

Direction des missions institutionnelles  
et des relations internationales  
Division relations extérieures

BREST, le 21 novembre 2024

N°089/Shom/DMI/REX/NP

## NATIONAL REPORT

- SUBJET** : France national report to the 25<sup>th</sup> meeting of the Meso-American and Caribbean Sea Hydrographic Commission (MACHC).
- 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 under final 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 ([shom-dg@shom.fr](mailto:shom-dg@shom.fr)).

### 2. SURVEYS

#### 2.1. Coverage of new surveys

Survey campaigns are planned by Shom on a regular basis in French overseas territories to update nautical charts.

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 French West Indies, French Guiana and Clipperton Island waters and the current surveys coverage for those three areas.

Since the last Conference, Shom has not conducted any survey in the MACHC region.

The survey work related to these areas for the next year is detailed hereafter:

- French Antilles: next survey campaign in 2025;
- French Guiana: next survey campaign in 2025;
- Clipperton Island: no systematic surveys scheduled.

## 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 to provide a very high-resolution Sea-Land digital terrain model (DTM) of metropolitan and overseas French coasts.

The products are freely available through Shom's data portals:

- [data.shom.fr](http://data.shom.fr): (Shom catalog / Master data / Lidar - Litto3D / West Indies)
- [diffusion.shom.fr](http://diffusion.shom.fr): <http://diffusion.shom.fr/donnees/altimetrie-littorale.html>
  - - For Guadeloupe: <https://diffusion.shom.fr/donnees/altimetrie-littorale/litto3d-guad2016.html>
  - - For Martinique: <https://diffusion.shom.fr/donnees/altimetrie-littorale/litto3d-mart2016.html>
  - - For Saint-Martin: <https://diffusion.shom.fr/donnees/altimetrie-littorale/litto3d-st-martin2019.html>
  - - For Saint-Barthélemy: <https://diffusion.shom.fr/donnees/altimetrie-littorale/litto3d-st-barth2019.html>
- the open platform for French public data: [data.gouv.fr](http://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 is mounted with CTD, O<sub>2</sub>, PAR, ADCP, Chlorophyll, CDOM and Backscattering sensors. The second glider is 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 on 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 aluminum 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. 1 – CATRINE frame mooring with its orange buoyancy above the canister*

### **Deployable Hydrographic System**

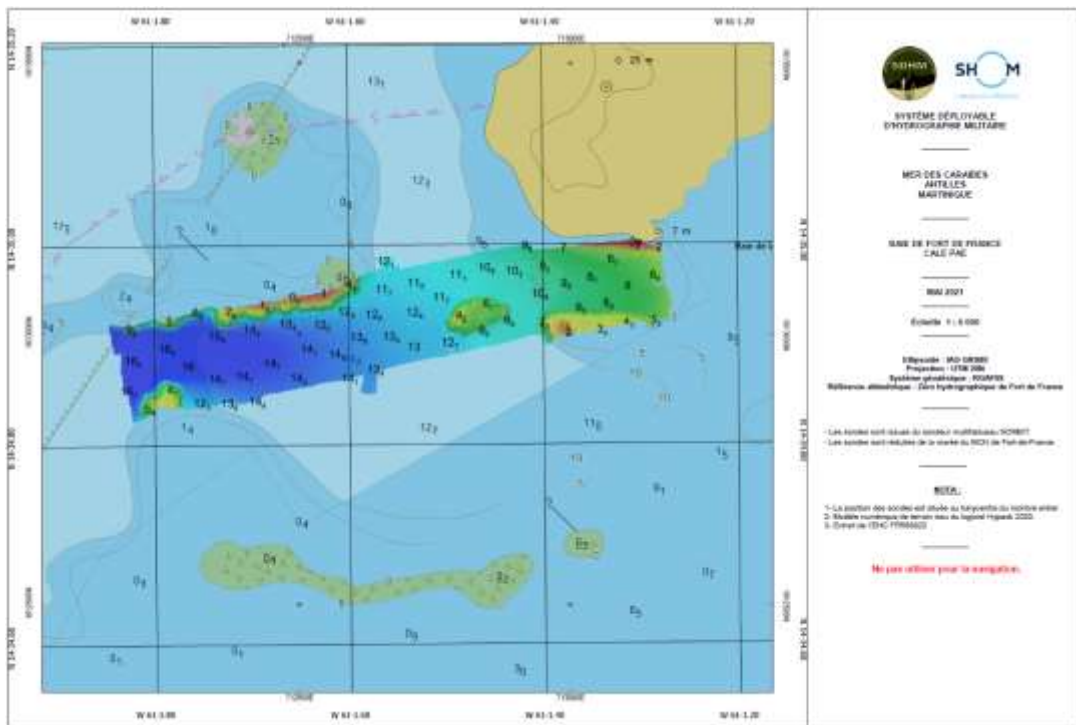
Taking advantage of the reducing size of multibeam echo sounder, Shom developed a portable Hydrographic system usable with small boats (inflatable).

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  $0.9^{\circ} \times 0.9^{\circ}$  at 400 kHz.



*Fig. 2 – Deployable Hydrographic System*



*Fig. 3 – 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 November 22, 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 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

NTR.

## 2.6. CHALLENGES AND ACHIEVEMENTS

NTR.

## 3. NEW CHARTS & UPDATES

### 3.1. ENC COVERAGE, GAPS AND OVERLAPS

As of August 1, 2024, Shom has produced 842 ENCs, of which 56 ENCs within region B. The full collection should eventually reach around 900 ENCs.

