REPORT

Direction des missions institutionnelles et des
relations internationales
Division Relations extérieures

Dossier suivi par l'IPETA Julien Smeeckaert

Tél. +33 (1) 53 66 97 81
Mail : julien.smeeckaert@shom.fr

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FRANCE NATIONAL REPORT TO THE 20TH CONFERENCE OF THE NORTH INDIAN OCEAN HYDROGRAPHIC COMMISSION (NIOHC)

1. Hydrographic Service: General

Shom is pursuing the achievement of its different commitments based on the National Maritime & Littoral Strategy and the Strategic Review of Defence and National Security, according to a 4 years targets and performance contract covering the 2017-2020 period, as approved by Shom's Board. It should be noted that a new targets and performance contract came into force on January 1st 2021 for the 2021-2024 period.

In addition to that, survey works are being conducted according to the prioritized 4-years survey plan for waterways under French jurisdiction.

Detailed information to update IHO Publication P-5 is regularly transmitted to IHO secretariat.

2. Surveys

2.1. Coverage of new surveys

Since the previous NIOHC conference (March 2019), Shom has conducted in March and April 2021 several surveys in the waters of the Republic of Djibouti: in the harbours of Djibouti (Fig. 1), Obock (Fig. 2), Damerjog (Fig. 3), in the Ghoubbet cove, Gulf of Tadjoura and Banka Arab (Fig. 4).

