



SPAIN

NATIONAL REPORT

**TO THE 18th MEETING
OF THE MEDITERRANEAN AND BLACK
SEA HYDROGRAPHIC COMMISSION
(MBSHC)**

**ISTANBUL, TURKEY
25 - 27 SEPTEMBER 2013**

1. Hydrographic Service

Instituto Hidrográfico de la Marina (IHM). There have not been any relevant modifications in the organization of our Hydrographic Service since the last meeting in 2011.

Information on IHM mission, structure and assets can be found in the web site <http://www.armada.mde.es/ihm>.

This report covers the period from June 2011 to August 2013.

2. SURVEYS

2.1. Coverage of new surveys

Since about 97% of the area with depths below 200 mts, under our responsibility in the Mediterranean Sea is properly surveyed, our hydrographic efforts have been focused on re-surveying those areas with the oldest hydrographic information.

In order to update our bathymetry and our national nautical chart scheme covering the Mediterranean Sea, IHM has planned and carried out a total of six hydrographic campaigns in the last two years. These surveys were performed with our hydrographic vessels mainly in the southeast coast of the Iberian Peninsula, in areas between “Cabo de Palos” and “Cabo de Gata”, in the Gulf of Almería, and in the coastal area of Málaga.



Figure 1. "Malaspina" class oceanic hydrographic vessel



Figure 2. "Antares" class coastal hydrographic vessel

IHM continued with its plan to survey all main harbours as well as their approaching channels by using detection means that yield full bottom coverage, to fulfil the IHO S-44 standard for special order surveys. For this purpose, IHM employs transportable hydrographic yachts carrying shallow water hull-mounted multibeam echosounders, and since 2012, it has also employed hydrographic boats fitted with bathymetric interferometric sensors for very shallow waters.



Figure 3. Transportable hydrographic yacht



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

Since 1995, the Spanish Navy Oceanographic Research Vessel “Hespérides” is available one month every with the purpose of carrying out surveys of the Spanish Exclusive Economic Zone (EEZ), and hydrographers from IHM are deployed for those campaigns. In the last two years, those EEZ surveys have been focused in the Atlantic areas, so no surveys have been performed in the Spanish Mediterranean EEZ.



Figure 5. Spanish Navy Oceanographic Research Vessel "Hespérides"

To date, the hydrographic coverage of the Spanish EEZ in the Mediterranean Sea is approximately 20%.

Figure 6 shows the coverage and quality of the hitherto collected bathymetric data in the last two years, in the areas of interest for the MBSHC.



Figure 6. Hydrographic surveys from September 2011 to May 2013

Survey planning

All the surveys have been planned taking into account the type and purpose of each navigational area, in accordance with the IHO S-44 publication (5th edition). This requirement makes us assign specific surveys to our ships depending upon their hydrographic capability, equipment and endurance.

2.2. New technologies and / or equipment

IHM started an equipment acquisition programme in 2010, supported by the Spanish Navy, which has resulted in a significant hydrographic capacity improvement.

2.2.1. Echosounders

By the end of 2011, both the oceanic hydrographic vessels “Tofiño” and “Malaspina” were fitted with single beam and multibeam echosounders. The latter worked in depths ranging from 100 to 5000 meters.

In the beginning of 2012, the “Tofiño” was fitted also with a shallow water multibeam echosounder. Since then, the ship has had the capacity to carry out full bottom coverage surveys from shallow depths down to 5000 meters.

On the other hand, the coastal hydrographic vessels “Antares” and “Rigel” were fitted only with single beam echosounders by the end of 2011. In the beginning of 2012, a shallow water multibeam echosounder was mounted on the “Antares”, which allows full bottom coverage from shallow depths of about 5 meters down to depths of 400 meters.

In addition, during 2011 IHM acquired two portable bathymetric interferometric systems for very shallow waters ranging from 0 – 50 meters. These sensors can be deployed from small boats, thus allowing full bottom coverage in areas very close to the coast where a larger ship would not possibly operate. With this capacity, the requirements for IHO special order surveys can be met.

As equipment hardware has been upgraded, the software has been improved accordingly. The software now being used is capable of handling the tasks of data acquisition, processing, and managing. This new software allows, for example, the display of the bathymetric data over an ENC or an ortophoto while carrying out the survey.

