SPAIN

NATIONAL REPORT

TO THE 15th MEETING OF THE EASTERN ATLANTIC HYDROGRAPHIC COMMISSION (EAtHC)

LAGOS, NIGERIA
17 – 19 OCTUBRE 2018

1. Hydrographic Service

Instituto Hidrográfico de la Marina, Spanish Navy Hydrography Office (IHM), did not have significant organization changes since last EAtHC meeting.

In June 15, 2018 Captain José Daniel González-Aller Lacalle assumed a position as Commander-Director of the Spanish Hydrographic Office, relieving to Captain Juan Antonio Aguilar Cavanillas.

IHM Website http://www.armada.mde.es/ihm presents more detailed information about our mission, organization structure and assets.

The following report covers the period starting November 2016 up to September 2018.

2. SURVEYS

2.1. Coverage of new surveys

In the past two years and for the purpose of updating the bathymetry of our national nautical chart scheme in the Atlantic Ocean, IHM conducted 24 surveys in this area with the ships and small boats of the Hydrographic Flotilla. More specifically, nine surveys were performed in the Gulf of Cadiz (west of the Strait of Gibraltar), four in the Bay of Biscay, and two in the vicinity of the Strait of Gibraltar. In addition to this, four more surveys were conducted in the estuary of the Guadalquivir and Guadiana River, close to the border with Portugal and another one in Tenerife (Canary Islands).

Figure 1. "Malaspina" class Hydrographic Vessel

Figure 2. Coastal Hydrographic Vessel BH Antares

Surveying the major ports of Spain and their approaches has been a priority for IHM. For this kind of works in shallow and very shallow waters where safety to navigation with heavy shipping traffic is a concern, IHM extensively used multibeam echosounders (MBES) and Phase Differencing Bathymetric Sonar Systems (PDBSS) to assure a complete exploration of the seafloor along with high precision positioning systems to minimize uncertainties in the soundings. This way the IHO standards for Special and 1a Order surveys were met. The same equipment and similar methodology were employed for IHO 1b and 2 Order surveys.

Figure 3. Transportable Hydrographic Launch LHT Escandallo

Figure 4. Very shallow water bathymetry system operated from a small rubber boat

Besides the mentioned hydrographic surveys, IHM participated in the Spanish Exclusive Economic Zone (EEZ) exploration, leading the seafloor surveys. This is a long term multidisplinary project developed by IHM in cooperation with other national institutions and universities and conducted on board the Oceanographic Research Vessel *Hespérides*. This platform is usually assigned one month a year for this mission. In 2016 and 2017, *Hespérides* carried out researches in the Spanish EEZ surrounding the Canary Islands.

Figure 5. Spanish Navy Oceanographic Research Vessel "Hespérides"

Spain presented the report of the Eastern Atlantic Hydrographic Commission during the I Assembly of the OHI in Monaco, April 2017.

The IHO Secretariat commented that the information regarding joint surveys provided in the presentation of the Report was very encouraging.

Spain responded that the collaboration between Portugal and Spain was expected to provide clear results in a few months and was a very good example of international collaboration in the regions.

Survey planning

IHM surveys were conducted in accordance with the current IHO standards (IHO S-44 5th edition) for the corresponding Order type and purpose of each navigational area. Detailing these general indications, specific instructions were regularly promulgated by the Hydrographic Division as a set of "Manuals" and "Hydrographic Permanent Instructions". These directions help IHM hydrographers use the equipment, increase efficiency and reduce the time required to complete the workflow from the planning of a survey, the at-sea works and the following processing and validation of data.

2.2. New technologies and / or equipment

During the past two years, IHM continued to acquire new equipment and develop new procedures.

The main acquisition and technical procedural effort was in RTK positioning. Transportable Hydrographic Launches *LHT Escandallo* and *LHT Astrolabio* were fitted with GPS RTK positioning equipment and the corresponding user's procedures were prepared. The Guadalquivir River surveys were executed with this positioning technique.

2.2.1. Echosounders

- Both Hydrographic Vessels *Tofiño* and *Malaspina* are currently fitted with two MBES each in full operation. This allows them to perform surveys in shallow and deep waters from 20 up to 5000 meters.

- *BH Malaspina* is fitted with *Kongsberg* EM302 and EM 3002 MBES.

- *BH Tofiño* has the MBES EM300 and EM 3002.

- For very shallow water surveys, both vessels are provided with *Kongsberg Geoswath*+ PDBSS to be fitted on their small launches.

- Coastal Hydrographic Vessel *BH Antares* was fitted in 2012 with a *Kongsberg* EM2040. This allows her to achieve Full Sea floor Search from very shallow to shallow waters up to 300 meters. For very shallow water surveys, she is

provided with *Kongsberg Geoswath+* PDBSS to be fitted on her small launches.

- All the *Kongsberg Geoswath+* PDBSS mentioned are shared among the vessels of the Hydrographic Flotilla. IHM has a total of two *Geoswath+ 500* for shallow waters up to 50 meters and one *Geoswath+ 250* for waters up to 80 meters.

- *LHT Astrolabio* is fitted with a *Kongsberg EM2040 Compact* MBES with *Seapath 330* (RTK positioning capable).

- *LHT Escandallo* is fitted with a *Kongsberg EM3002D* MBES. In September 2016 she has been fitted with a *Seapath 330* (RTK positioning capable).

- *LHT Sondaleza* has no permanent echosounder installed and can be fitted either with a *Kongsberg Geoswath+* PDBSS or a RESON T20P when deployed.

2.2.2. Bottom mapping sonars

- IHM's bottom mapping capability is based on several Side Scan Sonar (SSS) systems.

- A *Klein 3900* Side Scan Sonar, with the capability of being fitted with a magnetometer, was acquired in 2012 and is in operation ever since. This equipment is shared among the vessels of the Hydrographic Flotilla.

- For shallow waters, all three *Geoswath+* PDBSS available for the Hydrographic Flotilla small boats, have side scan imaging capability. Both bathymetry and side scan image is acquired during surveys with this equipment. This allows for precise georeferenced bottom images.

- Small boats are also fitted with pole-mounted *Starfish* SSS for very shallow water surveys.

2.3. New Ships

There are no new units in the Hydrographic Flotilla since last EAtHC report. There are plans for a new vessel but no date or budget has already been assigned for.

