NATIONAL REPORT

TO THE 20th MEETING OF THE MEDITERRANEAN AND BLACK SEAS HYDROGRAPHIC COMMISSION (MBSHC-20)

BIJELA, MONTENEGRO
4 to 6 JULY 2017

Instituto Hidrográfico de la Marina
Cádiz - España

1. HYDROGRAPHIC SERVICE

Instituto Hidrográfico de la Marina (España). There haven´t been relevant internal modifications in the organization of our Hydrographic Service since the last meeting. Only it was create the new section of Institutional Relations. Our organization, mission and different kind of services offered can be found at http://www.armada.mde.es (http://www.armada.mde.es/ArmadaPortal/page/Portal/ArmadaEspannola/ciencia_ihm_1/prefLang_es/).

This report covers the period May 2015 - May 2017.

2. SURVEYS

2.1. Bathymetric coverage of new surveys

In the last report (2015) 97% of Spanish Mediterranean coastal waters up to 200 m deep have already been surveyed. These data were updated considering single beam coastal surveys (<200 m) as complying adequately with S-44 standards. However, for this report, only multi beam surveys have been considered: 39% of Spanish Mediterranean coastal waters up to 200 m deep have already been surveyed. The current effort is focused on resurveying by multi beam the single beam coastal surveys (<200 m).

For the period covered by this report, the Spanish Hydrographic Office has conducted a total of twelve hydrographic surveys by using either Multibeam Echosounders (MBES) or Interferometric Sonar (Phase Differencing Bathymetric Sonars PDBS). These surveys were performed by our hydrographic vessels in the Alboran Sea and south and east coast of Spain.

Figure 1. "Malaspina" class oceanic hydrographic vessel.

Figure 2. "Malaspina" class oceanic hydrographic vessel, A-32 “Tofiño” in Monaco.

Figure 3. "Antares" class coastal hydrographic vessel.

Furthermore, it is important to highlight that this office has continued with the goal of carrying out hydrographic surveys of Ports and their approaching channels (Special order surveys). For this purpose, IHM employed small transportable hydrographic vessels fitted with MBES as well as small boats fitted with PDBS

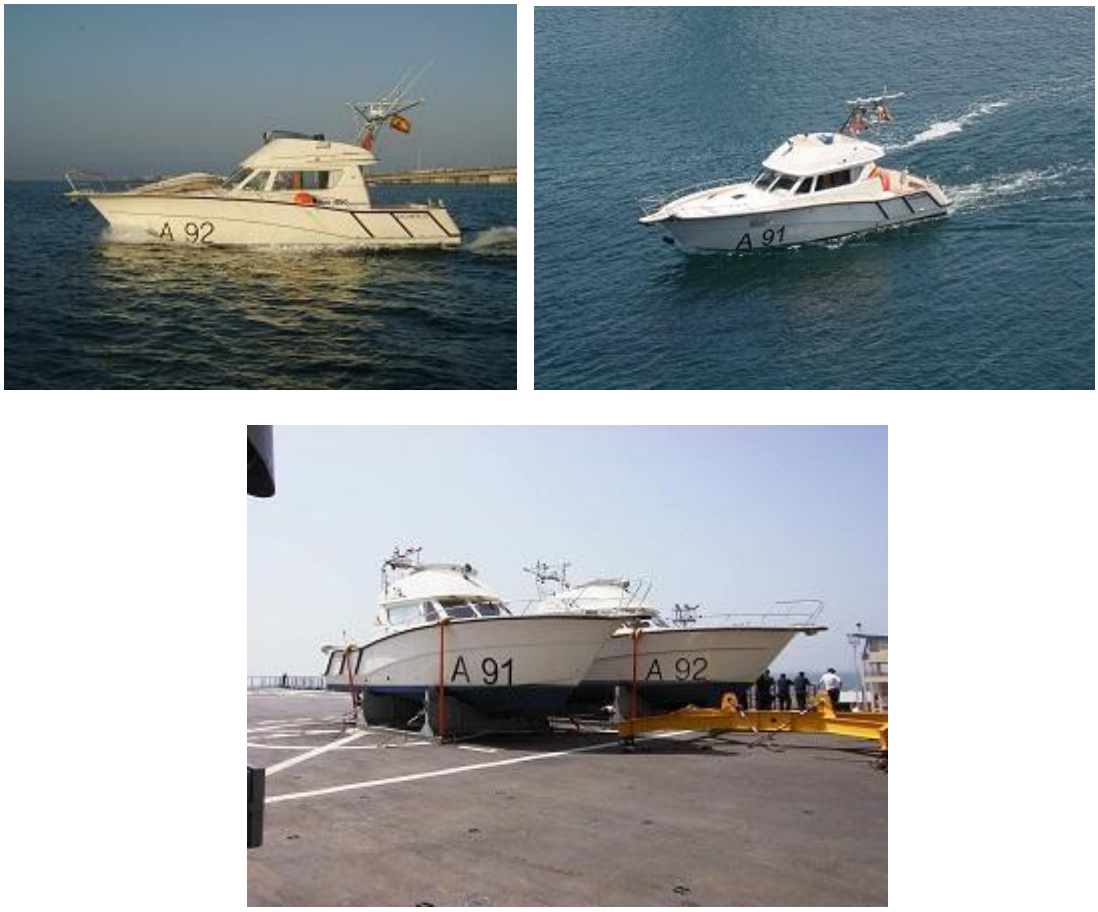

Figure 4. Small transportable hydrographic vessels.

Figure 5. New Small transportable hydrographic boat.

Compiled bathymetric coverage conducted by Spanish navy survey ships from May 2015 to May 2017 is illustrated in the next figure.

