REPORT

Direction des missions institutionnelles et des
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FRANCE NATIONAL REPORT
TO THE 18TH MEETING OF THE MESO AMERICAN AND CARIBBEAN SEA HYDROGRAPHIC COMMISSION (MACHC)

1. Hydrographic Service: General

Following up its targets and performance contract for the 2013-2016 period, Shom is pursuing the achievement of its different commitments based on the National Maritime & Littoral Strategy and the Defense & Security White book according to a new 4 years target and performance contract covering the 2017-2020 period, which has been approved one year ago by Shom's Board.

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

2. Surveys

2.1. Coverage of new surveys

Shom did not conducted new survey in the MACHC area since January 2016, except several local surveys completed right after IRMA hurricane in October 2017 (in particular, access to Galisbay's harbour and access to Anse Marcel and Port la Royale).

Third parties' surveys have been communicated to the Shom since the beginning of the year:

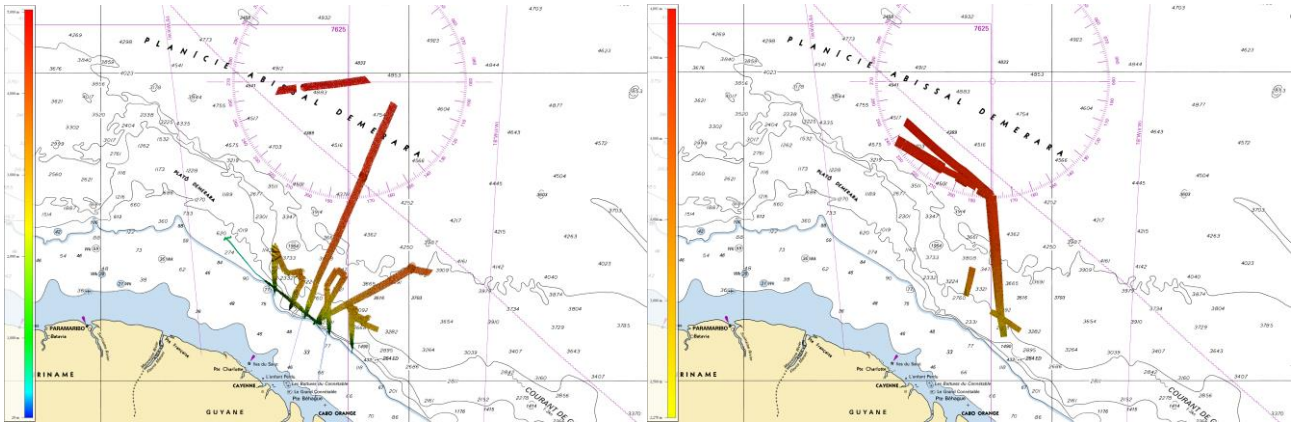


Fig.1: Third parties' surveys in French Guyana's EEZ (E2012 038 00 & E2012 039 00)

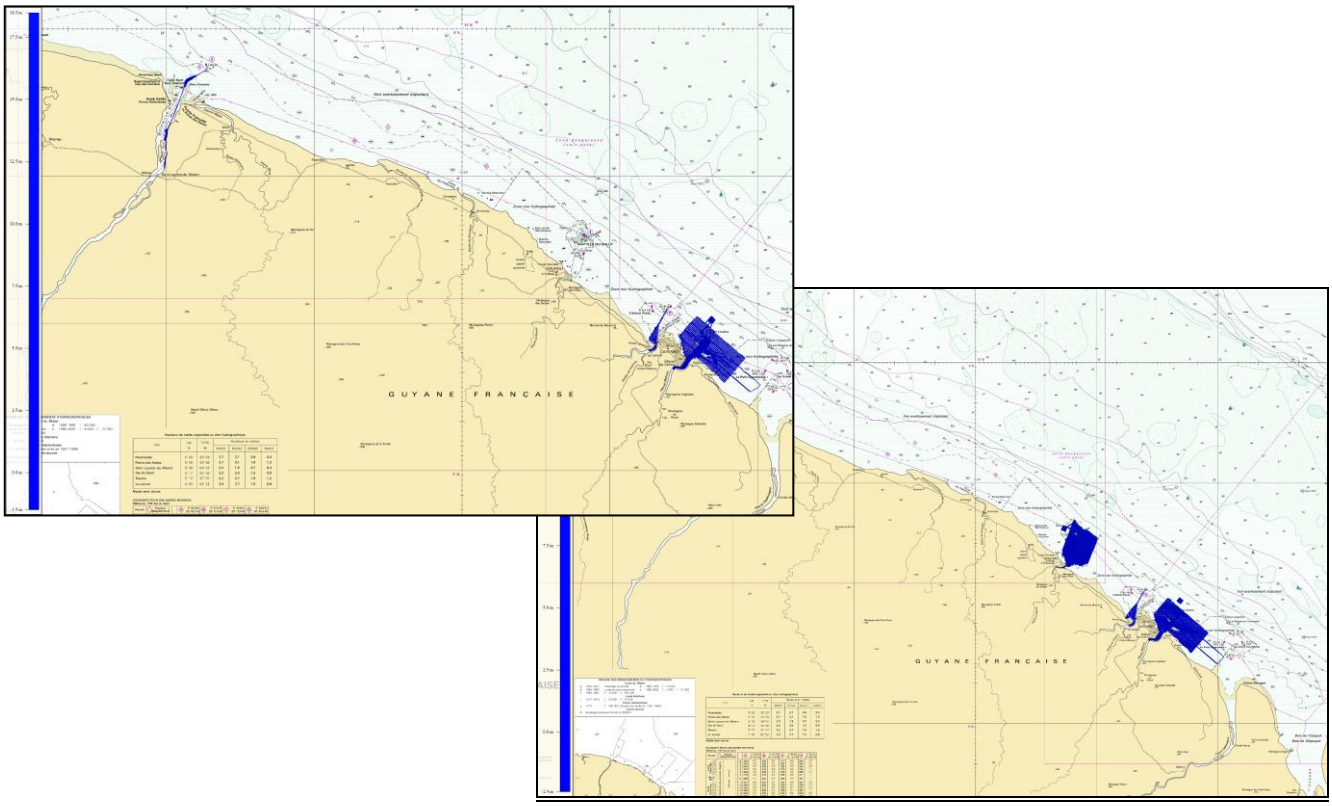


Fig.2: Surveys of French Guyana's coast (Direction de la Mer de Guyane - E2015 061 00 & E2016 051 00)