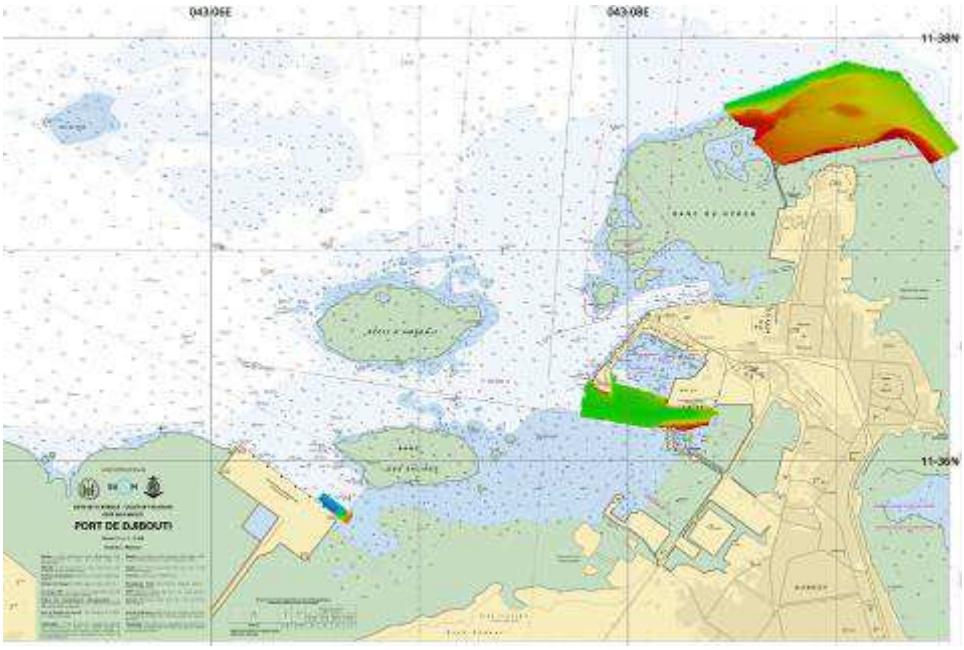

Fig. 1: Survey of Djibouti harbor

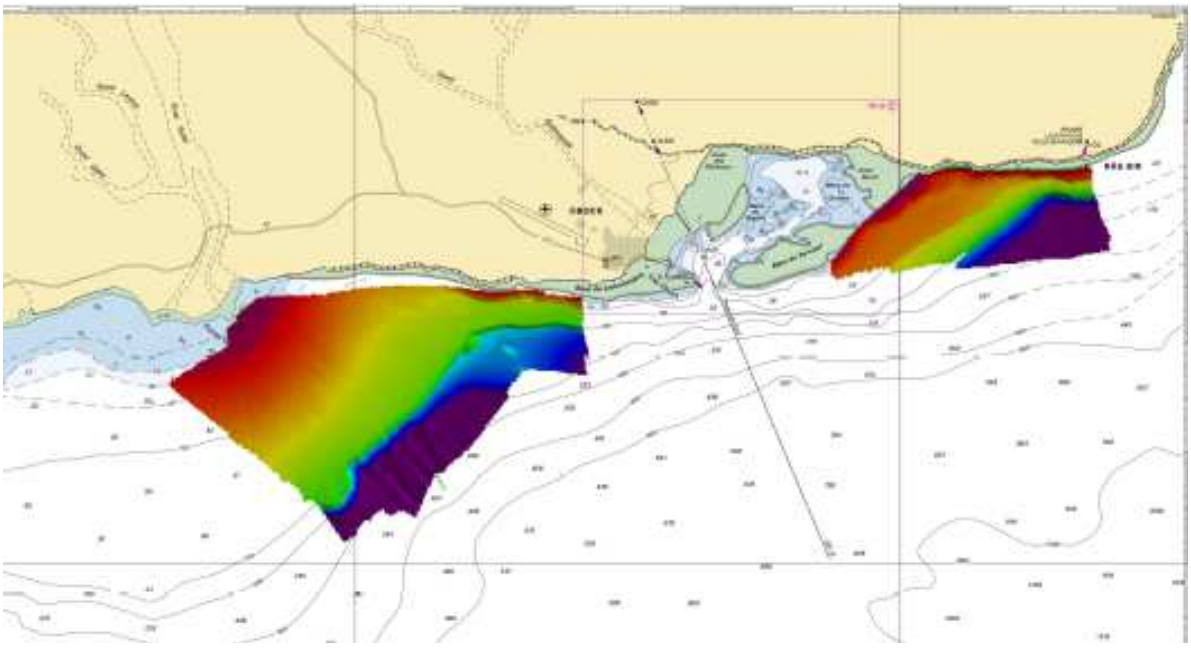

Fig. 2: Survey of Obock harbor

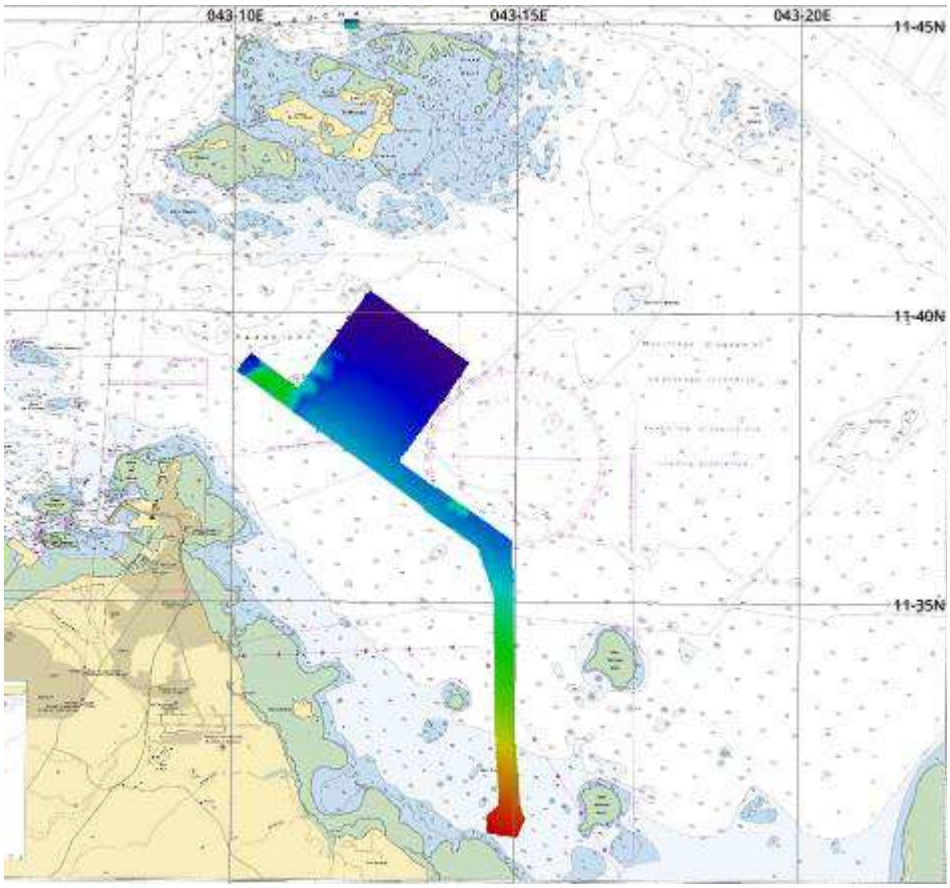

Fig. 3: Survey of Damerjog harbor

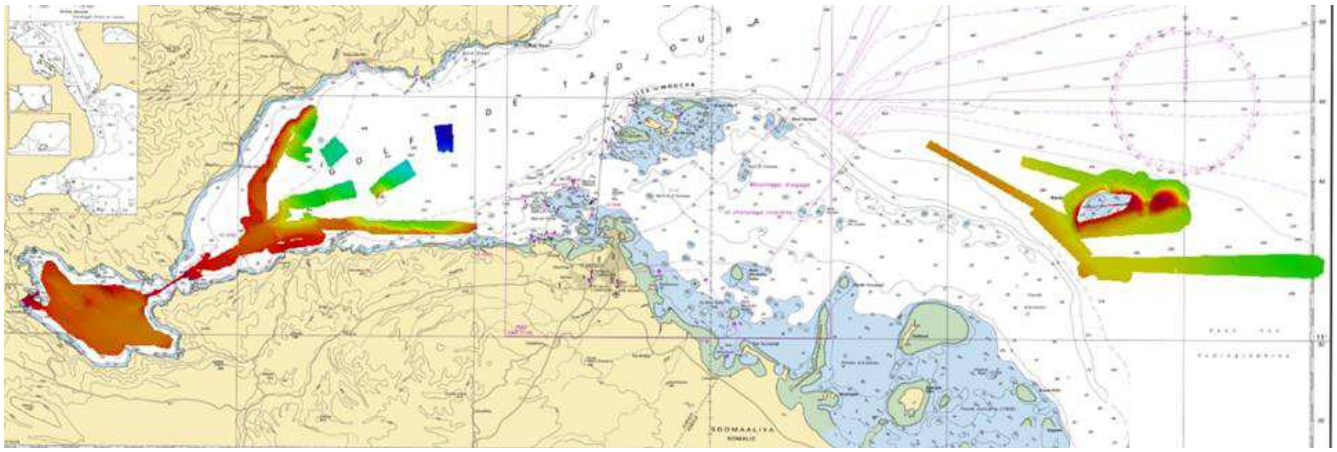

Fig. 4: Survey of Ghoubbet cove, Gulf of Tadjoura and Banka Arab

2.2. LIDAR Surveys

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2.3. Shom's survey programme for the region

Survey campaigns are planned by Shom on a regular basis in Djibouti and within the Bab-el-Mandeb Strait to improve the navigational safety. Their achievement level depends on the authorizations received from the concerned Coastal States.

The next surveys in the region are now planned in 2023.

2.4. New technologies and/or equipment

Shom's deployable system for hydrography (for REA surveys) has been upgraded with very shallow water multibeam echosounder (Norbit iWBMSh).

As part of the preparation phase for the replacement of the hydro-oceanographic fleet (CHOF project), an agreement was signed with the procurement agency of the French DoD (DGA) for a period of three years in order to conduct experiments and modernise hydrographic data processing techniques.
A first experiment was carried out in September 2020 with 2 USV DriX from iXblue; another experiment was carried out in January 2021 with AUV Gavia from Teledyne; a third experiment was carried out in May and June 2021 with USV Inspector and AUV A18D from ECA; deep-sea and shallow water AUV, USV and gliders experiments are also planned in the coming months. Beyond the evaluation of the hydrographic performance of these new platforms, these experiments should make it possible to adapt the organisation and processes in order to get the best out of these new technologies.