3. NEW CHARTS & UPDATES

3.1. ENCs

3.1.1. Production

Up to September 26, 2018, the IHM has produced 29 ENCs within the area of the EAtHC (out of a total of 110 published for all areas). Table 1 and 2 shows the distribution according to their navigational purpose:

Purpose 2	Purpose 3	Purpose 4	Purpose 5	Purpose 6
General	Coastal	Approach	Harbour	Berthing
2	1	2	23	1

Table 1. Distribution of ENC production in the EAtHC area

EAtHC ENC Production until September 26, 2018					
Purpose	**Total**	**Published**	**Pending**	**% Published**	**% Pending**
2	2	2	0	100%	0%
3	11	11	0	100%	0%
4	38	38	0	100%	0%
5	97	83	14	85,5%	14,5%
6	14	1	13	7%	93%
Total	**162**	**135**	**27**	**78,5%**	**21,5%**

Table 2. Distribution of ENC production and percentage in the EAtHC area

Since the date of the last meeting 7 new ENCs and 22 new editions have been produced within the EAtHC area. This shows the increasing workload associated with maintaining and updating the ENC catalog, which slows the production of new ENCs.

Tables 3 and 4 shows the new editions/ENC's within the EAtHC published since the date of the last meeting.

NEW EDITIONS FROM 15/09/2016 TO 26/09/2018		
NUMBER	**TITLE**	**ED.**
ES201080	Golfo de Vizcaya	4
ES201082	De Casablanca a Cabo Yubi	3
ES400412	Aproches de las Rías de Ferrol y La Coruña	5
ES400443	Aproches de Cádiz y Rota	6
ES30044B	De Punta del Gato a Sancti-Petri	8
ES503942	Ría de Santoña	2
ES504083	Puertos Espasante, Ortigueira y Cariño	2
ES504081	Puertos de Burela y San Cibrao	3
ES504126	Puerto de La Coruña	5

ES504167	Puertos de Panxón y Baiona	2
ES503931	Puertos de Mundaka y Bermeo	2
ES504131	Ría de Corme y Laxe	2
ES504153	Puerto de Villagarcía de Arousa	3
ES504450	Puerto de Tarifa	5
ES504011	Puerto de Santander	5
ES504042	Puerto de Gijón	5
ES504165	Puerto de Vigo	4
ES504052	Ría de Avilés	3
ES504430	Puerto de Cádiz	5
ES506010	Puerto de Arrecife	3
ES506120	Puerto de Santa Cruz de Tenerife	4
ES504052	Ría de Avilés	4

Table 3. New ENC editions produced since the date of the last EAtHC meeting.

NEW ENC's FROM 15/09/2016 TO 26/09/2018		
NUMBER	**TITLE**	**ED.**
ES561102	Puertos de Puerto Rico y Anfi de Mar	1
ES561103	Puerto de Arguineguín	1
ES547401	Puerto de Morayra	1
ES560101	Puerto de Corralejo	1
ES539302	Puerto de Elantxobe	1
ES561101	Puerto de Mogán	1
ES604433	Puerto de la Base Naval de Rota	1

Table 4. New ENC cells produced since the date of the last EAtHC meeting

Next figures show the new ENC cells and editions within the EAtHC published since the date of the last meeting.

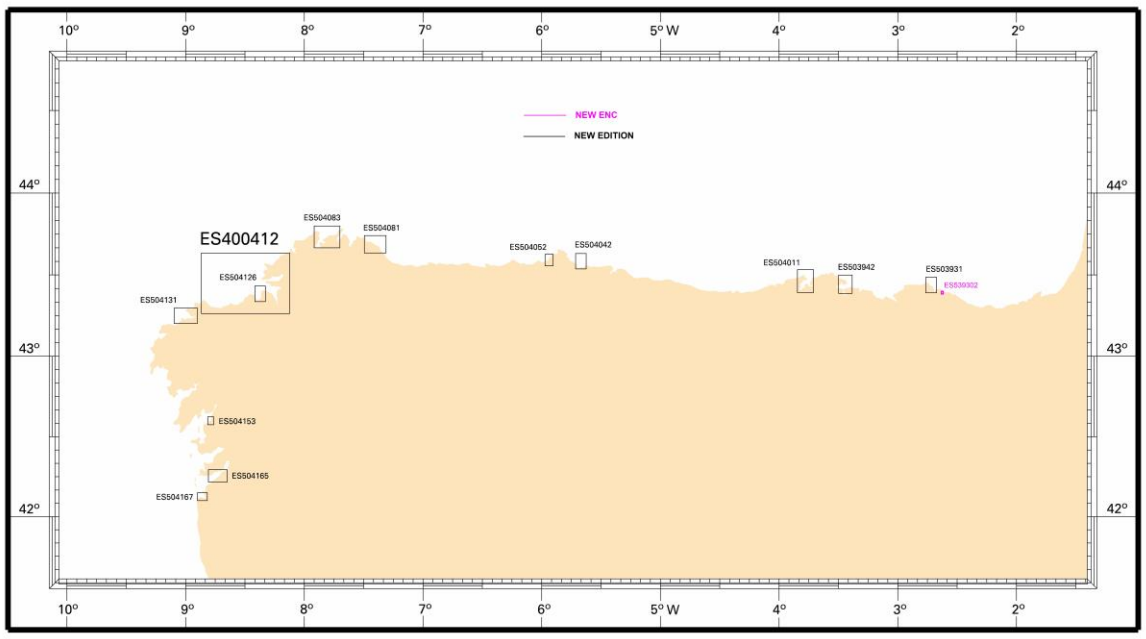

Figure 6. New ENC cells and editions produced in North of Spain since the date of the last EAtHC meeting (purposes 4, 5 and 6)

