

PORTUGAL NATIONAL REPORT

15TH MEETING OF THE

EASTERN ATLANTIC HYDROGRAPHIC COMMISSION

Lagos, Nigeria

17th – 19th October 2018

INSTITUTO HIDROGRÁFICO (IHPT)

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INTRODUCTION

This report describes the main technical activities and developments at the Instituto Hidrográfico (IHPT), the Portuguese Hydrographic Office, during the period from October 2016 to October 2018. It was elaborated in order to be presented at the 15th Conference of the Eastern Atlantic Hydrographic Commission (EAtHC), 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, most of the hydrographic surveys have been focused on the Portuguese coast. During that period thirty hydrographic surveys were realized in harbours and their approaches (in red at figure 1), such as: Viana do Castelo, Póvoa de Varzim, Vila do Conde, Douro River (river Mouth, Crestuma dam reservoir, and Régua dam reservoir), Águeda River, Peniche, Cascais, Lisbon harbour (Passo da Barra Sul, Portinho da Costa, Alcântara, Parque das Nações, Vila Franca de Xira, Alhandra, Póvoa de Santa Iria, Castanheira do Ribatejo), Setúbal, Faro, Vila Real de Santo António and Guadiana River.

A hydrographic survey of about 240 km² between the 10 m and 40 m isobathymmetrics was also carried out, along 130 km parallel to the southwest coast of mainland Portugal (in blue at figure 1).

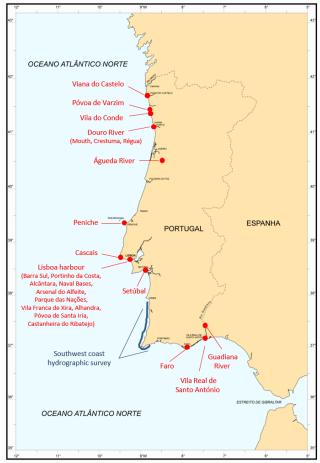


Figure 1 - Hydrographic surveys realized in Continental Portugal.

In Azores Archipelago six coastal hydrographic surveys were carried out: Ponta Delgada, Vila Franca do Campo, Mosteiros, Praia da Vitória, Flores and Corvo (see figure 2) and two ocean surveys (see figure 4).



Figure 2 - Hydrographic surveys accomplished in Azores Archipelago.

In Madeira Archipelago nine coastal hydrographic surveys were carried out: Funchal, Porto Santo, Selvagens, Selvagem Grande, Selvagem Pequena, in the cable layover area between Madeira Island and Porto Santo Island (see figure 3) and two ocean surveys (see figure 4).

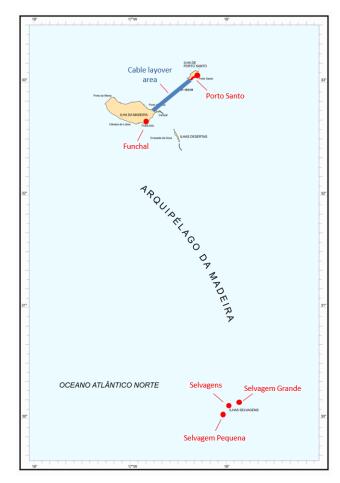


Figure 3 - Hydrographic surveys accomplished in Madeira Archipelago.

Both oceanic hydrographic ships "D. Carlos I" and "Almirante Gago Coutinho", from the Portuguese Navy, were employed on surveys for the project related to the proposal of extension of the Portuguese continental shelf (see figure 4) and on other projects associated with environmental studies, geophysics and dynamic characterization and coastal protection. In those surveys, hydrographic and topographic integrated methods were used and, in some cases, were included seismic geological methods and sediment and water chemical analysis.

