



**KINGDOM OF BAHRAIN**  
**NATIONAL REPORT- JANUARY 2017**

VII<sup>TH</sup> ROPME SEA ARE HYDROGRAPHIC COMMISSION  
MEETING  
(20 to 22 February 2017, Muscat, Sultanate of Oman)

**Prepared By:**  
Hydrographic Survey Directorate  
Survey and Land Registration Bureau

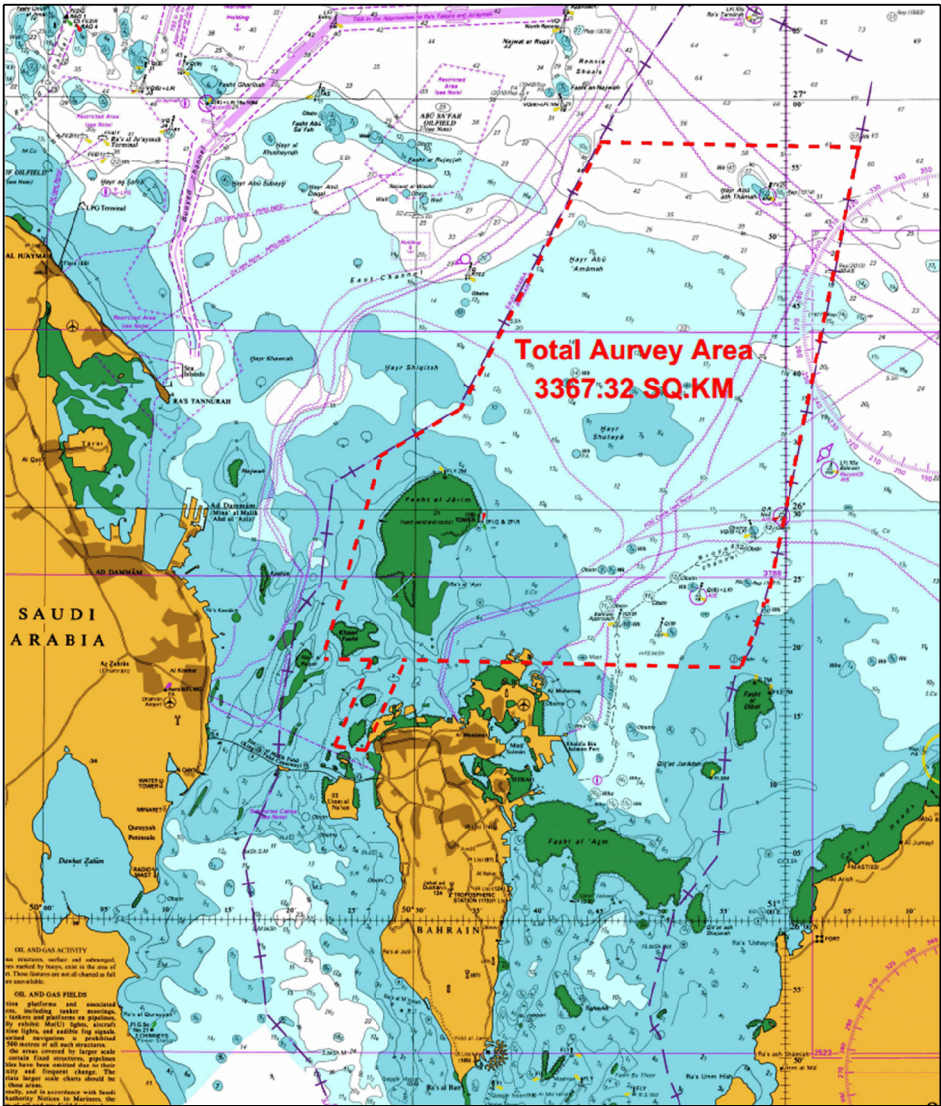
## 1. Hydrographic Office / Service

- a. The Hydrographic Authority for Bahrain was established in 1978 as a Section within the Survey Directorate of Ministry of Housing. The Hydrographic Section became a Directorate within the Survey and Land Registration Bureau (SLRB) since 2008.
- b. The Hydrographic Survey Directorate's (HSD) main duties include traditional bathymetry, tidal analysis and tidal stream measurement within the territorial waters of Bahrain and producing appropriate navigational charts for the EEZ.
- c. Since the mid-nineties all hydrographic data have been transformed into digital format. The Directorate has approximately 95% of all data needed for chart production in digital form and uses a comprehensive pool of networked PCs during its data processing and quality assurance/control. As a member of IHO and the United Nations, Bahrain is committed to provide safe water passage for all ships approaching our ports according to UN resolution regarding International Law of the Sea especially Safety of Life at Sea (SOLAS).
- d. HSD plays a vital role in improving Bahrain's Infrastructure & Economy by ensuring safe navigation, monitoring of sand search projects and reclamation. HSD also renders highly accurate surveys for the private sector in projects like developing new berths/jetties, reclamation projects, construction of marinas etc. at very nominal price in comparison to private survey companies.

## 2. Hydrographic Surveys:

- a. Regular surveys for updating the navigational charts where the depths are suspected to have changed being conducted regularly.
- b. **Airborne Bathymetric Survey.** The Hydrographic Survey Directorate in coordination with US Navy through bilateral agreement has carried out a LIDAR survey in February-March 2016. The total surveyed area (Northern part of Bahrain) was 3367 km<sup>2</sup>. The purpose of surveying this area is to update the old data and to assess the potential use of sand resources there for the development of Bahrain's infrastructure. This cooperation is

