RÉPUBLIQUE FRANÇAISE
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SHOM L'océan en référence

Direction des missions institutionnelles
et des relations internationales
Division relations extérieures

BREST, le 06 février 2024

N°006/Shom/DMI/REX/NP

NATIONAL REPORT

SUBJET	:	France national report to the 21st meeting of the South West Pacific Hydrographic Commission (SWPHC).
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. The next contract for the period 2025-2029 is in preparation.

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

Detailed information to update IHO Publication P-5 (Yearbook) has been submitted using the online system.

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

2 SURVEYS

2.1 COVERAGE OF NEW SURVEYS

Shom's national hydrographic survey programme (https://www.shom.fr/fr/qui-sommes-nous/programme-national-dhydrographie-pnh) details the long-term targeted objectives of CATZOC compliant hydrographic surveying in French Polynesia, New Caledonia and Wallis and Futuna waters and the current surveys coverage for those three areas.

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Since the previous SWPHC conference in February 2023, Shom's survey unit in the Pacific Ocean, GOP, has conducted several surveys to improve and update hydrographic knowledge.

These surveys, scheduled in close relation with local governmental authorities in the frame of a prioritized survey plan, to fulfil requirements expressed by local authorities, pilots, fishermen, mining operators and Defence.

More precisely, the GOP conducted the following surveys depicted hereafter:

- **In New-Caledonia:**

  Several surveys of recommended tracks, accesses and passages and Sea level station (SLS) maintenance have been performed all around New-Caledonia, mainly inside the lagoon, as summarized by figure 1 and illustrated by figures 2 to 7.

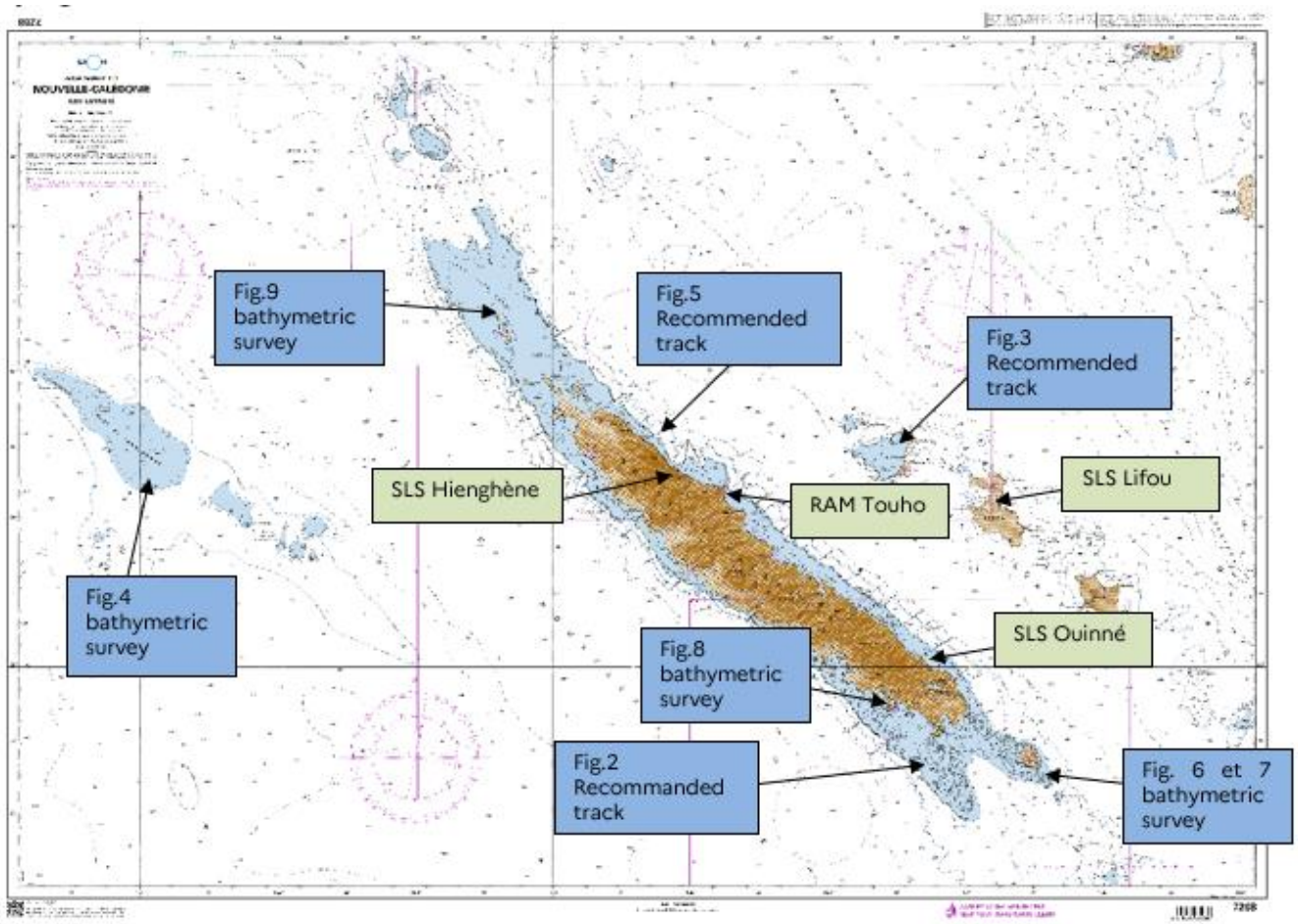

Fig. 1 – Locations of the hydrographic works realized in 2023 in New-Caledonia

> Surveys:

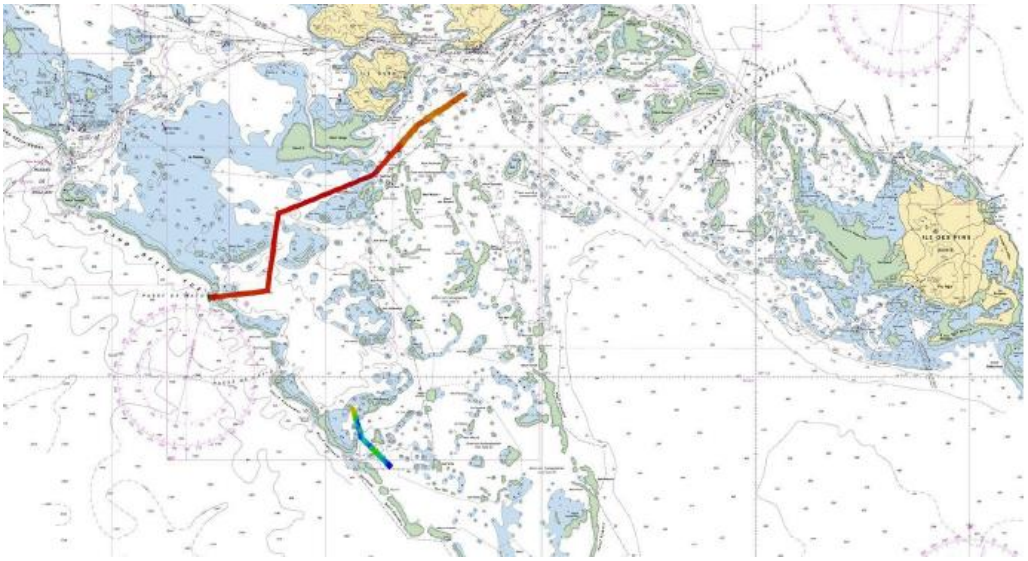

Fig. 2 – Recommended track between Mato Pass and the Havannah Channel and opening of navigation channels in the Great South Lagoon.

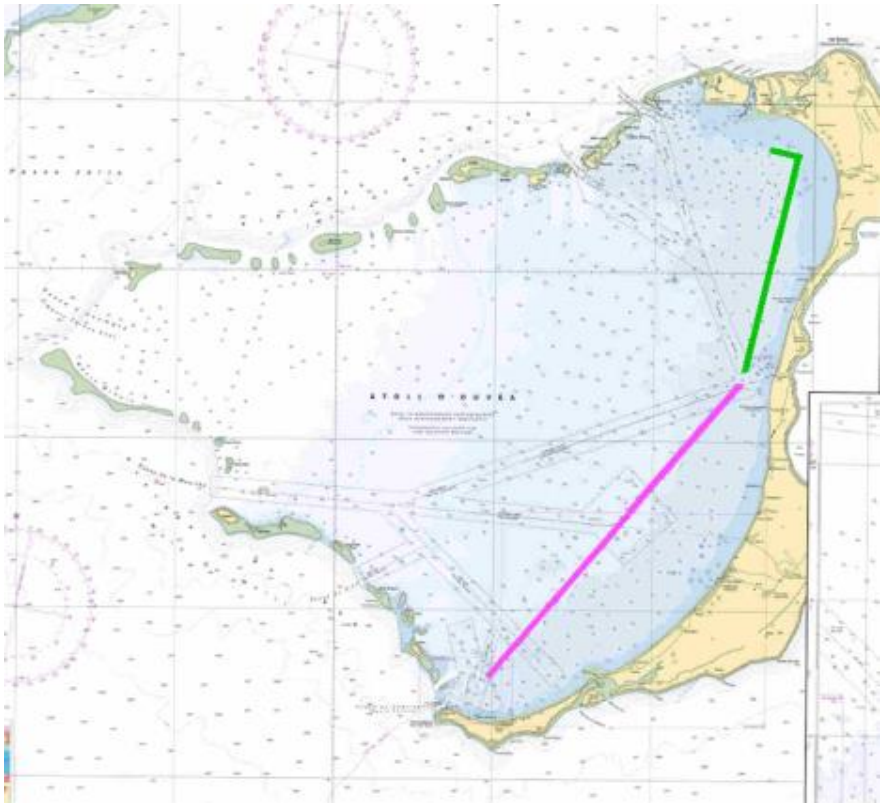

Fig. 3 – Ouvéa Island survey – Green, creation of a new recommended track, Pink, work to complement the track recommended in the 2021 survey.

