RÉPUBLIQUE FRANÇAISE
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SHOM L'océan en référence

Direction des missions institutionnelles
et des relations internationales
Division relations extérieures

BREST on April 29th, 2024

N°031/Shom/DMI/REX/NP

NATIONAL REPORT

SUBJECT	:	France national report to the 24th Conference of the Mediterranean and Black Seas Hydrographic Commission (MBSHC)
APPENDIX	:	one appendix.

1. HYDROGRAPHIC OFFICE: 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-year target and performance contract between Shom and the French State. The current target and performance contract came into effect on January 1, 2021 for the period 2021-2024. The next contract for the period 2025-2029 is in preparation.

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 (Yearbook) has been submitted using the online system.

This national report is submitted by RADM Laurent Kerléguer, French national hydrographer and Shom's Director General (laurent.kerleguer@shom.fr).

2. SURVEYS

2.1. COVERAGE OF NEW SURVEYS

Shom's national hydrographic survey programme (https://www.shom.fr/fr/qui-sommes-nous/programme-national-dhydrographie-pnh) details the long-term targeted objectives of CATZOC compliant hydrographic surveying in the Mediterranean Sea and the current surveys coverage for this area.

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Since the last Conference, Shom has conducted the following survey works from February 2022 until now:

- Corsica, by *Pourquoi Pas ?* (fig. 1);
- Bay of Saint-Raphaël, by BHO *Beautemps-Beaupré* (fig. 2);
- Golfe du Lion, by BHO *Beautemps-Beaupré* (fig. 3);

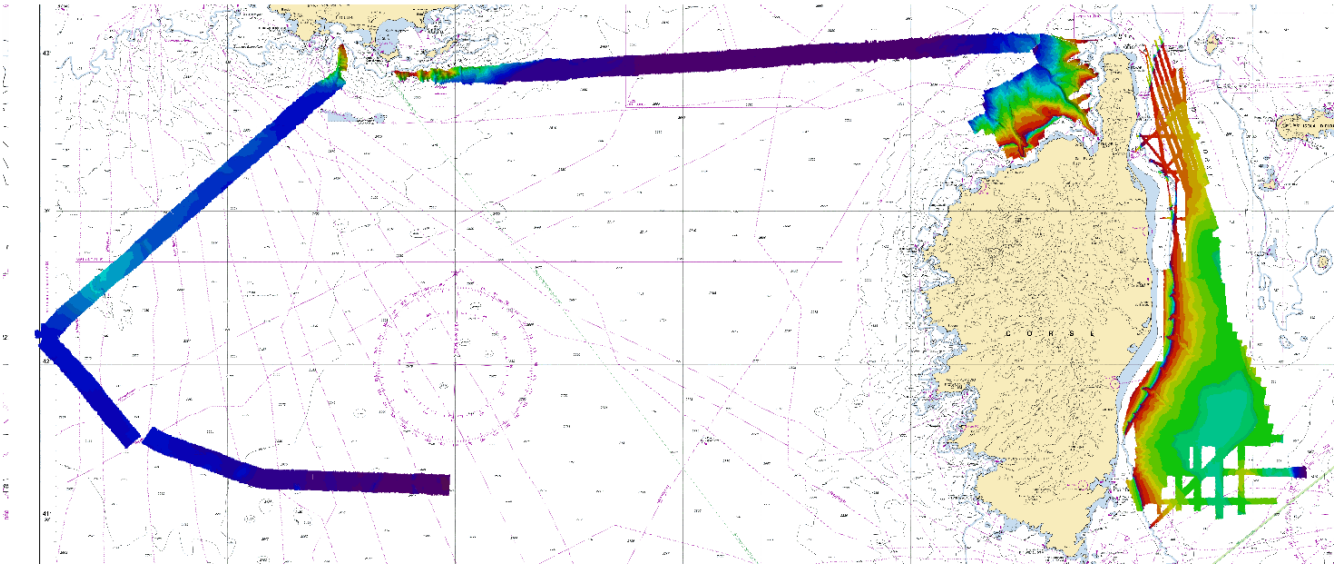


Fig. 1: Survey of Corsica in 2022 by Pourquoi Pas ?

