PORTUGAL

NATIONAL REPORT

15TH SOUTHERN AFRICA AND ISLANDS HYDROGRAPHIC COMMISSION MEETING

Seychelles

28th – 30th August 2018

INSTITUTO HIDROGRÁFICO
(IHPT)

TABLE OF CONTENTS

INTRODUCTION

This report describes the main technical activities and developments at the Instituto Hidrográfico (IHPT), the Portuguese Hydrographic Office, during the period from September 2017 to August 2018. It was elaborated in order to be presented to the 15th SAIHC Meeting and covers the following areas: Hydrography, Cartography, Information Technologies and GIS, Marine Safety, and Technical Assistance and Training.

1- HYDROGRAPHIC OFFICE

The IHPT is part of the Portuguese Navy and has the fundamental task of ensuring activities related to science and techniques of the sea, with a view to their military application, and to contribute to the country's development in science and protection of the marine environment.

The major activities of IHPT are in the areas of hydrographic surveying, cartography, safety of navigation, oceanography, geology and chemistry of the marine environment. The IHPT is also a State Laboratory and is the Portuguese Hydrographic Office.

Among those activities the training provided by the Hydrography and Oceanography School stands out, with FIG/IHO/ICA category A and B courses. It is an IHPT sector dedicated to the training of the Navy officers as well as civilian technicians, from Portugal and Portuguese-speaking African countries, as well as from other friendly nations.

The most relevant information is presented in Annex Alfa.

2- SURVEYS

During the period of this report no systematic surveys were executed by IHPT on the SAIHC region.

3- NEW CHARTS & UPDATES

IHPT is implementing the CARIS Hydrographic Production Database as the unique cartographic production system.

In addition to the Nautical Charts and the Electronic Navigational Charts, some charts for special purposes are also produced, for instance: charts for fisheries, charts for yachting, sedimentological charts and special charts for training purposes. All those charts are in accordance with IHO specifications and were very well accepted by the users.

All IHPT new charts and new editions are bilingual (Portuguese and English) and follow INT specifications, whether or not they belong to INT series.

Presently, IHPT provides 100% of the national Nautical Charts using a Print-on-Demand system. All charts are continuously updated according to the published “Notices to Mariners”.

a. Paper Chart

Since the last SAIHC meeting, IHPT did not produce any Nautical Chart of the region. However, IHPT is involved in the production of the following Nautical Chart:

- INT 7583 (Approaches to Port of Maputo. A - Port of Maputo). MZ, PT involved for production of the first INT chart version. Portugal and Mozambique in contact for exchange of information. PT awaits data from MZ.

In a joint effort with the Angolan authorities, IHPT has maintain the updates, through Notices to Mariners (NtM), of the following INT charts:

- INT 2089 (Gamba to Luanda);
- INT 2050 (Luanda to Baía dos Tigres);
- INT 2814 (Point Tchitembo to Cabeça da Cobra);
- INT 2550 (Cabeça da Cobra to Cabo Ledo);
- INT 2560 (Cabo Ledo to Lobito);
- INT 2570 (Lobito to Ponta Grossa);
- INT 2580 (Ponta Grossa to Foz do Cunene).

Schemes for the INT Charts, planned and edited by IHPT for SAIHC region, can be found in Annex Bravo (Angola) and Annex Charlie (Mozambique).

b. Electronic Navigational Chart

IHPT is a member and participates actively in the works of the International Centre for ENC (IC-ENC), including their Technical Experts Working Group. Since the last SAIHC meeting Portugal didn´t produce ENC cells in SAIHC Region and didn´t issued any update to the ENC cells.

Schemes for the ENC cells planned and edited by IHPT for the SAIHC region can be found in Annex Bravo (Angola) and Annex Charlie (Mozambique).

4- NEW PUBLICATIONS AND UPDATES

Since September 2017, IHPT published the Annual Group of Notices to Mariners (2018), as well as, every month, the Monthly Group of Notices to Mariners.

In addition to the Tide Tables for the main harbours of Continental Portugal and Azores and Madeira Archipelagos, IHPT also publishes annually the Tide Table (Volume II) - African Portuguese Speaking Countries and Macau (figure 1) which contains tide information for the following harbours in the SAIHC region:

- Soyo, Angola;
- Luanda, Angola;

- Lobito, Angola;
- Namibe, Angola;
- Maputo, Mozambique;
- Inhambane, Mozambique;
- Beira, Mozambique;
- Chinde, Mozambique;
- Ponta Tangalane, Mozambique;
- Pebane, Mozambique;
- Angoche, Mozambique;
- Ilha de Moçambique, Mozambique;
- Nacala, Mozambique;
- Pemba, Mozambique;
- Mocímboa da Praia, Mozambique.

The 2018 edition of Tide Table (Volume II) - African Portuguese Speaking Countries and Macau, was published in September 1st 2017.

Figure 1 – Tide table for African Portuguese Speaking Countries and Macau.

