

**21ST MEETING OF THE MESO AMERICAN – CARIBBEAN SEA
HYDROGRAPHIC COMMISSION (MACHC21)
Virtual Conference – 30 November - 3 December 2020**

NATIONAL REPORT FROM BRAZIL TO THE MACHC

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 publications release and update, maritime safety information (bad weather and navigational warnings broadcast), oceanographic data analysis, national oceanographic database, hydrographic staff training and capacity building.
- c) Submitted by: LCdr. (Engineer) Ricardo Ramos Freire, ricardo.freire@marinha.mil.br.

2. Surveys

- a) Coverage of new surveys: during 2020, the Brazilian Navy Hydrographic Vessels carried out surveys in the Amazon Basin, mainly in the Madeira, Solimões, Branco, and Amazon rivers and in the northern region of NAVAREA V, contributing to the nautical cartography production of the area.
- 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 chart update sources.
- e) Challenges and achievements: maintain the excellent service provided by DHN despite the coronavirus pandemic; 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), as well as refine water levels reduction at Amazon river mouth.

3. New Charts & Updates

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

The new cell produced since last MACHC meeting is:
BR504217 – Do Paraguai à Fazenda Caiçara

The updated cells since last MACHC meeting are:

BR400204 – Das Ilhas Pedreira à Ilha de Santana
 BR400221 – Barra Norte do Rio Amazonas
 BR400242 – Da Ilha dos Porcos à Ilha de Santana
 BR400302 – De Salinópolis ao Canal do Espadarte (NE)
 BR400303 – Do Cabo Maguari a Ilha Coroa Grande
 BR400304 – De Mosqueiro a Vila do Conde
 BR500320 – Porto de Belém
 BR304023 – Da Ilha de Patacho à Ilha de Santa Rita
 BR504211 – Da Foz do Rio Jari a Ilha Xavier
 BR504215 – Da Ilha Xavier à Ilha Jupatituba
 BR221010 – De Cayenne ao Cabo Gurupi
 BR321200 – Da Ponta do Tucumã à Ponta do Guará
 BR321300 – Do Cabo Norte ao Cabo Maguari
 BR44023A – Paraná de Santa Rita
 BR441011 – Da Ilha Salvador à Ilha Grande de Gurupá
 BR404418 – Do Lago Aracuã ao Rio Trombetas
 BR441012 – Da Ilha Cajari à Ilha Grande de Taiaçui

b) ENC distribution method:

Brazilian ENCs are available through IC-ENC resellers and distributors. Since 2018, the Brazilian company EMGEPRON is as reseller of VAR PRIMAR (<https://cartasnauticasbrasil.com.br/>).

c) RNCs:

DHN provides Raster Navigational Charts for its area of interest. 513 RNCs (77 in MACHC region) are currently available at no cost for the entire maritime community (<https://www.marinha.mil.br/chm/dados-do-segnav/cartas-raster>).

d) INT charts:

The updated INT chart is:

4196 – Do Cabo Norte ao Cabo Maguari

e) National Paper Charts:

The new nautical paper chart edition is:

4217 – Do Paraguai à Fazenda Caiçara

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

DHN plans to release soon 14 Inland ENCs for the Madeira river in the Amazon Basin.

g) Challenges and achievements:

DHN provide trainings to the regional hydrographic branches focusing on hydrographic data analysis, upload and validation of bathymetric and cartographic databases and production of nautical charts. The connection issues were solved so they can now work directly in the databases hosted by DHN, located in Niterói, Rio de Janeiro State. Key technical personnel specialized in Hydrography and Cartography was transferred to those branches, aiming to improve their production capabilities and to create critical mass.

4. New Publications & Updates

- a) New Publications: XXX.
- b) Updated publications:
 Tide Tables DG6
 Nautical Almanac DN5
 North Coast Sailing Directions, 12th Edition, Brazil, 2020-2024
 List of Lights, 37th Edition, Brazil, 2020-2021
 List of Fog Signals, 8th Edition, Brazil, 2020-2024
 List of Radio Signals, 14th Edition, Brazil, 2020-2024
- 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, through the Brazilian Navy Hydrographic Center, is responsible for the reception, processing and promulgation of MSI for NAVAREA V, in accordance with GMDSS Master Plan. Navigational warnings and meteorological information are broadcast by the 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 2017	MSI 2018	MSI 2019	MSI 2020	Training Date	Trainin g Date
Brazil (NAVAREA V)	Fulfilling all obligations	178	225	165	96	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: Improve the quality of the information received by implementing an online form with subjects related to safety of navigation.

6. C-55

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

Status of Hydrographic Surveying:

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	81	19	0
Depths > 200m	---	---	---

2 - Brazilian Coast

	A	B	C
0 - 200m	75	15	10
Depths > 200m	100	0	0

3 - São Pedro and São Paulo Archipelago

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

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 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

Regular staff training offer in hydrography:

COURSE	DESCRIPTION	DURATION
Basic Course in Hydrography and Navigation	Aims to qualify the student to be a technician in Hydrography and Navigation matters. CB Phase of Development 2	42 weeks Feb – Dec
Intermediate Course in Hydrography and Navigation (IHO Cat. “B”)	Aims to increase the capability of a technician in Hydrography and Navigation matters. CB Phase of Development 2	35 weeks Apr – Dec
Advance Course 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. CB Phase of Development 2	50 weeks Jan – Dec

- All courses are in Portuguese and students shall be proficient in spoken and written Portuguese.

- These courses are usually offered free of charge to MACHC Members, with the availability of meals throughout the week and providing training material, however, there is no offering of accommodation.

