various national agencies involved with hydrographic data in its broadest sense, specifically that agency recognized as the National Hydrographic Office, will form this vital government grouping. It is through such a structure that the systematic data collection carried out on the coast and at sea produces and disseminates information in support of maritime navigation safety and marine environment preservation, defence and exploitation.

Many potential benefits flow from an efficient national hydrographic structure which forms a vital part of the national environmental, spatial data and transport infrastructure. Whilst it is difficult to quantify the economic and commercial benefits that such a structure can bring, there are many examples of where the lack of such a structure has cost government large sums in duplicate data gathering exercise or projects that have failed to deliver the required result for the want of hydrographic data. However, as an indication of what might be gained, several studies by IHO Member States have suggested that there is a cost to benefit ratio of about 1:10 for major maritime nations. Volumes of international maritime trade continue to grow, and both now and in the future the exploitation of sustainable development of the national maritime zones will be a major pre-occupation of

government and industry. For further information reference should be made to IHO Publication M-2 'The Need for National Hydrographic Services' which can be downloaded free at http://www.iho.int/iho_pubs/misc/M-2_3.0.1_E_19OCT2011_TheneedforNHS.pdf

National Hydrographic Agencies

In modern government a wide variety of agencies have interests in hydrographic data and will provide or procure such data to meet their specific needs and requirements in fulfilment of that government's wider maritime responsibilities; these agencies are essential elements of the national infrastructure. Agencies with hydrographic interests 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

Co-ordination of the National Hydrographic Effort

Co-ordination of effort in common fields of endeavour is essential if governments are to work efficiently and are not to waste valuable resources; this is particularly relevant to the gathering and use of hydrographic data. By the careful and considered co-ordination of survey planning, data can be collected once to the highest appropriate standard. Examples abound in the most sophisticated of governments where the same or similar hydrographic data has been gathered in the same area either concurrently or in a short time frame due to a lack of co-ordination of national effort. In this regard the establishment of a co-ordinating body, the National Hydrographic Committee, as part of a national maritime structure is strongly recommended by the IHO. Membership of this national body should include representatives from all government agencies with interests in maritime affairs.

Funding

The organization of the above structure is cost free: national hydrography is not. It is essential that a mechanism for funding hydrography as an element as fundamental to government services as air traffic control is provided. This can be either direct funding, sponsored from international agencies or a combination of both. Occasionally data gathering operations can and are conducted by friendly nations under co-operation agreements. Without adequate funding, however, all of the foregoing will fail.

Annex E – Options for a Federal Hydrographic Structure

Introduction

The elements of a federal hydrographic structure for the UAE are set out in this annex. The main body of this annex discusses the general aspects pertaining to the options which are presented in Annex F.

Federal Hydrographic Need

It will be clear from the arguments presented in this report that there are within a maritime State's government and its economy a wide variety of users of hydrographic data. The specifications for the collection, processing, archiving and dissemination of hydrographic data may vary between users; however, there is sufficient overlap to make it prudent for governments to bring users together to ensure that the requirements are met with the minimum of government resources being committed to the task. To ensure this, a national hydrographic structure is a priority for all States regardless of their hydrographic capability. This policy is also in line with the recommendations of the IHO. In discussing a hydrographic structure for the UAE, the term 'federal' has been applied rather than 'national' due to the political structure of the nation.

Federal Hydrographic Structure

A federal hydrographic structure for the UAE should aim to provide the required hydrographic services to users – both public and private – with the minimum expenditure of government resources. Those engaged in hydrography should view such a structure as an aid to delivering hydrographic services and not an attempt by any one government body to monopolize hydrography within the UAE. Thus the structure should be able to discharge the UAE's SOLAS responsibilities whilst at the same time assist federal and emirate governments with hydrographic services.

