RÉPUBLIQUE FRANÇAISE
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SHOM L'océan en référence

Direction des missions institutionnelles
et des relations internationales
Division relations extérieures

BREST, le 10 février 2023

N° 009 /Shom/DMI/REX/NP

NATIONAL REPORT

SUBJET	:	France national report to the 20th 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-years target and performance contract between Shom and the French State. The current target and performance contract came into effect on January 1, 2021 for the period 2021-2024.

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

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

This national report is submitted by RDML Laurent Kerléguer, French national hydrographer and Shom Director General (shom-dg@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.

Since the previous SWPHC conference in February 2022, 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.

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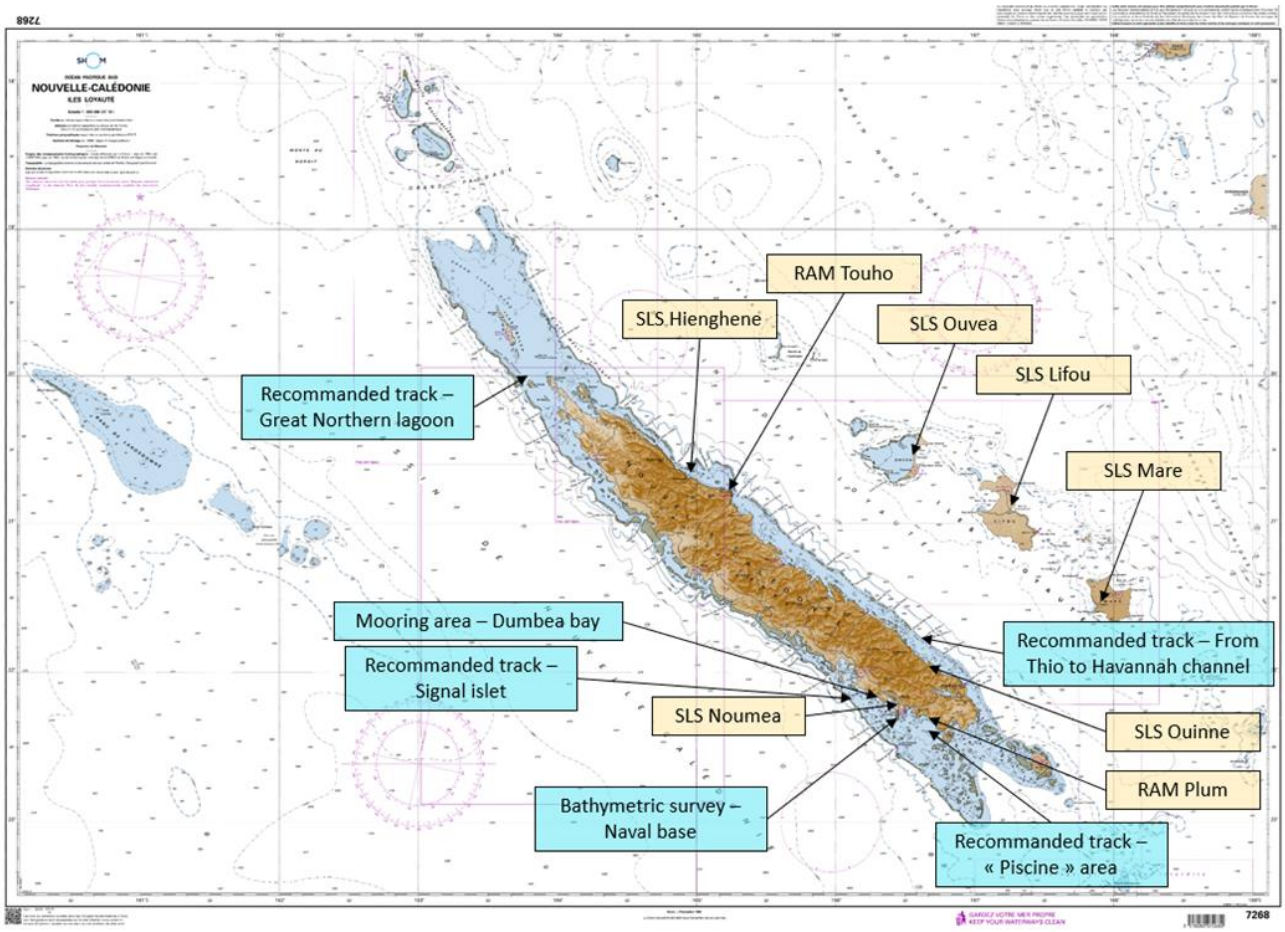
More precisely, the GOP conducted the following surveys depicted hereafter:

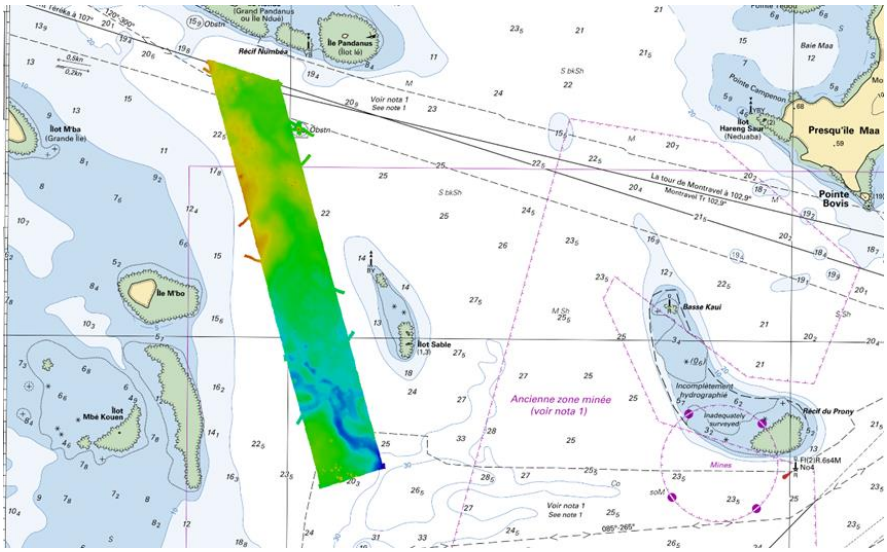
- <u>In New Caledonia</u>:

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

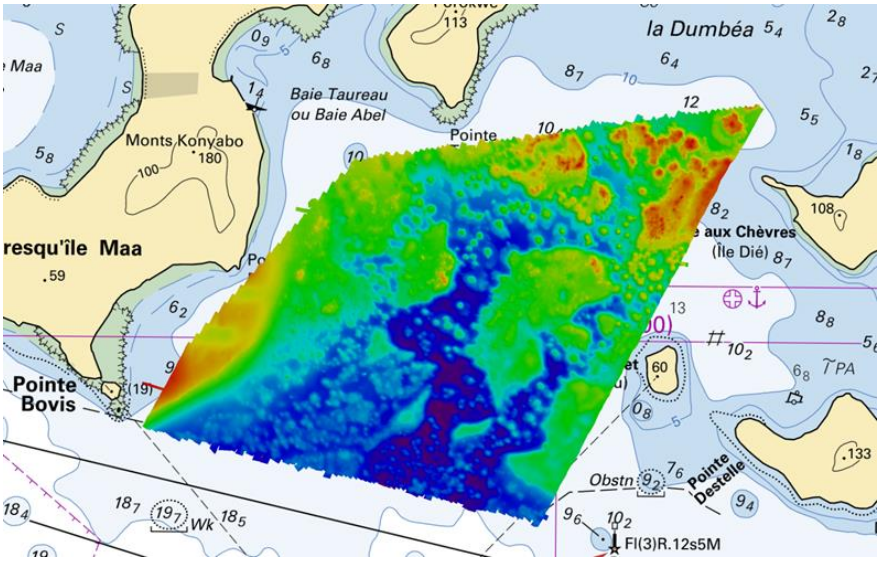


<u>Fig. 1</u> – Locations of the hydrographic works realized in 2022 in New-Caledonia

