REPORT FROM PORTUGAL

INSTITUTO HIDROGRÁFICO
(IHPT)

9th SAIHC Meeting
18 - 19 September 2012, Mauritius

INTRODUCTION

This report describes the main technical activities and developments of the IHPT from July 2011 to August 2012. It was elaborated in order to be presented to the 9th SAIHC Meeting and specially covers the following areas: Hydrography, Cartography, Information Technologies and GIS, Marine Safety, and Technical Assistance and Training.

1- HYDROGRAPHIC OFFICE

All the information is included in Annex Alfa.

2- SURVEYS

Hydrographic surveys are conducted, mainly, with multibeam systems. Nevertheless, several single beam echosounders are used. Positioning is obtained using GNSS (Differential or RTK/OTF).

Single beam echosounders with digital output (ATLAS DESO 20/22/25, MARIMATECH E206, and KNUDSEN 320 M) are used with automated data acquisition systems (HYPACK). Values of sound speed in the water for calibration are collected by sound speed profilers (APPLIED MICROSYSTEMS SVP-16 and SVP PLUS) and ATLAS calibration transducers are also used. Heave compensation is performed with inertial motion sensors (SEATEX MRU5 or MRU H).

Data is acquired and processed with the same application (HYPACK). For presentation and archive purposes, the data is transferred to CARIS GIS format.

IHPT presently operates several multibeam echosounder systems (MBES): two portable systems for shallow waters (KONGSBERG EM 3002) and two gondola mounted systems for deep waters (KONGSBERG EM 120) on the hydrographic ships “D. Carlos I" and “Almirante Gago Coutinho”. Hydrographic ship “Almirante Gago Coutinho” also has a multibeam system for coastal surveys (KONGSBERG EM 710).

All multibeam systems include one SEATEX SEAPATH 200 or SEAPATH 200 RTK (for positioning, heading, pitch, roll and heave measurements), one sound speed sensor at the transducer (APPLIED MICROSYSTEMS SMART PROBE) and a sound speed profiler (APPLIED MICROSYSTEMS SVP-16 or SVP PLUS). Data processing is done with CARIS HIPS.

Coastal topography and horizontal control is done, mostly, with geodetic GPS methods, including kinematics positioning and RTK/OTF (with TRIMBLE 4000/5700/5800 series).

Sometimes, hydrographic surveys are complemented with low tide beach GPS surveys. Nevertheless, topographic total stations (LEICA TC 305 and LEICA TC 1800) are also used to complement GPS observations. Data processing is performed with TRIMBLE software (TRIMBLE Geomatics Office).

Procedures (planning, execution and processing) of hydrographic surveys within the IHPT are in accordance with the IHO Special Publication S-44 (5th Edition, 2008). Special attention has been paid to the development of procedures for Quality Assurance (QA) and Quality Control (QC) of hydrographic data. These include: uncertainty budgets, analysis of digital terrain model based in raw data, statistical analysis per beam and analysis of the spatial and temporal variation of sound speed profiles on depth measurement and positioning.

Most of the hydrographic surveys were conducted in specific coastal areas and inside harbours and their approaches.

Hydrographic ships “D. Carlos I” and “Almirante Gago Coutinho” continue to be employed on data acquisition to complement the project of the extension of the Portuguese Continental Shelf, presented to the United Nations Organization on May 2009. These ships are still involved in several research projects in cooperation with national research institutions and in surveys for cartographic production and update.

Some surveys for environmental studies were also carried out. On such surveys, hydrographic and topographic integrated methods were used and simultaneous wave, tidal and current data were acquired. In some cases, these surveys included light seismic methods and sediment and water analysis.

IHPT batymetric database, the Hydrographic Data Warehouse (HDW), which uses an ORACLE database management system, continues to be uploaded with all the bathymetric data available. Due to the limitations in the system update and to have capability to manage the bathymetric surfaces, IHPT is starting to prepare is replacement.

3- NEW CHARTS AND UPDATES

Since mid 2004, nautical paper chart production at IHPT is done entirely using a Computer Assisted Cartography system (CAC). All charts are stored in digital support, which is also used for Electronic Navigational Charts production.

IHPT also produces nautical charts for special purposes, for instance: charts for fishermen, charts for pleasure crafts, sedimentological charts and special charts for training purposes. All those charts are in accordance with IHO specifications and were very well accepted from end 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.

The production of ENC cells is mainly done using software produced by Seven-C's (ENC Tools) and HydroServices (dKart Inspector). IHPT cells format is S-57/Edition 3.1.

The final validation of ENC cells is made with ECDIS software ECPINS-M. The Portuguese Navy ships equipped with ECDIS continuously verify IHPT ENC cells in real navigation conditions.