The following sections discuss the three key elements of the UAE's proposed federal structure, namely, the National Transport Authority, the Federal Hydrographic Consultative Commission and the Federal Hydrographic Office. How these three bodies might be linked organizationally are discussed at Appendix 1 Options for a Federal Hydrographic Structure.

Formalizing the Federal Structure

It is recommended that the eventual federal hydrographic structure agreed with the UAE is formally established under Federal Law and thus recognized within the federal government framework. Each emirate Executive Council may need to enact complementary legislation to ensure local compliance and recognition of the legal entity of a FHO.

Funding

The provision of federal hydrographic services is a federal government function in the same manner as defence or air traffic control, and, as with these examples, the federal hydrographic structure central to both the nation's discharge of international responsibilities and the efficient development of the nation's extensive maritime interests, requires adequate and sustained funding.

National Transport Authority

The National Transport Authority (NTA) represents the UAE at IMO and, by funding the UAE at IHO, is the lead federal representative for each of these organizations although currently MSD deputizes for NTA at IHO and in the IHO Regional Hydrographic Commission of which it is currently Chair. Whilst NTA may delegate the powers to discharge federal hydrographic responsibility to the Federal Hydrographic Office it is strongly recommended that NTA retain an officer within its organization with direct responsibility for federal hydrography and liaison on this subject with the MSD, IMO and IHO as NTA remains the legally responsible body under international treaty law.

The roles and responsibilities of NTA in any federal structure are considered:

- To be the SOLAS responsible organization;
- To represent the UAE's hydrographic interests at IMO;
- To delegate powers for federal hydrography as is seen appropriate within the UAE;
- To monitor the federal organization(s) with responsibility for federal hydrography to ensure that compliance with SOLAS is being met;
- To monitor the FHO to ensure that a good hydrographic service is provided to the UAE;
- To promote federal responsibility for hydrography within the individual emirates.

Federal Hydrographic Consultative Committee

At the centre of a federal hydrographic structure is the Federal Hydrographic Consultative Commission (FHCC). The FHCC should be a forum where maritime stakeholders can meet to learn of developments within other emirates, put forward their own requirements, for single or multiple emirates to develop coordinated hydrographic programmes and for the monitoring of the FHO. Additionally emirates can be informed of developments in the field of hydrography and proposals for international and national legislation affecting federal hydrography.

The roles and responsibilities of FHCC in any federal structure are considered to be:

- The coordination of hydrographic effort across all emirates, this may include prioritization of effort;
- The notification to the NTA of federal hydrographic issues that might require federal government intervention or legislation;
- The notification to NTA of deficiencies in federal hydrography to meet SOLAS obligations;
- The notification to the Federal Hydrographic Office (FHO) of the hydrographic needs of the respective emirates;
- To inform the FHO of hydrographic plans within each emirate;
- To liaise between the FHO and individual emirates to ensure the effective operation of the FHO and the federal hydrographic structure.

Government agencies forming the FHCC and their areas of responsibility or interest are listed in Appendix 2 to this annex. Draft FHCC Terms of Reference (ToRs) are at Appendix 3.

Federal Hydrographic Co-ordinator

Within the federal structure there is a role for a Federal Hydrographic Co-ordinator (FHC), the officer taking this responsibility should, ideally, have extensive experience in hydrographic matters. It is recommended that the FHC should be the lead officer for federal hydrography within the NTA.

The FHC should:

- act as the NTA's expert on hydrographic matters;
- act as the NTA's point of contact for all federal hydrographic matters including liaison with IMO, IHO and GCC on hydrographic matters;
- be responsible for the secretarial management of the FHCC and liaison between members between meetings;
- through the FHCC and the Board of the FHO monitor the federal hydrographic structures' deliverance of hydrographic services under SOLAS and for the benefit of the overall UAE bringing deficiencies to the notice of NTA and the FHCC as appropriate.