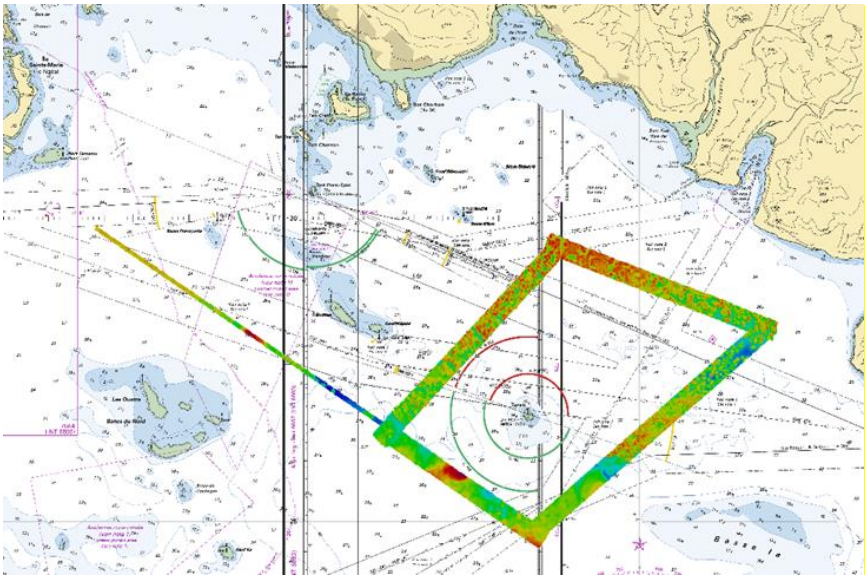
> Surveys:



<u>Fig. 2</u> – Recommended track alongside Signal islet



<u>Fig. 3</u> – Mooring area in Dumbea bay



<u>Fig. 4</u> – Recommended track in the so called "Piscine" area

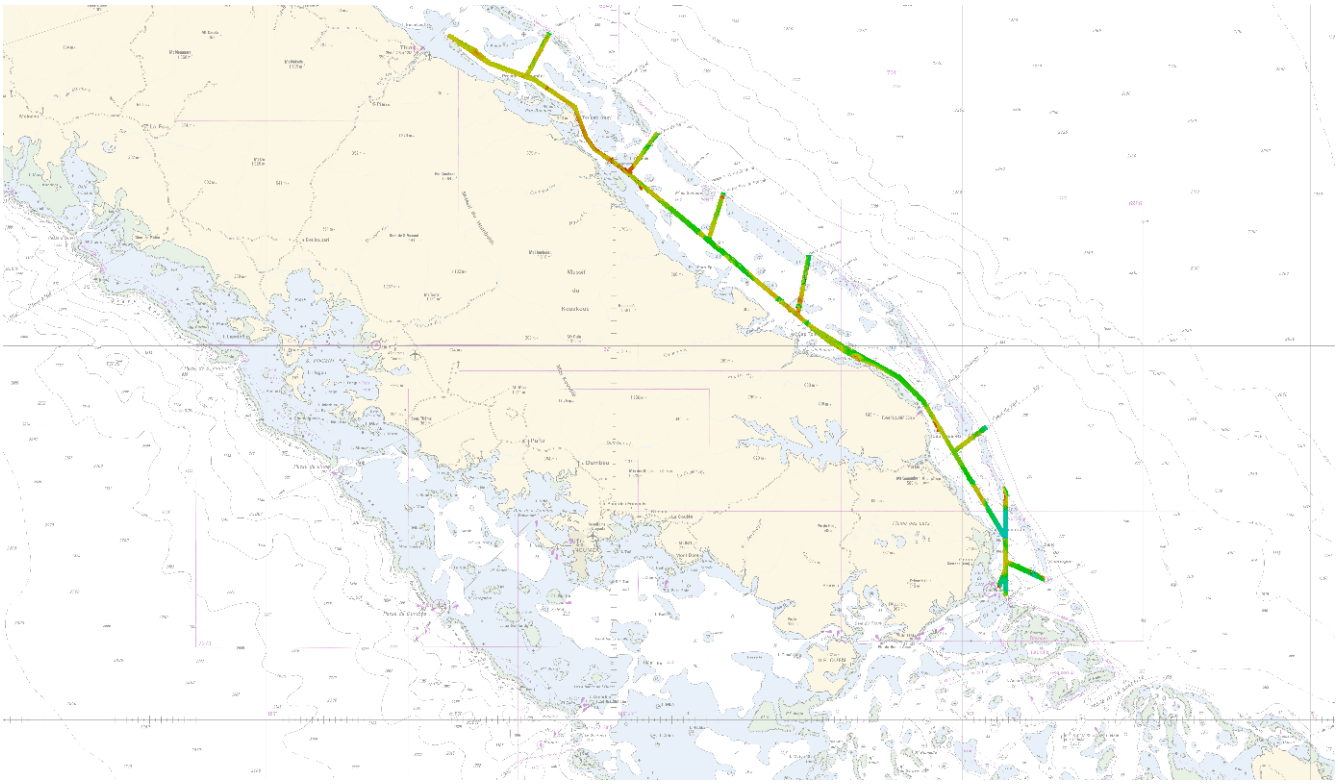


Fig. 5 – Recommended track from Thio to Havannah channel

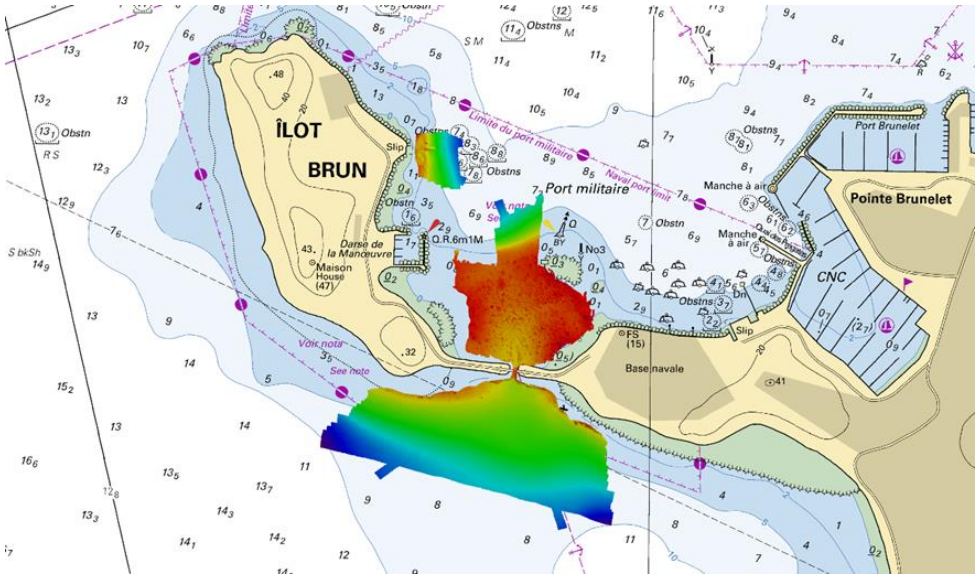


Fig. 6 – Bathymetric survey in the Noumea naval base

Fig. 7 – Opening of a new recommended track from Poum to Belep island in the Great Northern lagoon

> 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 8 and illustrated by figures 9 to 13. It's interesting to note that a new sea level station was installed in March 2022 on Ua Pou wharf, in the Marquesas Archipelago.