2.2.2. Bottom mapping sonars

IHM bottom mapping capacity has also benefited from the acquisition of new equipment. On one hand, a synthetic aperture sonar was mounted on one of the vessels. This sonar yields very good resolution and wide surveying swaths, enhancing the efficiency of the surveys. This sonar will be used to ensure full bottom exploration of harbour channels and anchoring areas, whose features might not be detected by bathymetric echosounders.



Figure 7. Wreck image obtained with the synthetic aperture sonar

On the other hand, a very fine resolution sidescan sonar has also been acquired, with the added capacity of operating alongside a magnetometer. This sonar can be deployed from either a hydrographic vessel or from one of the hydrographic yachts.

In addition, in order to cover very shallow water areas with sidescan sonar images, three portable ones have been acquired that can be operated from hydrographic boats. Working simultaneously with echosounders, these sidescan sonars will enable IHO special order surveys.

Finally, with the goal of having more assets available to carry out hydrographic surveys, as well as to optimize the use of public resources by different administrations, some agreements and arrangements are in the process of being signed between the Spanish Navy and several Spanish public agencies with competences in the marine environment, which operate platforms with multibeam echosounders. These agreements will enable the use of those platforms to obtain bathymetric data according with IHO standards, to feed IHM database.

2.3. New Ships

The two “Antares” class coastal hydrographic vessels will need to be replaced in the near future. There are currently two projects under development to build newer vessels, but due to the current financial situation it is not known when the building of those vessels will take place.

2.4. Problems encountered

NTR.

3. NEW CHARTS & UPDATES

3.1. ENC's

3.1.1. Production

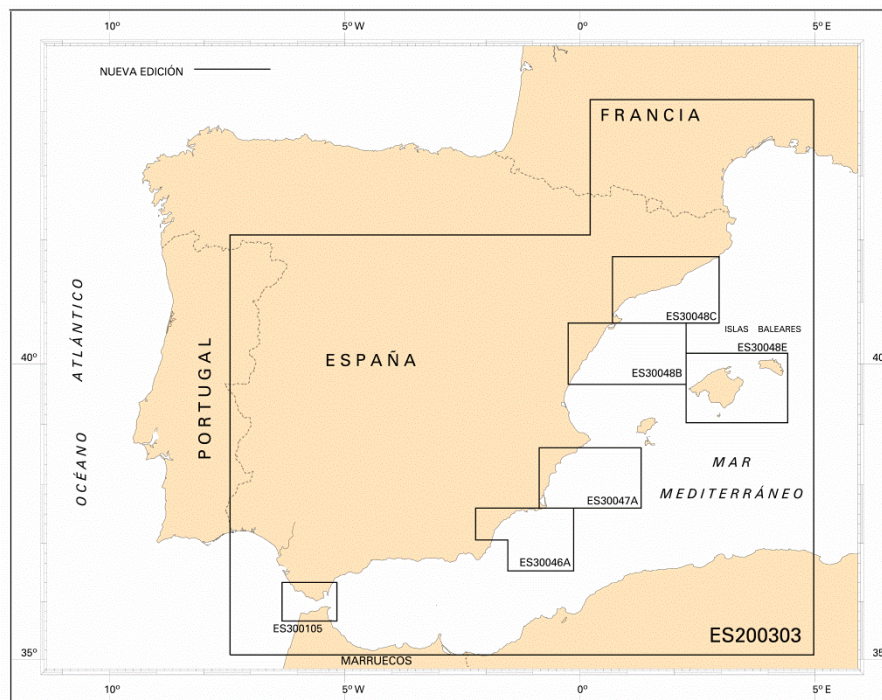
To date, IHM has produced 70 ENC's within the area of the MBSHC (out of a total of 154 published for all areas). Table 1 shows the distribution according to their navigational purpose.

Since the last MBSHC meeting, IHM has produced 21 new ENC's, 26 new ENC editions and 998 ENC updates in the Mediterranean. This shows the increasing workload associated with maintaining and updating the ENC catalog, which slows the production of new ENC's.

Navigational purpose	Projected	Produced
1 – Overview	0	0
2 - General	1	1
3 - Coastal	11	11
4 - Approach	36	30
5 - Harbour	65	28
6 - Berthing	0	0
Total	113	70

Table 1. Distribution of ENC production in the MBSHC area

The target of IHM ENC current project is to get full coverage on navigational purpose 4 for the entire Spanish coast, and to cover the main harbors and others such as marinas and small fishing ports with navigational purpose 5 ENCs. Figure 8 shows the ENC production in the MBSHC area since the last meeting.



