

**22nd CONFERENCE OF THE MESO AMERICAN – CARIBBEAN SEA
HYDROGRAPHIC COMMISSION (MACHC22)
Virtual Meeting – November 30 to December 3, 2021**

NATIONAL REPORTS FROM BRAZIL TO THE MACHC22

Executive summary

1. Hydrographic Office / Service

- a) Name of the institution: Directorate of Hydrography and Navigation (DHN).
- b) Description: DHN is responsible for hydrographic surveys and its analysis, nautical chart production, nautical publication release, weather forecast broadcast, maritime safety information and navigational warning broadcast, oceanographic data analysis, hydrographic training and capacity building implementation.
- c) Submitted by: Lt. (Engineer) Ana Emília de Souza Silva, ana.silva@marinha.mil.br

2. Surveys

- a) Coverage of new surveys: during 2021, the Brazilian Navy Hydrographic Vessels carried out surveys in the Amazon basin, mainly in the Madeira, Solimões, Negro, Branco, to support the nautical production developed by the regional hydrographic branches located in the Amazon basin and in the Paraguay river basin, as well as to refine the tidal reduction data outside the mouth of the Amazon river.
- b) New technologies and /or equipment: XXX
- c) New ships: XXX
- d) Crowdsourced and satellite-derived bathymetry - national policy: Crowdsourced Bathymetry (CSB) activities are allowed in the Brazilian EEZ. CSB and SDB are not recognized as valid sources for charting update.
- e) Challenges and achievements: to maintain the excellent service provided by DHN despite the coronavirus pandemic; to provide trainings in hydrographic data analysis and nautical cartography production to Regional Hydrographic branches in the Amazon basin (Belém and Manaus) and in the Paraguay river basin (Ladário); to establish the water level reduction at the Amazon river delta.

3. New charts & updates

- a) ENC coverage, gaps and overlaps:
Brazilian ENCs don't present gaps neither overlaps due to internal and external (IC-ENC) systematic checks.

The new ENC cells produced since last MACHC meeting were:

BR640323 - Terminais da Reman
BR404032 - De Novo Remanso à Manaus
BR540231 - Paraná de Santa Rita
BR404023 - De Óbidos as Ilhas do Caldeirão
BR504411 - Da Foz do Rio Trombetas ao Lago Paru
BR504413 - Do Lago Paru à Ilha Jacitara
BR504415 - Da Ilha Jacitara ao Lago Aracuã
BR504417 - Do Lago Aracuã ao Porto Trombetas
BR304023 - Da Ilha de Patacho à Ilha de Santa Rita

The updated ENC cell were:

BR400305 - Da Ilha do Capim à Ilha da Conceição
BR304029 - Da Ilha Panumã a Novo Remanso
BR44023A - Paraná de Santa Rita
BR321600 - Da Ilha Maiaú a Ponta Hazou
BR321400 - Do Machadinho a Ponta Quatipuru
BR404418 - Do Lago Aracuã ao Rio Trombetas
BR400412 - Baía de São Marcos - Prox. Do Terminal da Ponta da Madeira e Itaqui
BR221020 - De Salinópolis a Fortaleza
BR304025 - Da Ilha de Santa Rita ao Paraná do Ramos
BR441032 - Do Paraná do Ituquí a Ilha do Meio
BR321200 - Do Rio Calçoene a Ilha Sipioca
BR400304 - De Mosqueiro a Vila do Conde
BR500830 - Porto de Cabedelo
BR404030 - Da Ilha Panumã à Novo Remanso
BR540231 - Paraná de Santa Rita
BR500413 - Terminal da Ponta da Madeira e Porto de Itaqui

b) ENC distribution method:

Brazilian ENCs are distributed by IC-ENC. In 2018, the Brazilian company EMGEPON began working as a reseller of VAR PRIMAR (<https://cartasnauticasbrasil.com.br/>).

c) RNCs:

DHN provides Raster Navigational Charts for the Brazilian jurisdictional waters. 513 RNC (77 in MACHC region) are currently available at no cost for the entire community (<https://www.marinha.mil.br/chm/dados-do-segnav/cartas-raster>).