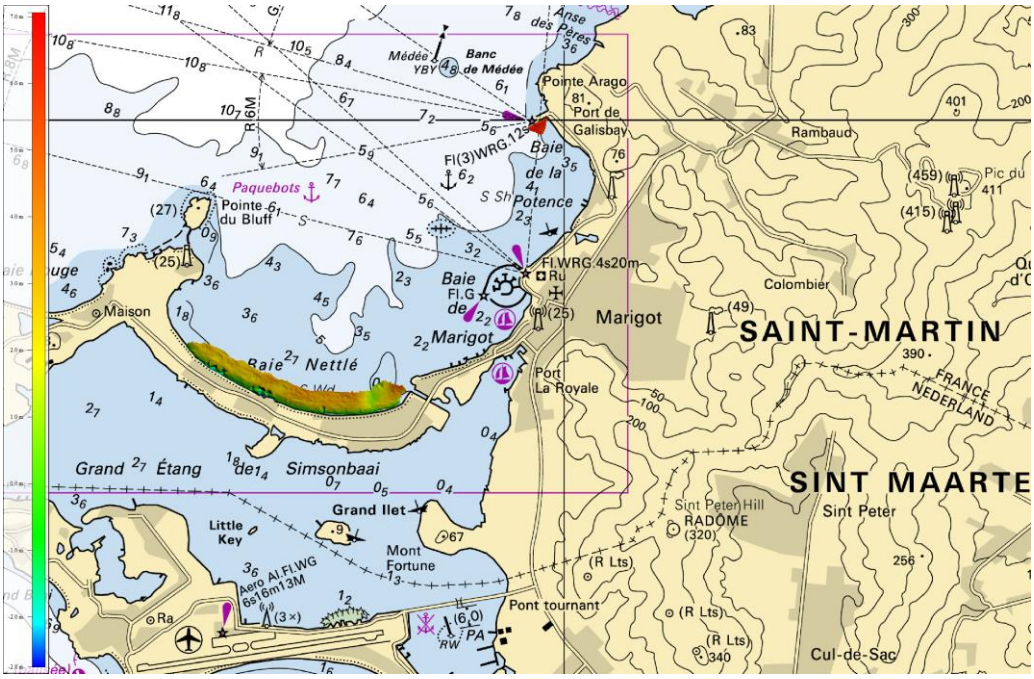


Fig.3: Survey of Baie Nettlé in Saint-Martin by INGEO (Saint-Martin – E 2016 048 00)

2.2. LIDAR Surveys

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

French overseas departments of Martinique and Guadeloupe have been surveyed in 2012-2013. All Litto3D® products are freely available through Shom's data portal (data.shom.fr) and the French Government open platform for public data (data.gouv.fr).

A combined topo-bathymetric lidar survey of the French Collectivity of Saint-Martin should be conducted in 2018. Any opportunity to liaise with other parties interested to take advantage of this future mobilization in the Caribbean has to be discussed shortly.

2.3. Shom's survey programme for the region

Shom's 2017-2020 national hydrographic survey programme[1] 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 (fig.4).

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

- **French Antilles**:

  Pursue of survey works in coastal waters with main harbour access channels and anchorage areas of St. Martin and St. Barthélémy in 2020. Opportunity works around Martinique and Guadeloupe.

- **French Guyana**:

  Pursue of survey works in coastal waters in order to define bathymetry in fishing areas to support the action of the State at sea. A 3 months deployment of a BH2 survey ship is scheduled by 2018, regarding survey work in French Guyana waters and completing the 2013 survey (see report to the 14th meeting of the MACHC).

- **Clipperton Island**

  No systematic surveys scheduled, only opportunity works.

[1] http://www.shom.fr/fileadmin/data-www/01-LE_SHOM/01-PRESENTATION_GENERALE/06-LE_PROGRAMME_ANNUEL/PNH_2017-2020_WEB_BD.pdf

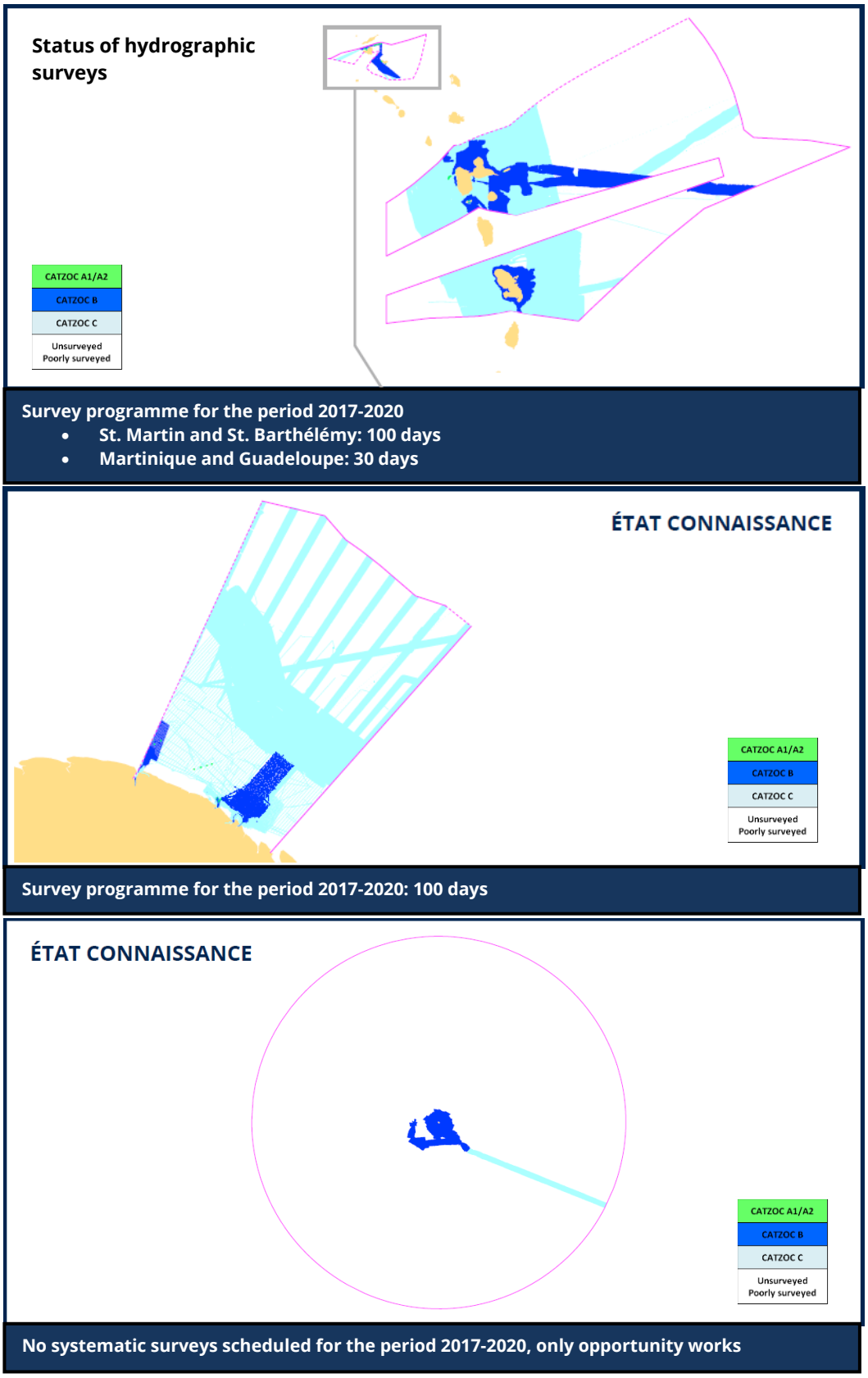


Fig.4-a/b/c: (top to bottom) Existing surveys for French Antilles, French Guyana and Clipperton Island waters

2.4. New technologies and / or equipment

NTR.

