SAIHC 6.2

17th MEETING OF SOUTH AFRICAN ISLANDS HYDROGRAPHIC COMMISSION

NATIONAL REPORT - MAURITIUS

3 - 4 February 2021

1. **Executive Summary**

1.1. **Name of the Institution** - Mauritius Hydrographic Service (MHS)

1.2. **Introduction**

Mauritius Hydrographic service (MHS) is a Government institution operating under the aegis of the Ministry of Housing and Land Use Planning and is the nodal agency for hydrographic surveying and nautical charting in Mauritius.

1.3. **Cooperation between India and Mauritius**

A Memorandum of Understanding (MoU) between Republic of Mauritius and Republic of India in the field of hydrography was signed on 24 October 2005. The MoU has been further renewed for the third time for a period of 5 years with effect from 24 October 2020. The potential areas of cooperation under the MoU have been deep sea surveys, production of navigational charts, training of staff and provision of expertise for setting up of hydrographic infrastructure in Mauritius.

1.4. **Staff of MHS**

MHS is headed by Commander (Hydrographer) deputed by the Government of India and supported by two Petty Officer Survey Recorders

One Principal Surveyor, one Senior Surveyor and one Surveyor from the Ministry of Housing and Land Use Planning also form part of the MHS team. They all are IHO/FIG CAT "A" qualified surveyors who have completed their one year Category "A" hydrographic programme under various IHO capacity building programmes.

1.5. **Submitted by:**

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2. Surveys

2.1 **Coverage of New Surveys**. The Mauritius Hydrographic Service (MHS) has been carrying out surveys for numerous stakeholder organisations in connection with projects of national importance. Some of the surveys carried out since the last SAIHC meeting are as follows:-

(a) **Hydrographic Survey Ilot Margenie to Ile Aux Cerfs (East Coast of Mauritius)**

Based on the request from the Ministry of Tourism, the survey was conducted within the lagoons of Ilot Margenie to Ile aux Cerfs to ascertain bathymetry, tidal current and composition of seabed. The data would be used to ensure that tourism related activities are carried out safely and with minimum impact on environment. The survey started in August and was completed in October 2019.

Fig. 1 Hydrographic Survey Ilot Margenie to Ile Aux Cerfs

(b) **Survey of Surinam and Pomponette Beach (South Coast of Mauritius)**

Following several meetings with the Beach Authority concerning

drowning cases near Surinam and Pomponette public beaches, the Mauritius Hydrographic Service (MHS) carried out a hydrographic survey in December 2019 for the delineation of safe swimming areas. The hydrographic survey was undertaken in collaboration with the assistance of INS Darshak (Indian Naval Survey Vessel).

(c) **Survey of Passes Phase V (East Coast of Mauritius)**

The survey of passes is of great importance for tourism, fisheries and activities related to blue economic development. These surveys enable demarcation of safe waters for vessels operating in these areas and update existing charts.

The mainland of Mauritius has 43 major passes and 34 minor passes. After the setup of MHS in 2013, these passes are being surveyed in a phased manner. The survey of the pass and lagoon off Poste de Flacq was completed in March 2020.

Till date, MHS has completed surveys of 22 passes.

Fig. 2 Survey of pass and lagoon off Poste de Flacq

(d) **Survey Around Wreck of MV Wakashio**

Following the grounding of MV Wakashio off Pointe D'Esny along the

South East Coast of Mauritius, MHS carried out a multi-beam survey to enable salvage operations.