d) INT charts: XXX

e) National paper charts:

The new editions of national paper nautical charts were:
4023A - Paraná de Santa Rita
320 - Porto de Belém

f) Other charts, e.g. for pleasure craft:

DHN released 14 Inland ENCs of the Madeira River.

g) Challenges and achievements:

DHN provide trainings to the Regional Hydrographic branches in the Amazon basin and in the Paraguay river basin focusing on hydrographic data analysis, validation of bathymetric and cartographic databases and production of nautical charts. The IT connection issues were solved so these branches can now work directly in the databases stored at DHN, Niterói, in the southeast of Brazil. Key technical personnel specialized in hydrography and cartography was transferred to these branches, aiming to improve their production capabilities and to create critical mass.

4. New publications & updates

a) New Publications:

Charts and Publications Catalogue, 14th Edition, Brazil, 2021-2025
 Tide Tables DG6, 58th Edition, Brazil, 2021
 Nautical Almanac DN5, 77th Edition, Brazil, 2021

b) Updated publications:

Charts and Publications Catalogue, 14th Edition, Brazil, 2021-2025
 List of Radio Signals, 14th Edition, Brazil, 2020-2024
 List of Lights, 37th Edition, Brazil, 2020-2021
 List of Fog Signals, 8th Edition, Brazil, 2020-2024
 North Coast Sailing Directions, 12th Edition, Brazil, 2020-2024
 Distance Tables, 4th Edition, Brazil, 2016

c) Means of delivery, e.g. paper, digital:

Accessible through paper format (EMGEPRON's website <https://cartasnauticasbrasil.com.br/>) and digital format (DHN's website - <https://www.marinha.mil.br/chm/dados-do-segnav/publicacoes>).

d) Challenges and achievements: XXX

5. MSI

a) Existing infrastructure for MSI dissemination:

DHN is responsible for NAVAREA V, which is operated by its subordinate agency Brazilian Navy Hydrographic Center, in accordance with GMDSS Master Plan. Navigational warnings and meteorological information are broadcast by SafetyNET service at scheduled times (0030 and 1230 UTC) twice a day. Meteorological information is broadcast at scheduled times (0730 and 1930 UTC) twice a day. Bad weather warnings are forwarded any time, whenever it's necessary. MSI is also broadcast in VHF/HF by the Brazilian Navy Radio Station in Rio de Janeiro, at least twice a day. Local navigational warnings are broadcast only by VHF/HF.

b) Statistics on work of the National Coordinator:

Country / Territory	PHASE 1 MSI STATUS	MSI 2018	MSI 2019	MSI 2020	MSI 2021	Training Date	Training Date
Brazil (NAVAREA V)	Fulfilling all obligations	225	165	160	86	Apr-2011	Oct-2018

c) New infrastructure in accordance with GMDSS Master Plan:

SERVICE	YES	NO	PARTIAL	NOTES
MASTER PLAN	X			
A1 AREA	X			
A2 AREA	X			
A3 AREA	X			
NAVTEX		X		
SafetyNET	X			

d) Challenges and achievements: to develop a web-based Navigational Warning system in order to optimize the delivery of maritime safety information and to prepare for the implementation of S-124. This new system is being tested.

6. C-55

Brazilian C-55 Region B was subdivided in 3 regions: Amazon Basin, Brazilian Coast, and São Pedro and São Paulo Archipelago.

6.1 Status of Hydrographic Survey:

Survey coverage, where:

A - Percentage which is adequately surveyed.

B - Percentage which requires re-survey at larger scale or to modern standards.

C - Percentage EEZ which has never been systematically surveyed.

1 - Amazon Basin

	A	B	C
0 - 200m	80	0	20
Depths > 200m	-	-	-

2 - Brazilian Coast

	A	B	C
0 - 200m	35	65	0
Depths > 200m	85	0	15

3 - São Pedro and São Paulo Archipelago

	A	B	C
0 - 200m	0	100	0
Depths > 200m	100	0	0

6.2 Status of Nautical Charting:

Coverage of charts published by your organization, where:

A - Percentage covered by INT series/paper chart series meeting the standards in S-4.