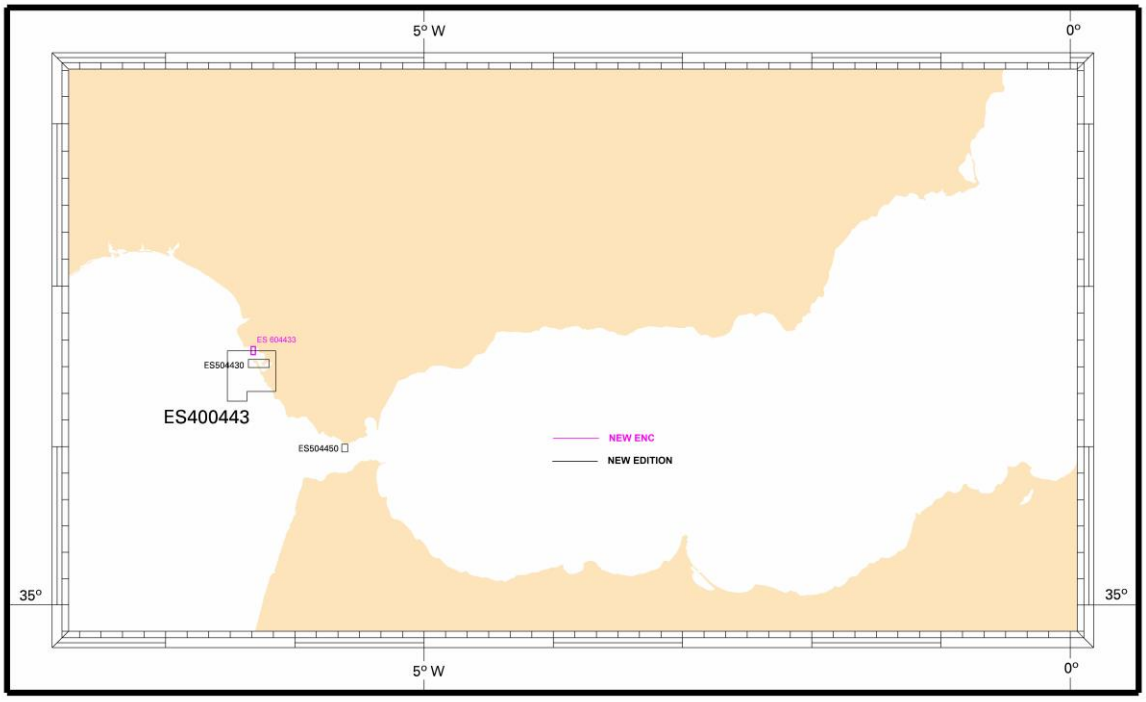

Figure 7. New ENC cells and editions produced in Gulf of Cádiz since the date of the last EAtHC meeting (purposes 4 and 5)

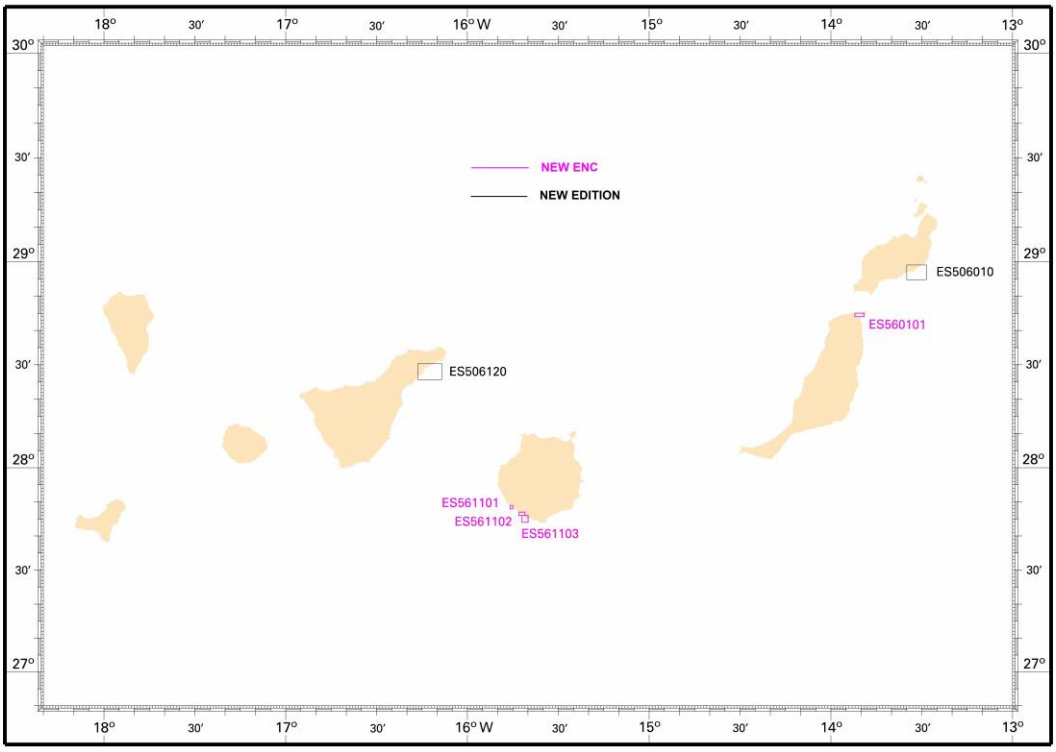

Figure 8. New ENC cells and editions produced in Canary Islands since the date of the last EAtHC meeting (purposes 4 and 5)

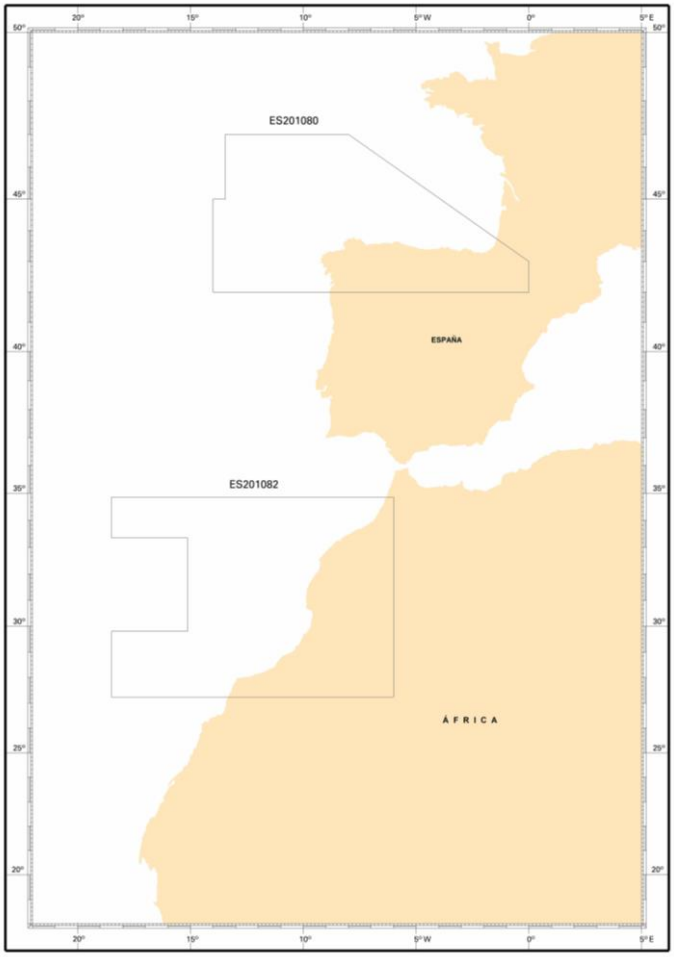

Figure 9. New ENC editions Purpose 2 produced since the date of the last EAtHC meeting

During the present year the first ENC Purpose 6 has been published within the EAtHC area.

