

Direction des missions institutionnelles
et des relations internationales
Division relations extérieures

BREST, le 25 novembre 2022

N° 039/Shom/DMI/REX/NP

NATIONAL REPORT

SUBJET : France national report to the 23nd 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. A new target and performance contract came into effect on January 1, 2021 for the period 2021-2024.

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 RDML Laurent Kerléguer, French national hydrographer and Shom Director General (laurent.kerleguer@shom.fr).

2. SURVEYS

2.1. COVERAGE OF NEW SURVEYS

Two third parties' surveys covering Guadeloupe harbours and French Guyana rivers have been communicated to Shom since the last Conference:

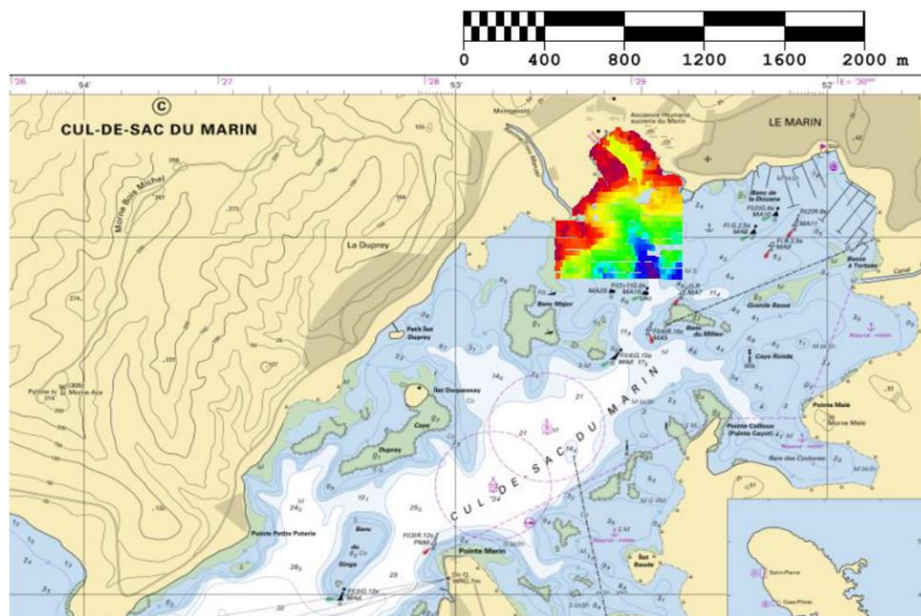


Fig. 1 – Survey coverage of Cul-de-sac Marin, in Martinique (2003 & 2014. CETEF Martinique FUCHS)

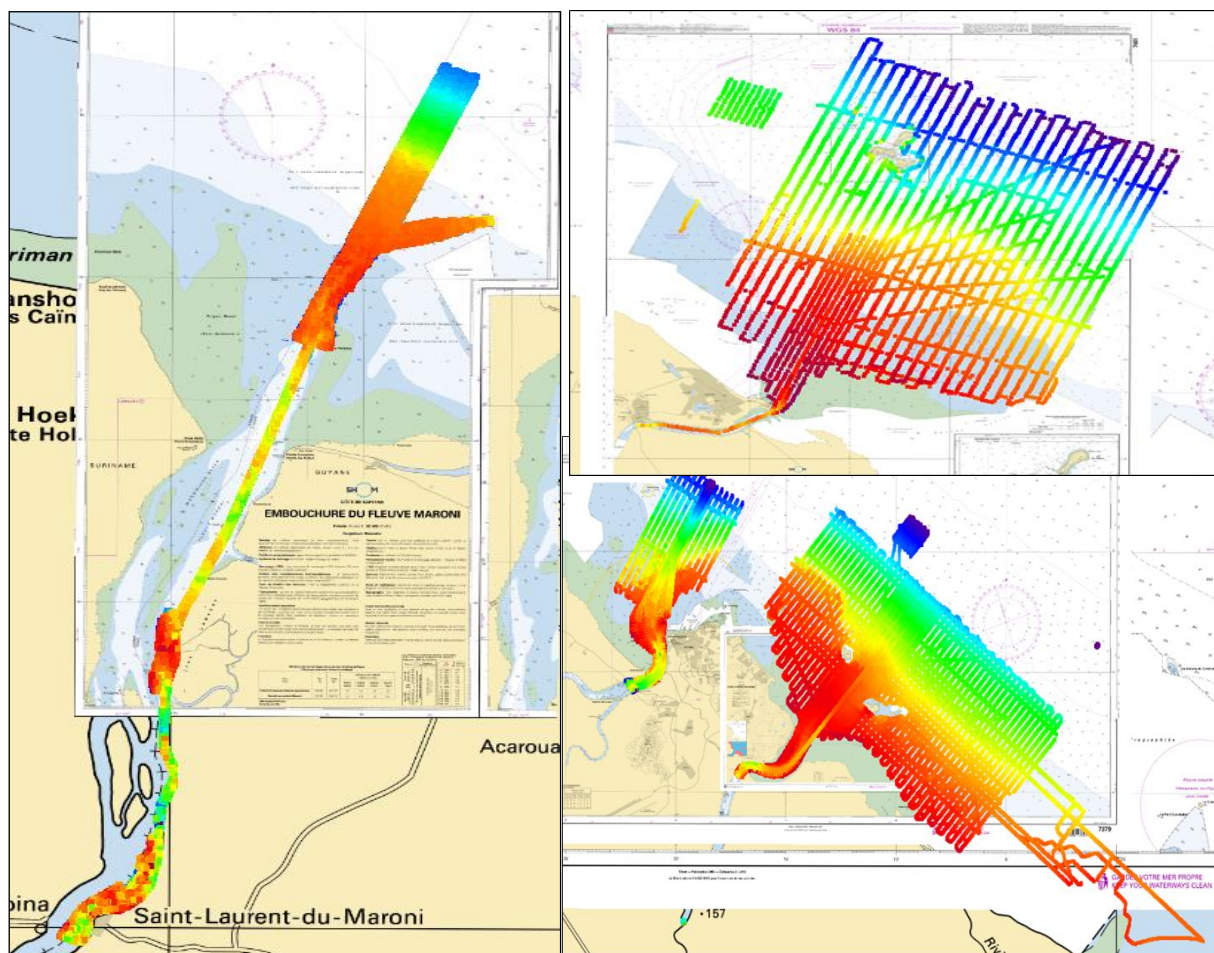


Fig. 2 – Overview of surveys in French Guyana (from 2018 to 2021, Guyana Lighthouse and Beacon Service)