5- MARITIME SAFETY INFORMATION

IHPT, as the national coordinator for the Maritime Safety Information, provides a 24h service of Navigational Warnings, in cooperation with the NAVAREA II coordinator.

NAVTEX broadcast is made both in English and Portuguese and it is transmitted from Penalva Station (near Lisbon), São Miguel Island (in the Azores Archipelago) and from Porto Santo Island (in the Madeira Archipelago).

The GMDSS coverage is not completed yet due to delays on the establishment of Digital Selective Call capability. It's expected to be fully implemented during 2019.

Monthly, IHPT publishes the Group of Notices to Mariners, containing all permanent, preliminary, and temporary warnings in force for the corresponding period. This information, covers all navigation charts and publications of Portugal, Angola, Cape Verde, Guinea-Bissau and São Tomé e Príncipe, and is also available on the web site (http://www.hidrografico.pt).

IHPT on-line application ANAVNET (http://www.anavnet.hidrografico.pt), provides either entire NtM publications, or single NtM affecting individual documents; allowing in any case consultation and printing, including entire correction pages of nautical publications and graphical annexes to paste on charts. Regarding Navigational Warnings, ANAVNET allows consultation of warnings broadcasted by any of the Portuguese NAVTEX stations (coastal and local warnings), both in Portuguese and English languages.

Regarding Broadcast Stations (BS) from the national differential GPS network, the Continental Portugal component consists of two DGPS BS, with redundancy and integrity monitoring, located at Cape Carvoeiro and Sagres. There are also two BS in Azores Archipelago (Horta station) and in Madeira Archipelago (Porto Santo station).

Portugal has also three AIS coastal stations in Continental Portugal and in Azores and Madeira Archipelagos.

6- C-55

An update of C-55 for Portugal, Portugal-Madeira and Portugal-Azores was sent to IHB last year.

7- CAPACITY BUILDING

The cooperation of Portugal within the SAIHC region in the hydrography subject, during this report's period, was the following:

a. ANGOLA

In an effort to contribute to the hydrographic capacity building and consequently to the safety of navigation in Angola, the Portuguese Navy, in 2016, invited the CIDDEMA to send up students to attend an FIG/IHO/ICA category B compliant, Hydrographic Technical Course, held by the IHPT School of Hydrography and Oceanography.

The five Angolan Navy officers, completed successful the course in August 2017. This course has a strong practical component with about 25 weeks, including an internship of 14

weeks in the IHPT Hydrographic Survey Team (usually known as Brigada Hidrográfica), this course enables its students to have a hands-on the job approach, with state of the art techniques on hydrographic surveying.

Figure 2 – IHPT Hydrographic Technical Course Students – practical class.

It is also expected that IHSMA (National Institute of Hydrography and Maritime Signalization of Angola) send two technicians, to the next Hydrographic Technical Course which will begin in September 2018.

b. MOZAMBIQUE

In 25th of April 2017, during the 1st IHO Assembly, a bilateral cooperation agreement has been signed between IHPT and Mozambique's Hydrographic Office – INAHINA (National Institute of Hydrography and Navigation). This agreement is focused on technical cooperation and interchange in the domains of hydrography, nautical cartography and oceanography.

With respect to the hydrography and nautical cartography themes, INAHINA expects the assistance of IHPT for the acquisition and processing of MBES systems data and production of Electronic Navigational Charts.

IHPT expects the cooperation from INAHINA to achieve the compromises assumed by Portugal and Mozambique, respecting to the co-production of INT charts has listed in the Charts section of this report.

In the fourth quarter of 2018, IHPT will carry out a capability building activity in Mozambique, assisting INAHINA with an action for MBES system capacitation. This action is planned in the OHI Capacity Building Work Programme (CBWP) as "P16 – Processing and Data Basing Training for Mozambique".

8- OCEANOGRAPHIC ACTIVITIES

IHPT develops activity related to physical, geological and chemical oceanography, participating in national and European Union research projects in those fields, but, from September 2017 until August 2018 there is no oceanographic activities to be described in the SAIHC region.

Accordantly with bilateral cooperation agreement signed between IHPT and INAHINA, in the future, it´s expected that IHPT will cooperate with INAHINA, in the SAIHC region, to build up capacities on oceanographic modelling, tides and currents data acquisition, oceanographic database administration and remote sensing applied for operational oceanography

9- OTHER ACTIVITIES

During this report's period, IHPT had the following relevant activities:

a. Participation in IHO Working Groups

Participation in the 5th Crowd-sourced Bathymetry Working Group meeting, in Monaco on December 2017. The objective was to analyse the responses to CL49 / 2017, in which member states, external organizations and other stakeholders were invited to comment on the draft version of the guidance document that will constitute Publication B-12 - Crowd-sourced Bathymetry Guidance Document.