Federal Hydrographic Office

The Federal Hydrographic Office (FHO) is the central element of the federal hydrographic structure responsible for the effective discharge of the UAE's international hydrographic responsibilities and federal hydrographic services. In this regard the main functions of the FHO are:

- The establishment and maintenance of an effective federal maritime safety information system;
- The establishment and maintenance of the federal hydrographic database;
- Provision of hydrographic data to government and private agencies within the UAE to promote the development of the UAE's maritime sector;
- Provision of hydrographic data to the Primary Charting Authority for the development and maintenance of effective nautical charting for the UAE under SOLAS;
- The development and maintenance of specialist nautical charts and publications for use in and by the UAE;
- Provide advice to the FHCC on hydrographic matters.

The FHO should:

- act as the federal focal point for maritime safety information;
- maintain the national hydrographic database and archive;
- recommend and coordinate federal hydrographic data gathering;
- to produce nautical charts for defence and to meet individual emirate special requirements and purposes;
- to produce local nautical publications;

Draft Terms of Reference for the FHO are contained in Appendix 5.

Federal Maritime Safety Information Capability

There is an urgent need to establish a single point of focus for MSI and to open and maintain direct communication with the NAVAREA IX Coordinator; the practice of sending MSI to MENAS should be strongly discouraged.

Federal and Emirate Hydrographic Survey Capability

Currently each emirate provides for its own hydrographic survey needs through a variety of agencies. The IHO sees no reason for this situation to alter except in that there are gaps within the national waters that require surveying or resurveying. These areas should be reviewed at the federal level and survey plans developed to rectify this situation such that all the national waters of the UAE are fully surveyed to modern standards.

Nautical Charts and Publications

Charts applicable to the discharge of SOLAS obligations are produced by UKHO. IHO does not, at this stage, consider it practicable for UAE to assume this responsibility with a national chart series. It is recommended that UKHO remains UAE's primary charting authority with the UAE ensuring a steady supply of new data to keep the charts well maintained. The UAE may wish to enter into a bilateral agreement with UKHO for royalty payments on UAE data by *formalizing the current arrangements with UKHO for the publication of nautical charts and publications for the safety of navigation*. The local production of nautical charts and other geo-spatial uses for either civil or military purpose is perfectly feasible and the UAE should, with the establishment of a Federal Hydrographic Data Centre, consider standardizing such national products across all emirates.

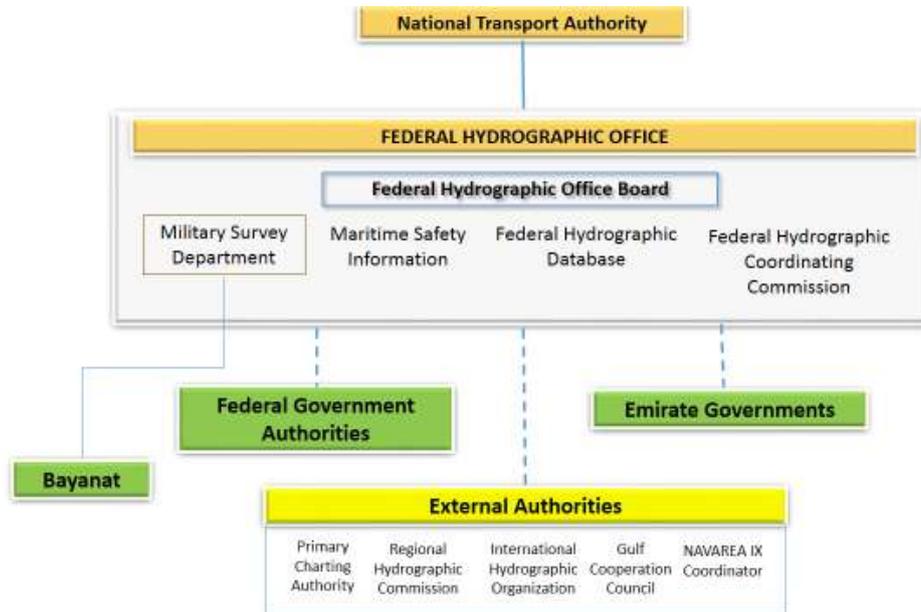
Annex F – Options for a Federal Hydrographic Structure