Fig. 5: Experiment of USV DriX deployed from BHO Beautemps-Beaupré (Sourec : Shom)

2.5. New ships

NTR.

2.6. Crowdsourced and satellite-derived bathymetry – national policies

Crowdsourced bathymetry

Shom translated the IHO B-12 Edition 2.0.3 (Guidance on Crowdsourced Bathymetry) into French.
France's CSB policy is currently under review.

Satellite-derived bathymetry

The satellite-derived bathymetry (SDB) has already been used for many years by Shom to complement traditional surveys (acoustic sounding surveys) to produce nautical charts in the Pacific region (available online https://services.data.shom.fr/geonetwork/srv/eng/catalog.search#/metadata/TRAITEMENT_IMAGE_SPATIO CARTE_MARINE.xml).
As an operator of a SDB production line, Shom is currently conducting a research and development project in the field of SDB: Bathysat project.
The objective of the project is to improve performance and quantify vertical uncertainties in accordance with the specifications of the new version of the S-44 (Edition 6.0.0). The results of the study should make it possible to extend the use of the SDB to areas where no field data are available.
The research part of the project has been completed last year. Results performed on different geographic areas (including an area in Pacific Ocean) have enabled to evaluate the capacity of the methods on the following objectives:

- the non-use of bathymetric measurements (to process pure remote SDB analysis);
- the accuracy of the solution faced with the seafloor complexity (reliability and limit of the parameterization of seafloor reflectance inside the model);
- the automatization and improvement of the calculation processes.