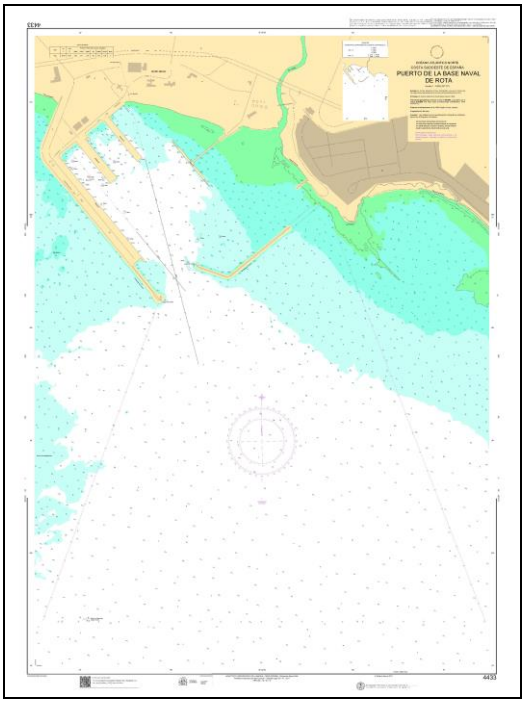

Figure 10. First Purpose 6 ENC published in EAtHC area

The objectives that we will face are to complete the project finishing Purpose 5 cells left, and continue with the Purpose 6 cells project to cover major Spanish ports.

3.1.2. Cooperation

Under the cooperation with the IC-ENC and PRIMAR RENCs, IHM continues to exchange all the ENC information needed with Portugal (IHPT) and France (SHOM) in order to accomplish with the IHO recommendations regarding horizontal and vertical consistency on the adjacent ENC.

3.2. ENC Distribution method

IHM is a member of the IC-ENC RENC, which carries out ENC validation and consistency checking before distribution, and distributes the ENCs via its chain of Value Added Resellers (VARs).

3.3 RNCs

NTR.

3.4 INT paper charts

Up to September 26, 2018, the IHM has produced 6 new editions (NE) of INT paper charts within the area of the EAtHC (out of a total of 18 published for all areas). Table 5 and figure 11/12 show these NE.

NUM (INT)	SCALE	TITLE
4411 (INT 1904) (NE)	1/25 000	Barra y Puerto de Huelva
4430 (INT 1903)(NE)	1/12 500	Puerto de Cádiz
4431 (INT 1904) (NE)	1/12 500	Puertos de Rota, Base Naval de Rota y El Puerto de Santa María
81 (INT 1935) (NE)	1/350 000	De cabo Trafalgar a punta Europa y de Ceuta a Kenitra (Port Lyautey)
82 (INT 1936) (NE)	1/350 000	De Kenitra a cabo Beddouza (Cantin)
5G (INT 2088) (NE)	1/1 000 000	De Lagos a Gambia

Table 5. INT paper charts published since the date of the last EAtHC meeting

Figure 11. Peninsula Ibérica.