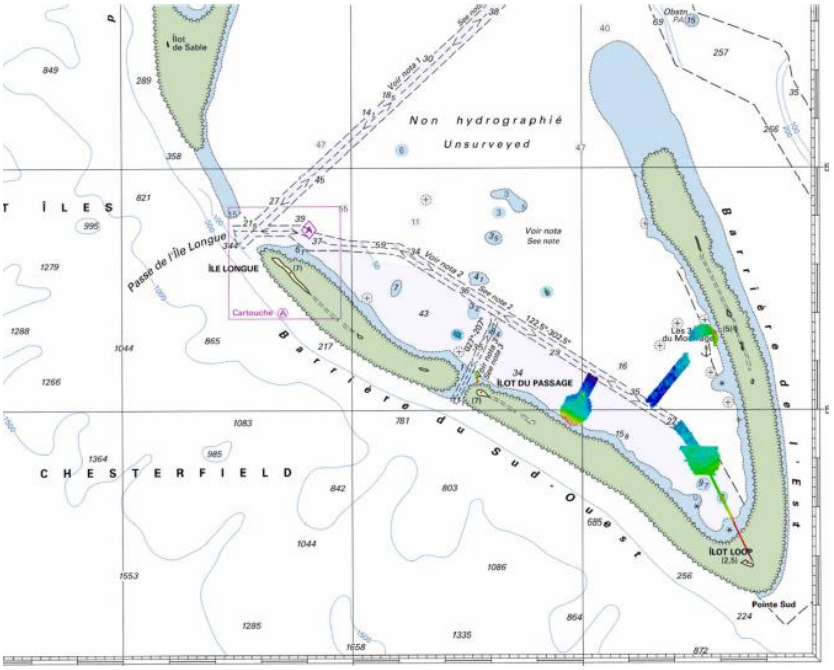

Fig. 4 – Chesterfields Islands survey

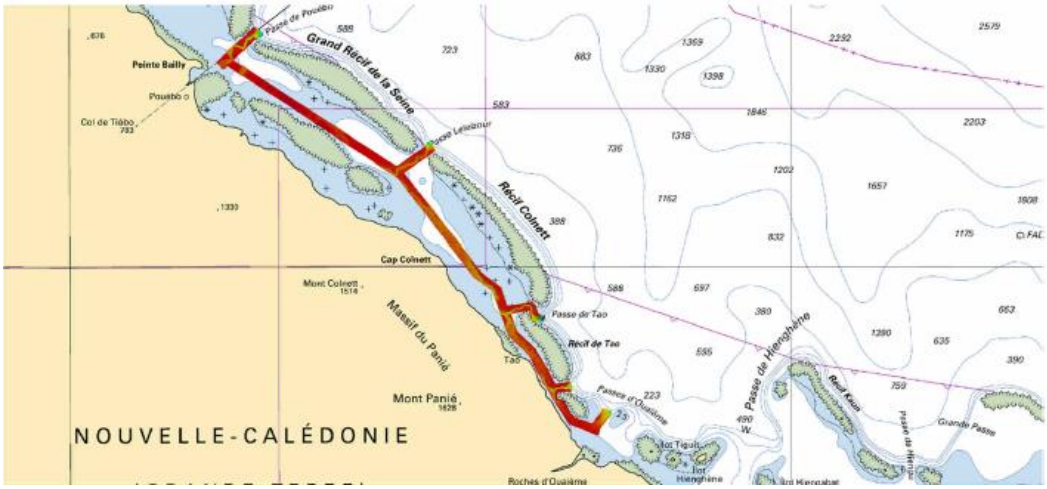

Fig. 5 – Recommended track from Pouébo to the Ouaïème passes

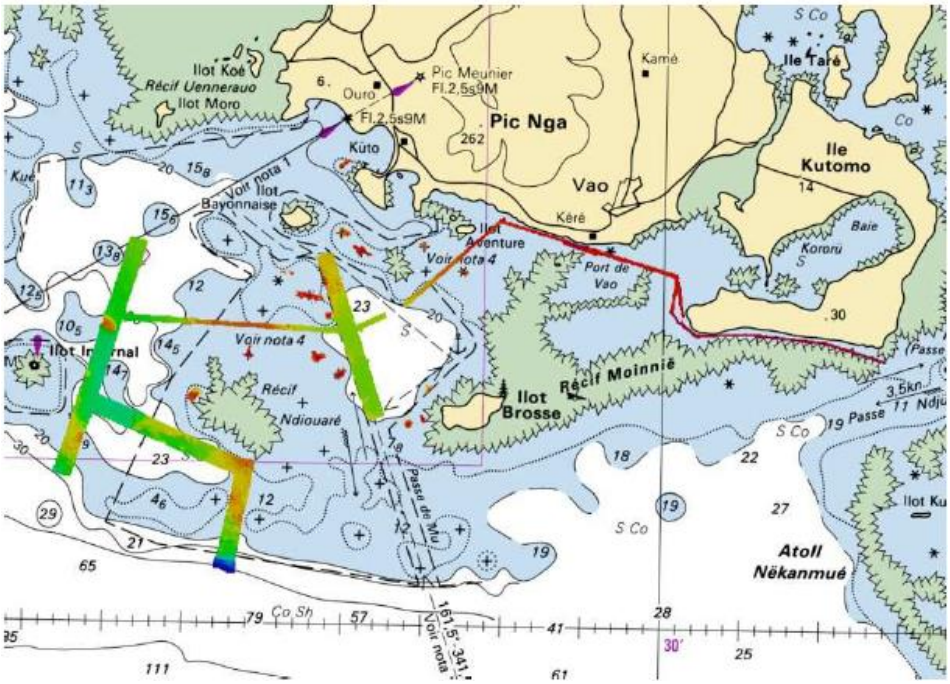

Fig. 6 – Bathymetric survey of Ile des Pins – south coast

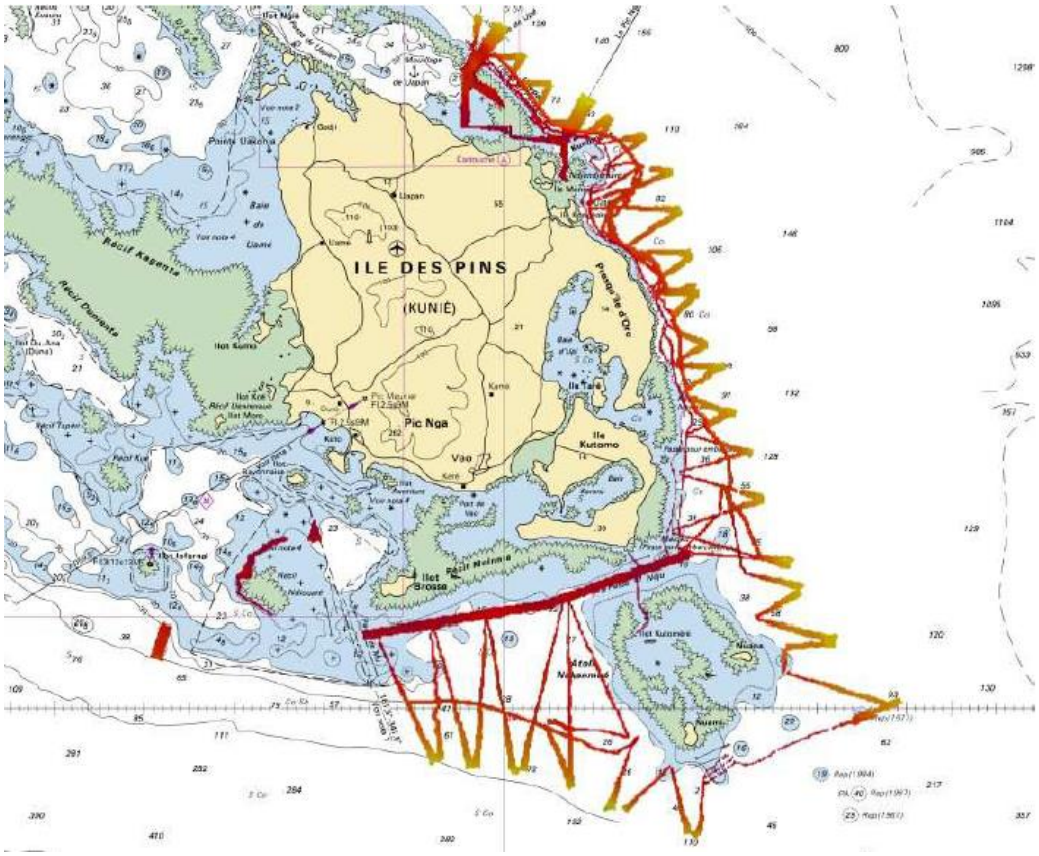

Fig. 7 – Bathymetric survey on île des Pins – south and east coasts.

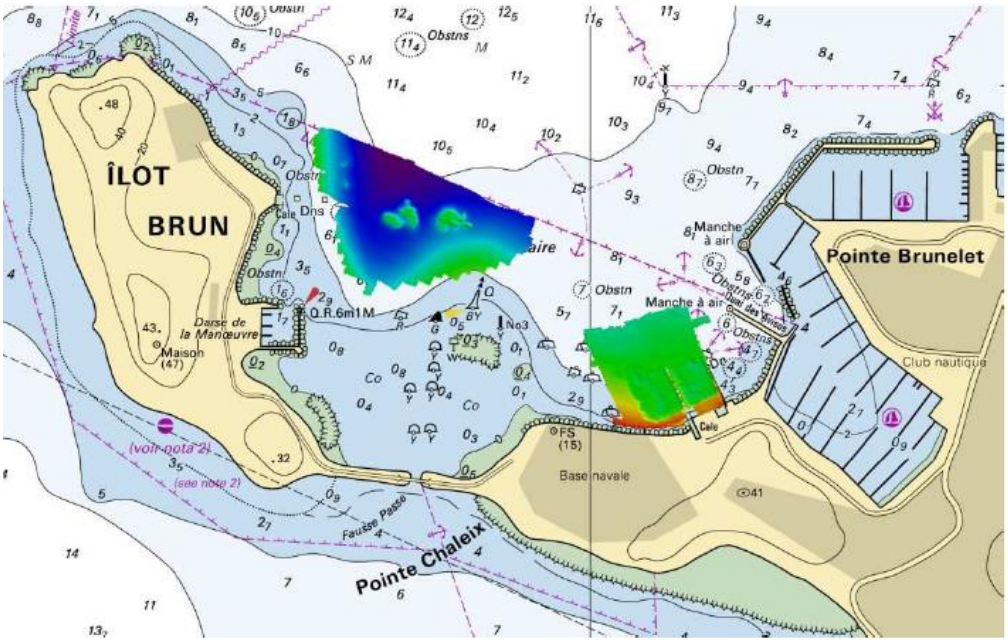

Fig. 8 – Bathymetric survey POM quay and dredged discharge aera.

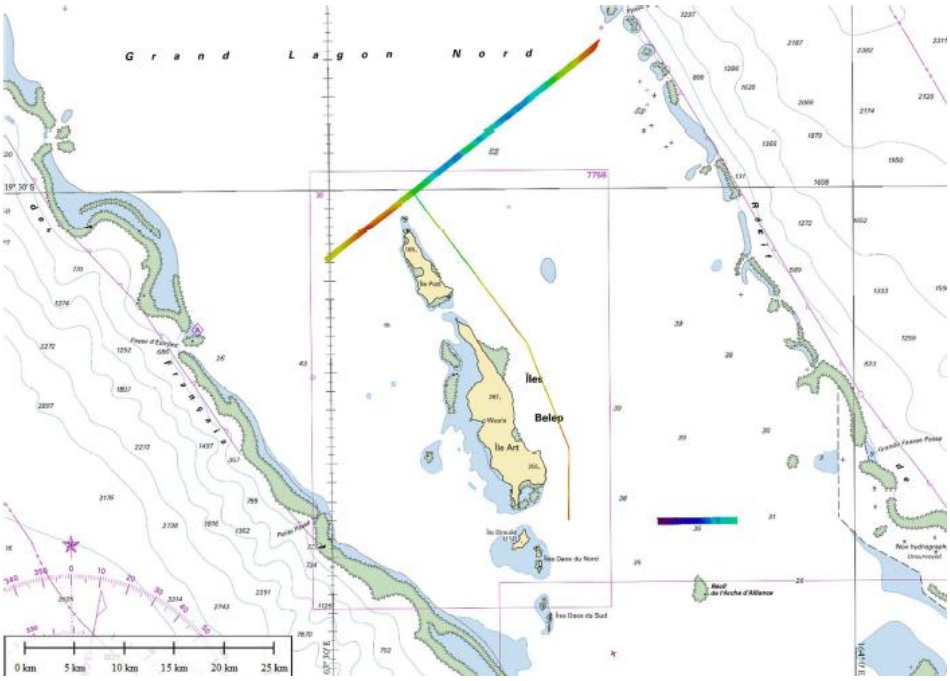

Fig. 9 – Bathymetric survey in the large northern lagoon – Belep Islands

> Maintenance of Sea Level Stations (SLS) network dedicated to sea level observation and tsunamis warning system and control if tide observatories over the main island (figure 1).

- **In French Polynesia:**

  Several surveys of recommended tracks, accesses and passages have been performed all around French Polynesia, mainly inside the lagoon, as summarized by figure 10 and illustrated by figures 11 to 14.

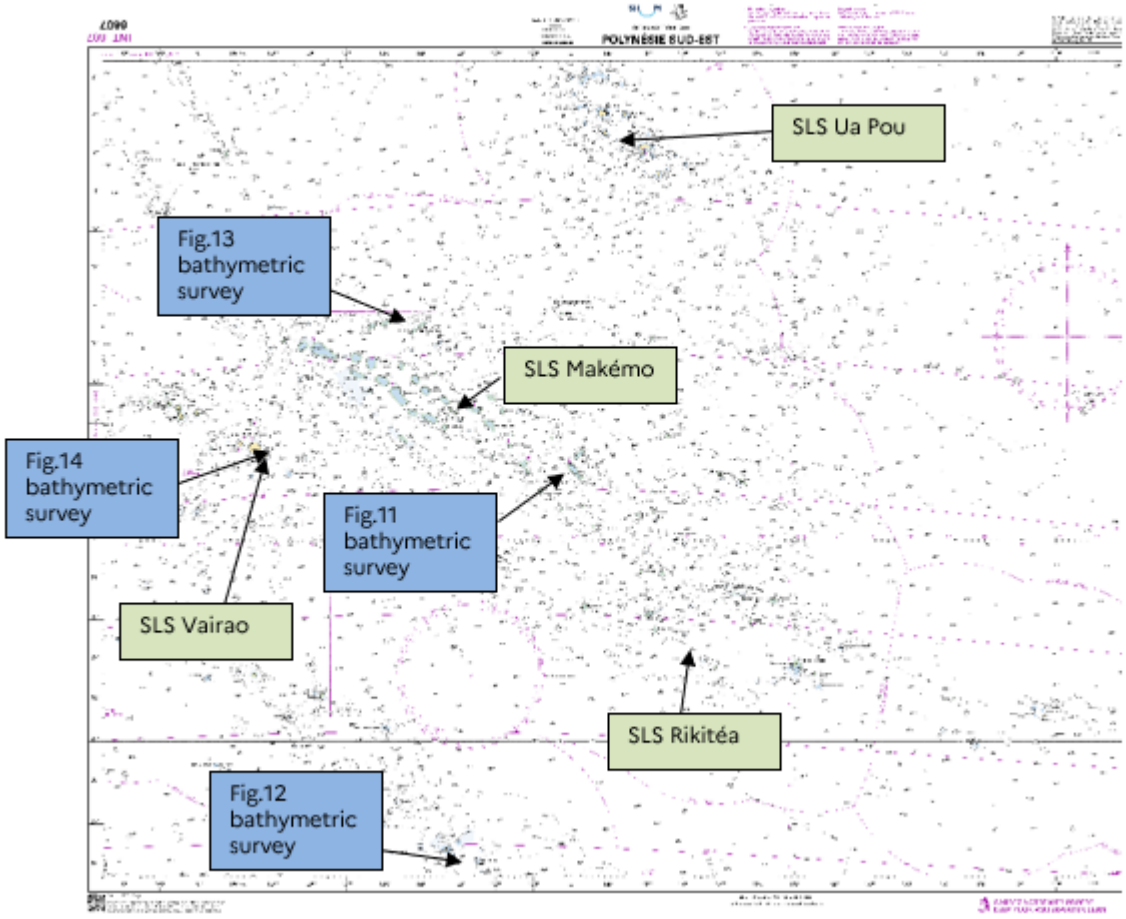

Fig. 10 – Locations of the hydrographic works realized in 2023 in French Polynesia