The development part will start this year with the candidate selected from the analysis of the results of the research phase. The objective of this next step is to develop a prototype of the future production line complying with the following concepts of operation:

- to develop, on a case-by-case basis, charting products in remote areas (in the absence of conventional hydrographic surveys),
- to generate seabed morphology products (DTMs) useful for hydrodynamic modelling in particular,
- to have a tool for rapid coastal environment reconnaissance: estimation of bathymetric characteristics, turbidity, coastline,
- to detect, on a case-by-case basis, possible morphological changes in the seabed in the coastal strip (high revisit rates) in order to prioritize hydrographic surveys (decision support tool).

2.7. Problems encountered

NTR.

3. New charts & updates

3.1. ENCs

As of 1st June 2021, Shom has produced some 785 ENCs, of which 8 ENCs within region J.

The full collection should eventually reach a figure of the order of 900 ENCs.

In line with the WEND recommendations and guidelines, France produces its small scale ENC cells as closely as possible to INT chart schemes.

3 new cells and 3 new editions have been produced since the last conference.

The current status of ENC production in the region J is detailed in the table below:

Usage Band	Produced Cells	Total planned Cells	Percentage
1	0	0	N/A
2	1	1	100%
3	2	2	100%
4	1	2	50%
5	3	7	57%
6	1		
Total	8	12	67%

The planned cells to be produced in that region are listed below, they should be produced in 2023 or later:

- Ouest du golfe de Tadjoura (FR478480)
- Entrée du Ghoubbet El Kharâb – Mouillage des Boutres (FR57848B) – replaces FR57519B
- Port du Ghoubbet (FR57848C)
- Baie de Doraleh et de Khôr Ambâdo (FR57849A)
- Terminal de Damerjog (FR57849B)
- Port de Tadjoura (FR57849C) – replaces FR67519A

The following figures are extracts from the online PRIMAR catalogue http://www.primar.org showing Shom ENC coverage within the NIOHC (region J) area:

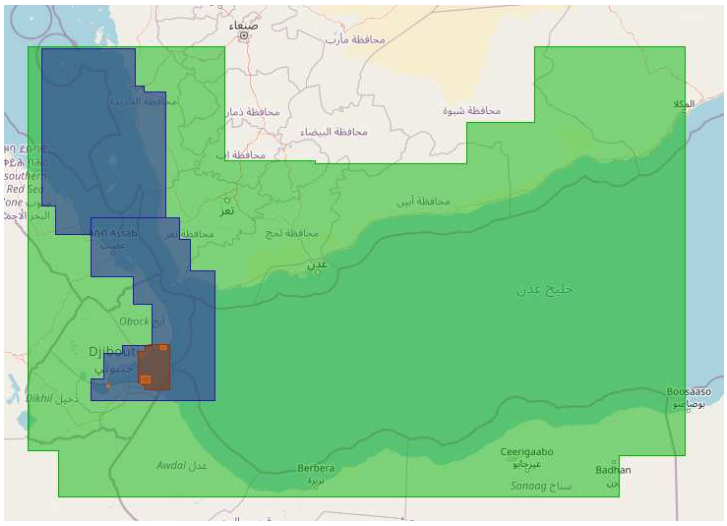

Fig. 6: French ENC cells within the NIOHC region (source: www.primar.org)

3.2. ENC Distribution method

All French ENCs (S-63 encrypted format) are distributed to End User Service Providers by PRIMAR RENC. France is providing its support to the work plan of the WEND working group for improving the implementation of WEND principles.

3.3. RNCs

NTR.

3.4. INT charts

All INT charts under responsibility of Shom in the region have been produced, as detailed in the following table:

Scale	Produced INT charts	Planned INT charts	%
Small (<1/1 000 000)	0	0	N/A
Medium	3	3	100
Large (>1/100 000)	2	2	100
Total	5	5	100

One INT chart has been produced since the last conference:

INT	Scale 1:	Title	Comment
7118	200 000	De Al Hudaydah à Al Mukha	FR7518 – New Edition

A new edition of INT7115 (FR7547) - Abords de Djibouti is in progress.

3.5. National paper charts

No national chart has been produced since the last conference, and none is planned for 2021-2022.

2 new charts are currently designed to cover the western part of the Gulf of Tadjoura at scale 1: 50 000 and should be produced from 2023:

- FR7848 – Ouest du golfe de Tadjoura
- FR7849 – Ports du golfe de Tadjoura

These future charts may be submitted later as new INT charts to the NIOHC ICCWG.

3.6. Other charts, e.g. for pleasure craft

Shom provides georeferenced marine charts in GeoTiff and S-57 format when produced. These digital marine charts are now available through Shom's online store http://diffusion.shom.fr under various licenses[1] according to the purpose of use. These data can be used with GIS or cartographic software for commercial or private purposes.

