

Direction des missions institutionnelles
et des relations internationales
Division relations extérieures

BREST, le 28 octobre 2021

N° 026/Shom/DMI/REX/NP

NATIONAL REPORT

- SUBJET** : France national report to the 22nd 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.

2. SURVEYS

2.1. COVERAGE OF NEW SURVEYS

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

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 conducted opportunity survey works in march 2021 in Martinique (Fort-de-France harbour), with a new deployable system (cf. 2.3).

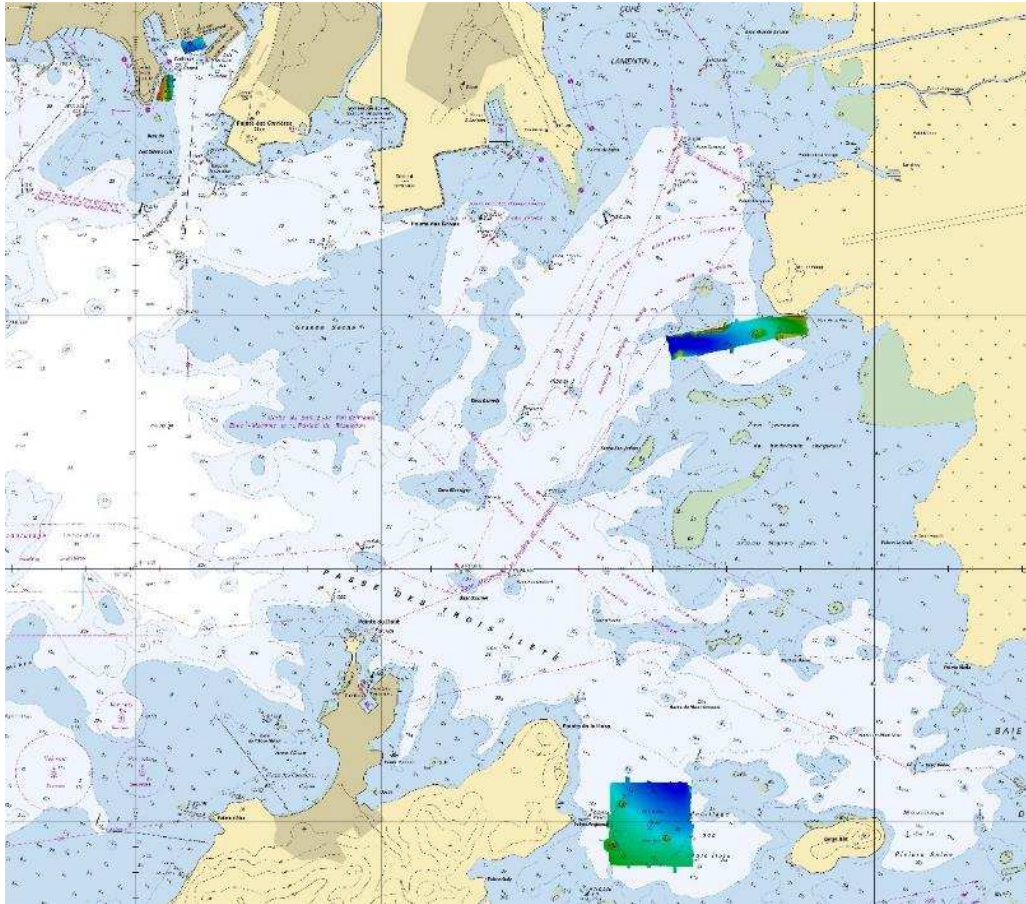


Fig.1 – Survey results in Fort-de-France harbour with the new deployable system

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

- French Antilles: opportunity works around Martinique and Guadeloupe in 2022 and 2023. sext survey campaign in 2024;
- French Guyana: surveys were carried out along the coasts of French Guyana in 2018. No new survey currently planned for next year. 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

The Shom's deployable hydrographic system (for rapid environmental assessment) has been upgraded with a very shallow multibeam sonar (Norbit iWBMSH).