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 Antilles, French Guyana 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 those areas for the next year is detailed hereafter:

- French Antilles: next survey campaign in 2024;
- French Guyana: Next survey campaign in 2024;
- Clipperton Island: no systematic surveys scheduled, only opportunity works.

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 (Shom catalog / Master data / Coastal altimetry)
- diffusion.shom.fr: <http://diffusion.shom.fr/pro/risques/altimetrie-littorale.html>
 - For Guadeloupe: <https://diffusion.shom.fr/pro/amenagement/altimetrie-littorale/litto3d-guad2016.html>
 - For Martinique: <https://diffusion.shom.fr/pro/amenagement/altimetrie-littorale/litto3d-mart2016.html>
 - For Saint-Martin: <https://diffusion.shom.fr/pro/risques/altimetrie-littorale/litto3d-st-martin2019.html>
 - For Saint-Barthélemy: <https://diffusion.shom.fr/pro/risques/altimetrie-littorale/litto3d-st-barth2019.html>
- the open platform for French public data: data.gouv.fr

2.3. NEW TECHNOLOGIES AND/OR EQUIPMENT

See §10.1 for the preparation of future capacities.

2.4. NEW SHIPS

NTR.

2.5. CROWDSOURCED AND SATELLITE-DERIVED BATHYMETRY - NATIONAL POLICY

Crowdsourced bathymetry – CSB

Shom translated into French the IHO publication B-12 (Edition 2.0.3), Guide on participatory bathymetry. The document is available on https://iho.int/uploads/user/pubs/bathy/B_12_Ed.2.0.3_2020-FR.pdf. France is participating in the revision of the current document.

The French national policy for crowdsourced bathymetry is currently under review.

Satellite-derived bathymetry – SDB

The satellite-derived bathymetry (SDB) has been used since 1987 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_SPATIOCARTE_MARINE.xml).

Shom is currently conducting a research and development project in the field of SDB, Bathysat project, that will 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 use SDB with no need for calibration with field data.

The research part of the project has been completed in 2020. Results performed on different geographic areas have enabled to evaluate the capacity of the methods on the following objectives:

- to dispense with in situ bathymetric observations for the setting of the SDB;
- to improve the accuracy of the solution faced with the seafloor complexity (reliability and limit of the parameterization of seafloor reflectance inside the model);
- to automate and improve the calculation processes.

The development part was completed in September 2022. This stage has enabled Shom to acquire a prototype of the future production line with the following operating concepts:

- 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 in particular for hydrodynamic modelling;
- to have a tool for rapid recognition of the coastal environment: estimation of bathymetric characteristics, turbidity, coastline;
- to detect, on a case-by-case basis, possible morphological changes of the seabed in the coastal strip (high revisit rates) in order to prioritise hydrographic surveys (decision support tool).

The industrialisation part will be performed next year, for a fully operational solution at the end of 2023.

2.6. CHALLENGES AND ACHIEVEMENTS

NTR

3. NEW CHARTS & UPDATES

3.1. ENC COVERAGE, GAPS AND OVERLAPS

As of 15th October 2022, Shom has produced 810 ENCs, of which 52 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	10	13	77%
5	28	33	100%
6	5		
Total	52	55	95%