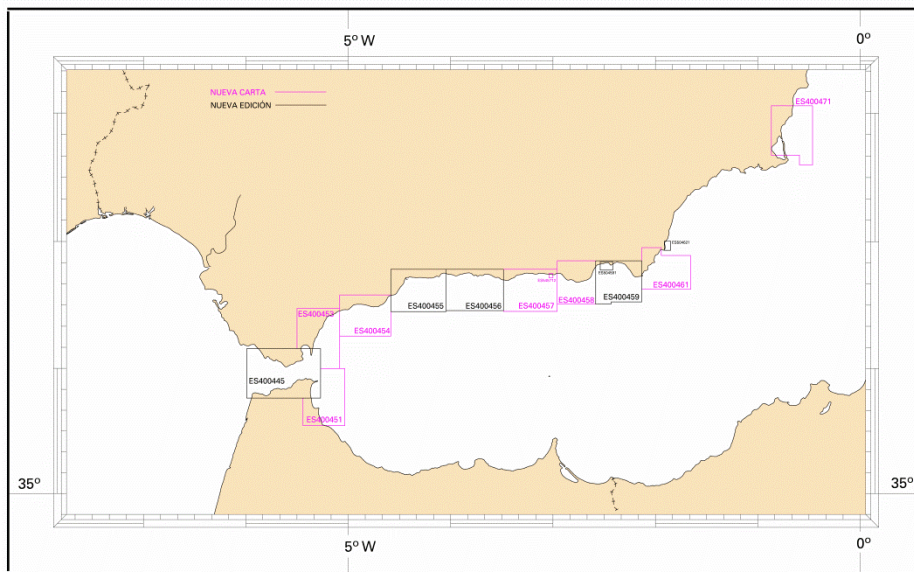
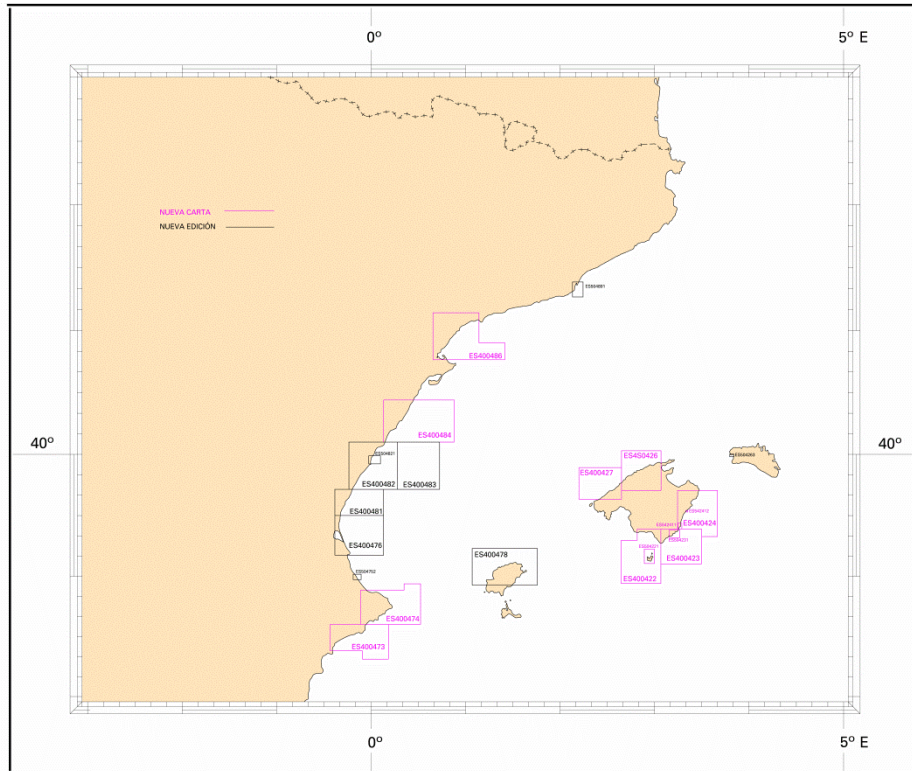


Figure 8. New ENC cells and editions produced in the MBSHC area since the last meeting

3.1.2. Cooperation

Under the provisions of a bilateral agreement, and under the umbrella of the cooperation of IC-ENC and PRIMAR RENCs, IHM continues to exchange all the ENC information needed with France (SHOM) in order to comply with the IHO recommendations regarding horizontal and vertical consistency on

the adjacent ENC (in the boundaries between national waters in the Mediterranean).