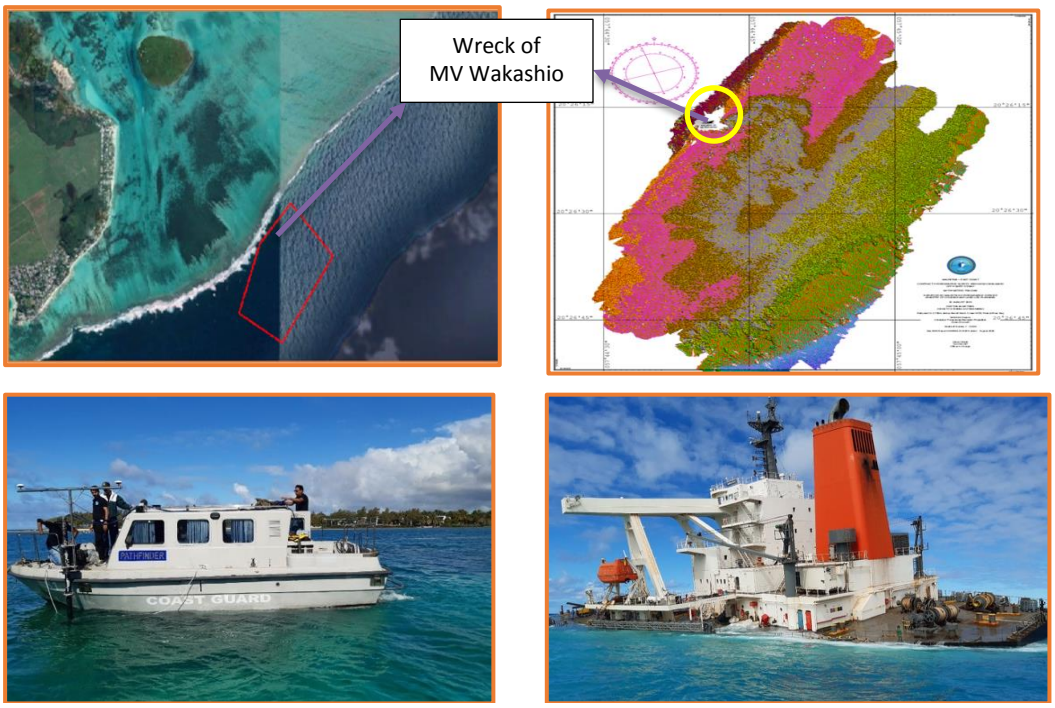

Fig. 3 Hydrographic Survey around MV Wakashio

(e) **Survey off Flic en Flac (West Coast)**

As per the request of the Ministry of Environment, Solid Waste Management and Climate Change, a bathymetric survey was undertaken along the coastal stretch of Flic en Flac to study coastal erosion. In addition, bathymetric data was also collected over the two passes falling within the survey area. The survey was undertaken in September 2020.

Fig. 4 Hydrographic Survey off Flic-en-Flac

(f) **Comprehensive Check Survey of Port-Louis Harbour**

Based on the request received from Mauritius Ports Authority (MPA) a Check Survey of Port Louis harbour was undertaken in July 2020. The survey was conducted using Portable Multibeam Echo Sounder (SeaBat T-20P) mounted on Inshore Survey Vessel Pathfinder with 100% overlap. This was the first comprehensive survey of Port Louis Harbour undertaken by MHS using Multibeam Echo Sounder.

(g) **Survey off Souillac and Deep Sea Block South East of Mauritius**

Indian Naval Survey ship 'Darshak' was deployed in our waters from 25 November to 26 December 2019 in order to undertake joint multi-disciplinary surveys in the following areas:-

(i) Southern (Souillac) part of Mauritius with the aim to publish a new chart and update the relevant Navigational Publications; and

(ii) South Eastern part of Mauritius based on the request from the Department for Continental Shelf Maritime Zones Administration and Exploration for research purposes.