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

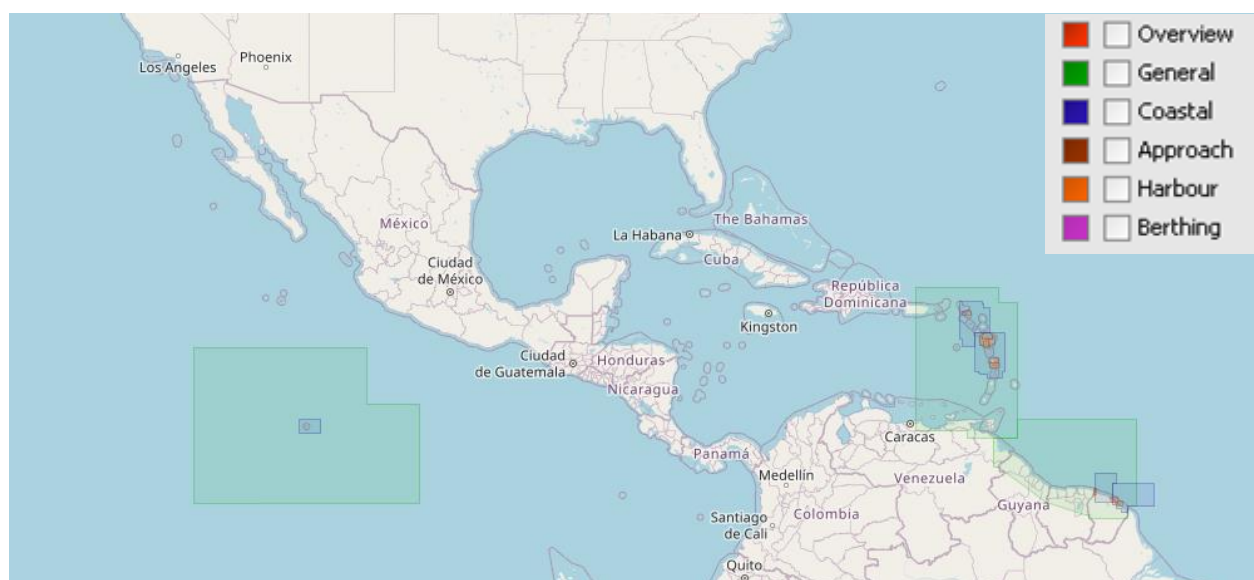


Fig. 3 - Shom ENC coverage within Region B area

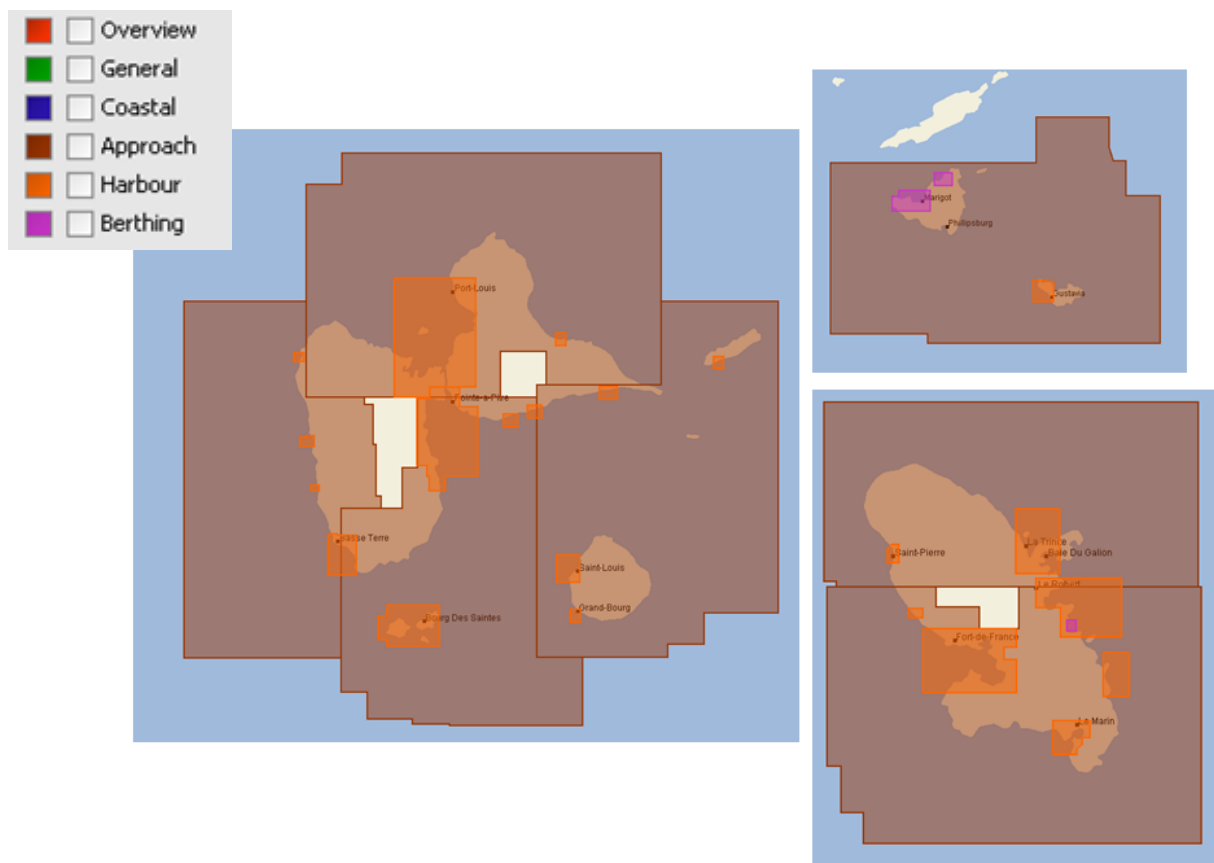
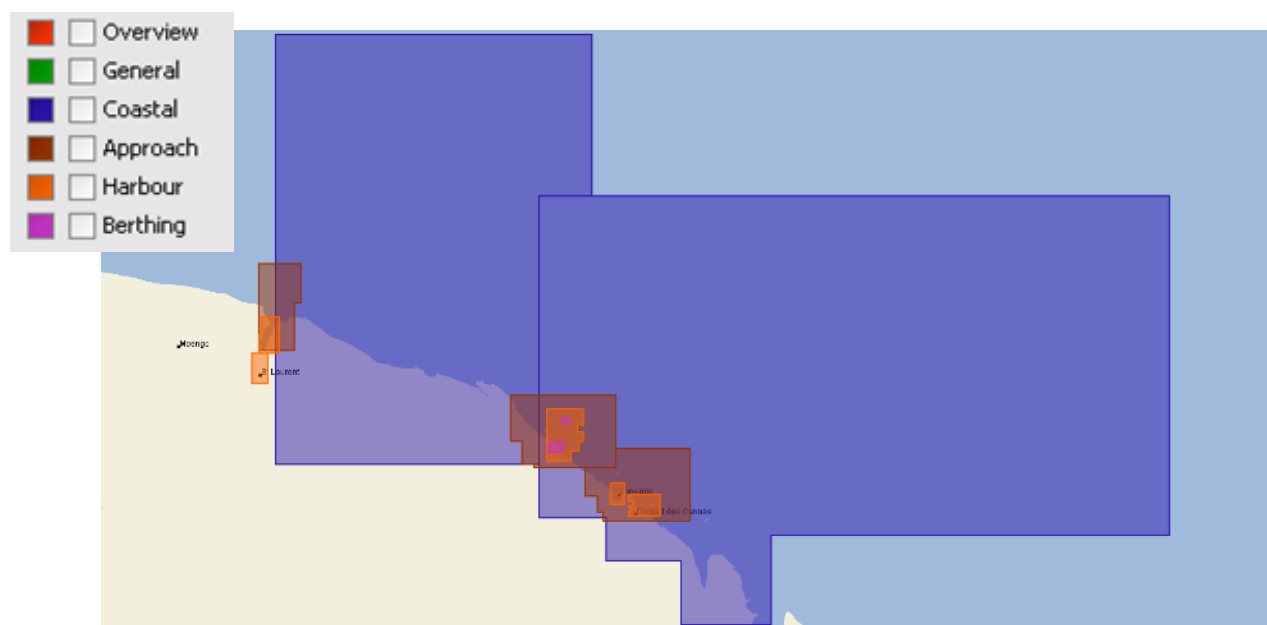