> Surveys:

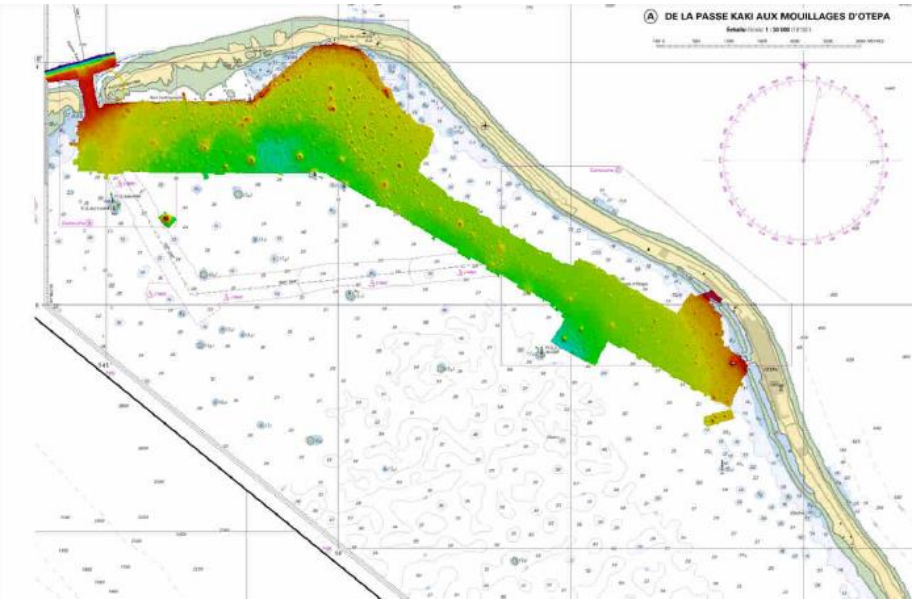

Fig. 11 – Survey of Hao atoll

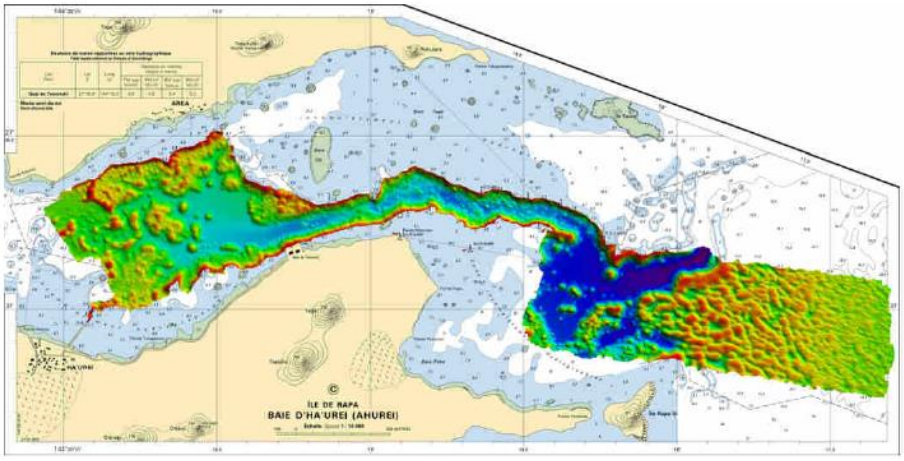

Fig. 12 –Survey on Rapa island

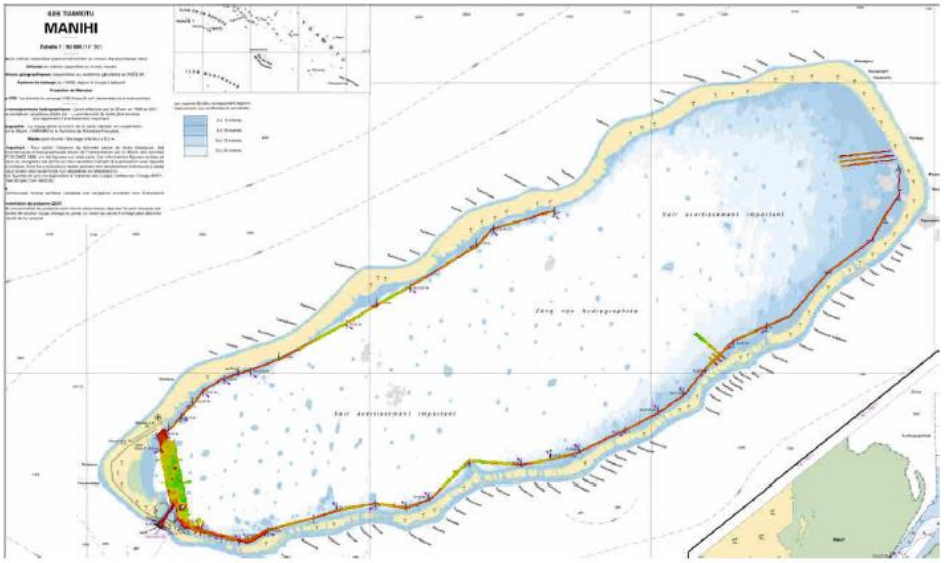

Fig. 13 – Survey of Manihi atoll

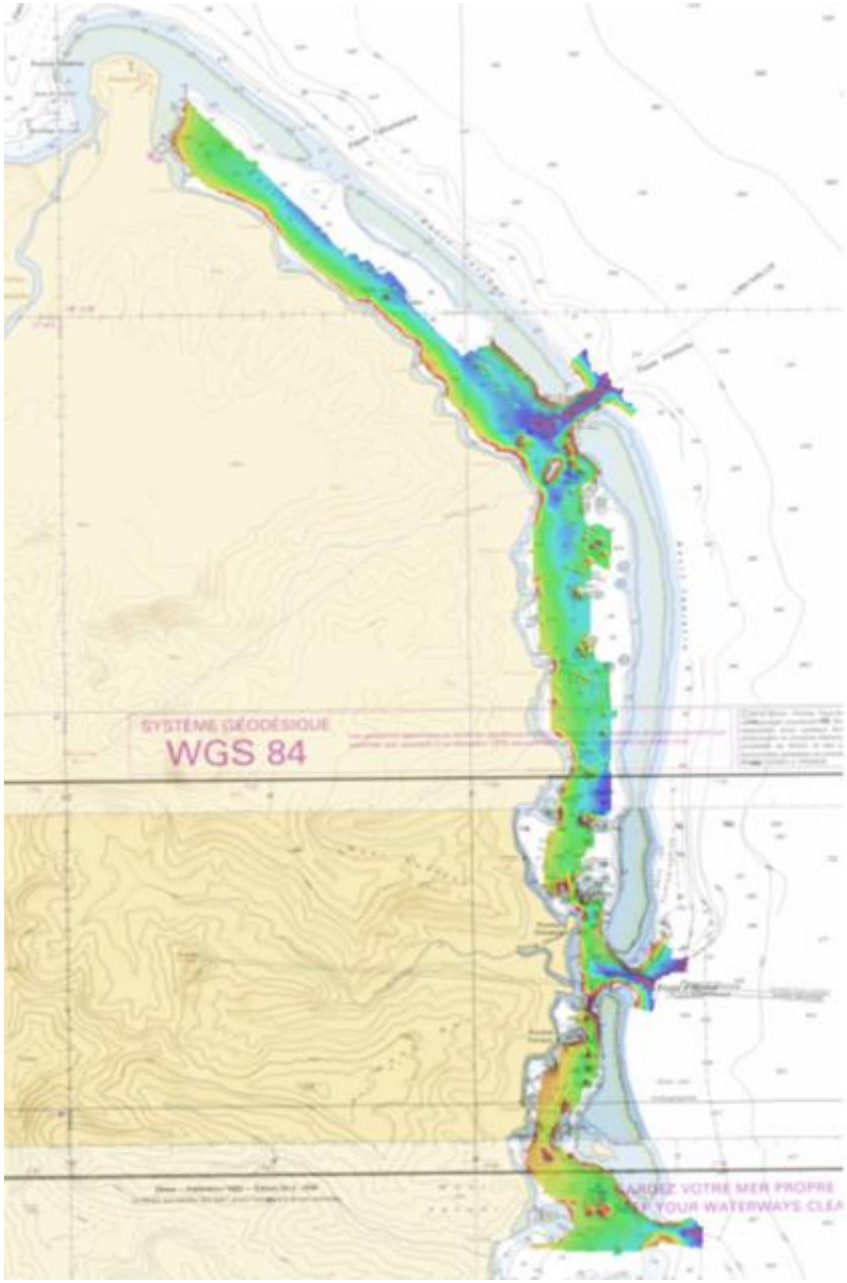

Fig. 14 – Recommended track from Tautira to Tehua roto

> Maintenance of Sea Level Stations (SLS) network dedicated to sea level observation and tsunamis warning system and control if tide observatories over the main island (figure 9).

- **In Wallis & Futuna:**

  A bathymetric survey of a recommended track, its access and passage have been performed at Wallis, mainly inside the lagoon, illustrated by figure 15.

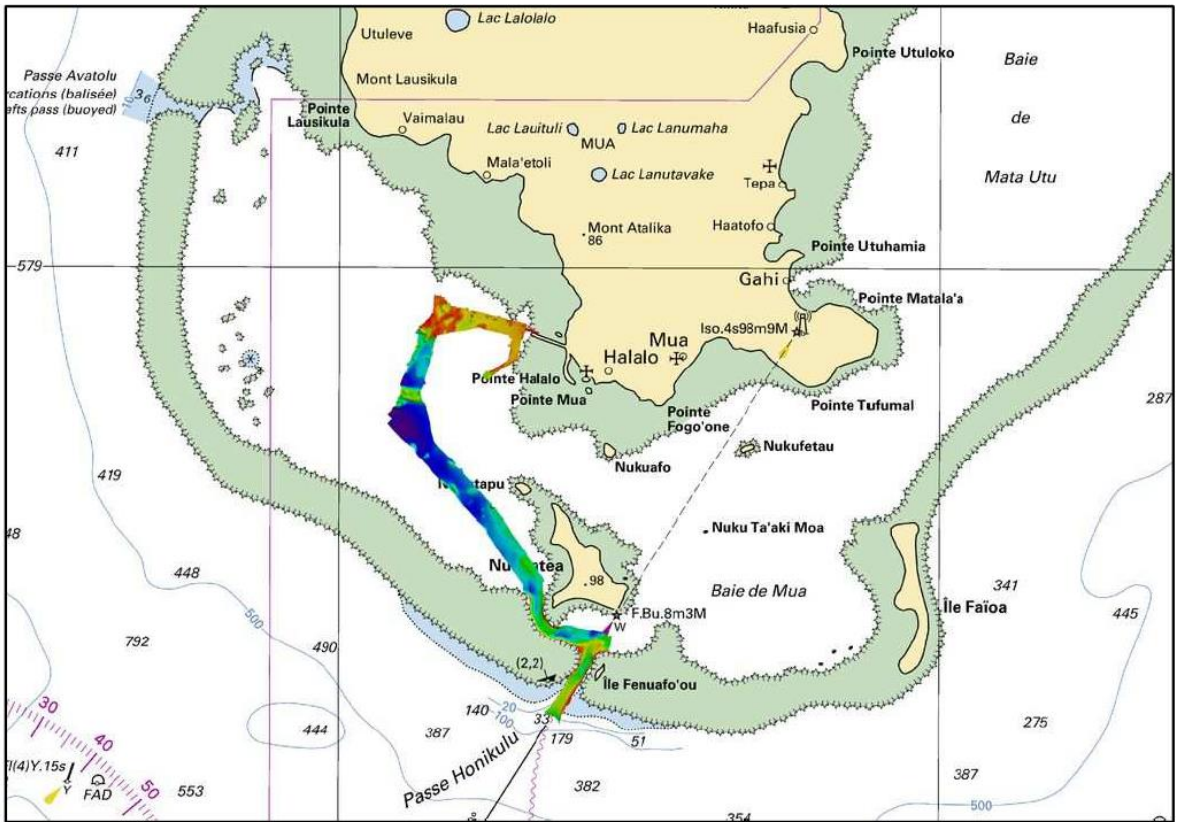

Fig. 15 – In December 2023, bathymetric survey in the western lagoon of Wallis – Uvéa island

2.2 LIDAR SURVEYS

These data, critical for coastline management and risks prevention, 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 Tahiti (French Polynesia): https://diffusion.shom.fr/pro/amenagement/altimetrie-littorale/lidar-polynesie-francaise-tahiti-2015.html
  - For Moorea (French Polynesia): https://diffusion.shom.fr/pro/amenagement/altimetrie-littorale/lidar-polynesie-francaise-moorea-2015.html
  - For Bora Bora (French Polynesia): https://diffusion.shom.fr/pro/amenagement/altimetrie-littorale/lidar-polynesie-francaise-borabora-2015.html
  - For Taharuu (French Polynesia): https://diffusion.shom.fr/pro/amenagement/altimetrie-littorale/lidar-polynesie-francaise-taharuu-2015.html
- the open platform for French public data: data.gouv.fr

Project of bathymetric lidar survey in French Polynesia is underway. A tender has been published and field operations are expected to begin by mid-2024. Shom will be the project management assistant of the local administration. The areas of interest are illustrated by the red polygons on the figures below.