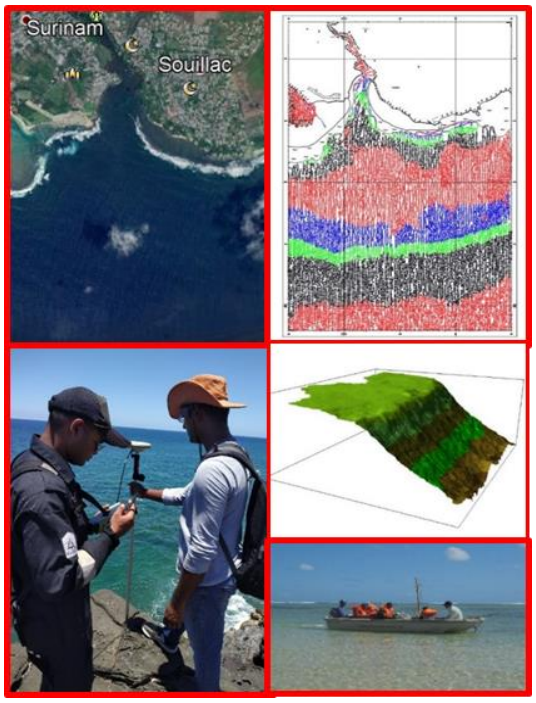

Fig. 5 Hydrographic Survey off Souillac

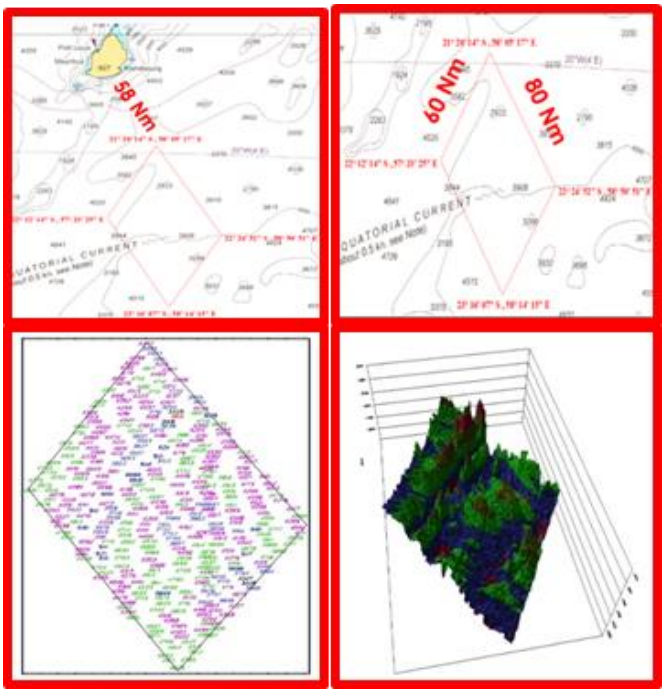

Fig. 6 Hydrographic Survey of Deep Sea Block (SE of Mauritius)

2.2 **The basic infrastructure** available for undertaking Hydrographic surveys at Mauritius Hydrographic Service are listed below:-

(a) Inshore Survey Vessel "Pathfinder"

(b) Seabat T-20P Multibeam Echosounder System interfaced to SBG Ekinox II Inertial Navigational System

(c) Atlas Deso-30 Echo sounder with 210 KHz and 33 KHz Transducers

(d) Hemisphere R-131 Satellite DGPS

(e) TSS Dynamic Motion Sensor 25.

(f) Side Scan Sonar 4200 FS with Discover and Sonar wiz software

(g) CTD 48M Sound Velocity Profiler

(h) Precision Depth Recorders – PDR 601

(i) Teledyne Hydrotrac Portable Single Beam Echo Sounder

(j) Infinity-EM Current Meter

(k) HYPACK 2019 software

(l) CARIS Processing Suite for Single and Multi-beam Sounding

(m) CARIS BDB

(n) CARIS Paper Chart Composer

2.3 **New Technologies/Equipment**

(a) MHS has successfully commissioned its first **shallow water Multi Beam System** (SeaBat T-20P) in 2020. A contraption arrangement was made on ISV Pathfinder for deployment of the new MBES system. Additionally, to maximise the use of the equipment from different platforms, arrangements for mounting the MBES have been made on Heavy Duty Boat of National Coast Guard.

Fig. 7 MBES Mounted on HDB & ISV Pathfinder

(b) **CARIS BathyDatabase.** As the amount of Hydrographic data handled by MHS has increased over the years, the need to have a database system in order to manage, store and backup the data more efficiently was felt. In view of the above, CARIS BDB software suite was procured by the Ministry. The installation of the same was undertaken in June 2020.