Fig. 4 - Shom ENC coverage focus (UB 4-6) in French Antilles (Guadeloupe, left – St Martin & St Barthelemy, top right – Martinique, bottom right)



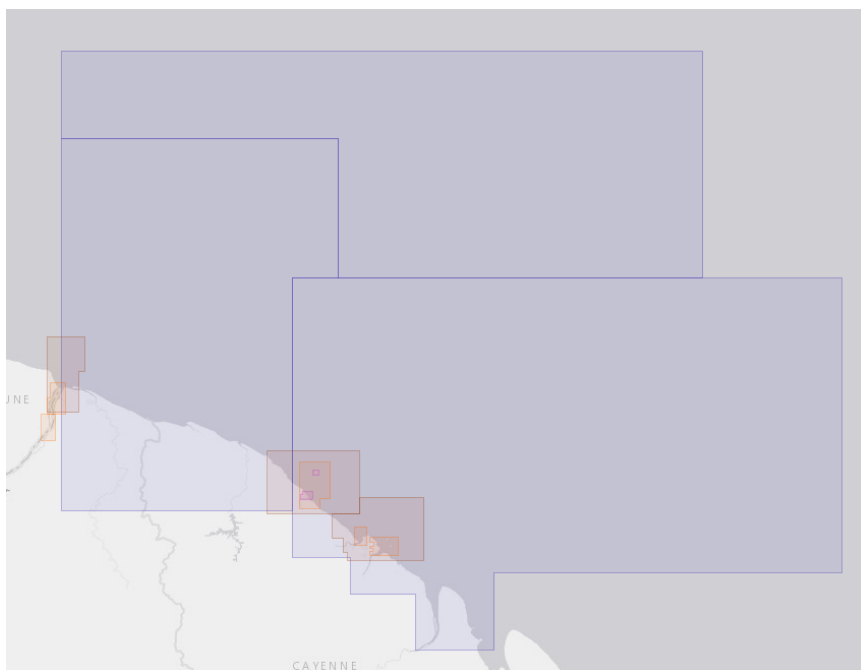


Fig. 5 - Shom ENC coverage focus (UB 3-6) in French Guyana

ENC cells produced since the last conference are detailed hereafter:

Number	Scale 1 :	Title
FR373740	180 000	Côte de la Guyane Française

3.2. ENC DISTRIBUTION METHOD

All French ENC's 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 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	/
Total	5	5	100

3.5. NATIONAL PAPER CHARTS

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

National	INT	Scale 1:	Title
6898	402	2 750 000	Mer des Antilles (Mer des Caraïbes)
7471	/	60 000	D'Anguilla à Saint-Barthélemy

Following charts are planned to be issued in 2022/2023:

National	INT	Scale 1:	Title
7337	/	80 000	Baie de l'Oyapok
7381	/	100 000	De Kourou à Cayenne
7482	/	60 000	De l'Ilet à Kahouanne aux Saintes
6738	/	60 000	La Martinique
6892	/	15 000	Baie de Fort-de-France

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

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 licenses¹ according to the purpose of use. These data can be used with GIS or cartographic software for commercial or private purposes.

A S-57 license² allows unlimited download of updated versions for 12 months from the date of purchase.

3.7. CHALLENGES AND ACHIEVEMENTS

NTR.

4. NEW PUBLICATIONS & UPDATES

4.1. NEW PUBLICATIONS

NTR.

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>).

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

4.4. 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>.

5.2. STATISTICS ON WORK OF THE NATIONAL COORDINATOR

See Appendix.

Shom is responsible for the control and coordination of local and coastal warnings issued by its national delegated coordinators (maritime zone commands and JRCC mentioned in §5.3)).

5.3. 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.

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 50 59 +596 (0)6 96 28 40 82	+596 (0)5 96 39 51 65	emia-antilles.ccmoh24.fct@def.gouv.fr emia-antilles-centops-joc.permanence-ops.fct@intradef.gouv.fr
IV	French Guyana	Commandant de Zone Maritime Guyane	+594 (0)5 94 39 56 69 +594 (0)6 94 26 88 05	+594 (0)5 94 39 57 20	info-nautique.charge-com.fct@def.gouv.fr
XII	Clipperton Island	JRCC Tahiti	+689 (0) 40 54 16 16 +689 (0) 40 54 16 15	+689 (0) 40 42 39 15	contact@jrcc.pf jrcc-tahiti.cdq.fct@intradef.gouv.fr

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 SafetyCast Iridium as a satellite operator for the dissemination of their nautical information, the integration of SafetyCast Iridium is underway for NAVAREA II coordinators.

Coordinators in the overseas regions are currently still using the Inmarsat SafetyNet operator. 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 for a general switch to SafetyCast.

French national nautical information platform - PING

France is developing its national nautical information platform called PING. This web platform will constitute a shared information system for the transmission, formatting, digitization and posting of nautical information on the Internet.

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 will have 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 regulations in a spatialized form.