- Interested countries must send their requests through the military attaché of the Brazilian Embassy with at least 6 (six) months in advance.

In order to complement the staff training programs, DHN offers other shorter trainings annually in hydrographic survey with MBES, operational oceanography, marine meteorological observations and magnetic compass compensation.

a) Training received, needed, offered:

In 2020, a Petty Officer from Senegal attended the basic course in hydrography and navigation at DHN.

In 2021, DHN expects to receive more students from abroad to attend our courses in hydrography. So far, Senegal, Guatemala and Sao Tome and Principe have already expressed interest in sending students to the Cat. "A" and Cat. "B" courses.

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 hydrographic training. Due to the COVID-19 pandemic situation, the implementation of the course was postponed to 2021. UFF has already acquired a hydrographic vessel to support the practice of the program, which remains moored with the other Brazilian Navy Survey Ships.

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:

In March, DHN promoted a Hydrographic Awareness Seminar with dual objective of raising awareness of the importance of hydrography for the Associate and Observer members of SWAtHC, as well as to give to these representatives the opportunity to participate in the SWAtHC meeting, exposing them to the benefits of being proactive members of this Commission and encouraging eventual membership to the IHO.

In order to present the importance and economic advantages of an adequate Hydrographic Governance, the presenters addressed the visions of the topic related to IHO, IMO, IALA, SOLAS Convention (Chapter V), the Capacity Building Strategy and the National Hydrographic Offices of Brazil and Uruguay. It is expected that these participants are now in better position to determine how best to fulfill their States' obligations for providing appropriate hydrographic services in the interests of safety of navigation and protection of the marine environment.

Within the 2021 CB Work Program, DHN will host a Port and Shallow Water Survey Course that will likely be in October. Although this training is within the SWAtHC Capacity Building Work Plan, DHN has reserved 2 (two) vacancies for MACHC Members.

DHN will participate with one instructor in the Tides Workshop for Spanish Speakers, proposed by MACHC postponed to 2021 also due to the pandemic situation.

8. Oceanographic Activities

a) General:

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

- 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 Seabed 2030 project initiative.
- c) Tide gauge network:
 288 active tide gauges are distributed throughout the Brazilian territory (October 2020). 11 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:
 Creating and storing metadata using GeoNetwork, and testing commercial and open source solutions for geoportal viewer.
- b) Relationship with the NSDI:
 DHN provides raster version of its nautical charts, as well as complimentary data according to its Data Access Policy (NAD-DHN).
- c) Involvement in regional or global MSDI efforts:
 DHN participates in IHO MSDI WG, UN-GGIM WGMGI and OGC Marine DWG meetings.
- d) National implementation of the Shared Data Principles:
 DHN makes stored environment data available in accordance with its Data Access Policy (NAD-DHN).
- e) MSDI national portal: XXX.
- f) Best practices and lessons learned:
 Metadata extraction can be a challenging endeavor, especially when not using proper spatial ETL tools or when the data does not have a coherent structure.
- g) Challenges and achievements:
 Allocation of financial and technical resources dedicated to establish and to maintain the spatial data infrastructure.

10. Innovation

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

11. Other Activities

a) Participation in IHO meetings:

On the last year, DHN participated in events (face-to-face or virtual) of the following organs: IHO Assembly, IHO Council, SWAtHC, HSSC, IRCC, HSPT, S-100WG, S-101PT, ENCWG, NCWG, NIPWG, DQWG, TWCWG, ABLOS, WWNWS-SC, WENDWG, IBSC, MSDIWG, SCUFN and GEBCO Guiding Committee.

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 Brazilian Marine Meteorological Service products, broadcast at no cost along and offshore the Brazilian coast and by internet.

c) Geospatial studies:

DHN offers a shallow water current prediction system which extrapolates current speeds and directions in shallow waters from the astronomical tidal components. The actual version is constrained to the Guanabara Bay and to the Sepetiba Bay, in Rio de Janeiro State (<https://www.marinha.mil.br/chm/dados-do-smm/corrente-de-mare>). DHN recently release SISCORAR app for mobile devices.

d) Preparation for responses to disasters:

DHN maintains a 24/7 service to support responses to disasters. The Senior and Working POCs can be found in the MACHC Initiative website (https://www.iho-machc.org/documents/dr/brazil_dr.html).

e) Environmental protection:

DHN created a segregated Marine Protected Area (MPA) layer from its cartographic database where all informed MPAs are coded. It's been prepared for future S-100 needs. This information is represented on paper charts and in ENCs.

f) Engagement with the Maritime Administration:

DHN is under the Brazilian Maritime Administration. The Commander of the Brazilian Navy is the Brazilian Maritime Authority.

g) Aids to Navigation matters:

DHN is responsible for issuing the Maritime Authority standards related to AtoN and for the supervision of AtoN in the Brazilian jurisdictional waters, and represents Brazil at IALA.

h) Magnetic and gravity surveys:

DHN conducted magnetometry and gravimetry surveys that supported the Brazil's submission of its continental shelf to the United Nations' Commission on the Limits of the Continental Shelf.

i) International engagements:

DHN also actively participates of working groups, committees and commissions of IMO, IALA, IOC and WMO. It also contributes with smaller organizations that discusses related matters to the previously mentioned ones (e.g. IEHG).

j) Others: XXX.

12. Conclusions

DHN reassures its commitment with MACHC and plans continuous hydrographic activities in order to keep its nautical charts and publications updated, as stated in Chapters IV and V of the SOLAS Convention.