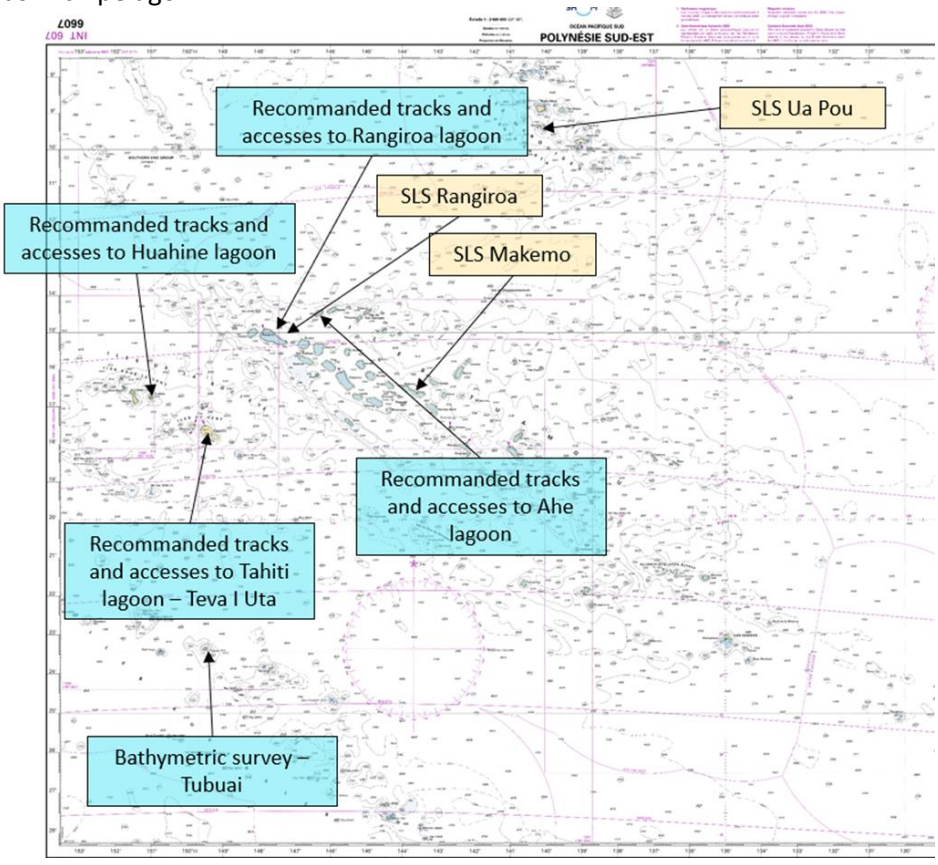


Fig. 8 – Locations of the hydrographic works realized in 2022 in French Polynesia

> Surveys:

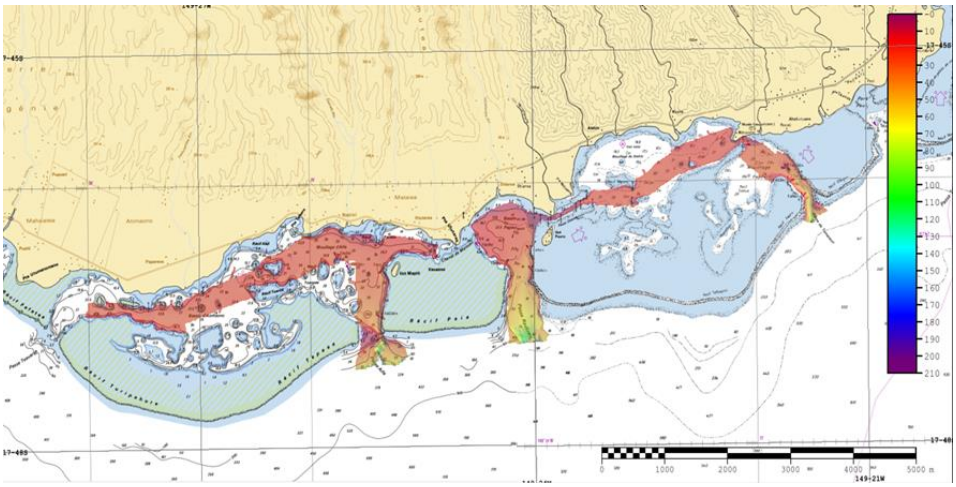


Fig. 9 – Accesses and recommended tracks inside Tahiti lagoon (Teva I Uta village)