A mobile application will also be associated with the platform.

The production and digital dissemination of navigation warnings will use the IHO S-124 Navigational warnings standard under development, 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 when it is published.

The goal is to deploy PING operationally in 2023 in metropolitan France and then in the French overseas territories.

It is planned that the source code of PING will be open source.

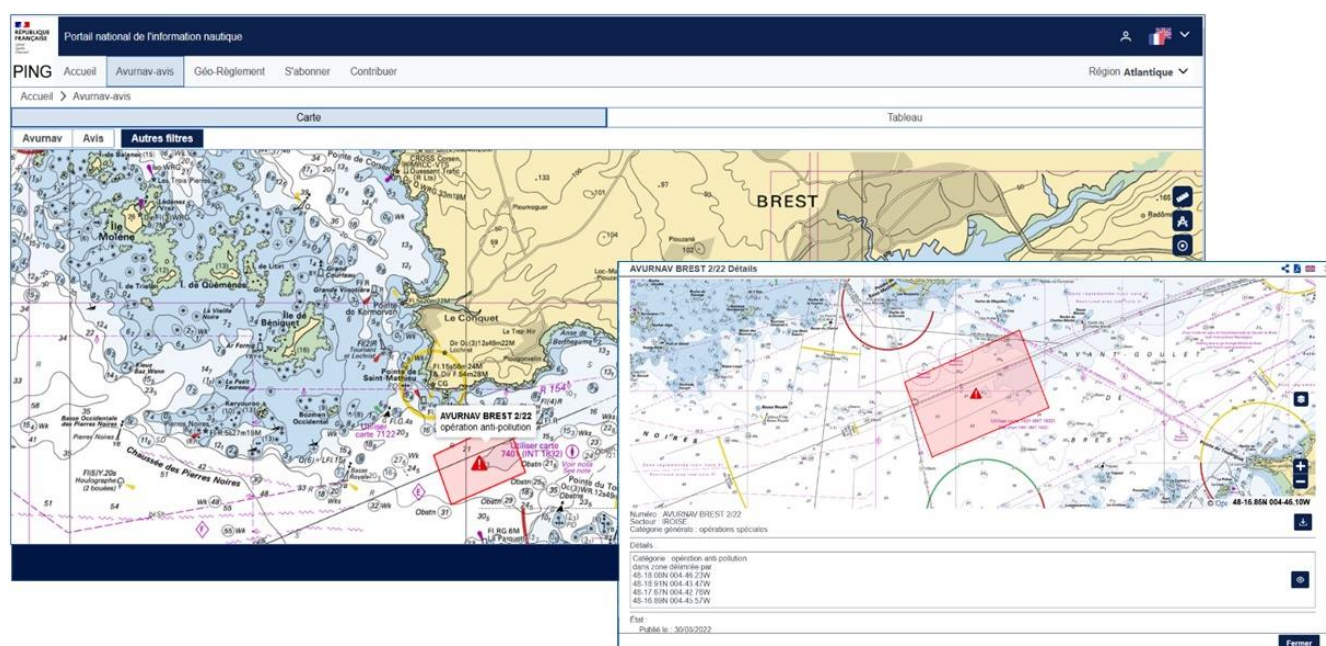


Fig. 6 – Views of the PING portal under test - Viewing navigation warnings

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 21st November 2022:

Survey Status		Depth < 200m			Depth > 200m		
Updated: October 2021		A	B	C	A	B	C
A	France – Clipperton Island	77.7	5.7	16.6	3.3	0	96.7

B	France – French Antilles	33	44.1	22.9	38.1	9.4	52.5
	France – French Guyana	0.3	43.2	56.5	58.8	0	41.2

Charting Status Updated: October 2021		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 Guyana	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-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/sites/default/files/2022-09/Offre_formation_Externe_2022-2023.pdf.

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 L'océan en référence

TRAINING COURSES PROVIDED BY SHOM SCHOOL

COURSE	Average number of students	Duration	Admission	Curriculum
BS/L3* HYDRO*	2 to 8 petty officers / 2 foreign students / 10 students UBO	14 months	based on application file	maneuver and navigation Training specific course on hydrography and oceanography on board end-study project
C SYSRES-HOM	2 to 5 hydrographers petty officers	9 months	based on application file	information technology theoretical and practical training (application to hydrography IT) Practical internships in SHOM IT department and survey unit (GHOA)
C SUP HYDRO***	2 to 5 hydrographers petty officers	4 months	based on application file	advanced technical training on hydrography team management training
NAUTICAL CARTOGRAPHER TRAINING COURSE*	2 to 8 trainees	9 months	based on diplomas or competitive exam	general training on hydrography and geosciences specific training on nautical cartography end-study technical project

SHOM school support to L'ENSTA Bretagne

COURSE	Average number of students	Duration	Admission	Curriculum
HYDROGRAPHIC ENGINEER**	36 months (+12 months for French military students)	based on diplomas or competitive exam	see: www.ensta-bretagne.fr	

Accreditation Logos: Cti, FIG, ICA, CNCP, EUR-ACE®

Footer: www.shom.fr | @shom_fr | shom.fr | shom_fr

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

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.



Fig. 8 – 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

NTR.

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 2020.

Note that the current EMODnet Bathymetry phase (2020-2022) 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 Guyana. 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 10 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 prêcheur (CG Martinique), Le Robert (CG Martinique) ;
- Saint-Martin : Le Marigot (CT Saint-Martin) ;
- French Guyana : Îles du Salut (Shom/DM Guyane), Îlet La Mère (DM Guyane) and Dégrad des Cannes (DM Guyane).



Fig. 9 - French tide gauges in the MACHC region (source: data.shom.fr)

8.4. NEW EQUIPMENT

Since 2021, the RONIM tide gauge network is being renovated: data loggers, transmission equipment and supervision software are renewed. The expected results are: better reliability, improved transmission rates and reduced maintenance needs.