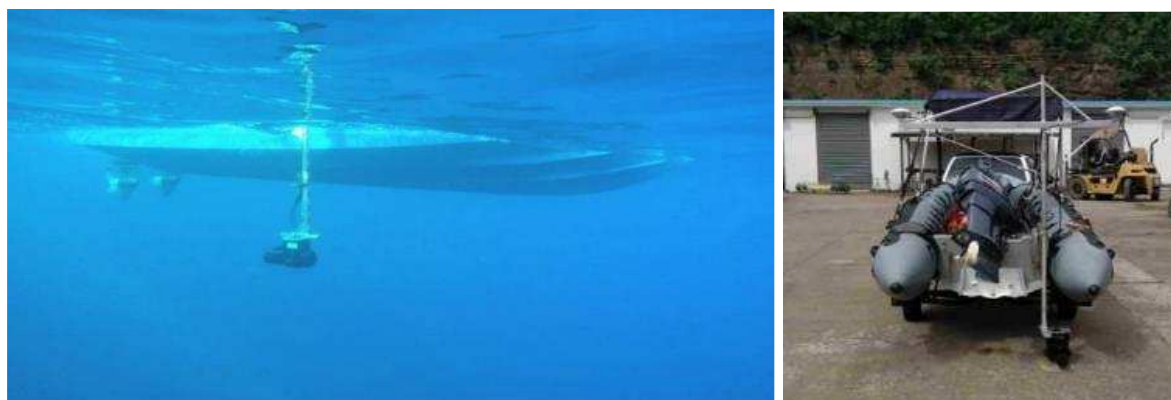


Fig. 2 – MBES Norbit iWBMSH integrated to Shom's deployable hydrographic system

See §10.1 for the preparation of future capacities.

2.4. NEW SHIPS

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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) in the Pacific region

(available online
https://services.data.shom.fr/geonetwork/srv/eng/catalog.search#/metadata/TRAIEMENT_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 last year. Results performed on different geographic areas (including an area in Pacific Ocean) have enabled to evaluate the capacity of the methods on the following objectives:

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

The development part will start in 2022.

2.6. CHALLENGES AND ACHIEVEMENTS

NTR.

3. NEW CHARTS & UPDATES

3.1. ENC COVERAGE, GAPS AND OVERLAPS

As of 15th October 2021, Shom has produced 788 ENCs, of which 51 ENCs within region B. 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.

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 | 5 | 6 | 83% |
| 4 | 10 | 13 | 77% |
| 5 | 28 | 33 | 100% |
| 6 | 5 | | |
| Total | 51 | 55 | 93% |