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

Table 2 shows the new INTernational paper charts / editions within the MBSHC published since the date of the last meeting. These are either new charts (NC) or new editions (NE).

INT Nº	National Nº	Title	Edition
3185	4891	Puerto de Barcelona	9, May 2011

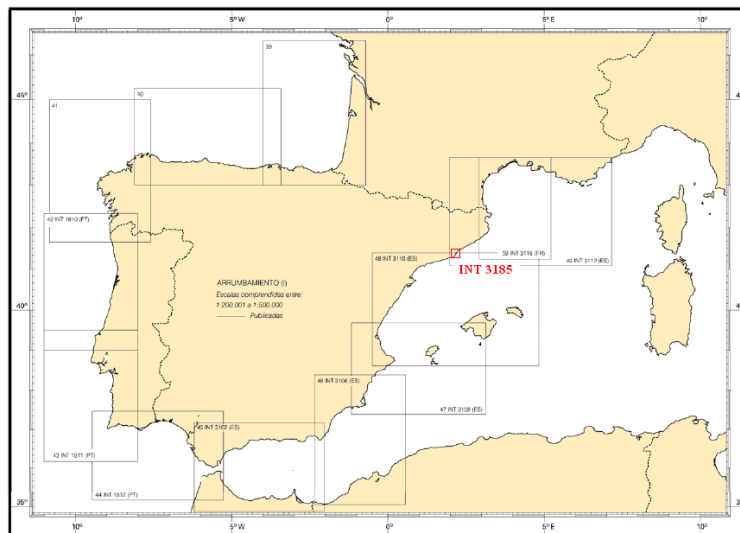


Table 2/ Figure 9. INT paper charts in the MBSHC area published since the last meeting

Table 3 shows INT charts projected for the second semester of 2013, and 2014.

INT Nº	National Nº	Title	Edition
3152	445A	Bahía de Algeciras	NE, 8
3106	46	De cabo de Gata al cabo de las Huertas y de cabo Milonia a cabo Ivi	NC
3112	49	De cabo Tortosa a cap Cerbere, con las islas Mallorca y Menorca	NC
3175	482A	Aproches de Castellón	NE, 4

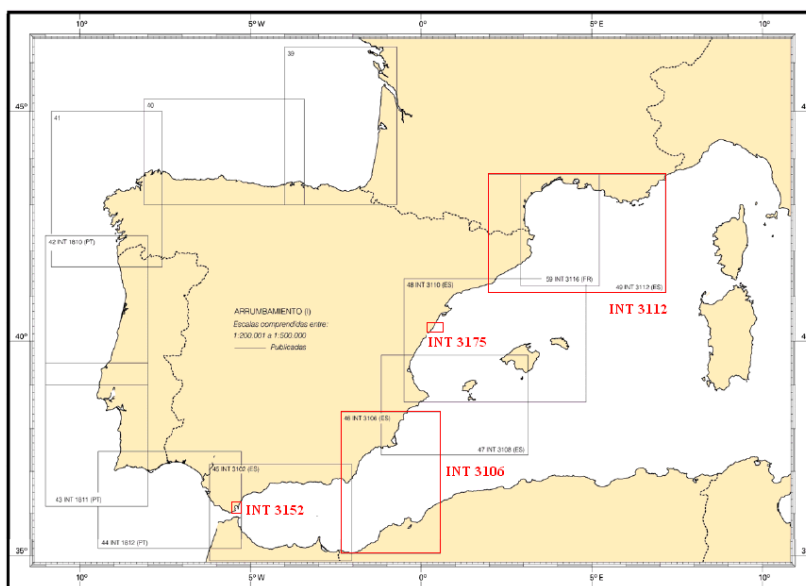


Table 3/ Figure 10. Projected INT paper charts in the MBSHC area for 2013 - 2104

Table 4 shows the production status of the INT charts assigned to Spain in the MBSHC area.