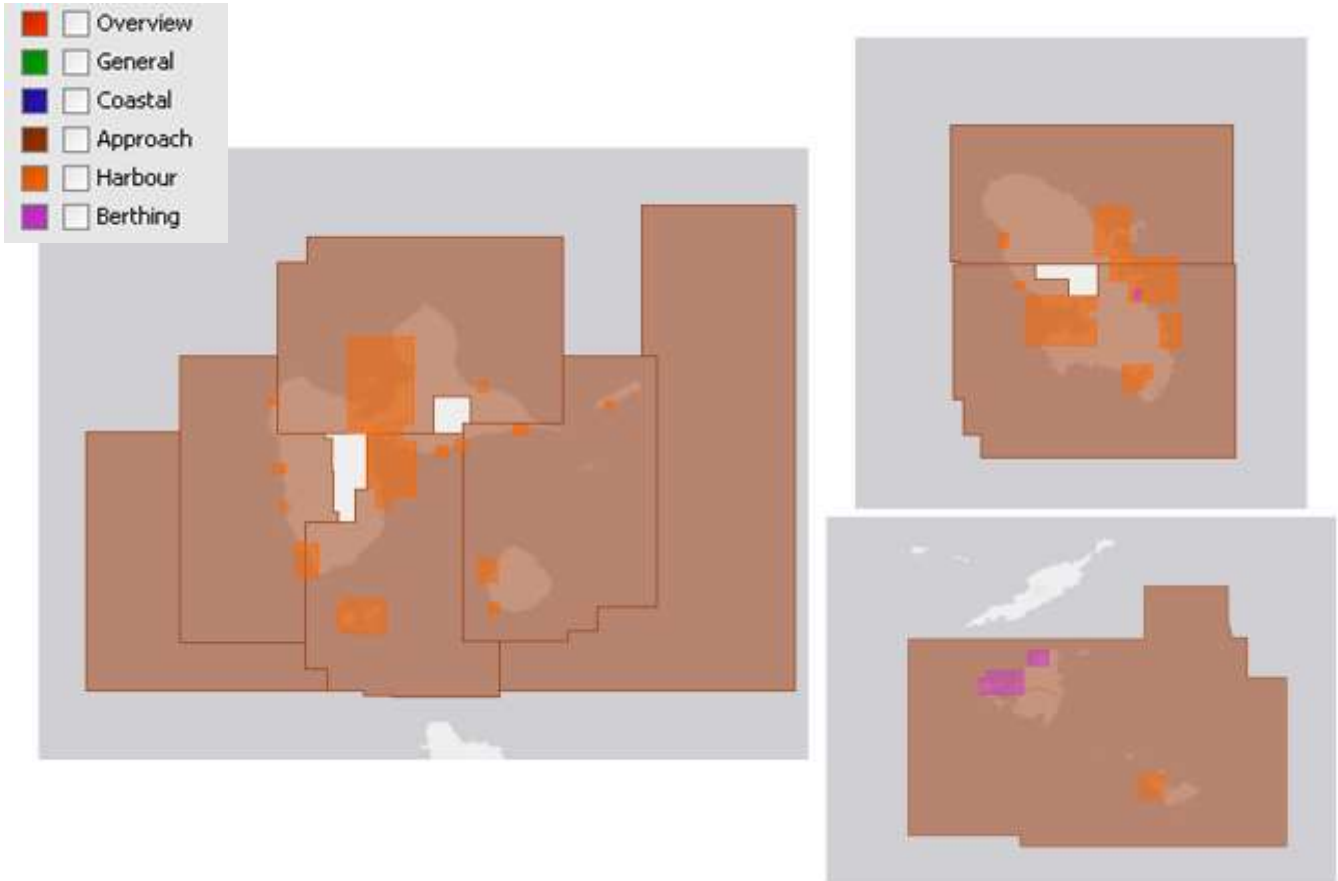
The ENC schema is now complete in region B. Details are provided in the table below:

Usage Band	Produced Cells	Planned Cells	Percentage
1	0	0	N/A
2	3	3	100%
3	6	6	100%
4	14	14	100%
5	28	33	100%
6	5		
<b>Total</b>	<b>55</b>	<b>55</b>	<b>100%</b>

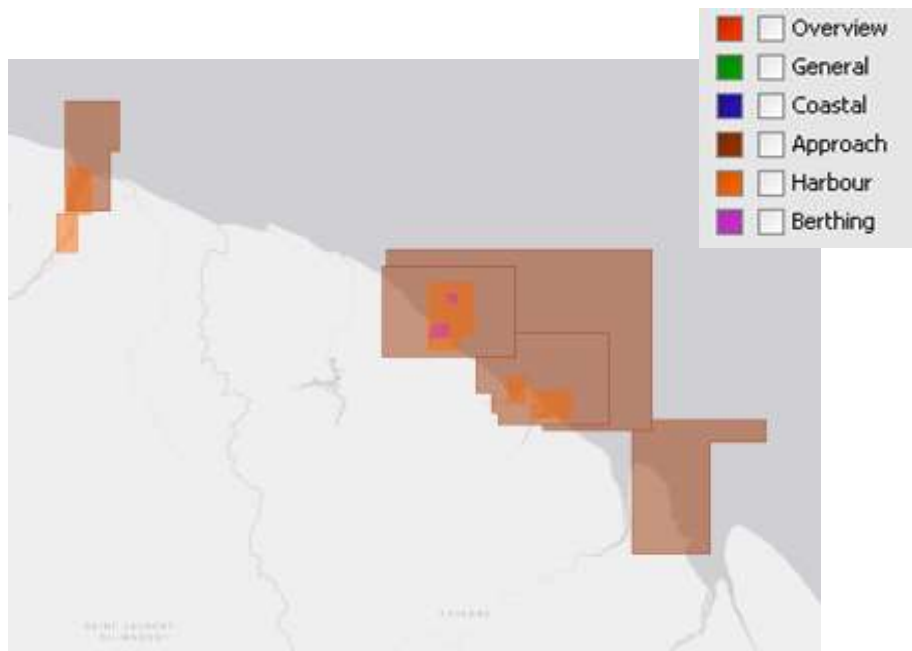
The following figures are extracted from the online PRIMAR catalogue (<http://www.primar.org>) showing Shom ENC coverage within the MACHC (region B) area:



*Fig. 4 - Shom ENC coverage within Region B area*



*Fig. 5 - Shom ENC coverage focus (UB 4-6) in French Antilles (Guadeloupe, left – St Martin & St Barthelemy, bottom right – Martinique, top right)*



*Fig. 6 - Shom ENC coverage focus (UB 3-6) in French Guiana*

ENC cell produced since the last conference are detailed hereafter:

Number	Scale 1 :	Title
FR473370	45 000	Baie de l'Oyapock

### 3.2. ENC DISTRIBUTION METHOD

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

### 3.3. RNC

NTR.