2.5. New ships

NTR.

2.6. Problems encountered

NTR.

3. New charts & updates

3.1 ENCs

As of 7 November 2017, Shom's collection of ENCs has reached 585 cells of which 46 cells within that region. Since last MACHC conference, 1 UB4 and 3 UB5 have been produced in French Guyana (Maroni River) and 12 UB5 and 1 UB6 in La Martinique and Guadeloupe. 3 ENCs remain to be produced to achieve the planned coverage.

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

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

Usage Band	Produced Cells	Planned Cells	Percentage
1	0	0	N/A
2	3	3	100%
3	4	4	100%
4	10	10	100%
5	24	32	91%
6	5		
Total	46	49	94%

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

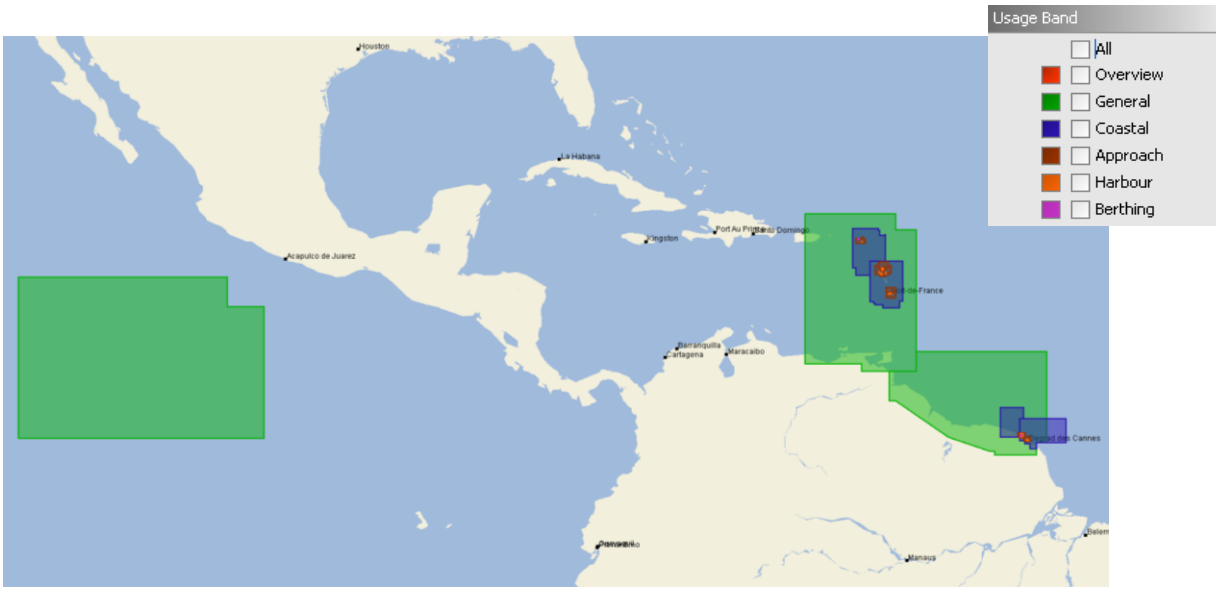


Fig.5: Shom' ENC coverage within Region B area.

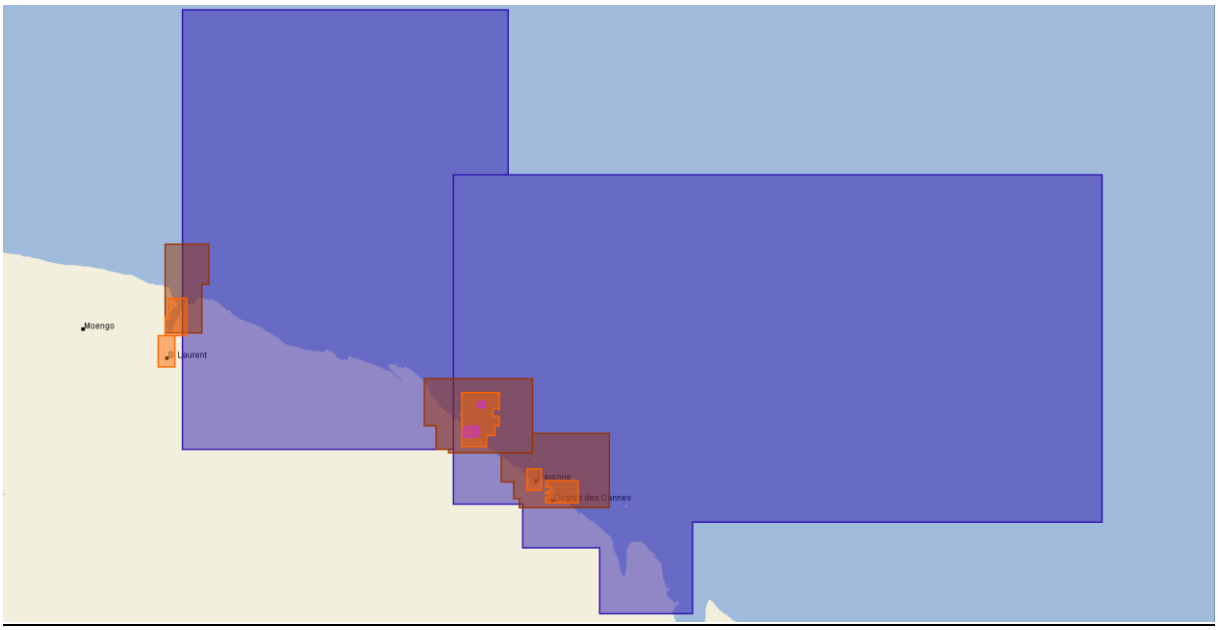


Fig.6: Shom ENC coverage focus (UB 3-6) in French Guyana.