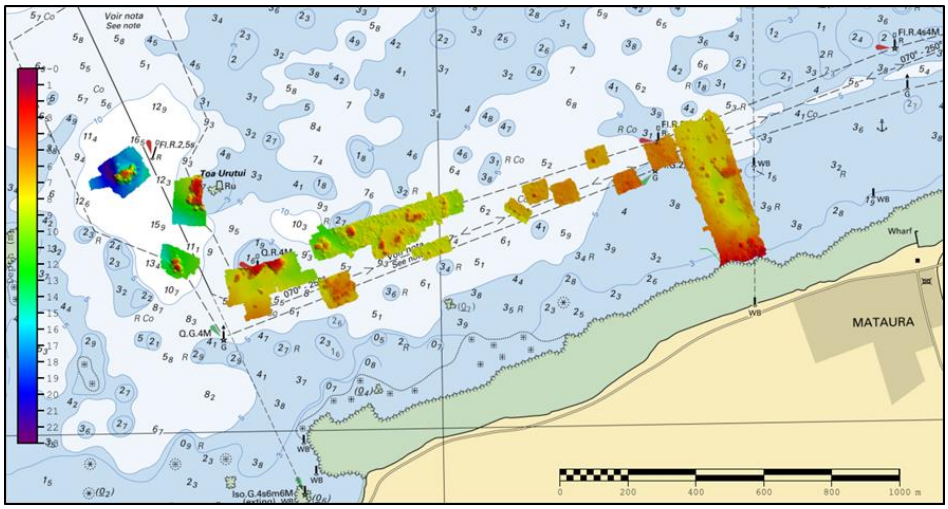


Fig. 10 –Bathymetric survey inside Tubuai lagoon

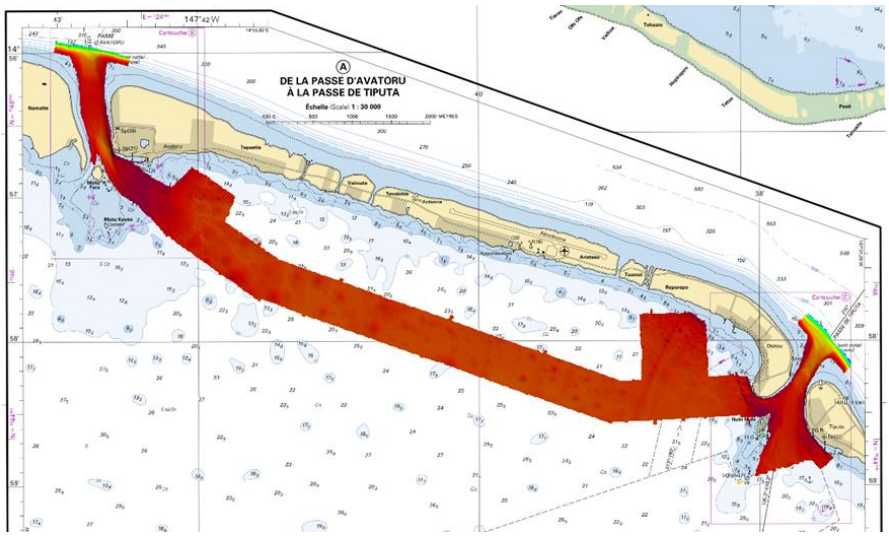
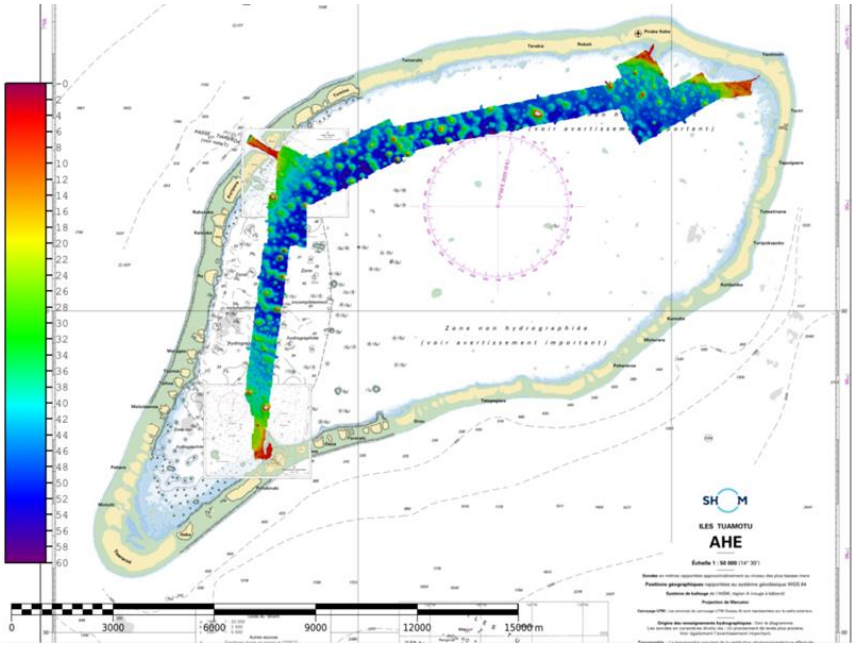
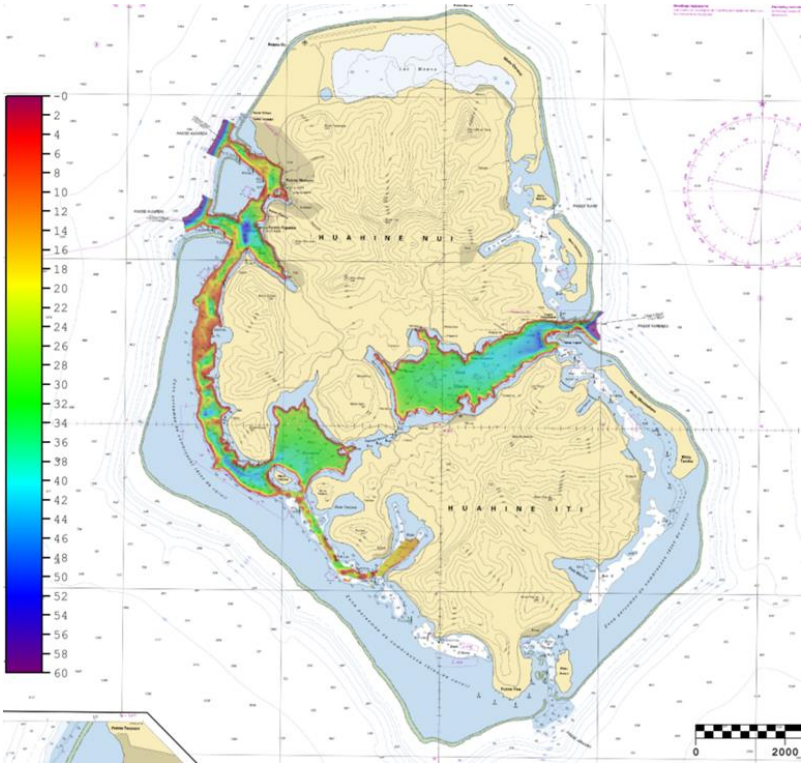


Fig. 11 – Accesses and recommended tracks inside Rangiroa lagoon



<u>Fig. 12</u> – Accesses and recommended tracks inside Ahe lagoon



<u>Fig. 13</u> – Accesses and bays inside Huahine lagoon

> 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).

- <u>In Wallis & Futuna</u>:
  In 2022, thanks to the Covid restrictions looseness, the maintenance operations to recommission the sea level stations implanted on Mata Utu and Leava wharfs were led. The two stations are now available again.

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, that was due to launch in 2022, is pending administrative and financial approval from local authorities. If it was to be approved, areas of interest might differ from what has been presented during previous SWPHC session.

In the meantime, Shom is in contact with authorities of New-Caledonia for possible bathymetric lidar survey around the islands.

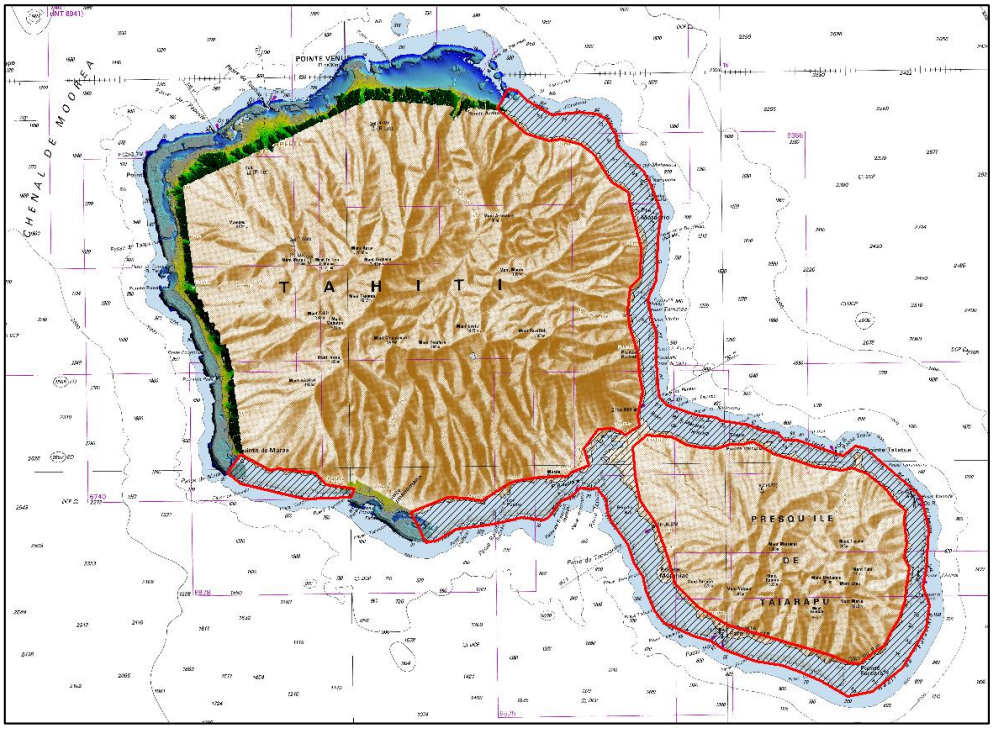


Fig. 14 – Existing Lidar surveys in Tahiti and possible extension project

2.3. NEW TECHNOLOGIES AND/OR EQUIPMENT

See §10.1 for the preparation of future capacities.

In New Caledonia:

The use of the MBES on each vessel and the fine tuning of its acquisition parameters, has dramatically improved surveying as well as postprocessing operations efficiency.

The CUBE algorithm was used for data processing, on areas where the morphology does not include too many coral pinnacles.

Numbo sea level station was upgrade to the metropolitan standard (RONIM v2) and the success of this operation should lead to the global upgrade of the Caledonian SLS network in 2023.

In French Polynesia:

Training and routine use of the Norbit multibeam echosounder allowed the Shom's Polynesian team to realize impressive bathymetric surveys to ensure safety of navigation through the accesses and into the lagoons. The results are presented in Paragraph 2.1.

2.4. NEW SHIPS

2023 will see the new French Navy patrol boat *Auguste Benebig* allocated to Noumea, New Caledonia. This brand-new ship is equipped with a through-hull well in which the EM2040p used by Shom in New Caledonia can be installed. This new survey capacity will be tested and set operational in 2023.