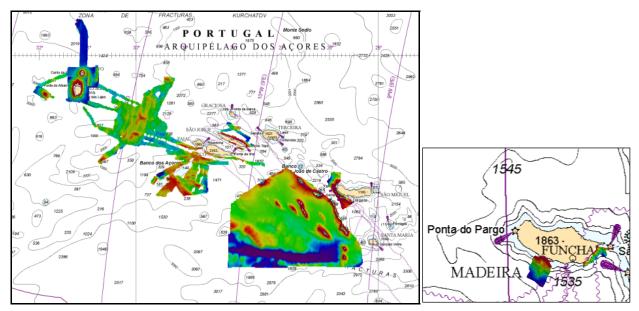


Figure 4 – Oceanic Hydrographic surveys in Azores Archipelago and Madeira Archipelago.

In the context of the cooperation with other countries, it should be mentioned the collaboration with Cape Verde, São Tomé and Príncipe, Guinea-Bissau and with Spain, Instituto Hidrográfico de la Marina (IHM).

In Cape Verde were realized eleven surveys (see figure 5): Porto da Praia, in Santiago Island; Porto Grande, in S. Vicente Island; Porto Novo and NW Bank in Sto. Antão Island; S. Vicente Channel (between S. Vicente and Sto. Antão); Sal Rei, in Boa Vista Island and Baía da Palmeira, in Sal Island.

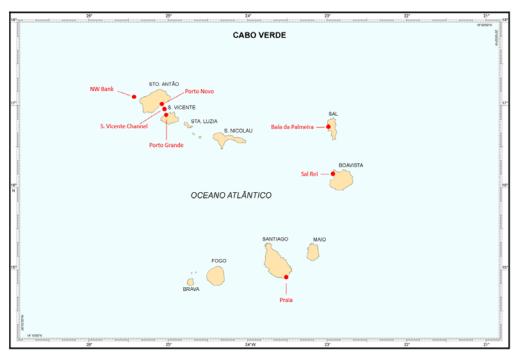


Figure 5 - Hydrographic surveys realized in Cape Verde.

In São Tomé and Príncipe was accomplished one survey in the São Tomé harbour and Baía de Ana Chaves (see figure 6).

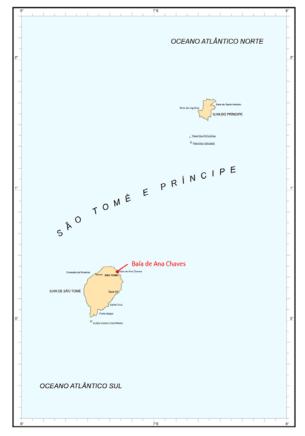
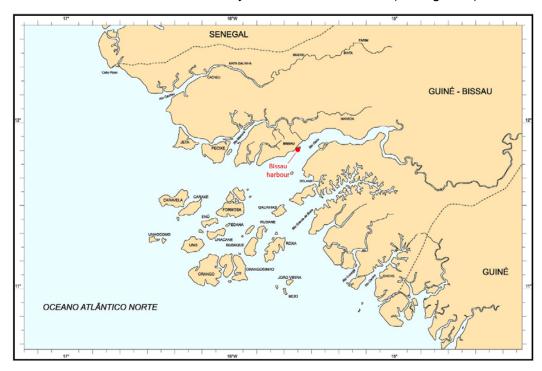


Figure 6 - Hydrographic surveys fulfilled in São Tomé and Príncipe.



In Guinea-Bissau was realized one survey in the Bissau harbour (see figure 7).

Figure 7 - Hydrographic survey fulfilled in Guinea-Bissau.

3- NEW CHARTS & AND UPDATES

IHPT continued the implementation of 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 EAtHC meeting, IHPT published new charts (in blue), new editions (in red) and schemed/projected (in green), depicted in the figures 8 to 10, within the areas of the Commission.