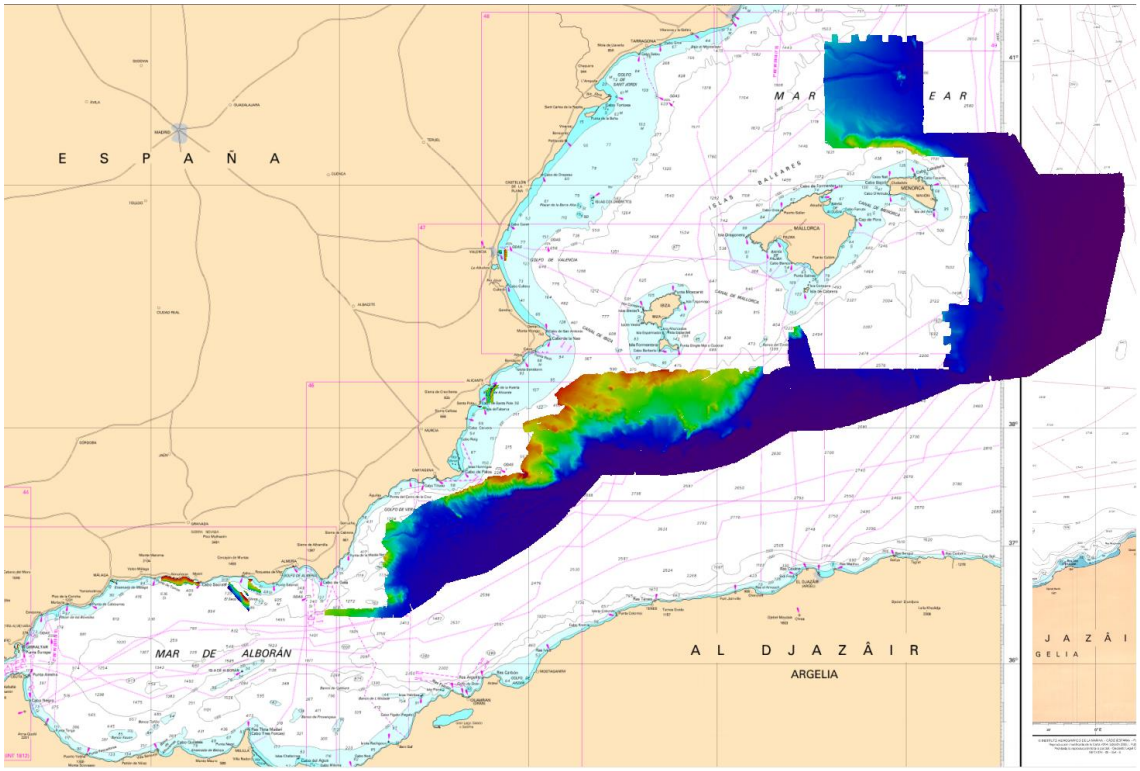

Figure 6. Compiled bathymetric coverage conducted by Spanish navy survey ships from May 2015 to May 2017

Survey planning

Surveys have been prepared by taking into account the type and purpose of each navigational area, in accordance with the IHO S-44 publication. This requirement directs us to assign specific surveys to the right asset (Hydrographic Vessel, Transportable Vessel or Boat) depending on her hydrographic capability, equipment and endurance.

2.2. New technologies and/or equipment

2.2.1. Cartographic production

The production of charts with CARIS HPD production system is fully established, and work continues on the migration of cartographic production to the new system. A print on demand system (POD) is completely established to print charts embedded in CARIS HPD production system. Nowadays this POD (Print on demand) percentage is reaching the 51 % of the total Cartography published by IHM.

2.2.2. Echosounders

IHM started an Equipment Acquisition Program six years ago, financed by the Spanish Navy, which has resulted in a significant hydrographic capacity improvement. New

MBES (EM-2040) and PDBS (Geoswath 500 and 250) were acquired and installed on our vessels and boats in order to work in shallow waters.

In summary, our Hydrographic Fleet is currently fitted as follows:

- All Hydrographic Vessel, “Tofiño” and “Malaspina”, is equipped with two hull-mounted MBES (for shallow and deep waters). Furthermore, each vessel has two small hydrographic boats to cover very shallow waters with portable PDBS.

- Coastal Hydrographic Vessel “Antares” is fitted with a MBES in order to work in shallow waters. This vessel only has one small hydrographic boat with the capacity to work with portable PDBS in very shallow waters.

- Three Transportable small hydrographic Vessels have either MBES or PDBS in order to conduct Special Order Surveys.

2.2.2.1 Bottom Mapping Sonars

On one hand, PDBS develop new advanced capabilities for shallow water surveys. PDBS provides a wider swath-width compared to MBES. Furthermore, PDBS provides both and simultaneously co-registered high-resolution side scan sonar imagery and three-dimensional bathymetry. This advanced capability allows the hydrographer to detect, explore and identify submerged features during the survey. In addition, this imagery provides an important help during data processing.

On the other hand, its main handicap is that this system requires a long period of time to process all acquired data.

2.3. New Vessels

Specific projects for new coastal hydrographic vessels have been developed for the last decade. However, they have not been built yet, due to the budget restrictions. Therefore, IHM has not any date for enjoying new vessels.

In 2016 the vessel “Sondaleza” was registered in the official list of ships of the Navy.

It is conceived as multipurpose deployable boat, being able to take like equipment the portable sounder PDBS Geoswath Plus, or a MBES. The main mission is to carry out hydrographic surveys with total coverage of the seabed in ports, access channels and anchorages.

Their transfer can be done by land via towing to access any work area.

Figure 7. "Sondaleza" towed by a car

2.4. Problems encountered

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3. NEW CHARTS AND UPDATES

3.1 ENC

To date, IHM has produced 142 ENCs within the area of the MBSHC (out of a total of 274 published for all areas).

Since the last MBSHC meeting, IHM has produced 43 new ENCs, 36 new ENC editions and 792 ENC update´s. This shows the increasing workload associated with maintaining and updating the ENC catalog, which slows the production of new ENCs.

While it continues the work to finish Purpose 5 Project, during this year Purpose 6 Project is going to be started with the most important commercial ports.

Navigational purpose	Projected	Published
1 - Overview	0	0
2 - General	1	1
3 - Coastal	11	11
4 - Approach	45	45
5 - Harbour	99	85
6 - Berthing	10	0
Total	**166**	**142**

Figure 8. Navigational purpose 2 and 3 ENC production in the MBSHC May 2015-2017

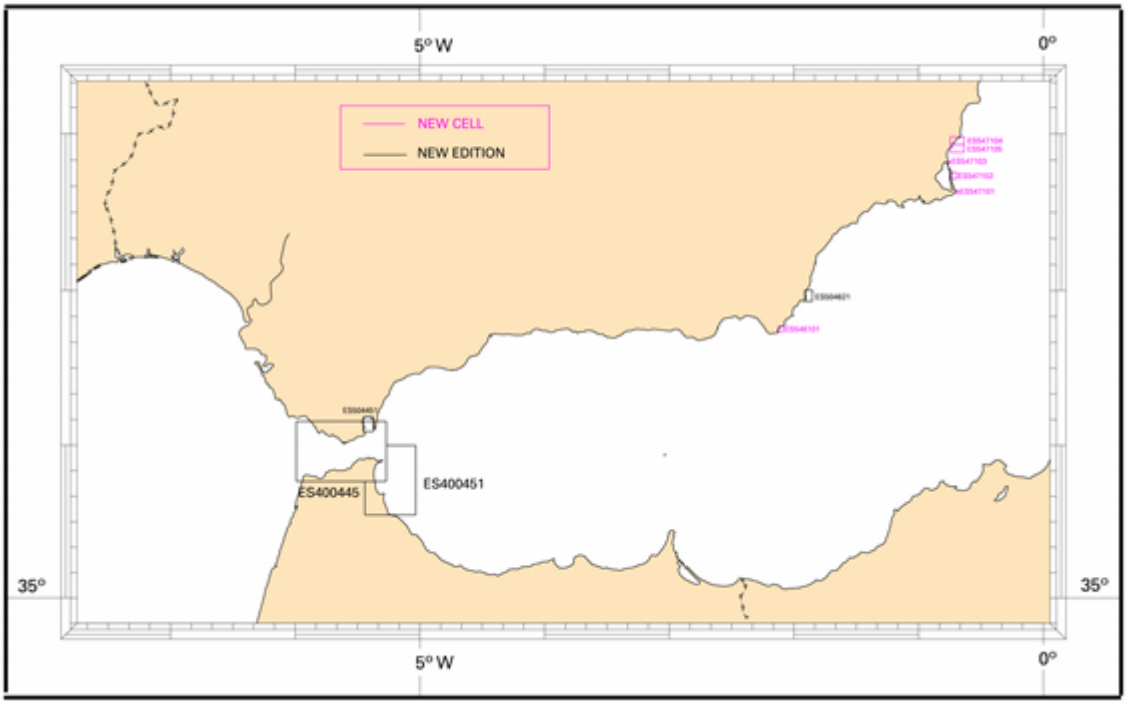

Figure 9. Navigational purpose 4 and 5 ENC production in the MBSHC May 2015-2017 part1