2.5. CROWDSOURCED AND SATELLITE-DERIVED BATHYMETRY - NATIONAL POLICY

Crowdsourced bathymetry – CSB

On 22 November 2022, France published an instruction of the Prime Minister on crowdsourced bathymetry to respond to the IHO's encouragement to increase global bathymetric coverage.

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.

Through this instruction, crowdsourced bathymetry is authorised in the waters under French sovereignty or jurisdiction, subject to the definition and constraints imposed by the legal text. Data from crowdsourced bathymetry in French waters are 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 Participatory 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) to produce nautical charts in the Pacific region

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

Shom is currently conducting a research and development project in the field of SDB, Bathysat project, that will improve performance and quantify vertical uncertainties in accordance with the specifications of the new version of the S-44 (Edition 6.0.0). The results of the study should make it possible to use SDB with no need for calibration with field data.

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

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

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

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

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

Meanwhile, the new SDB products will be tested over the New-Caledonian lagoon to compared and to assist classic bathymetric surveys in the Great Southern lagoon.

2.6. CHALLENGES AND ACHIEVEMENTS

See Paragraph 2.3.

3. NEW CHARTS & UPDATES

3.1. ENC COVERAGE, GAPS AND OVERLAPS

As of 1st of January 2023, Shom has produced 812 ENCs, of which 267 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	13	14	93%
3	23	23	100%
4	72	76	95%
5	89	159	98%
6	67		

Total	**267**	275	**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:

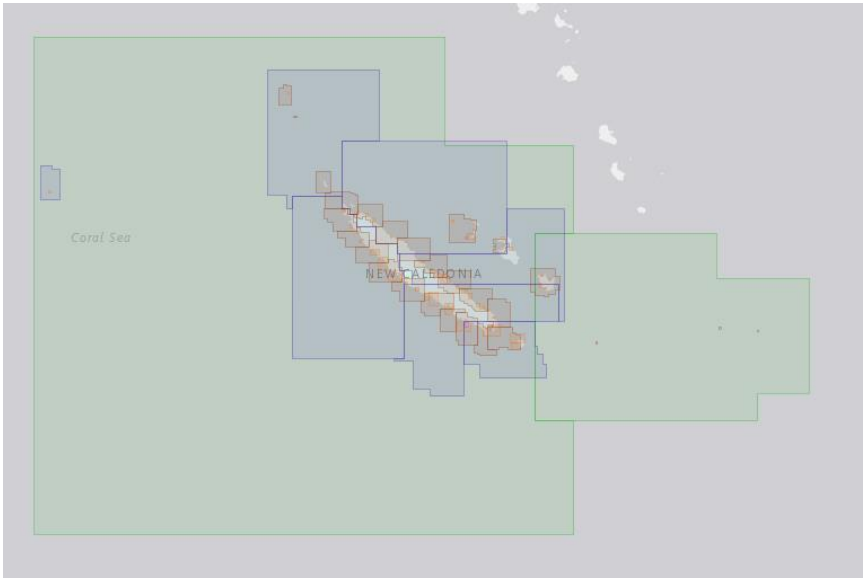


Fig. 15 - Region L - Shom's ENC production - New-Caledonia

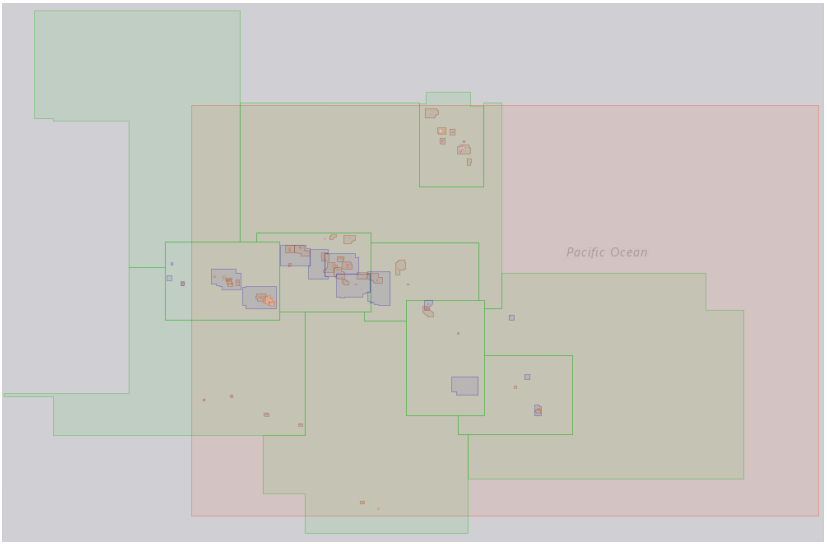


Fig. 16 - Region L - Shom's ENC production - French Polynesia

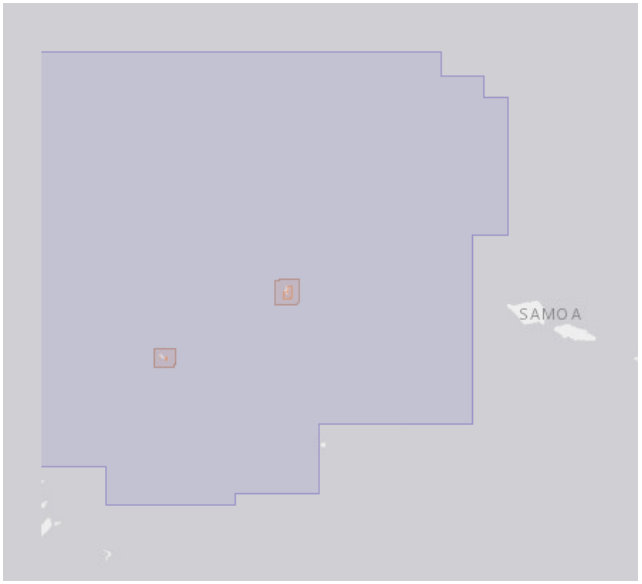


Fig. 17 - Region L - Shom's ENC production – Wallis & Futuna

ENC cells produced since the last conference are detailed hereafter:

Number	Scale 1 :	Title
FR17246A	3 000 000	Polynésie Française partie nord
FR17246B	3 000 000	Polynésie Française partie sud
FR46279C	45 000	Maria
FR473140	45 000	Ahe
FR474620	45 000	Amanu
FR474640	45 000	Motutunga
FR474650	45 000	Tahanea
FR56820C	8 000	Quai de l'île Tiga
FR57452A	8 000	Passes Fafameru et Teikariki - Village Ikitake
FR57757A	12 000	Baie de Kouaoua
FR57757B	12 000	Baie de Canala
FR577630	22 000	Abords Sud-Ouest de l'île des Pins – Baies de Kuto et de Kanuméra
FR67464A	4 000	Motutunga – Passe Nord-Ouest
FR67465A	12 000	Tahanea - Passes Motupuapua, Teavatapu et Otao

ENC cells planned for 2023 are listed below:

Number	Scale 1:	Title
FR56820D	10 000	Lifou – Baie de Chépénéhé

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 table below contains the INT charts produced since the last conference:

INT	Scale 1:	Title	Comment
654	1 500 000	De Tahiti aux Îles Marquises	FR7371 – New Edition
656	1 500 000	Des Îles Tuamotu aux Îles Australes	FR7347 – New Edition
6899	25 000	Accès au Port de Nouméa	FR7644 – New Edition

Besides, the following INT charts are planned for the 2023-2024 period:

INT	Scale 1:	Title	Comment
6843	300 000	Nouvelle-Calédonie (partie Sud-Est) - Iles Loyauté	FR6686 – New Edition
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 is planed for 2022 and 6844 for later.