IHPT is a member and participates actively in the works of the International Centre for ENCs (IC-ENC), including in their Technical Experts Working Groups. Presently, 82 Portuguese ENC cells are available for distribution through IC-ENC, charting all oceanic and coastal waters of Portugal (total coverage was achieved in the end of 2010), as well as main harbours and their approaches, and the coasts of Cape Verde, Angola and Mozambique.

The issuing of Notices to Mariners (NtM), which affect paper charts and ENC cells, is coordinated with the release of ENC CDs by the IC-ENC. ENC updates contain all permanent, preliminary, and temporary warnings in force. Unfortunately, due to lack of information provided to IHPT from those countries ENCs produced from Cape Verde, Angola and Mozambique are not updated.

IHPT continues the implementation, now in a mature stage, with several Nautical Charts and ENC cells produced each year, of the second generation of Computer Assisted Cartography, CARIS – Hydrographic Production Database (HPD), which allows a full integration of the cartographic production, both paper charts and ENC cells. HPD works with an ORACLE 9i database management system and provides a single and seamless database for all the cartographic information available at IHPT.

Following the full digital cartographic process, since middle 2004, IHPT is using Print-on-Demand (PoD) system to print the Nautical Charts, as well as their sub products, upon request by the users. Presently IHPT provides 85% of national Nautical Charts using this process. PoD-charts are continuously updated according to the published “Notices to Mariners”.

IHPT concluded in January of 2012 a folio of six charts to support the fishing activities. Those charts cover the general coastal area of Continental Portugal at a scale of 1:150000 and have an additional layer of sedimentology with relevant seabed information for fishermen.

IHPT is also migrating the Nautical Charts reference system to WGS84. Presently 66% of national Nautical Charts have been published on WGS84. However, it will take more 2 or 3 years to convert all the Portuguese paper chart folio.

On the SAIHC region IHPT has produced two ENC cells (usage band 2) corresponding to two small scales INT charts of Mozambique and Angola coasts (see figure 1).

In 2013 IHPT plans to publish five INT charts from the coast of Angola (2814, 2550, 2560, 2570 and 2580) in co-production with the UKHO. Those charts have a 1:200 000 scale (see figure 2).

Figure 1 – ENC cells of Angola and Mozambique produced in 2008

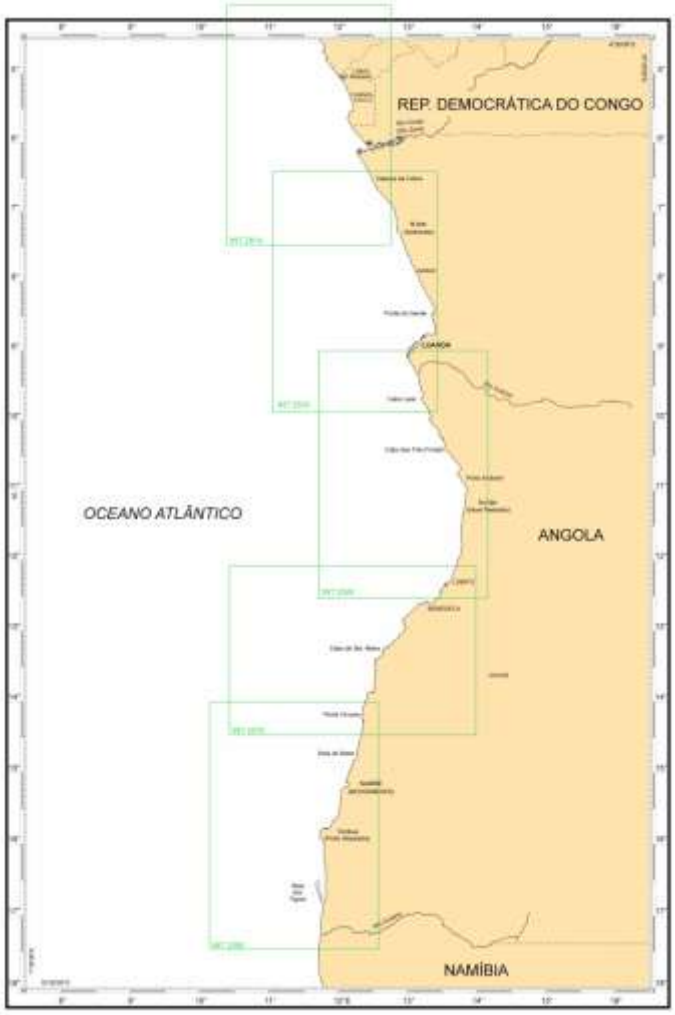

Figure 2 – Nautical Paper Charts of Angola planned to 2013

4- NEW PUBLICATIONS AND UPDATES

Nil.