A S-57 license[2] allows unlimited download of updated versions for 12 months from the date of purchase.

3.7. Problems encountered

NTR.

4. New publications & updates

4.1 New Publications

NTR.

4.2. Updated publications

Publications are updated weekly in accordance with the Shom Notices to Mariners.

4.3. Means of delivery

All nautical publications are available in digital format only (pdf files) on Shom's online shop (http://diffusion.shom.fr).

4.4. Problems encountered

NTR.

5. MSI

5.1. Existing infrastructure for transmission

Shom's notices to mariners (GAN) are exclusively available under digital formats on Shom website: http://diffusion.shom.fr/gan.

5.2. New infrastructure in accordance with GMDSS Master Plan

NTR.

5.3. Problems encountered

NTR.

6. C-55 Latest update

The latest C-55 update for both Survey and Charting Status in the Mediterranean region was realised via the online form on June 8th 2021.

C-55 charting and surveying status values regarding Region J area under Shom responsibility are summed up in the following tables:

Survey Status **Updated December 2020**	**Depth < 200m**			**Depth > 200m**		
	A	**B**	**C**	**A**	**B**	**C**

[1] Internal reuse, commercial reuse, documentary use or end user.

[2] Each license allows internal reuse of the data for up to 5 workstations. For more information, contact *bps@shom.fr.*

J	Djibouti	21.74 %	57.73 %	20.53 %	90.87 %	0.6 %	08.53 %

Charting Status Updated June 2021		Small (<1 M)			Medium (1M < / < 100 000)			Large (> 100 000)			Metric	WGS84
		A	B	C	A	B	C	A	B	C		
J	Djibouti	100	0	NA	100	0	100	81	0	50	100	100

C-55 values for survey status (top table) and charting status (down table). Updated values are highlighted in red.

7. Capacity Building Offer of and/or demand for Capacity Building

7.1. Training received, needed, offered

Initial training capabilities provided by Shom include the following FIG-OHI-ACI courses: category B for hydrographic surveyors and category B for nautical cartographers. So far, those courses[3] are provided in French and are open to francophone foreign applicants.

A category A course for hydrographic surveyors is provided at ENSTA Bretagne.

Fig. 7: Courses and training provided at the Shom hydrographic school (source: shom.fr)

One petty officer from Indonesia (PUSHIDROSAL) completed the Shom Cat. B course in hydrography in Brest (Sept. 2018 to July 2019) and another one completed the Cat. B course in nautical cartography in Brest (Sept. 2018 – May 2019).

7.2. Assistance for the construction of hydro-oceanographic vessels

Shom has a recognized know-how in the field of hydro-oceanographic vessel construction (from the 8m launch to the 100m ship), has the mastery of the whole process from the expression of needs to the implementation of systems. He puts his expertise at the service of shipyards, within the framework of new construction or modernization for:

[3] Training offer: http://www.shom.fr/le-shom/formation-emplois-stages/formation/
Modalities: drh-for-eco@shom.fr

- Studies, in order to define, on the basis of an expression of need, the complete specifications in terms of hydro-oceanographic equipment (including IT), as well as the layout of the premises and scientific areas of a hydro-oceanographic vessel. Shom provides intellectual services such as the drafting of the metrology survey essential for the proper integration and control of systems, the specification of spare parts batches adapted to the ship's missions, the interface drawings, the recipe book and the ship's logbook (in its field of expertise).

- Reception and integration of equipment: supervision of the integration (mechanical, interfacing, metrology...) of equipment, factory, harbour and sea acceptance tests.

- Training and assistance: training of the personnel having to implement the equipment, but also of the personnel ensuring the maintenance of the systems, transfer of skills, handling of warranty calls after delivery of the vessel to the final customer.

Fig. 8: Nigerian hydrographic vessel Lana built by the French shipyard OCEA with Shom support and delivered in April 2021

7.3. Status of national, bilateral, multilateral or regional development projects with hydrographic component

For the countries benefiting from Shom support to meet their hydrographic services obligations spelled out by the SOLAS convention, France fosters a mechanism of gradual transfer of responsibilities through State-to-State administrative arrangements. This mechanism relies on training at Shom facilities and the formalisation of the respective responsibilities for maritime safety information, hydrographic and charting activities.

Within the NIOHC area, a bilateral arrangement of this kind is concluded between France and the Republic of Djibouti.

An arrangement for the exchange and reproduction of nautical products, in accordance with IHO Resolution 7/1919 as amended (former A3.4) has been concluded with the National Hydrographic Office of India (INHO). The last revision was signed in June 2021.

7.4. Definition of bids to IHO CB Work Programme

NTR.