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	3	5	60%
Large (>1/100 000)	10	10	100%
Total	**20**	**22**	**91%**

3.5. NATIONAL PAPER CHARTS

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

National	Scale 1:	Title	Comment
6176	30 000	Maupihaa (Maupélia)	New Edition
6279	Div.	Iles Rimatara et Maria	New Edition
6282	30 000	Passes entre les Iles Raiatea et Tahaa	New Edition
6283	30 000	Île Tahaa	New Edition
6421	175 000	Îles Arutua, Apataki, Kaukura, Niau	New Edition
6689	594 000	Îles Tuamotu (Partie Ouest)	New Edition
6690	592 500	Îles Tuamotu (partie centrale)	New Edition
7011	60 000	De la Presqu'île Neuméni à Port-Ounia	New Edition
7261	174 000	De Fakarava à Makemo	New Edition
7262	174 000	De Makemo à Marutea Nord	New Edition
7314	50 000	Ahe	New Edition
7320	60 000	De Koumac à Poum	New Edition
7373	80 000	Rangiroa	New Edition
7462	60 000	Amanu	New Chart
7464	50 000	Motutunga et Tepoto Sud	New Chart
7465	50 000	Tahanea	New Chart
7757	20 000	Baie de Kouaoua et Baie de Canala	New Chart
7763	25 000	Abords Sud-Ouest de l'Île des Pins - Baies de Kuto et de Kanuméra	New Chart

Following charts are planned to be issued in 2023-2024:

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
6717	10 000	Port Phaeton (Teauaa) - Tapuaeraha	New Edition
6876	20 000	Iles Wallis - Accès à Mata Utu et Halalo	New Edition
6949	60 000	Abords de Thio	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
7755	60 000	De Ponérihouen au Cap Dumoulin	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 updated versions for 12 months from the date of purchase.

3.7. CHALLENGES AND ACHIEVEMENTS

The 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 1rst of January 2026). In particular, the "S-100 across the Channel" project, in partnership with the UKHO, from S-101 ENC production to sea trials, is a risk assessment on the dual fuel mode of ECDIS.

4. NEW PUBLICATIONS & UPDATES

4.1. NEW PUBLICATIONS

NTR.

4.2. UPDATED PUBLICATIONS

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

4.3. MEANS OF DELIVERY

Nautical publications are available in digital format only (pdf files) on Shom's online shop (http://diffusion.shom.fr).

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 for Nouméa, with operating organism: MRCC 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.

[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*

Hereafter are listed the coordinates of those authorities:

Area	Phone number	Fax number	Email address
New Caledonia	+687 292 121		operations@mrcc.nc
French Polynesia	+689 40 541 615	+689 40 423 915	contact@jrcc.pf

MSI Point of contact at Shom:

M. Philippe Pellae-Arthaud
Head of Regional Team
French Hydrographic Office
13, rue du Chatellier – CS 92803 - 29228 BREST CEDEX 2 – FRANCE
Tel : + 33 (0) 256 31 23 03
email: dops-psm-na-omer@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 (MRCC 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 web platform will constitute a shared information system for the transmission, formatting, digitization and posting of nautical information on the Internet.

This platform aims to digitize nautical information as much as possible to promote wide dissemination and integration into user systems (ship navigation systems, shore services systems, user systems, etc.).

The platform will have a portal for humans and programming interfaces (API) for systems, with 3 functional modules:

- production and distribution of navigational warnings,
- transmission of source information by maritime services and users to contribute to nautical information,
- production and dissemination of maritime regulations in a spatialized form.

A mobile application will also be associated with the platform.

The production and digital dissemination of navigation warnings will use the IHO S-124 Navigational warnings standard under development, while ensuring compatibility with the current NAVTEX and EGC systems.

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

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

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

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

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 2022		**Depth < 200m**			**Depth > 200m**		
		A	**B**	**C**	**A**	**B**	**C**
L	France – French Polynesia	15.5	17.2	67.3	17.2	0.0	82.8
	France – New Caledonia	15.6	22.0	62.4	19.3	2.1	78.6
	France – Wallis & Futuna	17.6	30.9	51.5	20.4	0.0	79.6

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/sites/default/files/2022-09/Offre_formation_Externe_2022-2023.pdf

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

Fig. 18 – 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. 19 – 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 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 Government: Hienghène, Maré, Lifou, Thio, Ouinné and Ouvéa, and one station owned by Shom Numbo (Nouméa),

The maintenance operations are funded on a 5 years basis. The rhythm of operations is about 18 months. The convention will end in December 2023 and a new one is being written.

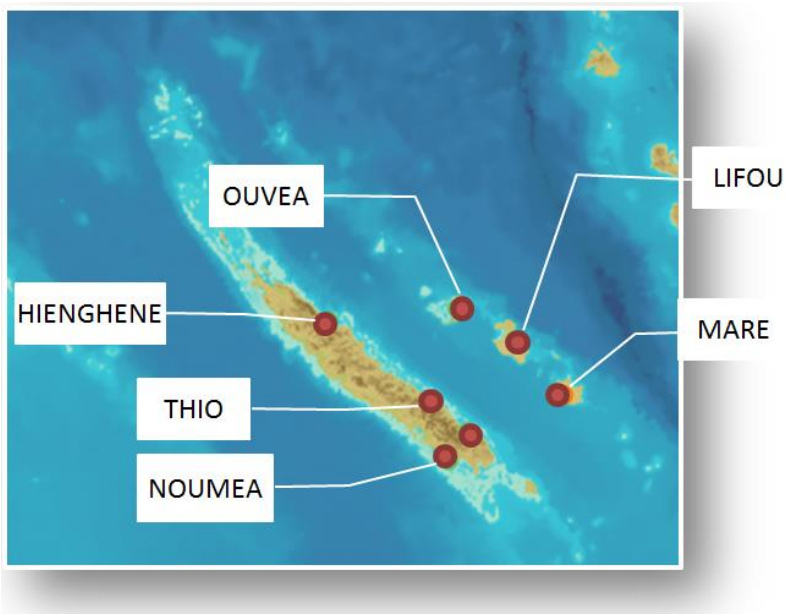


Fig. 20 – Tidal gauges network covering New Caledonia waters

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. 21 – 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

Fig. 22 – Tidal gauges network covering Wallis and Futuna waters

8.4. NEW EQUIPMENT

The COVID-19 crisis delayed Shom's project of a convergence on a similar hardware standard for SLS in metropolitan France and in the Pacific. But in 2022, the mandatory tests where led with success over Numbo station and the rest of the Caledonian network should be tackled by the end of 2023.

The expected results are: a better reliability, improved transmission rates and lower maintenance requirements.

It is expected that tide gauges in Wallis & Futuna will benefit from these improvements in 2024. In French Polynesia, the upgrade operation has to be financed by the stakeholders.

8.5. CHALLENGES AND ACHIEVEMENTS

One of the main challenges for GOP in the coming 2 years will be the upgrade of the sea level observation network through the Pacific Ocean.

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.