### 3.4. INT CHARTS

The overall INT chart production status for the region B (changes in red) is provided below:

Scale	Produced INT charts	Planned INT charts	Percentage
Small (<1/1 000 000)	1	1	100
Medium	4	4	100
Large (>1/100 000)	0	0	/
<b>Total</b>	5	5	100

### 3.5. NATIONAL PAPER CHARTS

Since the last MACHC meeting, the following charts have been edited:

National	INT	Scale 1:	Title
6738	/	60 000	La Martinique
7485	4193	300 000	Des Iles du Salut à Cabo Orange

Following charts are planned to be issued in 2024/2025:

National	INT	Scale 1:	Title
7482	/	60 000	De l'Ilet à Kahouanne aux Saintes

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

Shom provides 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<sup>1</sup> according to the purpose of use. These data can be used with GIS or cartographic software for commercial or private purposes.

<sup>1</sup>Internal reuse, commercial reuse, documentary use or end user.



A S-57 license<sup>2</sup> allows unlimited download of weekly updated versions for 12 months from the date of purchase.

### 3.7. CHALLENGES AND ACHIEVEMENTS

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 availability of the first ECDIS S-100 expected in 2026). 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 (including 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 (ENCs and paper charts) to eliminate discontinuities between products. With this renewal of the charts, Shom found relevant to issue ENCs according the grid scheme adopted by the UKHO. Shom will start to renew its charts according the FCU in the continental France in 2025.

## 4. NEW PUBLICATIONS & UPDATES

### 4.1. NEW PUBLICATIONS

Since July 2023, the coverage of French nautical publications (list of lights, radio signals, sailing directions) has been reduced to the areas under the charting responsibility of France. This consistency enables Shom to develop relations and knowledge of navigation zones in mainland France, French overseas territories and foreign countries, some of which we have bilateral arrangements with.

### 4.2. UPDATED PUBLICATIONS

Sailing directions, light and fog signal books and radio signal books are no longer published in print form. They are updated on a weekly basis and distributed via the online Shom distribution space. Mariners who subscribe to these books are alerted of corrections by e-mail and by the Notice to Mariners (GAN).

### 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>.

---

<sup>2</sup> Each license allows internal reuse of the data for up to 5 workstations. For more information, contact [bps@shom.fr](mailto:bps@shom.fr)



MSI Point of contact at Shom:

Head of office  
 French Hydrographic Office  
 13, rue du Chatellier – CS 92803 - 29228 BREST CEDEX 2 – FRANCE  
 Tel : + 33 (0) 256 31 21 92  
 Email: [infonaut-om@shom.fr](mailto:infonaut-om@shom.fr)

## 5.2. STATISTICS ON WORK OF THE NATIONAL COORDINATOR

See Appendix.

Shom controls and coordinates local and coastal warnings issued by its national delegated coordinators (maritime zone commands mentioned in Appendix).

## 5.3. NEW INFRASTRUCTURE IN ACCORDANCE WITH GMDSS MASTER PLAN

There is no NAVTEX coverage for French overseas territories, coastal warnings are broadcast through SafetyNet network.

Hereafter are listed the French overseas territories POCs for NAVAREA IV and XII:

AREA	COUNTRY	NAME	TELEPHONE	FACSIMILE	EMAIL
IV	French Antilles	Commandant de Zone Maritime Antilles	+596 (0)5 96 39 57 76 (HNO) +596 (0)5 96 39 57 20	+596 (0)5 96 39 51 65	<a href="mailto:emia-antilles.ccmoh24.fct@def.gouv.fr">emia-antilles.ccmoh24.fct@def.gouv.fr</a> <a href="mailto:emia-antilles-centops-joc.permanence-ops.fct@intradef.gouv.fr">emia-antilles-centops-joc.permanence-ops.fct@intradef.gouv.fr</a>
IV	French Guiana	Commandant de Zone Maritime Guyane	+594 (0)5 94 39 56 69	+594 (0)5 94 39 57 20	<a href="mailto:info-nautique.charge-com.fct@def.gouv.fr">info-nautique.charge-com.fct@def.gouv.fr</a>
XII	Clipperton Island	JRCC Tahiti	+689 (0) 40 54 16 16 +689 (0) 40 54 16 15	+689 (0) 40 42 39 15	<a href="mailto:contact@jrcc.pf">contact@jrcc.pf</a> <a href="mailto:jrcc-tahiti.cdq.fct@intradef.gouv.fr">jrcc-tahiti.cdq.fct@intradef.gouv.fr</a>

## 5.4. CHALLENGES AND ACHIEVEMENTS

### Dissemination of nautical information in NAVAREAS IV and XII

In accordance with the International Maritime Organisation's instructions to States to use Iridium services for the dissemination of their nautical information, the integration of Iridium SafetyCast is effective for NAVAREA II coordinator since June 2023.

Coordinators in the overseas regions are currently still using the Inmarsat SafetyNet system only. However, the DGAMPA (Directorate General for Maritime Affairs, Fisheries and Aquaculture, Ministry of Transport), which is responsible for the dissemination and implementation of the means of disseminating nautical information, is aware of the need to broadcast coastal warnings in overseas regions via Iridium SafetyCast also.

### 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 continental France and in NAVAREA II area.

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

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 first S-100 ECDIS are available, while ensuring compatibility with the current NAVTEX and EGC systems.

