INSTITUTO HIDROGRÁFICO

http://www.hidrografico.pt/

2022

PORTUGAL

National Report

This report describes the main technical activities and developments at Instituto Hidrográfico (IHPT), the Portuguese Hydrographic Office, during the period from February 2021 to May 2022. It was elaborated to be presented at the 18th SAIHC Meeting in accordance with IHO Resolution 2/1997 as amended.

IHO International Hydrographic Organization

18th Southern Africa and Islands Hydrographic Commission (SAIHC)

Plenary meeting 9th – 12th May 2022

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1- HYDROGRAPHIC OFFICE

Established in 1960, Instituto Hidrográfico (IHPT) is both an organization within the Portuguese Navy and a national marine research laboratory. It is the national hydrographic service, provides environmental support to naval operations and does research and development activities in physical and chemical oceanography, marine geology, hydrography, safety of navigation and marine data management.

IHPT is focused on the ocean observation, mapping its several scientific dimensions and predicting its behavior in the short, medium and long term. It is committed to open data policies and sharing its capabilities with the society for faster research, development and knowledge of the ocean.

The main objectives of IHPT activities are the safety of navigation, the environmental monitoring and the protection of the marine environment. It is permanently involved in several R&D projects, which ultimately contribute to the climate change analysis and the development of the blue economy. It has established a Quality Management System recognized by an independent, credible and competent external entity, according to the normative reference (NP EN ISO 9001). The Quality Policy includes a commitment to meeting regulatory requirements and continuously improving to meet customer needs.

Among these activities, the training provided by the Hydrography and Oceanography School stands out, with FIG/IHO/ICA category A and B courses. Its students are Navy officers and civilian technicians, from Portugal and Portuguese-speaking African countries, as well as from other friendly nations.

Detailed information to update IHO Publication P-5 has been submitted using the online system, by Commander João Paulo Delgado Vicente, Head of the Hydrographic Division (dt.hi.chf@hidrografico.pt).

In SAIHC region, IHPT is the Primary Cartographic Authority (PCA) in:

- Angola
- Mozambique

2- SURVEYS

a) Coverage of new surveys

The main hydrographic program of IHPT, the “SEAMAP 2030: Mapping of the Portuguese Sea” (http://www.hidrografico.pt/iprojeto/16) is in progress. This program has the objective of contributing to the conservation and sustainable use of the sea, supporting research, and promoting development. It is aligned with United Nations Decade of Ocean Science for Sustainable Development.

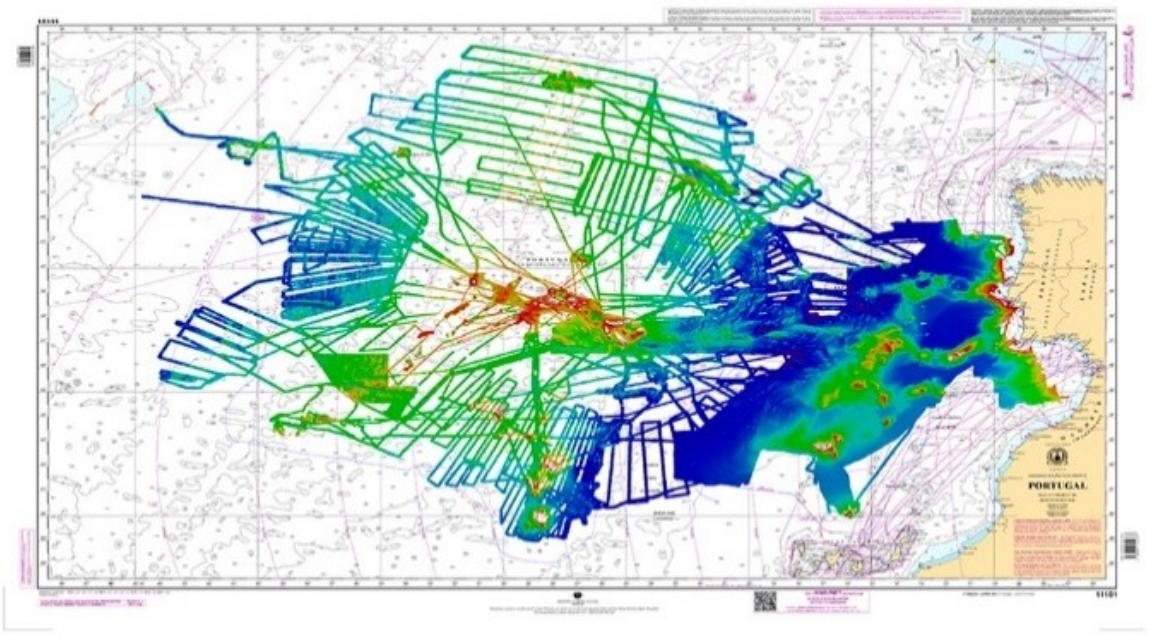

Figure 1 – SEAMAP 2030 actual coverage with multibeam survey.

In SAIHC region IHPT conducted hydrographic surveys in Luanda harbor in November and December 2021. These surveys are part of the *Iniciativa Mar Aberto 2021.2* and aims to verify the bathymetry, the evolution of the seafloor morphology and collect data for cartographic updating.