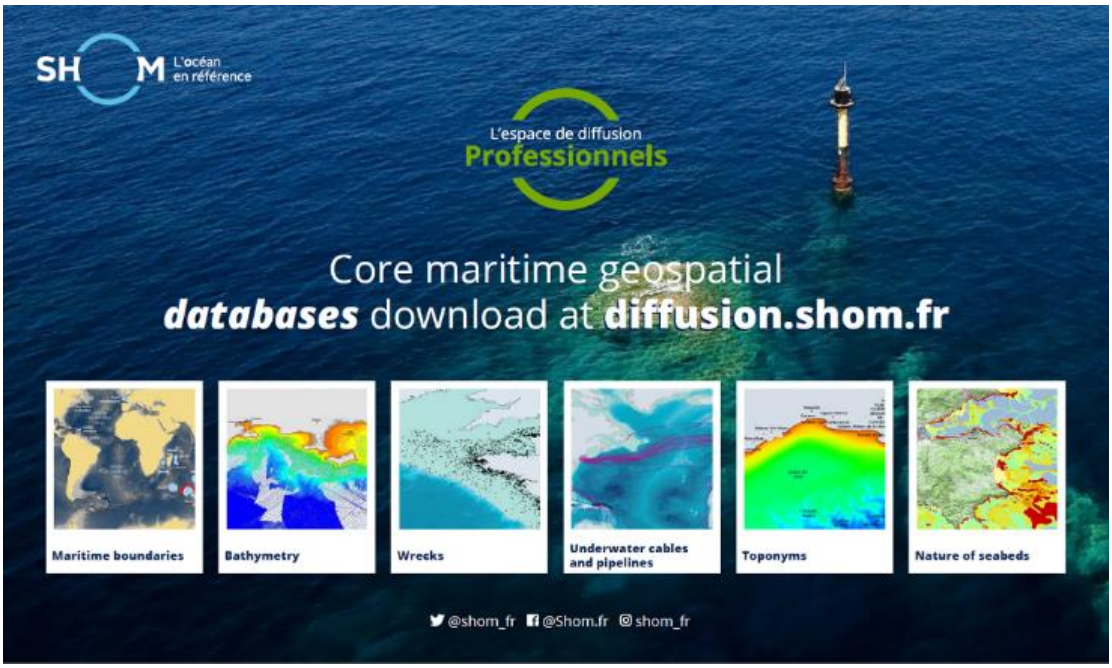


Fig. 23 - Access to Shom's open data (diffusion.shom.fr)

9.5. MSDI NATIONAL PORTALS

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:

- Wrecks and obstructions (edition);
- Aids to navigation (AToN) (edition extended to French overseas territories);
- Maritime Limits (new edition): Decree n° 2022-1352 of October the 24th 2022 defining the maritime boundary between France and Tuvalu. Also available on maritimelimits.gouv.fr
- Bathymetric measurements (edition);
- Maritime Altimetric References (edition).

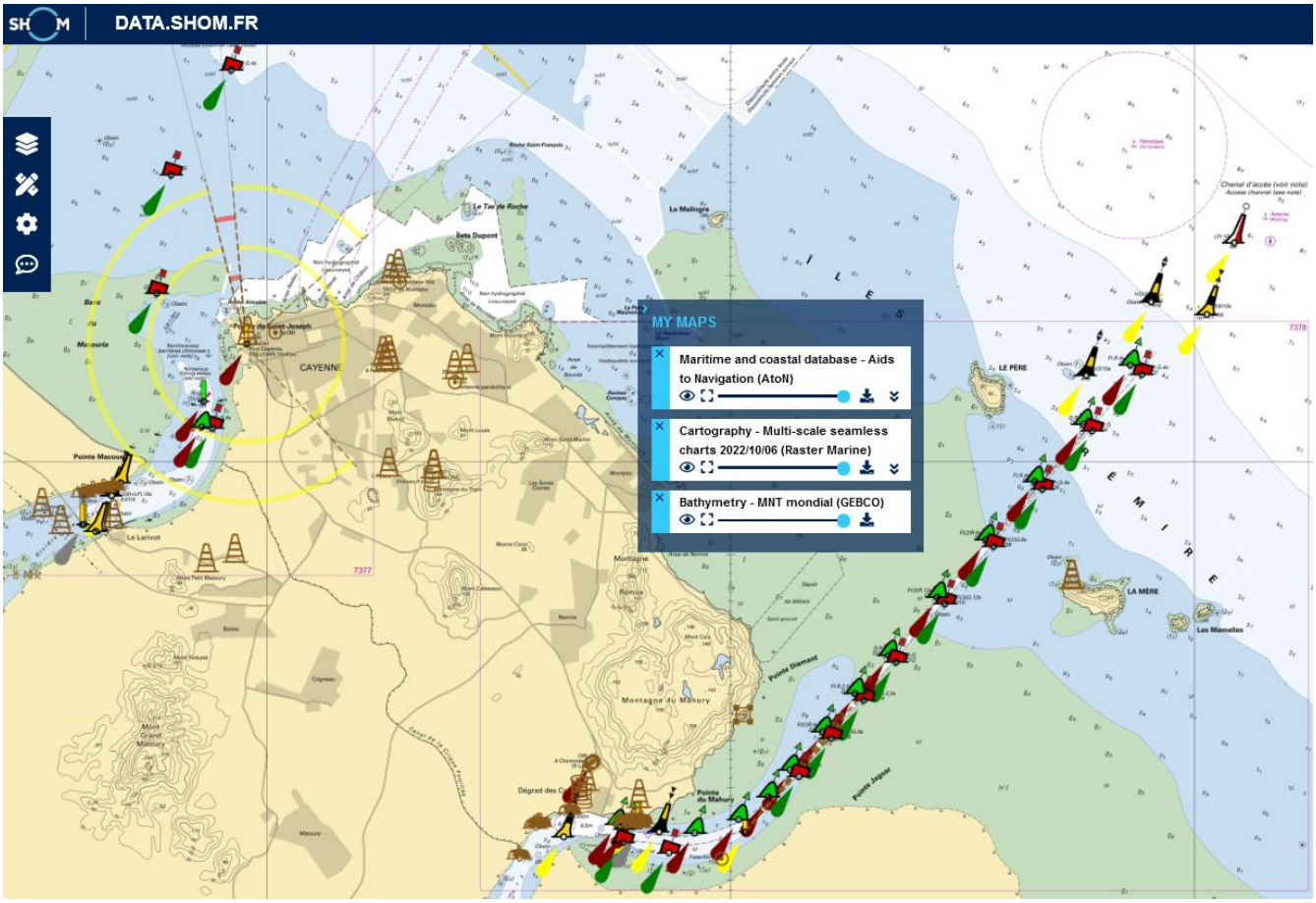


Fig. 24 – Aids to navigation extended to the French overseas territories (data.shom.fr)

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

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

9.6. BEST PRACTICES AND LESSONS LEARNED

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 and diffusion.shom.fr. Based on feedback from portal users, new portal ergonomics have been defined.

A first step was taken in 2021 with data.shom.fr portal.

A second step during the second quarter of 2022 consisted of merging user accounts for data.shom.fr on one hand and for the online shop diffusion.shom.fr on the other. From now on, a single account allows the user to find his settings on each portal.

The third and final step was the commissioning of the new online shop with a more readable offer and a simplified and more intuitive user experience.