Participation on the 2nd HSPT (Hydrographic Surveys Project Team) meeting regarding the special publication S-44 revision. There were also two relevant designations: an IHPT member has been nominated for the IOC WG on user requirements and contributions to GEBCO products and other IHPT member has been selected as IHO representative to the IBSC.

Participation on the Marine Spatial Data Infrastructures Working Group (MSDIWG) from OHI. Namely with contribution for the following activities of the 2018-2020 Working Plan:

- B.3 Identify wider user requirements for bathymetry data;
- D.2 Assess the suitability and shortcoming of standards in supporting data interoperability;
- E.1 Identify and report on the future trends affecting MSDI e.g. autonomous platforms, standards, big data, cloud, internet of things and artificial intelligence;
- G.1 Maintain IHO publication C-17 to reflect developments in ICT, Content, Standards and Governance of MSDI.

b. Naval Meteorological and Oceanographic Center

In the past 15 years, the IHPT has developed state of the art and tools and operational systems in the field of meteorological and oceanographic forecast, in-situ ocean observation networks and remote sensing techniques, along the Portuguese margin and coastal areas

In November 2017, IHPT activated the new GEOMETOC center of the PRT Navy, named CMETOC (Naval Meteorological and Oceanographic Center), collocated at IHPT and under the direction of the IHPT General-Director.

CMETOC is operated by 13 people, distributed in four thematic areas (Oceanography, Meteorology, Geospatial Information and Mine Warfare Data Center), which guarantee the daily GEOMETOC operational support to the Portuguese Navy Fleet and Force.

c. MSDI Progress

IHPT has been developing and modernizing his MSDI (2018-2020) to implement the INSPIRE and MSDI best procedures to improve the data management, metadata creation, implement better data search services and optimized data access services. This will be based on a centralized web portal, which will focus on themes such as products, services, activities, means and data, with a user oriented focus.

The operational forecast system for sea state “Qual é a tua Onda?” continues to be maintained, depicting sea state forecasts and other generic information to the public. This information system is available to the general public, on the IHPT web portal, organized into usability sectors, such as the surf community, recreational navigation and fisheries.

Notices to Mariners and Navigational Warnings issued by the IHPT are also available at IHPT Internet portal ANAVNET, as well as general information on the Portuguese Nautical Charts and Nautical Publications.

IHPT also supports IC-ENC by providing a world ENC availability catalogue (independent of maker or distributor) to support the mariners.

The IHPT participate in the Pan- European Infrastructure for Ocean & Marine Data Management (SeaDataNet) and European Marine Observation and Data Network (EMODnet). With this participation in European level multidisciplinary projects IHPT learns and keeps their alignment with the best procedures in the MSDI research developments.

d. Courses in Hydrography

IHPT School of Hydrography and Oceanography provides Specialization Courses in Hydrography (FIG/IHO Category A and B). During the period of this report a total of 9 students (4 sergeants of the Portuguese Navy and 5 officers of the Angolan Navy) completed a Category B course. Also 7 students (4 officers of the Portuguese Navy, 1 officer of the Royal Navy of Morocco, and 2 civilians (one form Italy and other from Brazil) are currently attending a Category A course.

e. Collaboration with other countries

Cape Verde

In the period of October 3rd to December 22nd 2017, the Portuguese Navy Hydrographic Ship, NRP *D. Carlos I*, has conducted hydrographic surveys in Cape Verde's waters, has part of a military technical cooperation initiative, within the Community of Portuguese Language Countries (CPLP).

In order to verify the bathymetric evolution and to collect data for cartographic updating, a hydrographic survey was carried out in Porto de Sal-Rei (Boavista Island) with a duration of 3 days and another in Porto da Palmeira (Sal Island), with a duration of 2 days.

The IHPT signed, on 30th November 2017, a protocol with the Maritime and Port Agency of Cape Verde.

This protocol came to formalize and reinforce the cooperation between the two countries in the hydrography work that has been developed over two years, having as first result the edition of two new nautical charts for the ports of Praia and Mindelo: 66401 INT 1964 "Aproximações ao Porto da Praia (Plano do Porto da Praia)" and 66402 INT 1965 "Aproximações ao Mindelo (Plano do Porto Grande)".

In addition to updating Cape Verde cartography, this protocol will develop technical cooperation, institutional capacity building and training of technical staff of that country.

Guiné-Bissau

In the period of October 3rd to December 22nd 2017, the Portuguese Navy Hydrographic Ship, NRP *D. Carlos I*, has conducted hydrographic surveys in Guiné Bissau waters, has part of a military technical cooperation initiative, within the Community of Portuguese Language Countries (CPLP).

In order to verify the bathymetric evolution and to collect data for cartographic updating, a hydrographic survey was carried out in Bissau Harbor, with a duration of 2 weeks.