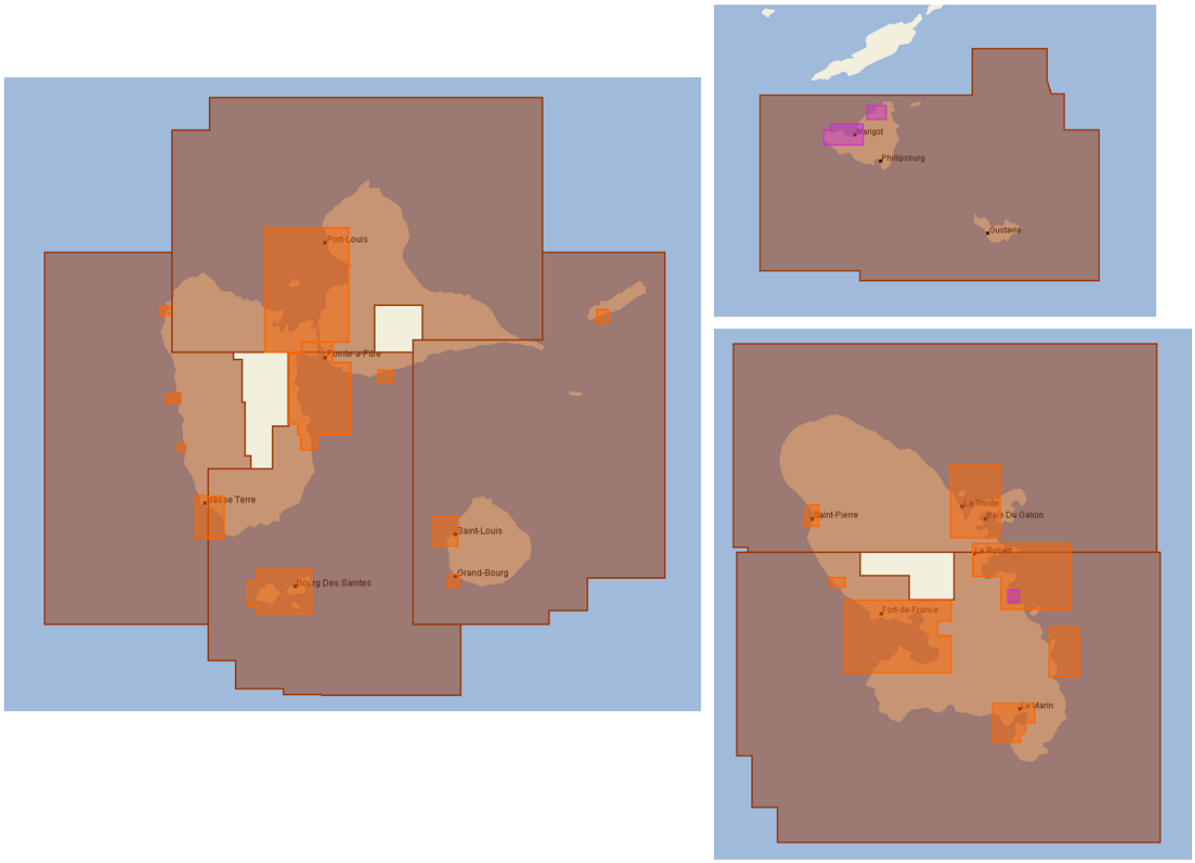


Fig.7: Shom ENC coverage focus (UB 4-6) in French Antilles (Guadeloupe, left – St Martin & St Barthélémy, top right – Martinique, bottom right).

Shom's remaining ENC production plan is depicted in the following table:

Port/Area	Usage Band	Corresponding FR Paper Chart	Date of issue
Ports et mouillages de Grande-Terre, de Marie-Galante et de la Désirade : Saint-François, Le Moule, Grande Anse, Sainte-Anne et anse Accul, Petit Havre	5	7102 (insets A,C & D)	2017/2018

3.2. ENC Distribution method

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

Since 2014, Shom provides georeferenced marine charts in GeoTiff and S-57 format when produced. These digital marine charts are now available through Shom's online store http://diffusion.shom.fr under various licenses[1] according to the purpose of use. These data can be used with GIS or cartographic software for commercial or private purposes.

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

3.3. RNCs

NTR.

3.4. INT charts

French charts include a QR Code to direct access to NTM applicable to that chart. Moreover, all up to date French charts are now available by 'Print On Demand' to French forces users.

Shom's INT chart production plan for this region is completed:

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
7100	/	15 000	Abords de Pointe-à-Pitre
7378	/	15 000	Accès au Degrad des Cannes
7472	/	Various	Ports et mouillages de Saint-Martin (Sint Maarteen) et de Saint-Barthélemy
7471	/	60 000	D'Antigua à Saint-Barthélemy

[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*

Following charts are planned to be issued in 2018:

National	INT	Scale 1:	Title
7480	/	10 000	Accès au fleuve Kourou – Port de Pariacabo
7481	/	25 000	Approches de Kourou – Iles du Salut
7379	/	15 000	Abords de Cayenne
7376	/	60 000	Embouchure du fleuve Maroni
7471	/	60 000	D'Antigua à Saint-Barthélemy
6892	/	15 000	Baie de Fort-de-France

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

NTR.

3.7. Problems encountered

Following hurricane Irma on 5 September 2017, several actions have been conducted on French charts and ENCs:

- ENCs

Chapter 2.2.3.1. of the UOC (S57 – Appendix B.1, Annex A), Quality of bathymetric data, has the following :

> • As a result of some disasters, e.g. earthquakes, tsunamis, hurricanes, it is possible that large areas of seafloor have moved and/or become cluttered with dangerous obstructions. Emergency surveys may subsequently be conducted over essential shipping routes and inside harbours. Outside these surveys, all existing detail is now suspect, whatever the quality of the previous surveys. In such cases, the CATZOC value should be reclassified to value *5* (zone of confidence D) in the affected areas outside the area covered by emergency surveys.

In accordance with this rule, Shom changed the CATZOC value on the large scale ENCs of St Martin and St Barthélémy.

In addition, a CNTARE has been created, with INFORM ="*Major changes to depths and topography in the area covered by this chart may have occurred as a result of hurricane Irma on 5 September 2017. Mariners must be aware of possible uncharted dangers to navigation and contact the harbour authority for access conditions*."

Resurveys will be needed in time to be able to revert to better CATZOC values.

- Paper charts

Notes have been added to FR7471 and FR7472 to warn the mariner.

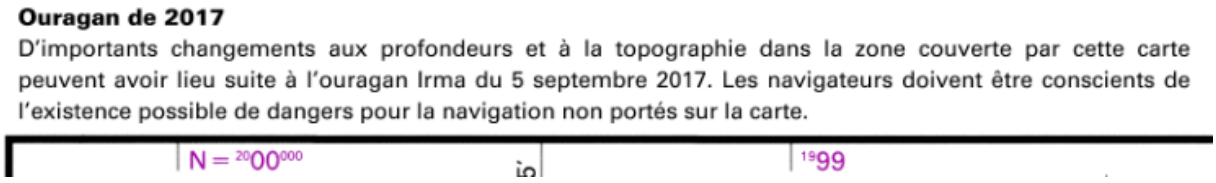


Fig.8: Note added to FR7472 by NTM/Block.