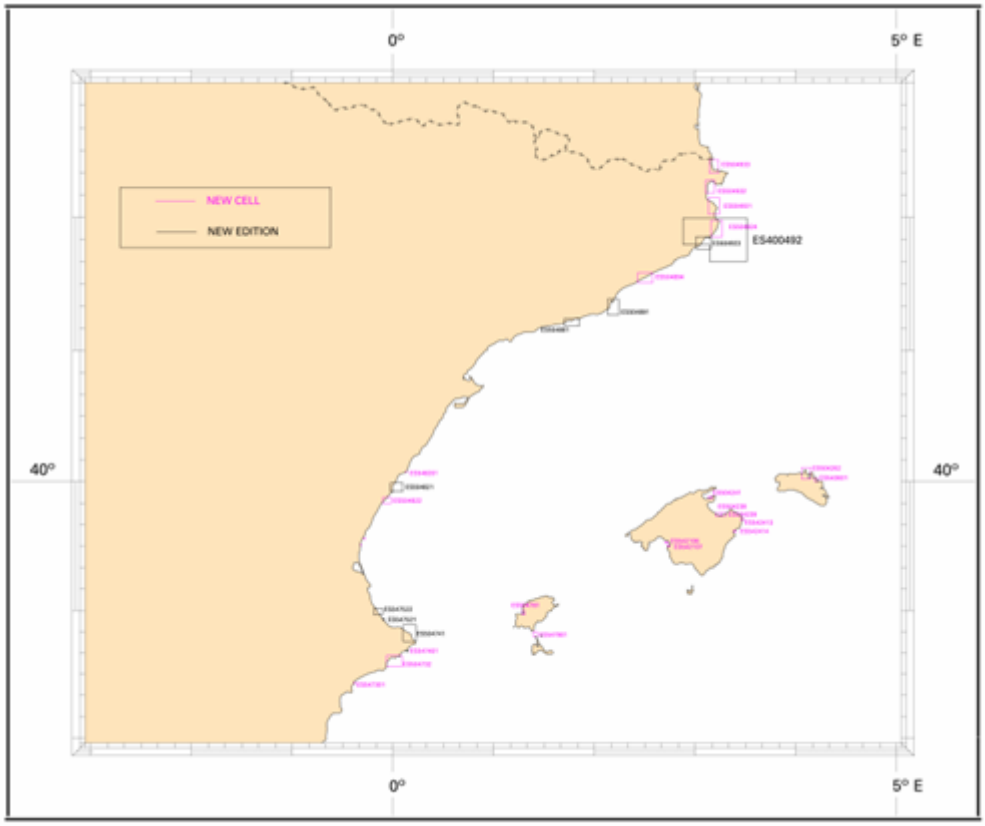

Figure 10. Navigational purpose 4 and 5 ENC production in the MBSHC May 2015-2017 part2