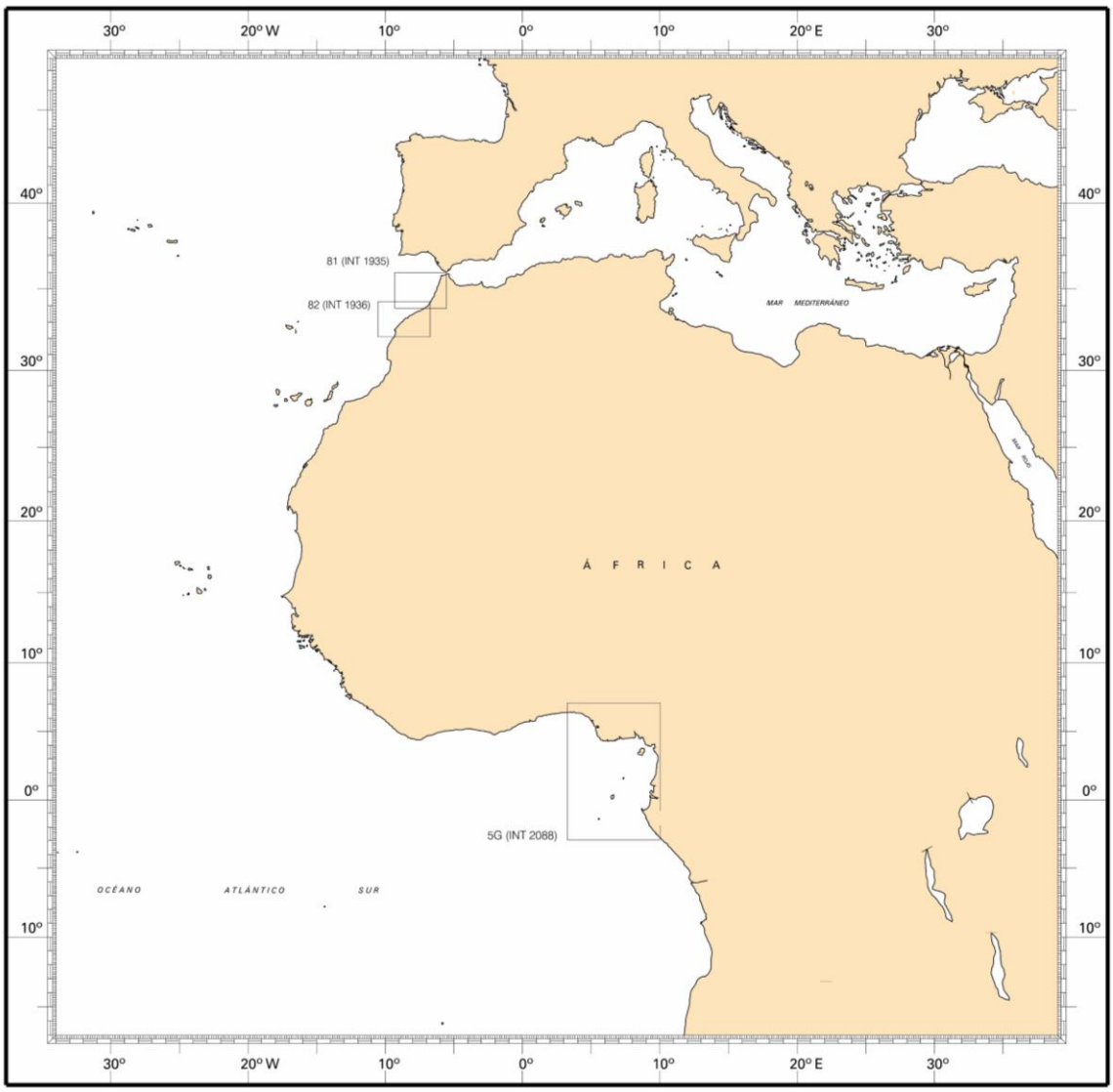

Figure 12. Africa

3.5 National paper charts

Since the date of the last meeting, within the area of the EAtHC, a number of national paper charts have been published. These are 5 new editions and 1 new chart (NC). These charts are either produced from national data or adopted from charts produced by other Hydrographic Offices. All of them are shown in Table 6 and figure 13.

NUM	SCALE	TITLE
4421 (NE)	1/12 500	Broa de Sanlúcar y fondeadero de Bonanza
4422 (NE)	1/12 500	Del Caño de Enriquez al Caño de San Carlos
4424 (NE)	1/12 500	Del Caño de la Lisa a la Atravesada del Rincón
4425 (NE)	1/12 500	De la Huerta del Rincón al puente de San Telmo

4433 (NC)	1/5 000	Puerto de la Base Naval de Rota
440A (NE)	1/25 000	Desembocadura río Guadiana y ría de Isla Cristina

Table 6: National paper charts published since the date of the last EAtHC meeting

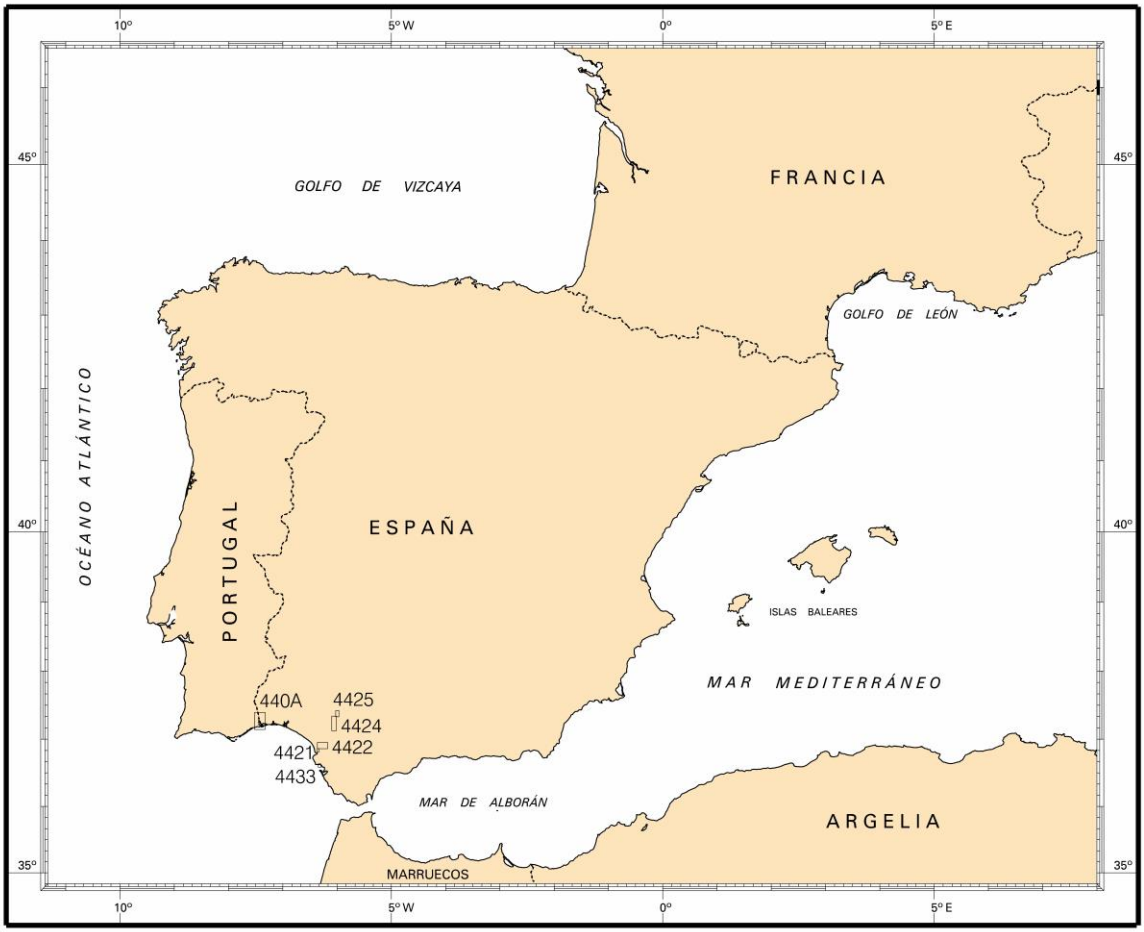

Figure13. Peninsula Ibérica

3.6 Problems encountered

Even though the Spanish catalogue lists nautical charts covering part of the western African coast, no systematic surveys have been carried out by IHM in that area for decades, except for soundings of opportunity when vessels transit between the Iberian Peninsula and the Canary Islands. Therefore, no data are available for IHM to publish up-to-date editions of the existing charts.

3.7 Updates INT Catalogue.

During this period, it has been made cartographic updating of the INT charts assigned to Spain in the region G, according to the catalogue INToGIS.

4. NEW PUBLICATIONS AND UPDATES

4.1. New publications

NTR.