As set out in the main body of this report, it is considered that there are three key elements for a federal hydrographic structure for the UAE which are the National Transport Authority (NTA), the Federal Hydrographic Consultative Commission (FHCC) and the Federal Hydrographic Office (FHO). To remove the direction of the FHO from the NTA it is proposed that there should be a board of management for the FHO reporting to, but not necessarily a part of, NTA. Within NTA it is considered that there should be an officer with the title of the Federal Hydrographic Officer to act as the focal point within NTA for hydrographic matters.

Each option allows for the internal liaison between federal ministries, the individual emirates, the FHO and NTA. Similarly each option allows for the effective and essential liaison with external authorities and agencies without which hydrographic services within the UAE cannot develop effectively nor can the UAE take its proper place within the international hydrographic community.

The following three appendices set out options for a federal hydrographic structure based on the elements outlined above and discussed elsewhere in this report. The rationale for each option is also discussed, however, it is not felt appropriate for the IHO to recommend one option over the others as it is considered that the UAE government should decide which one best suits its mode of operation.

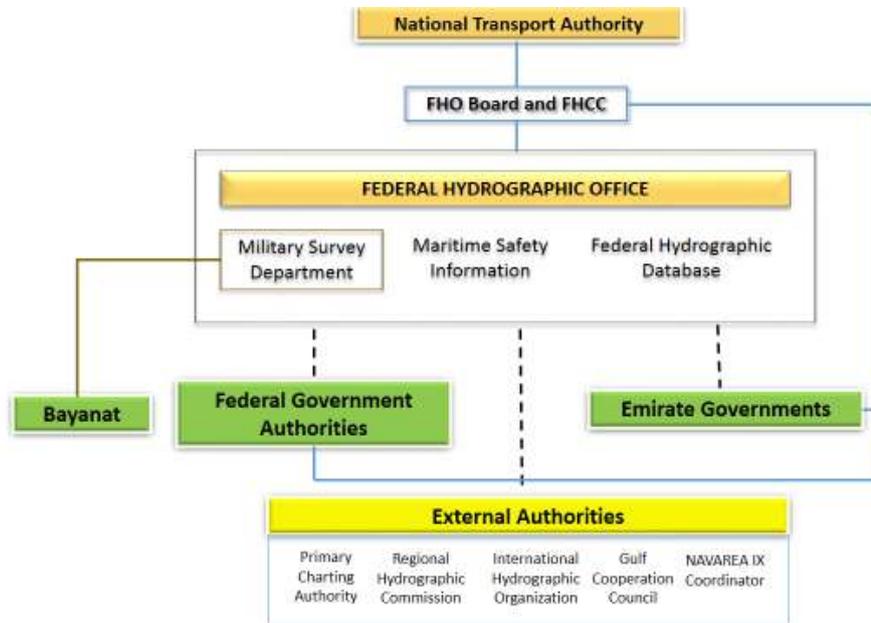
Appendix 1 - Option 1



Option 1 centres almost all of the federal hydrographic structure within the FHO; the FHO under this arrangement is answerable directly and only to the NTA. Included within the FHO are its Board of Directors and the FHCC although those on the Board or participating in the FHCC may not be fulltime FHO staff. Liaison with all external authorities, both within the UAE and abroad is direct from the FHO.

An element of MSD is included within the FHO with Bayanat being an external agency for the supply of hydrographic and nautical cartographic services as appropriate for both military and civil use. It envisaged that with Bayanat's primary role as the provider of military geospatial data and secondary role as a commercial geospatial data provider able to provide data to FHO under contract, then the link with Bayanat is directly through the MSD cell at FHO.