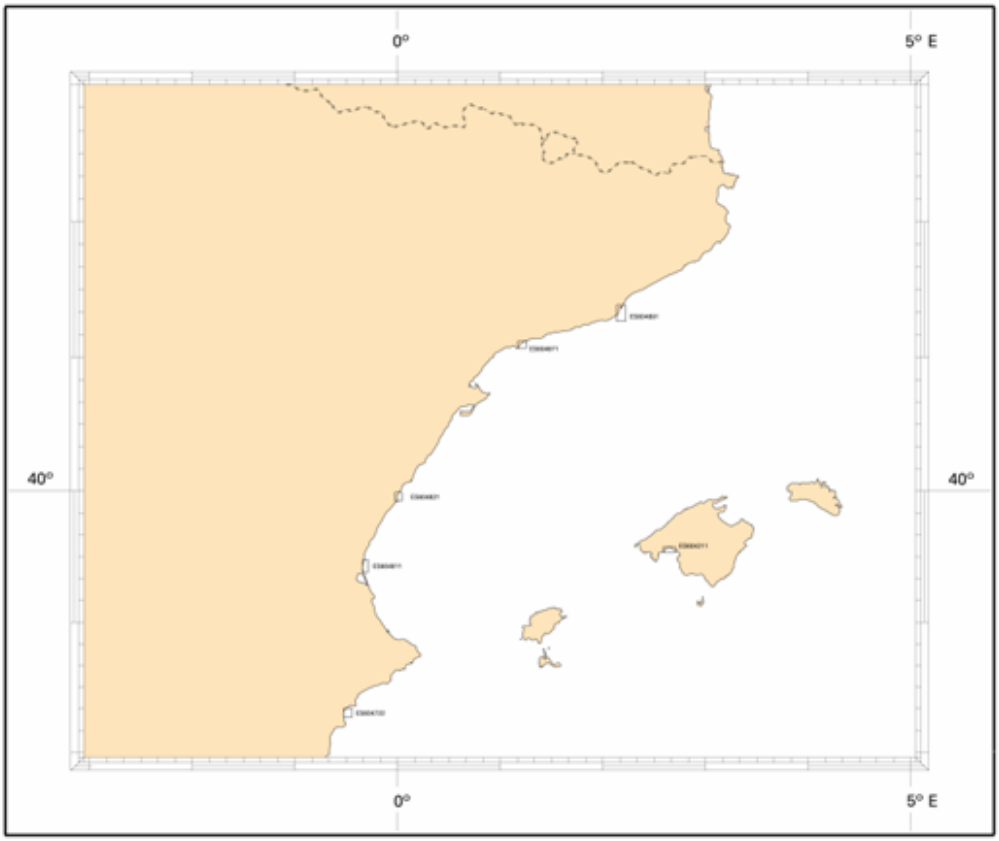

Figure 11. Navigational purpose 6 ENC projected part 1

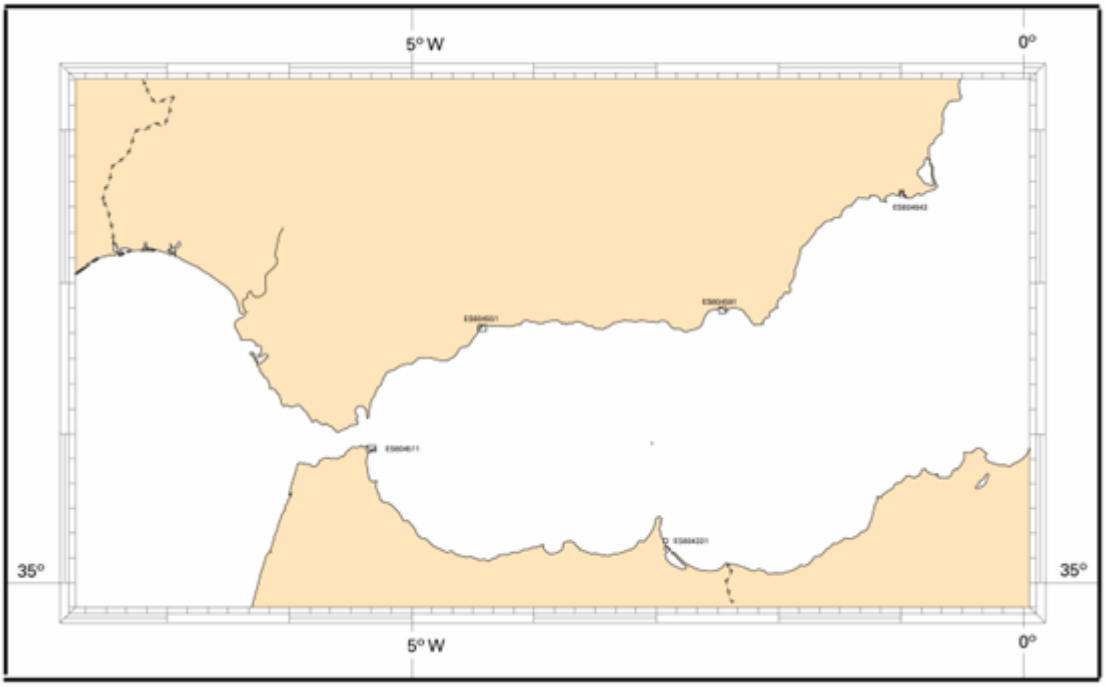

Figure 12. Navigational purpose 6 ENC projected part 2

3.2 ENC distribution method.

Spain is a member of the International Center for ENC (www.ic-enc.org/) RENC. All Spanish ENCs are distributed by IC-RENC, which carries out validations and consistency checks before distribution. There is close collaboration in development with this RENC, especially regarding the optimization of production and validation processes.

3.3. RNCs.

NQR.

3.4. International Charts.

Nowadays, IHM has produced 59 International charts, 25 within the area of the MBSHC (out of a total of 360 published for all areas).

Since last MBSHC meeting, IHM has produced 4 new INT Charts, 4 new editions and 111 Notice to Mariners. This table shows the increasing workload associated with maintaining and updating the INT Chart catalog.

Navigational purpose	MBSHC ZONE
INT charts made since the last MBSCH Conference	8
Charts projected for the second semester of 2017, and 2018	10
Status of the INT charts production assigned to Spain	25
Status of the INT charts production assigned to IHM pending to be published	1
Leisure Charts published	7
Leisure charts pending to be published	10

Table 1

The next table shows INT charts made since the last MBSCH Conference:

INT No	National No	Title	Edition
3185	4891	Puerto de Barcelona	X Jun 2016
3176	4821	Puerto de Castellón	V Sep 2016
3102	45	Estrecho de Gibraltar y Mar de Alborán	V Mar 2016
300	7	Mar Mediterráneo y Mar Negro	III Sep 2016
3108	47	De cabo Tiñoso a cabo Canet, con las islas de Ibiza, Formentera, Cabrera y costa SW de Mallorca.	IV Sep 2016
3110	48	De cabo de la Nao a Barcelona, con las islas Baleares	III Sep 2016
3112	49	Golfo de León. De punta del Llobregat a cabo d ’Antibes	I Sep 2017
3116	59	De cabo San Sebastián a Fos-sur-Mer	I Sep 2017

Table 2

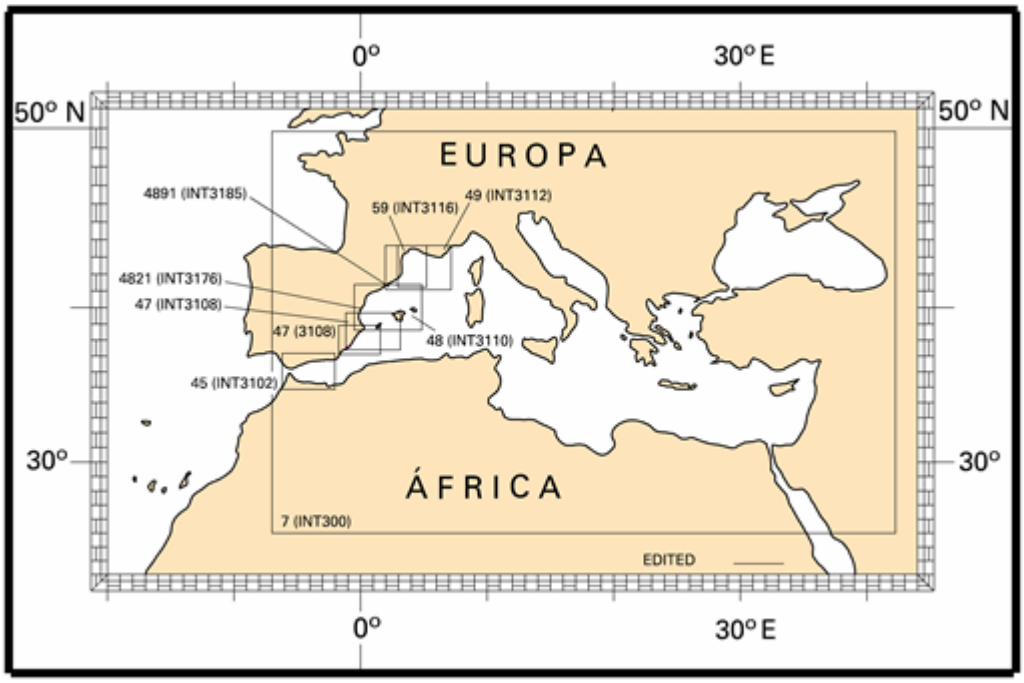

Figure 13. INT charts produced since the last MBSHC Conference

The next table shows INT charts projected for the second semester of 2017, and 2018/19.

INT No	National No	Title	Edition
4F	305	Mar de Liguria, mar Tirreno y estrecho de Sicilia	II Dec 2000
3106	46	Del Cabo de Gata al Cabo de Las Vertas y del Cabo Milionia al Cabo Ivi	III Oct 2013
3165	4642	Puertos de Cartagena y Escombreras	IV Nov 2007
TBD	45A1 (1:275 000)	Estrecho de Gibraltar y Mar de Alborán	TBD
TBD	46A1 (1:250 000)	Cabo de gata a Garrucha	TBD
TBD	47A1 (1:250 000)	De Garrucha a Gandia	TBD
TBD	48A1 (1:250 000)	De Alicante a Peñíscola	TBD
TBD	48A2 (1:250 000)	Islas Baleares	TBD
TBD	48A3 (1:250 000)	De Peñíscola a Lloret de Mar	TBD
TBD	49A1 (1:275 000)	De Argeles Sur Mer a Puerto de Mahón	TBD