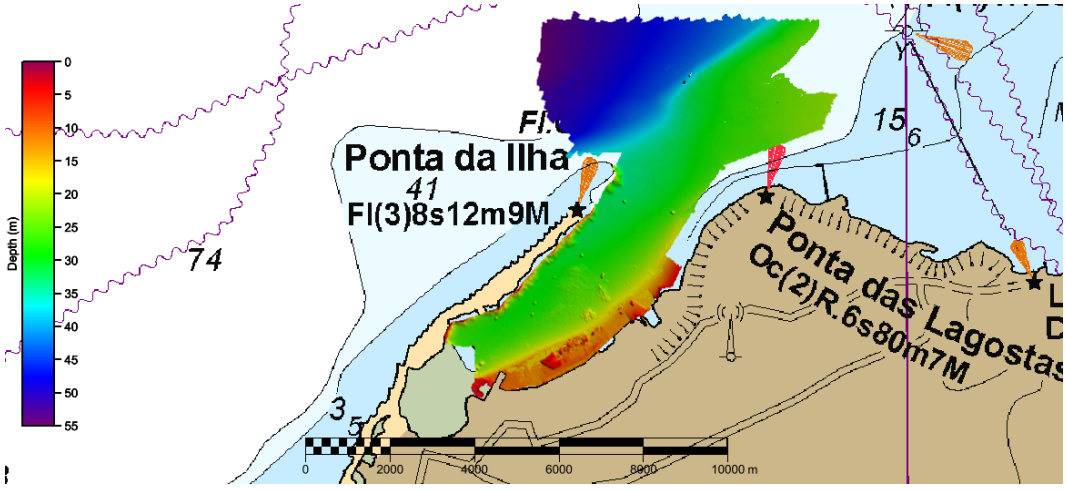

Figure 2 – Bathymetric coverage of Luanda harbor carried out between November and December 2021 with a multibeam survey.

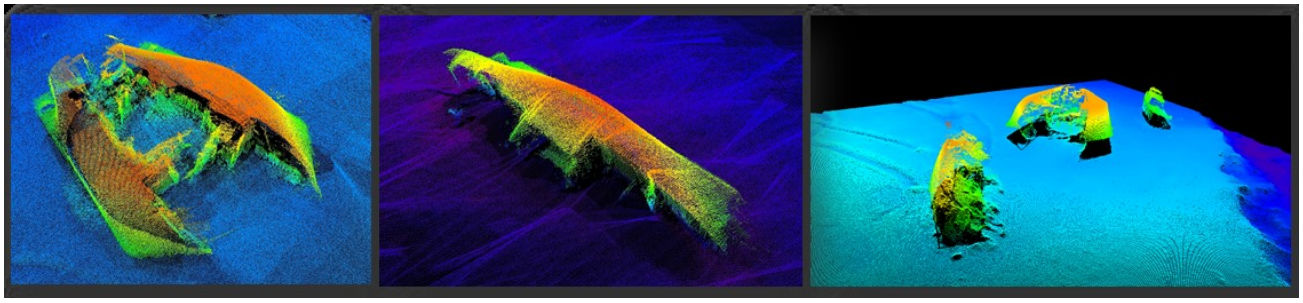

Figure 3 – Wrecks that were detected at Luanda harbor.

b) New technologies and /or equipment

On the technological line, Portugal is using top of the shelf acoustic systems for hydrographic surveys. New methodologies based on satellite imagery and low flying vehicles imagery is also being used and currently developed. Portugal is also using third party surveys data, which is appropriately being checked for quality control.

For the future, Portugal has the challenge to complete the SEAMAP 2030 program to make good use of crowdsourced data, and the derivation of bathymetry from remote imaging data for cartographic usage. A regular updated service of coastal bathymetry is also one objective for the coming future.

c) New ships

NTR.

d) Crowdsourced and satellite-derived bathymetry - national policy

IHPT has no knowledge of crowdsourced bathymetry sources for the SAIHC area.

e) Challenges and achievements

Obtaining funding for new surveys off Mozambique and Angola, in conjunction with those countries, is considered the greatest challenge.

During the hydrographic surveys carried out in Luanda harbor in November and December 2021, the IHPT operationalized the KONGSBERG EM 2040C multibeam echosounder, belonging to the Angolan authorities, which is installed on the vessel Kilamba. During this period, training was provided to three technicians from the *Instituto Hidrográfico e de Sinalização Marítima de Angola* (IHSMA) and to two Angolan Navy officers with the category B hydrography course taken at the IHPT's Hydrography and Oceanography School.