Spain

In cooperation between IHPT and the IHM (Spanish Hydrographic Office), IHPT has had technical reunions regarding the determination of the difference between the Chart Datum from Portugal and Spain in the Guadiana River's mouth.

f. Projects

Douro River

In 2015 IHPT has started the participation, has a partner, in the Douro's Inland Waterway 2020 project. The main objective is to transform the Douro River in a safe waterway with good trading routes in order to contribute for the European Transport Purposes for 2020. IHPT activities in this project are related with the hydrographic surveys and the production of Nautical Charts and Electronic Navigational Charts of all Portuguese sections of the Douro River, which comprises about 210 Km, has five locks and very intense tourist navigation, important for the regional and country economy.

Currently, the nautical cartography of the river is under construction for publication between 2018 and 2019. Two charts in a total of 6 plans were published in June 2018.

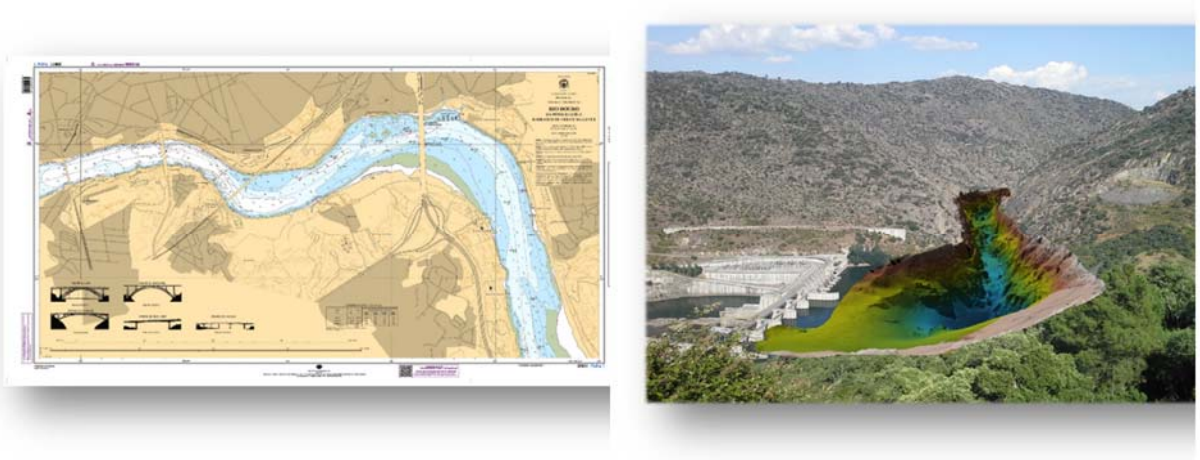


Figure 3 – Nautical chart and DTM, from Douro River.

Guadiana River

Since May 2017, IHPT is participating in a POCTEP INTERREG V-A 2014-2020 project entitled “Guadiana: Navigable Natural Heritage”. The project aims to produce the official hydrographic cartography of the Guadiana River, between Vila Real de Santo Antonio and Pomarão. The hydrographic works took place between October 2017 and May 2018.

Currently, the nautical cartography of the river is under construction for publication at the end of 2019.

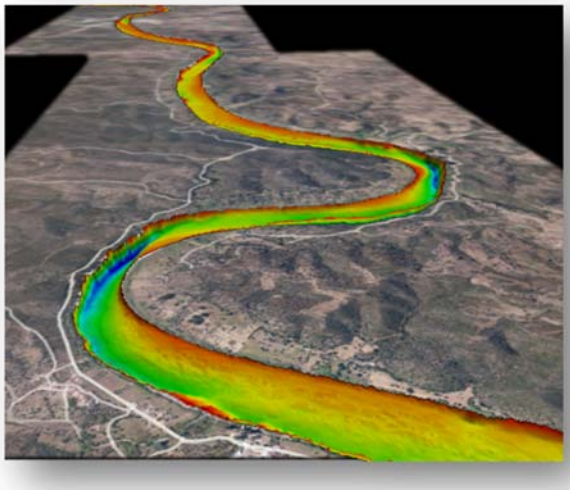
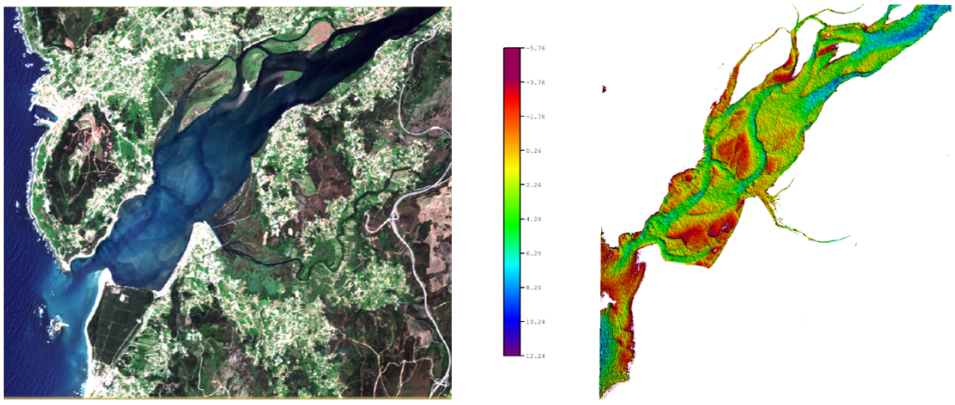


Figure 4 – DTM, from Guadiana River.