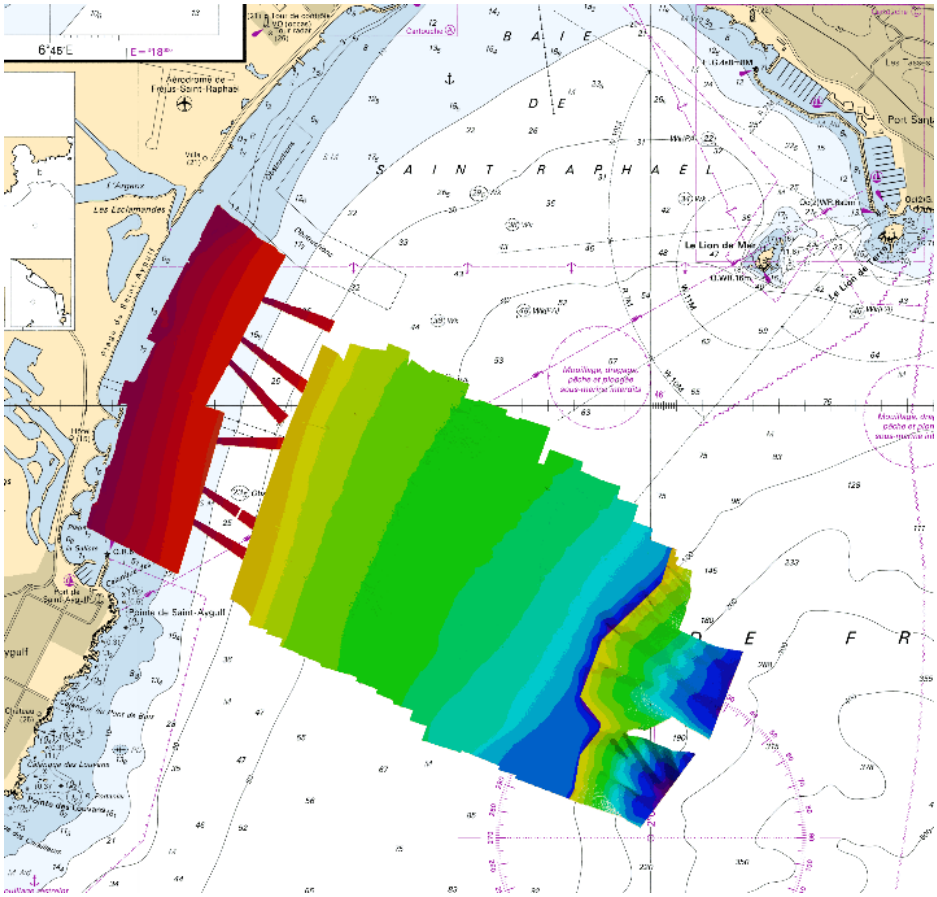


Fig. 2: Survey Bay of Saint Raphael by BHO Beautemps-Beaupré

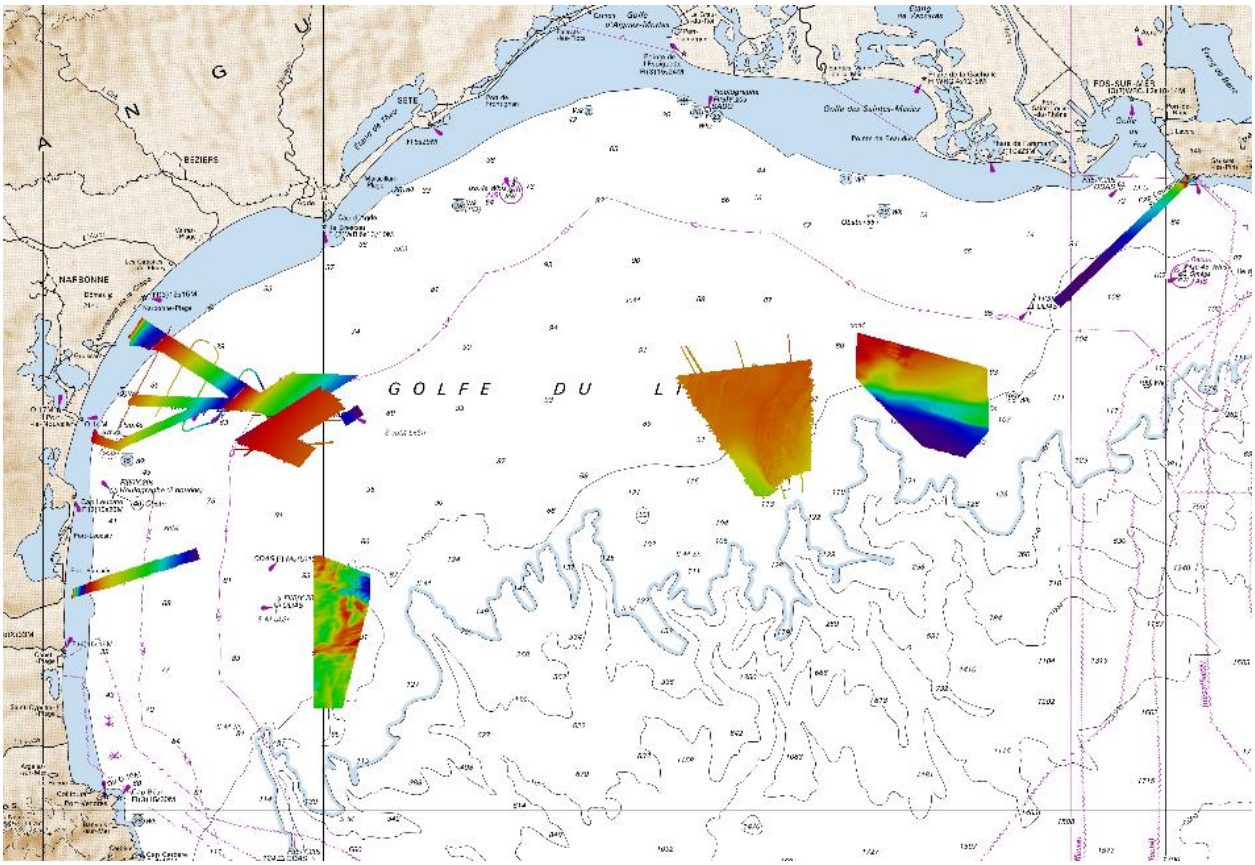
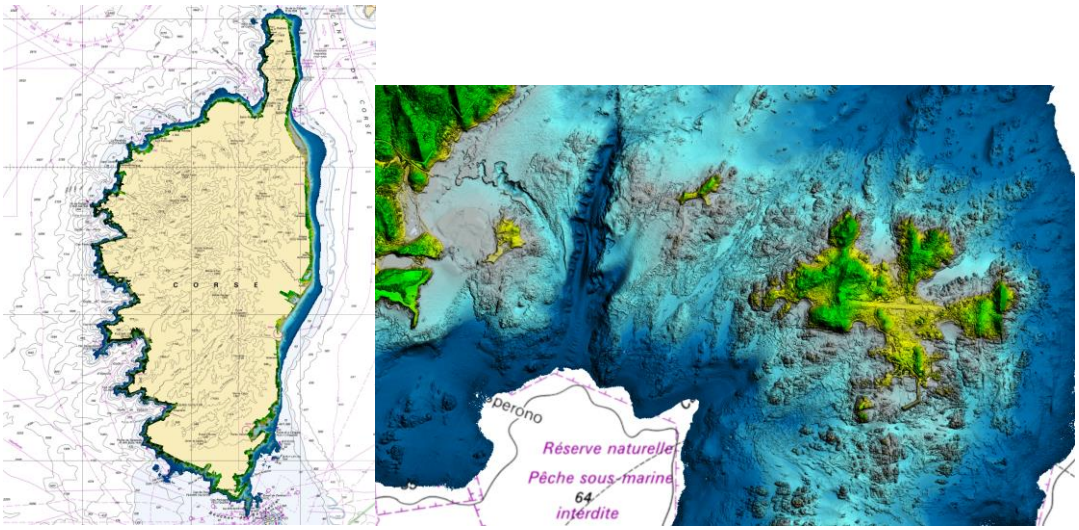


Fig. 3: Survey golfe du lion by BHO Beautemps-Beaupré

2.2. LIDAR SURVEYS

LIDAR surveys are conducted within the framework of Litto3D programme. This national programme, based on a partnership between Shom and the National Institute of Geographic and Forest Information (IGN), aims at providing a very high-resolution Sea-Land digital terrain model (DTM) of metropolitan and overseas French coasts.

A topographic-bathymetric lidar survey covering the Corsica region was completed in 2018 (cf. Fig.4) and is is freely accessible on Shom's data portals (see below). This added to the already available Lidar-based products on mainland France's Mediterranean coasts.



Corsica topo-bathymetric Litto3D lidar product (general view and detail)

All Litto3D products are freely available through Shom's data portals

- data.shom.fr (Shom catalog / Master data / Coastal altimetry): data.shom.fr
- diffusion.shom.fr: http://diffusion.shom.fr/pro/risques/altimetrie-littorale.html

and the French Government open platform for public data: data.gouv.fr.

2.3. NEW TECHNOLOGIES AND/OR EQUIPMENT

Gliders

Following the preparatory phase for the replacement of the hydro-oceanographic fleet (CHOF project), Shom has invested in 2 gliders to increase its collected data. The first glider will be mounted with CTD, O2, PAR, ADCP, Chlorophyll, CDOM and Backscattering sensors. The sensor glider will be mounted with CTD and hydrophone sensors.

New frame mooring

Involved in ecological issue, Shom developed a frame mooring called CATRINE with no loss of deadweight at the sea bottom. Usable until 150 meters depth, the frame mooring includes an acoustic release connected to a 200 meters Dynema rope stored in an aluminium canister during the deployment.

At the end of the deployment (after weeks or months at the bottom of the sea), the acoustic release is activated. The orange buoyancy goes up to the surface unwinding the rope stored in the canister. Arrived at the sea surface, operators need to recover the orange buoyancy and the Dynema rope. Using an electric winch on board, operators wire the 200 meters rope to recover the frame mooring and the instrumentation.

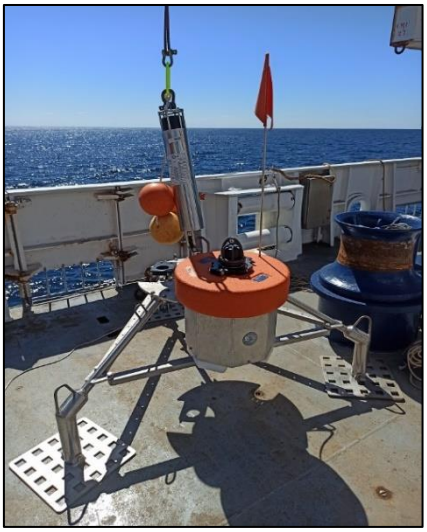


Fig. 4 – CATRINE frame mooring with its orange buoyancy above the canister

Deployable Hydrographic System

Taking advantage of the reducing size of multibeam echo sounder, Shom developped a portable Hydrographic system usable with small boats (inflatable).

The system is composed of 5 components: an electronic watertight case, an energy watertight case, a rugged computer powered with Hypack, a sidescan sonar and a multibeam echo sounder with integrated inertial and GNSS receiver.

This efficient system has a maximum range of 160 meters and a resolution of 0.9°*0.9° at 400 kHz.

Fig. 5 – Deployable Hydrographic System

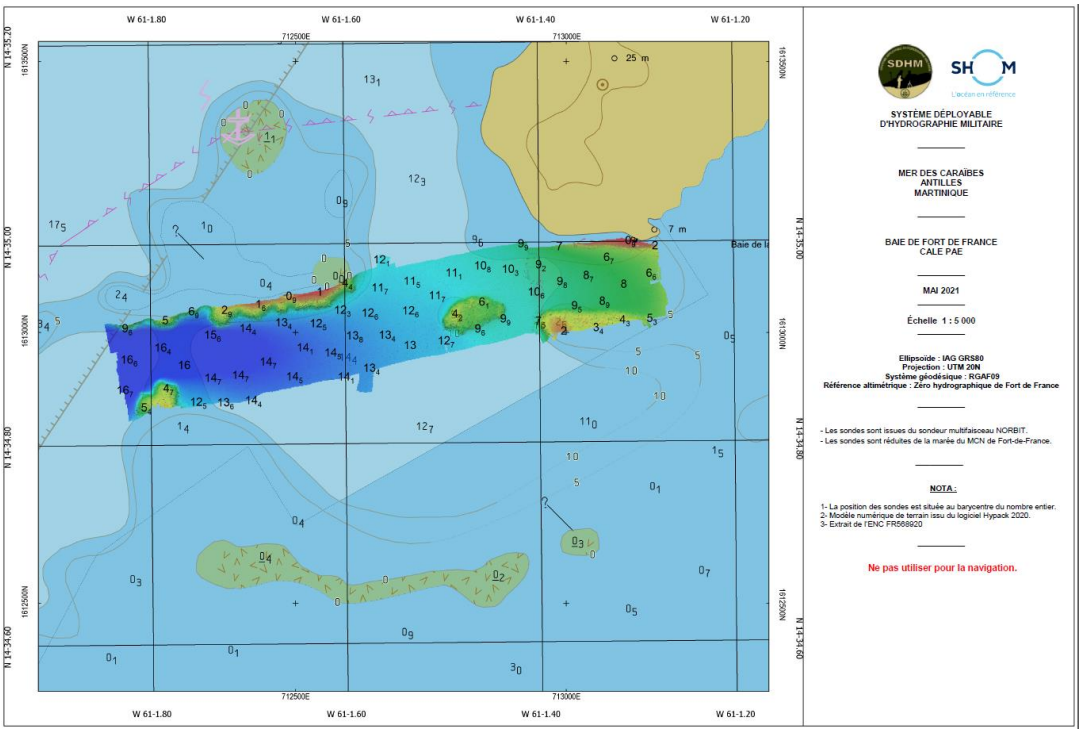


Fig. 6 – Final Product obtained with the Deployable Hydrographic System - Fort de France Bay Martinique

2.4. NEW SHIPS

NTR.