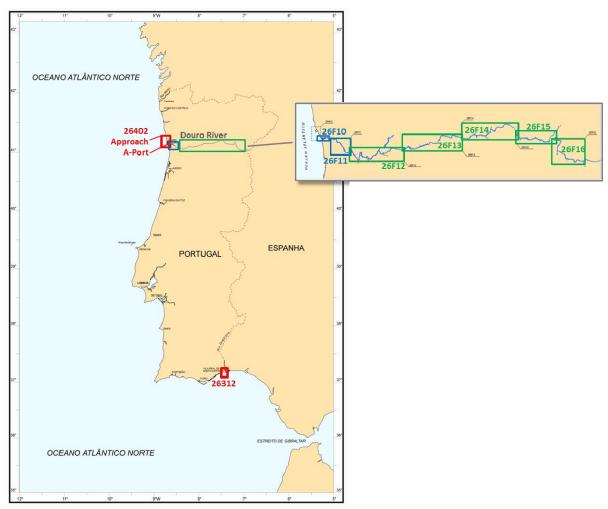


Figure 8 - New editions in Continental Portugal.

Currently, the nautical cartography of the Douro River is under construction for publication between 2018 and 2019. Two charts in a total of 6 plans were published in June 2018 (see figure 8).

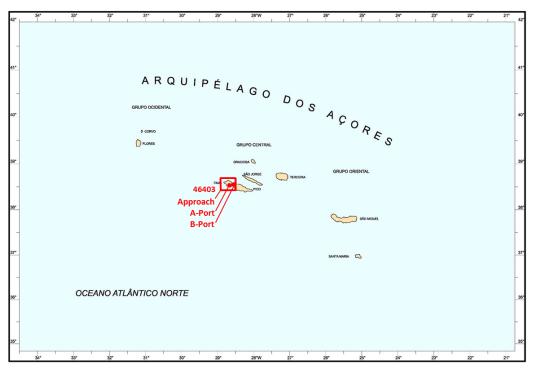


Figure 9 - New editions in Azores Archipelago.

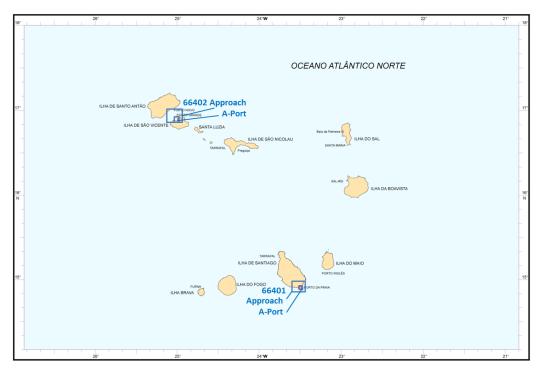


Figure 10 - New editions in Cape Verde.

b. <u>Electronic Navigational Chart</u>

IHPT ENC cells format is S-57/Edition 3.1. Each ENC is broadly equivalent to a paper chart, both in terms of its coverage area and its content. IHPT is a member and participates actively in the works of the International Centre for Electronic Navigational Charts (IC-ENC), including their Technical Experts Working Groups. Presently, seventy seven (77) Portuguese ENC cells are available for distribution through IC-ENC, since 2010, covering all the oceanic and coastal waters of Portugal, as well as the main harbours and their approaches. Those ENC cells can be classified according to the following navigational purposes:

NP1	NP2	NP3	NP4	NP5
Overview	General	Coastal	Approaches	Harbour
1	3	11	18	44

Furthermore, Portugal has completed sixteen (16) ENC cells of the folio in the area of Cape Verde, classified according to the following navigational purposes:

NP2	NP3	NP4	NP5
General	Coastal	Approaches	Harbour
1	1	2	

In the area of São Tomé e Príncipe, Portugal has produced two (2) cells, classified according to the following navigational purposes:

NP4	NP5
Approaches	Harbour
1	1

Since the last meeting, were produced eight (8) new ENC cells (in blue), and fifteen (15) new editions (in red), depicted in the following figures:

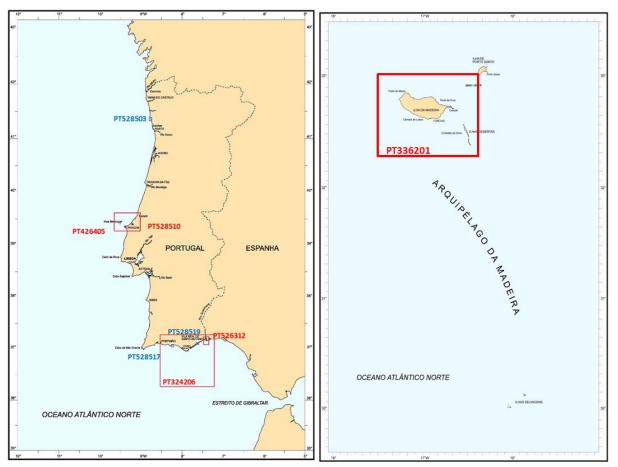


Figure 11 - New ENC editions in Continental Portugal (left) and Madeira Archipelago (right).

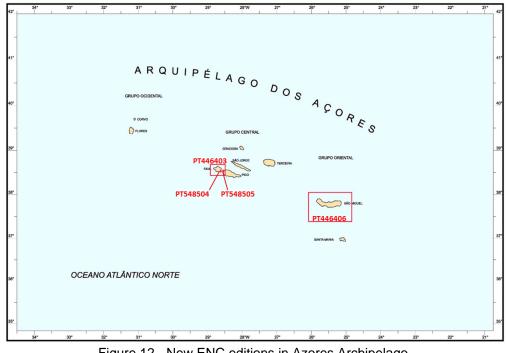


Figure 12 - New ENC editions in Azores Archipelago.

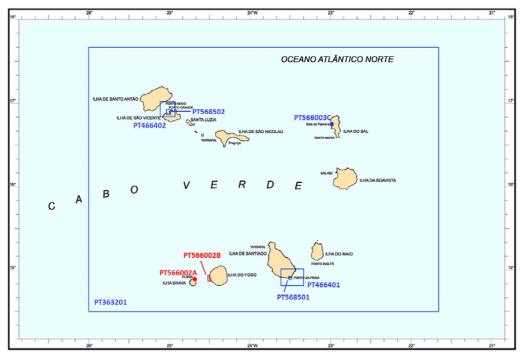


Figure 13 - New ENC editions in Cape Verde.

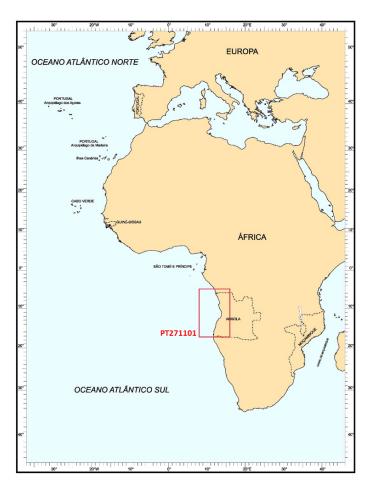


Figure 14 - New ENC editions in Angola.

A list of the ENC cells produced by IHPT during the report's period is presented in Annex Bravo.

4- NEW PUBLICATIONS AND UPDATES

Since November 2016, IHPT published the following nautical publications:

- Annual Group of Notices to Mariners (2017).
- Annual Group of Notices to Mariners (2018).

Annually, the IHPT publishes the Tide Tables for the main harbours of Continental Portugal and the Azores and Madeira Archipelagos. During the last years some of the tidal constituents continued to be recalculated using more recent tidal observations.

IHPT also publishes, annually, the Tide Tables for the African Portuguese Speaking Countries which, in the EAtHC region, includes the main harbours of Cape Verde, Guinea Bissau and São Tomé and Príncipe.