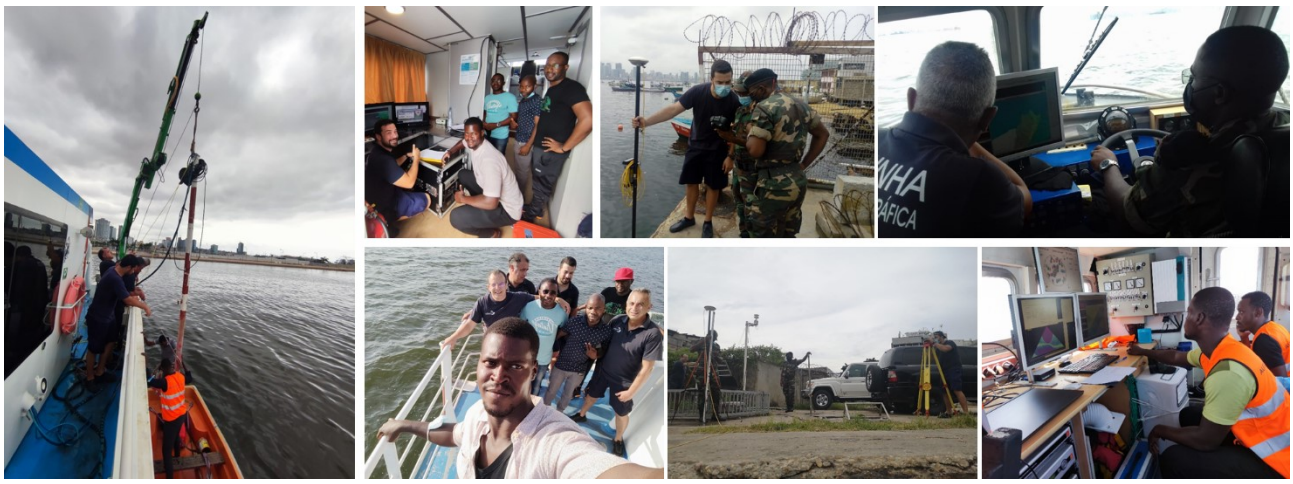

Figure 4 – Luanda survey and training of ISHMA and Angolan Navy technicians.

3- NEW CHARTS & UPDATES

All IHPT Electronic Navigational Charts (ENC) and updates are produced according to the S-57 standard. All new Nautical Charts (NC) and new editions are bilingual (Portuguese and English) and follow INT specifications, whether or not they belong to INT series. Presently, IHPT provides its Nautical Charts using a Print-on-Demand system. All charts are continuously updated according to the published "Notices to Mariners". IHPT also produces NC and ENC, including some charts of the International Portfolio (INT), for African Portuguese speaking countries.

a) ENC coverage, gaps and overlaps

The Portuguese ENC national portfolio includes 98 cells organized in 6 Usage Bands. Since the last SAIHC meeting, Portugal produced one ENC cell in the SAIHC Region. Table I shows published ENC.

Table I – IHPT ENC published

Area	Cell number	Usage Band	Status	Observations
ANGOLA				
Along coast of ANGOLA	PT 271101	2	Published	4th Edition, August 2021

b) ENC Distribution method

IHPT is a member of the International Centre for ENC (IC-ENC), participating actively in its works, including their Technical Experts Working Group. IC-ENC RENC distributes all Portuguese ENC.

c) RNC

NTR.

d) INT Charts

Since the last SAIHC meeting, IHPT produced/co-produced the INT Nautical Charts showed in tables II and III.

Table II – INT charts produced or co-produced by IHPT

INT Number	PT NAC Number	Title	Scale	Edition	Status
ANGOLA					
2089	72101	Gamba to Luanda	1/1000000	2ª 2021	Published
2050	72102	Luanda to Baía dos Tigres	1/1000000	2ª 2021	Published
2814	73201	Point Tchitembo to Cabeça da Cobra	1/350000	2ª 2021	Published
2550	73202	Cabeça da Cobra to Cabo Ledo	1/350000	2ª 2021	Published
2560	73203	Cabo Ledo to Lobito	1/350000	2ª 2021	Published
2570	73204	Lobito to Ponta Grossa	1/350000	2ª 2021	Published
2580	73205	Ponta Grossa to Foz do Cunene	1/350000	2ª 2021	Published
MOZAMBIQUE					
7632		Porto da Beira	1/30 000	New Edition 2021	

Table III –INT charts under construction and planned to be produced

INT Number	PT NAC Number	Title	Scale	Status	Comments	Producer(s)
MOZAMBIQUE						
7683	-	Aproximações a Maputo/Porto de Maputo	1/30 000; 1/15 000	New Chart	Compilation by INAHINA and IHPT; QC/Revision Scheduled 2022	Co-production MZ-PT
7641	-	Aproximações a Quelimane/Porto de Quelimane	1/30 000; 1/10 000	Produced	New edition; under construction (waiting for ICC comments); Scheduled 2022	Co-production MZ-PT
7645	-	Topuito	1/30 000	Schemed New Chart	No data available	Co-production MZ-PT
7620	-	Cabo São Sebastião à Beira	1/350 000	New Chart	Compilation by INAHINA Scheduled 2021-2022	Co-production PT-GB
7630	-	Beira ao Rio Zambeze	1/350 000	Schemed New Chart	(INAHINA)	Co-production PT-GB
7640	-	Rio Zambeze à Ilha Epidendron	1/350 000	Schemed New Chart	(INAHINA)	Co-production PT-GB
ANGOLA						
2551	16303	Porto de Luanda	1/15 000	Schemed	1st edition - publication planned for May 2022	PT

In a joint effort with the Angolan authorities, IHPT has maintained the updates, through Notices to Mariners (NtM), of the published charts. Following the commitments assumed with the Angola government, IHPT is producing the nautical cartography of the port of Luanda (ENC and paper chart) which will be ready for publication during the 2nd quarter of 2022. The hydrographic survey executed in December 2021 is being used in this production.

e) National paper charts

All IHPT new charts and new editions are bilingual (Portuguese and English) and follow INT specifications, whether or not they belong to INT series. The existing nautical paper chart portfolio aims to meet the specific needs of mariners, being grouped according to their purpose. It was designed taking into consideration that the number of charts should be as minimal as possible; should comply with the navigation safety principles and, be in accordance with the requisites of the IHO.