8. Oceanographic activities

8.1. GEBCO/IBC's activities

NTR.

8.2. Tide gauge network

Shom is the national coordinator and reference authority for the observation of the sea level, collecting, managing and distributing the data, including those produced by Shom tidal network, RONIM.

These missions are carried out under the REFMAR programme. All real time and processed tide gauge measurements collected under that programme are freely accessible on the web http://data.shom.fr/#donnees/refmar for all areas under French jurisdiction.

This network is recognized as an important tool for coastal operational oceanography, risk assessment, studies on the evolution of the mean sea level, etc.

Shom's tidal predictions are available through a web service named maree.shom.fr. This service provides free access of one year of tidal predictions from over 1,000 harbours worldwide.

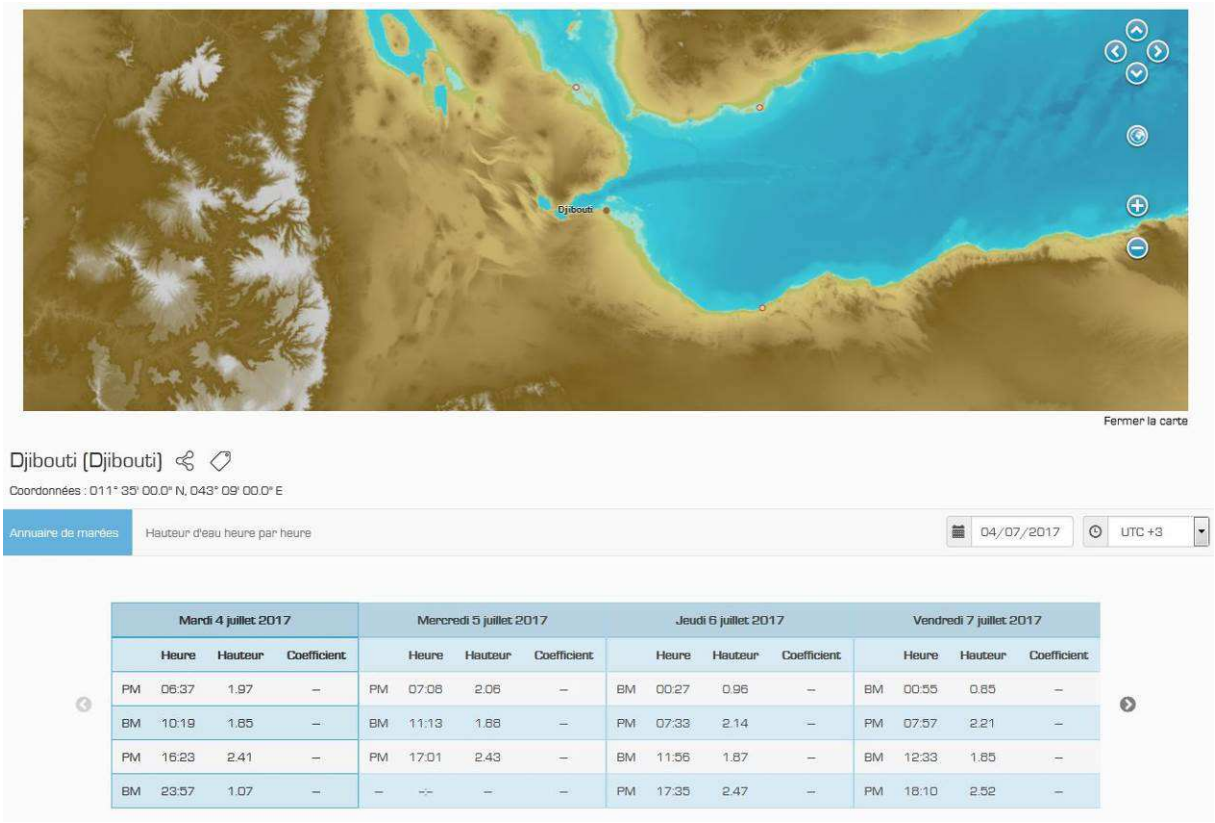

Fig. 9: Tide predictions for Djibouti available through Shom's web portal (source: maree.shom.fr)

8.3. New equipment

NTR.

8.4. Problems encountered

NTR.

9. Other activities

9.1. Participation in IHO Working Groups

See §9.9 International.

9.2. Meteorological data collection
NTR.

9.3. Geospatial studies
NTR.

9.4. Disaster prevention
France may have Navy ships in the NIOHC region ready to provide support in case of an emergency. France also provides technical support and has a rapid response capacity for environmental data in case of a disaster.

The point of contact at Shom in case of a marine disaster is the head of the maritime safety information division. This division can be reached 24/7 by fax +33 298 221 665 or email coord.navarea2@shom.fr.