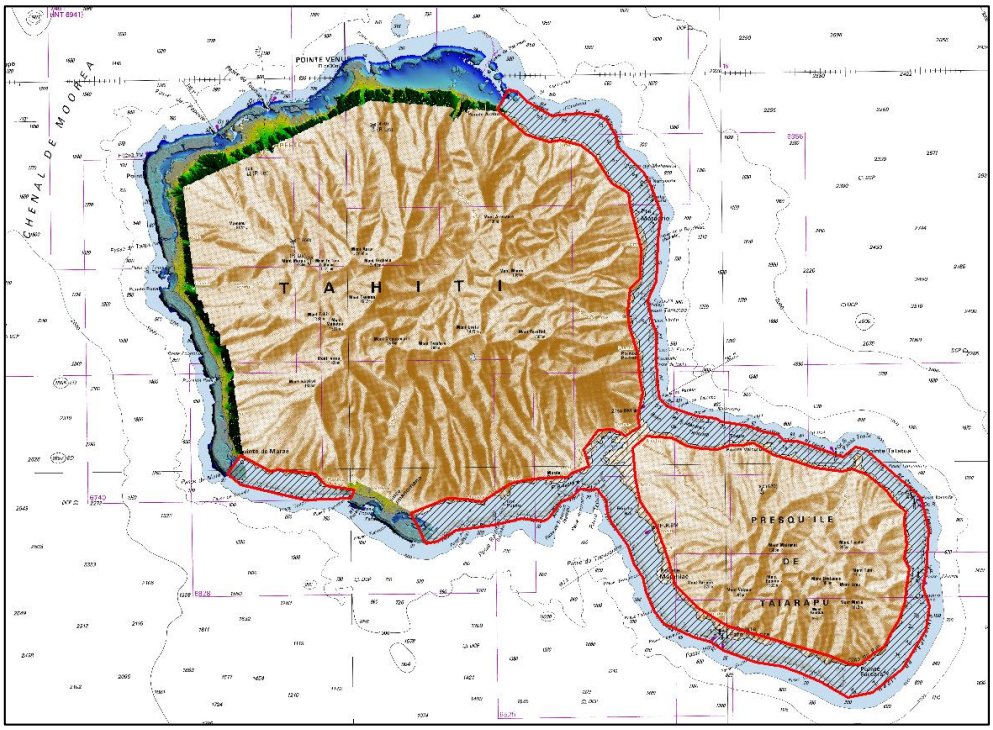

Fig. 16 – Existing Lidar surveys in Tahiti and extension project

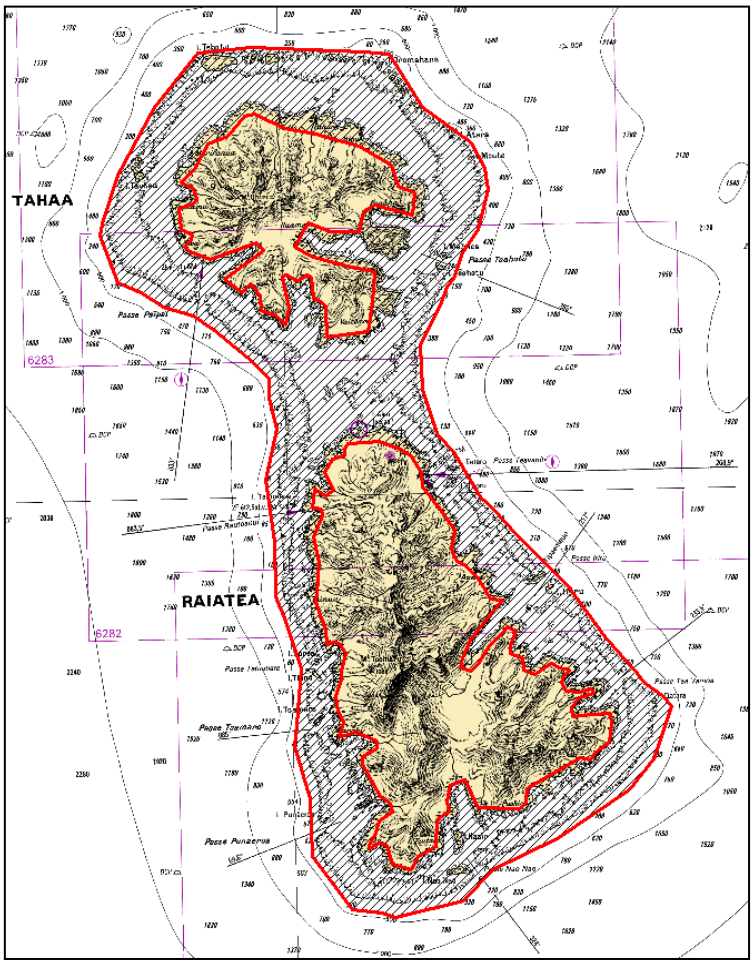

Fig. 17 – Lidar survey project over Tahaa and Raiatea

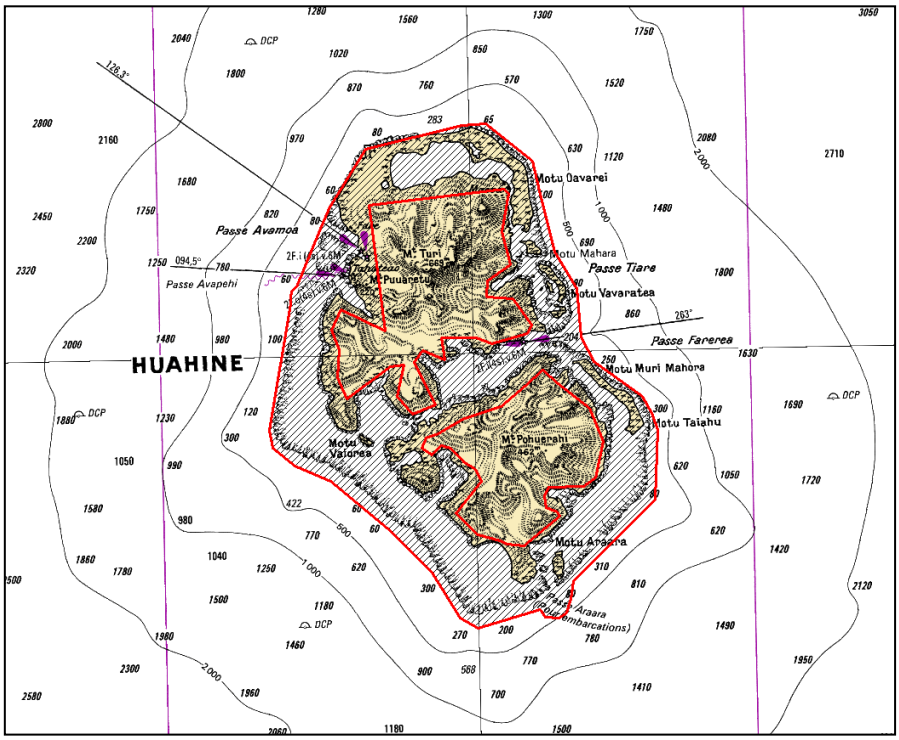

Fig. 18 – Lidar survey project over Huahine

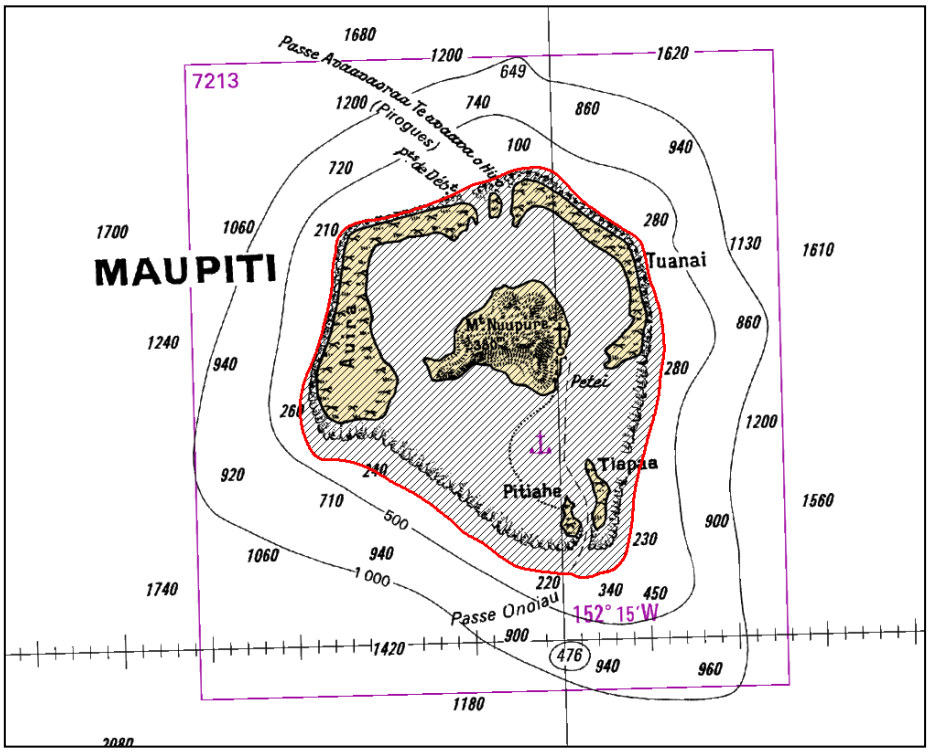

Fig. 19 – Lidar survey project over Maupiti

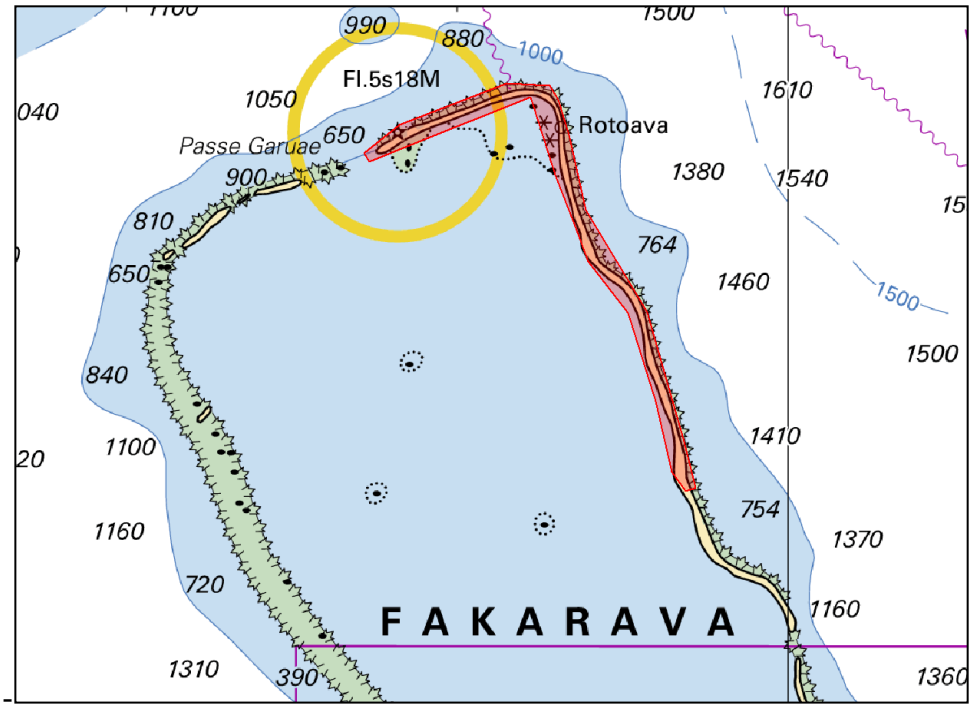

Fig. 20 – Lidar survey project over Fakarava

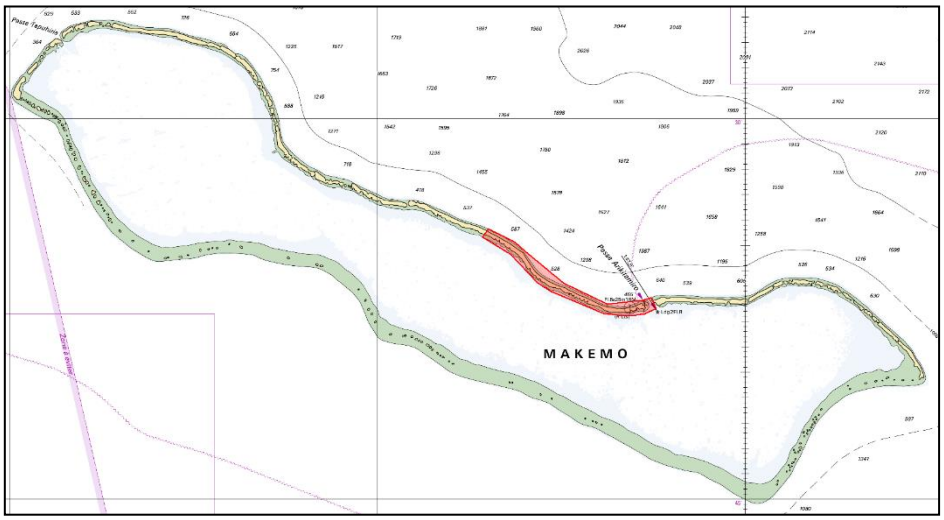

Fig. 21 – Lidar survey project over Makemo

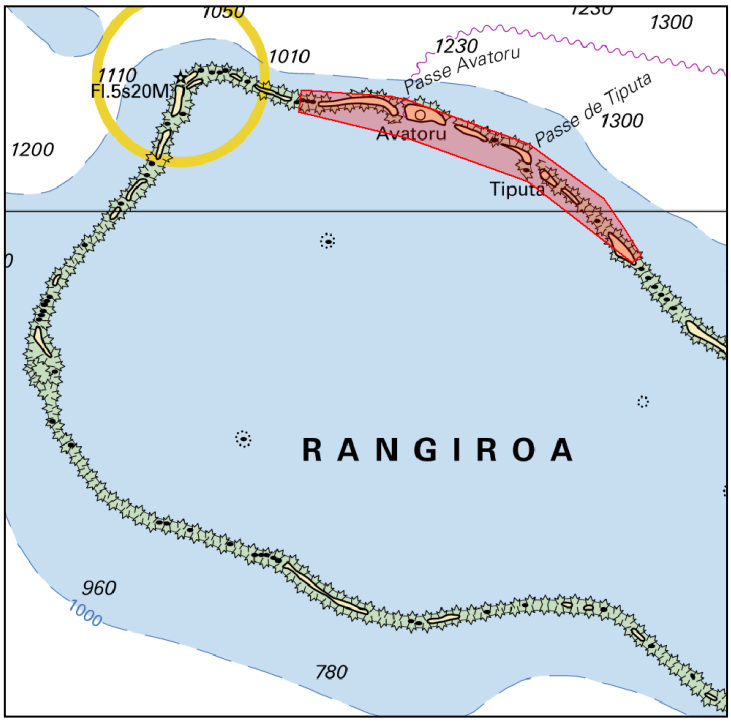

Fig. 22 – Lidar survey project over Rangiroa

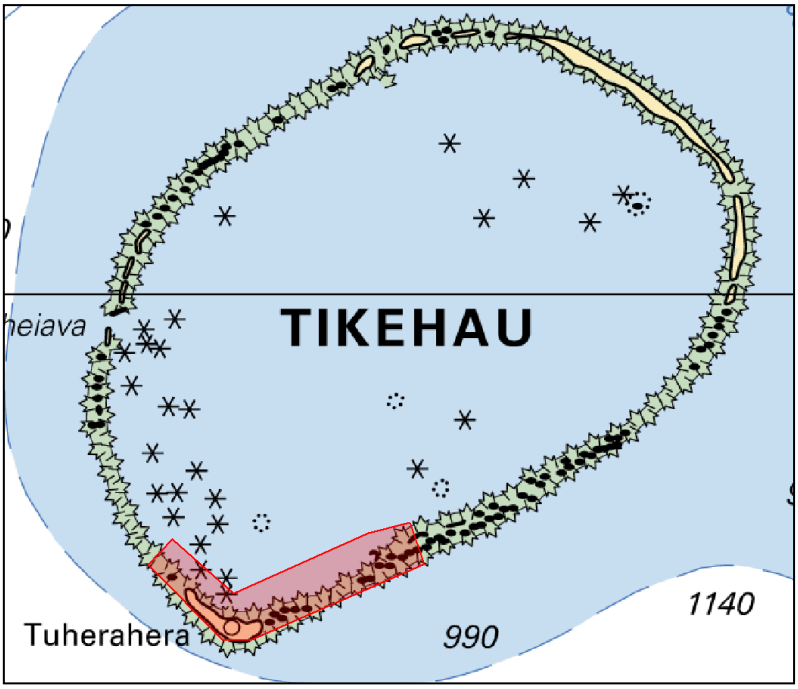

Fig. 23 – Lidar survey project over Tikehau

In the meantime, Shom is in contact with authorities of New-Caledonia for bathymetric lidar surveys around the islands. The project is pending administrative and financial approval from local administration by the end of 2024 first quarter and should cover the areas of interest plotted on the figure below, green polygons represent the priorities. Airborne surveys might be realized in 2025.

Fig. 24 – Lidar project of New Caledonia

2.3 NEW TECHNOLOGIES AND/OR EQUIPMENT

Gliders

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

New frame mooring

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

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

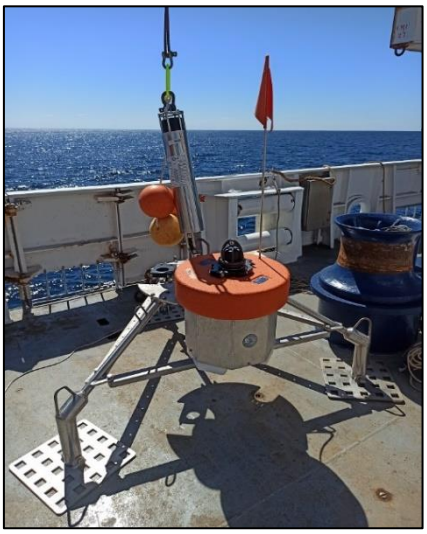

Fig. 25 – CATRINE frame mooring with its orange buoyancy above the canister

Deployable Hydrographic System

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

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

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

Fig. 26 – Deployable Hydrographic System

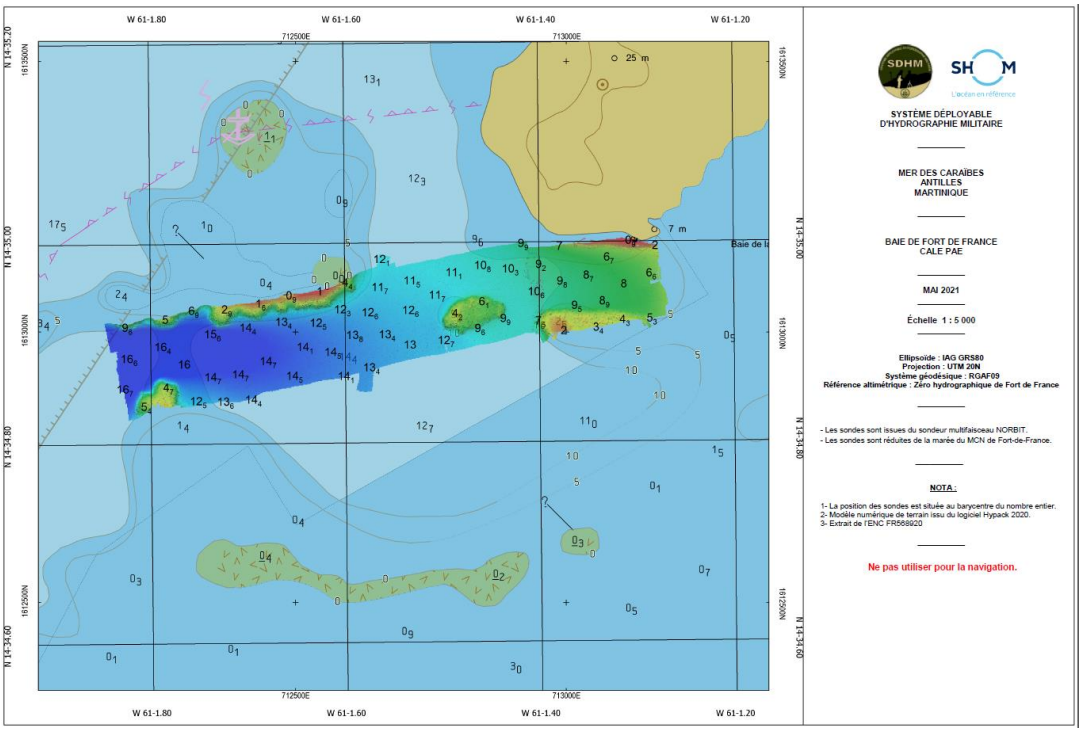

Fig. 27 – Final Product obtained with the Deployable Hydrographic System - Fort de France Bay Martinique

2.4 NEW SHIPS

French naval forces in New Caledonia were reinforced in 2023 thanks to the commissioning of a new patrol boat: *Auguste Bénébig*. Beyond her police and patrol mission over the French EEZ and the Pacific Ocean, *Auguste Bénébig* can be equipped with a shallow water multi-beam echosounder deployed through a moon pool. This system makes her a versatile ship able to lead hydrographic survey until 150 m depth. In 2023, GOP did the first MBES calibration and operational evaluations off the coasts of Noumea, around Tiga island and in Wallis lagoon.