intended to continue this year and it will extend to cover other areas of interest. This survey was a huge success as it involved multiple government agencies from both Bahrain and USA and the coordination was very smooth. The Bahrain government saved an enormous amount of money as the survey was conducted free of cost. This data is very useful for any future developments of Bahrain and also for the projects under 2030 Vision.



LIDAR Survey Area

3. New Charts and updates:

- a. ENC's: Bahrain produced 4 new ENC's in the year 2016 which forms the large scale chart series for the Bahrain Approach Channel. Presently Bahrain is producing a total of 8 ENC's.
- b. The ENC's are distributed through IC-ENC
- c. INT charts: Bahrain produces 5 INT Charts
- d. National Paper Charts: 4 new charts were introduced in the year 2016 which covers the Bahrain approach Channel.
- e. No other charts are produced by Bahrain and there were no problems encountered in chart production and distribution.
- f. The list of Bahraini charts and products are as below:

<b>Chart No.</b>	<b>Title</b>	<b>Edition</b>	<b>Scale</b>	<b>Datum</b>
1501 INT7258	Mina' Salman and Approaches	Feb 2012	1:15000	WGS 84
1502 INT7259	Mina Manama and Approaches	Feb 2012	1:15000	WGS 84
1503 INT7261	Khalifa Bin Salman Port	Feb 2012	1:15000	WGS 84
1504	Approaches to Port of Sitrah	Jan 2016	1:15000	WGS 84
1505	Approaches to Bahrain Southern Part	Jan 2016	1:15000	WGS 84
1506	Approaches to Bahrain Central Part	Jan 2016	1:15000	WGS 84
1507	Approaches to Bahrain Northern Part	Jan 2016	1:15000	WGS 84
2001	Sitra to Umm Jalid	Feb 2012	1:20000	WGS 84
2502	Hawar	Mar 2004	1:25000	WGS 84
5001	Sitrah to Tighalib	Feb 2012	1:50000	WGS 84

5002	Hidd Al Jamal to Hidd Al Theeb	Nov 2008	1:50000	WGS 84
5003	Al Baynah al Saghirah to Ra's Al Barr	Feb 2012	1:50000	WGS 84
1509 INT7255	Approaches to Bahrain	Feb 2012	1:50000	WGS 84
5006	Hayr Shutayah to Khawr Fasht	May 2011	1:50000	WGS 84
6501 INT7254	Outer Approaches to Bahrain	Feb 2012	1:65000	WGS 84
10001	Khawr Fasht to Janan	Feb 2012	1:10000	WGS 84
P700	Tide Tables	Annual Editions		
P701	Tidal Streams Atlas	Sep 1997		
P702	Symbols, Abbreviations & Terms Used on charts - Chart 1	Apr 2006		
Electronic Navigation Charts (ENC) 1501, 1503, 1504, 1505, 1506, 1507, 5006, 6501 to IHO S57 Standards				
Customized Charts, soundings, tidal and water temperature data as per customer requirement				