2.5. CROWDSOURCED AND SATELLITE-DERIVED BATHYMETRY - NATIONAL POLICY

Crowdsourced bathymetry – CSB

In accordance with the IHO publication B-12, crowdsourced bathymetry is the practice of simultaneously recording the vessel's position and depth measurement, made **with standard**

navigation instruments, on board a non-specialist vessel during its routine maritime operations. This recorded data is intended to be provided free of charge to the relevant organisation for consideration and, subject to validation, for public dissemination.

An instruction of the Prime Minister (published 22 November 2022) sets the French national policy regarding crowdsourced bathymetry.

Crowdsourced bathymetry is authorised in the waters under French sovereignty or jurisdiction, subject to the definition and constraints imposed by the instruction. Data from crowdsourced bathymetry in French waters have to be transmitted as a priority to the Shom, or alternatively to one of the following trusted third parties:

- the European Marine Observation and Data Network EMODnet, via its "Data Ingeneering" portal EMODnet, via its Data Ingestion Portal (https://submission.emodnetingestion.eu/);
- the IHO Data Centre for Digital Bathymetry (DCDB - https://www.ngdc.noaa.gov/iho/).

The CSB data are licensed under the Attribution 4.0 International (CC BY 4.0) (https://creativecommons.org/licenses/by/4.0/deed.fr) or Attribution 3.0 IGO (CC BY 3.0 IGO) (https://creativecommons.org/licenses/by/3.0/igo/deed.fr), in accordance with the IHO Guide to Crowdsourced Bathymetry (IHO Publication B-12).

Satellite-derived bathymetry – SDB

The satellite-derived bathymetry (SDB) has been used since 1987 by Shom to complement traditional surveys (acoustic sounding surveys) initially to produce nautical charts in the Pacific region (available online

https://services.data.shom.fr/geonetwork/srv/eng/catalog.search#/metadata/TRAITEMENT_IMAGE_SPATIOCARTE_MARINE.xml).

In 2019, Shom initiated a research and development project for a new SDB chain, the Bathysat project, aimed at updating the processing chain in service to improve its performance. In particular, by using algorithms based on physics rather than on statistical approaches, the aim is to decrease the need of bathymetric observations when carrying out reconnaissance surveys using SDB.

Initial production tests carried out in New Caledonia and French Polynesia have demonstrated that the solution is capable of generating consistent coastal bathymetric data without the need to carry out measurements or collect on site data. Because of their spatial and vertical resolution, these products are suitable for field reconnaissance (to support survey planning) and for forcing sea state models, when no data from conventional systems is available.

Another essential property for Shom is that this chain is not a 'black box' and is perfectly controlled internally, which is essential in particular for qualifying measurements. This new chain is currently being industrialised for operational use, scheduled for 2025.

2.6. CHALLENGES AND ACHIEVEMENTS

In foreign areas where France assumes responsibility for marine cartography, Shom must collect all nautical information and the results of surveys carried out, as long as this information is relevant to navigation safety.

It is *imperative, for the safety of navigation*, that the data *(quays topography, harbor bathymetry and nautical information)* resulting from port redevelopment work as well as that resulting from maintenance dredging be transmitted to Shom for updating of nautical charts and nautical documents *(in compliance with specifications A-402.1 and B-635.4 of standard S-4)*.

3. NEW CHARTS & UPDATES

3.1. ENC COVERAGE, GAPS AND OVERLAPS

As of 1st April 2024, Shom has produced 840 ENCs, of which 115 ENCs within region F.

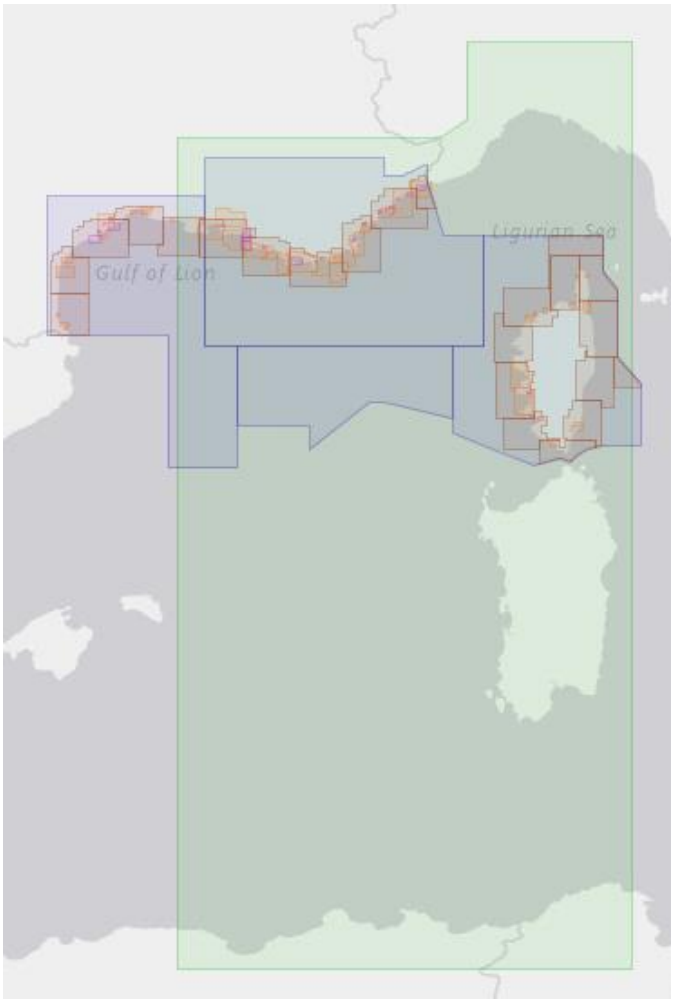
The full collection should eventually reach around 900 ENCs.

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

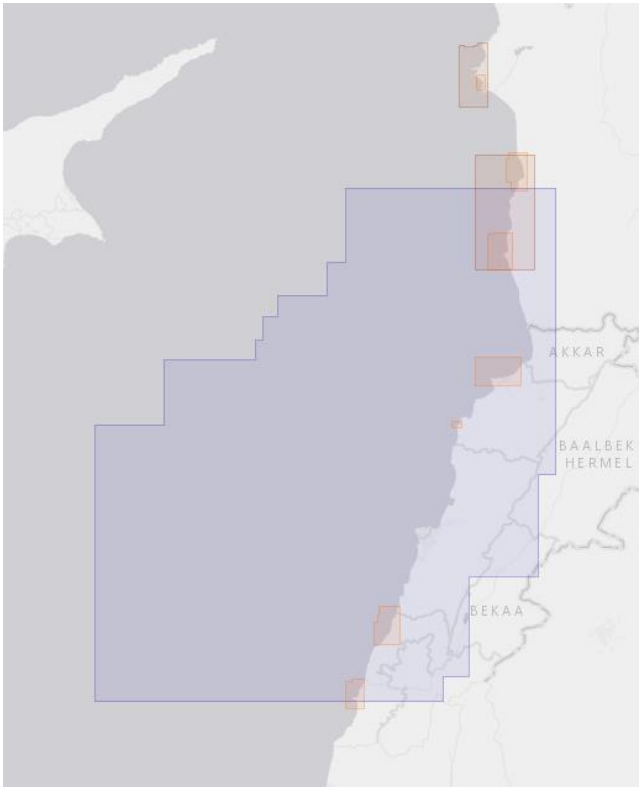
Shom plans to produce 2 new cells in 2021 in order to increase the UB3 and UB4 coverage in the Western Part of Region F. Details are provided in the table below:

Usage Band	Produced Cells	Planned Cells	Percentage
1	0	0	/
2	1	1	100
3	5	5	100
4	25	25	100
5	46	84	100
6	38		
Total	115	117	100

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



Western part



Eastern part

Fig. 7: Shom ENC coverage within Region F

ENC cells produced since the last conference are detailed hereafter:

Number	Scale 1 :	Title	Comment
FR372550	180 000	*De Tartūs à Sūr*	New edition
FR468430	45 000	*Du Cap Cerbère à Port-Barcarès*	New edition
FR468440	45 000	*De Port-Barcarès à Gruissan*	New edition
FR470240	45 000	*Bouches de Bonifacio*	New edition
FR471620	45 000	*Du Golfe de Valinco à la Pointe de Roccapina*	New edition
FR57434B	8 000	*Port de Port-La-Nouvelle*	New edition
FR574420	12 000	*De Villefranche-sur-Mer à Menton*	New edition
FR570910	22 000	*Abords de Toulon*	New edition
FR57096A	8 000	*Baie de Figari*	New edition
FR57096B	4 000	*Port de Bonifacio*	New edition
FR572000	22 000	*Du Cap d'Antibes au Cap Ferrat*	New edition

FR574420	12 000	*De Villefranche-sur-Mer à Menton*	New edition
FR67200A	4 000	*Antibes - Port Vauban*	New edition
FR67200B	4 000	*Marina Baie des Anges*	New edition
FR67200C	4 000	*Port de Saint-Laurent-du-Var*	New edition
FR67200D	8 000	*Port de Nice et Rade de Villefranche*	New edition
FR670930	8 000	*Rade de Toulon*	New edition

ENC cells planned for 2024 or later are listed below:

Number	Title
FR469420	De Punta d'Orchina au Cap Muro - Abords d'Ajaccio
FR474430	De Monaco à Menton
FR566840	Golfe et Port de Fos
FR573160	Golfe de Sagone

3.2. ENC DISTRIBUTION METHOD

All French ENCs (in S-63 encrypted format) are made available to distributors through the PRIMAR RENC. Shom participates, along with other hydrographic services, in the coordination work of the RENC (IC-ENC and PRIMAR).