Satellite Derived Bathymetry

Since 2015, IHPT has been performing some studies in Satellite Derived Bathymetry (SDB), from multispectral satellite images for shallow-waters, using Landsat 8 and Sentinel-2A images. More recently, SDB studies have been developed using SAR (Synthetic Aperture Radar) imagery. The goal of assess bathymetry through SDB methodologies is not to directly produce nautical charts, but rather to evaluate the amount of changes since the last survey. Besides SDB methodology being a cost-effective tool to support nautical chart production workflow in terms of field reconnaissance and hydrographic surveys planning, it is also a valid tool to retrieve updated bathymetry along coast that could be used as input for running oceanographic coastal drift models, among other wide range of coastal applications.



S2-A imagery (29/06/2016) Bathymetric Model obtained with a S2-A imagery

Figure 5 – Example of a SDB model retrieved from multispectral imagery.

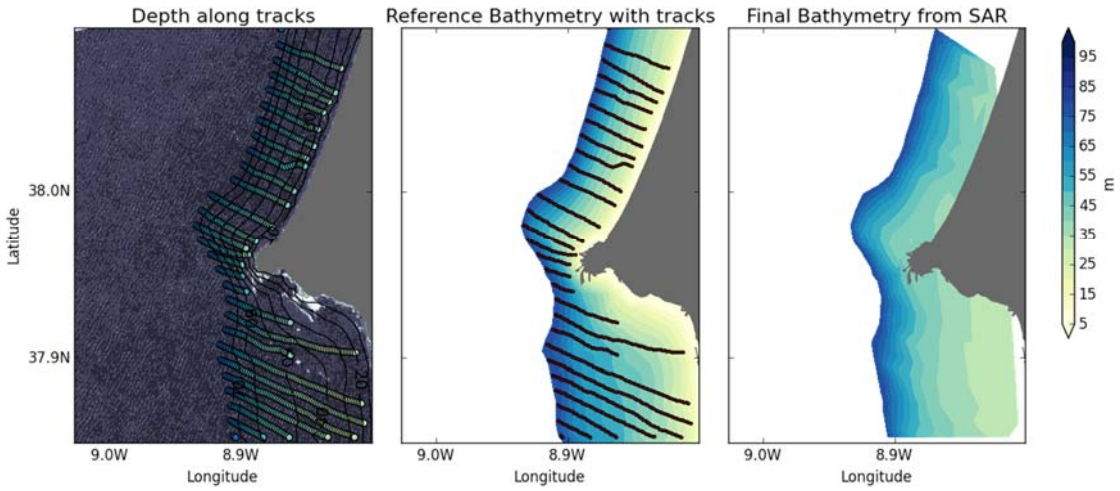


Figure 6 – Example of a SDB model retrieved from SAR imagery.

Since the beginning of 2016, IHPT is a partner of the EU funded Co-ReSyF H2020 Project (Coastal Waters Research Synergy Framework) which will implement a dedicated data access and processing online infrastructure to support research applications using Earth Observation data for monitoring of Coastal Waters. Our main contributions are directly related with two SDB research applications: one retrieving bathymetry from multispectral images and another one from Synthetic Aperture Radar (SAR) images. Within the project scope IHPT is programming SDB algorithms, implementing them into the Co-ReSyF platform and has been performing validation tests using the in-situ data available from IHPT hydrographic surveys database.

EMODnet – High Resolution Seabed Mapping

The European Maritime Observation and Data Network (EMODnet), an initiative of the European Commission's Directorate-General for Maritime Affairs and Fisheries (DG MARE), is composed of a partnership of more than one hundred of European organizations working together to gather marine data from a variety of sources, with the aim of making them more accessible and interoperable.

Part of the work involves linking to national, regional or thematic data repositories in which lies the basic information and the creation of outreach products. Thematic groups have been set up to organize the data available from various sources, assess their quality, ensure that they are accompanied by metadata and provide such data through thematic portals in the areas of bathymetry, geology, habitats, biology, chemistry, physical oceanography, and human activities.

The High Resolution Seabed Mapping (HRSM) project aims to create and maintain an operational service that provides free and open access to the seabed and coastal sea basin bathymetric models at the best resolution possible.

The overall objective is to bring together bathymetric surveys of European seas and to produce, publish and serve a harmonised and high resolution Digital Terrain Model (DTM) of all European basins.

IHPT has been collaborating with this project for almost a decade, providing bathymetric data in the Atlantic, Azores and Madeira regions.

Figure 7 – EMODnet – Portal for Bathymetry (http://www.emodnet-bathymetry.eu).