4. New publications & updates

4.1 New Publications

NTR.

4.2. Updated publications

A new edition of the list of lights LD (Saint-Pierre-et-Miquelon – Petites Antilles – Guyane) was released in July 2017.

A new edition of Radio Signals 92.2 (Stations Radio Maritimes – Amériques – Océanie – Asie(Est)) was released in May 2017.

A new edition of Radio Signals 96.2 (Stations Météorologiques – Amériques – Océanie – Asie(Est)) was released in May 2017.

4.3. Means of delivery

By the end of 2016, all nautical publications are available in digital format (pdf files) on Shom's online shop (diffusion.shom.fr). Most publications are still available on paper, but from now on, new editions of nearly all publications will be only digital.

5. MSI Existing infrastructure for transmission

Since January 1st 2014, Shom's notices to mariners (GAN) are exclusively available under digital formats, either downloadable on http://diffusion.shom.fr/gan or by annual subscription (CD-rom).

5.1. New infrastructure in accordance with GMDSS Master Plan

There is no NAVTEX station related to 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	opsmer.faa@wanadoo.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 (Île)	JRCC Papeete	+689 (0) 40 54 16 16 +689 (0) 40 54 16 15	+689 (0) 40 42 39 15	contact@jrcc.pf

5.2. Problems encountered

NTR.

6. C-55 Latest update

The last C-55 update by France has been transmitted to the IHB on June 30th 2017. The C-55 charting and surveying status values regarding Regions A and B areas under Shom responsibility are summed up in the following tables :

Survey Status		Depth < 200m			Depth > 200m		
		A	B	C	A	B	C
A	France - Clipperton Island	0	52,6	47,4	0	1,1	98,9
B	France - French Antilles	1	60,3	38,6	0	8,1	91,8
	France - Guyane	0,1	3,7	96,2	0	0	100

Charting Status		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	0	0	NA	0	0	50	100	100
B	France - French Antilles	100	0	NA	100	0	100	100	0	100	100	100
	France - Guyane	100	0	100	100	0	66,67	100	0	75	100	100

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

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

7.1. Training received, needed, offered

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

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

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

Within the Eastern Atlantic Hydrographic Commission capacity building work program, Shom has developed a maritime safety information e-learning course (http://rsm-msi.org/). This course is only available in French for the moment but a proposal has been made to translate it in English.

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

NTR.

7.3. Definition of bids to IHO CB Work Programme

NTR.

8. Oceanographic activities

8.1. GEBCO/IBC's activities

NTR.

8.2. Tide gauge network

Shom is the national coordinator and reference authority for the observation of the sea level, managing and issuing the resulting data. Besides, including these produced by Shom tidal network, RONIM. These missions are carried out under the REFMAR programme. All real time and processed tide gauge measurements collected under that programme are accessible on web http://data.shom.fr/#donnees/refmar in areas under French jurisdiction.

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

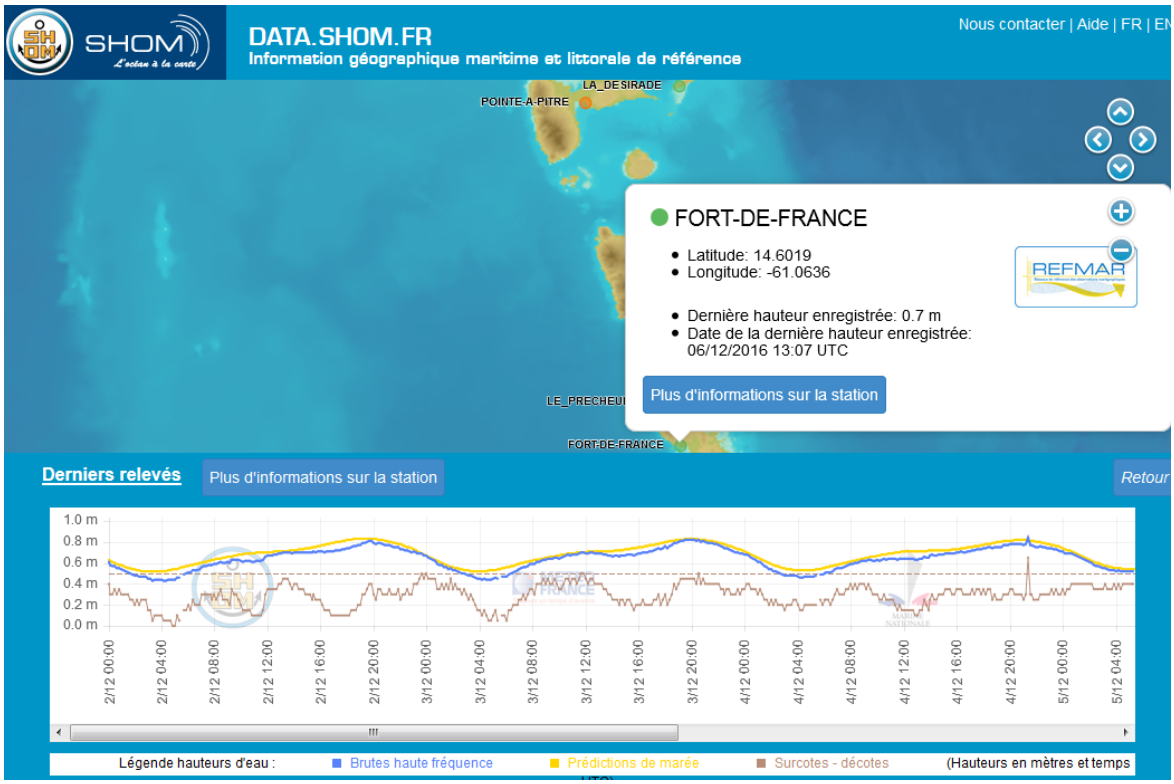


Fig.10: Real time measurements from REFMAR tidal network on Shom's web portal (data.shom.fr)

Since May 2016, Shom's tidal predictions are available through a new web/smartphone/tablet-friendly online service named maree.shom.fr. This service provides free access of one year of tidal predictions from over 1,000 harbours worldwide.

Within the REFMAR network, 10 French permanents 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 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).

More information about Shom's involvement can be found through the following link :

http://refmar.shom.fr/fr/sea_level_news_2012/t2/coordonner-l-alerte-aux-tsunamis-dans-les-petites-antilles-source-deal-guadeloupe

During 2017 cyclonic season, tide gauges of northern Antilla were decisive in providing authorities with first-hand recordings of sea level rises, allowing quick assessment of storm surges. Saint-Martin tide station was directly hit by Irma cat. 5 Hurricane and suffered minor damages while being able to record the 2m surge.