France supports the work plan of the WEND working group to improve the implementation of the WEND principles.

3.3. RNC

NTR.

3.4. INT CHARTS

The overall INT chart production status for the region F is provided below:

Scale	Produced INT charts	Planned INT charts	Percentage
Small (<1/1 000 000)	1	1	100
Medium	5	5	100
Large (>1/100 000)	17	17	100
Total	23	23	100

See next section (3.5) for details (charts produced and production plan for the period 2022-2024).

3.5. NATIONAL PAPER CHARTS

Since the last MBSHC conference, the following charts have been produced or edited:

National	INT	New chart (NC) or new edition (NE):	Scale 1:	Title
5641		NE	15 000	Port de Bejaïa (Bougie)
5678		NE	10 000	Port d'Arzew
6823		NE	50 000	Abords Sud de Bastia
6843	3186	NE	50 000	Du Cabo Creus à Port-Barcarès
6855		NE	50 000	Du Phare d'Alistro à Solenzara
6907		NE	25 000	Étang de Berre
6911		NE	15 000	Golfe de Porto-Vecchio
6942		NE	50 000	De Punta d'Orchina au Cap Muro
6970		NE	50 000	De Punta di l'Acciolu à Capo Cavallo
6980		NE	15 000	L'Île-Rousse, Sant'Ambrogio et Calvi
7024	3350	NE	50 000	Bouches de Bonifacio
7050		NE	50 000	De Calvi à Cargèse
7091	3197	NE	25 000	Abords de Toulon
7096		NE	/	Baie de Figari - Port de Bonifacio
7162		NE	50 000	Du Cap Muro au Cap de Feno
7200	3199	NE	25 000	Du Cap d'Antibes au Cap Ferrat
7255	3606	NE	250 000	De Al Lādhiqīyah à Şūr
7280		NE	25 000	Golfe d'Ajaccio
7316		NE	25 000	Golfe de Sagone
7434	3188	NE	/	Ports de Sète, Port-la-Nouvelle, Port-Vendres et Collioure
7436	3345	NE	/	Approches et Port de Bastia - Ports d'Ajaccio et de Propriano
7442	3191	NE	20 000	De Villefranche-sur-Mer à Menton

7514	3671	NE	/	Ports du Liban
Fac simile charts:				
7663	3113	NE	275 000	Du port de Barcelona au Cap Cerbère avec les Îles de Mallorca et de Menorca (fs ES 49A1)

The following charts are planned to be published in 2024-2025:

National	INT	New chart (NC) or new edition (NE):	Scale 1:	Title
6684	3192	NE	25 000	Golfe et Port de Fos
6942		NE	50 000	De Punta d'Orchina au Cap Muro
7316		NE	25 000	Golfe de Sagone

3.6. OTHER CHARTS, E.G. FOR PLEASURE CRAFT

Shom has set up a dedicated team working on the implementation of the S-101 (with the aim of switching all production to this new format by the time the first ECDIS S-100 is available). In particular, the "S-100 across the Channel" project, in partnership with the UKHO, from S-101 ENC production to sea trials, is a risk assessment on the dual fuel mode of ECDIS.

The Shom project "Unified Cartographic Source" will review methodology (included automation) to produce French charts with a data-centric approach and the principle of "single charting scale per area". This project will include a homogenisation of chart scales by Usage Band and a review of all the French charts to eliminate discontinuities between products: Shom plans to start the production mid-2024.

Shom provides georeferenced marine charts in GeoTiff and S-57 format. These digital marine charts are 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. CHALLENGES AND ACHIEVEMENTS

The transition between Lebanon and France for the Lebanon waters is in progress : ENC for Beirut are produced and distributed by Lebanon (The INT chart should be produced by Lebanon soon).

[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.*

4. NEW PUBLICATIONS & UPDATES

4.1. NEW PUBLICATIONS

NTR.

4.2. UPDATED PUBLICATIONS

Publications are updated weekly in accordance with Shom Notices to Mariners.
New editions of the following sailing instructions have been published since the last MBSHC meeting:

- D21 : De la frontière espagnole au cap de l'Aigle (Aug 2023)
- D22 : Du cap de l'Aigle à la frontière italienne (aug 2023)
- D23 : France – Côtes de Corse (Ju 2023);
- D6 : Mer Méditerranée Côtes du Maroc, d'Algérie, de Tunisie, du Liban et de Syrie (nov 202

4.3. MEANS OF DELIVERY

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

4.4. CHALLENGES AND ACHIEVEMENTS

NTR.

5. MSI

5.1. EXISTING INFRASTRUCTURE FOR MSI DISSEMINATION

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

MSI Point of contact at Shom:

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Head of team
French Hydrographic Office
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Tél : +33 (0) 256 31 21 92
Email : infonaut-d@shom.fr

Regional contact for french waters : Métro office
Regional contact France :
French Hydrographic Office
13, rue du Chatellier - CS 92803 - 29228 BREST CEDEX 02 - FRANCE
Tél : +33 (0) 256 31 21 92
Email : infonaut-metro@shom.fr

Regional contact for other countries
M. Jean-Louis Trébaul
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Tél : +33 (0) 256 31 24 45
Email : jean-louis.trebaul@shom.fr

5.2. STATISTICS ON WORK OF THE NATIONAL COORDINATOR

See Appendix. Shom plays a control and coordination role of local and coastal warnings issued by its national delegated coordinators (maritime zone commands mentioned in Appendix).

New infrastructure in accordance with GMDSS Master Plan. There is no NAVTEX station cover for French overseas territories, MSI warnings are broadcast through SafetyNet network.

5.3. CHALLENGES AND ACHIEVEMENTS

French national nautical information platform - PING

France has been operating its national nautical information platform called PING (https://portail.ping-info-nautique.fr/) since April 10, 2024 in mainland France and in NAVAREA II area.

This platform aims to digitize nautical information as much as possible to promote wide dissemination and integration into user systems (ship navigation systems, shore services systems, user systems, etc.).

The platform has a portal for humans and programming interfaces (API) for systems, with 3 functional modules:

- production and distribution of navigational warnings,
- transmission of source information by maritime services and users to contribute to nautical information,
- production and dissemination of maritime geo-regulations in a spatialized form.

A mobile application named Nav&Co is also associated with the platform.

The production and digital dissemination of navigation warnings will use the IHO S-124 Navigational warnings standard, when the firsts S-100 ECDIS will be available, while ensuring compatibility with the current NAVTEX and EGC systems.

The project is supported by the European Maritime Affairs and Fisheries Fund and the navigation warnings module has been developed and tested in the framework of the European Interreg MED OSMOSIS project.

For the time being, PING is based on the draft S-124 standard. It will be aligned with the first edition of the S-124 standard in the next future.

PING will be deployed in the French overseas territories in 2025.

The source code of PING will be open source as soon as PING is aligned with the S-124 ed. 1.