2.4 **New Ships**. Nil

2.5 **Problems Encountered**. Nil

3. **New Charts & Updates**

3.1 **ENC's**. A total of 12 Electronic Navigation Charts have been produced in collaboration with National Hydrographic Office, Dehradun, India for Mauritian waters. Since the last SAIHC meet two new Electronic Navigation Chart has been produced. The details of the new ENCs are enumerated below:-

(a) ENC Number - IN32527M
Chart Number - 2527 (INT 77397)
Chart Title - Mauritius
Publication Year - 2019
Scale - 125 000

(b) ENC Number - IN52530A
Chart Number - 2530
Chart Title - Approaches to Grand Port
Publication Year - 2020
Scale - 30 000

3.2 **ENC Distribution Model**. ENCs covering Mauritian waters are distributed worldwide through UKHO, M/s Jeppesen Marine, M/s Primar Norwegian Hydrographic Service and M/s IIC Technologies Limited.

3.3 **RNC's**. Presently, UKHO is producing some of the RNCs for Mauritian waters.

3.4 **Charts**. Two new paper charts have been published since SAIHC 16, making the total navigational charts for Mauritius to ten which are as follows: -

Sl No.	Chart No.	Name
(a)	2514 (INT 7739)	Port Louis and Approaches to Port Louis.
(b)	2503 (INT 77391)	Approaches to Cargados Carajos Shoals
(c)	2504 (INT 77392)	Mathurin Harbour
(d)	2505 (INT 77393)	Approaches to Mathurin Harbour
(e)	2506 (INT 77394)	Grand Bay and Grand Riviere Noire Bay
(f)	2507 (INT 77395)	Grand Port
(g)	2512 (INT 77396)	Agalega Island
(h)	2529	Northern Islets of Mauritius
(i)	2527 (INT 77397)	Mauritius
(j)	2530	Approaches to Grand Port

Table 1 List of Navigational Charts

Charts of Mauritian waters are available from the following agencies:-

(a) Cartographic Section, Ministry of Housing and Land Use Planning, Mauritius

(b) National Hydrographic Office, Dehradun

(c) Naval Chart Depots at Mumbai and Vishakhapatnam

(d) M/s IIC Technologies Limited

(e) M/s Jeppesen India Private Limited

(f) M/s Lift o Marine

(g) M/s C & C Marine Combine

(h) M/s EW Liner Charts & Publication

3.5 **Other Charts**. The catalogue of charts for Mauritius is being expanded to 14 charts as per the charting scheme finalised in consultation with National Hydrographic Office, India. The new charting scheme would significantly enhance the navigational safety in Mauritian waters. The details of the additional charts are as follows:-

Sl No.	Proposed Chart	Scale	Remarks
(a)	Point Sud Ouest (Le Morne)	1: 10,000	Surveys undertaken by INS Sarvekshak in December 2018
(b)	Souillac	1: 7,500	In progress

(c)	Saint James Anchorage (Agalega)	1: 5,000	-
(d)	Rodrigues Island	1: 50,000	Chart in the final stages of Publication

Table 2 Proposed Charts

3.6 **Problems Encountered**. Nil

4. **New Publications & Updates**

4.1 **Updated Publication**. The catalogue of Paper Charts and Electronic Navigational Charts, Mauritius has been updated as on September 2020. The catalogue is available at https://housing.govmu.org/Documents/MHS%20311220/COMBINED%20CATALOGUE%202020.pdf

4.2 **Problems Encountered**. Nil

5. **MSI (Maritime Safety Information)**

5.1 **Existing Infrastructure for Transmission**.

Dissemination of Maritime Safety Information is carried out by the Mauritius Radio Services (MRS), a GMDSS coast station operated by Mauritius Telecom, on behalf of and within an agreement with the Shipping Division of the Ministry of Blue Economy, Marine Resources, Fisheries and Shipping. GMDSS covers sea areas A1, A2 and A3 within our SRR only. Mauritius Radio Services operates 24/7 and is based at Cassis, Port-Louis. Mauritius is located in NAVAREA VIII coordinated by India.