8.3. New equipment

NTR.

8.4. Problems encountered

NTR.

9. Other activities

9.1. Meteorological data collection

NTR.

9.2. Geospatial studies

NTR.

9.3. Disaster prevention

- **Tsunami :**

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.

France 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 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.

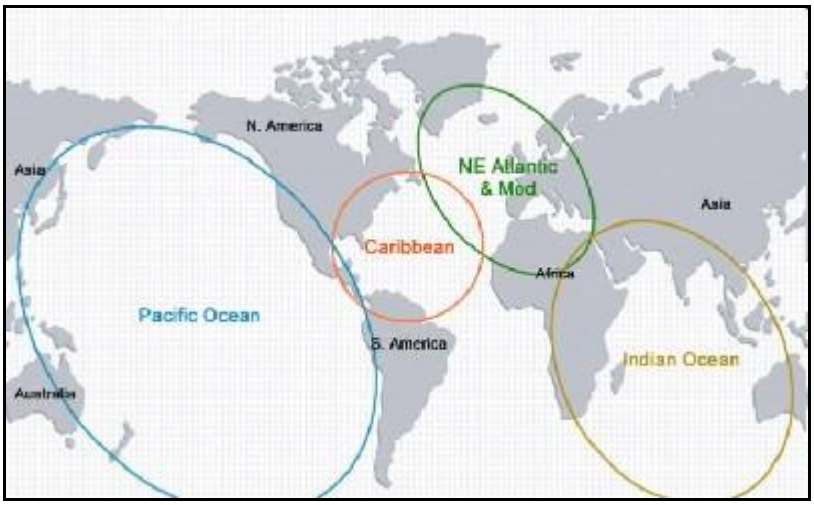


Fig.11: Cooperation areas on tsunami warning system (source COI; UNESCO).

- **Coastal flooding :**

Shom is associated with *Météo-France* in the provision of an alert system against coastal flooding named *Vigilance Vagues Submersion (VVS).* This allows for a better anticipation of this destructive phenomenon and protection of the populations living in the littoral area of Metropolitan France. An extension of that alert system towards French overseas departments is currently under work.

Shom provides the tidal predictions, expertise and models in coastal hydrodynamics and real time tide gauge observations as well as information relative to extreme sea levels and bathymetry. *Météo-France*'s marine forecasters examine and compile the data and produce a map depicting the level of coastal flooding threat together with the risk of tall waves for each French metropolitan department.

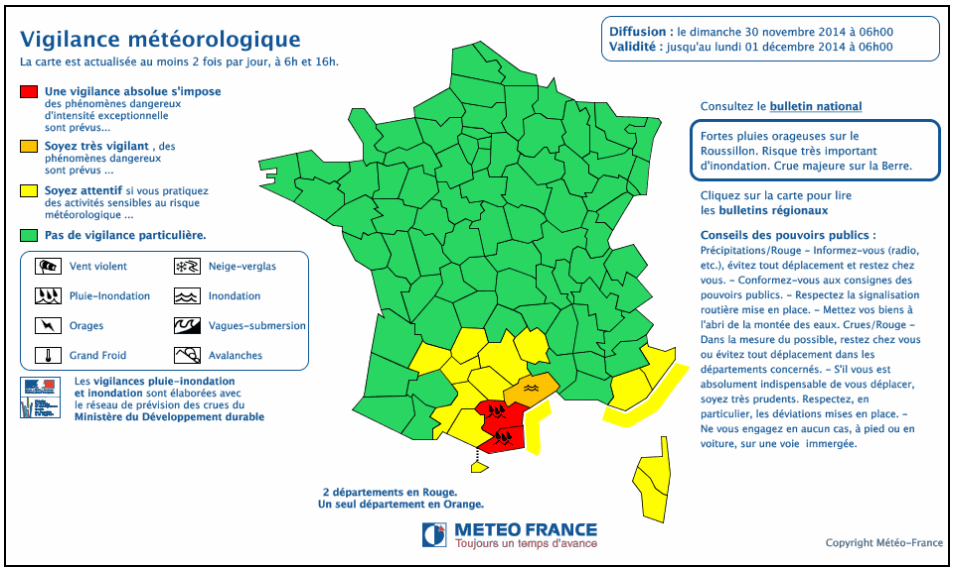


Fig.12: An example of coastal flooding alert (yellow level).
Costs subject to alert are underlined according to the alert level (source www.meteo.fr).

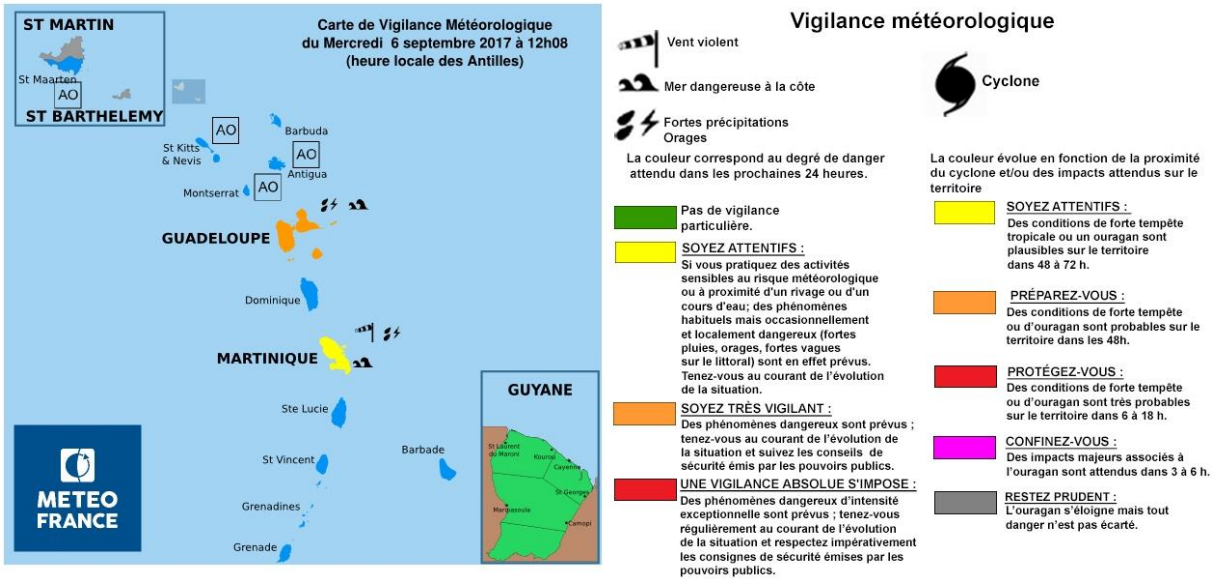
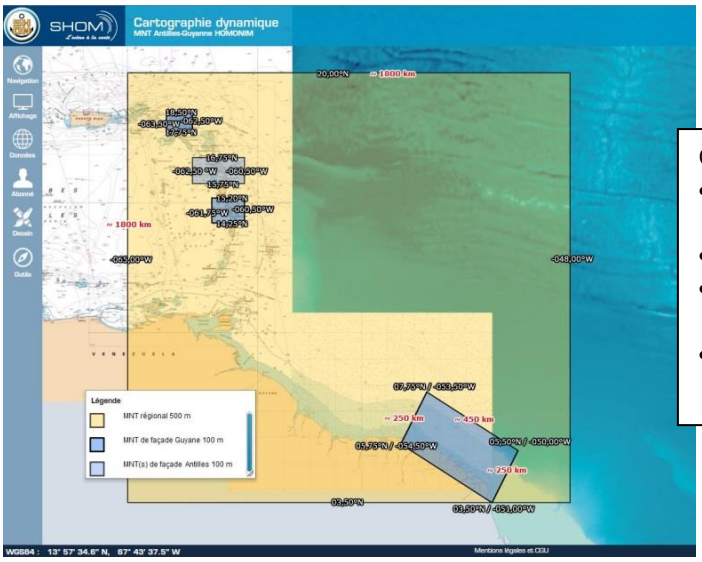