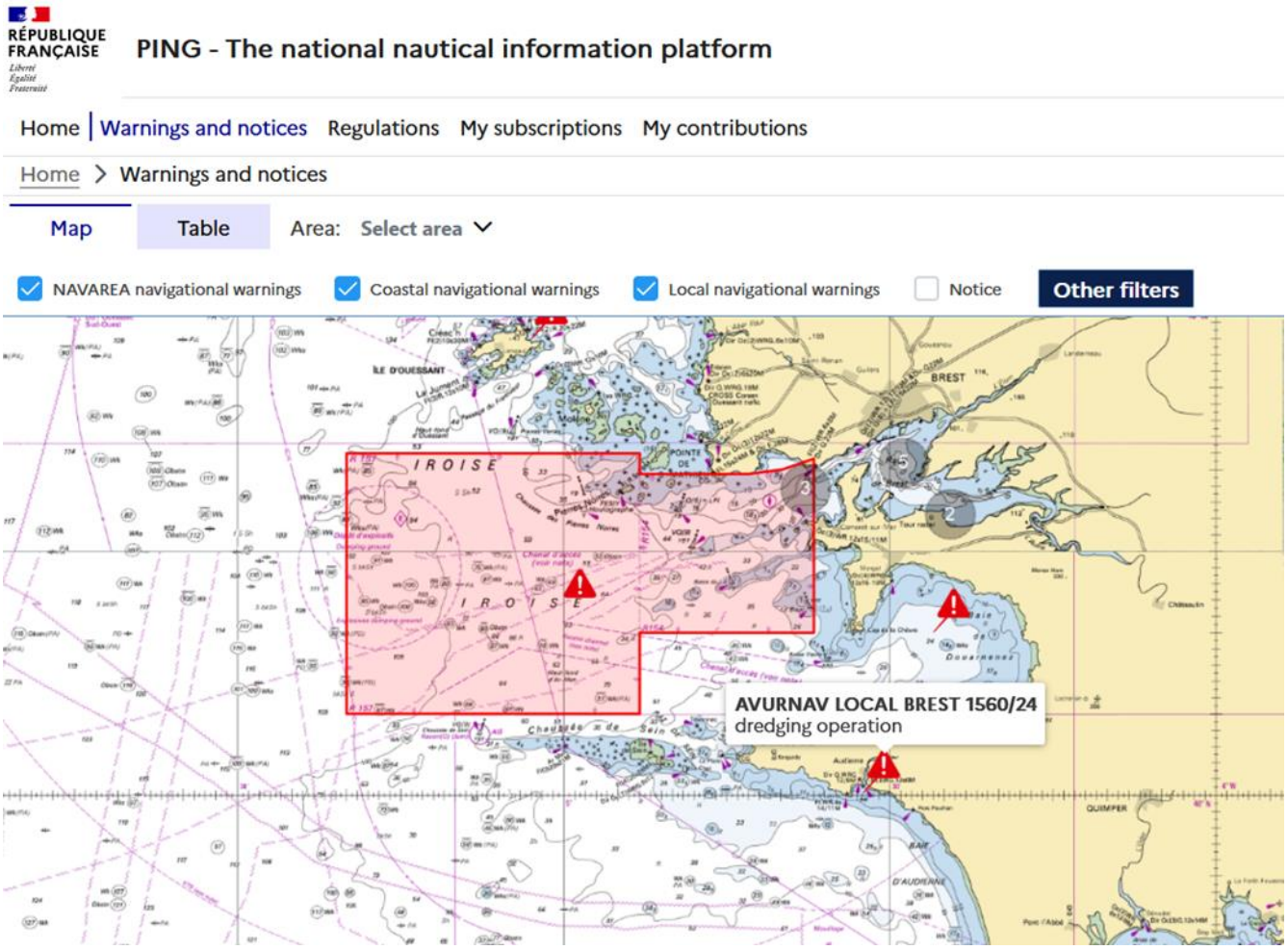

Fig.8 – Views of the PING portal - Viewing navigation warnings

6. C-55 – LATEST UPDATES

The latest C-55 update for both Survey and Charting Status in the Mediterranean region was realised via the online form on April 15th 2021.

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

Survey Status Updated December 2023		Depth < 200m			Depth > 200m		
		A	B	C	A	B	C
F	France Méditerranée	60.1	37.4	2.4	92.9	0.1	7.0
	Liban	31.3	13.3	55.4	97.9	0.0	2.0
	Monaco (Principauté de)	79.6	18.9	1.4	94.8	0.0	5.1

Charting Status Updated April 2024	Small (<1 M)			Medium (1M < / < 100 000)			Large (> 100 000)			Metric	WGS84
	A	B	C	A	B	C	A	B	C		

	France Méditerranée	100	/	100	100	/	100	100	/	100	100	100
F	Liban	100	/	NA	100	/	100	100	/	100	100	100
	Monaco (Principauté de)	100	/	100	100	/	100	100	/	100	100	100

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

7. CAPACITY BUILDING

7.1. OFFER OF CAPACITY BUILDING

Shom school offers FIG-OHI-ACI (category B) courses in hydrography and marine cartography. These courses are given in French and are open to French-speaking foreign candidates (depending on available places). The training offer is presented on the Shom website:

https://www.shom.fr/fr/nos-activites/formation

Some training modules are provided within the framework of the French-speaking hydrography association (AFHy: http://www.afhy.fr/) and are open to its members.

A training course in hydrography accredited in category A FIG-OHI-ACI is provided by ENSTA Bretagne (https://www.ensta-bretagne.fr/index.php/option-hyo-hydrographie-et-oceanographie/).

Fig. 9 – Courses and training provided at the Shom hydrographic school (source: shom.fr)

Hereafter are listed the training courses provided or being providing since September 2020 to foreign trainees from the MBSHC region since the MBSHC20 conference:

Country	Course	Year	Student
Morocco	Cat B. Hydrographic course	2019-2020	1
Morocco	Cat B. Nautical cartographer	2020-2021	1

Lebanon	Cat B. Nautical cartographer	2020-2021	1
Tunisia	Apprenticeship training at the cartographic department	2021	1
Morocco	Taylor-made training on maritime delineation (technical tools and juridical aspects)	2022	3
Lebanon	Car B. Hydrographic course	2022-2023	1
Morocco	Cat B. Nautical cartographer	2023-2024	1
Tunisia	Cat B. Nautical cartographer	2023-2024	1

7.2. TRAINING RECEIVED, NEEDED, OFFERED

NTR.

7.3. PROJECT MANAGEMENT ASSISTANCE FOR THE CONSTRUCTION OF HYDRO-OCEANOGRAPHIC VESSELS

Shom has a recognized know-how in the construction of hydro-oceanographic vessels (from 8m launches to 100m vessels). It masters the entire process from the expression of needs to the implementation of systems. It puts its expertise at the service of shipyards, within the framework of new constructions or modernizations for:

- Studies to define, on the basis of an expression of need, the complete specifications in terms of hydro-oceanographic equipment (including computers), as well as the fitting out of premises and scientific spaces of hydro-oceanographic ships. Shom provides intellectual services such as the drafting of the metrological survey essential to the proper integration and control of the systems, the specification of the batches of spare parts adapted to the ship's missions, the interface plans, the acceptance book and the ship's logbook (in its field of competence).
- Equipment acceptance and integration: supervision of equipment integration (mechanical, interfacing, metrology, etc.), acceptance tests in the factory, in port and at sea.
- Training and assistance: training of personnel who will implement the equipment, but also of personnel who will maintain the systems, transfer of skills, handling of warranty calls after delivery of the vessel to the end customer. A Shom hydrographic engineer has been deployed to the Nigerian Naval Hydrographic Office for two years for the training on the new French-built hydrographic vessel Lana.

Fig. 10 – Nigerian hydrographic ship Lana built by the French shipyard OCEA with the support of Shom (Source: OCEA)

7.4. 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.

7.5. DEFINITION OF PROPOSALS AND REQUESTS TO THE IHO CBSC

NTR.

8. OCEANOGRAPHIC ACTIVITIES

8.1. GENERAL

NTR.

8.2. GEBCO/IBC'S ACTIVITIES

In the waters under French jurisdiction of the SWPHC region, Shom's bathymetric data are accessible:

- through the *EMODnet Bathymetry* portal (http://www.emodnet-bathymetry.eu/)
- in the form of bathymetric DTMs for the coastline and the shoreline on Shom's dissemination space (http://diffusion.shom.fr/pro/risques/bathymetrie.html?p=1)
- as bathymetric batches on Shom's dissemination space

- (http://diffusion.shom.fr/pro/amenagement/bathymetrie/lots-bathy.html)

Data on transits in French and international waters were provided to IHO DCDB and for integration into the GEBCO grid in 2018.

The survey coverage and associated metadata available on the IHO DCDB site are provided via the *EMODnet Bathymetry* portal supported by the European Union. The last update of all these bathymetric resources was performed in December 2022.

8.3. TIDE GAUGE NETWORK

Shom is the national coordinator and reference authority for the observation of the sea level, managing and issuing the resulting data. This mission is 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. Shom itself operates and maintains a large tidal network reporting in real time, RONIM, which is a major contribution to REFMAR.

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/smartphone/tablet-friendly online service named maree.shom.fr.

Fig. 11: Real time measurements from REFMAR tidal network on Shom's web portal (data.shom.fr)

8.4. NEW EQUIPMENT

NTR.

8.5. CHALLENGES AND ACHIEVEMENTS

Evolution of the tidal services

The products called "Annuaire des marées", " Horaires de marées (calculés pour 100 ports)" and " Prédictions à la carte (disponibles pour 1000 ports) ", which were previously available on the portal diffusion.shom.fr, have been merged into a single service called "Marées à la carte".

This service, which calculates tide predictions, can be accessed at the following address: https://diffusion.shom.fr/marees/horaires-des-marees.html.

The functions available are:

- Calculation of the times and heights of high and low tides, combined with coefficients (Annuaire des marées). The coefficients are calculated for French Channel and Atlantic ports only;
- Calculation of water level at a given time step (1, 5, 10, 30 and 60 minutes);
- Threshold calculation (search for time slots where a water level is above or below a given threshold).

The results are available in two formats:

- XML: standard exchange format, intended for programming or use on the Web. This format is available for calculating the times and heights of high and low water;
- TXT: simple text format in columns. Format available for calculating times and heights of high and low water, water levels at a given time step and thresholds.

A user guide describing the various functions and settings of the service is available on the service's home page by clicking on the "More details" link.