In the MACHC region, the tide gauge of Iles du Salut is renewed. Point-à-Pitre and Fort-de-France stations should be renewed at the end of November 2022.

8.5. CHALLENGES AND ACHIEVEMENTS

NTR.

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 MSDI WG. As part of the MSDI Data audit, the different layers available on the Shom portal for the region were referenced.

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. are distributed under a Creative Commons "CC-BY-SA 4.0" license or an open license, depending on the case.

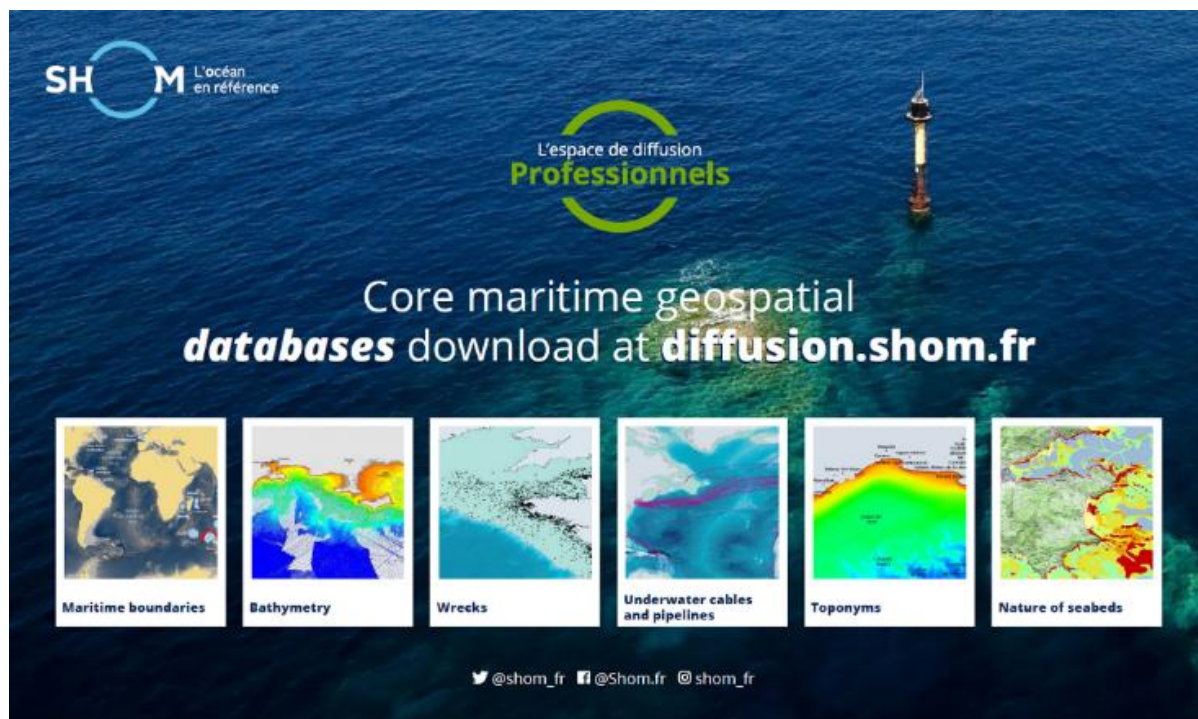


Fig. 10 - Access to Shom's open data (diffusion.shom.fr)

9.5. MSDI NATIONAL PORTAL

Data available 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 MACHC region.

Hereafter are listed some of the latest evolutions:

- Wrecks and obstructions (edition);
- Aids to navigation (AToN) (edition extended to French overseas territories);
- Maritime Limits (new edition): Decree No 2022-20 of 12 January 2022 establishing the outer limit of the territorial sea and the outer limit of the exclusive economic zone of the French Guiana. Also available on maritimelimits.gouv.fr
- Overseas France coastline: former Histolit coastline restricted to the Overseas French territories;
- Bathymetric measurements (edition);
- Coastal altimetry (Litto3D) – Saint-Martin and Saint-Barthelemy: final version.