4.2. Updated publications

Edition in Spanish of the IHO S4 Publication, “Regulations of the IHO for International (INT) Charts and Chart Specifications of the IHO”, Edition, 4.7.0 (2017).

Edition of the Spanish Catalog of Nautical Charts and other publications, 2017 and 2018 editions.

Figure 14. Catalogue of Nautical Charts and other Publications

Edition in Spanish of the IHO publication INT 1 “Symbols, abbreviations and terms used on charts, 6th edition, 2018”.

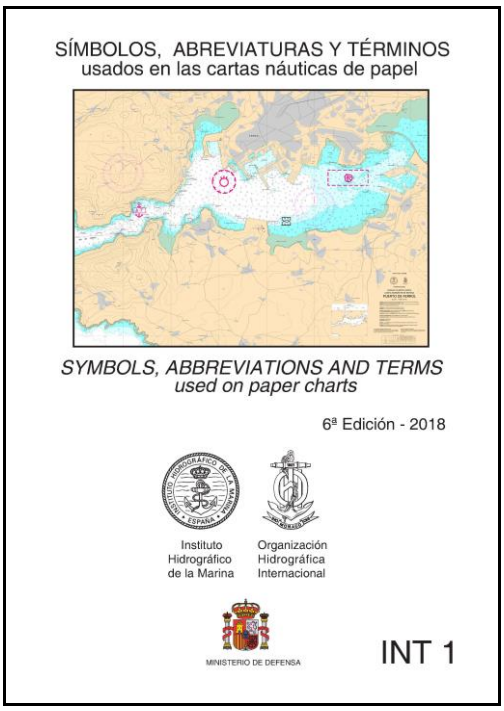

Figure 15. Publication INT 1

Sailing Directions:

Sailing Directions num.1, 2018 edition. North Coast of Spain, from Río Bidasoa to Ría de Ribadeo.

Sailing Directions num. 2, 2018 edition. North and Northwest Coast of Spain, from Ría de Ribadeo to Cabo Finisterre.

Sailing Directions num.3, 2018 edition. Northwest Coast of Spain, from Cabo Finisterre to Rio Miño.

Sailing Directions num.4, 2018 edition. Coast of Portugal and Açores Islands.

Sailing Directions num. 5, 2018 edition. Southwest and South Coast of Spain, from Río Guadiana to Cabo Sacratif including the North and South Coasts of Gibraltar Strait.

Sailing Directions num. 9, 2018 edition. Northwest Coast of Africa, from Cabo Espartel to Cabo Verde, including Madeira, Selvagens and Cabo Verde Islands.

Sailing Directions num. 10, 2018 edition. Canary Islands.

List of Lights:

List of lights and fog signals, part I, 2018 edition. Coasts of Spain and Portugal on the Atlantic Ocean, Africa West Coast from Cabo Espartel to Cape Verde (Senegal), Azores Islands, Madeira, Canary Islands and Cape Verde.

List of lights and fog signals, part II, 2018 edition. Gibraltar Strait, Balearic Islands and Mediterranean coasts of Spain, Morocco and Algeria.

Radiosignals, 2018 edition.

4.3. Means of delivery.

A digital version of the publication List of Lights and Fog Signals is available online in the following internet address**:**

http://www.armada.mde.es/ihm/Aplicaciones/LibroFaros/V3/index.html

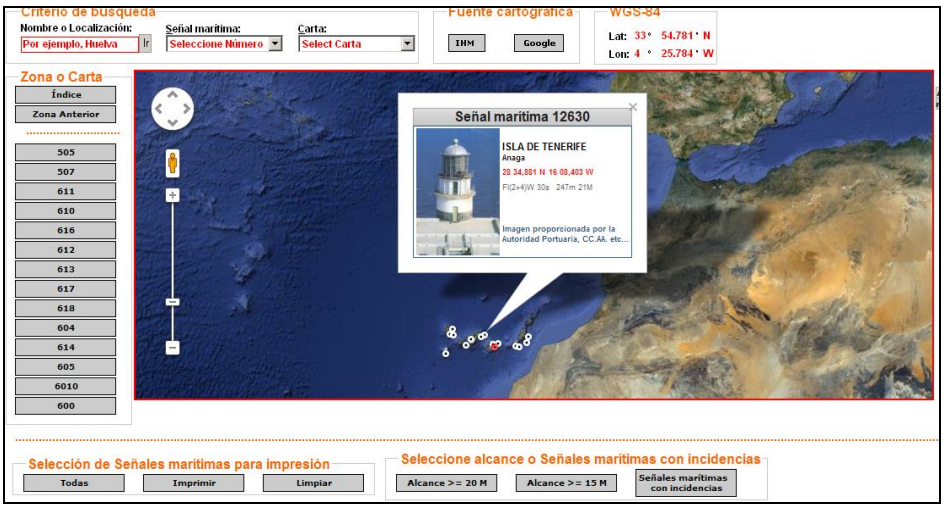

Figure 16. Screenshot of the List of Lights and Fog Signals interactive tool

5. MSI

5.1 Existing Infrastructures for transmission.

National Coordinator and NAVTEX Coordinator: Spanish Maritime Safety Agency (SASEMAR).

NAVTEX Stations:
Las Palmas [I] English, [A] Spanish
La Coruña [D] English, [W] Spanish
Tarifa [G] English, [T] Spanish.

NAVAREA III Coordinator: Spanish Hydrographic Institute (IHM).

There is a fluid exchange of NAVAREA warnings between NAVAREA III Coordinator and NAVAREA II Coordinators.

Portugal and Morocco exchange MSI with SASEMAR to promulgate coastal warnings mainly from Tarifa NAVTEX Station.

Likewise, the IHM receives MSI from Morocco, which is passed to SASEMAR to transmit as coastal warning from the NAVTEX stations, or is promulgated by the IHM as NAVAREA warning by SafetyNET.

5.1.2. SAR Organisation

Coordinator: SASEMAR through its National Centre (CNCS) in Madrid, and 19 Maritime Rescue Coordination Centres (MRCCs) located along the coast line of the Peninsula Iberica, Canary and Balearic Islands.

5.2. New infrastructure in accordance with GMDSS Master Plan

NTR.

5.3. Problems encountered.

NTR.

6. C-55

6.1. SPAIN. CHARTING REGION G

6.1.1. Hydrographic Surveying

Survey coverage, where:

A = percentage which is adequately surveyed.

B = percentage which requires re-survey at larger scale or to modern standards.