9. SPATIAL DATA INFRASTRUCTURES

9.1. STATUS OF MSDI

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

9.2. RELATIONSHIP WITH THE NSDI

The various maritime geographical information produced by Shom are referenced on the French NSDI (https://www.data.gouv.fr/).

9.3. INVOLVEMENT IN REGIONAL OR GLOBAL MSDI EFFORTS

Shom contributes to the IHO MSDIWG.

9.4. NATIONAL IMPLEMENTATION OF THE SHARED DATA PRINCIPLES – INCLUDING ANY NATIONAL DATA POLICY AND IMPACT ON MARINE DATA

In accordance with France open data policy, Shom has opened access to its basic data: bathymetric data, wrecks, cables, seabed types, maritime limits & boundaries, toponymic databases, port information, and maritime regulations, etc. These data are distributed under a Creative Commons "CC-BY-SA 4.0" license or an open license, depending on the case.

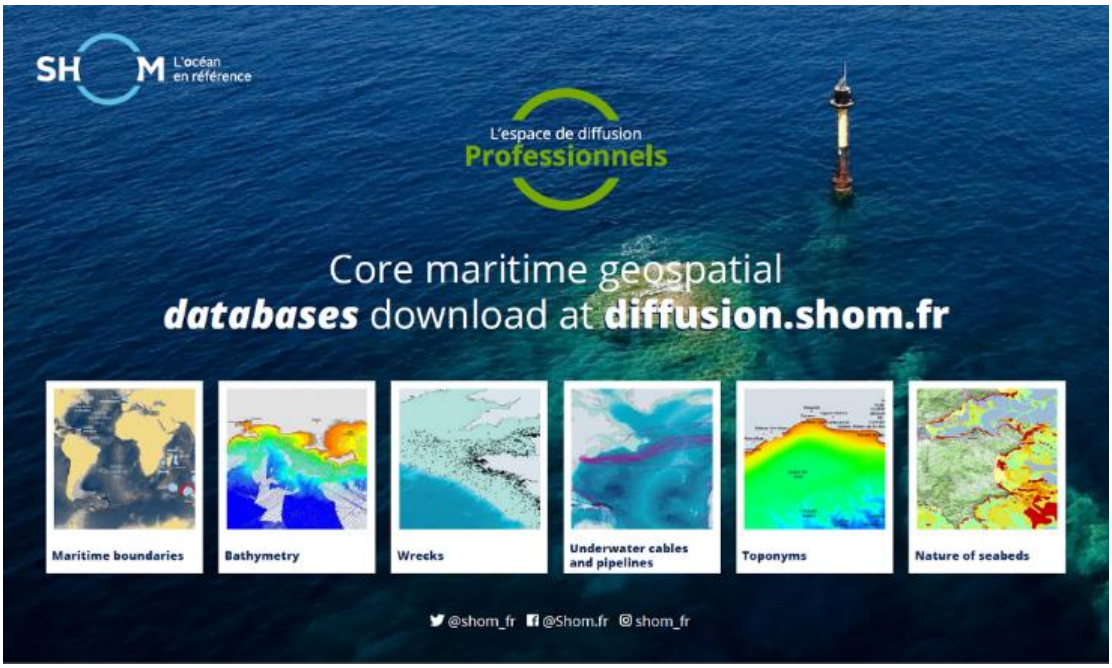

Fig.12 – Access to Shom's open data (diffusion.shom.fr)

9.5. MSDI NATIONAL PORTALS

Data on data.shom.fr portal are organised according to the following topics:

- Master data: cartography, maritime boundaries, maritime and coastal database, coastal altimetry, bathymetry, vertical datums, sedimentology, geophysics, tides, currents and historical data;
- Oceanographic forecasts: waves, meteorology, water level, hourly surface hydrodynamic, daily mean 3D hydrodynamic and oceanogram;
- Coastal observations: sea level (REFMAR), sea surface current and sea bottom turbidity.

Not all this information is available on the MBSHC region.

Hereafter are listed some of the latest evolutions:

- Aids to navigation (AToN) (edition);
- Wrecks and obstructions (edition);
- Coastal altimetry (Litto3D): data display improvements;
- Bathymetric measurements (edition);
- National hydrography program: current status (new);
- Maritime areas – chart 8510CX (edition);
- State action at sea – chart 7360 (edition);
- Maritime Altimetric References (edition);
- Sovereignty or jurisdiction maritime spaces (new). Also available on maritimelimits.gouv.fr;
- Vertical datums: Bathyelli v2.1 (edition);
- Mainland France sediment map (edition);
- Global coastline (edition);
- GEBCO worldwide bathymetric DTM (edition);
- Tidal tables calculation (edition);
- On demand tidal table calculation (update).

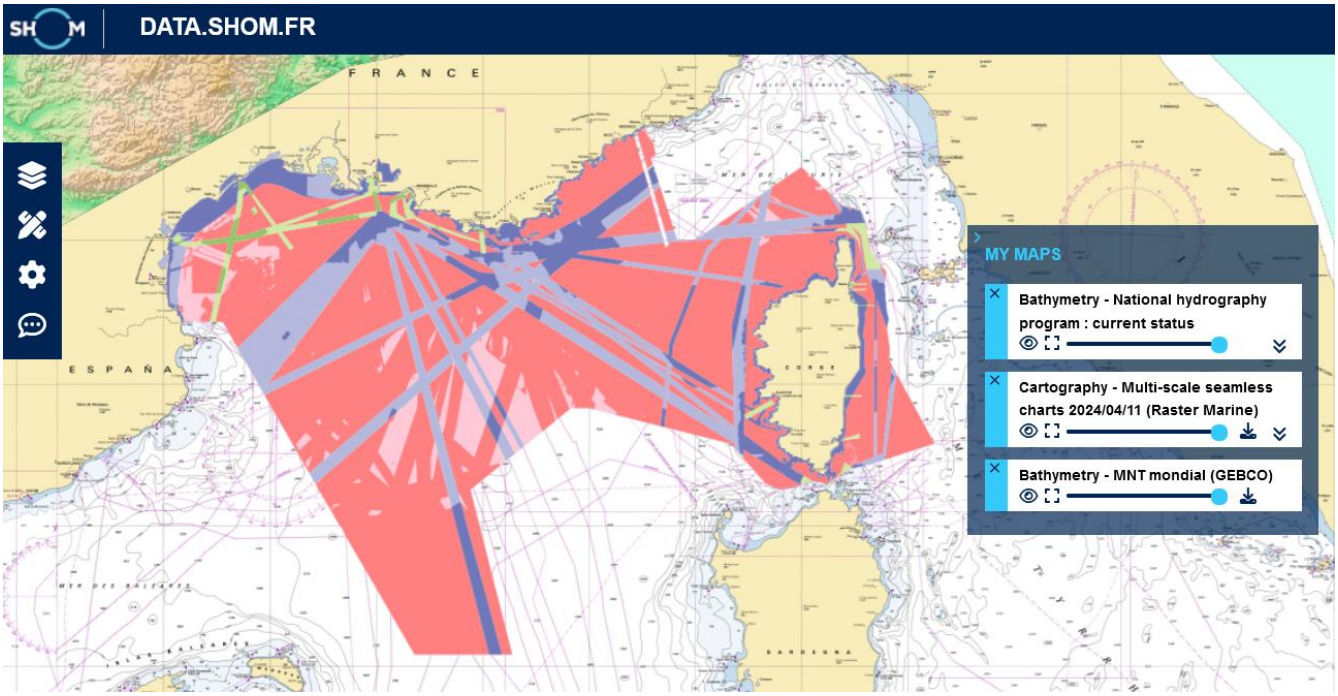

Fig. 13 – National hydrography program: current status (data.shom.fr)

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).

9.6. BEST PRACTICES AND LESSONS LEARNED

Based on feedback from portal users, new portal ergonomics have been defined.

The new online shop with a more readable offer and a simplified and more intuitive user experience is now available.