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

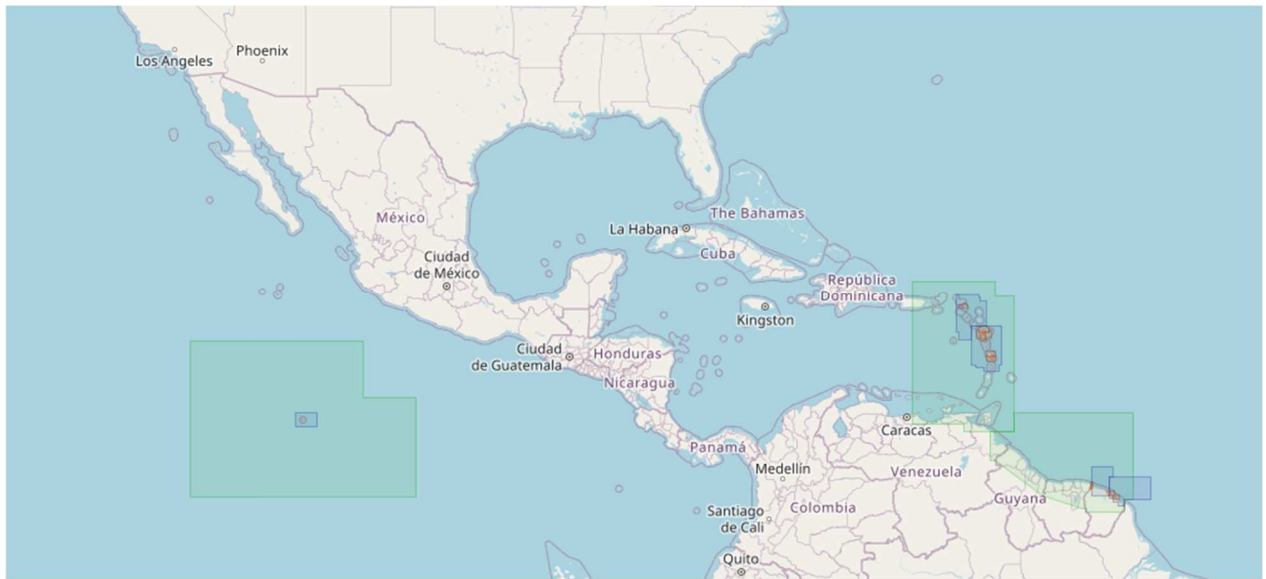


Fig. 3 - Shom ENC coverage within Region B area

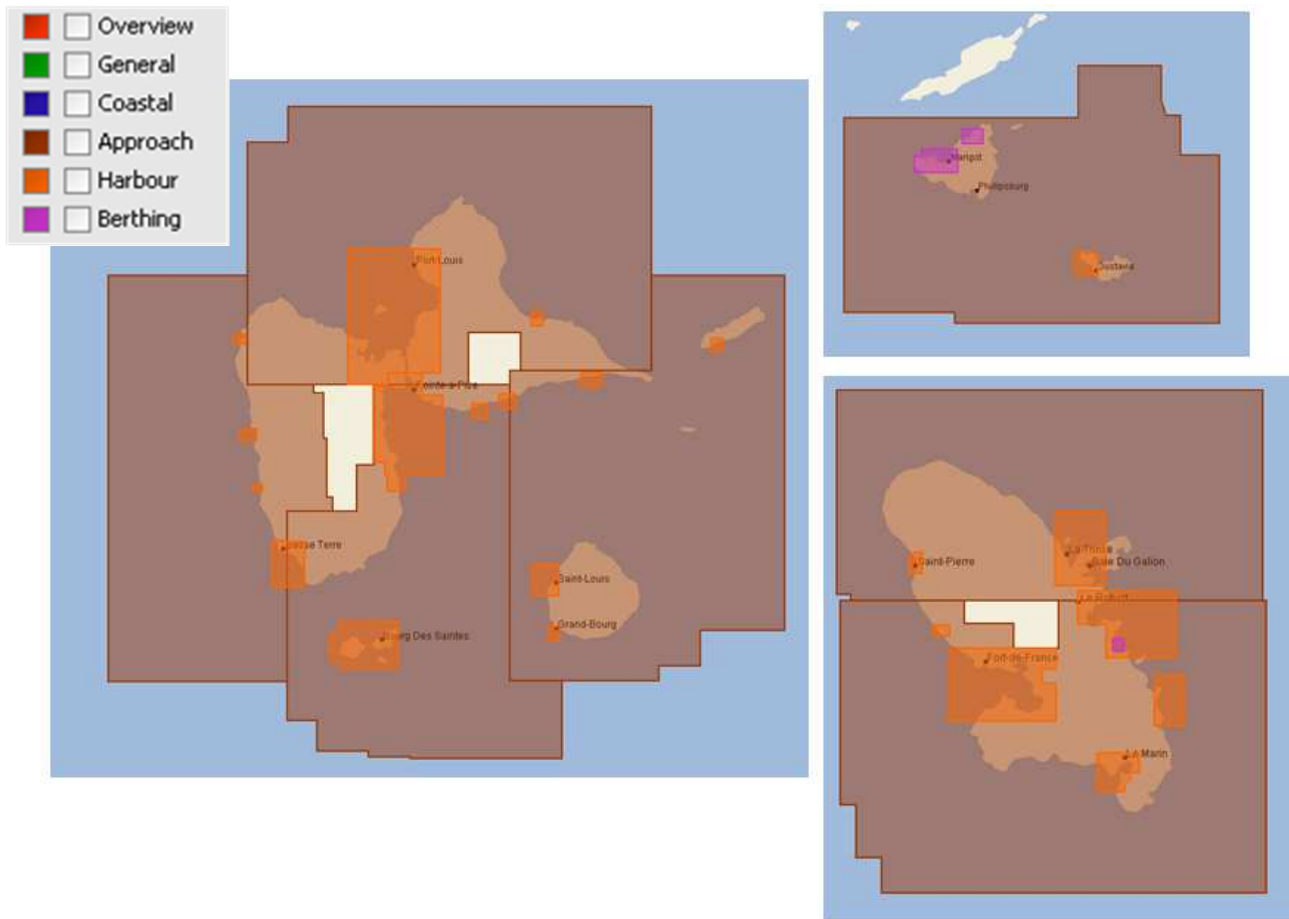


Fig. 4 - Shom ENC coverage focus (UB 4-6) in French Antilles (Guadeloupe, left – St Martin & St Barthelemy, top right – Martinique, bottom right)