5- MARTIME SAFETY INFORMATION

IHPT, as national coordinator for Maritime Safety Information, provides a 24-hour 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 Monsanto (near Lisbon) and from Horta (in the Azores Archipelago) stations. Madeira Archipelago NAVTEX will be established in the near future (Porto Santo Station). Replacement of current stations is developing under on the execution of the Portuguese GMDSS procurement program, approved last June.

The GMDSS coverage is not completed yet due to delays on the establishment of Digital Selective Call capability, which are expected to be solved in a near future.

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, Cabo Verde, Guiné and São Tomé e Príncipe, and is also available on the web site (http://www.hidrografico.pt).

IHPT on-line application - ANAVnet, 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 glue 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. Access to this web service has been increasing every year. Some reports and feedbacks from leisure mariners and fisherman have pointed out that ANAVNET is a valuable and very flexible application.

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 the Portuguese Archipelagos: one in the Azores Archipelago (Horta station) and another one in Madeira Archipelago (Porto Santo station).

AIS coastal stations are operational since the summer of 2006, both in Azores and Madeira Archipelagos. For the continental coast of Portugal, this system started this year in parallel with the coastal VTS.

6- CAPACITY BUILDING

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

ANGOLA

- IHPT established contacts with the Director of IHSMA (Hydrographic and Maritime Signalization Institute of Angola), Angola's HO, related to the future collaboration between IHPT and IHSMA. An agreement of collaboration was proposed to develop IHSMA hydrographic capacity. A proposal was also presented to execute the hydrographic and topographic surveys of the most important Angolan harbours and to produce the respective Nautical Paper Charts and ENC's.

- An IHO capacity building advisory visit is planned to November of 2012 with the participation of one hydrographer from IHPT.

MOZAMBIQUE

- The Director of INHAHINA (Mozambique's HO) visited IHPT in November 2009 under the Bilateral Agreement between Mozambique and Portugal in the field of Hydrography, Nautical Cartography, Safety of Navigation and Oceanography. A collaboration program was established including nine action items to be realized during three years 2010-2012 to increment INHAHINA's capabilities in the mentioned areas.

However, due to financial constraints some of the action items were not achieved.

- An IHO capacity building advisory visit is planned to October of 2012 with the participation of one hydrographer from IHPT.

Portugal is presently chairing Eastern Atlantic Hydrographic Commission (EAtHC) and has a strong commitment to improve capacity building activities in that region.

7- 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. As contributed to the development of the renewal energy testing in Portugal through the characterization of wave and weather regimes.

IHPT is running, presently, a comprehensive network of tide gauges (17), wave and multiparametric buoys (7) and coastal weather stations (3) in the Portuguese EEZ. A HF radar system to measure superficial currents and waves is also being operated by IHPT along the Portuguese coast (3 stations).

8- OTHER ACTIVITIES

a. Information technologies and GIS

IHPT has various Internet portals (www.hidrografico.pt, gis.hidrografico.pt) presenting information about its organization, main activities, products offered, and specific on-line data freely available in some extent. IHPT also provides several geographic data services on-line.

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

Databases and related applications are being developed using ORACLE software. They

include not only hydrographic and cartographic applications but also environmental and coastal management products. The core of this system is IDAMAR which is a geographic information infrastructure for marine environment under development at IHPT dealing with technical and scientific data within IHPT. Main IDAMAR's development objectives are to improve internal production processes and to support operational, planning and strategic decision-making. Its core is an Oracle Spatial database management system that is explored in several ways producing tables, charts, web pages and reports, and feeding several GIS packages.

This system is also being used to support IC-ENC by providing a world ENC availability catalogue.

Lisbon, 7th September 2012

ANNEX ALFA

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, Analogue and Digital Nautical 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. Provision of geophysical and environmental information for scientific and defence issues
National day - *Fête nationale – Fiesta nacional*	10 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*	Vice-admiral Agostinho Ramos da Silva, Director General
Tonnage – *Tonelaje*	2012 = 1 371 496
Total Budget - *Budget total – Presupuesto Total*	10 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*	225
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.*	34 82
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; - 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	34
Almirante GAGO COUTINHO	2285	1985	34
ANDRÓMEDA	245	1985	13
AURIGA	245	1987	13
ATLANTA	38.7	1981	3
CORAL	38.7	1981	3
FISÁLIA	38.7	1981	3
Other information of interest – *Autres informations utiles - Otra información de interés.*	The School of Hydrography and Oceanography provides Hydrographic courses of category A and B.		