Fig.13: An example of cyclone warning advice for overseas departments (source www.meteo.fr).

Besides, the HOMONIM Project in partnership between Shom and Météo-France, launched in 2011 aims at improving the VVS alert system through 3 axis :

- Extension of real time sea level observation capability,
- Production of a first range of multi-scale bathymetric digital terrain models, crucial to improve coastal hydrodynamics modeling,
- Improvement of wave and surge modeling with the implementation of new modeling chain based on HYCOM and WAVEWATCH III models.

After a first phase (2011-2015) focused on France mainland coasts, a second phase of that project was initiated at the end of 2015, to end in 2019. One of its main axis consists of completing and improving storm surge forecast capabilities on overseas territories, precisely French Antilles, French Guyana and French overseas Territories of the SouthWest Indian Ocean. This phase includes specific the development of surge and waves modeling configurations on those territories.



Coastal sea state model: WaveWatch-3

- implemented on French West Indies and Guiana coast
- Unstructured grid, ~200 m at the shore
- off-the-shelf bathymetry, locally complemented
- operated in real time by Météo-France

Storm surge model: HyCoM

- implemented over Caribbean and Guiana
- curvilinear grid
- 2,5 km in Guiana / ~900 m over Caribbean
- off-the-shelf bathymetry. **Will be updated on March 2018.**
- operated in real time by Météo-

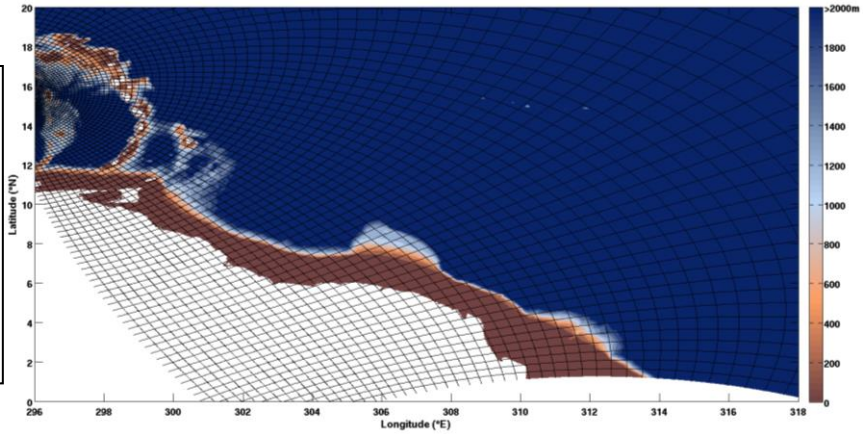


Fig.14: Storm tide forecast tools – On going project HOMONIM

- **Oil spills:**

NTR.

9.4. Environmental protection

NTR.

9.5. Astronomical observations

NTR.

9.6. Magnetic/Gravity surveys

NTR.

9.7. MSDI Progress

Since the launch of Shom's maritime and coastal geographic information portal data.shom.fr, further developments have been implemented with new online services data layers on a regular basis. Hereafter are listed the some of the latest evolutions:

- Contextual URL for layers
- Improved display and download for oceanographic forecasts
- New high (10-20m) and medium (100m) resolution DTM Layers (open data)
- New layer on administrative limits

- Maritime archives: old charts and survey sheets have been scanned and are now available on the web site,

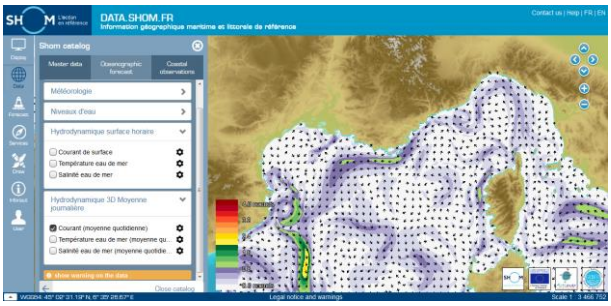
Those evolutions can all be followed via Shom's Twitter account (@shom_en & @shom_fr).

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

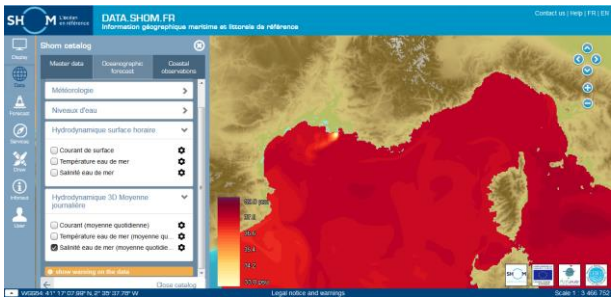
Data available on that portal are organised according to the following topics:

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

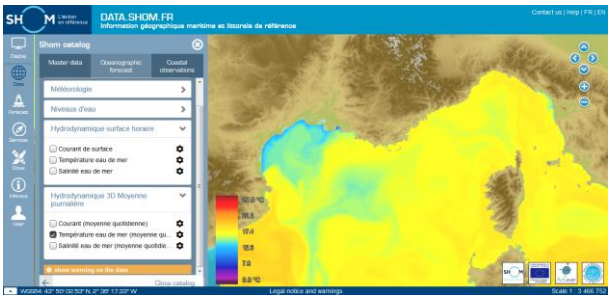
Not all these information are available on MACHC region.