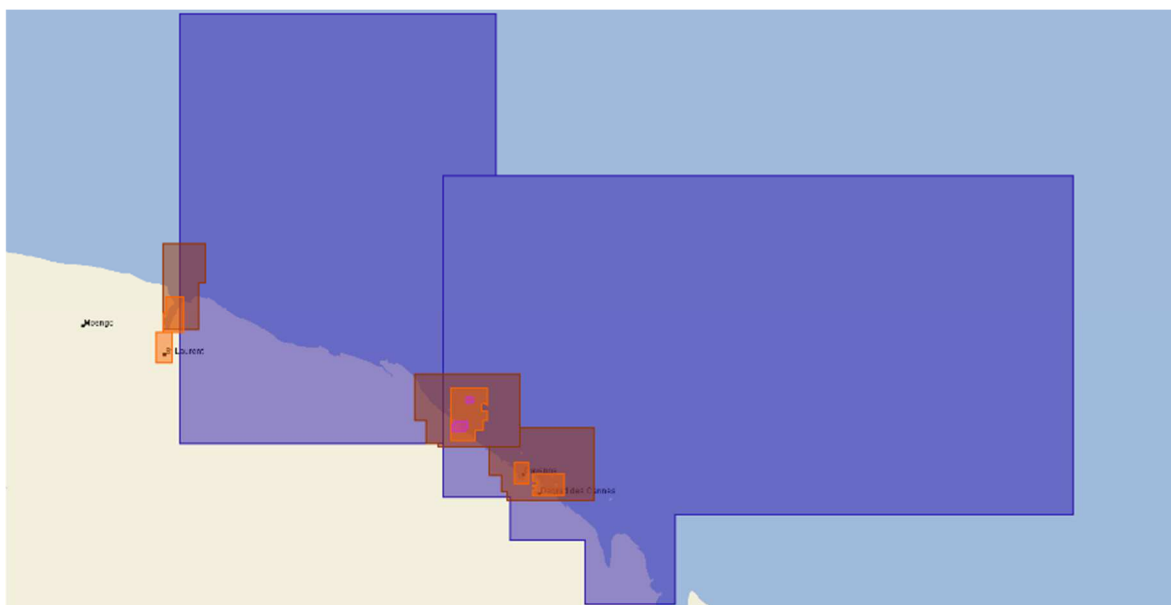


Fig. 5 - Shom ENC coverage focus (UB 3-6) in French Guyana

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 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 |
|----------|-----|----------|---|
| 7088 | / | 20 000 | La Martinique - Havre du Robert et Baie du François |

| | | | |
|------|---|---------|---|
| 7089 | / | Div. | La Martinique - Saint-Pierre, Case-Pilote, Cul-de-Sac du Marin, Baie du Vauclin |
| 7374 | / | 500 000 | Côte de la Guyane française |
| 7379 | / | 50 000 | Abords de Cayenne |
| 7380 | / | 50 000 | Abords de Kourou |

Following charts are planned to be issued in 2021/2022:

| National | INT | Scale 1: | Title |
|----------|-----|----------|-----------------------------------|
| 7471 | / | 60 000 | D'Anguilla à Saint-Barthélemy |
| 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.

The following chart of State at Sea has been edited in March 2021:

Chart No 8523 CX « Carte d'Action de l'Etat en Mer – Océan Atlantique Nord – Zone maritime Antilles – Guyane ».

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

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

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>.

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 |
| 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 | nauticinfo.guyane@netfag.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

NTR.

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 October 2021:

| Survey Status | | Depth < 200m | | | Depth > 200m | | |
|------------------------------|----------------------------|--------------|------|------|--------------|-----|------|
| | | A | B | C | A | B | C |
| Updated: October 2021 | | | | | | | |
| 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 | | Small (<1 M) | | | Medium (1M < / < 100 000) | | | Large (> 100 000) | | | Metric | WGS84 |
|------------------------------|----------------------------|--------------|---|-----|---------------------------|---|-----|-------------------|---|-----|--------|-------|
| | | A | B | C | A | B | C | A | B | C | | |
| Updated: October 2021 | | | | | | | | | | | | |
| 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/2020-10/Offre_formation_2020-2021_Web.pdf

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 L'océan en référence

TRAINING COURSES PROVIDED BY SHOM SCHOOL

BS/L3* HYDRO*

Average number of students: 2 to 8 petty officers/ 2 foreign students/10 students UBO

Duration: 14 months

Admission: based on application file

Curriculum: manoeuvre and navigation Training, specific course on hydrography and oceanography, on board end-study project

C SYSRES-HOM

Average number of students: 2 to 5 hydrographers petty officers

Duration: 9 months

Admission: based on application file

Curriculum: information technology theoretical and practical training (application to hydrography IT), Practical internships in SHOM IT department and survey unit (GHOA)