Sea Level Rising and Coastal Vulnerability Studies

IHPT in direct collaboration with the Faculty of Science from University of Lisbon are adapting to the Guinea Bissau coast environment a sea level rising coastal impact model developed for Continental Portuguese Coast. This kind of models and studies helps decision makers to identify more vulnerable regions to sea level rising phenomenon and helps them to create mitigation plans for reducing the potential mid and long term social, men made infrastructures and environmental impacts.

10- ACTIVITIES TAKEN FOLLOWING THE 14th SAIHC CONFERENCE ACTION ITEMS

After the 14th SAIHC Conference, and hoping to correspond to its Action Items, IHPT has developed the following activities:

- Capacity building inputs have been provided proposing new activities in Mozambique and Angola;
- IHPT promoted INAHINA's application for new Capacity Building activities;

- A dataset of bathymetric data based on IHPT ENC cells PT221101, PT233101 and PT241101 has been delivered to IHO Data Centre for Digital Bathymetry;
- Updates for IHO publications C-55 and P-5 have been delivered. In future IHPT intends to send this updates in an annually base, has requested by IHO;

11- ACTIVITIES TAKEN FOLLOWING THE 6th ICCWG MEETING

In response to the actions from the 6th ICCWG Meeting, IHPT has taken the following activities:

- Contacts have been developed regarding data share from surveys conducted where IHPT is the Primary Chart Authority.
- In a joint effort with INAHINA and UKHO, IHPT has worked on the planning for the co-production of several INT charts has presented on Section 3.a. of this report.
- Continued contacts with INAHINA to exchange information for compilation of Nautical Charts INT 7583 (Approaches to Port of Maputo. A - Port of Maputo), INT 7631 (Approaches to Beira) and INT 7632 (Port of Beira). PT awaits response from MZ.
- The planning schemes for the 1st Edition of four ENC cells presented on Section 3.b of this report have been reported to SAIHC.

ANNEX A

HYDROGRAPHIC OFFICE GENERAL INFORMATION

PORTUGAL (PORTUGUESE REPUBLIC)