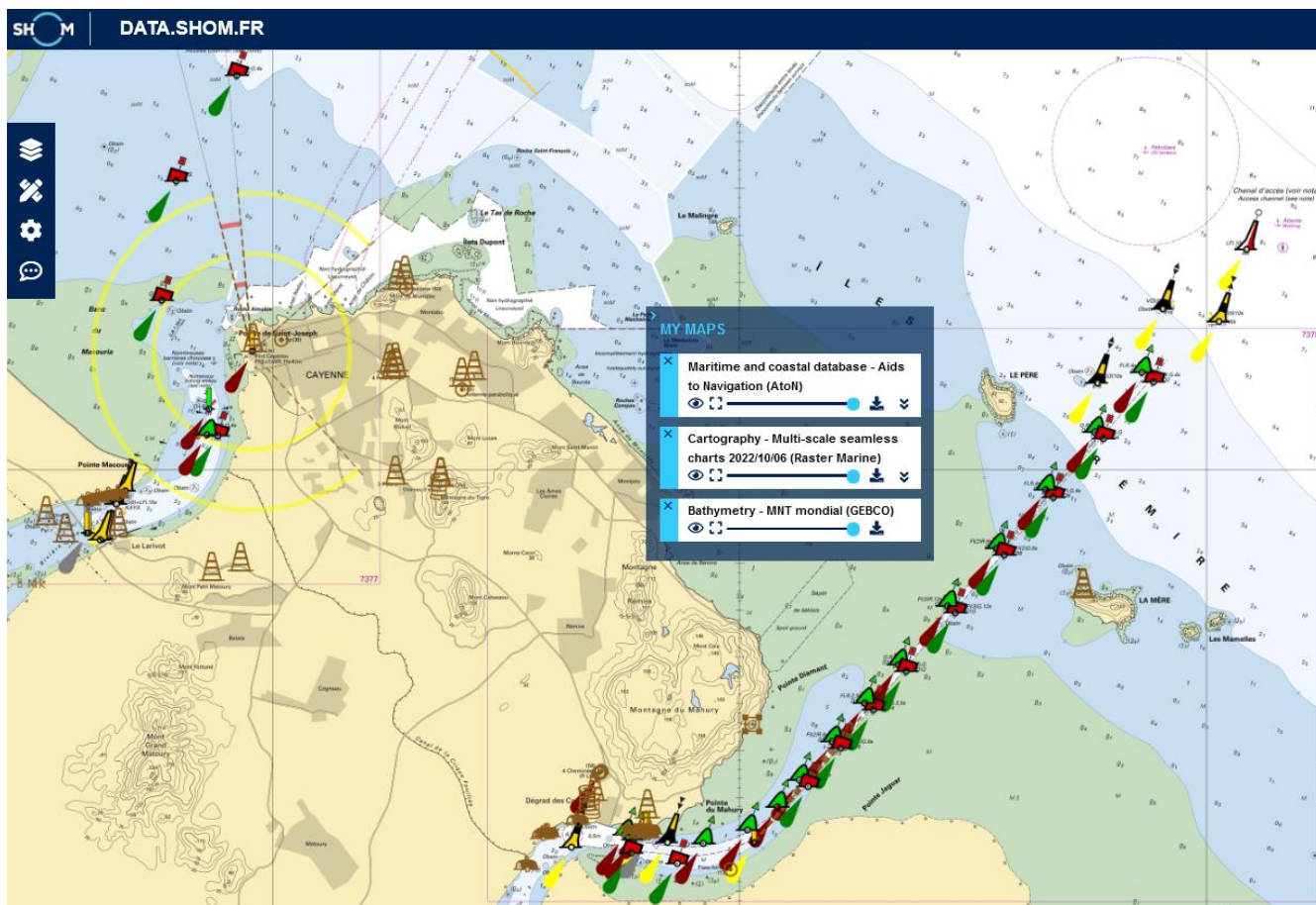


Fig. 11 – Aids to navigation extended to the French overseas territories (data.shom.fr)

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

NTR.

9.7. CHALLENGES AND ACHIEVEMENTS

NTR.

10. INNOVATION

10.1. USE OF NEW TECHNOLOGIES

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 Unmanned Surface Vehicles DriX from iXblue; many other experiments were carried out in 2021 with AUV A18D from ECA and with deep sea AUV HUGIN 6000 Superior from Kongsberg. Following these trials, rentals of HUGIN 6000m Superior have been contracted with Kongsberg in order to give some basic training to people in charge of the high-resolution

deep-sea cartography and to prepare for autonomy. Other experiments are planned in the coming years with the aim of assessing definitively the USV DRIX performances and to challenge UAV in conditional operations. 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. 12 - Experiment of USV Drix deployed from BHO Beautemps-Beaupré (Source: Shom)



Fig. 13 - Experiment of AUV HUGIN deployed from BHO Beautemps-Beaupré (Source: Shom)

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 is used 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
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		✓	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. Although 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.

It should be noted that Shom pilots the bathymetric part of the EMODNET programme. By the end of 2022, Shom will be ready to meet one of the objectives of this programme, which is the delivery of an EMODnet Digital Bathymetry (DTM) of the Caribbean area, around the European overseas islands.

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 division. This division can be reached 24/7 by email 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 and operated by Shom, IPGP, CG Martinique, is recognised as a key component for the development of a regional tsunami warning system.

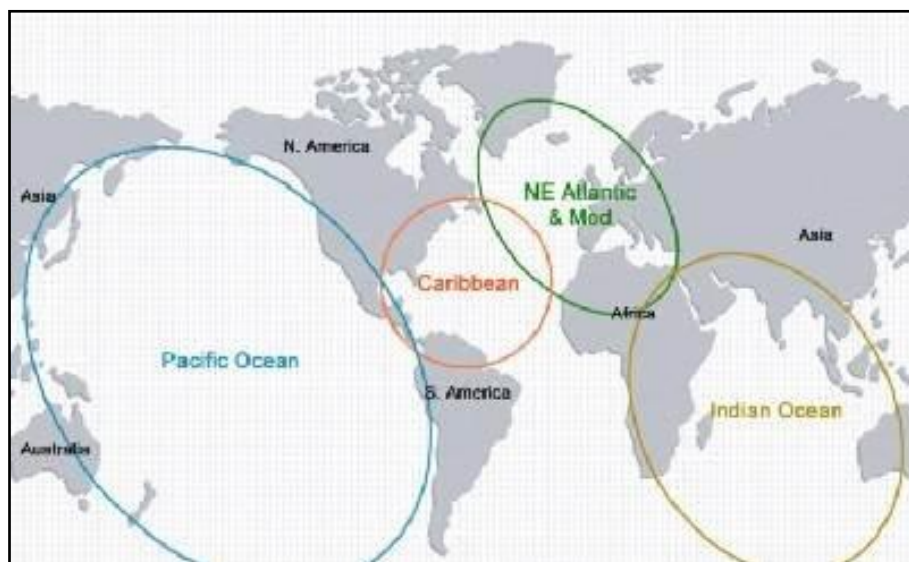


Fig. 14 - Cooperation areas on tsunami warning system (source COI; UNESCO)

- **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>).

Since 2018, 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 Guyana 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 Guyana and Martinique, Guadeloupe, St. Barthelemy islands.

The wave models have been upgraded in March 2022:

- over the Caribbean Sea the model domain is slightly extended southward to the coast of Venezuela, and includes an updated bathymetry;
- in French Guyana, the model now includes variable granulometry in bottom friction parameterization.