B - Percentage covered by Raster Navigational Charts (RNCs) meeting the standards in S-61.

C - Percentage covered by ENC's meeting the standards in S-57.

1 - Amazon Basin

Chart coverage	Passage (%)	Coastal (%)	Port (%)
INT	-	-	-
RNC	-	-	90
ENC	-	-	100
Status of Paper Charts			
Paper charts with depths in meters (%)		100	
Paper charts referenced to a satellite datum (%)		89	

2 - Brazilian Coast

Chart coverage	Passage (%)	Coastal (%)	Port (%)
INT	100	100	100
RNC	100	100	100
ENC	100	100	100
Status of Paper Charts			
Paper charts with depths in meters (%)		100	
Paper charts referenced to a satellite datum (%)		100	

3 - São Pedro and São Paulo Archipelago

Chart coverage	Passage (%)	Coastal (%)	Port (%)
INT	100	100	-
RNC	100	100	-
ENC	100	100	-
Status of Paper Charts			
Paper charts with depths in meters (%)		100	
Paper charts referenced to a satellite datum (%)		100	

7. Capacity Building

Offer of Capacity Building:

COURSE	DESCRIPTION	DURATION
Basic in Hydrography	Aims to qualify the student to be a technician in Hydrography and Navigation issues	42 weeks Jan 25-Nov 12
Intermediate in Hydrography (IHO Cat. "B")	Aims to increase the capability of the student to be a technician in Hydrography and Navigation	35 weeks Apr 12-Dec 10
Advanced in Hydrography (IHO Cat. "A")	Aims to provide the student with the capability to plan, to conduct and to execute the activities related with the Hydrographic Service	50 weeks Jan 5-Dec 10

All courses and trainings offered are in Portuguese.

These courses are usually offered free of charge to MACHC Members, with the availability of meals throughout week days.

Interested countries must send their requests through the Defense/Navy Attaché of the Brazilian Embassy with at least 6 (six) months in advance.

a) Training received, needed, offered:

In 2020, a representative of the Senegalese Navy has completed the hydrographic basic training course and an officer of the National Navy of Uruguay completed the specialization course in meteorology.

In 2021, two representatives of the Senegalese Navy are taking the intermediate specialization course in hydrography (Cat “B”) and the advanced specialization course in hydrography (Cat “A”) courses.

Training activities were greatly affected, given the circumstances of the COVID-19 pandemic.

In March and April 2021, DHN participated with representatives in a virtual training, organized by UKHO, whose contents were:

- Understanding ENCs,
- Introduction to S-57, and
- Compiling for Navigational Safety.

b) Status of national, bilateral, multilateral or regional development projects with a hydrographic component. (In progress, planned, under evaluation or study):

DHN continues to support the Fluminense Federal University (UFF), in the implementation of a hydrography training program (Cat “A” or/and Cat “B”). Due to the COVID-19 pandemic situation, the implementation of the course was postponed to 2022. UFF has already acquired a hydrographic vessel to support the practice of the program.

DHN has bilateral agreements for cooperation in hydrography and nautical cartography with Shom (France), MARAD (Guyana), NHS (Norway), IH (Portugal), MAS (Suriname) and UKHO (United Kingdom).

c) Description of proposals and requests to the IHO/CBSC:

For 2022, Brazil has submitted to the SWAtHC Capacity Building Coordination and then to CBSC a proposal for a Basic ENC Production Course. This proposal was included in the 2022 Capacity Building Work Programme and provides invitation for two representatives of MACHC. However, this event is not yet to be funded.

8. Oceanographic activities

a) General:

Deployment of XBTs by the Brazilian Navy Ships in international waters and maintenance of 8 (eight) moored buoys of the PIRATA Moored Array Project by the Brazilian Navy Survey Ships.