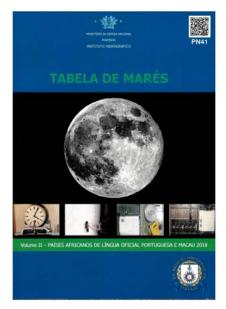


Figure 15 - Tide table for the African Portuguese Speaking Countries.

5- MARITIME SAFETY INFORMATION

Until October 2012, IHPT, as the national coordinator for the Maritime Safety Information, provided a 24h service of Navigational Warnings, in cooperation with the NAVAREA II coordinator. Since that date, this service is provided by the Portuguese Navy Communications Center (COMAR), remaining IHPT the National Coordinator.

NAVTEX broadcast is issued both in English and Portuguese and it is transmitted from the Maritime Communications Center (Lisbon), S. Miguel (Azores Archipelago) and Porto Santo (Madeira Archipelago) stations.

The GMDSS coverage is not completed yet, due to some delays on the establishment of the Digital Selective Call capability. Efforts are being made to cover all the Portuguese maritime territory.

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

IHPT built a friendly on-line application – ANAVNET, supported by robust and secure databases, capable of providing either entire NtM publications, or single NtM affecting individual documents, allowing in any case their consult and print, including entire correction pages of nautical publications and blocks to apply on nautical charts.

ANAVNET allows the consult of Navigational Warnings broadcasted by any of the Portuguese NAVTEX stations, both in Portuguese and English languages, as well as the Local Navigational Warning, promulgated by Maritime and Harbour Authorities.

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

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

6- <u>C-55</u>

An update of C-55 for Portugal, Portugal-Madeira and Portugal-Azores was sent to IHB last year, as presented in Annex Charlie.

7- CAPACITY BUILDING

During the period of this report no capacity building activities were executed by IHPT on the EAtHC region.

However, some capacity building actions were undertaken in Angola and Mozambique as reported below in paragraph 9.e - Cooperation with other countries.

8- OCEANOGRAPHIC ACTIVITIES

IHPT has regular and robust activity in respect to physical, geological and chemical oceanography, participating in national and European Union research projects in those fields. IHPT is running, presently, a comprehensive network of seventeen (17) tide gauges, seven (7) wave and multi-parametric buoys, three (3) coastal weather stations and five (5) HF radar systems to measure superficial currents and waves in the Portuguese EEZ (see figure 16).

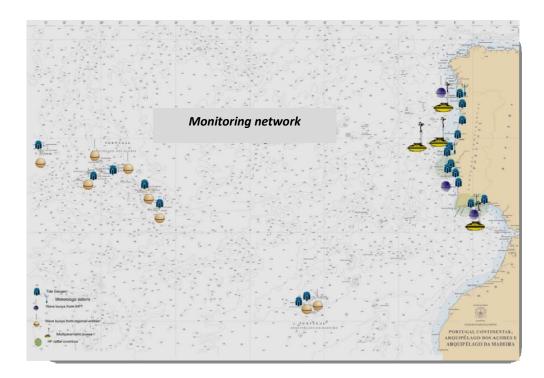


Figure 16 - System of Monitoring and Operational Forecast of the Portuguese EEZ.

9- OTHER ACTIVITIES

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

a. <u>Participation in IHO Working Groups</u>

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. <u>MSDI Progress</u>

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. <u>Courses in Hydrography</u>

IHPT School of Hydrography and Oceanography provides Specialization Courses in Hydrography (FIG/IHO/ICA Category A and B). During the period of this report attended the courses the following students:

- 2015/2016, Cat. A, four militaries of the Portuguese Navy and six civilians (one from Brazil)
- 2016/2017, Cat. B, four militaries of the Portuguese Navy and five officers of the Directorate of Hydrography and Navigation of the Angolan Navy.
- 2017/2018, Cat. A, four militaries of the Portuguese Navy and one officer of the Royal Navy of Morocco, and two civilians (one form Italy and other from Brazil).