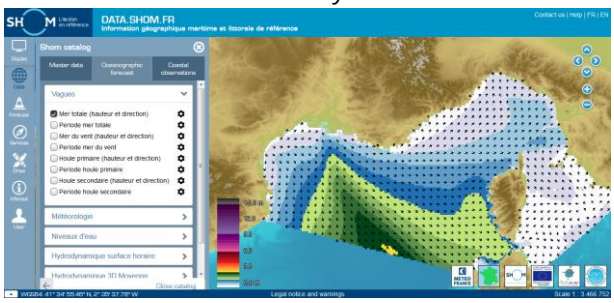
Currents



Salinity



Sea temperature



Waves

Fig.15: Oceanographic forecasts on Shom's data portal (data.shom.fr)

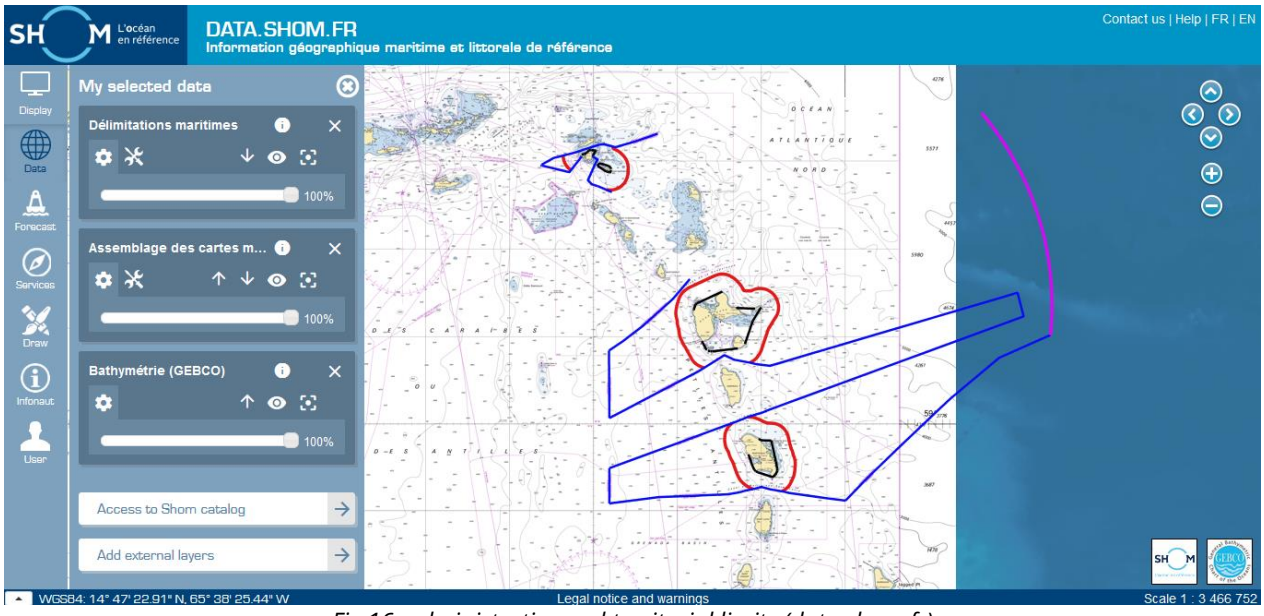


Fig.16: administrative and territorial limits (data.shom.fr)

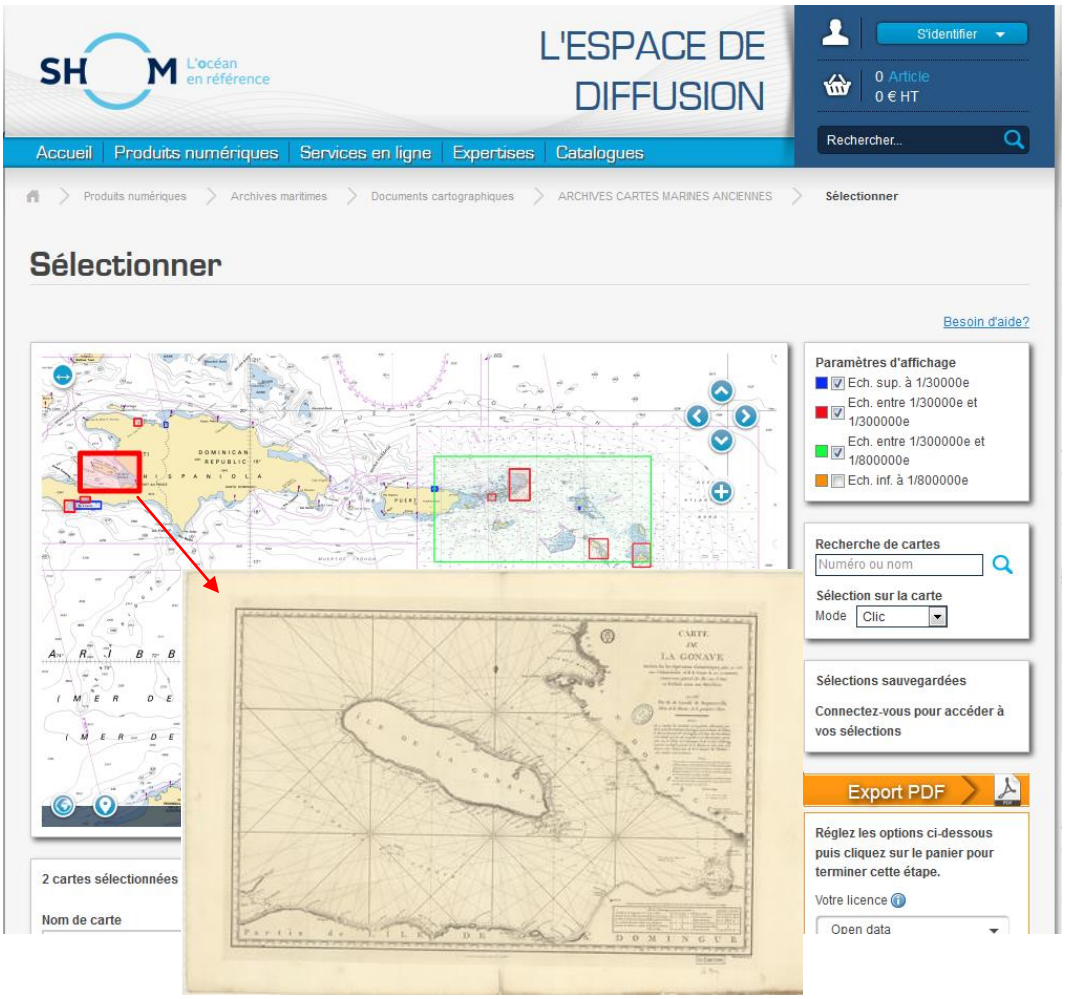


Fig.17: Archives: nautical charts and survey minutes (diffusion.shom.fr)

9.8. International

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

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

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

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

10. Conclusions

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

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