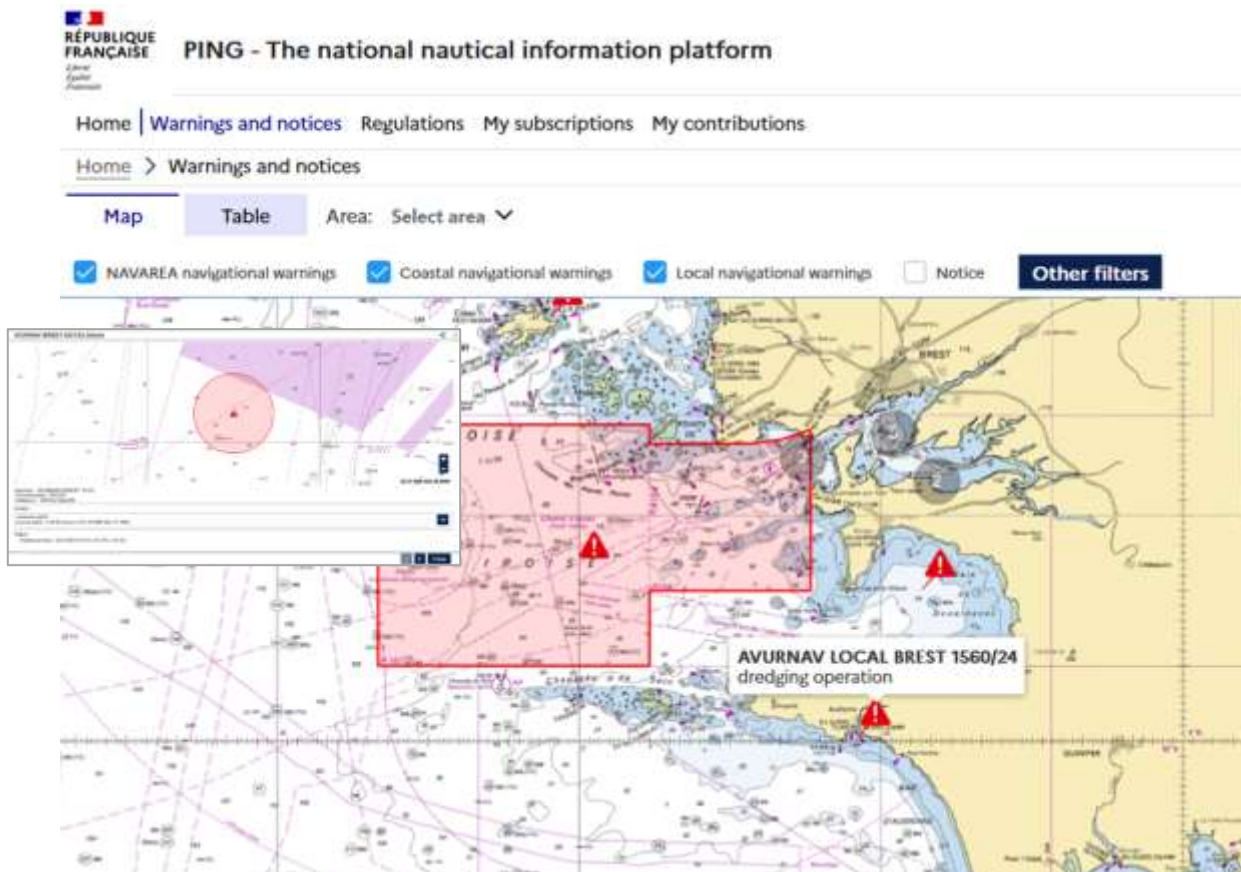
The project is supported by the European Maritime Affairs and Fisheries Fund and the navigation warnings module has been developed and tested in the framework of the European Interreg MED OSMOSIS project.

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

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

- nautical information,
- production and dissemination of maritime geo-regulations in a spatialized form.

A mobile application will also be associated with the platform.



*Fig. 7 – Views of the PING portal - Viewing navigation warnings*

## 6. C-55 – LATEST UPDATES

The table with the latest information to update IHO Publication C-55 (Status of Hydrographic Surveying and Charting Worldwide) have been provided using the online system on 26 August 2024:

Survey Status <b>Updated: October 2024</b>		Depth < 200m			Depth > 200m		
		A	B	C	A	B	C
A	France – Clipperton Island	77.8	5.5	16.7	3.3	0	96.7
B	France – French Antilles	34.7	47.0	18.3	46.7	9.4	43.9
	France – French Guiana	0.3	43.2	56.5	58.8	0	41.2

Charting Status <b>Updated: October 2024</b>		Small (<1 M)			Medium (1M < / < 100 000)			Large (> 100 000)			Metric	WGS84
		A	B	C	A	B	C	A	B	C		
A	France – Clipperton Island	100	0	100	NA	0	0	NA	0	0	100	100
B	France – French Antilles	100	0	NA	100	0	100	100	0	100	100	100
	France – French Guiana	100	0	100	100	0	100	100	0	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-IHO-ICA (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/>).

# Shom school

Training courses of reference in hydrography and marine sciences

## Homologations and equivalences

Category B homologations by the international committee FIG/OHI/ACI\*:

- Hydrographer certificate
- Preparatory technician in marine cartography

Registration at level II to the RNCP\*\* of the training Hydro CSUP to qualify for the title of Supervisor hydrographer.