C SUP HYDRO***

Average number of students: 2 to 5 hydrographers petty officers

Duration: 4 months

Admission: based on application file

Curriculum: advanced technical training on hydrography, team management training

NAUTICAL CARTOGRAPHER TRAINING COURSE*

Average number of students: 2 to 8 trainees

Duration: 9 months

Admission: based on diplomas or competitive exam

Curriculum: general training on hydrography and geosciences, specific training on nautical cartography, end-study technical project

SHOM school support to

L'ENSTA Bretagne

Average number of students: 36 months (+12 months for French military students)

Duration: based on diplomas or competitive exam

Admission: see: www.ensta-bretagne.fr

HYDROGRAPHIC ENGINEER**

www.shom.fr

@shom_fr | shom.fr | shom_fr

Fig. 6 – 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. 7 – 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.

10 French permanent tide gauges are 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 Guyana : Îles du Salut (Shom/DM Guyane), Îlet La Mère (DM Guyane) and Dégrad des Cannes (DM Guyane).



Fig. 8 - French tide gauges in the MACHC region (source: data.shom.fr)

8.4. NEW EQUIPMENT

NTR.

8.5. CHALLENGES AND ACHIEVEMENTS

The Shom tide gauges will undergo a renewal of the datalogger and some real time transmission elements in 2022 and 2023.

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.

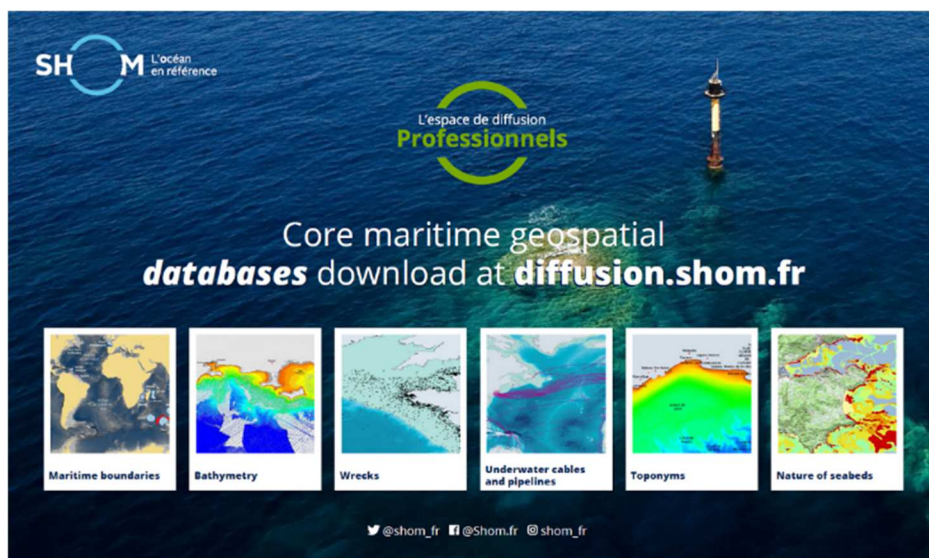


Fig. 9 - Access to Shom's open data (diffusion.shom.fr)

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);
- Port information (new layer);
- Regulation – Navigation (new layer);
- Worldwide sediments map (edition);
- New tools and services (<https://services.data.shom.fr/support/fr/>);
- New ergonomics of data.shom.fr portal (see next chapter);
- Redesigned drawing tool.