In September of the current year another edition of a course Cat. B began, with four militaries of the Portuguese Navy and two Portuguese civilians.

e. <u>Cooperation with other countries</u>

<u>Angola</u>

IHPT is in contact with Hydrographic and Maritime Signalization Institute of Angola (IHSMA), Angola's HO, related to the future collaboration between IHPT and IHSMA. A proposal was presented to execute the hydrographic and topographic surveys of the most important Angolan harbours and to produce the respective Nautical Charts and ENC.

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), and enables its students to have a hands-on the job approach, with state of the art techniques on hydrographic surveying.



Figure 17 – IHPT Hydrographic Technical Course Students – practical class.

Cape Verde

Between 2th and 10th December 2016, a hydrographic survey was carried out in the archipelago of Cape Verde - Porto da Praia (Santiago Island) and Porto Grande (São Vicente Island), aiming the collection of updated hydrographic information of the ports and surrounding areas.

In the period from 27th to 31st March 2017, a delegation from IHPT and SHOM made a technical visit to Cape Verde under its Capacity Building program to assess the current situation and the future need for maritime safety, hydrographic surveying and cartographic production.

This visit resulted in recommendations for strengthening hydrographic capacity and for outlining a plan to build this capacity in Cape Verde.

From October 3rd until November 22nd 2017, the Portuguese Navy Hydrographic Ship, NRP *D. Carlos I*, has conducted hydrographic surveys in Cape Verde's waters, as 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.

Mozambique

Between the 24th of October and the 4th of November 2016, IHPT has assisted Mozambique's Hydrographic Office – INAHINA (National Institute of Hydrography and Navigation), with an action for MBES system capacitation. With that purpose, a team of two IHPT technical advisors was deployed to exchange experiences and enhance INAHINA's knowledge about MBES systems. The action was frequented by fourteen attendees, ten of which were INAHINA's technical personnel.

Apart from the mentioned Capacity Building action, in 25th of April 2017, during the 1st IHO Assembly, a bilateral cooperation agreement has been signed between IHPT and INAHINA. 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.

On the other hand, IHPT expects the cooperation from INAHINA to achieve the compromises assumed by Portugal and Mozambique, respecting to the co-production 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).

In November 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".

<u>Guinea-Bissau</u>

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

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

For a period of three weeks, from 16th of July till 3rd of August 2018, the Commander Alberto Tipote from the Administração do Porto de Bissau, visited the IHPT. During this period he accompanied the final phase of the production of the nautical chart resulting from the aforementioned hydrographic survey as well as it was possible to discuss the existing silting in this port area and the need of dredging.

It should also be noted that it is planned to install of a tide gauge at the port facilities in Bissau, which will allow the update of tide forecasts and consequently the safety of navigation at this port.

São Tomé and Príncipe

In the last trimester of 2016, the Portuguese Navy Hydrographic Ship NRP *Almirante Gago Coutinho* executed a bilateral cooperation mission in São Tomé and Príncipe. This mission was contextualized in the framework of technical-military cooperation with the CPLP countries and aimed at carrying out a series of activities that contribute to maritime safety in the Gulf of Guinea, as well as naval presence.

In addition to the obligations related to the military component, between October 21st and November 19th, the vessel has conducted hydrographic surveys in São Tomé and Príncipe's waters, with the purpose of updating the Nautical Charts 66420 "Approach to the Ports of São Tomé and Fernão Dias" and 322 "Island of S. Tomé".

<u>Spain</u>

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, as 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.

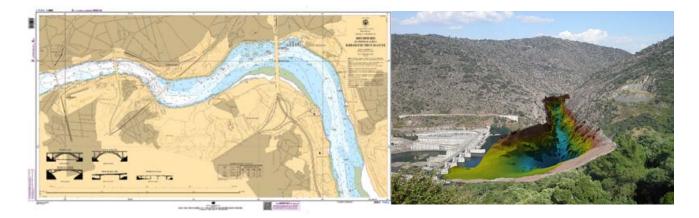


Figure 18 – Nautical chart and DTM, from Douro River.