- **Tsunami:**

Shom is maintaining a large real time tide gauge network RONIM, an important tool for coastal operational oceanography, risk assessment, studies on the evolution of the mean sea level, etc. Having tide gauges in Europe and in the French overseas territories, SHOM is contributing to Tsunami warning in Pacific Ocean, Indian Ocean, Caribbean Sea and Mediterranean Sea.

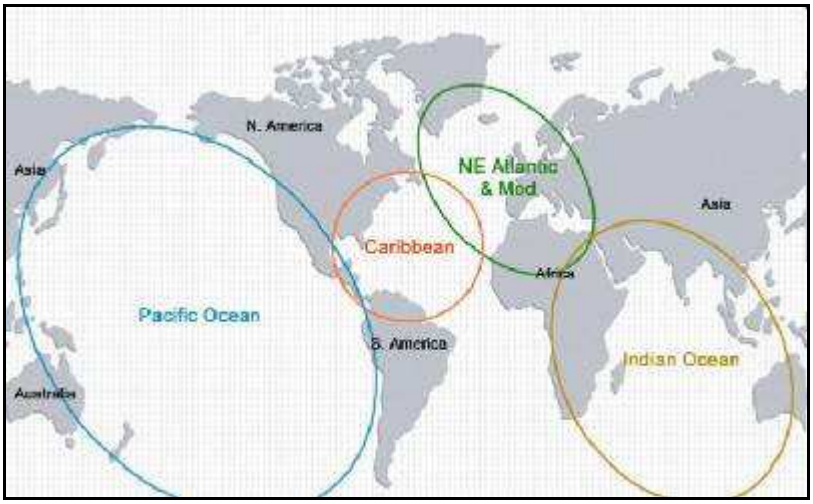

Fig. 10: Cooperation areas on tsunami warning system (source COI; UNESCO).

- **Coastal flooding:**

NTR.

- **Oil spills:**

SHOM is an active member of the inter-agency drifting committee which is activated by the maritime prefecture every time there is an oil spill. The POLMAR safety plan for the sea was signed on 23rd November 2004 and aims at enabling France to face in a reactive manor a potential wide spread of marine pollution, by ensuring the efficient coordination of national operations and support from public services.

9.5. Environmental protection
NTR.

9.6. Astronomical observations
NTR.

9.7. Magnetic/Gravity surveys

NTR.

9.8. MSDI Progress

Shom develops and maintains a MSDI covering all maritime areas under French jurisdiction. The information thus compiled is accessible through 3 portals:

- data.shom.fr
- diffusion.shom.fr
- maritimelimits.gouv.fr

Since the launch of Shom's maritime and coastal geographic information portal data.shom.fr, further developments have been implemented with new online services data layers on a regular basis.
Data available on that portal are organised according to the following topics:

- Master data: charts, maritime boundaries, maritime and coastal databases, coastal altimetry, bathymetry, vertical datums, sedimentology, tides and currents and marine archives;
- Oceanographic forecast: sea state, meteorology, sea level, hydrodynamic;
- Coastal observations: HF radar and tide gauge data.

Not all this information may be available on NIOHC region.

Hereafter are listed some of the latest evolutions:

- Bathymetric measurements;
- Geophysics – gravity stations;
- New design for the data portal (data.shom.fr) – June 2021.

Those evolutions can all be followed via Shom's Twitter account (@shom_en & @shom_fr).

A detailed description of the portal functions and contents is available on Shom website (https://services.data.shom.fr/support/fr).