The Portuguese nautical charts portfolio is composed by the charts mentioned on table IV.

Table IV –Portuguese nautical charts portfolio

Country		NC (Portuguese folio)	INT		Old Folio (Portuguese folio)
PAL* SAIHC Region	Mozambique	**42**	**		**42**
	Angola	**46**	**7**		**39**
Overview		5	0		5
*PAL - African Portuguese speaking countries ** No PT national number assigned to Mozambique INT charts					
OBS: New chart scheme under development for the PAL to allow cancellation of the old folio. These charts will be produced in the next 3-5 years in accordance with IHO specifications.					

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

Charts for other purposes as Fisheries, Yachting, Sediments distribution, special training and Inland (Douro and Guadiana rivers) were produced for Portugal geographical area. IHPT did not produce any Other Charts for the SAIHC region.

g) Challenges and achievements

The good cooperation with Mozambique has allowed the co-production of INT charts in accordance with the IHO standards and specifications.

The challenge is to build ENC production capacity in Mozambique for 2022/23.

Major concerns/challenges are: the high number of charts still to be produced and the resolution of overlaps in the Port of Beira (UKHO/India).

IHPT sees the implementation of the S-100 as a major challenge, particularly with what regards to the production of S-101 ENCs (Specifications/Production Software/QC/Validation/National Procedures) as well as the establishment of S-101 ENCs schemes and the way during the transition period.

4- NEW PUBLICATIONS AND UPDATES

a) New Publications

Since the last meeting IHPT published the Annual Group of Notices to Mariners (2022), as well as, every month, the Monthly Group of Notices to Mariners.

Annually, IHPT publishes the Tide Tables for the main harbors of Portugal, including the Azores and Madeira Archipelagos. IHPT also publishes, annually, the Tide Tables for the African Portuguese Speaking Countries which, in the SAIHC region, includes the main harbors of Angola and Mozambique.

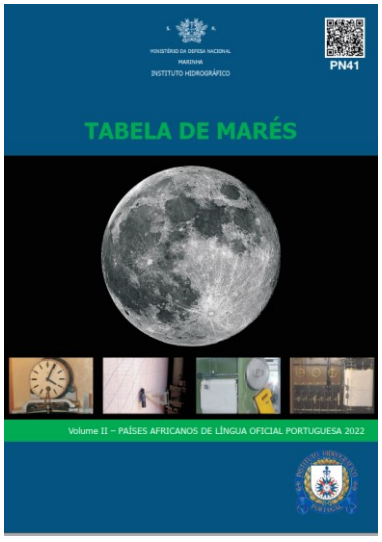

Figure 5 - Tide table for the African Portuguese Speaking Countries.

b) Updated publications

Since February 2021, the "Charts and Nautical Publications Catalogue" is freely available online in PDF format to be consulted or downloaded. It is kept up to date. The link to this publication is as follows: https://loja.hidrografico.pt/?product=catalogo-de-cartas-e-publicacoes-nauticas-digital. In the future it will also be available on the new ANAVNET platform.

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

Digital or paper, if requested.

d) Challenges and achievements

IHO has released a Portuguese version of the 6th Edition of the Special Publication S-44 'IHO Standards for Hydrographic Surveys'. This Portuguese version is the result of a productive cooperation from Brazil (DHN) and Portugal (IHPT). Available on: https://iho.int/uploads/user/pubs/standards/s-44/20211216_S-44_Ed6_2.0.1_Portugues_v2F.pdf.

5- MARITIME SAFETY INFORMATION

a) Existing infrastructure for transmission

NTR.

b) Statistics on work of the National Coordinator

IHPT doesn't have National Coordinator responsibilities for countries in SAIHC area.

c) New infrastructure in accordance with GMDSS Master Plan

No new information received from INAHINA or ISHMA.

d) Challenges and achievements

To keep cooperating with INAHINA (Mozambique) and ISHMA (Angola) as requested in the future, by those agencies.

IHPT is currently developing a new ANAVNET system, which will renew the web access to maritime safety information, e.g.: notices to mariners, navigational warnings and meteorological warnings. All the information will be georeferenced for spatial analysis purposes. This new platform is scheduled to be launched during the 2nd quarter of 2022.

6- C-55

NTR in SAIHC area.

7- CAPACITY BUILDING

a) Offer of and/or demand for Capacity Building

The School of Hydrography and Oceanography (https://www.hidrografico.pt/op/23) is a Navy Specialization School, and the department of the Hydrographic Institute dedicated to the training of Navy officers, petty officers and civilian technicians necessary for the Hydrographic and Oceanographic services. The training provided by the Hydrography and Oceanography School stands out, with FIG/IHO/ICA category A and B courses.