Table 3

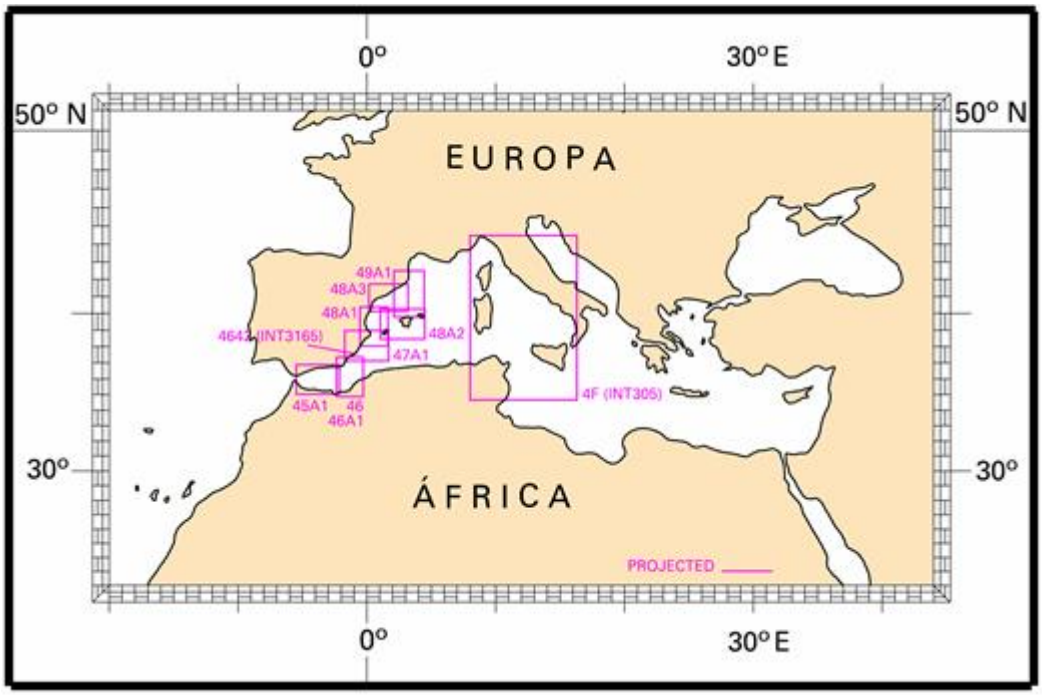

Figure 14. INT paper Charts projected in the MBSHC from May 2017 to 2019

The next table shows status of INT charts production assigned to IHM.

INT No.	National No.	Title	Edition	Scale
303	4-C	Mar de Alborán y Mar Balear	97/	1 000 000
3102	45	Estrecho de Gibraltar y Mar de Alborán	(79)/(08)	350 000
3106	46	Del Cabo de Gata al Cabo de Las Vertas y del Cabo Milionia al Cabo Ivi	(77)/(99)	350 000
3108	47	De Cabo Tiñoso a Cabo Canet con las islas Ibiza, Formentera, Cabrera y Costa sudoeste de Mallorca	(76)/(05)	350 000
3110	48	De Cabo de la Noa a Barcelona con las Islas Baleares	(78)/(04)	425 000
3112	49	Golfo de León – De Punta del Llobregat a Cabo d'Antibes	(79)/	400 000
3150	105	Estrecho de Gibraltar	98/10	100 000
3152	445 A	Côte Sud d'Espagne – Bahía de Algeciras	86/08	25 000
3156	455 A	Aproches del Puerto de Málaga	84/06	25 000
3157	4551	Puerto de Málaga	95/06	10 000
3159	459	Golfo de Almería – De la Punta Sabinar al Cabo de Gata Plan A – Roquetas de Mar	(59)/07	50 000 7 500
3160	4591	Puerto de Almería	93/07	10 000
3164	464 A	Aproches de Cartagena y Escombreras	85/09	30 000
3165	4642	Puertos de Cartagena y Escombreras	96/07	10 000
3167	472 A	Aproches del Puerto de Alicante	87/09	25 000
3168	4722	Puerto de Alicante	87/09	10 000
3172	481 A	Aproches del Puerto de Valencia Plan A: Pobla de Farnals Plan B: Port-Saplaya	87/10	25 000 10 000 10 000
3173	4811	Puerto de Valencia	94/10	10 000
3175	482 A	Aproches del Puerto de Castellón	95/03	25 000
3176	4821	Puerto de Castellón	91/11	10 000
3179	487 A	Aproches del Puerto de Tarragona	89/04	25 000
3180	4871	Puerto de Tarragona	80/05	10 000
3184	489 A	Aproches del Puerto de Barcelona	87/06	25 000
3185	4891	Puerto de Barcelona	92/11	12 500
3252	4511	Bahía y Puerto de Ceuta	92/09	10 000

Table 4

Status of the production of international charts assigned to Spain.

Scale	Assigned	Produced
Small 5.000.000-1.000.000	1	1
Medium 350.0000-100.000	6	5
Large 80.000-10.000	18	18
TOTAL	25	24 *

* INT 3106, Coproduction as INT Chart between Argelia and Spain. Exist as National Spanish Chart

Table 5

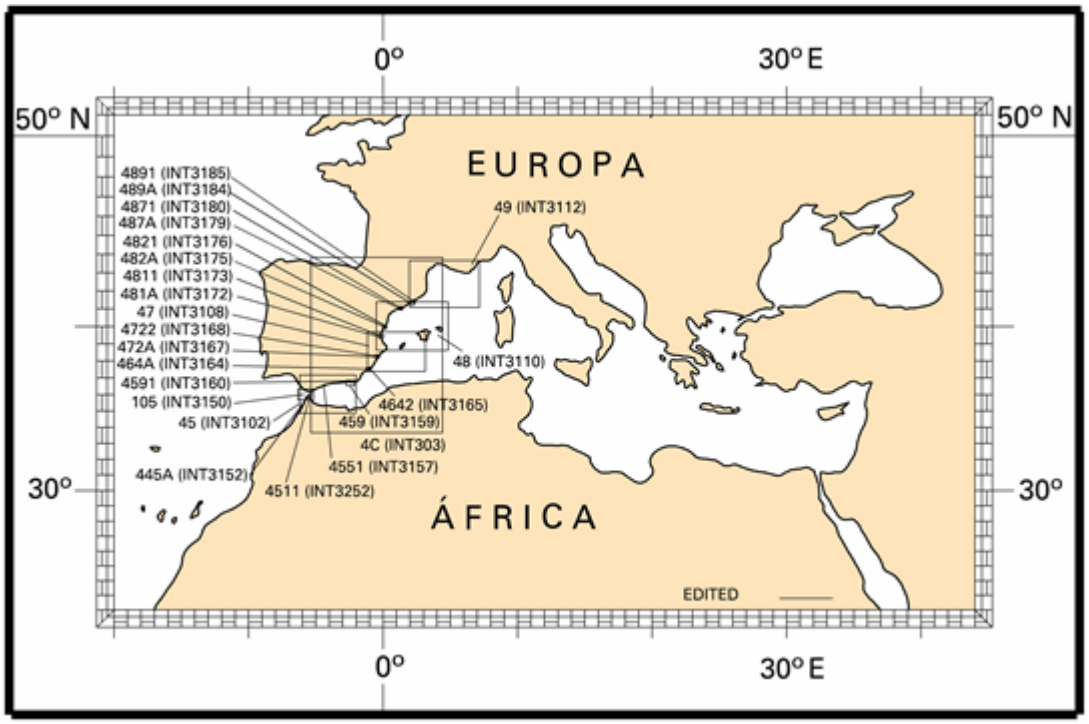

Figure 15. Status of the INT charts production assigned to IHM

The boundaries of medium scale INT charts (3102, 3106, 3108, 3110 y 3112) are being modified to adjust to the boundaries of the corresponding scale of the scheme for INT charts (1:250.000) in accordance with Table 3.