5.2 **MRS disseminates MSI by the following methods**:-

(a) **Navtex**

All MSI are transmitted on the International Navtex by default. The frequency is 518 KHz. There is no National Navtex (490 KHz) service in Mauritius. This is a service wherein messages are broadcast in a national language. The Station Identification of the Navtex in Mauritius is C. Messages are transmitted on a 10-minute slot every

4 hours starting at 0020, 0420, 0820, 1220, 1620 and 2020 hours GMT. The normal range of Navtex broadcast is 400 nautical miles.

(b) **VHF**

Based on the area of concern, some MSI messages are broadcast on VHF Radio Telephony on Channel 24, after an announcement is made on Channel 16. MRS has a VHF network that completely covers the Sea Area A1 of Mauritius. 6 VHF stations are remotely operated around the island from the control centre in Cassis.The maximum range is 30 nautical miles.

(c) **HF**

MSI may also be broadcasted on HF Radio Telephony (8800 khz). This is specifically done if the area of concern is around the Mauritius fishing banks. Fishing vessels operating on Mauritius fishing banks are equipped with an HF Radio Telephone equipment for communication with MRS on HF. Weather information are sent daily to these fishing vessels on HF.

(d) **Inmarsat-C**

If the area of concern is relatively far from Mauritius, especially beyond the normal range of Navtex, some MSI may be broadcast on the e-broadcast system. This system is operated by AMSA (Australian Maritime Safety Authority) and MRS have access to this platform through an agreement made by the Shipping Division. It is an online tool through which messages may be broadcast to ships within Mauritius Search and Rescue Region (SRR). The e-broadcast is normally intended for Distress and Urgent situations and therefore not all MSI messages are broadcast on this system.

5.3 **Merchant Shipping Notice**. Following the MV Wakashio incident, Merchant Shipping Notice 21 of 2020 was issued by the Shipping Division of the Ministry of Blue Economy, Marine Resources, Fisheries and Shipping regarding the establishment of recommended Areas To Be Avoided (ATBAs) around the Islands of Mauritius and Rodrigues by vessels on innocent passage. The areas have been designated to reduce the risks of further marine casualties by increasing the safety of navigation and to protect the marine

environment. The limits of the recommended ATBAs will be incorporated in relevant paper charts and ENCs.

5.4 **Problems Encountered**. Nil

6. C-55

The updated C-55 table is placed at Annexure to the National Report.

7. Capacity Building

7.1 Training Received, Needed and Offered

(a) **Training Received**

(i) **Training Onboard INS Darshak**. On job training is regularly provided on-board Indian Navy ships during each survey mission. During the deployment of INS Darshak in November/ December 2019, a total of 8 personnel from various Government agencies of Mauritius embarked the ship for joint survey and training during its two survey sorties. Ship's staff imparted on-job training to the officers by providing exposure to the latest hydrographic equipment and practices. In addition the embarked Officers participated actively in all the survey operations, data collection and data processing.

(ii) **Training on Portable Multi-beam Echo Sounder.** Mauritius received its first portable MBES SeaBat T 20-P in September 2019. Extensive training was imparted to the surveyors form the Ministry of Housing and Land Use Planning. In addition, officers from Department for Continental Shelf Maritime Zones Administration and Exploration (CSMZAE) also participated actively during the commissioning of the equipment and received training.

(iii) **Training on CARIS Bathy Data Base Software Suite**. With the procurement of CARIS BDB, Officers from the Cartography and

Hydrography section of the Ministry of Housing and Land Use Planning received training in the software during June 2020. Owing to the travel restrictions imposed due to the COVID-19 pandemic the entire training was undertaken remotely by the OEM from Netherlands.

(iv) **Training on CARIS HIPS/SIPS Professional**. MHS upgraded its data processing suite to the latest version of CARIS HIPS/SIPS professional version 11. In order to optimise the utilisation of the software a five day training was organised remotely in collaboration with the OEM in July 2020.