The next courses available start:

- September 2022: CAT B
- September 2023: CAT A

Table V shows the latest capacity building actions made between Portugal and Mozambique.

Table V –PT-MZ latest CB actions

Date		Where
November 2018	PT-MZ Training in MBES acquisition and processing.	INAHINA (Mozambique)
May 2019	PT-MZ Working meeting on the production of INT nautical charts	IHPT (Portugal)
2020/21	PT-MZ Working meeting on the production of INT nautical charts. Action cancelled due COVID-19.	INAHINA (Mozambique)

b) Training received, needed, offered

IHPT recommends a strong commitment to the training of SAIHC members in the development and production of the new generation of S-100 products and services. These activities should be coordinated in the next years by the Region to include as many participants as possible, as well as to influence the standardization of training.

a) Status of national, bilateral, multilateral or regional development projects with a hydrographic component.

Two bilateral protocols were signed in the end of 2021 regarding hydrography, cartography, oceanography, R&D and capacity building, with:

- ISHMA: Instituto Hidrográfico e de Sinalização Marítima de Angola
- INIPM: Instituto Nacional de Investigação Pesqueira e Marinha de Angola

b) Definition of proposals and requests to the IHO CBSC

INAHINA and IHPT have proposed for 2021 (postponed for 2022 due COVID) a training for cartographic technicians of Mozambique Hydrographic Office in the production of ENCs aiming for the country's development of ENC production capability.

IHPT intends to propose a training in MBES acquisition and processing to ISHMA.

8- OCEANOGRAPHIC ACTIVITIES

c) General

IHPT develops activity related to physical, geological and chemical oceanography, participating in national and European Union research projects in those fields.

In this scope, in Angola, a Sofar Spotter wave and SST buoy was deployed nearshore Luanda Bay. This buoy sends the data in near real time (hourly) using Iridium satellite communication systems to both INIPM and IH. Data is made openly available at IHPT cell phone application (for both IOS and Android systems).

Figure 6 - Sofar Spotter wave and SST buoy (yellow).

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

d) GEBCO/IBC's activities

IHPT provides bathymetric data to IHO DCDB and GEBCO through EMODNet, the European Marine Observation and Data Network. With this participation in European multidisciplinary projects, IHPT learns and keeps their alignment with the best procedures in the MSDI research developments.

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 web 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.

A harmonized EMODnet Digital Terrain Model (DTM) has been generated for European sea regions from selected bathymetric survey data sets, composite DTMs, Satellite Derive Bathymetry (SDB) data products, while gaps with no data coverage are completed by integrating the GEBCO Digital Bathymetry (see GEBCO Grid and IHO DCDB website).

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

e) Tide gauge and other monitoring equipment network

There is no IHPT oceanographic equipment installed on SAIHC region.

f) New equipment

NTR

g) Challenges and achievements:

The harmonic constants included on Volume II of Tide Table are not updated since 1973 for Angola and 2000 for Maputo, Mozambique. This lack of update is due to the absence on data published by the concerned national authorities.

9- SPATIAL DATA INFRASTRUCTURES

As a marine data and knowledge producer, the IHPT's internal data management processes are kept in line with national, European and international data policies and information sharing legal requirements.

IHPT is in all aspects a data driven organization. To address the geospatial data needs for improvement, IHPT has built a Marine Spatial Data Infrastructure (MSDI) through the "Hidrográfico Plus" project having granted funding from SAMAP2030 program (POCI-02-0550-FEDER-035422). This MSDI is aligned with the IHO, UN-GGIM, INSPIRE, IODE best practices and fair principles to improve data management, metadata creation, data search services and optimized data access services. The MSDI frontend is a centralized webGIS – "Hidrográfico Plus" (https://geomar.hidrografico.pt). In the geoportal users will find several marine and hydrographic datasets: environment observations at sea, forecasts, nautical charts and hydrographic information.

a) Status of MSDI

"Hidrográfico Plus" MSDI integrates the software components presented in the Figure 24. This service oriented architecture implements the MSDI functionalities, principles and pillars. Human and machine actors could access marine data through OGC services and custom APIs. The infrastructure

presents a full integration between the portal and the metadata catalogue, this integration optimizes data access by National Spatial Data Infrastructure (SDI) – SNIG Portal - and INSPIRE Geoportal.

The MSDI has been designed to support blue economy sector clients like maritime users, fisheries, aquaculture, green energy operators, etc. At this point, the users recognize the potential of this new tool as an organizational asset capable of supporting diverse scientific projects and clients – human and machines.

Figure 7 – "Hidrográfico Plus" MSDI functionalities and components.

From the systems architecture (Figure 5) point of view the IHPT MSDI implements several open source technologies. This allows IHPT to be compliant with INSPIRE and IHO MSDI requirements and to publish diverse data sources and formats through web services.