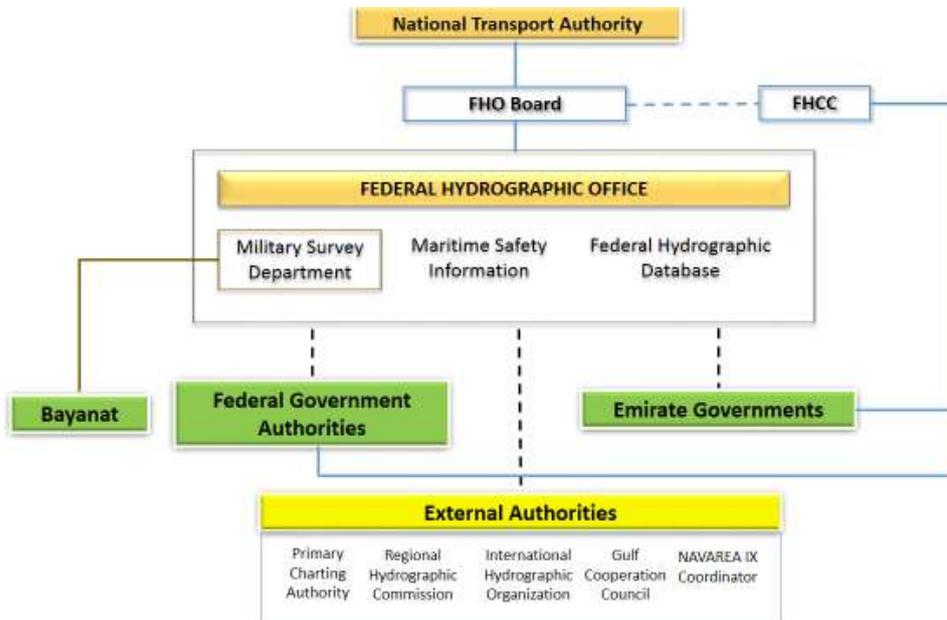
Appendix 2 - Option 2



Option 2 moves one step away from Option 1 in that the FHO Board together with the FHCC, are removed from the FHO and placed between it and the NTA. This remoteness of the Board from the FHO allows for the Board to direct and monitor the FHO on behalf of the NTA. Liaison with all external authorities, both within the UAE and abroad is direct from the FHO whilst both the FHO Board and FHCC have direct links to the various emirates and authorities to determine national priorities for FHO and monitor its output from the emirate view point.

As with Option 1, an element of MSD is included within the FHO with Bayanat being an external agency for the supply of hydrographic and nautical cartographic services as appropriate for both military and civil use.

Appendix 3 - Option 3



Option 3 moves one step away from Option 2 in that the FHO Board and the FHCC are both removed from the FHO. The FHO Board is placed between it and the NTA to allow the Board to focus attention on the FHO on behalf of the NTA. To assist in its work of monitoring and directing the FHO it has a link to an independent FHCC which itself is constituted to have a direct link to the various emirates and authorities to determine national priorities enabling it to advise the FHO Board on the output from the FHO. Liaison with all external authorities, both within the UAE and abroad is direct from the FHO whilst the FHCC has a direct liaison with all external authorities as required to conduct its business.

As with Options 1 and 2, an element of MSD is included within the FHO with Bayanat being an external agency for the supply of hydrographic and nautical cartographic services as appropriate for both military and civil use.

Appendix 4 – Draft FHCC Members

It is considered that as a minimum the following should be members of the Federal Hydrographic Consultative Commission (FHCC). Individual emirates should be encouraged to be represented as fully as possible whilst noting that the increased size of the FHCC may reduce its effectiveness.