\* International surveyor federation/International hydrographic organization/International cartographic association

\*\* Répertoire National de la Certification Professionnelle/ National directory of professional certificate

## Extended courses

### L3 BS HYDRO

Third year student/hydrographer certificate



- 15 petty officers/civilians/foreigners
- 10-month training for civilians, 14-month training for petty officers
- Admission based on application
- International certificate of Hydrographer technician

### C SYSRES-HOM

Hydrography, Oceanography and Meteorology Systems and Networks administrator certificate



- 2 to 5 petty officers
- 9-month training
- Admission based on application
- Certificate issued by French Navy

### CSUP-HYDRO

Higher hydrography certificate



- 2 to 5 PO HYDRO
- 4-month training
- Admission based on application
- Certificate issued by French Navy

### MARINE CARTO

Preparatory technician certificate in marine cartography certificate



- 2 to 6 civilians/ foreigners
- 9-month training
- Admission to TSEF\*\*\* competition
- International certificate of Cartographer

e-learning platform



Shom training course catalogue



Short training courses  
AFHy training course  
Extended courses

www.shom.fr



Fig. 8 – Courses and training provided at the Shom hydrographic school (source: shom.fr)



## 7.2. TRAINING RECEIVED, NEEDED, OFFERED

In March 2024, a woman hydrographic officer from Colombia was trained as part of the joint CANADA-IHO Empowering Women in Hydrography (EWH) project. She was given the opportunity to follow a 3-week hydrography training program offered jointly by Shom and ENSTA Bretagne in Brest. This training program is a basic course in hydrographic surveying, including theory, practical work and carrying out a survey on board a hydrographic vessel. This course is run in partnership with the Association Francophone d'Hydrographie (AFHy) and can lead to Hydro3 certification.

## 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.



*Fig. 9 – 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 MACHC 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.

Note that the current *EMODnet Bathymetry* phase (2022-2024) will generate a bathymetric DTM in the waters under the jurisdiction of EU countries in the MACHC area (i.e. Martinique, Guadeloupe, Curaçao, St Marteen, Aruba and the Caribbean Netherlands) with the same characteristics as for Europe mainland. Collaboration with GEBCO is sought on this matter ensuring coherence between both DTM and preventing from redundant work.

#### 8.3. TIDE GAUGE NETWORK

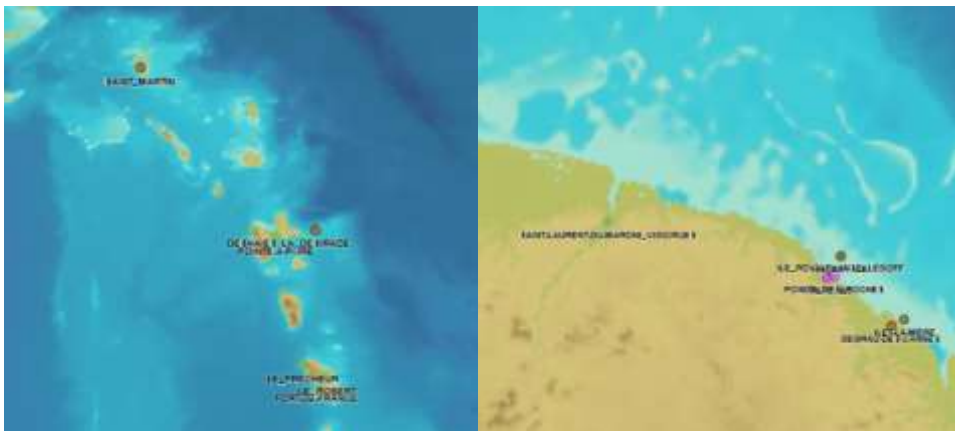
Shom is the national coordinator and reference authority for the observation of the sea level, managing and issuing the resulting data. This mission is carried out under the REFMAR programme. All real time and processed tide gauge measurements collected under that programme are freely accessible on the 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.

RONIM tide gauges are available in the MACHC region in the French Antilles and in French Guiana. This network is recognized as an important tool for coastal operational oceanography, risk assessment, studies on the evolution of the mean sea level, etc.

In addition to the tide gauges of the RONIM network, there are other tide gauges installed locally that are included in the REFMAR coordination. In all, there are 14 French permanent tide gauges located in the region:

- Guadeloupe : Pointe-à-Pitre (Shom/Météo-France/DM Guadeloupe), Deshaies (IPGP) and La Désirade Island (IPGP) ;
- Martinique : Fort-de-France (Shom/Météo-France/marine nationale), Le pêcheur (CG Martinique), Le Robert (CG Martinique) ;
- Saint-Martin : Le Marigot (CT Saint-Martin) ;
- French Guiana : Îles du Salut (Shom/DM Guyane), Îlet La Mère (GPM Guyane/DGTM Guyane) and Dégrad des Cannes (GPM Guyane/DGTM Guyane), Pointe des roches (GPM Guyane/DGTM Guyane), Pariacabo (GPM Guyane/DGTM Guyane), Ile Royale anse Legoff (GPM Guyane/DGTM Guyane), Saint-Laurent du Maroni (Vigicrue).



*Fig. 10 - French tide gauges in the MACHC region (source: 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 " Prédications à la carte (disponibles pour 1000 ports) ", which were previously available on the portal [diffusion.shom.fr](http://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](http://data.shom.fr) ;
- [diffusion.shom.fr](http://diffusion.shom.fr) ;
- [maritimelimits.gouv.fr](http://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 fundamental data: bathymetric data, wrecks, cables, seabed types, maritime limits & boundaries, toponymic databases, port information, and maritime regulations, etc. are distributed under a Creative Commons "CC-BY-SA 4.0" license or an open license, depending on the case.

*Fig. 11 - Access to Shom's open data (diffusion.shom.fr)*

The project Marine Spatial Planning-Outermost Regions (MSP-OR) started in 2021 supports competent authorities in the establishment and implementation of the EU Maritime Spatial Planning (MSP) Directive (2014/89/UE) in the EU Outermost Regions, including in French Guiana. The main goal is to contribute to promote ocean governance through MSP and applying the Ecosystem-Based Approach in MSP.

In this context Shom has the essential role to develop and bring its expertise on MSP relevant information related to (i) safety of navigation and (ii) maritime surveillance for The Strategic Document of Sea Basin (DSBM) French Guiana.