Fig. 28 - EM2040p MBES installed on its mount, deployable under the hull through the moonpool

Her sistership, *Teriieroo a Teriierooiterai*, should join the French naval forces in French Polynesia by the end of 2024, offering new hydrographic perspectives to the local administration.

2.5 CROWDSOURCED AND SATELLITE-DERIVED BATHYMETRY - NATIONAL POLICY

Crowdsourced bathymetry – CSB

In accordance with the IHO publication B-12, crowdsourced bathymetry is the practice of simultaneously recording the vessel's position and depth measurement, made **with standard navigation instruments, on board a non-specialist vessel during its routine maritime operations**. This recorded data is intended to be provided free of charge to the relevant organisation for consideration and, subject to validation, for public dissemination.

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

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

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

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

Satellite-derived bathymetry – SDB

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

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

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 development of Bathysat 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).

In 2023, Shom's project BATHYSAT, aiming at developing a new satellite image processing chain, ended successfully. The first operational product focused on Pins Island, southern New-Caledonia, and was provided to GOP to efficiently prepare and lead its hydrographic surveys in the area.

Based on that successful ground truth, Bathysat will now be industrialised, to generate a fully operational solution at the end of 2024.

2.6 CHALLENGES AND ACHIEVEMENTS

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3 NEW CHARTS & UPDATES

3.1 ENC COVERAGE, GAPS AND OVERLAPS

As of 1st of January 2024, Shom has produced 837 ENCs, of which 270 ENCs within region L.

The full collection should eventually reach 900 ENCs.

Since the end of 2020, the coverage in ENCs directly digitized from paper charts of New Caledonian and French Polynesian waters has been achieved. Remaining ENCs need a new edition or publication of existing paper charts.

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 L is detailed in the table below:

Usage Band	Produced Cells	Planned Cells	Percentage
1	3	3	100%
2	14	14	100%
3	23	23	100%
4	72	76	95%
5	91	161	98%
6	67		
Total	**270**	277	**97%**