Scale	Assigned	Published
Small 5.000.000-1.000.000	1	1
Medium 350.0000-100.000	6	1(*)
Large 80.000-10.000	18	18
TOTAL	25	20

Table 4. INT paper charts production status in the MBSHC area

(*) In the last MBSHC meeting, it was agreed that the limits of the new medium scale INT charts (3102, 3106, 3108, 3110, and 3112) would be set to match those of the national charts (45, 46, 47, 48, and 49). The new editions of these national charts will already be INT charts.

3.5 National paper charts

Table 5 shows the national paper charts which have been published since the las MBSHC meeting:

National Nº	Title	Edition
423	De punta Plana a puerto Colom y archipiélago de Cabrera	2 - Jun 2011
48C	De cabo Tortosa a cabo de Tossa	3 - Dic 2011
455	De punta de Calaburras a ensenada de Vélez-Málaga	6 - May 2012

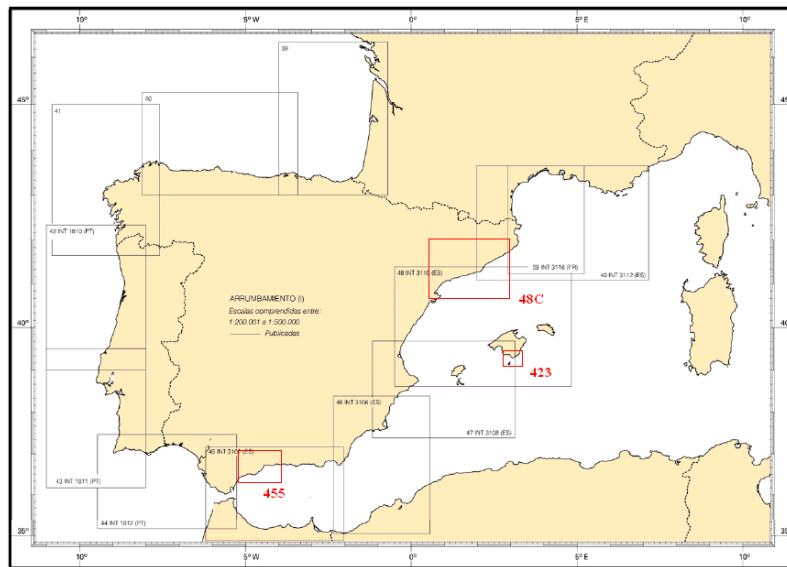


Table 5/ Figure 11. National paper charts published in the MBSH area since the last meeting

3.6 Other charts

Leisure craft charts.

Until 2010, the IHM leisure craft charts catalog comprised 10 charts. Each of them had a coastal nautical chart on the front and several harbours on the back, printed on standard nautical chart paper.

Since 2011, the new leisure craft chart has been published as a booklet comprising several A3 size glossy paper sheets containing: part of the coastal nautical chart of the area, each of the harbours in the area along with an excerpt of the sailing directions, a summarized table of the international regulation to prevent collisions at sea, and an explanation of the IALA maritime buoyage systems.

No new leisure craft charts have been published in the Mediterranean Sea in the new format, although two of them are projected.

3.7. Chart production

In September 2012, as part of the forementioned acquisition programme supported by the Spanish Navy, IHM acquired a new chart production integrated system (CARIS HPD), to generate both paper charts and ENC's from the same database.

Since this new technology implies many changes in current chart production flow, an internal working group has been created to identify the necessary steps to progressively migrate from the current production model to the new one.

Print-on-demand

With the purpose of improving the efficiency of the chart and publications printing system at IHM, several digital plotters and digital printers have been acquired. Currently, these digital printing devices coexist with the traditional ones, but more printing orders are progressively being handled by the digital devices, which allow for an in-house print-on-demand (POD) system to be put into practice. This POD system makes it possible to print just the number of copies needed, in contrast with the traditional system which implied the printing of a great number of copies.