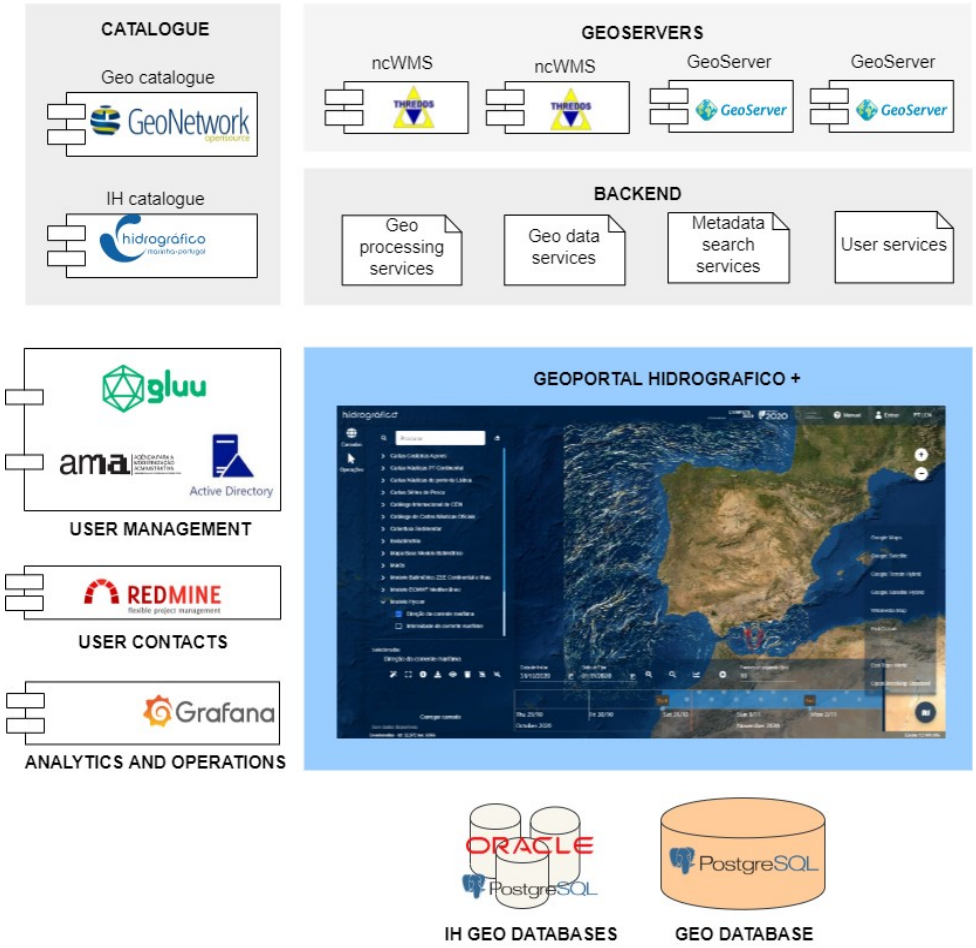

Figure 8 - Hidrografico Plus MSDI architecture.

The Portuguese Hydrographic Institute MSDI will support goals 2 and 3 identified in the OHI strategic plan.

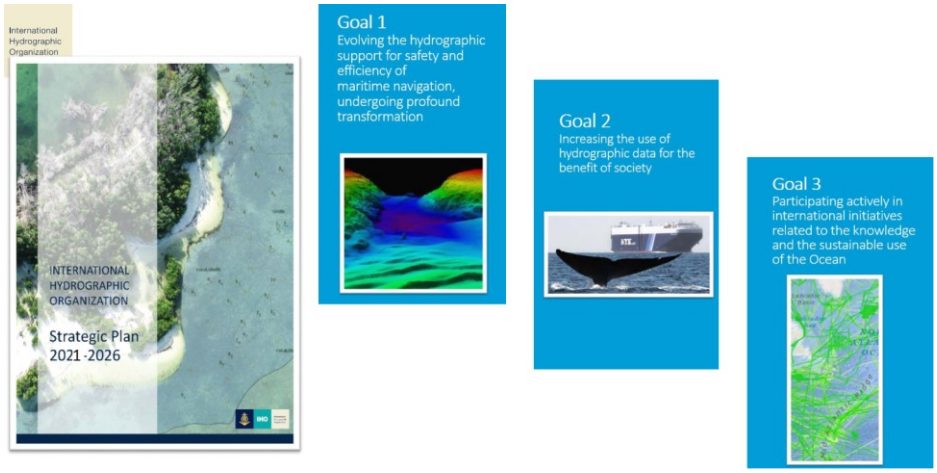

Figure 9 - OHI Strategic Plan (2021 – 2026)

Notices to Mariners and Navigational Warnings 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:

(https://gisportal.hidrografico.pt/arcgis/apps/webappviewer/index.html?id=0c592915e0884049b7c197bf7cbe2d91).

b) Relationship with the NSDI

IHPT data is available through Open Geospatial Consortium (OGC) web services in the Portuguese National Spatial Data Infrastructure (NSDI) – Sistema Nacional de Informação Geográfica (SNIG): https://snig.dgterritorio.gov.pt/. SNIG maintains a centralized metadata catalogue with all national data providers and it is linked to the EU INSPIRE Portal. The metadata is shared between the different infrastructures through automatic harvesting process. This approach assures data access for different clients.

c) Involvement in regional or global MSDI efforts

IHPT works in the SNIG Working Groups for a common effort in the INSPIRE implementation principles and provides geospatial data services to other portals like the Marine Spatial Data Portal – Geoportal do Mar Português

(https://webgis.dgrm.mm.gov.pt/portal/apps/webappviewer/index.html?id=df8accb510bc4f33963d9b03bf3674b8).

d) National implementation of the Shared Data Principles – including any national data policy and impact on marine data.