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

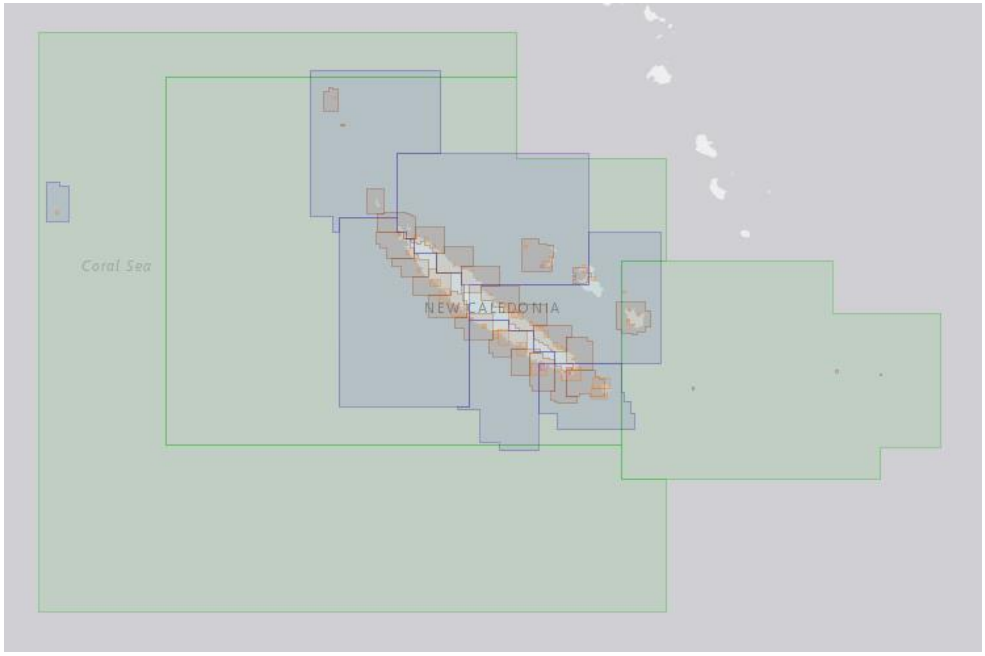

Fig. 29 - Region L - Shom's ENC production - New-Caledonia

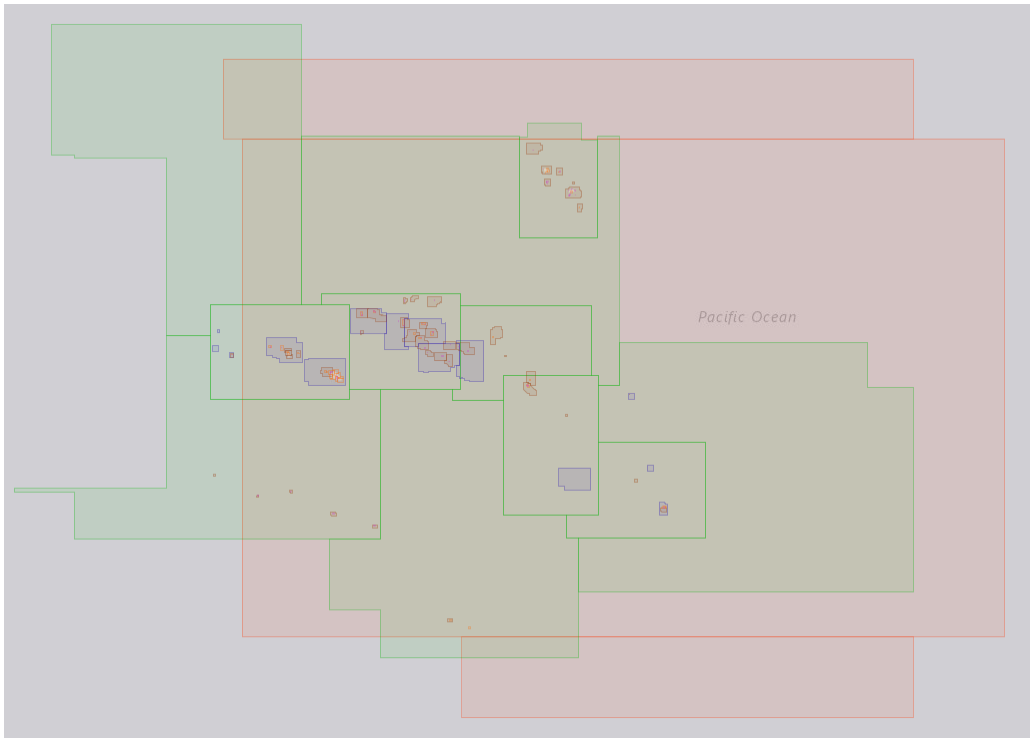

Fig. 30 - Region L - Shom's ENC production - French Polynesia

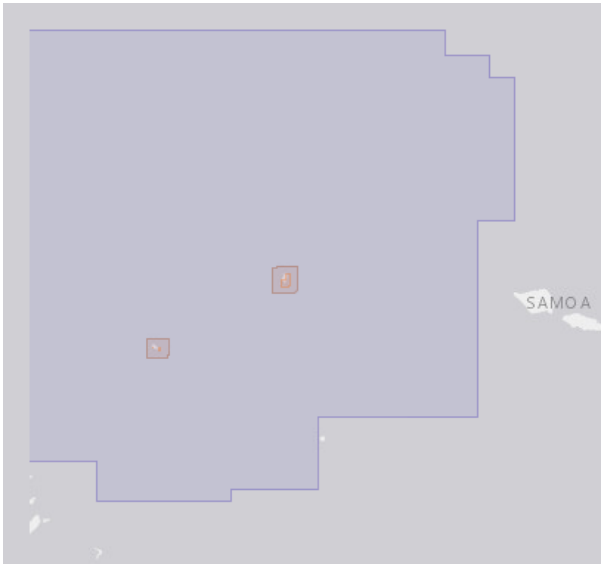

Fig. 31 - Region L - Shom's ENC production – Wallis & Futuna

ENC cells produced since the last conference are detailed hereafter:

Number	Scale 1 :	Title
FR272680	700 000	Nouvelle-Calédonie
FR56820D	8 000	Lifou - Quai de la Baie de Chépénéhé
FR56827A	8 000	Baie de NGo

ENC cells planned for 2024 are listed below:

Number	Scale 1 :	Title
FR66554A	8 000	Accès au port minéralier de Vavouto

3.2 ENC DISTRIBUTION METHOD

French ENCs (in S-63 encrypted format) are made available to distributors through the PRIMAR RENC. Shom participates, along with other hydrographic 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 table below contains the INT charts produced since the last conference:

INT	Scale 1:	Title	Comment
6843	300 000	Nouvelle-Calédonie (partie Sud-Est) - Iles Loyauté	FR6686 – New Edition

Besides, the following INT charts are planned for the 2024-2025 period:

INT	Scale 1:	Title	Comment
6883	59 600	Abords de Nouméa - Passes de Boulari et de Dumbéa	FR6687 – New Edition
6898	31 000	Canal de La Havannah et Canal Woodin	FR7645 – New Edition
6940	10 000	De la Passe de Taapuna à la Passe d'Arue	FR7460 – New Edition

Concerning New Caledonia's coastal scheme, France is currently producing five 1: 300 000 charts covering the main island and its vicinities. Therefore, France has submitted these five charts under national numbers FR7760, FR7761, FR7762, FR6686 and FR6768 to the Region L INT scheme. They have been approved with INT numbers 6840, 6841, 6842, 6843 and 6844. The first three have been published in 2017-18, 6843 in 2023 and 6844 will be published in 2026.

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

Scale	Produced INT charts	Planned INT charts	Percentage
Small (<1/1 000 000)	7	7	100%
Medium	4	5	80%
Large (>1/100 000)	10	10	100%
Total	**21**	**22**	**95%**

3.5 NATIONAL PAPER CHARTS

Since the last SWPHC conference, the following charts have been edited:

National	Scale 1:	Title	Comment
6717	10 000	Port Phaeton (Teauaa) - Tapuaeraha	New Edition
6876	20 000	Iles Wallis - Accès à Mata Utu et Halalo	New Edition
7755	60 000	De Ponérihouen au Cap Dumoulin	New Edition

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

National	Scale 1:	Title	Comment
tbd	Div.	tbd – replace FR5878 and FR7455	New chart
4232	Div.	Îles Australes	New Edition
6033	175 000	Archipel de la Société	New Edition
6420	175 000	De Mataiva à Rangiroa et Makatea	New Edition
6525	25 000	Abords de Port Phaeton	New Edition
6949	60 000	Abords de Thio	New Edition
7234	60 000	Îles Futuna et Alofi	New Edition

7259	75 000	Ile Maré	New Edition
7305	25 000	De la Passe d'Aiurua à la Passe Havae	New Edition
7353	Div.	Ua-Pou et Ua-Huka	New Edition
7461	25 000	De Taapuna à la Pointe Vénus	New Edition

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 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 weekly updated versions for 12 months from the date of purchase.

3.7 CHALLENGES AND ACHIEVEMENTS

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

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

An agreement between Shom and the Pacific Community (SPC) has been signed on the 27th of February 2023 in Noumea, headquarter of the SPC. It will strengthen the cooperation between the two organisations in the field of hydrography in the Pacific region to tackle the main challenges such as safety of navigation, environmental protection and biodiversity, water level monitoring, the understanding of the ocean role in climate change, modelling of the ocean and the prevention of the submersions and tsunamis risks.

This agreement creates a new momentum and allows Shom to make available its expertise in particular for evaluation and prevention of climate change impacts on the environment.

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).

[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*

4.3 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.

In SWPHC area, Shom has delegated its duties of national coordinator to two maritime authorities:

- in New Caledonia, to the Commandant de la zone maritime Nouvelle-Calédonie et Wallis et Futuna, with operating organism: COSS NOUMEA for regions in NAVAREA X and XIV areas,
- in French Polynesia, to the Commandant de la zone maritime Polynésie française, with operating organism: JRCC Tahiti, for regions in NAVAREA XIV area.

Hereafter are listed the coordinates of those authorities:

Area	Phone number	Fax number	Email address
New Caledonia	+687 29 23 32	+687 29 23 03	operations@mrcc.nc
French Polynesia	+689 40 541 615	+689 40 423 915	contact@jrcc.pf

MSI Point of contact at Shom:

M. Philippe Égelé
Head of Nautical Information Team
French Hydrographic Office
13, rue du Chatellier – CS 92803 - 29228 BREST CEDEX 2 – FRANCE
Tel : + 33 (0) 256 31 21 92
email: infonaut-d@shom.fr

5.2 STATISTICS ON WORK OF THE NATIONAL COORDINATOR

See Appendix.

Shom only plays a control and coordination role of local and coastal warnings issued by its national delegated coordinators (COSS Nouméa and JRCC Tahiti).

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.

5.4 CHALLENGES AND ACHIEVEMENTS

French national nautical information platform - PING

France is developing its national nautical information platform called PING.

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 geo-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.

PING will be deployed operationally beginning of 2024 in metropolitan France and end of 2024 in the French overseas territories.

The source code of PING is open source and its interoperability has been successfully tested.

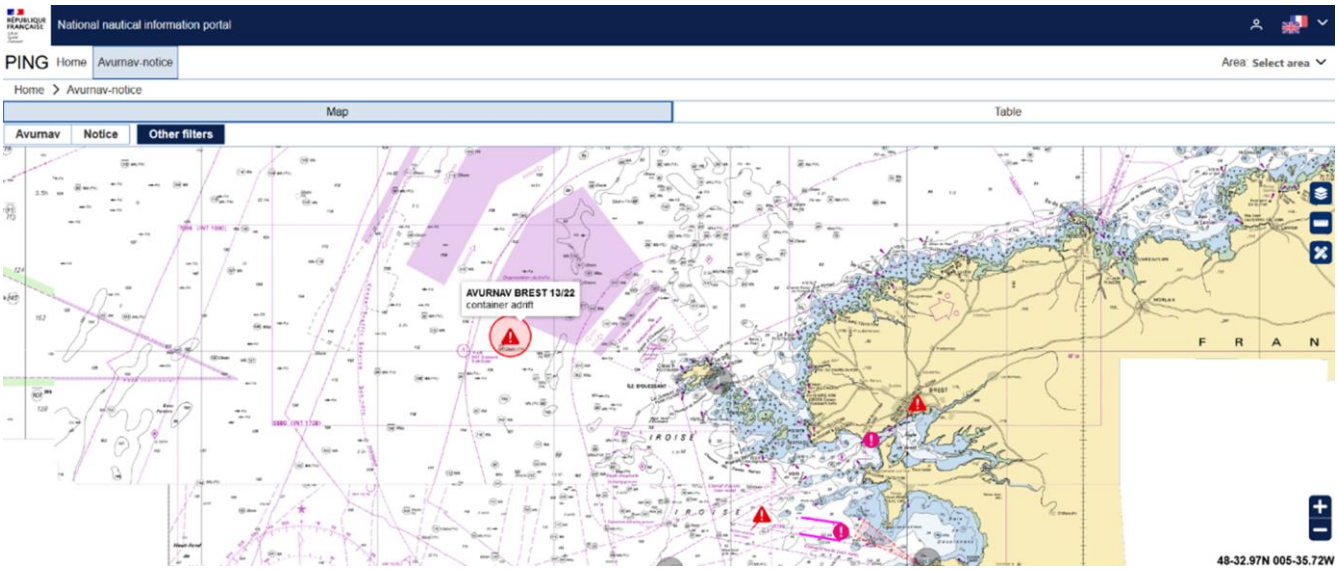

Fig. 32 – Views of the PING portal under test - Viewing navigation warnings

6 C-55 – LATEST UPDATES

The table with the latest information to update IHO Publication C-55 (Status of Hydrographic Surveying and Charting Worldwide) regarding region L area have been provided using the online system on 24th January 2023:

Survey Status Updated: December 2023		Depth < 200m			Depth > 200m		
		A	B	C	A	B	C
L	France – French Polynesia	14.7	18.2	67.1	16.1	1.2	82.7
	France – New Caledonia	15.2	22.7	62.1	19.3	2.1	78.6
	France – Wallis & Futuna	18.1	30.9	51.0	20.5	0.0	79.5

Charting Status Updated: January 2023		Small (<1 M)			Medium (1M < / < 100 000)			Large (> 100 000)			Metric	WGS84
		A	B	C	A	B	C	A	B	C		
L	France – French Polynesia	100	0	100	100	0	100	84	0	100	100	100
	France – New Caledonia	100	0	100	100	0	100	92	0	100	100	100
	France – Wallis & Futuna	100	0	NA	100	0	NA	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/fr/nos-activites/formation

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

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

Fig. 33 – 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. 34 – Nigerian hydrographic ship Lana built by the French shipyard OCEA with the support of Shom (Source: OCEA)

7.4 STATUS OF NATIONAL, BILATERAL, MULTILATERAL OR REGIONAL DEVELOPMENT PROJECTS WITH HYDROGRAPHIC COMPONENT

For the countries benefiting from Shom support to meet their hydrographic services obligations spelled out by the SOLAS convention, France fosters a mechanism of gradual transfer of responsibilities through State-to-State administrative arrangements. This mechanism relies on training at Shom facilities and the formalisation of the respective responsibilities for maritime safety information, hydrographic and charting activities.