The next table shows status of the INT charts production assigned to SPAIN pending to be published.

INT No.	National No.	Title	Edition	Scale
3106	46	De cabo de Gata a Cabo de las Huertas y de cabo Milanio a cabo IVI	III oct 2013	1:350 000

Table 6

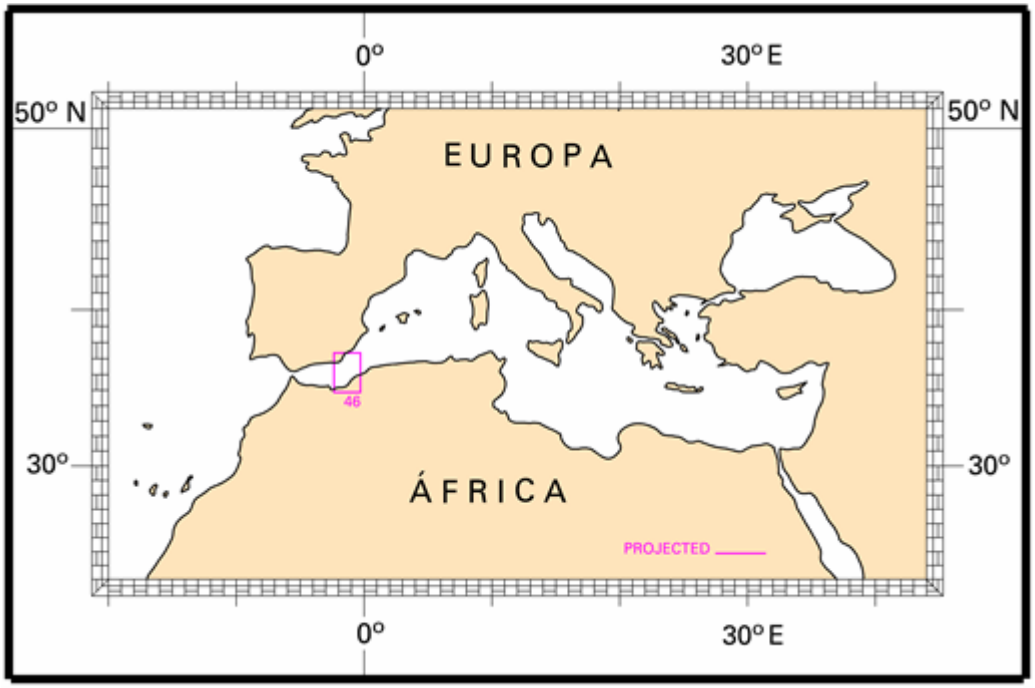

Figure 16. Status of the INT charts production assigned to IHM pending to be published

3.5 National paper charts.

The next table shows national charts made since the last XIX MBSCH Conference:

National No	Title	Edition
4894	Puertos de Mataró, El Balís y Arenys de Mar	I May 2016
4923	Puerto de San Feliú de Guixols, Platja d'Aro y Palamós	I Jun 2016
4643	Dársena Militar y puertos de Cartagena y Escombreras	I Sep 2016
4924	Puertos de Aiguablava, Llafranc e islas Hormigas	I Sep 2016
4741	De ensenada de Jávea al puerto de Denia.	V Oct 2016
4881	Puertos de Vilanova i la Geltrú y Sitges	I Oct 2016
D48NE	Puertos de Mallorca NE	I May 2016
4710	Puertos de Torrevieja, Cabo Roig, Campoamor y La Horadada	I Sep 2015
471A	De cabo Palos a S. Pedro del Pinatar con el Mar Menor	I Sep 2015
445	Estrecho de Gibraltar	V Jun 2015
4451	Puerto Algeciras	XI Sep 2015
4931	Puertos de l´Estartit, l´ Escala e islas Medas.	I Oct 2015
4933	Puertos de Port de la Selva, Llança, Colera y Portbou	I Oct 2015

Table 7

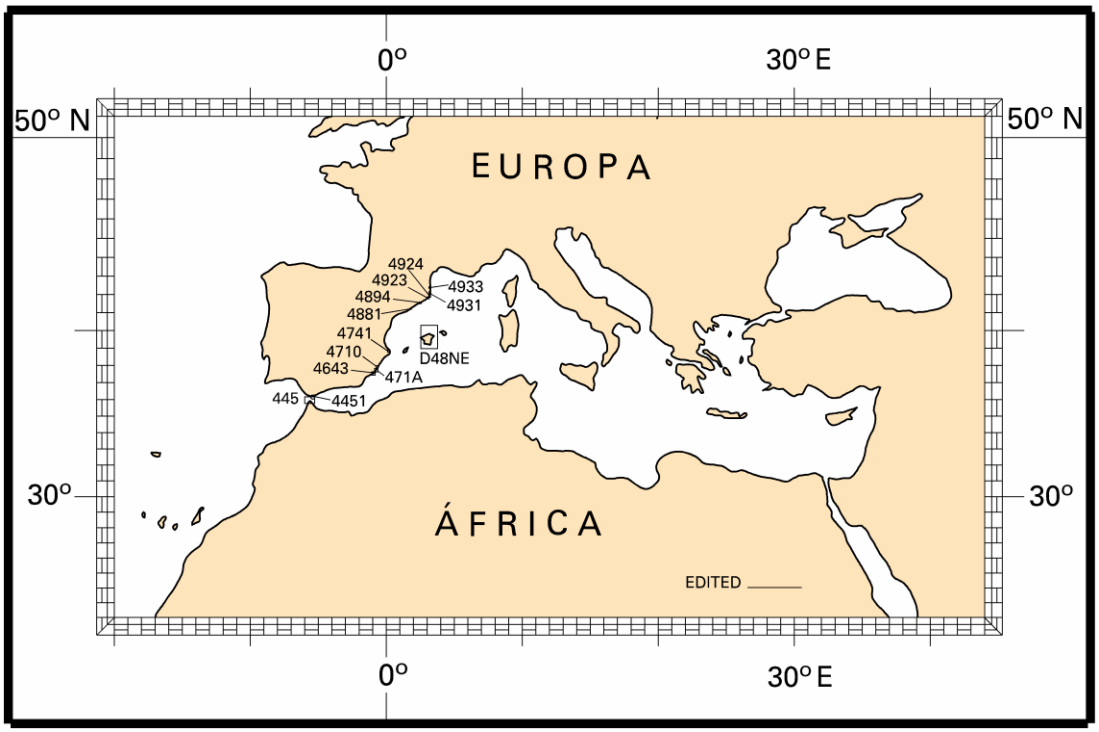

Figure 17. National Paper Charts produced in the MBSHC May 2015-2017

3.6 Other charts.

Leisure Charts

Since the new format for leisure charts was implemented, from May 2015, a booklet of leisure charts was published, chart D-48NE. Currently, there is work in progress regarding eight new editions of booklet of leisure charts in the Mediterranean Sea area.