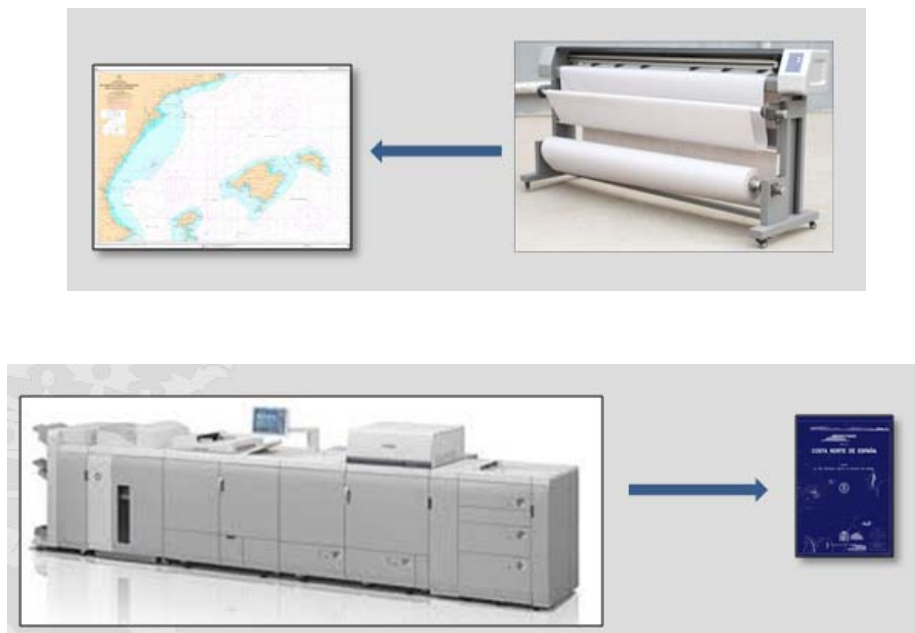


Figure 12. Print On Demand (POD) digital plotter and printer

3.8. Problems encountered

NTR.

4. NEW PUBLICATIONS AND UPDATES

4.1. New publications

NTR.

4.2. Updated publications

- *Catalog of Nautical Charts and other publications*, 2013 edition.
- IHO S-4 associated publication *INT 1 – Symbols, Abbreviations and Terms use on Charts (Spanish version)*, 4th edition 2011.
- *List of lights and fog signals, part II*, 2013 edition. Gibraltar Strait, Balearic Islands and Mediterranean coasts of Spain, Morocco and Algeria.
- *Supplement num. 1 (2013) to Sailing Directions num. 3, vol.II* 2010 edition. Balearic Islands and North coasts of Morocco and Algeria.
- *Supplement num. 1 (2012) to Sailing Directions num. 3, vol.I* 2010 edition. North and South Coasts of the Strait of Gibraltar, and Eastern Coast of Spain from Punta Europa to the French border.
- *International Regulations for the Preventing Collisions at Sea (1972)*, 2012 edition.

4.3. Means of delivery

A digital version of the publication *List of Lights and Fog Signals* is currently available online, which is an interactive application, in the following internet address:

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

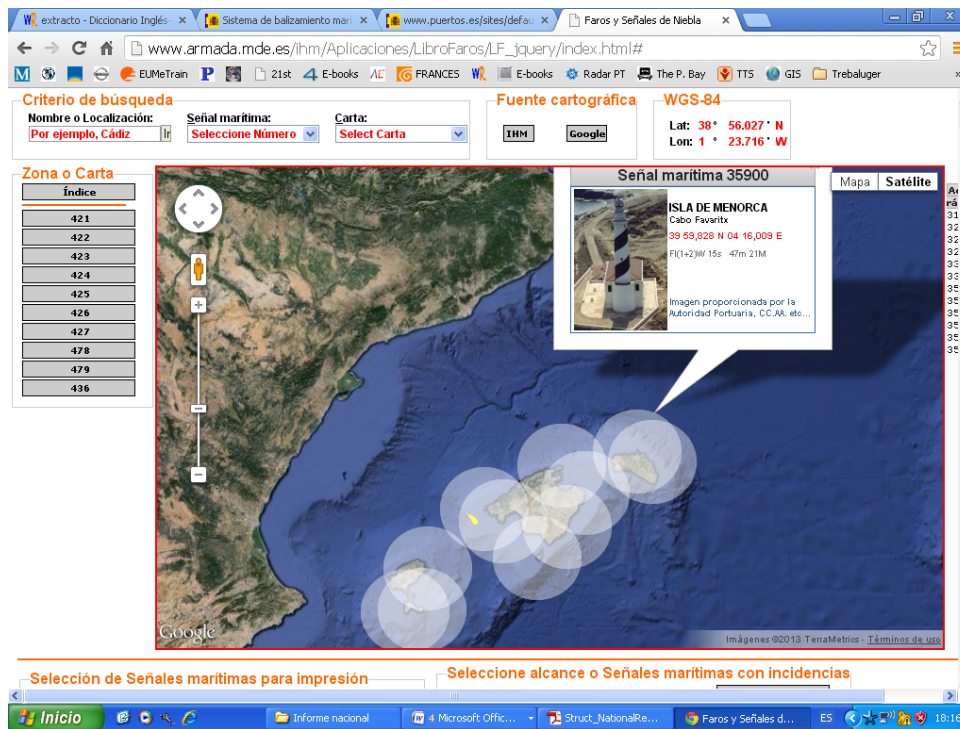


Figure 13. Screenshot of the List of Lights and Fog Signals interactive tool

4.4. Problems encountered.

NTR.

5. MSI

Spain is NAVAREA III (Mediterranean and Black Sea) Coordinator.

5.1. Existing Infrastructures for transmission

The current situation of the dissemination of Maritime Safety Information can be summarized as follows:

5.1.1. Coastal Navigational Warnings in Spanish Coasts

Coordinator: SASEMAR (Spanish National Agency for Maritime Search and Rescue Operations, Ministry of Public Works) is the national Coordinator for coastal and local radio navigational warnings. The National Rescue Co-ordination Centre (CNCS) is located in Madrid.

Means: NAVTEX Stations.
MF and VHF Stations.

IHM liaises with SASEMAR about coastal warnings. ABERTIS company supports the net between SASEMAR, coastal stations and IHM.

5.1.2. Navarea III Navigational Warnings

Coordinator: IHM. NAVAREA III warnings are broadcast via SAFETYNET through Burum Land Earth Station and AOR-E Satellite over the whole region.

A total of 24 NAVTEX Stations , most of them broadcasting also at 490 KHZ in local language, cover the Mediterranean and Black Seas, except the coastal area of Lybia. This area is covered by SAFETYNET.

IHM liaises with SHOM exchanging everyday NAVAREA warnings originated in each region that are relevant for each coordinator. In addition, all updated NAVAREA III and II warnings are disseminated through the IHM digital application GESNAV on a daily basis.

IHM publishes the Notice to Mariners bulletin weekly which include the NAVAREA warnings in force.

5.1.3. SAR Organisation

Coordinator: SASEMAR through its National Centre (CNCS) and its Area, Regional and Local Centres.

Means: NAVTEX stations and communication stations at SASEMAR Centres, as well as coastal MF and VHF stations.

5.2. New infrastructure in accordance with GMDSS Master Plan

NTR.

5.3. Problems encountered.

NTR.

6. C-55

6.1. SPAIN. CHARTING REGION F

Information valid as of 1 September 2013.

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	97	3	0
Dephts > 200 m	45	5	50

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 M-4.

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

C = percentage covered by ENC's 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	80

6.1.3. MARITIME SAFETY INFORMATION (MSI).

NAVIGATIONAL INFORMATION (S-53)

SERVICE	Yes	No	Partial	Notes
LOCAL WARNINGS	X			
COASTAL WARNINGS	X			
NAVAREA WARNINGS	X			
PORT INFORMATION	X			Agreements with all 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			For NAVAREA Warnings only.

7. Capacity Building

7.1. Offer of and/or demand for Capacity Building

The Spanish Hydrographic School, located within the premises of IHM, offers both Category A and B IHO/FIG/ICA hydrography courses. These courses have been reviewed and re-approved in 2013 from the International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers. They are 10 month long and are taught in Spanish language. Minimum academic enrolling requirements are needed.

The following is a list of the students who have attended these courses in the last three academic years, and those who will start this current one:

Category A course:

Academic year 2013-2014

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

Academic year 2012-2013

2 Officers from the Spanish Navy

Academic year 2011-2012

2 Officers from the Spanish Navy
1 Officer from Guatemala

Academic year 2010-2011

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

Academic year 2009-2010

4 Officers from the Spanish Navy
1 Officer from the Dominican Republic
1 Officer from Morocco
1 Officer from Tunisia

Category B course:

Academic year 2013-2014

3 Petty Officers from the Spanish Navy

Academic year 2012-2013

1 Petty Officer from the Spanish Navy
1 Petty Officer from the Dominican Republic

Academic year 2011-2012

1 Petty Officer from the Spanish Navy
1 Petty Officer from the Dominican Republic

Academic year 2010-2011

2 Petty Officers from the Spanish Navy
1 Petty Officer from the Dominican Republic

Academic year 2009-2010

1 Petty officer from the Spanish Navy.

For the time being, all the students are military personnel. The attendance of non-Spanish students is offered through a *Collaboration Agreement with regard to military training*, signed between the Spanish Ministry of Defence

and other countries. This agreement provides grants for the attendance to the abovementioned courses.