C = percentage which has never been systematically surveyed.

	A	B	C
Dephts < 200 m	69	31	0
Dephts > 200 m	95	0	5

6.1.2. Nautical Charting

Status of nautical charting within the limits of the EEZ

A = percentage covered by INT series, or a paper chart series meeting the standards in S-4.

B = percentage covered by Raster Navigational Charts (RNCs) meeting the standards in S-61.

C = percentage covered by ENCs meeting the standards in S-57.

Purpose/ scale	**A**	**B**	**C**
Offshore passage/ Small	100	0	100
Landfall and Coastal passage/ Medium	100	0	100
Approches and Ports/ Large	100	0	86

Regarding to ENC large scale coverage is important to notice that current percentage (86%) has been calculated over the new ENC production project, which aims to cover all national main and secondary ports.

6.1.3. Maritime Safety Information (MSI).

NAVIGATIONAL INFORMATION (S-53)

SERVICE	Yes	No	Partial	Notes
Local Warnings	X			Via SASEMAR
Coastal Warnings	X			Via SASEMAR
NAVAREA Warnings	X			Via NAVAREA II Coordinator
Port Information	X			Port Authorities

GMDSS IMPLEMENTATION (IMO Publication 970–GMDSS Manual)

SERVICE	Yes	No	Partial	Notes
Master Plan	X			
Area A1	X			
Area A2	X			
Area A3	X			
NAVTEX	X			
SafetyNET	X			

6.2. SPAIN. CANARY ISLANDS, CHARTING REGION G

6.2.1. Hydrographic Surveying

A = percentage which is adequately surveyed.

B = percentage which requires re-survey at larger scale or to modern standards.

C = percentage which has never been systematically surveyed.

	A	B	C
Dephts < 200 m	40	60	0
Dephts > 200 m	65	0	35

6.2.2. Nautical Charting

Status of nautical charting within the limits of the EEZ

A = percentage covered by INT series, or a paper chart series meeting the standards in S-4.

B = percentage covered by Raster Navigational Charts (RNCs) meeting the standards in S-61.

C = percentage covered by ENCs meeting the standards in S-57.

Purpose/ scale	A	B	C
Offshore passage/ Small	100	0	100
Landfall and Coastal passage/ Medium	100	0	100
Approaches and Ports/ Large	100	0	94

Regarding to ENC large scale coverage is important to notice that current percentage (94%) has been calculated over the new ENC production project, which aims to cover all national main and secondary ports.

6.2.3. Maritime Safety Information (MSI).

NAVIGATIONAL INFORMATION (S-53)

SERVICE	Yes	No	Partial	Notes
Local Warnings	X			Via SASEMAR
Coastal Warnings	X			Via SASEMAR
NAVAREA Warnings	X			Via NAVAREA II Coordinator
Port Information	X			Port Authorities

GMDSS IMPLEMENTATION (IMO Publication 970–GMDSS Manual)

SERVICE	Yes	No	Partial	Notes
Master Plan	X			
Area A1	X			
Area A2	X			
Area A3	X			
NAVTEX	X			
SafetyNET	X			

7. Capacity Building

7.1. Offer of and/or demand for Capacity Building

The Spanish Hydrographic School, located within the premises of the IHM, offers both hydrographic surveyor Category A and B courses. These courses are 10-month long and are taught in Spanish. Minimum academic enrolling requirements should be fulfilled.

On April 2013 the Specialization Programs in Hydrography & Oceanography for Naval Officers (Cat A) and for Petty Officers (Cat B) were revalidated and recognized by the FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers. In the year 2019 the specialization programs in hydrography and cartography will be renewed

The following is a list of the students who have attended these courses in the last four academic years:

Cat A:

Academic year 2018-2019.

- 2 Officers from the Spanish Navy
- 1 Officer from Mauritania
- 1 Officer from Tunisia
- 1 Officer from Cabo Verde

Academic year 2017-2018.

- 2 Officers from the Spanish Navy
- 1 Officer from Argentina

Academic year 2016-2017.

- 2 Officers from the Spanish Navy
- 1 Officer from Mauritania
- 1 Officer from Morocco
- 1 Officer from Argentina
- 1 Officer from Uruguay

Academic year 2015-2016.

- 2 Officers from the Spanish Navy
- 1 Officer from Algeria
- 1 Officer from Morocco

Cat B:

Academic year 2018-2019

- 3 Petty Officers from the Spanish Navy

Academic year 2017-2018

- 4 Petty Officers from the Spanish Navy

Academic year 2016-2017.

- 3 Petty Officers from the Spanish Navy

Academic year 2015-2016.

- 3 Petty Officers from the Spanish Navy
- 1 Petty Officer from Morocco

To date, all the students taking the fore mentioned courses are military personnel. The attendance of non-Spanish students is offered though a *Collaboration Agreement with regard to military training*, signed between the Spanish Ministry of Defense and other countries. This agreement provides grants for the attendance to the abovementioned courses.

The point of contact for these matters is generally the Defense Attaché to the corresponding Spanish Embassy.

7.2. Training received, needed, offered

Currently there are several Spanish officers who are attending different master:

- Master in Geographical Information Quality Evaluation and Management. (University of Jaen) from September 25, 2017 to November 23, 2018

- Geospatial Information Course. From November 5, 2018 to July 26, 2019. Madrid.

- Master in Advanced Hydrography for Professionals Course, from May 2018 to July 2020. Plymouth.

7.3 Status of national, bilateral, multilateral or regional development projects with hydrographic component. (In progress, planned, under evaluation or study)

Two bilateral agreement with Portugal and France:

- the updated Bilateral cooperation agreement between IHM and “Service Hydrographique et Oceanographique de la Marine” (SHOM) was signed and published in Spanish Offical Bulletin in 2016.
- the updated Bilateral cooperation agreement between IHM and Instituto Hidrografico de Portugal is in progress.

8. Oceanographic activities

8.1. General

IHM has developed an internet access website that includes tidal information of national ports in order to facilitate its exploitation from the Internet. This web page is being continuously improved and it´s not a substitute of Tide Tables.

Installation of permanent tide stations in locations that will improve the current coverage of the national tide gauge network is still in process. Once deployed, it is to share your data with other national bodies studying the tide, and also have their own permanent tide gauges.