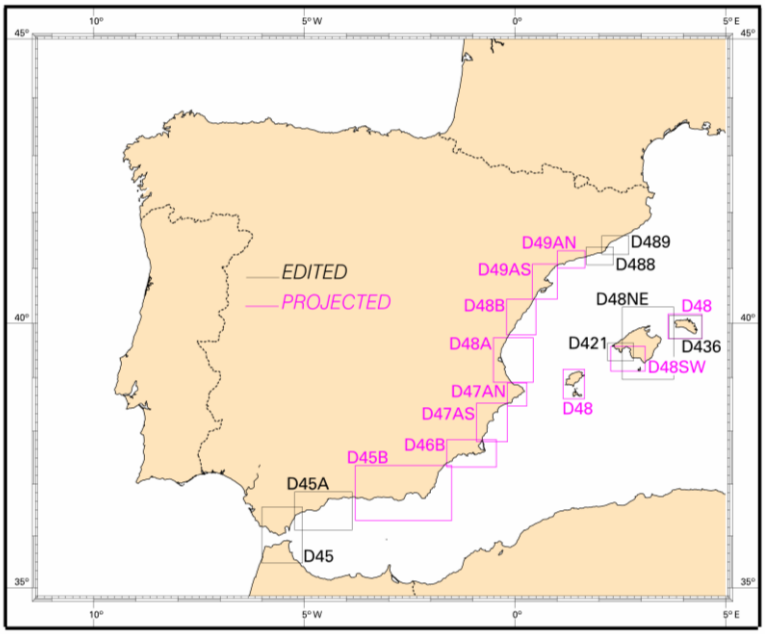

Figure 18. Leisure charts

National No	Title	Edition	Published
D45	De Barbate a Estepona y de cabo Espartel a cabo Negro	I Dic 2014	X
D45A	De Estepona a p unta de Torrox	I Dic 2013	X
D488	Del puerto de Vilanova y La Geltrú al puerto de Barcelona	I dic 2006	X
D489	Del puerto de Barcelona al puerto de Arenys de Mar	I Oct 2008	X
D48NE	De Cala Figuera a Sóller	I Jun 2016	X
D 421	De la isla Dragonera a cabo Blanco	I Jun 2005	X
D436	Isla de Menorca	I May 2004	M
D48SW	Puertos de Mallorca SW	TBD	TBD
D48	Puertos de Menorca e Ibiza	TBD	TBD
D45B	Puertos de Granada – Almería	TBD	TBD
D46B	Puertos de Murcia	TBD	TBD
D47AS	Puertos de Alicante 1	TBD	TBD
D47AN	Puertos de Alicante 2	TBD	TBD
D48A	Puertos de Valencia	TBD	TBD
D49AS	Puertos de Tarragona 1	TBD	TBD
D49AN	Puertos de Tarragona 2	TBD	TBD
D48B	Puertos de Castellón	TBD	TBD

Table 8

3.7 Issues encountered.

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4. NEW PUBLICATIONS AND UPDATES.

4.1 New publications.

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4.2 Updated publications.

Publications are updated via Notice to Mariners (*Avisos a los Navegantes*) booklet which can also be downloaded free of charge from the IHM section in the Spanish Navy Official Website.

4.2.1 Charts new editions:

- A new edition of «*Catálogo de Cartas Náuticas y otras publicaciones*» (Catalogue of Nautical Charts and Publications) was published in the third quarter of 2015, the second quarter of 2016, and first quarter 2017.

- A new edition of publication «*INT1, Símbolos, abreviaturas y términos usados en las cartas náuticas (5ª Edición*) » (Symbols, Abbreviations and Terms Used on Nautical Charts) was published in the fourth quarter of 2015.

- It is scheduled a new edition of publication «*INT1, Símbolos, abreviaturas y términos usados en las cartas náuticas (6ª Edición*) » (Symbols, Abbreviations and Terms Used on Nautical Charts) in the third quarter of 2017

4.2.2 Nautical publications

- *Catalog of Nautical Charts and other publications*, 2015 edition.

- IHO S-4 associated publication INT *1 – Symbols, Abbreviations and Terms use on Charts (Spanish version)*, 5th edition 2015.

- *Regulations for International (INT) Charts and Chart Specifications of the IHO* (Spanish: Edition 4.6.0, April 2016 - Publication date: April 2016)

- *List of lights and fog signals, part I 2017 edition*. Atlantic Spain and Portugal coast and occidental Africa coast from Espartel Cape to Verde Cape (Senegal) and Azores, Madeira, Canarias and Verde Cape islands.

- List of lights and fog signals, part II 2017 edition. Gibraltar Strait, Balearic Islands and Mediterranean coasts of Spain, Morocco and Algeria.

- *Sailing Directions num. 1*. From Río Bidasoa to Río Rivadeo.

- *Sailing Directions num. 2*. From Río Rivadeo River to Cabo Finisterre.

- *Sailing Directions num. 3*. From Cabo Finisterre to Río Miño.

- *Sailing Directions num. 4*. From Río Miño to Río Guadiana, and Azores Islands.

- *Sailing Directions num. 5*. From Río Guadiana to Sacratif Cape and the North and South coasts of Gibraltar Strait.

- *Sailing Directions num. 6*. From Sacratif Cape to Cabo La Nao, North Coast of Morocco and Coast of Algeria to Kramis Cape.

- *Sailing Directions num. 7*. From Cabo La Nao to France Border.

- *Sailing Directions num. 8*. Islas Baleares and North Coast of Algeria from Kramis Cape to Tunisia Border.

- *Sailing Directions num. 9*. Northeast Coast of Africa from Espartel Cape to Verde Cape. Madeira, Selvagens and Cabo Verde Islands.

- *Sailing Directions num. 10*. Islas Canarias.

- *Radiosignals book 2017 edition*.

4.3. Means of delivery

Charts and other nautical publications produced by the Instituto Hidrográfico de la Marina can be purchased through the net of authorized sales agents. Contact information with these sales agents is available in the following internet address:
IHM sales agents
http://www.armada.mde.es/ihm/Aplicaciones/Agentes/Index_Agencias_xml.htm

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:

Faros y Señales de Niebla
http://www.armada.mde.es/ihm/Aplicaciones/LibroFaros/V3/index.html#