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

7.2. Training received, needed, offered

NTR.

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

A cooperation agreement in the fields of hydrography and oceanography between IHM and the Romanian Maritime Hydrographic Directorate (DHM) is in the process of being signed.

Talks are in progress between IHM and a national university, to agree on setting up the basis a “master in hydrography”, which would follow the line of the currently taught Hydrography Category A course.

IHM participates in the European Union initiative EMODNET (European Marine Observation and Data NETWORK), in the theme dedicated to digital bathymetry.

7.4. Definition of bids to IHOCBC

NTR.

8. Oceanographic activities

8.1. General

An upgraded IHM tidal database is under construction and is being populated by tidal data collected from all national harbours. Users will be able to access this database in the future via the Internet.

Chart Datum calculation for the Mediterranean area is being updated. To date, the Chart Datum was estimated generally by subtracting 0.5 meters from the medium sea level (MSL). Now, the Lowest Astronomical Tide (LAT) will be used as the Chart Datum, following the same method used for the Atlantic waters and the IHO recommendations.

Also, all available information at IHM about bottom composition types is being georeferenced and vectorized to be accessible for GIS applications, and complement nautical cartography.

8.2. GEBCO/IBC's activities

NTR.

8.3. Tide gauge network

There is information online at the IHO website regarding the Spanish network of tide gauges at:

http://www.iho-ohi.net/mtg_docs/com_wg/IHOTC/IHOTC_Misc/TideGaugeInventory.pdf



Figure 14. Spain's Mediterranean Permanent Tide Gauges Network

Some tide gauges operated by IHM are integrated in the national tide gauge network, comprising others from a number of public authorities and institutions.

8.4. New equipment

Five radar tide gauges have been recently acquired by IHM, fitted with meteorological sensors and real time transmission capability, which will be deployed as long-term stations at locations not covered by the current national tide gauge network. Once these gauges are deployed, their data will be shared with the other national institutions which take part in the national network.



Figure 15. Radar tide gauge

8.5. Problems encountered

The current tidal data database has limited access, which does not allow to operatively analyze the data. This is the reason why an upgraded database is under construction. This database should allow interaction with web applications.

9. Other activities

9.1. Participation in IHO Working Groups

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

- Hydrographic Services and Standards Committee (HSSC)
- Standardization of Nautical Publications Working Group (SNPWG)
- Chart Standardization and Paper Chart Working Group (CSPCWG)
- Tidal and Water Level Working Group (TWLWG)
- Surface Currents Working Group (SCWG)
- Hydrographic Commission on Antarctica (HCA)
- East Atlantic Hydrographic Commission (EAAtHC)
- World-Wide Navigational Warning Service Sub-Committee (WWNWS)
- Finance Committee (FC)
- Hydrographic Dictionary Working Group (HDWG)
- Marine Spatial Data Infrastructure Working Group (MSDIWG)

9.2. Meteorological data collection

The recently acquired tide gauges integrate meteorological sensors, whose records can be transmitted in real time to IHM.

9.3. MSDI Progress

Within the framework of the national Spatial Data Infrastructure concept, some digital information has been sent to the Central Cartographic Registry of Spain, including Spain's updated coastline on a scale 1:50000.

Also within the SDI framework, IHM takes part in a working group on Spain's SDI (IDEE in Spanish), which aims to integrate via the Internet all data, metadata, services and any other geographical information produced in Spain, so that all potential users be able to locate, identify, select, and access such resources through the SDI geoportal (<http://www.idee.es>).

Likewise, a geographic web portal within the Ministry of Defence is under construction, which will represent its SDI portal. IHM takes part in this project, and is currently elaborating a metadata database.

Finally, an in-house geoportal is under construction and is now at an advanced stage. It consists on both a Web application and a Web Map Server (WMS) tool. Some data will also be available to download. The goal of this geoportal is to comply with the SDI European and Spanish legal requirements, as well as to have a comprehensive tool available to satisfy all the needs of data that are constantly being requested to IHM by the general public, companies, and institutions.