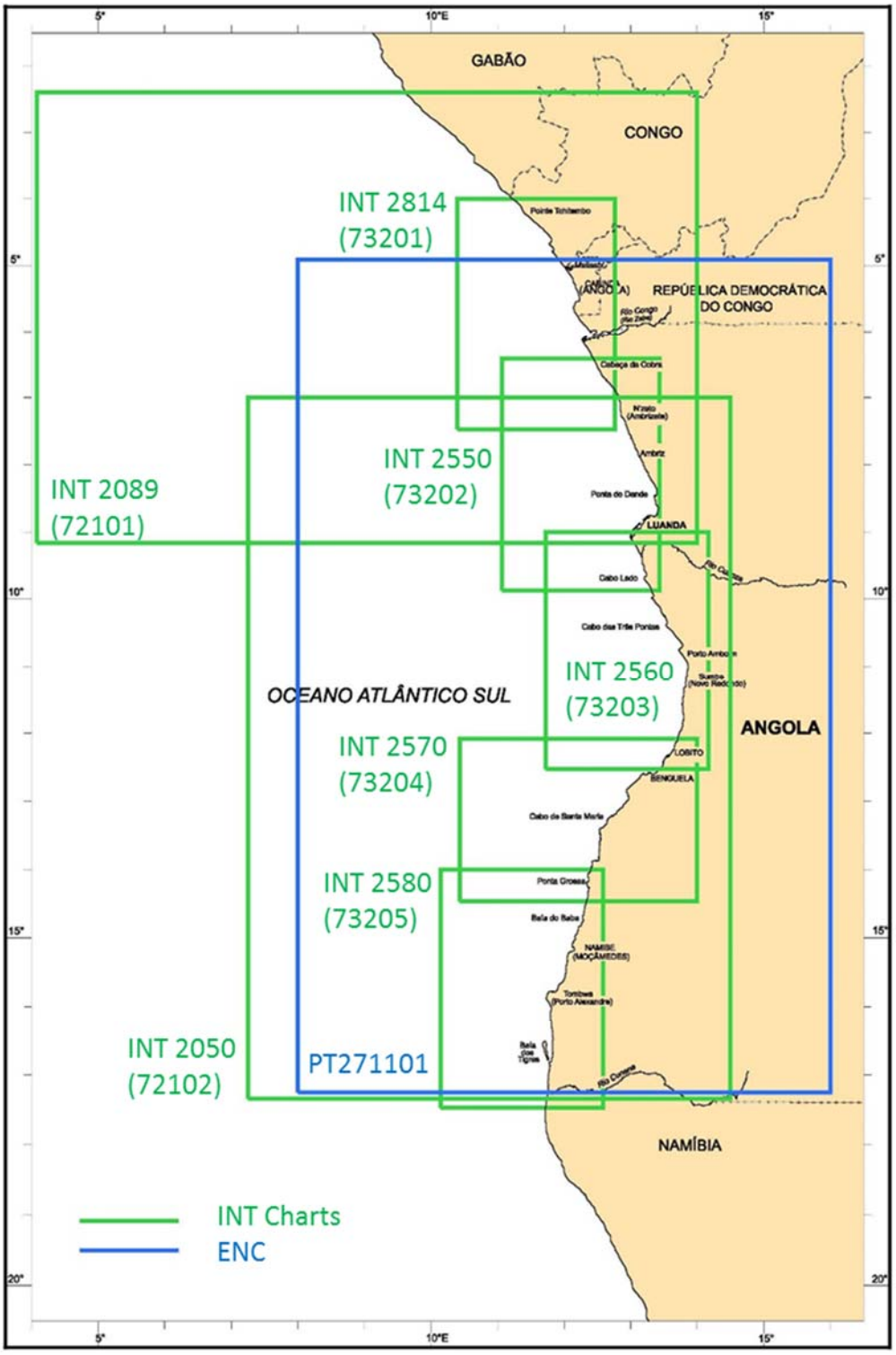
INSTITUTO HIDROGRAFICO **Rua das Trinas – 49** **1249-093 LISBOA**	
Department of which the Hydrographic Office is part *Ministère dont dépend le Service Hydrographique Ministerio del que depende el Servicio Hidrográfico*	Ministry of National Defence – Navy.
Principal functions of the H.O. - *Attributions principales du S.H.* *Principales funciones del S.H.*	Hydrographic Surveys, Nautical Paper Charts and Electronic Navigational Charts, Sailing Directions, Lights and Radio Signals Lists, Notices to Mariners (monthly), Immediate Navigational Warnings, Tide Tables, Tidal Currents, Magnetic Compass Certification and Adjustment. Aids to Navigation Plans. DGPS, AIS projects, Oceanography, and Provision of geophysical and environmental information for scientific and defence issues.
National day - *Fête nationale – Fiesta nacional*	10th June
Telephone : **Fax :** **E-mails :** **WEB site:**	+ 351 21 094 3000 + 351 21 094 3299 dirgeral@hidrografico.pt dirtecnica@hidrografico.pt hidrografia@hidrografico.pt http://www.hidrografico.pt
Date of establishment and Relevant National Legislation – ***Date de fondation et législation nationale concernée*** *– Fecha de establecimiento y Leyes nacionales dereferencia*	22 September 1960 • Territorial Sea: Law n° 34/2006 • Baseline: Laws n° 2130/66 and 495/85 • EEZ: Laws nº 34/2006, n° 119/78 and n° 52/85
Name and rank of the Director or Head - *Nom et grade du directeur –* *Apellidos y graduación del Director*	Rear-admiral Carlos Manuel da Costa Ventura Soares, Director-General
Tonnage – *Tonelaje*	2016 = 9 946 565 tons
Total Budget - *Budget total – Presupuesto Total*	9 million Euros
Staff employed - *Effectifs* **–** *Plantilla*	For details, consult the WEB site: http://www.hidrografico.pt
N° of charts published - *Nombres de cartes publiées –* *N° de cartas publicadas*	210, from which 82 of them represent Portuguese waters.
N° of INT charts published – *Nombres de cartes INT publiées - N° de cartas INT publicadas.* **N° of ENC cells published –** *Nombres de cellules ENC publiées - N° de células ENC publicadas.*	44, from which 37 of them represent Portuguese waters. 117, from which 98 of them represent Portuguese waters.
Type of publications produced (e.g. Tide Tables, Sailing Directions, List of Lights etc.) – *Type de publications produites (par ex: Tables des marées, Instructions nautiques, Livres des Feux, etc. - Tipo de publicaciones producidas (por ej: Tablas de mareas, Derroteros,Libros de Faros etc.)*	- Catalogue of Charts and Nautical Publications; - Catalogue of Nautical Charts of Portugal; - INT1 "Symbols, Abbreviations and Terms used in Charts"; - Tide Tables – Volume I – Portugal; - Tide Tables – Volume II – African Portuguese Speaking Countries; - List of Radio Aids and Services; - List of Lights, buoys, beacons and fog signals – Volume I – Portugal; - List of Lights buoys, beacons and fog signals – Volume II – Angola, Moçambique, São Tomé and Guiné Bissau; - List of Lights buoys, beacons and fog signals – Volume III – Cape Verde Archipelago - Sailing Directions – Continental Portugal – Volumes I to III; - Sailing Directions – Azores Archipelago – Volumes I to II; - Sailing Directions – Madeira Archipelago;

	- Sailing Directions - Angola and São Tomé e Principe Ports Pilot; - Sailing Directions - Cabo Verde – Volumes I to V; - Sailing Directions (Pleasure Craft) – Continental Portugal (Portuguese/English).
Surveying vessels/ Aircraft – *Bâtiments hydrographiques/aéronefs – Buques hidrográficos/ Aeronaves*	Displacement / Date Launched / Crew
D. CARLOS I	2285 / 1989 / 35
ALMIRANTE GAGO COUTINHO	2285 / 1985 / 35
ANDRÓMEDA	245 / 1985 / 13
AURIGA	245 / 1987 / 13
ATLANTA	38.7 / 1981 / 3
FISÁLIA	38.7 / 1981 / 3
Other information of interest – *Autres informations utiles - Otra información de interés.*	IHPT School of Hydrography and Oceanography provides Hydrography and Oceanography FIG/IHO/ICA category A and B courses.