Department	Responsibility or Interest
National Transport Authority	SOLAS
Ministry of Defence	MSD Bayanat Military Spatial Data
Ministry of Foreign Affairs	UNCLOS Maritime Boundaries Foreign Research Cruises
Ministry of Finance	Funding
Ajman Emirate Representative	Ajman hydrographic interests
Abu Dhabi Emirate Representative	Abu Dhabi hydrographic interests
Dubai Emirate Representative	Dubai hydrographic interests
Fujairah Emirate Representative	Fujairah hydrographic interests
Ras al-Kaimah Emirate Representative	Ras al-Kaimah hydrographic interests
Sharjah Emirate Representative	Sharjah hydrographic interests
Umm al-Qaiwain Emirate Representative	Umm al-Qaiwain hydrographic interests

Participation by federal ministries responsible for environment, fisheries, coastal development and management and tourism, if they exist, and the main government and academic institutions involved in marine research should also be considered.

Appendix 5 – Draft FHCC Terms of Reference

Role

The role of the Federal Hydrographic Consultative Commission (FHCC) is to provide strategic direction and leadership to ensure the discharge of the UAE's obligations as an IMO Member State and signatory to SOLAS for the provision of hydrographic services in respect of the UAE's waters.

Deliverables

The FHCC sets out to take an overview of the UAE as an active member of IMO, IHO and of the ROPME Sea Area Hydrographic Commission (RSAHC). Deliverables will be:

Guidance to NTA in meeting the UAE's hydrographic obligations under SOLAS – namely SOLAS V Regulation 2 Definitions, Regulation 9 Hydrographic Services, Regulation 19 Carriage Requirements for Shipborne Navigational Systems and Equipment and Regulation 27 Nautical Charts and Nautical Publications;

Guidance to the FHO in meeting the obligations of IMO/IHO/RSAHC membership;

Represent the interests of maritime stakeholders throughout the UAE to NTA and the FHO.

Definitions

For these initial Terms of Reference, the following meanings are defined:

Term or Abbreviation	Meaning	Details
UAE MOT	Ministry of Transport	Federal ministry with responsibility for the maritime sector including SOLAS.
NTA	National Transport Authority	The federal authority responsible for the discharge of SOLAS hydrographic obligations in United Arab Emirates
FHO	Federal Hydrographic Office	A unit, to be established, delegated to undertake the functions to fulfil the UAE Government's obligations as a maritime nation in respect of maritime safety information, hydrography and navigational charting
IHO	International Hydrographic Organization	The international body with responsibility for hydrography and the standardization of nautical charts
IHB	International Hydrographic Bureau	The secretariat of the IHO
PCA	Primary Charting Authority	The body currently producing official nautical charts and products on behalf of the UAE
RSAHC	ROPME Sea Area Hydrographic Commission	Regional commission of the IHO
UKHO	United Kingdom Hydrographic Office	PCA for UAE waters

Term

These Terms of Reference are effective from [date] and will continue until [date] or until amended by the Members or terminated by the NTA.

Membership

Membership of the FHCC is listed below.

The organizations and departments listed in the table are full members of the committee, are voting members and form the quorum for the meetings. If all full members of the meeting are unable to attend a particular meeting, it may be possible for ex-committee endorsement to be obtained from the absent member. Other relevant stakeholders may be co-opted onto the FHCC as required. Wherever possible decisions should be reached by consensus, however if voting is required on an issue or to endorse a proposal the senior delegate present from an emirate or ministry attending the meeting will cast the vote for that emirate or ministry, in the event of a tied vote the Chairman shall have the casting vote.