(b) **Training Needed**. Additional training requirements are envisaged in following areas: -

(i) Nautical Cartography (Paper Chart and ENC chart production)

(ii) 06 weeks Electronic Survey Equipment Orientation Course (ESEOC) for two personnel conducted at National Institute of Hydrography, Goa.

(iii) CAT 'A' and CAT 'B' courses for one Officer.

8. **Oceanographic Activities**

The Mauritius Oceanography Institute (MOI) advises Government on the formulation and implementation of policies and programs in respect to oceanography and marine resources. MHS also works in close collaboration with MOI for providing assistance in the collection of certain oceanographic Datasets like Sound Velocity Profiles, ocean Current Parameters, nature of seabed etc. The Mauritius Meteorological Service is responsible for the maintenance of tide gauges and production of tide tables in Mauritius. The following tide stations are in use:

Locations	*Digital Tidegauges*	*Installation*	*Sensors used to measure sea level*	*GPS Positions*
Port Louis ***(Trou Fanfaron)***	Sutron SatLink Logger	14 March 2008	Encoder, radar, pressure	20^0 09.434' South, 57^0 30.256' East
Port Louis ***(Trou Fanfaron)***	Vaisala (MAWS 301)	May 2005	Encoder, radar, pressure	
Blue Bay	Sutron SatLink (XLITE 9210)	29 November 2008	Radar, pressure	20^0 26.650' South, 57^0 42.655' East
Rodrigues ***(Port Mathurin)***	Sutron SatLink Logger	8 March 2008	Encoder, radar, pressure	19^0 40' South, 63^0 25' East
Agalega ***(La Fourche)***	Sutron SatLink (XLITE 9210)	22 November 2008	Radar only	10.346^0 South, 56.586 East

Table 3 Tide Stations in the Republic of Mauritius

9. **Spatial Data Infrastructure**

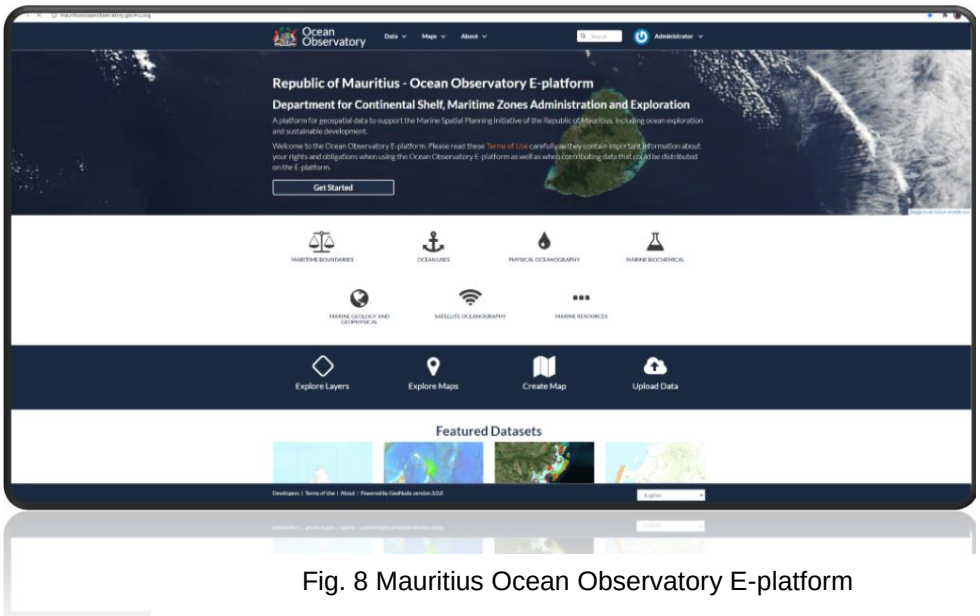

Fig. 8 Mauritius Ocean Observatory E-platform

The Department for Continental Shelf, Maritime Zones Administration and Exploration, with the expertise of the Commonwealth Scientific and Industrial Research Organisation (CSIRO) Oceans & Atmosphere, Australia, has developed the Mauritius Ocean Observatory E-platform (E-platform) under the Indian Ocean Rim Association (IORA) project "Developing an Enhanced Ocean Observatory in support of Ocean Exploration and Development". The main objective of the E-platform is to centralise data pertaining to the maritime zones of the Republic of Mauritius in order to facilitate data discovery and data sharing between

researchers, partners and users involved in management, policy and planning.