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.

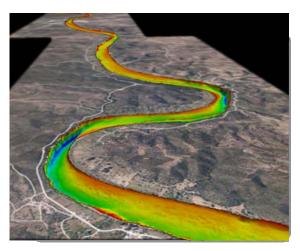


Figure 19 – DTM, from Guadiana River.

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.

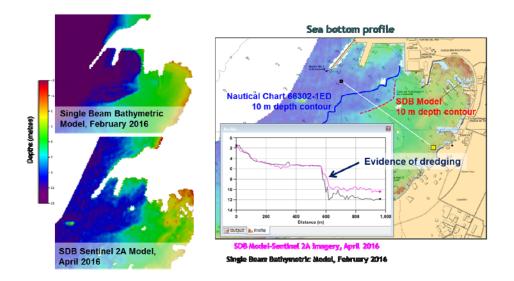


Figure 20 – Detecting sea bottom changes based on a SDB model retrieved from multispectral imagery – Dredging example, São Vicente Island, Cape Verde.

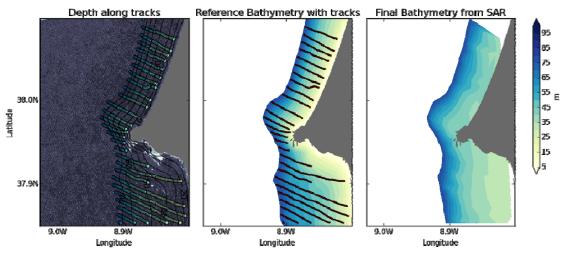


Figure 21 – Example of a SDB model retrieved from SAR imagery.

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 22 – 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.

ANNEX A

HYDROGRAPHIC OFFICE GENERAL INFORMATION PORTUGAL (PORTUGUESE REPUBLIC)

das Trinas – 49
49-093 LISBOA
Ministry of National Defence – Navy.
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.
10 th June
+ 351 21 094 3000 + 351 21 094 3299 dirgeral@hidrografico.pt dirtecnica@hidrografico.pt hidrografia@hidrografico.pt http://www.hidrografico.pt
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
Rear-admiral Carlos Manuel da Costa Ventura Soares, Director-General
2016 = 9 946 565 tons
9 million Euros
For details, consult the WEB site: http://www.hidrografico.pt
210, from which 82 of them represent Portuguese waters.
44, from which 37 of them represent Portuguese waters.
117, from which 98 of them represent Portuguese waters.
 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;

	 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/	Displacement	Date Launched	Crew	
Aeronaves 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

NAUTICAL AND ELECTRONIC NAVIGATIONAL CHARTS PUBLISHED BY PORTUGAL

Since the last meeting, INT charts published, covering areas of the Commission, are listed in the following table:

NAUTICAL CHARTS						
Number		Title	Scale 1:	Issue		
National	INT			National	INT	
		Ilha do Faial e Canal do Faial	50 000		30 NOV 2016	
46403	1891	A - Porto da Horta	7 500	30 NOV 2016		
		B – Porto da Madalena	7 500			
26312	-	Barra e Porto de Vila Real de Santo António	15 000		-	
66404	4064	Aproximações ao Porto da Praia	40 000	20 NOV 2018	30 NOV 2018	
66401	1964	A – Porto da Praia	7 500	30 NOV 2018		
66400	1965 -	Aproximações ao Mindelo	40 000	20 NOV 0040	30 NOV 2018	
66402		A- Porto Grande	10 000	30 NOV 2018		
26F10	-	Rio Douro – Estuário (Da Barra à Ponte D. Luís)	10 000	30 JUN 2018	-	
26F11-Folha01	-				-	
26F11-Folha02	-		5 000		-	
26F11-Folha03	-	Rio Douro – Estuário (Da Ponte D. Luís à barragem de Crestuma-Lever)		30 JUN 2018	-	
26F11-Folha04	-				-	
26F11-Folha05	-				-	
00400	1871Aproximações a Leixões e à Barra do Rio DouroA - Porto de Leixões e Barra do Rio Douro	Aproximações a Leixões e à Barra do Rio Douro	30 000	24 11 11 2040	24 111 2040	
26402		A - Porto de Leixões e Barra do Rio Douro	10 000	— 31 JUL 2018	31 JUL 2018	