7.5 DEFINITION OF PROPOSALS AND REQUESTS TO THE IHO CBSC

NTR.

8 OCEANOGRAPHIC ACTIVITIES

8.1 GENERAL

NTR.

8.2 GEBCO/IBC'S ACTIVITIES

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

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

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

The survey coverage and associated metadata available on the IHO DCDB site are provided via the *EMODnet Bathymetry* portal supported by the European Union. The last update of all these bathymetric resources was performed in December 2020.

8.3 TIDE GAUGE NETWORK

Shom is the national coordinator and reference authority for the observation of the sea level, managing and issuing the resulting data. This mission is carried out under the REFMAR programme. All real time and processed tide gauge measurements collected under that programme are freely accessible on the web http://data.shom.fr/#donnees/refmar for all areas under French jurisdiction. Shom itself operates and maintains a large tidal network reporting in real time, RONIM, which is a major contribution to REFMAR.

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

Since the last conference, regular or occasional maintenance interventions have been carried out on the network of tide gauges deployed in the French Pacific territories:

New Caledonia:

Tide gauges network in New Caledonia is composed of 6 stations owned by the local Government (Hienghène, Maré, Lifou, Thio, Ouinné and Ouvéa) and one station owned by Shom (Numbo-Nouméa).

The convention which covers the maintenance operations of this network is being renewed and pending financial approval from local administration. It should sustain the operations planned every two years on each observatory, from 2024 to 2029.

The network has been updated to the RONIM V2 standard over the last 2 years and is now equipped with new Campbell dataloggers.

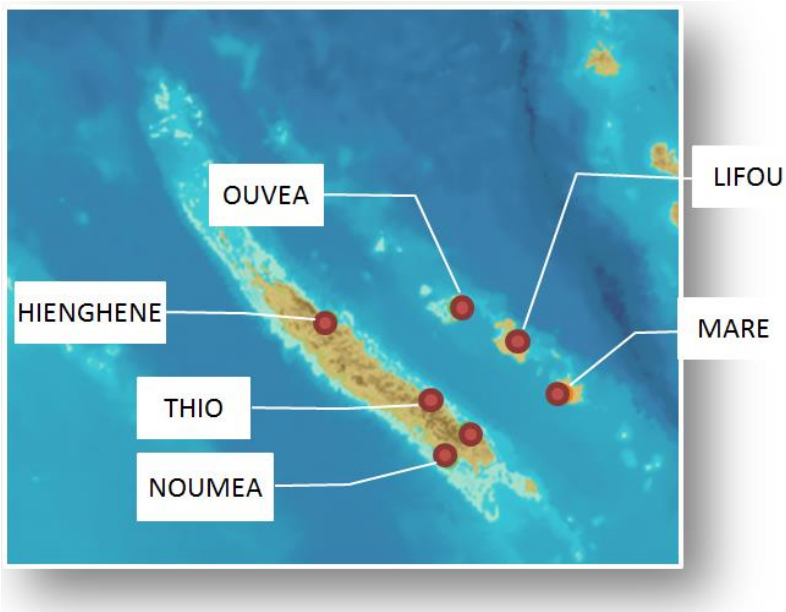

Fig. 35 – Tidal gauges network covering New Caledonia waters

French Polynesia:

Shom operates five tide gauges in French Polynesia: Vairao (Tahiti), Ua Pou, Makemo, Rikitea and Tubuai.

The convention with local authorities signed in 2021 mentioned that the network should cover the five archipelagos. A new station was then installed on Ua Pou wharf in March 2022 and is now available. Thanks to this convention, lasting 6 years, the 18-month cycle for maintenance operations on each observatory is sustained.

Rangiroa observatory was dismantled in 2021 due to rebuilding of the wharf. It has been installed again in 2022 and is now available again but its maintenance is not covered by the convention any more.

Fig. 36 – Tidal gauges network covering French Polynesia waters

Wallis & Futuna:

Shom operates two tide gauges in Wallis-&-Futuna territory: Leava and Mata Utu. The maintenance operations are funded on a 5 years basis, starting in 2021. The rhythm of operations is about 18 months.

These two observatories should be upgraded to the RONIM v2 standard in 2024 and therefore equipped with Campbell dataloggers.

Fig. 37 – Tidal gauges network covering Wallis and Futuna waters

8.4 NEW EQUIPMENT

NTR.

8.5 CHALLENGES AND ACHIEVEMENTS

Evolution of the tidal services

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

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

The functions available are:

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

The results are available in two formats:

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

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

9 SPATIAL DATA INFRASTRUCTURES

9.1 STATUS OF MSDI

Shom develops and maintains a MSDI covering all maritime areas under French jurisdiction. The information thus compiled is accessible through 3 portals:

- data.shom.fr
- diffusion.shom.fr
- maritimelimits.gouv.fr

In addition, local authorities manage MSDI portals:

- New Caledonia: https://georep.nc/
- French Polynesia: https://www.tefenua.gov.pf/

9.2 RELATIONSHIP WITH THE NSDI

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

9.3 INVOLVEMENT IN REGIONAL OR GLOBAL MSDI EFFORTS

Shom contributes to the IHO MSDIWG.

The head of GOP is the French representative in the SWPHC MSDIWG.

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

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

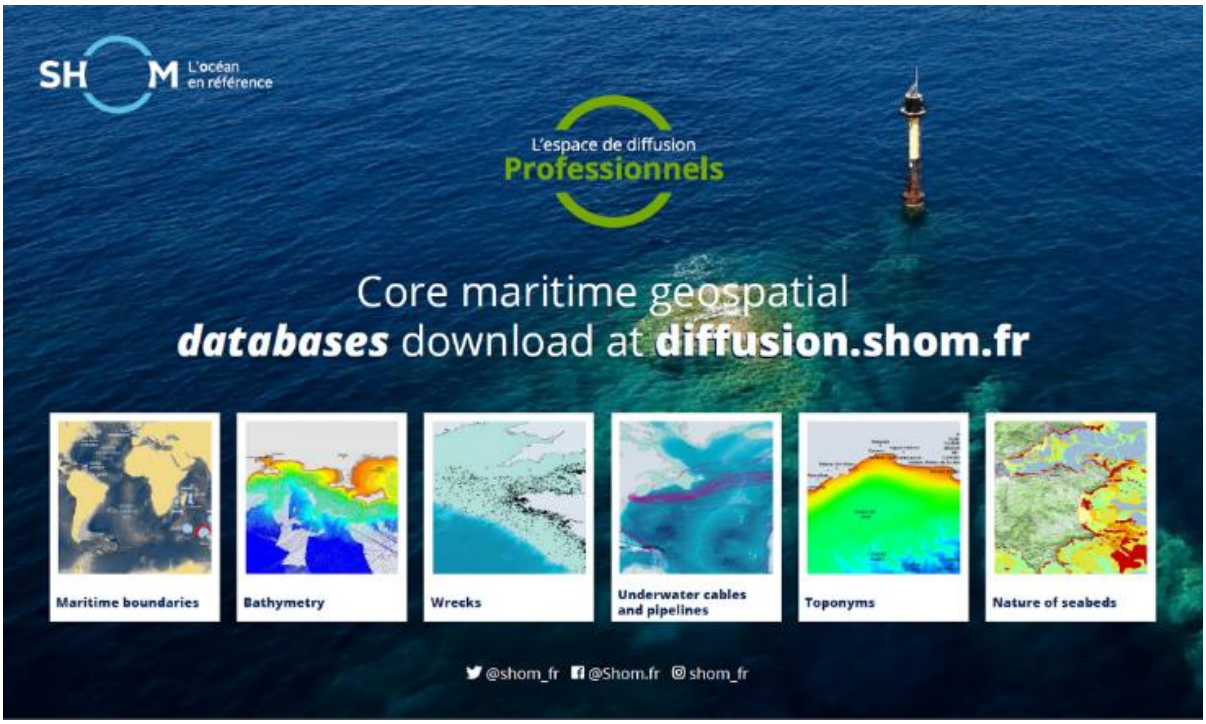

Fig. 38 - Access to Shom's open data (diffusion.shom.fr)

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 the SWPHC region.

Hereafter are listed some of the latest evolutions:

- Aids to navigation (AToN) (edition);
- Maritime Limits (new edition): Decree n° 2022-1742 of December the 30th 2022 defining the maritime boundary between France and Fidji. Also available on maritimelimits.gouv.fr;
- Sovereignty or jurisdiction maritime spaces (new). Also available on maritimelimits.gouv.fr;
- Maritime areas – chart 8510CX (edition);
- Maritime Altimetric References (edition);
- Coastal altimetry (Litto3D): French Polynesia: data display improvements;
- Bathymetric DTM: Tahiti and Moorea Islands (new);

- Global coastline (edition);
- GEBCO worldwide bathymetric DTM (edition);
- Tidal tables calculation (edition);
- On demand tidal table calculation (update).

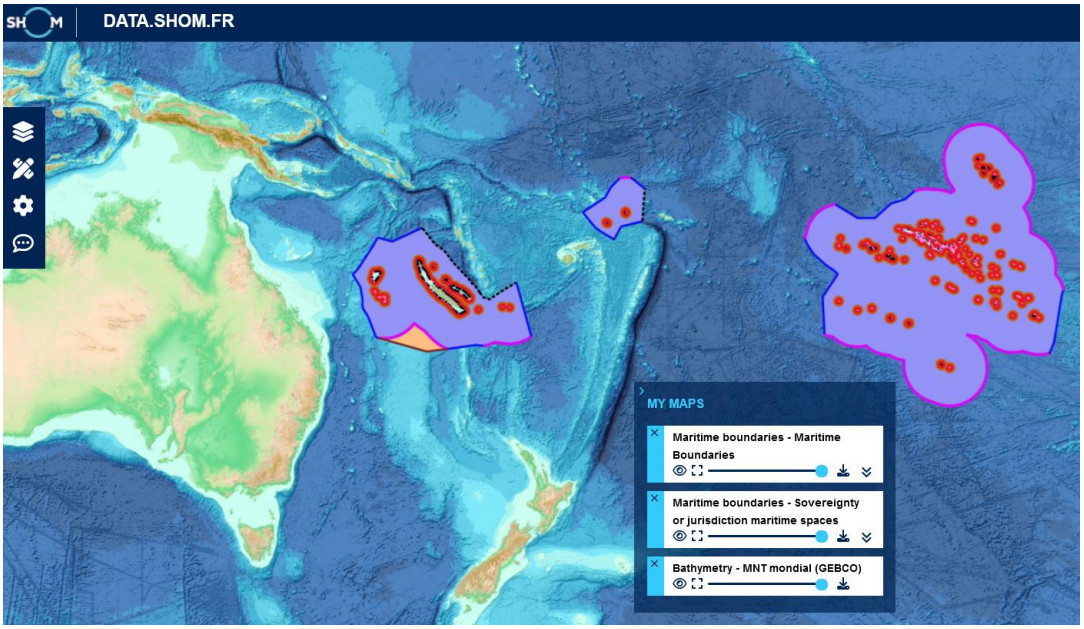

Fig. 39 – Sovereignty or jurisdiction maritime spaces (data.shom.fr)

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

A detailed description of the portal functions and contents is available on Shom website (https://services.data.shom.fr/support/fr).