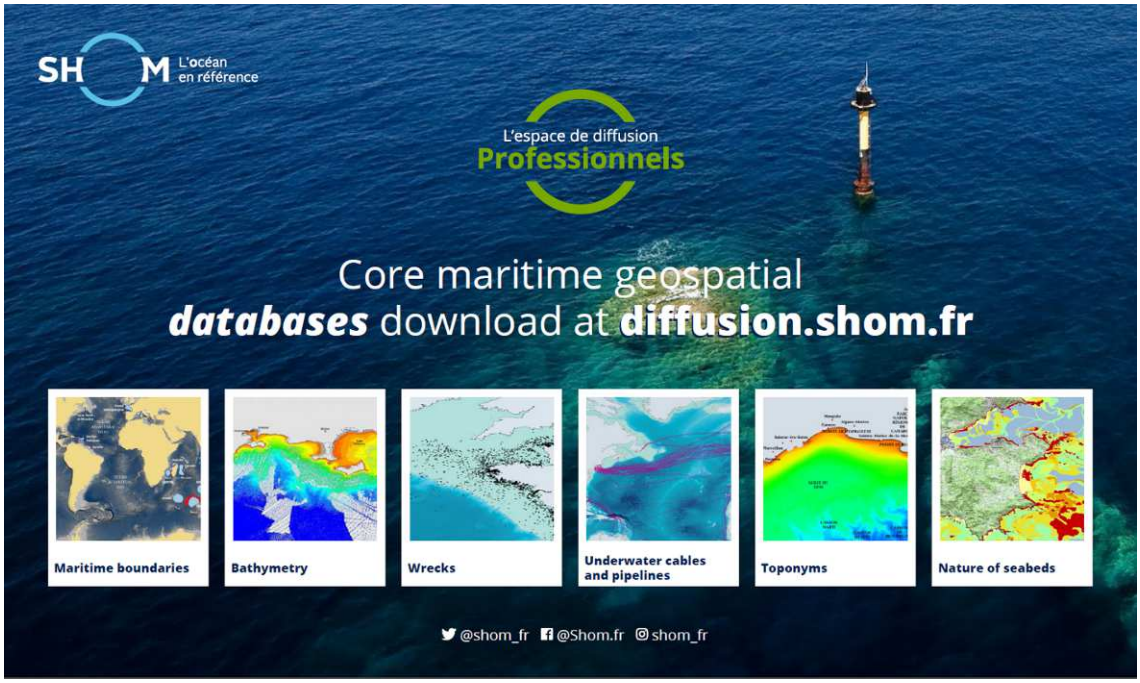

Fig. 11: open data (diffusion.shom.fr)

A detailed description of the portal functions and contents is available on Shom website (http://www.shom.fr/les-services-en-ligne/portail-datashomfr/).

Fig. 12: bathymetric measurements and gravity stations with the new portal design (data.shom.fr)

9.9. International

Because of its overseas territories and primary charting responsibilities, France, represented by Shom, is a member or associate member in 9 regional hydrographic commissions.

The detail of Shom's involvement in other IHO activities is listed in the table hereafter:

Name	Chair / Vice chair	Member	Observations
CBSC		✓	Capacity Building Sub-Committee
NCWG		✓	Nautical Cartography Working Group (former CPSCWG)
ENCWG		✓	ENC Working Group (former TSMADWG/DIPWG)
DPSWG		✓	Data Protection Scheme Working Group
DQWG		✓	Data Quality Working Group -Last meeting in 1996
EAtHC	✓	✓	Eastern Atlantic Hydrographic Commission
FC		✓	Vice-chairman of Finance Committee
GEBCO		✓	Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of Oceans (GEBCO)
HCA		✓	Hydrographic Commission on Antarctica
HDWG	✓	✓	Hydrographic Dictionary Working Group
HSSC	✓	✓	Hydrographic Services and Standards Committee, formerly known as the Committee on Hydrographic Requirements for Information Systems (CHRIS)

IENWG	✓	✓	IHO-European Union Working group
IRCC		✓	Inter Regional Coordination Committee
MACHC		✓	MESO American & Caribbean Sea Hydrographic Commission
MBSHC		✓	Mediterranean and Black Seas Hydrographic Commission
MSDIWG		✓	Marine Spatial Data Infrastructure Working Group
NIOHC		✓	North Indian Ocean Hydrographic Commission
NIPWG		✓	Nautical Information Provision Working Group (former SNPWG)
NSHC		✓	North Sea Hydrographic Commission
RSAHC		✓	ROPME Hydrographic Commission
S100WG		✓	S-100 Working Group (former TSMADWG/DIPWG)
SAIHC		✓	Southern Africa and Islands Hydrographic Commission
HSWG		✓	S-44 Hydrographic surveys Project Team
SWPHC		✓	South-West Pacific Hydrographic Commission
TWCWG	✓	✓	Tidal, Water Level and Currents Working Group (former TWLWG/SCWG)
WEND		✓	Wold-Wide Electronic Navigational Chart Database
WWNWS		✓	World-wide Navigational Warning Service Sub-Committee, formerly known as the Promulgation of Radio Navigational Warnings Sub-Committee (PRNW)

10. Risk assessment

Shom has finished in 2020 the development of a prototype tool called “Deseasion platform”. It is a multicriteria decision tool, for hydrographic risk assessment and cost-benefit analysis. It will be used in the coming years in order to improve the national hydrographic survey programme.

11. Conclusions

Shom supports any initiatives aiming at improving the maritime knowledge and the navigation safety, as far as the data collected benefits the charting authorities and the update of nautical documentation of that region.

Destinataires	:	OHI – NIOHC Chair (Sri Lanka)
Copies intérieures	:	DG – DMI - DMI/REX - Archives (DMIDSD/2.015)