The public release of the numerical forecasts of the models is effective since March 25 2021 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.

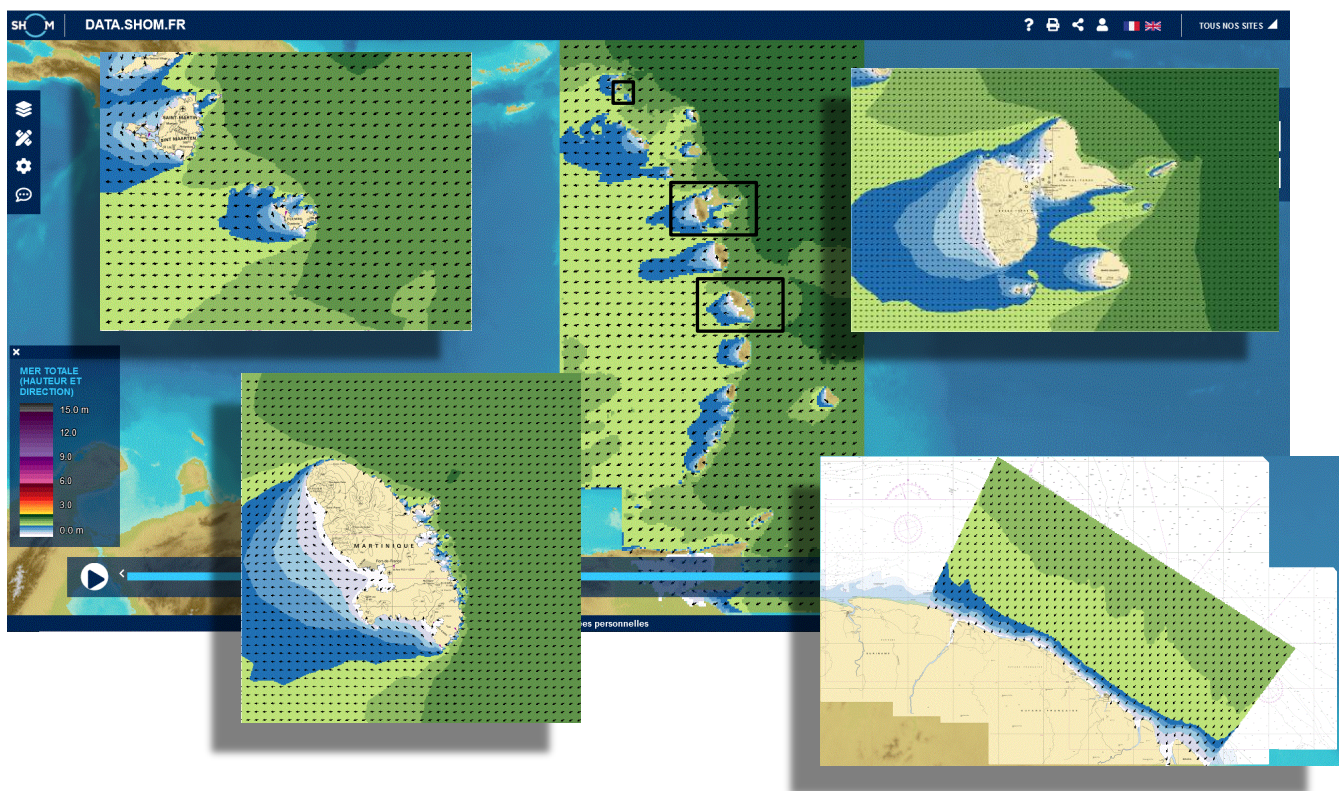


Fig. 15 – Display of waves height and direction on data.shom.fr

11.5. ENVIRONMENTAL PROTECTION

Shom is a player 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. Shom is also a monitoring operator for these descriptors. It is involved in European projects on this issue, such as the JONAS³ project on the assessment of noise from maritime traffic on the Atlantic coast.

2019 and 2020 were mainly devoted to the revision of monitoring programs. The years 2021 and 2022 are 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

NTR.

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 cartographic authorities and the updating of the nautical documentation of this region.

³ Joint Framework for Ocean Noise in the Atlantic Seas <https://www.jonasproject.eu>

ANNEXE I TO THE REPPORT N°039/SHOM/DMI/REX/NP DATED 25/11/2022

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 Guyana, 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 (dops-psm-na-om@shom.fr) of the "Information and Nautical publication" department of the "Maritime Products and services" division: dops-psm-na-omer-infonaut-all@shom.fr	+33 2 56 312 312 +33 2 56 312 273 +33 2 56 312 190 +33 2 56 312 439	/	dops-psm-na-omer-infonaut-all@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 September 15th 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
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 over past year (SMAN12, NCSR7, DRWG19).

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 50 87 +596 (0)6 96 28 40 82	+596 (0)5 96 39 51 65
		EMAIL	emia-antilles.ccmoh24.fct@def.gouv.fr emia-antilles-centops-joc.permanence-ops.fct@intradef.gouv.fr	
IV	French Guyana	Commandant de Zone Maritime Guyane	+594 (0)5 94 39 56 69 +594 (0)6 94 39 56 46	+594 (0)5 94 39 57 20
		EMAIL	info-nautique.charge-com.fct@def.gouv.fr	
XII	Clipperton (Île)	JRCC Tahiti	+689 (0) 40 54 16 16 +689 (0) 40 54 16 15	+689 (0) 40 42 39 15
		EMAIL	contact@jrcc.pf jrcc-tahiti.cdq.fct@intradef.gouv.fr	

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 :

- MACHC CHAIR (DHN - BR)
- IHO SECRETARIAT

COPIES INTÉRIEURES :

- DG
- DMI (D-REX)
- archives (DMIDSD 2.033)