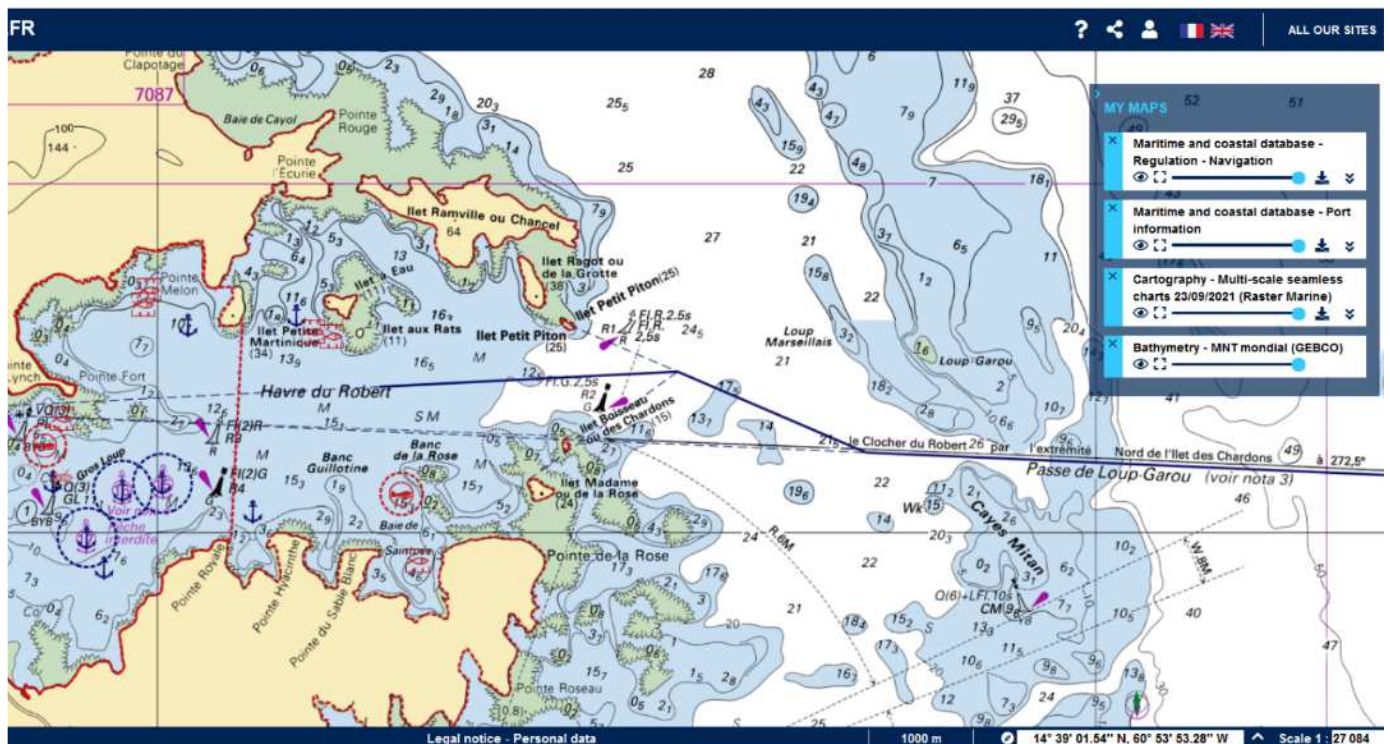


Fig. 10 - New layers: Port information & Regulation - Navigation (data.shom.fr)

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

Between July 2019 and June 2020, a UX designer from the "designers of general interest" (DIG) program supported by the French interdepartmental digital direction (DINUM) was tasked with improving the user experience of dissemination portals including data.shom.fr. Based on feedback from portal users, a new portal ergonomics with, in particular, a more prominent cartography and a redesigned drawing tool has been defined. This new portal was put online at the beginning of June 2021.

Among the new features of this new version of data.shom.fr:

- A more fluid interface with repositionable windows;
- A redesigned drawing tool to facilitate its use;
- The "Ocean Forecast" tab restructured;
- A redesigned catalogue of available layers;
- New measurement tools: surface calculation and azimuth distance;
- A complete version in English.