ELECTRONIC NAVIGATIONAL CHARTS						
Number	NC	UB	Title	Edition	Date	
PT271101	72101	2	Cabinda à Baía dos Tigres	3	NOV16	
PT324206	24206	3	Ponta do Altar à Ilha Cristina	7	JUN17	
PT336201	36201	3	Madeira e Ilhas Desertas	4	JUN18	
PT363201	201	3	Arquipélago de Cabo Verde	1	AGO17	
PT426405	26405	4	Peniche, Nazaré e Ilhas Berlengas	2	JUL18	
PT446403	46403	4	Ilha do Faial e Canal do Faial	3	MAR17	
PT446406	46406	4	Ilha de São Miguel	2	MAI17	
PT466401	66401	4	Aproximações ao Porto da Praia	1	FEV18	
PT466402	66402	4	Aproximações a Mindelo	1	MAR18	
PT526312	26312	5	Barra e Porto de Vila Real de Santo António	3	MAR18	
PT526312	26312	5	Barra e Porto de Vila Real de Santo António	4	MAI18	
PT528503	26410	5	Portos da Póvoa de Varzim e Vila do Conde	1	NOV17	
PT528510	26405	5	Porto de Peniche	2	JUN18	
PT528517	27503	5	Porto de Albufeira	1	NOV17	
PT528519	27503	5	Porto de Tavira	1	NOV17	
PT538501	36401	5	Baía e Porto de Porto Santo	3	NOV17	
PT548504	46403	5	Porto da Horta	3	FEB17	
PT548505	46403	5	Porto da Madalena	3	NOV16	
PT56602A	67502	5	Furna – Ilha Brava	2	JUN17	
PT56602B	67502	5	Vale de Cavaleiros – Ilha do Fogo	2	JUN17	
PT56603C	67503	5	Baía da Palmeira – Ilha do Sal	2	JUL17	
PT568501	66401	5	Porto da Praia – Ilha de Santiago	1	FEB18	
PT568502	66402	5	Porto Grande - Ilha de São Vicente	1	MAR18	

Since the last meeting, ENC cells published, covering areas of the Commission, are listed in the following table:

ANNEX C

UPDATES TO C55

Status of Hydrographic Surveys

		Α	В	С
Portugal	depths < 200 m	100	0	0
(Continental Portugal)	depths > 200 m	99	0	1
Portugal	depths < 200 m	65	0	35
(Madeira Archipleago)	depths > 200 m	66	1	33
Portugal	depths < 200 m	60	40	0
(Azores Archipelago)	depths > 200 m	56	1	43

Status of Nautical Charting

		Α	В	С
	Offshore passage / Small	100	0	100
Portugal (Continental Portugal)	Coastal passage / Medium	100	0	100
	Approaches Ports / Large	100	0	100
	Offshore passage / Small	100	0	100
Portugal (Madeira Archipleago)	Coastal passage / Medium	100	0	100
	Approaches Ports / Large	100	0	100
	Offshore passage / Small	100	0	100
Portugal (Azores Archipelago)	Coastal passage / Medium	100	0	100
	Approaches Ports / Large	100	0	100

The other items have no changes.

ANNEX D

PORTUGUESE TIDE GAUGE NETWORK