In order to meet this target, Shom carried out a mission to meet all stakeholders of maritime surveillance and safety of navigation in French Guiana, which was followed by the delivery of a report and dataset related to the maritime navigation safety stakes in French Guiana. Shom also provided guidance to the administrations for the preparation of the MSP official plan zones layer related to French Guiana (DSBM vocation zones), including:

- preparation of reliable coordinates of the limits legally compliant with existing limits;
- recommendation of a suitable data model ensuring the layer interoperability among national MSDIs and with EMODnet Human Activities portal (DG MARE).

This project has been extended to the end of this year.

#### 9.5. MSDI NATIONAL PORTAL

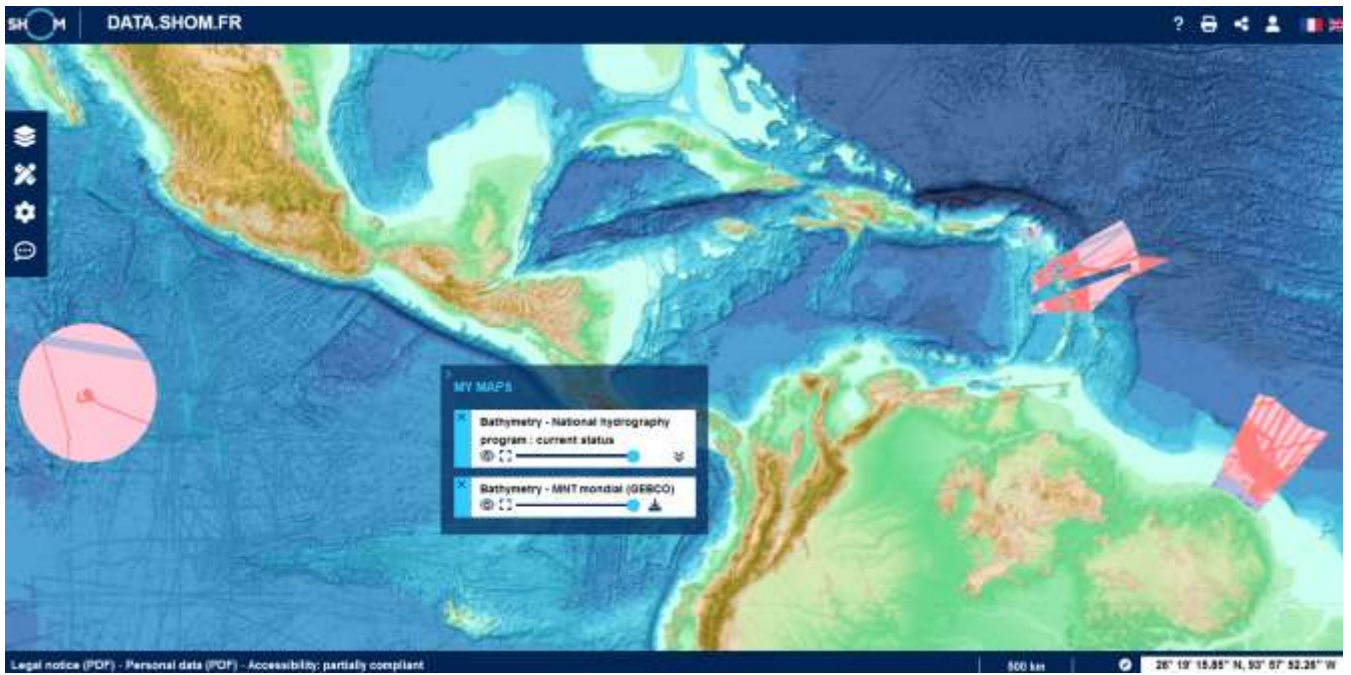
Data available on [data.shom.fr](http://data.shom.fr) portal are organised according to the following topics:

- 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 MACHC region.

Hereafter are listed some of the latest evolutions:

- aids to navigation (AToN) (edition with improvements on IALA zone B display);
- national hydrography program: current status (new);
- bathymetric measurements (edition);
- tidal tables calculation (edition);
- on demand tidal table calculation (update);
- global coastline (edition);
- GEBCO worldwide bathymetric DTM (edition).



*Fig. 12 – National hydrography program- current status (data.shom.fr)*

Those evolutions can all be followed via Shom’s X 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. 13 – New ergonomics of Shom’s online shop (diffusion.shom.fr)*

## 9.7. CHALLENGES AND ACHIEVEMENTS

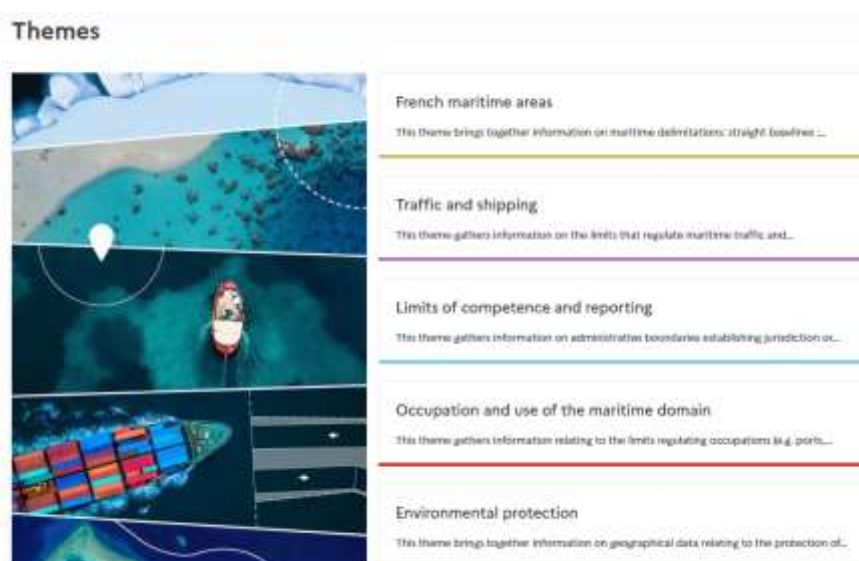
The national maritime boundaries portal ([maritimelimits.gouv.fr](http://maritimelimits.gouv.fr)) is based on Article 16 of Order No. 2016-1687 of 8 December 2016, with the aim of consulting and disseminating the official elements used to delimit maritime areas under the sovereignty or jurisdiction of 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. 14 – New ergonomics of the official French maritime boundaries portal*



*Fig. 15 – 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), an agreement was signed with the procurement agency of the French DoD (DGA) to conduct experiments and modernize hydrographic data processing techniques.