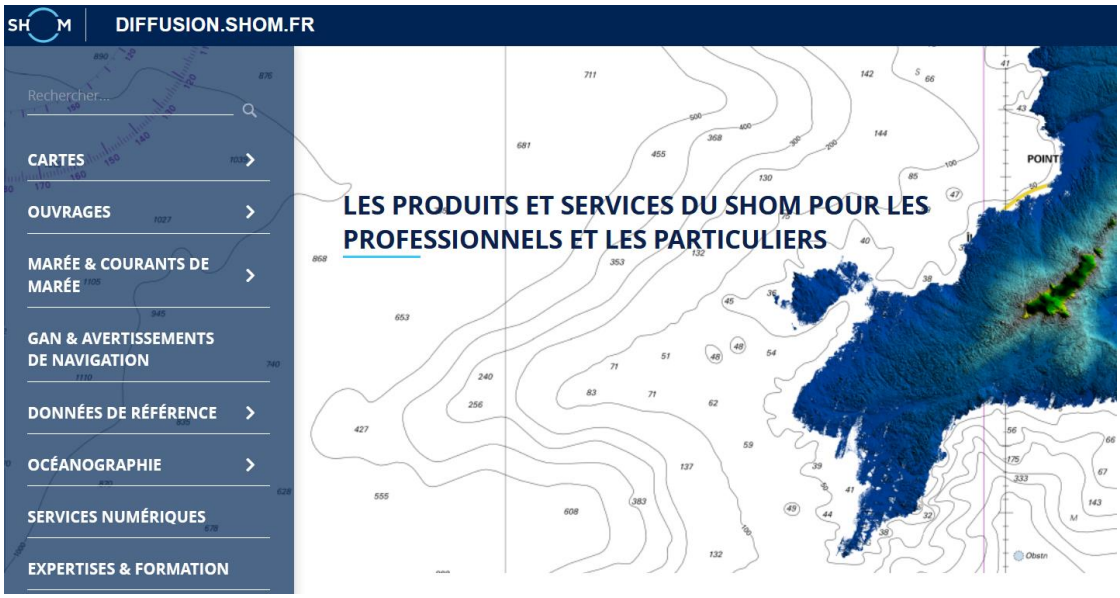

Fig. 14 – New ergonomics of Shom's online shop (diffusion.shom.fr)

9.7. CHALLENGES AND ACHIEVEMENTS

The national maritime boundaries portal (maritimelimits.gouv.fr) is based on Article 16 of Order No. 2016-1687 of 8 December 2016, with the aim of consulting and disseminating the official elements used to delimit maritime areas under the sovereignty or jurisdiction of the French Republic, in particular legal references and digital data.

A new version of this portal was released in February 2023. This new version includes new ergonomics and information is now organized into 4 themes:

- French maritime areas;
- Traffic and shipping;
- Limits of competence and reporting;
- Occupation and use of the maritime domain.

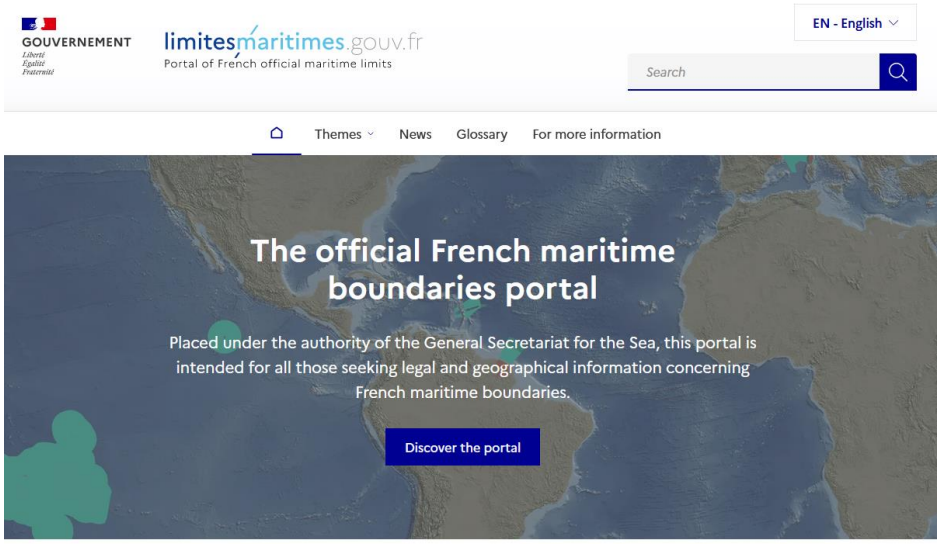

Fig. 15 – New ergonomics of the official French maritime boundaries portal

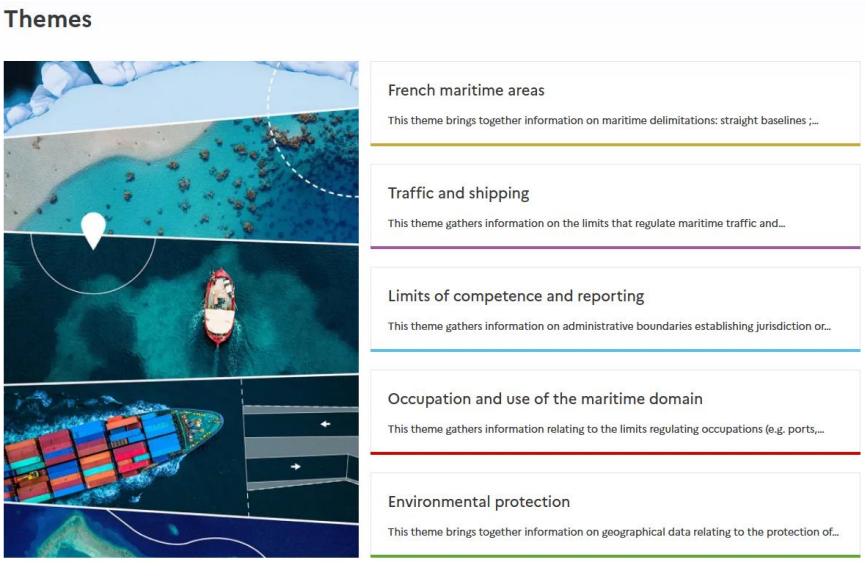

Fig. 16 – Themes of the official French maritime boundaries portal

10. INNOVATION

10.1. USE OF NEW TECHNOLOGIES

As part of the preparatory phase for the replacement of the hydro-oceanographic fleet (CHOF project), a three-year agreement was signed with the procurement agency of the French DoD (DGA) to conduct experiments and modernize hydrographic data processing techniques.

An initial experiment was carried out in September 2020 with 2 DriX unmanned surface vehicles equipped with an MBES and a sediment echo sounder, and was repeated in October 2023. From 2021 onwards, numerous other experiments were carried out with Exail's AUV A18D and Kongsberg's AUV HUGIN 6000 Superior to acquire the autonomy required for their use and knowledge of high-resolution seabed mapping.

Shom possesses since 2024 two gliders. The first operate the following equipments: CTD, O2, PAR, ADCP, Chlorophyl, CDOM and Backscattering. The second one has: CTD and hydrophones.

In addition, after several years of operational use of airborne Lidar, experiments are planned in the coming years to test UAVs equipped with bathy Lidar in conditional operations.

Fig. 17 - Experiment of USV DriX deployed from BHO Beautemps-Beaupré (Source: iXblue, 2020)

Fig. 18 - Experiment of AUV HUGIN deployed from BHO Beautemps-Beaupré (Source: Marine Nationale, 2021)

10.2. RISK ASSESMENT

Shom completed in 2020 the development of an experimental tool called "Deseasion platform". It is a multi-criteria decision tool for hydrographic risk assessment and cost-benefit analysis. It will be used in the coming years to improve the national hydrographic survey program.

10.3. POLICY MATTERS

NTR.

11. OTHER ACTIVITIES

11.1. PARTICIPATION OF IHO MEETINGS

Due to 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
ENCWG		✓	ENC Standards Maintenance Working Group
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
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
NSHC		✓	North Sea Hydrographic Commission
RSAHC		✓	ROPME Hydrographic Commission
S100WG		✓	S-100 Working Group
SAIHC		✓	Southern Africa and Islands Hydrographic Commission

HSWG		✓	Hydrographic Surveys Working Group
SWPHC		✓	South-West Pacific Hydrographic Commission
TWCWG		✓	Tidal, Water Level and Currents Working Group
WEND		✓	Wold-Wide Electronic Navigational Chart Database
WWNWS		✓	World-wide Navigational Warning Service Sub-Committee

11.2. METEOROLOGICAL DATA COLLECTION

NTR.

11.3. GEOSPATIAL STUDIES

NTR.

11.4. PREPARATION FOR RESPONSES TO DISASTERS

France may have Navy ships in the MBSHC 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.

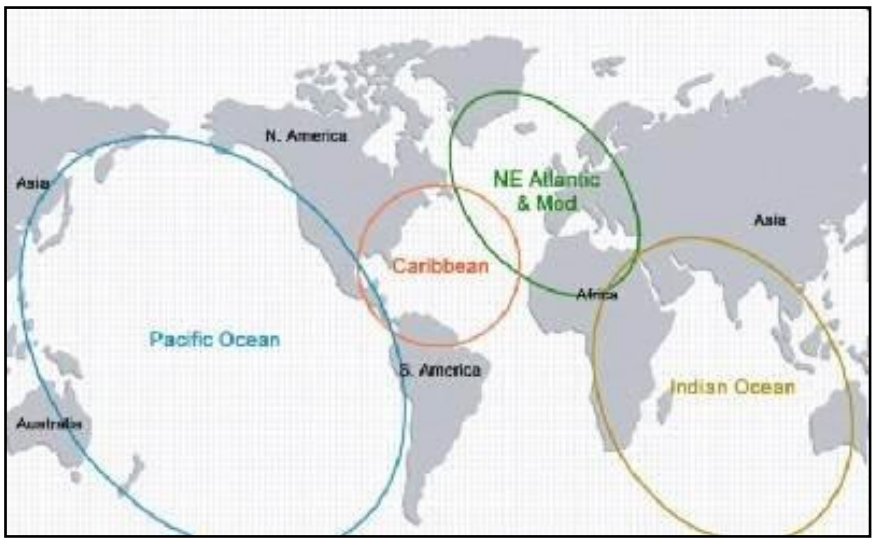

Fig. 19: Cooperation areas on tsunami warning system (source COI; UNESCO).