9.1 National implementation of the Shared Data Principles

The E-platform has as objective to support the Marine Spatial Planning initiative of the Republic of Mauritius by providing a platform to collect, store, organize and provide access to spatial-temporal data relevant to ocean exploration and development. By integrating various sources of information and providing access to relevant knowledge, the E-platform will not only serve as a guide to identify gaps in existing information and data but also enhance the sustainable management of the maritime zones of Mauritius through informed decisions.

The E-platform also serves as a platform to provide access to cruise reports and data collected during research cruises that have been approved under the Maritime Zones (Conduct of Marine Scientific Research) Regulations 2017. The E-platform thereby ensures the dissemination and flow of scientific data and information resulting from marine scientific research as stipulated under Article 244 of the United Nations Convention on the Law of the Sea (UNCLOS).

The E-platform offers access to information under the following category:

(a) Maritime Boundaries
(b) Ocean Uses
(c) Physical Oceanography
(d) Marine Biochemical
(e) Marine Geology and Geophysical
(f) Satellite Oceanography
(g) Marine Resources

9.2 Best practices and lessons learned

The E-platform is built using GeoNode (https://geonode.org/), an open-source Geospatial Content Management System, which allows data to be loaded into a geospatial database alongside connected metadata and document resources. Each dataset in the E-platform can be shared publicly or restricted to allow access to only specific users. The E-platform also allows for creation of metadata, dataset overlays and map visualizations. Communication tools on the E-platform enable users and data providers to interact among themselves and thereby facilitate the access and usability

of data. User profiles and the contact information of data providers can be viewed by all users of the E-platform.

The E-platform provides functionalities such as:

(a) Upload – layers (ESRI Shapefile and GeoTiff)
(b) Upload – Documents (for example PDF, txt, docx etc)
(c) Add Remote Services - Wep Mapping Service
(d) Styling & Editing
(e) Metadata – ISO19115 - ISO19139 XML
(f) Users & Groups
(g) Permissions
(h) Map creation/ visualization

Users can download products according to their needs. Every data is accompanied with a metadata which provides the basic information on the data (e.g who created the data; what is the content of the data; when was the data created; where is it geographically; how and why was the data created). Some data may not be available for download from the E-platform; the metadata will guide you where/who to contact to obtain the data.

9.3 **Challenges and Achievements**

(a) The Ocean Observatory E-Platform has been set up on the Government Intranet System (GINS) and is currently accessible by Ministries and Departments.

(b) About 100 documents, geospatial layers and metadata have been processed using a Geographical Information System software and uploaded on the E-Platform.

(c) A server has been procured under the UNDP/GEF 'Mainstream Biodiversity into the Management of the Coastal Zone in the Republic of Mauritius' project to compile information received from stakeholders and process the information into a compatible format for the E-Platform.

(d) An end-user training on 'Ocean Observatory E-platform' was held on 18 September 2019. The training gathered 14 participants from different Ministries and Departments. The aim of this training

was to provide representatives of Ministries and Departments having policy/regulatory responsibilities and scientific/technical expertise relevant to data management with hands-on training for the effective use of the E-platform.

10. Other Activities

10.1 IMSAS Audit

Mauritius underwent IMO Member State Audit Scheme (IMSAS) from 10-17 February 2020 which was intended to provide audited Member States with a comprehensive and objective assessment of its administration and implementation of IMO instruments. In this context, a team of three (03) Officers from IMO namely Mr. Haakon Storhaug (Audit Team Leader), Mr. Nicola Orlando (Team Member) and Mr. Omar Hassein (Team Member) accompanied by Officers from the Shipping Division visited the Mauritius Hydrographic Service on 13 February 2020. During the audit, no issues related to hydrography were highlighted by the audit team.