- b) GEBCO/IBC's activities, GEBCO Seabed 2030 activities:
GEBCO soundings are performed by the Brazilian Navy Survey Ships during all hydrographic and oceanographic surveys. DHN continues its effort to provide reliable data to the Seabed 2030 Project initiative
- c) Tide gauge network:
208 active tide gauges are distributed throughout the Brazilian territory (October 2021). 24 active tide gauges are placed in the MACHC region.
- d) New equipment: XXX
- e) Challenges and achievements: XXX

9. Spatial data infrastructures

- a) Status of MSDI:
In progress, creating and storing metadata using Geonetwork. The data sharing and visualization with Geoserver was implemented. An open source solution of the Brazilian Marine Spatial Data Infrastructure (IDEM-DHN) integrated to a geoportal viewer is under construction.
- b) Relationship with the NSDI:
DHN currently provides to the Brazilian National Spatial Data Infrastructure (INDE), managed by the Brazilian Institute of Geography and Statistics (IBGE): the Digital Bathymetric Model of the Brazilian Continental Shelf with 1 km resolution; Raster Navigational Charts; 181 metadata; and several other layers, according to the DHN Data Access Policy (NAD-DHN).
- c) Involvement in regional or global MSDI efforts:
DHN attends IHO MSDIWG, UN-GGIM WGMGI and OGC Marine DWG meetings.
- d) National implementation of the Shared Data Principles:
All DHN data is shared according to its Data Access Policy (NAD-DHN), issued in 2018.
- e) MSDI national portal:
Brazil has a national portal for all governmental geospatial data (www.inde.gov.br) which DHN contributes with its marine data and information. DHN is working on the Brazilian Marine Spatial Data Infrastructure (IDEM-DHN).
- f) Best practices and lessons learned:
Extraction of metadata can be a challenging effort, especially when not using proper spatial ETL tools or when data lacks coherent structure. Collaboration in the context of INDE with IBGE, specially through capacity building through short-duration online courses offered by IBGE, has proved highly fruitful, in contribution to the Brazilian Marine Spatial Data Infrastructure (IDEM-DHN).
- g) Challenges and achievements:
The design of the project outline and the establishment and coordination of a multidisciplinary team to develop the project.

10. Innovation

- a) Use of new technologies: XXX
- b) Risk assessment: XXX
- c) Policy matters: XXX

11. Other activities

- a) Participation in IHO meetings:
DHN participated of IHO Council, MACHC, SWAtHC, HCA, IRCC, HSSC, HSPT, S-100WG, S-101PT, ENCWG, NCWG, NIPWG, DQWG, TWCWG, ABLOS, WWNWS-SC, WENDWG, MSDIWG, IBSC and GGC.
- b) Meteorological data collection:
Meteorological data are collected by fixed meteorological stations placed all over Brazil, by ships and are also received from other institutions through internet links. All data are used for the Marine Meteorological Service products, broadcast at no cost along and offshore the Brazilian coast and by internet.
- c) Geospatial studies: XXX
- d) Preparation for responses to disasters:
DHN maintains a 24/7 service with telephone and e-mail.
- e) Environmental protection:
DHN created a Marine Protected Area layer in its cartographic database. It's been prepared for future S-100 based products. This information is represented at nautical paper charts and ENCs.
- f) Engagement with the Maritime Administration:
The Brazilian Maritime Administration is under the Brazilian Navy structure. DHN maintains straight collaboration with the Brazilian Directorate of Ports and Coasts an important body of the Brazilian Maritime Administration.
- g) Aids to Navigation matters:
DHN is responsible for the publication of all AtoN products, as well as actively represent Brazil's interests at IALA.
- h) Magnetic and gravity surveys:
DHN carried out magnetometric surveys related to the Brazilian submission to the United Nations' Commission on the Limits of the Continental Shelf.
- i) International engagements:
DHN actively participates in working groups, committees and commissions at IHO, IMO, IALA, IOC and WMO. It also contributes with other organizations dealing with areas related to those mentioned (e.g. IEHG, IC-ENC).

j) Others: XXX

12. Conclusions

DHN reassures its commitment with MACHC and plans continuous hydrographic activities so as to keep its nautical charts updated, as stated in regulations V and IX of the SOLAS Convention.