9.6 BEST PRACTICES AND LESSONS LEARNED

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

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

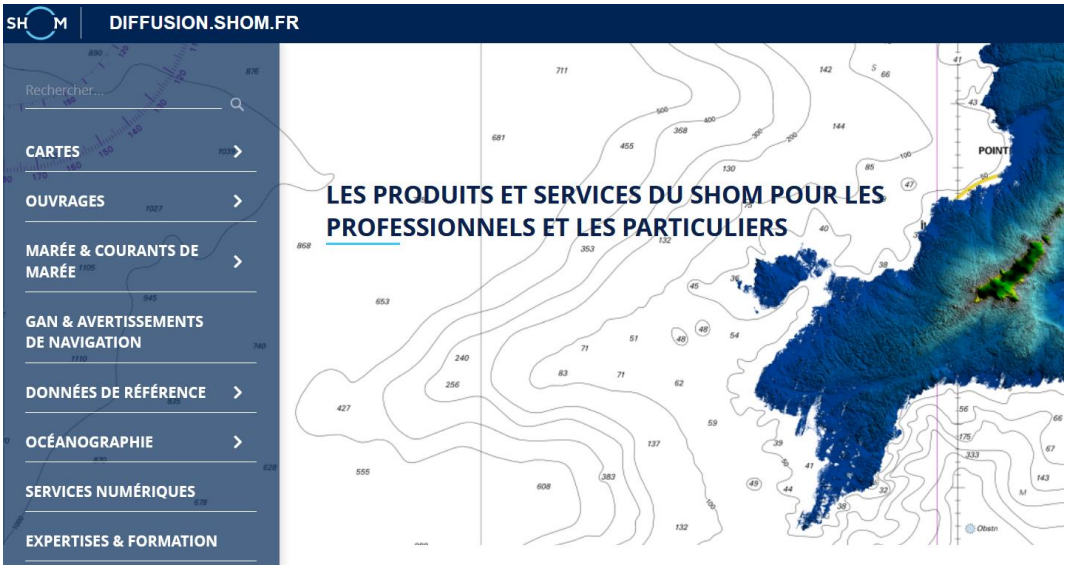

Fig. 40 – New ergonomics of Shom's online shop (diffusion.shom.fr)

9.7 CHALLENGES AND ACHIEVEMENTS

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

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

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

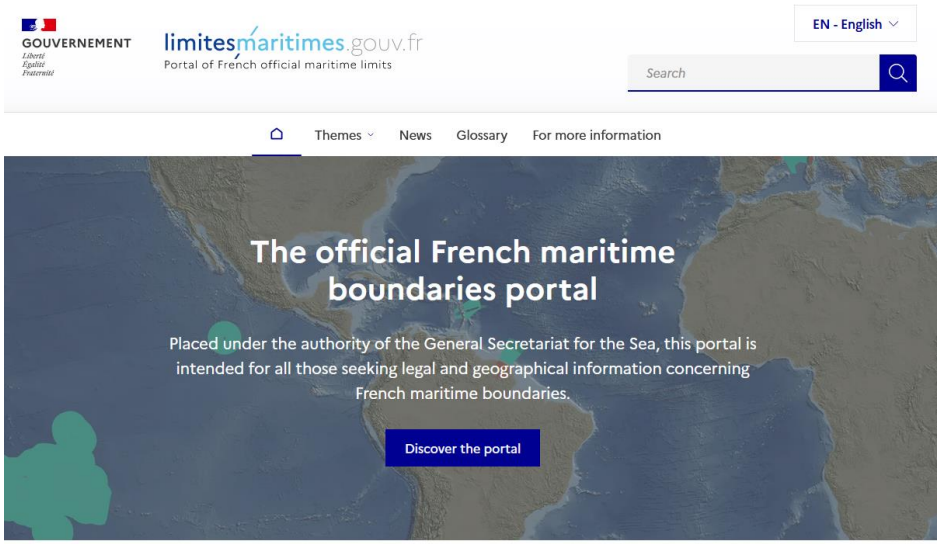

Fig. 41 – New ergonomics of the official French maritime boundaries portal

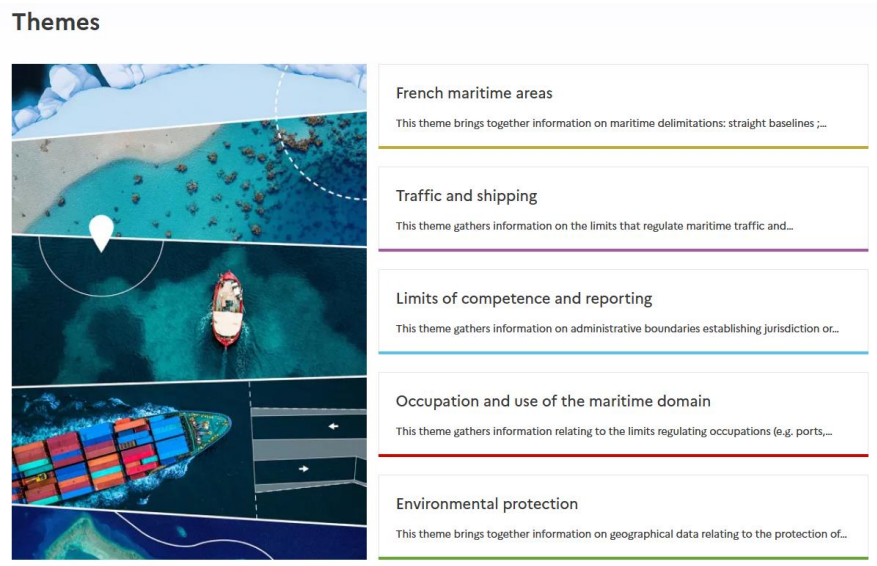

Fig. 42 – Themes of the official French maritime boundaries portal

10 INNOVATION

10.1 USE OF NEW TECHNOLOGIES

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

An initial experiment was carried out in September 2020 with 2 DriX unmanned surface vehicles equipped with an MBES and a sediment echo sounder, and was repeated in October 2023. From 2021 onwards, numerous other experiments were carried out with Exail's AUV A18D and Kongsberg's AUV HUGIN 6000 Superior to acquire the autonomy required for their use and knowledge of high-resolution seabed mapping. At the same time, Alseamar's Seaexplorer gliders were repeatedly tested under operational conditions. In addition, after several years of operational use of airborne Lidar, experiments are planned in the coming years to test UAVs equipped with bathy Lidar in conditional operations.

Fig. 43 - Experiment of USV DriX deployed from BHO Beautemps-Beaupré (Source: iXblue, 2020)

Fig. 44 - Experiment of AUV HUGIN deployed from BHO Beautemps-Beaupré (Source: Marine Nationale, 2021)

10.2 RISK ASSESMENT

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

10.3 POLICY MATTERS

NTR.

11 OTHER ACTIVITIES

11.1 PARTICIPATION OF IHO MEETINGS

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

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

Name	Chair / Vice chair	Member	Observations
CBSC		✓	Capacity Building Sub-Committee
NCWG		✓	Nautical Cartography Working Group
ENCWG		✓	ENC Standards Maintenance Working Group
DPSWG		✓	Data Protection Scheme Working Group
DQWG		✓	Data Quality Working Group -Last meeting in 1996
EAtHC	✓	✓	Eastern Atlantic Hydrographic Commission
FC		✓	Vice-chairman of Finance Committee
GEBCO		✓	Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of Oceans (GEBCO)
HCA		✓	Hydrographic Commission on Antarctica
HDWG		✓	Hydrographic Dictionary Working Group
HSSC	✓	✓	Hydrographic Services and Standards Committee
IENWG	✓	✓	IHO-European Union Working group
IRCC		✓	Inter-Regional Coordination Committee
MACHC		✓	MESO American & Caribbean Sea Hydrographic Commission
MBSHC		✓	Mediterranean and Black Seas Hydrographic Commission
MSDIWG		✓	Marine Spatial Data Infrastructure Working Group
NIOHC		✓	North Indian Ocean Hydrographic Commission
NIPWG		✓	Nautical Information Provision Working Group

NSHC		✓	North Sea Hydrographic Commission
RSAHC		✓	ROPME Hydrographic Commission
S100WG		✓	S-100 Working Group
SAIHC		✓	Southern Africa and Islands Hydrographic Commission
HSWG		✓	Hydrographic Surveys Working Group
SWPHC		✓	South-West Pacific Hydrographic Commission
TWCWG		✓	Tidal, Water Level and Currents Working Group
WEND		✓	Wold-Wide Electronic Navigational Chart Database
WWNWS		✓	World-wide Navigational Warning Service Sub-Committee

11.2 METEOROLOGICAL DATA COLLECTION

NTR.

11.3 GEOSPATIAL STUDIES

NTR.

11.4 PREPARATION FOR RESPONSES TO DISASTERS

France may have Navy ships in the SWPHC 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 the deployment and maintenance of most of the French sea-level stations in the Pacific. These observatories contribute to the tsunami warning system.

Some of these sea-level observatories are part of the IOC GLOSS system for a global monitoring of sea level change.

Leava (Wallis&Futuna), Papeete, Rikitea, Rangiroa, Makemo, Tubuai, Nuku Hiva (French Polynesia), and Noumea (Numbo – New Caledonia) observatories are already included in the so-called “GLOSS Core Network”.

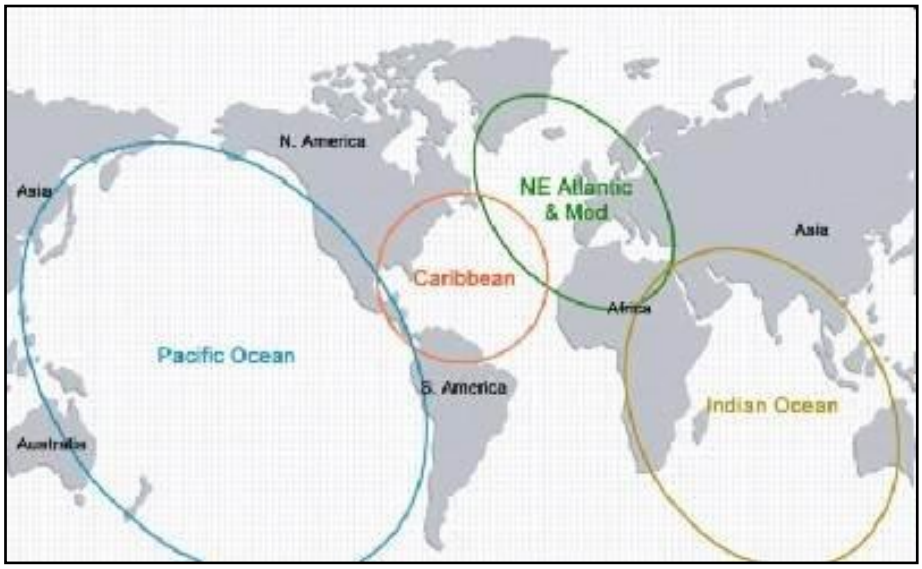

Fig. 45 - Cooperation areas on tsunami warning system (source COI; UNESCO)

- **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 metropolitan and Overseas Departments 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).

11.5 ENVIRONMENTAL PROTECTION

Shom plays a key role in the national implementation of the European Union Marine Strategy Framework Directive (MSFD). Shom is the scientific responsible for the descriptors "Hydrographic changes" and "Noise", coordinates the associated monitoring programs, and is also a monitoring operator. It is involved in European projects on this issue, such as the JONAS[3] project on the assessment of noise from maritime traffic on the Atlantic coast.

While 2019 and 2020 were mainly devoted to the revision of monitoring programs, years 2021 and 2022 were focused on the calculation of indicators and assessments of Good Ecological Status. These assessments will then be reported to the EU by France, based on the scientific reports delivered by the different institutions in charge.

11.6 ENGAGEMENT WITH THE MARITIME ADMINISTRATION

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

[3] Joint Framework for Ocean Noise in the Atlantic Seas https://www.jonasproject.eu)

11.7 AIDS TO NAVIGATION MATTERS

NTR.

11.8 MAGNETIC AND GRAVITY SURVEYS

NTR.

11.9 INTERNATIONAL ENGAGEMENTS

NTR.

12 CONCLUSIONS

12.1 AREAS OF SIGNIFICANT ACHIEVEMENT

The arrival in Nouméa and above all the hydrographic qualification of the patrol boat Auguste Bénébig is an up-and-coming reinforcement of the naval capacities of the French forces in the region. She will enhance the fleet at disposal of Shom to fulfil its missions. GOP is eager to test the next patrol boat who should join the French naval forces based in Franch Polynesia in 2024.

12.2 AREAS OF PARTICULAR CONCERN

NTR.

12.3 ANY OTHER MATTERS OF INTEREST TO THE SWPHC

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.

ANNEX I TO THE REPORT N°006/SHOM/DMI/REX/NP DATED 06/02/2024

NATIONAL MSI SELF-ASSESSMENT

Country: FRANCE - Organization: Shom

1 MARITIME AREA

[Describe maritime area including details of the geographic boundaries]

The maritime area includes all maritime areas under French jurisdiction within the South West Pacific: it includes coastal waters (up to 250 NM) of French Polynesia, New Caledonia and Wallis and Futuna.

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	+33 2 56 312 192 +33 2 56 312 273 +33 2 56 312 439	/	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, last update September 6th 2023).

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

EQUIPMENT TYPE FOR PORTS AND LOCAL AREA	SOFTWARE VERSION	DATE OF UP-DATE
No NAVTEX station in French overseas territories within the MACHC region. Coastal warnings broadcasted through SAFETYNET		
Terrestrial radiocommunications HF, MF and VHF means		

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

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

4 NAVTEX COVERAGE:

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

Not applicable.

Coastal warnings broadcasted by SafetyNET in French overseas territories.

5 OPERATIONAL ISSUES:

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

NTR.

6 CONTINGENCY PLANNING

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

NTR.

7 CAPACITY BUILDING

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

Not applicable.

8 OTHER ACTIVITIES

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

Shom participates to IHO and IMO Working Groups, Regional Hydrographic Commissions and the regional conferences related to MSI over past year (WWNWS15, NCSR10, DRWG22).

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 X and XIV:

AREA	COUNTRY	NAME	TELEPHONE	FACSIMILE
X and XIV	France - New Caledonia	Maritime Rescue Coordination Centre Nouméa https://www.mrcc.nc/	+687 292 121	
		EMAIL	operations@mrcc.nc	
XIV	France - French Polynesia	Joint Rescue Coordination Centre Tahiti http://www.jrcc.pf/	+689 40 541 615	+689 40 423 915
		EMAIL	contact@jrcc.pf	

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 EXTÉRIEURS :

- SWPHC CHAIR (Ms Hilary Thompson - AUS)
- IHO SECRETARIAT

COPIES INTÉRIEURES :

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