ANNEX B

IHPT CHART SCHEMES FOR THE SAIHC REGION (PUBLISHED INT CHARTS AND ENC CELLS)

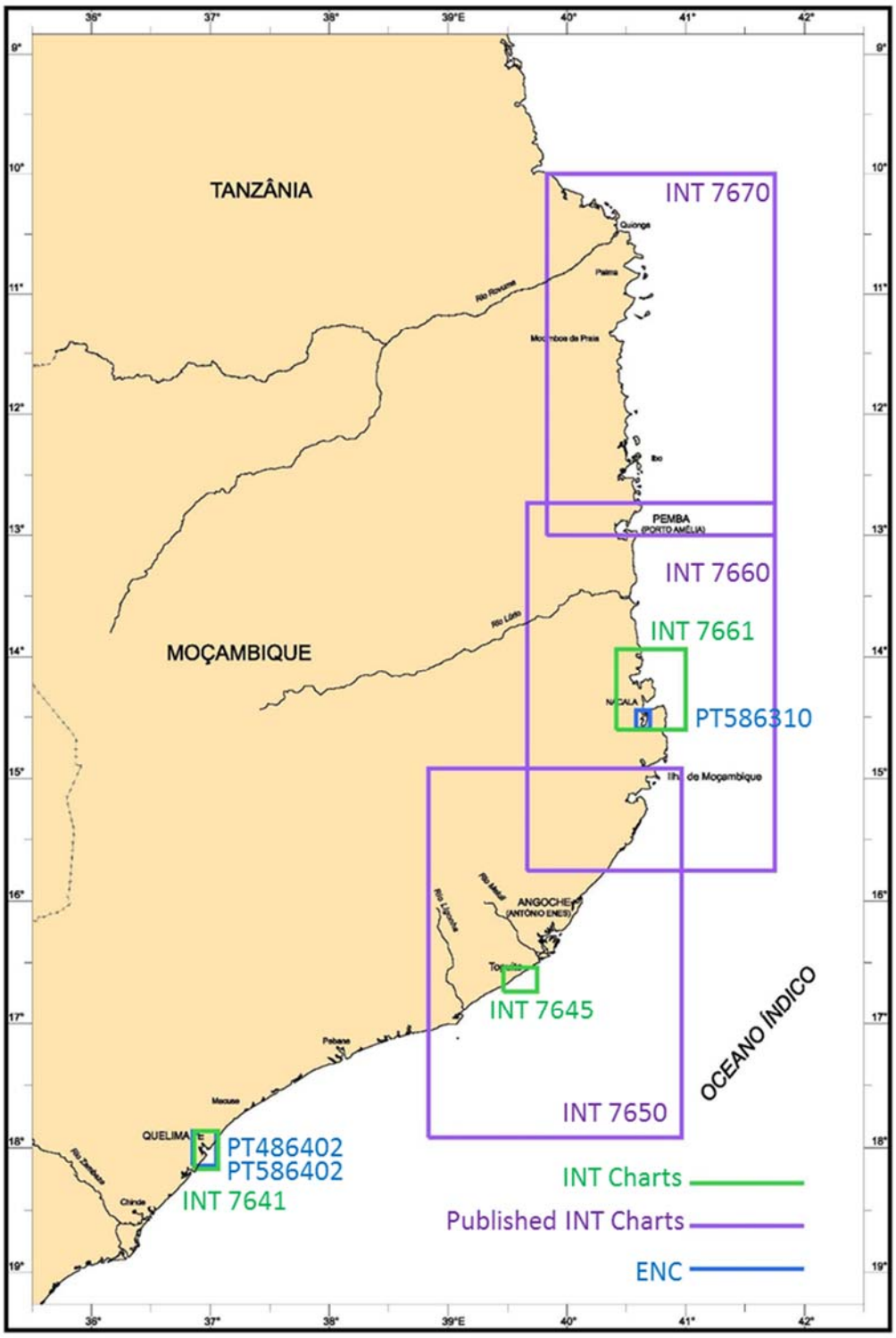
ANGOLA



ANNEX C

IHPT CHART SCHEMES FOR THE SAIHC REGION (PLANNED AND PUBLISHED INT CHARTS AND ENC CELLS)

NORTH OF MOZAMBIQUE



ANNEX C

IHPT CHART SCHEMES FOR THE SAIHC REGION (PLANNED AND PUBLISHED INT CHARTS AND ENC CELLS)

SOUTH OF MOZAMBIQUE