National Transport Authority (Chair)
Ministry of Defence
Ministry of Foreign Affairs
Ministry of Finance
Ajman Emirate Representative
Abu Dhabi Emirate Representative
Dubai Emirate Representative
Fujairah Emirate Representative
Ras al-Kaimah Emirate Representative
Sharjah Emirate Representative
Umm al-Qaiwain Emirate Representative

Responsibilities

The FHCC will:

- Foster hydrographic cooperation between emirates for the safety of navigation in UAE waters;
- Continuously review the federal hydrographic needs of the UAE;
- Advise the FHO on the federal hydrographic needs of the UAE;
- Advise the NTA on the UAE's compliance with SOLAS hydrographic matters;
- Co-ordinate hydrographic projects across emirates to provide maximum return for minimum resource expenditure;
- De-conflict hydrographic projects within and between emirates;
- Review proposed international regulations to ensure that hydrographic matters are properly aligned;
- Monitor the national archiving and databasing of hydrographic data and allow its use by public and private bodies;
- Removing obstacles to the FHO's successful management, delivery and implementation of nautical charting of UAE's waters;
- Maintaining the focus of the FHO in the fulfilment of SOLAS and federal hydrographic obligations and interests;
- Monitoring and managing the factors outside FHO's control that are critical to its success.

The members of the FHCC will:

- Attend all FHCC meetings;
- If unable to attend a FHCC meeting, nominate an alternate and proxy;
- Take every opportunity to promote federal and emirate hydrographic capability;
- Share all communications and information relevant to the FHO or hydrographic activities relating to the UAE across all FHCC members;
- Notifying members of the FHCC, as soon as practical of any matter arising which may be deemed to affect the development of FHO, FHCC or hydrographic capability in the UAE.

Federal Hydrographic Co-ordinator

The Federal Hydrographic Coordinator shall be The Federal Hydrographic Coordinator will act as the Secretary for the FHCC. The Coordinator will arrange the meeting venue, produce and disseminate the Agenda, arrange for Minutes to be taken and circulated and will liaise with FHCC members outside of committee meetings to further the business of the FHCC.

Amendment , Modification or Variation

These Terms of Reference may be amended, varied, or modified in writing after consultation and agreement by FHCC members.

Appendix 6 – Draft FHO Terms of Reference

Purpose

The purpose of the Federal Hydrographic Office (FHO) is to act as the federal agency for hydrography within the United Arab Emirates Government and specifically to discharge the UAE's responsibilities under SOLAS and in particular SOLAS Chapter V Regulation 9.

Responsibilities

Maritime Safety Information (MSI)

- To be the federal focal point for all MSI data;
- To assess and disseminate MSI as required by the WWNWS, GMDSS and national information systems including Notices to Mariners;
- To assess and disseminate MSI to foreign hydrographic offices producing nautical charts and publications of United Arab Emirates waters;
- To maintain an archive of all MSI data including source, assessment, and why, when and how cancelled.

Hydrography

- To propose and plan, as required, hydrographic surveys to IHO Orders of Survey;
- To propose, plan and monitor surveys to be conducted by external agencies – e.g. Bayanat;
- To ensure that all hydrographic data is forwarded to the Primary Charting Authority;
- To maintain an archive of all hydrographic data;
- To make available to all UAE agencies hydrographic data as and when requested;
- To make available to commercial enterprise releasable hydrographic data as and when requested on a repayment basis.

Navigational Charts and Publications

- Maintain a close liaison with the Primary Charting Authority to maintain the primary nautical charts and publications for the United Arab Emirates;
- To revive and maintain for publication previous United Arab Emirates charts;
- To develop and produce specialised charts for national civil and defence purposes.
- To maintain a national archive of nautical charts.

Federal Hydrographic Consultative Committee

- To be a member of the Federal Hydrographic Consultative Committee;
- The Chief Hydrographic Officer to be the national Hydrographic Coordinator;
- To provide professional hydrographic advice to the FHCC.

Authority

The FHO has authority as follows:

- Direct liaison with departments within the UAE government in pursuance of its purpose;
- Direct liaison with the FHCC;
- To be a member of the FHCC;
- Direct liaison with the International Hydrographic Bureau;
- Direct liaison with the Regional Hydrographic Commission;
- Direct liaison with the GCC;
- Direct liaison with all foreign government hydrographic offices in pursuance of its purpose.