An 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 two gliders since 2024. The first operates the following equipment: CTD, O<sub>2</sub>, PAR, ADCP, Chlorophyl, CDOM and Backscattering, the second: 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.

Decision has been taken to replace, between 2027 and 2029, the 3 French Navy coastal hydrographic vessels (Borda, Lapérouse, Laplace) with two new offshore hydrographic vessels (BHNG).

Those two vessels will be manned with two crews and have an intense use at sea with drones such as USVs, AUVs and gliders. USVs will start to operate for France in 2026.



*Fig. 16 – Experiment of USV DriX deployed from BHO Beautemps-Beaupré (Source: iXblue, 2020)*



*Fig. 17 – Experiment of AUV HUGIN deployed from BHO Beautemps-Beaupré  
(Source: Marine nationale, 2021)*

## 10.2. RISK ASSESSMENT

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

## 10.3. POLICY MATTERS

NTR.

## 11. OTHER ACTIVITIES

### 11.1. PARTICIPATION OF IHO MEETINGS

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
Council		✓	IHO Council
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		✓	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		✓	World-Wide Electronic Navigational Chart Database
WWNWS		✓	World-wide Navigational Warning Service Sub-Committee

#### \*Representation of MACHC at the IENWG

France represents the MACHC at IENWG since its creation. The main topic of the IENWG is to deal with European Union policies, activities and processes of HO's interest, the impacts of these activities go beyond Europe. As an illustration, the EMODnet EU initiative, which celebrated its 10th anniversary in 2020, provides a worldwide data index (CDI) and a Bathymetry World Base layer produced in cooperation with the GEBCO.

#### 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 MACHC 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 unit that can be reached 24/7 by fax +33 298 221 665 or email [coord.navarea2@shom.fr](mailto:coord.navarea2@shom.fr).

#### Tsunami alert

Shom contributes to tsunami warning for the Caribbean via the Pacific Tsunami Warning Centre (PTWC) which issues, on an interim basis, threat information for the Caribbean. The importance of the development of real-time tide gauges on French coast operated by Shom, IPGP, CG Martinique, is recognised as a key component for the development of a regional tsunami warning system.



*Fig. 18 - Cooperation areas on tsunami warning system (source COI; UNESCO)*

#### Coastal flooding

Shom is associated with Météo-France in the provision and improvement of the alert systems against storm surges and tides named Vigilance Vagues Submersion (VVS). This allows for a better anticipation of flooding and protection of people living in French domestic and overseas coastal areas.

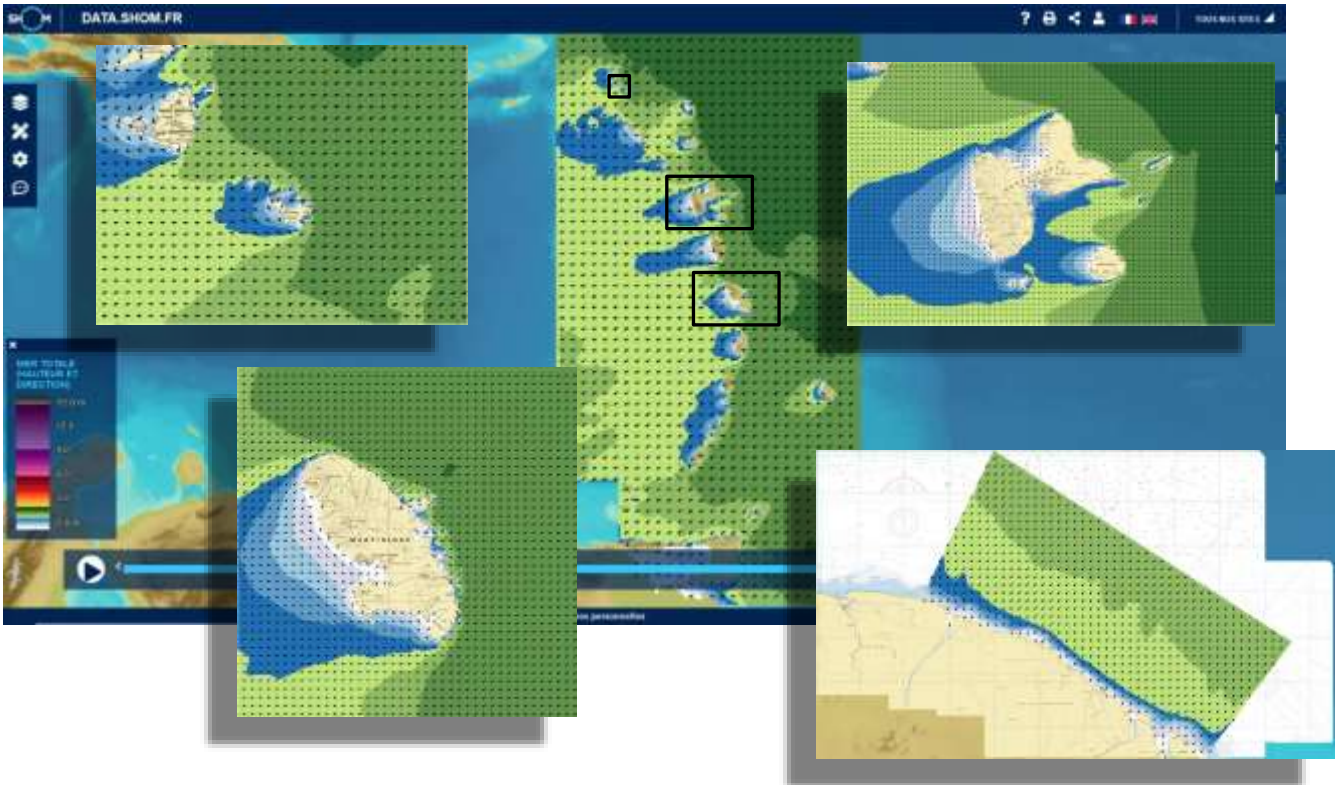
Shom provides the tidal predictions, development and expertise on coastal hydrodynamic and wave models, real time tide gauge observations as well as information relative to extreme sea levels and bathymetry. Météo-France's marine forecasters perform a comprehensive analysis of observation and model outputs to produce a forecast, summarized on a map depicting the level of awareness to adopt (<https://vigilance.meteofrance.fr/fr>).