- Coastal flooding :

  Shom is associated with Météo-France in the provision and improvement of an alert system to prevent from storm surges and tides named Vigilance Vagues Submersion (VVS). This allows for a better anticipation of flooding and protection of the populations living in the littoral area of Metropolitan France. An extension of that alert system towards French overseas departments is currently under work.

  Shom provides the tidal predictions, development and expertise on coastal hydrodynamic and wave models, real time tide gauge observations as well as information relative to extreme sea levels and bathymetry. Météo-France's marine forecasters perform a comprehensive analysis of observation and model outputs to produce a forecast, summarized on a map depicting the level of awareness to adopt along French metropolitan department.

  As an outcome of the HOMONIM Project conducted in partnership with *Météo-France,* latest up-to-date capacity for coastal flooding forecast over the area is operational since June 2017. This modelling capacity relies on:

  - a storm surge model, based on barotropic version of Shom's HyCom model, with a 1 to 3 km resolution grid over the Mediterranean basin;
  - a coastal wave models based on WaveWatch-III, with a 200m-resolution unstructured grid along the domestics French coast.

  The models are operated by Météo-France up to provide 3-day forecasts of storm surges as well as the significant height and the period of wind waves an swell. Model outputs are available on both Shom (data.shom.fr/catalogue/oceano) and Météo-France (donneespubliques.meteofrance.fr) data portal.

Météo-France's marine forecasters also perform a comprehensive analysis of observation and model outputs to produce a forecast, summarized on a map depicting the level of awareness to adopt along French metropolitan departments.

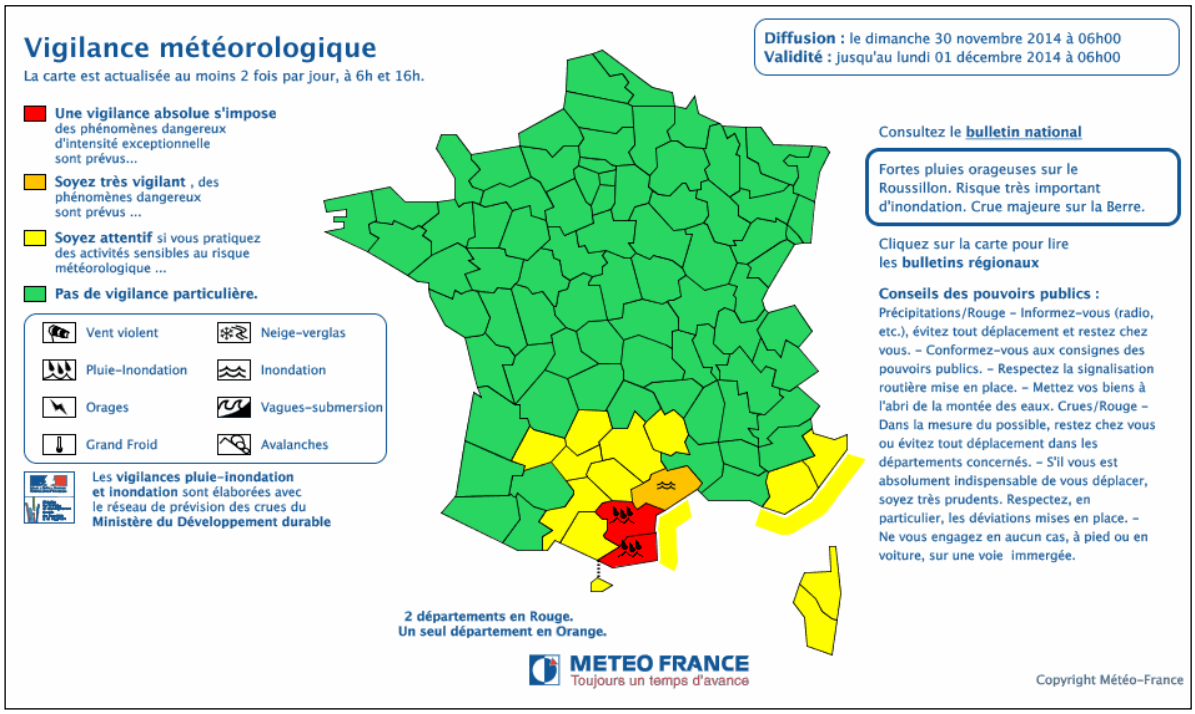

Fig. 20: An example of coastal flooding alert (yellow level).

Costs subject to alert are underlined according to the alert level (source www.meteo.fr).

- 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.

11.5. ENVIRONMENTAL PROTECTION

NTR.

11.6. ENGAGEMENT WITH THE MARITIME ADMINISTRATION

NTR.

11.7. AIDS TO NAVIGATION MATTERS

NTR.

11.8. MAGNETIC AND GRAVITY SURVEYS

NTR.

11.9. INTERNATIONAL ENGAGEMENTS

NTR.

12. CONCLUSIONS

Shom supports any initiative aimed at improving hydrographic knowledge and navigation safety, insofar as the data collected benefit the cartographic authorities and the updating of the nautical documentation of this region.

APPENDIX I TO THE REPORT N 031/SHOM/DMI/REX/NP DATED APRIL 29TH, 2024

NATIONAL MSI SELF-ASSESSMENT

Country: FRANCE

Organization: Shom

1. Maritime area

[Describe maritime area including details of the geographic boundaries]

The maritime area includes coastal waters of southern coast of France and Corsica.

2. Operational Points of Contact for the National Coordinator

INSTITUTION	TELEPHONE	FACSIMILE	EMAIL
Shom, France office of the "Information and Nautical publication" department of the "Maritime Products and services" division.	+33 256 31 25 67 +33 256 31 21 92 +33 256 31 23 65	/	Infonaut-metro@shom.fr

3. GMDSS Master Plan

[Report on the status of the GMDSS Master Plan: Is it up to date? When was the last update?]

The French GMDSS Master Plan is compiled in the Shom publication "Maritime radiocommunications" reference n°924-RNC available on-line: https://diffusion.shom.fr/pro/rsx-92-4-radiocommunications-maritimes-systeme-mondial-de-detresse-et-de-securite-en-mer-smdsm.html

The publication is regularly updated (last version April 4th 2021).

[Specifics of equipment used and software version with date up-dated]

Equipment Type for Ports and Local Area	Software Version	Date of Up-date
NAVTEX station (MRCC La Garde).	Inoperative	Inoperative
Terrestrial radiocommunications HF, MF and VHF means		

[Detail the number of warnings identified as immediate priority (requiring transmission within 30 minutes) and the average elapsed time for passing to NAVAREA coordinator, as reported to the last RHC meeting]:

Year Y-2		Year Y-1		Year Y	
Total	Average elapsed time	Total	Average elapsed time	Total	Average elapsed time
NTR	NTR	NTR	NTR	NTR	NTR

4. NAVTEX Coverage:

[Diagram of NAVTEX stations and service areas within maritime area; Contact details for NAVTEX Stations; Confirm operational status has been validated.]

MRCC La Garde tel : +33 4 94 61 71 10 lagarde@mrccfr.eu - Inoperative since January 2020.

5. Operational Issues:

[New infrastructure in accordance with GMDSS Master Plan; Problems encountered?]

MRCC La Garde NAVTEX station has been off air since January 2020, and NAVAREA III coordinator has kindly undertaken the broadcasting of some coastal warnings on its behalf in Mediterranean Sea via SafetyNET technology. Unfortunately, the failure of La Garde NAVTEX transmitter will not be resolved in the near future. As a consequence, this mitigating situation, commanded by the need to maintain the dissemination of maritime safety information, hence to ensure the safety of navigation, might last over several months.

The French Directorate of Maritime Affairs is investigating various options that might be used to recover the autonomy of La Garde broadcasting capacity.

6. Contingency Planning

[Provide information regarding contingency plans that have been established and future plans where appropriate. Also report on any testing of the plan that has been conducted]

NTR.

7. Capacity Building

[Demands for Capacity Building, Training requested or received, any offered, status of national, bilateral, multilateral or regional development projects with MSI component]

Not applicable.

8. Other Activities

[Participation in other IHO or IMO Working Groups, Regional Hydrographic Commissions, regional conferences related to MSI over past year]

Shom participates to IHO and IMO Working Groups, Regional Hydrographic Commissions and the regional conferences related to MSI over past year (SMAN12, MSC7).

9. National Maritime Website

[(Address, statistics (if permitted by national legislation; how often is the information on your web site updated? Do you display the date and time of the last update on your web site?]

10. Recommendations

[If any]

11. Summary

[Please provide a short summary of this paper which will be included in the final report of the meeting.]

LISTE DE DIFFUSION

DESTINATAIRES :

- MBSHC CHAIR (MS. VINKA KOLIĆ BUBIĆ CROATIA)
- IHO SECRETARIAT

COPIES INTÉRIEURES :

- DG
- DMI (D-REX)
- ARCHIVES (DMIDSD 2.018)