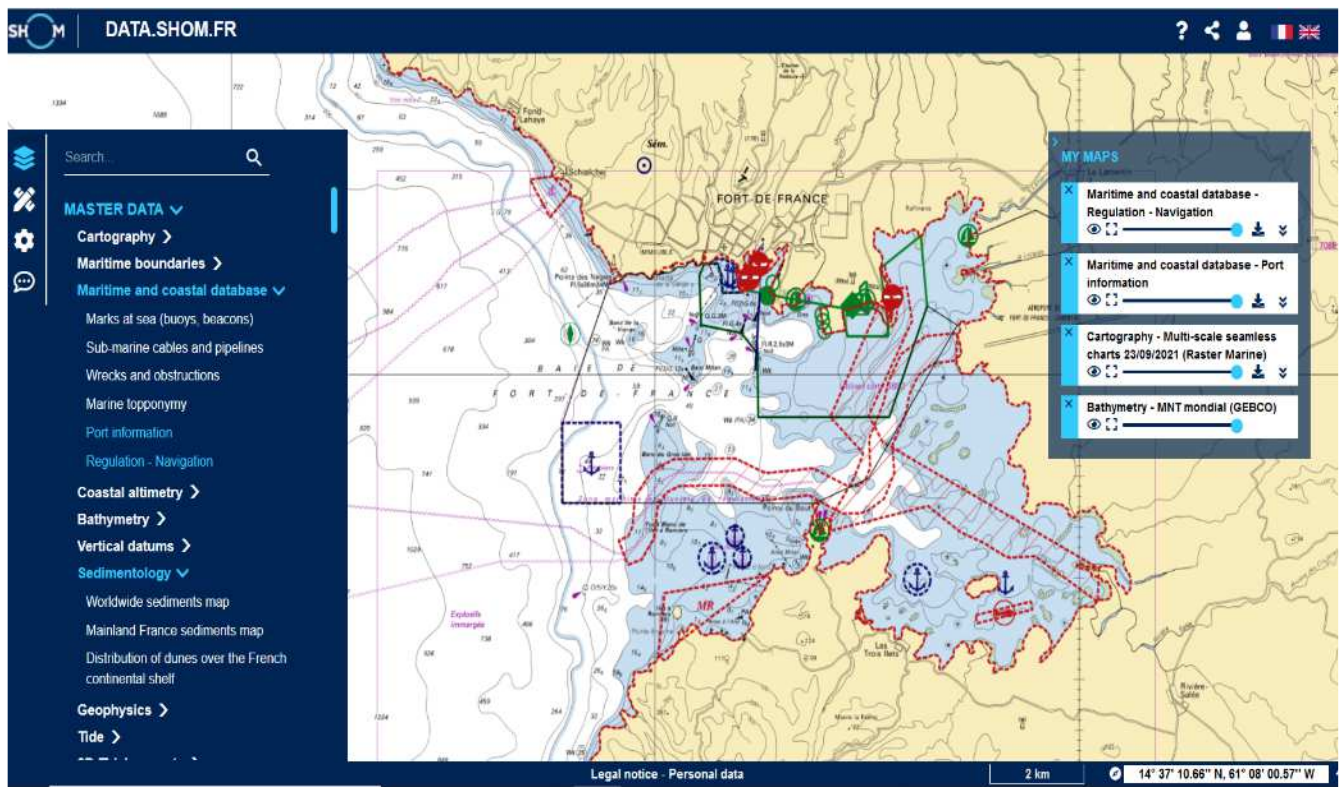


Fig. 11 - New ergonomics of Shom's maritime geographic information portal (data.shom.fr)

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: in January with Autonomous Underwater Vehicle Gavia from Teledyne; in May and June with USV Inspector and AUV A18D from ECA; in August with 2 gliders Sea Explorer from Alseamar and a last one in October with deep sea AUV HUGIN Superior from Kongsberg Maritimes. Other experiments are planned in 2022 and in the coming years. 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 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 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

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 |

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 fax +33 298 221 665 or 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, IGP, CG Martinique, is recognised as a key component for the development of a regional tsunami warning system.

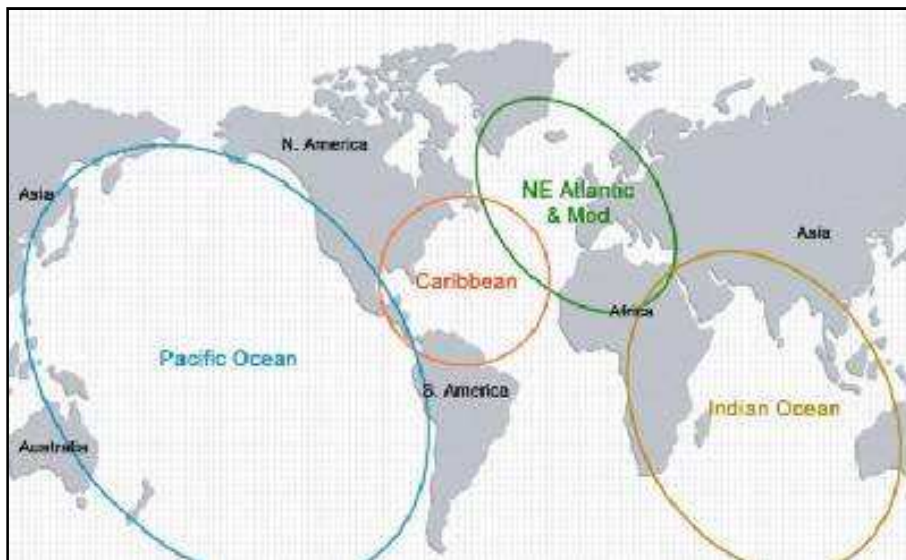


Fig. 14 - Cooperation areas on tsunami warning system (source COI; UNESCO)

- **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 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.