A study has been made to know the propagation of the tide along the Gualdalquivir River, in close collaboration with Sevilla Port Authority and the University of Málaga. These data have allowed the development by IHM of a continuous Hydrographic Reference Surface along the river.

The current measurement capacity of the Hydrographic vessel “Malaspina” has been recovered.

Several joint measures have been carried out involving MBES, and magnetic measurements in order to evaluate the volume of iron present in a specific area.

A specific tool is being developed, in collaboration with the University of Cantabria, for the prediction of oceanographic conditions such as surf zone and wave parameters in the beach for a specific area. This tool is part of a development to support amphibious operations. With this university we are also working on the exploitation of data obtained from unmanned vehicles.

8.2. GEBCO/IBC’s activities

NTR.

8.3. Tide gauge network

There is a tidal gauge network all around Spain with more than 40 sensors distributed along the coast. Three out of them belong to IHM, and there is a project to install more in the near future.

8.4. New equipment

Works are being carried out trying to integrate in some of our tide gauges the capability of transmit data in real time. Some hardware has to be acquired.

8.5. Problems encountered

Development of Tides web information has to be improved in order to include historical data as well as metadata.

9. Other activities

9.1. Participation in IHO Working Groups

The IHM takes part in several committees and working groups of the IHO:

- Hydrographic Services and Standards Committee (HSSC)
- Nautical Information Provision Working Group (NIPWG)
- Nautical Cartography Working Group (NCWG)
- Tidal and Water Level Working Group (TWLWG)
- Marine Spatial Data Infrastructure Working Group (MSDIWG)
- World-Wide Navigational Warning Service Sub-Committee (WWNWS)
- Finance Committee (FC)
- Hydrographic Commission on Antarctica (HCA)
- East Atlantic Hydrographic Commission (EAtHC)
- Mediterranean and Black Sea Hydrographic Commission (MBSHC)
- Electronic Nautical Chart Working Group (ENCWG)
- S-100 Working Group (S-100 WG)
- Inter-Regional Coordination Committee (IRCC)
- Council
- Strategic Plan Review Working Group (SPRWG)
- IHO-EU Network Working Group (IENWG)

IHM takes part in several working groups of the NATO:

- Geospatial Maritime Working Group (GMWG).
- Defense Maritime Geospatial Exchange Model (DMGEM).
- AML Co-Production Program (NACPP) (Additional Military Layers).
- Military Oceanography Working Group (MILOC).

IHM Spain is membership of the Council selected by EAtHC in 2017.

During the first Assembly, Spain presented the report of the Eastern Atlantic Hydrographic Commission.

The OHI Secretary stated he was encouraged to see Cameroon had joined the IHO and encouraged joint efforts of the countries in the region to improve navigation and safety in the area. He commented that the information regarding joint surveys provided in the presentation of the Report was very encouraging.

Spain responded that the collaboration between Portugal and Spain was expected to provide clear results in a few months and was a very good example of international collaboration in the regions.

In 2018, Spain and Portugal have presented the new edition of paper charts 440-A (ES) «Desembocadura río Guadiana y ría de Isla Cristina. Ayamonte, Vila Real de San Antonio, Isla Cristina y El Moral», and 26312 (POR) «Barra e Porto de Vila real de Santo Antonio», and all ENC correlated, to the mouth of the Guadiana River in the Spanish town of Ayamonte, on October 9, with the presence of the Ministers of Defense of both countries. The data of these charts come from the joint surveys of both countries, besides using the same vertical references.

9.2. Meteorological data collection

We currently have two weather station deployed. One of them in the Arsenal of Ferrol and the other one in training camp Sierra Retín, with internet access to data.

Additionally, we have three automatic tide gauge stations installed with meteorological sensors, also with internet access to data.

9.3. Geospatial studies

IHM is beginning to develop a continuous Hydrographic Reference Surface (HRS), which is in its first steps waiting for adequate funding. This project attempts to present a vertical reference surface for hydrographic data, and correlate this reference surface with other vertical reference surfaces used for other purposes, such as terrestrial cartography. This project is being development between Portugal and Spain to the Peninsula Iberica.

9.4. Disaster prevention

NTR.

9.5. Environmental protection

IHM continues feeding a database of whale watching with the information received from Navy ships.

IHM recommends noise policies to avoid risk to mammals in the areas of scientific studies where transmissions are made.

9.6 Astronomical observations

NTR

9.7 Magnetic/Gravity surveys

NTR

9.8 MSDI Progress

Within SDI´s, this IHM is a participant in the GT-IDEE (Working Group on Infrastructure of Spatial Data of Spain), tasked with the integration via internet of geographic data, metadata, services and information produced in Spain, to help users locate, identify, select and access such resources via the IDEE geoportal (http://www.idee.es). http://ideihm.covam.es/servicios.html.

Also, the Spanish Central Archive of Cartography (Instituto Geográfico Nacional, IGN)) has been provided with digital information produced by the IHM, including the Spanish coastline at scale 1:50000, straight territorial sea baseline and de Spanish Exclusive Economic Zone in the North-western Mediterranean. This information is available to free download in the following internet address: Centro de descargas del CNIG (IGN).

In addition, the IHM is also developing an own SDI (IDE-IHM), with the purpose to give an answer to the increasing demand of users to have access to nautical information. This IDE-IHM is intended to offer the following services:

- Nautical Chart WMS Service. These services will provide access to some geographical information, which is included in the Spanish IHM official nautical cartography. The data is selected from different proposal of navigation Electronical Nautical Chart (ENC) already produced by the Spanish IHM. The visual representation mimics the standard S52 of IHO, including information for the type standard, adding depths and obstructions.

- WMS/WFS for Spanish Coast line. This service will provide capabilities to display and download the Spanish coastline included in the official nautical cartography (scale 1:50.000).

- CSW Service of Metadata Catalog (Spanish IHM Nautical Chart). This service will provide capabilities of Catalog and searching of metadata files published in the IDE-IHM as WMS Service, WMS Layers, Electronic Nautical Chart (ENC) and Paper Nautical Chart (PNC).

- WMS/WFS for straight territorial sea baseline. This service will provide capabilities to display and download, the straight territorial sea baseline (LBR).

- WMS for Maritime borders. This service will provide capability to display the maritime limits as national territorial waters, contiguous zone, continental platform and exclusive economic zone.

- WMS for IHM cartographic production plan. This service will provide capability to display the Spanish IHM production plan for paper nautical chart and for Electronic Nautical Chart (ENC).