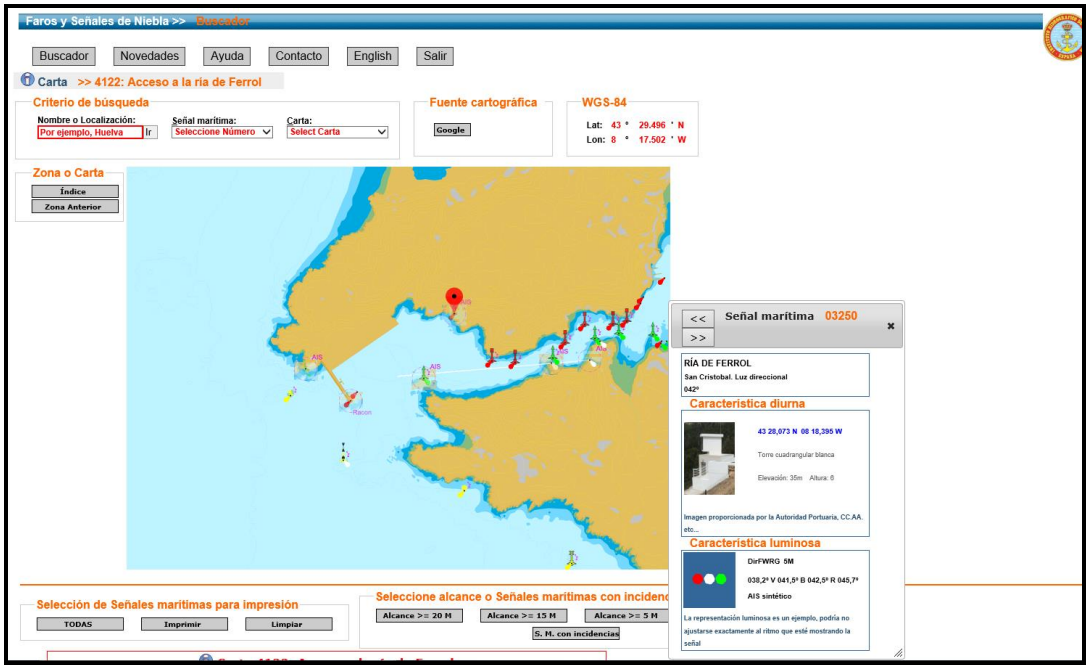

Figure 19. Screenshot of the List of Lights and Fog Signals interactive tool

4.4. Problems encountered.

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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.

NAVAREA III 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 25 NAVTEX Stations broadcast in the International NAVTEX Service, some of them broadcasting also at 490 KHZ in local language, covering the Mediterranean and Black Seas, except the coastal area of Libya. This area is covered by SAFETYNET.

IHM liaises with SHOM exchanging NAVAREA warnings originated in each region that are relevant for each coordinator.

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

5.1.2. 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

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5.3. Problems encountered.

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6. S-55.

6.1. Spain. Cartographic Region F.

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	39	61	0
Dephts > 200 m	87	0	13

Table 9

This table has been updated not considering now single beam coastal surveys (<200 m) as complying adequately with S-44 standards. Only multi beam surveys have been considered.

6.1.2 Cartographic production

Status of cartographic production within the Spanish EEZ.

A = percentage covered by INT chart series, or paper charts complying with S-4 regulations.
B = percentage covered by raster charts (RNCs) complying with S-61 regulations.
C = percentage covered in accordance with S-57 regulations.

Purpose / Scale	**A**	**B[1]**	**C**
Offshore passage / Small	100	0	100
Landfall and Coastal passage/ Medium	100	0	100
Approaches and Ports / Large	100	0	84

Table 10

[1] Spain does not produce raster charts.

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

Table 11

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.

Table 12

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 25th April 2013 the Specialization Programs in Hydrography & Oceanography for Naval Officers (Category A) and for Petty Officers (Category B) were revalidated and recognized by the FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers.

This School is currently implementing a virtual portal as a supporting knowledge center for students including a repository for teaching documents, regulations, procedures, relevant links and various learning resources.

Learning platform MOODLE is used both in online training and to complement classroom courses, as it can be used as a basic repository of student resources and as a network learning environment for students to interact, access content and complete tasks, monitoring their full performance online and in the classroom.

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

Category A course:

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 Argelia
- 1 Officer from Morocco

From 2009-2015

- 14 Officers from the Spanish Navy
- 2 Officer from Argelia
- 1 Officer from Argentina
- 1 Officer from Dominican Republic
- 1 Officer from Guatemala
- 1 Officer from Honduras
- 1 Officer from Morocco
- 1 Officer from Tunisia

Category B course:

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 the Morocco

From 2009-2015

- 11 Petty Officers from the Spanish Navy
- 3 Petty Officer from Dominican Republic

Nowadays, all the students who take the aforementioned 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 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 Defense Attaché to the corresponding Spanish Embassy

7.2 Training requests, requirements, offers.

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

A Spanish Navy officer from IHM is attending the course in «Ocean Engineering: Ocean Mapping - MS» at the Center for Coastal and Ocean Mapping & Joint Hydrographic Center Chase Ocean Engineering Lab, Univ. of New Hampshire, for a two years period.

Another Spanish Navy officer is attending the Master of Coastal and Port Engineering at the University of Cantabria, for a period of two years.

Two members of the ENC Office staff attended the Second Course on ENC Validation 2016 ("IC-ENC ENC Validation Training Course") at the IC-ENC facilities in Taunton from 4th to 13th July 2016.

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 Algeria, pending the official signature:

- Bilateral cooperation agreement between Hydrographic Services IHM and "Service Hydrographique des Forces Navales" (SHFN) from Algeria.
- Technical co-production agreement for INT charts 3104 and INT 3106: co-production INT chart 3106 (1:350.000) immediately after the signature of agreement as an interim INT chart, and then, co-production INT 3104 (1:250.000) several months after the agreement (delete INT 3106).

7.4 Definition of bids to IHOCBC

NTR.

8. OCEANOGRAPHIC ACTIVITIES

8.1 General

During the last 5 years, the main effort of the Oceanographic Section has been aimed on making real time tide data, available to IHM Hydrographic Commissions, in order to improve the bathymetric results due to have extra time because with this method is not necesary to discharge tide data at the tide station as we used to do. These has been reached developing the following ideas:

Creating a WEB interface for remote access to tide data. This interface will provide access not only to IHM stations, but also to stations which belong to other organizations which have entered into arrangements to share tide data. This web is working now although is not completed yet.

Investing in real time data acquisition systems, both for new and existing tide stations.

8.2 GEBCO/IBC's activities

The IHM, as a partner, has been part of the EMODNET Project from 2013 to June 2016.

GEBCO is making use of data from the EMODNET Project

8.3 Tide gauge network

This IHM has purchased 10 new tidal stations, in 2014 and 2015, fitted with Valeport radar technology, capable of real time data transmission via GPRS modem.

These stations has been deployed by hydrographic commissions alongside fixed stations from IHM and collaborating organizations, so that IHM bathymetric works may include near-real-time tide data (near real time).

8.4 New equipment

During the last two years, no new Oceanographic equipment has been purchased, except XBT to calibrate multibeam systems.

8.5 Problems encountered

NTR.

9. OTHER ACTIVITIES

9.1 Participation in IHO Working Groups

IHM takes part in several working groups of the IHO:

- Definition and Length of Coastline Working Group.
- Tides, Water Level and Currents WG (TWLCWG).
- Nautical Charts Working Group (NCWG).
- S-100 Working Group (S-100WG).
- ENC Standards Maintenance Working Group (ENC-WG).
- Nautical Information Provision Working Group (NIPWG).
- World Wide Navigational warning Service Sub-Committee (WWNWS).
- World Wide Navigational Warning Service Sub Committee (WWNWS SC).
- Marine Spatial Data Infrastructure Working Group (MSDIWG).
- IHO-EU Network Working Group (IHO-EU NWG).
- Hydrographic Dictionary Working Group (HDWG)

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).

9.2 Meteorological data collection

NTR

9.3 Geospatial studies

NTR

9.4 Disaster prevention

NTR

9.5 Environmental protection

NTR

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).

Also, the Spanish Central Archive of Cartography (Instituto Geográfico Nacional) 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).