Storm surge and coastal waves forecasts rely on multiple runs of state-of-the-art models developed in the framework of the HOMONIM Project, conducted in close partnership with Météo-France:

- the storm surge configurations are based on a 2D shallow water version of the HyCom model, implemented on a curvilinear grid with varying resolution of 2,5 km in French Guiana and 900 m around Caribbean islands;

- the wave configurations are based on the spectral wave model WW3 implemented on unstructured computational grids with roughly 200 m resolution on the shoreline of French Guiana and Martinique, Guadeloupe, St. Barthelemy islands.

The public release of the numerical forecasts of the models is on the Shom's data website (data.shom.fr). 2D-maps of and storm surge (hourly) and waves (3-hourly) can be displayed as well as high frequency time series of observed and forecasted storm surge at the tide gauge locations, where existing in the area.



*Fig. 19 – Display of waves height and direction on data.shom.fr*

#### 11.5. ENVIRONMENTAL PROTECTION

Shom is an actor in the national implementation of the European Union Marine Strategy Framework Directive (MSFD). Shom is the scientific lead for the descriptors "Hydrographic changes" and "Noise" and coordinates the associated monitoring programs.

The years 2021 to 2023 were focused on the calculation of indicators and assessments of Good Ecological Status. These indicators will then be reported to the EU by France, based on the scientific reports delivered by the different institutions in charge.

#### 11.6. ENGAGEMENT WITH THE MARITIME ADMINISTRATION

Shom is engaged in the French Antilles and in French Guiana with government services as part of its national hydrographic mission and support to defense.

#### 11.7. AIDS TO NAVIGATION MATTERS

NTR.

## 11.8. MAGNETIC AND GRAVITY SURVEYS

NTR.

## 11.9. INTERNATIONAL ENGAGEMENTS

Within the MACHC region, an agreement has been established in 2014 between the Maritime Authority Suriname (MAS) and Shom in the field of hydrographic surveys, exchange of hydrographic information and data, and training in hydrography and cartography.

## 12. CONCLUSIONS

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

# ANNEX I TO THE REPORT N°089/SHOM/DMI/REX/NP DATED 21/11/2023

## 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 (up to 250 NM) of French Guiana, coastal waters of the French West Indies (Martinique, Guadeloupe, St Martin et St Barthelemy), as well as Clipperton Island in Pacific.

### 2. OPERATIONAL POINTS OF CONTACT FOR THE NATIONAL COORDINATOR

INSTITUTION	TELEPHONE	FACSIMILE	EMAIL
Shom, overseas office of the "Information and Nautical publication" department of the "Maritime Products and services" division: infonaut-om	+33 2 56 312 192 +33 2 56 312 273 +33 2 56 312 439	/	<a href="mailto:infonaut-om@shom.fr">infonaut-om@shom.fr</a>

### 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 September 15<sup>th</sup> 2021, last update September 6<sup>th</sup> 2023).

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

Equipment Type for Ports and Local Area	Software Version	Date of Up-date
No NAVTEX station in French overseas territories within the MACHC region. Coastal warnings broadcasted through SAFETYNET		
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.]*

Not applicable.

Coastal warnings broadcasted by SafetyNET in French overseas territories.

## 5. OPERATIONAL ISSUES:

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

## 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.

## 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?)]*

French overseas territories POCs for NAVAREA IV and XII:

AREA	COUNTRY	NAME	TELEPHONE	FACSIMILE
IV	French Antilles	Commandant de Zone Maritime Antilles	+596 (0)5 96 39 57 76 +596 (0)5 96 39 57 20	+596 (0)5 96 39 51 65
		EMAIL	<a href="mailto:emia-antilles.ccmoh24.fct@def.gouv.fr">emia-antilles.ccmoh24.fct@def.gouv.fr</a> <a href="mailto:emia-antilles-centops-joc.permanence-ops.fct@intradef.gouv.fr">emia-antilles-centops-joc.permanence-ops.fct@intradef.gouv.fr</a>	
IV	French Guiana	Commandant de Zone Maritime Guyane	+594 (0)5 94 39 56 69	+594 (0)5 94 39 57 20
		EMAIL	<a href="mailto:info-nautique.charge-com.fct@def.gouv.fr">info-nautique.charge-com.fct@def.gouv.fr</a>	
XII	Clipperton (Île)	JRCC Tahiti	+689 (0) 40 54 16 16 +689 (0) 40 54 16 15	+689 (0) 40 42 39 15
		EMAIL	<a href="mailto:contact@jrcc.pf">contact@jrcc.pf</a> <a href="mailto:jrcc-tahiti.cdq.fct@intradef.gouv.fr">jrcc-tahiti.cdq.fct@intradef.gouv.fr</a>	

## 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 EXTERIEURS :

- MACHC CHAIR
- MACHC SECRETARY
- IHO SECRETARIAT

### COPIES INTÉRIEURES :

- DG
- DMI (D - REX – PL)
- DOPS/STM (AL – BATHY – DTO – REC – MAC – GEOPHY)
- DOPS/PSM (NA – CA – GEO)
- CHOF
- DRIP/LAB
- DRH/ECO
- DMGS (IES)
- ARCHIVES (DMIDSD 2.033)