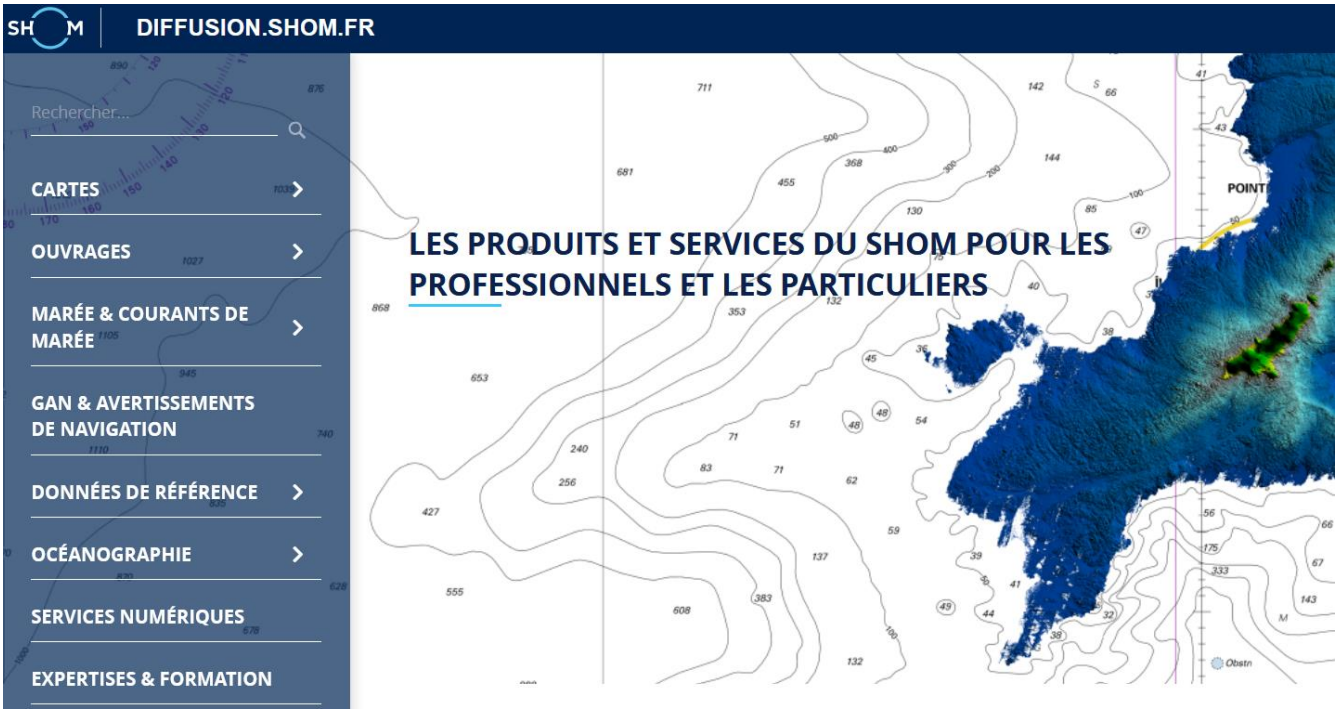


Fig. 25 - New ergonomics of Shom's online shop (diffusion.shom.fr)

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 with AUV A18D from ECA and with deep sea AUV HUGIN 6000 Superior from Kongsberg. Following these trials, rentals of HUGIN 6000m Superior have been contracted with Kongsberg in order to give some basic training to people in charge of the high-resolution deep-sea cartography and to prepare for autonomy. Other experiments are planned in the coming years with the aim of assessing definitively the USV DRIX performances and to challenge UAV in conditional operations. Beyond the evaluation of the hydrographic performance of these new platforms, these experiments should make it possible to adapt the organisation and processes in order to get the best out of these new technologies.

Fig. 26 - Experiment of USV DriX deployed from BHO Beautemps-Beaupré (Source: Shom)

Fig. 27 - Experiment of AUV HUGIN deployed from BHO Beautemps-Beaupré
(Source: Shom)

10.2. RISK ASSESMENT

Shom completed in 2020 the development of an experimental tool called "Deseasion platform". It is a multi-criteria decision tool for hydrographic risk assessment and cost-benefit analysis. It 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
Council		✓	IHO Council
CBSC		✓	Capacity Building Sub-Committee
NCWG		✓	Nautical Cartography Working Group
ENCWG		✓	ENC Standards Maintenance Working Group
DPSWG		✓	Data Protection Scheme Working Group

DQWG		✓	Data Quality Working Group -Last meeting in 1996
EAtHC	✓	✓	Eastern Atlantic Hydrographic Commission
FC		✓	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 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 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.

Futuna (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”.

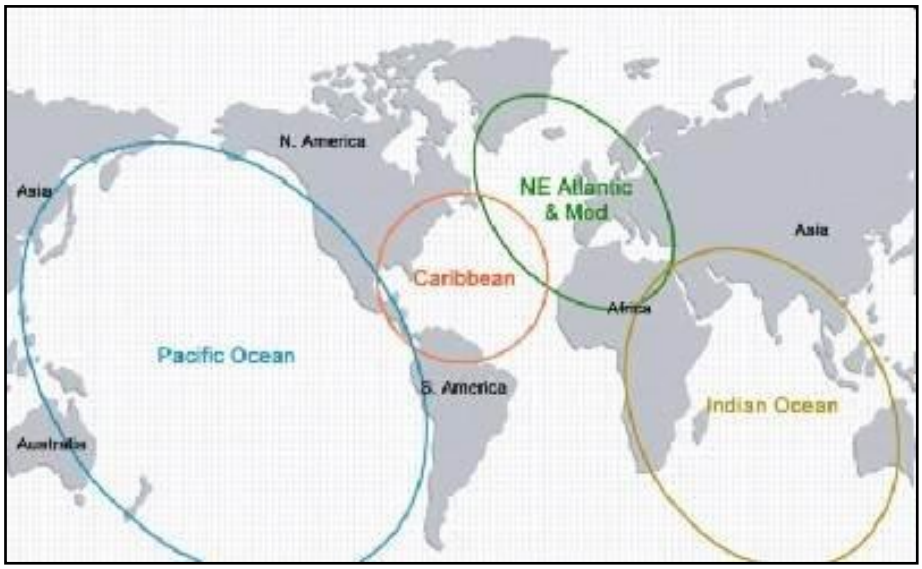


Fig. 28 - Cooperation areas on tsunami warning system (source COI; UNESCO)

- **Coastal flooding**

Shom is not currently working on the development of coastal flooding forecast capabilities in the French Pacific territories but is in contact with Météo-France to make multi-resolution bathymetric digital elevation models over Tahiti and Moorea islands, that meet the requirements for the implementation of storm surge and wave coastal models in the area.

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 JONAS[3] project on the assessment of noise from maritime traffic on the Atlantic coast.

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

11.6. ENGAGEMENT WITH THE MARITIME ADMINISTRATION

NTR.

11.7. AIDS TO NAVIGATION MATTERS

NTR.

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

11.8. MAGNETIC AND GRAVITY SURVEYS

NTR.

11.9. INTERNATIONAL ENGAGEMENTS

NTR.

12. CONCLUSIONS

a) Areas of significant achievement

Despite the six months unavailability of the ship *Louis Hénin* in New-Caledonia, the team manage to lead several hydrographic surveys thank to its hydrographic motor boats. Once she was repaired, *Louis Hénin* was dedicated to hydrographic missions allowing Shom to catch up and to fulfil its annual program in the Caledonian lagoon.

Meanwhile, the Polynesian team kept improving its mastering of its new deployable Norbit system and tackled impressive surveys over distant islands.

b) Areas of particular concern

The COVID-19 crisis has a severe impact on the global maritime and aerial freight in 2021 and in the beginning of 2022. Even if the freight limitations are almost over, its costs are staying high, which might compromise the missions, especially in French Polynesia.

c) 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.

ANNEXE I TO THE REPORT N° 009/SHOM/DMI/REX/NP DATED 10 FEBRUARY 2023

NATIONAL MSI SELF-ASSESSMENT.

Country: FRANCE

Organization: Shom

1. **Maritime area**

[Describe maritime area including details of the geographic boundaries]

The maritime area includes 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 of the "Information and Nautical publication" department of the "Maritime Products and services" division	+33 2 56 312 190 +33 2 56 312 439 +33 2 56 312 273	/	dops-psm-na-omer@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/ouvrages/radiosignaux/rsx-92-4-radiocommunications-maritimes-systeme-mondial-de-detresse-et-de-securite-en-mer-smdsm.html

The publication is regularly updated (last version January 11th 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 ovserseas territoritories within the MACHC region. Coastal warnings broadcasted through SAFETYNET	NTR	NTR
Terrestrial radiocommunications HF, MF and VHF means	NTR	NTR

[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 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.]

Shom, as French national MSI coordinator, do not transmit MSI within the SWPHC region.

Shom controls and coordinates the warnings issued by its national delegated coordinators.

LISTE DE DIFFUSION

DESTINATAIRES :

- SWPHC CHAIR (LINZ - NZ)
- IHO SECRETARIAT

COPIES INTÉRIEURES :

- DG
- DMI (D-REX)
- GOP
- archives (DMIDSD 2.007)