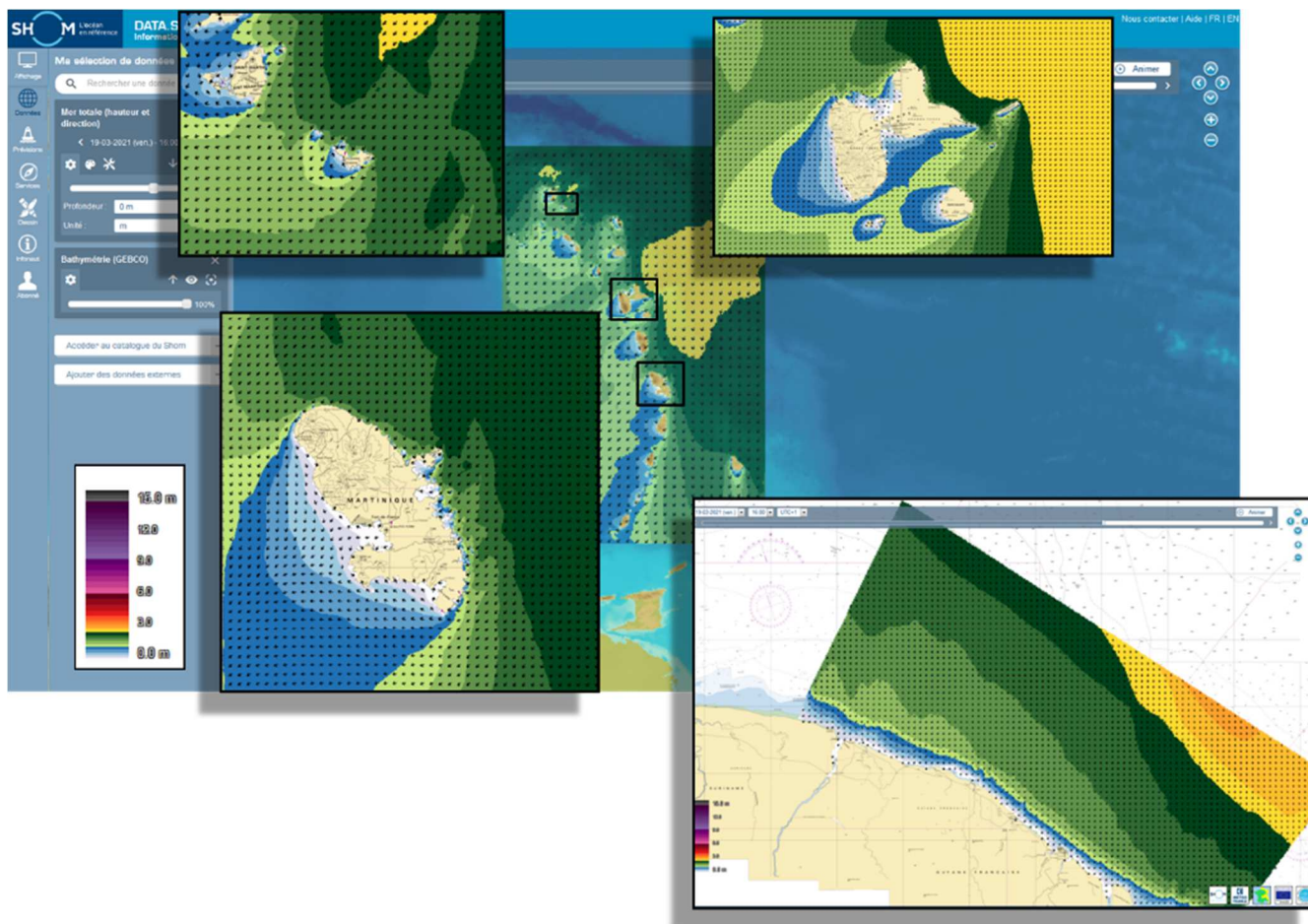


Fig. 15 – Display of waves height and direction on data.shom.fr

Upgrades of the wave model configurations are scheduled by the end of 2021:

- over the Caribbean Sea to extend the domain to Haiti, include an updated bathymetry and set up hourly wind forcings;
- in French Guyana, to include variable granulometry in bottom friction parameterization.

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 year 2021 is focused on the calculation of indicators and assessments of Good Ecological Status. These indicators will then be reported to the EU by France.

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

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: na-om-all@shom.fr | +33 2 56 312 312 +33 2 56 312 273 +33 2 56 312 303 | / | na-om-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 39 57 20 | +596 (0)5 96 39 51 65 |
| | | EMAIL | emia-antilles.ccmoh24.fct@def.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 INTERIEURES :

- DG
- DMI
- DMI/REX
- ARCHIVES (DMIDSD/2.033).