Fig. 9 Presentation at MHS for IMSAS Audit

10.2 **Participation in IHO meetings**

The Permanent Secretary (Head of Delegation) of the Ministry of Housing and Land Use Planning and officers from MHS participated in the 2nd Session of the IHO Assembly which was held as remote event from 16th to 18th November 2020.

Fig. 10 Participation to the 2nd Session of the IHO Assembly

Input to the IHO Publication P-5 (*Yearbook*)

Country *: Mauritius*
Organization *: Mauritius Hydrographic Service*

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Other point(s) of contact	Mr D. Madhow, Principal Surveyor (230) 401 6808 dmadhow@govmu.org Mr H. Teckmun Senior Surveyor 002304013801 hydrounit@govmu.org
Web site	housing.govmu.org
Country information	
Declared National Tonnage	Tonnage: 164349 T Date: December 2019
-National day **-Fête nationale** **-Fiesta nacional**	Independence Day 12 March Republic Day 12 March
Date of establishment and Relevant National Legislation	Hydrographic surveys and nautical charting are under the ambit of Ministry of Housing and Land Use Planning. The legislative framework for hydrographic services would be formulated in due course.
Date first joined IHO	August 2005
Date ratification Convention	August 2005

Remarks on membership	Nil
Agency information/ Information sur l'agence/ Información sobre la agencia	
Top level parent organisation	Ministry of Housing and Land Use Planning
Principal functions of the organisation or the department	1. Hydrographic surveys for compiling and updating nautical charts and products. 2. Project surveys in support of development activities, scientific research, coastal zone management, environmental protection, fisheries management and maritime security. 3. Compilation of Navigational warnings for promulgation through NAVAREA coordinator. 4. Procurement & Maintenance of hydrographic, oceanographic and marine cartographic equipment for the department. 5. Interact with International Hydrographic Organisation (IHO), North Indian Ocean Hydrographic Commission (NIOHC), Southern African & Islands Hydrographic Commission (SAIHC) on matters related to hydrography. 6. Provide training to surveyors, officers from Ministry of Housing and Land Use Planning & other stakeholders in the field of hydrography 7. Cooperate with other stakeholders and provide expertise on matters related to maritime domain.
Annual operating budget	Approximately 125,000 USD
Total number of staff employed	6
Number of INT charts published	8
Total number of paper charts published	10
Number of ENC cells published	12
Number of Other charts	Nil

-Type of publications produced	Catalogue of Chart			
Detail of surveying vessels/ aircraft	**Name**	**Displacement**	**Date Launched**	**-Number of crew**
	ISV Pathfinder	6.5 T	2012	05
Other information of interest	Following a memorandum of understanding in the field of Hydrographic Cooperation with India, a full-fledged Hydrographic Unit was established at the Ministry of Housing and Land Use Planning in 2013.			

Input to the IHO Publication C-55 (*Status of Hydrographic Surveying and Charting Worldwide*)
Country: Mauritius

C-55 Summary for:				Comments on Charts:
Country:	Mauritius			
Country Iso Code:	MU			
Country SubCode:	-			
INT Region:	H			
Country/Depend:	-			
Last updated:	January 2020			
Provided by:	Mauritius			
Chart coverage	**Passage (%)**	**Coastal (%)**	**Ports and Approaches (%)**	
INT	100	100	75	**Comments on Surveys:**
RNC	100	100	100	
ENC	100	100	100	
Status of Paper Charts				
Paper charts with depths in meters (%)			100	
Paper charts referenced to a satellite datum (%)			100	
Status of surveys	**Adequate (%)**	**Resurvey (%)**	**No survey (%)**	
0-200m	35	65		
> 200m	06	94		

MSI	Y/N	Comments on MSI:
Local warning	Y	
Coastal warning	Y	
Nav warning	Y	
Port warning	Y	
GMDSS	**Y/N**	**Comments on GMDSS:**
Master Plan	Y	
Area A1	Y	
Area A2	Y	
Area A3	Y	
NAVTEX	Y (International Frequency)	
SafetyNet	N	