#### 4. New Publications & Updates

- a. New publications: Annual tide Tables for 2016 and 2017 were published during the period under review.
- b. Bahrain also produces Tidal Stream atlas and Chart symbols and Abbreviations book and these publications will be updated as and when more data is gathered.
- c. The publications are sold over the counter at Hydrographic Survey Directorate and no problems encountered in production and distribution of the tide tables.

5. MSI

- a. Existing infrastructure- controlled and coordinated by Ports & Maritime Authority under Ministry of Transportation & Telecommunications.
- b. New infrastructure – NIL.
- c. Problems encountered – NA

6. C-55

Adequately Surveyed	Not adequate	No survey
63%	31%	6%
All navigationally critical areas such as approach channel and harbor has been surveyed to 100%	With the recent LiDAR survey of the northern area in 2016, this figure will change into adequately surveyed areas after completing the data processing	Efforts are in hand to survey these areas

7. Capacity Building:

- a. Bahrain fully supports the IHO Capacity building program and effectively utilizes the courses offered under this program. Bahrain has no training centers and hence depends on other institutes worldwide for training its staff.
- b. One staff completed the Cat A program in August 2016 from US under the IHO Capacity building program sponsored by the Republic of Korea.
- c. One staff is undergoing the Category "B" Marine Geospatial Information Programme sponsored by the Republic of Korea and has successfully completed 2 modules.
- d. One staff attended the RSAHC MBES Processing Course, Abu Dhabi, United Arab Emirates in June 2015.
- e. One staff attended the Introduction to MSDI and Data Management Training Course for RSAHC by IIC Academy, Visakhapatnam, India in Jun 2016.

- f. One staff is preparing to attend the RSAHC ENC QA Training Course, Bangkok, Thailand scheduled for Jan-Feb 2017

## 8. Oceanographic activities

- a. General – Bahrain has different government organisations and departments that deal with oceanographic activities and HSD is in close working relationship with these organisations.
- b. Tide Gauge Network – Bahrain has a total of 12 automatic radar type tide gauge systems that cover the entire coast of Bahrain. This project was completed in 2014 and the 12 stations are continuously monitoring tide at every 10 minutes interval. Tide Gauges in these stations are fully automated, highly precise and with GPRS connectivity

## 9. Other activities

- a. Participation in IHO Working Groups: Bahrain is actively involved in the IHO Programs as well as Regional Hydrographic Commissions (RSAHC) programs.
- b. Meteorological data collection: Presently the meteorological data is collected by the meteorological department and it is shared with HSD. Studies are underway to have different meteorological sensors integrated to the existing tide gauge network for collection of data.
- c. National Sand Search Project : The National sand search project is aimed towards identifying the potential sand resources all around Bahrain to continue with the economic growth of Bahrain. Since Bahrain is surrounded by sea on all sides it has a good deposit of natural sand resources. The problem faced in extracting these natural resources is the lack of reliable data regarding the sand deposits. The Governance Committee and various sub committees were formed for the smooth conduct of the project. Numerous meetings have been conducted and data sharing between various stake holders are agreed upon. HSD acted as the coordinator for the Sand Search Governance committee and various sub committees. HSD has collected and compiled all available data from different stake holders and an initial database has been set up. The survey boat equipped with sub bottom profiler was deployed to carry out the initial sand search survey for the existing borrow area off East

Hidd. The existing sand volume calculation and the amount of sand extracted for the past 20 years were estimated. HSD also conducted a sand search survey for determining potential borrow area for the East Sitra Project. The quantity of sand available to the most suitable area of the project site has been determined by HSD.

## **10. Conclusion**

Bahrain Hydrographic Survey Directorate is committed towards fulfilling its mandate of having adequately surveyed safe navigational routes for the waters of Bahrain. HSD also had a successful year and maintains good cooperation with various government agencies and contribute towards the economic and strategic growth of Bahrain.