Several Portuguese organizations have been implementing the common European directives and orientations such as INSPIRE, Marine Directive Framework, the European Strategy for Data Policy and the Directive on open data and the re-use of public sector information, also known as the 'Open Data Directive' (Directive (EU) 2019/1024).

The main driver in the SDI and MSDI has been the European community and the regional initiatives. SNIG follows the INSPIRE directive and the Implementation Working Groups. IHPT combined the need to implement the INSPIRE directive with the IHO and IMO principles and requirements to build up the Hidrografico Plus MSDI capable of serving multiple users, needs and uses. Portugal does not have a national common marine data policy. However, data producers and providers have their own organizational data policies aligned with national and European legislation compliant with international data management best practices.

The "Hidrográfico Plus" platform currently delivers free data, for visualization, and download. Some of the data is not available for download, as in the future a paid access will be required for downloading that data.

e) MSDI national portal

Currently a simple portal as the MSDI national portal is not identified, and maybe the best approach for the implementation of MSDI federate principles is to implement a network of geospatial services and aggregated metadata access points like SNIG and INSPIRE portals.

f) Best practices and lessons learned

The "Hidrográfico Plus" MSDI follows the best practices and requirements identified from several recognized institutions/organizations: INSPIRE (https://inspire.ec.europa.eu/), OHI MSDIWG (https://iho.int/en/body-of-knowledge), OGC (https://www.ogc.org/) and IOC OceanBestPractices (https://repository.oceanbestpractices.org/handle/11329/139), among others. The main lessons learned are the need to maintain a good human resources capacity building program and to maintain the internal competences and technical skills aligned with the MSDI principles and implementation models.

g) Challenges and achievements.

"Hidrográfico Plus" MSDI components are used to support internal technical and scientific geospatial data management processes and to feed external clients with near real time data. This MSDI supports the organization mission as marine national laboratory and hydrographic chart authority. Being a navy unit, it supports maritime operations that are extremely dependent of geospatial data.

"Hidrográfico Plus", since its internet deployment has proved its value. The IHPT developed this project taking into account marine user needs. This MSDI should be mature at the Ocean Decade Beginning and Portugal has great expectations about its role for decreasing the ocean knowledge gap at National, European and Global level. This MSDI implements all identified requirements needed for interoperability. For sure it will potentiate the access to IHPT blue geospatial data and has potential for private sector applications development. In this way, IHPT will manage one infrastructure ready to be used in the Open Data Directive umbrella and aligned with INSPIRE requirements. This is one of the IHPT contributions for Ocean Decade sustainable development goals and for national blue economy development.

Currently, there are plans to incorporate the IHPT open data into the European Commission (EC) funded NextGEOSS catalogue (https://nextgeoss.eu/), a European contribution to GEOSS (Global Earth Observation System of Systems), which consists of a next generation European data hub and cloud platform, for EO data, where the users can connect to access data and deploy EO-based applications. The concept revolves around bringing the data and resources to the user communities, together with cloud resources, seamlessly connected to provide an integrated ecosystem for supporting applications.

Another platform to use the "Hidrográfico Plus" data services, starting by free data, will be the

European Space Agency (ESA) funded ECOMI (E–COMmerce platform for MIcro geoservices) platform, based on the store4EO platform (https://www.store4eo.com/), which aims to become a marketplace connecting EO service providers and users of such services. The platform aims to facilitate the delivery of innovative geo-services to various industries, the public sector, and the general public, while reinforcing the use of EO services.

Putting all this together, the "Hidrográfico Plus" is rapidly becoming a consolidated platform of geographic ocean data, by making easily available, the value of the data produced by IHPT, to a number of different community of users, and also by integrating into a network of other geospatial European initiatives, where all those stakeholders can work together for the benefit of all.

The MSDI development is a continuous process. Digital era is still rising multiple challenges for hydrographic offices. For sure new requirements for digital data should show up soon. Yet, at this moment our main goals have been achieved.

The main challenges will keep the MSDI aligned with digital data strategies at different levels. This is a digital environment with a continuous evolution, which requires a rapid adaptation to new clients and stakeholders. Data harmonization and development of S-100 based web services will be for sure a challenge in the future.

10- INNOVATION

a) Use of new technologies

Considering the use of new technologies for hydrographic surveys, Portugal has put new work power to developing and using current satellite technology for the acquisition of bathymetric information. In house software development allowed the use of satellite images to bring in new survey techniques. Multispectral remote detection images are now used for bathymetry where this approach is considered viable and needed. Following this implementation, new tasks have been set up, to develop a similar technique using remotely acquired imaging from low flying vehicles such as unmanned aerial vehicles.

Portugal is currently working on Horizon2020 European Project "4S - Satellite Seafloor Survey Suite" focused on using new techniques for having Bathymetry and Seafloor Classification from remotely acquired multispectral images throughout a web service.

Furthermore, other methods are being developed, such as using the wave field inversion for calculating depth and thus achieving another bathymetric survey technique. Considering the development of these methods using new technologies, Portugal is currently working on several European projects focused specifically on these purposes.

As a statement of those capabilities is the fact that IHPT is now a “beta-tester” for the brand new ESA products.

b) Risk assessment

IHPT is conducting Risk Assessment of some of the waterways in order to identify areas of improvement for the safety of navigation. These assessments are performed in accordance with the recommendations and guidelines of IALA.

c) Policy matters.

NTR.

11- OTHER ACTIVITIES

a) Participation in IHO Meetings

Portugal participated in the IHO Assembly (A2) and in the celebrations of the 100 years of the IHO. IHPT shared several photos and images, which were used in the commemorative video published by the IHO.

At the IHPT, the Director-General Rear-admiral Carlos Ventura Soares gave a brief address alluding to this day, followed by a presentation on the ocean data infrastructure “Hidrográfico Plus”, by Lieutenant-commander Paulo Antunes Nunes.

Portugal also contributed to THE INTERNATIONAL HYDROGRAPHIC REVIEW No. 25 (May 2021), available on https://iho.int/uploads/user/pubs/ihreview_P1/IHR_May_2021.pdf, with two articles:

- Portuguese Hydrographic Institute: 60 years of ocean knowledge projected into the future by RAdm C. V. Soares;
- Program SEAMAP 2030 - 100% of the Portuguese maritime spaces mapped by 2030 by Lieutenant-commander T. Geraldes Dias.

Due to its primary charting responsibilities, Portugal, represented by IHPT, is a member of EAtHC and Associated Member of SAIHC. From September 2020 the Diretor-general of IHPT, RAdm Carlos Ventura Soares, took the chair of the EAtHC commission, having handed over command to RAdm Mário José Simões Marques in January 2022.

The detail of IHPT involvement in other IHO activities/working groups is listed in the table hereafter.

	Description	IHPT representation
HSSC	Hydrographic Services and Standards Committee	CDR João Vicente and Eng.ª Paula Sanches
IENWG	IHO-European Union Working Group	Captain Miguel Bessa Pacheco
IRCC	Inter-Regional Coordination Committee	RAdm Carlos Ventura Soares / RAdm Simões Marques; CDR João Vicente; Eng.ª Paula Sanches
CBWG	Capacity Building Working Group	CDR João Vicente
MSDI	Marine Spatial Data Infrastructure Working Group	LCDR Telmo Dias
S100WG	S-100 Working Group	Eng.ª Paula Sanches
S101PT	S-101 Project Team	Eng.ª Paula Sanches
SCUFN	GEBCO Sub-Committee on Undersea Feature Names	Eng.ª Paula Sanches
WEND	Worldwide ENC Database Working Group	Eng.ª Paula Sanches
DQWG	Data Quality Working Group	Eng.ª Paula Sanches
HSWG	Hydrographic Surveys Working Group	CDR João Vicente and CDR Carlos Marques (HSWG Secretary)
CSBWG	Crowdsource bathymetry Workin Group	Eng.ª Leonor Veiga and LtCDR Telmo Dias

b) Meteorological data collection

NTR.

c) Geospatial studies

NTR.

d) Preparation for responses to disasters

IHPT, with regard to disaster response, set up a multidisciplinary team within its many scientific/marine science capabilities (such as hydrography, physical oceanography, marine geology, chemistry and pollution and Data center) combined with the expertise in marine technology and ocean engineering.

The purpose of the *Equipa Hidrográfica de Intervenção Rápida* (Quick Response Hydrographic Team) is to support the national emergency coordinator in case of a natural or manmade disaster or emergency and also in Portuguese Naval Operations.

e) Environmental protection

NTR.

f) Engagement with the Maritime Administration

NTR.

g) Aids to Navigation matters.

NTR.

h) Magnetic/Gravity surveys

NTR.

i) International engagements

In 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).

The Bilateral cooperation agreement was reviewed in 2018. 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, regarding the co-production of INT charts has listed in the Charts section of this report.

In December 2021, a bilateral cooperation agreement has been signed between IHPT and Instituto Hidrográfico e de Sinalização Marítima de Angola (IHSMA). With this agreement it is expected a more effectiveness hydrography and cartography activities in Angola.

j) Others - Naval Meteorological and Oceanographic Center

IHPT has developed state of the art 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 set up a GEOMETOC center of the PRT Navy, named CGEOMETOC (Naval Geospatial, Meteorological and Oceanographic Center), under the direction of IHPT's Director-general.

12- FINAL REMARKS

a) Areas of significant achievement

IHPT and INAHINA are cooperating on nautical charts co-production.

IHPT and ISHMA are cooperating in hydrographic surveys in Angola harbors.

b) Areas of particular concern

Travel and accommodation are still the major concerns for any partnership or support actions IHPT can be involved in Mozambique and Angola.

It would be of major interest that further capacity building actions could be taken into consideration:

- In Mozambique in order to continue the development of full hydrographic and cartographic capabilities

- In Angola in order to improve data acquisition and, consequently, chart's new editions.

Due to the Covid-19 international health crisis, some capacity building activities which were scheduled for 2021/22 had to be postponed to 2022/23.

c) Any other matters of interest to the SAIHC

NTR.