



**SPAIN**

**NATIONAL REPORT**

**TO THE 22<sup>nd</sup> MEETING  
OF THE MEDITERRANEAN AND BLACK  
SEAS HYDROGRAPHIC COMMISSION  
(MBSHC-22)**

**CADIZ, ESPAÑA (SPAIN)  
APR 2022 – MAY 2024**

**Instituto Hidrográfico de la Marina  
Cádiz - España**

# HYDROGRAPHIC SERVICE

Instituto Hidrográfico de la Marina (IHM, España). There haven't been relevant internal modifications in the organization of our Hydrographic Service since the last meeting. Our organization, mission and different kind of services offered can be found at <http://www.armada.mde.es/ihm>

This report covers the period Apr 2022 – May 2024.

## 2. SURVEYS

### 2.1. Coverage of new surveys

A total of 99% 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: 47% 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 eight hydrographic surveys by using Multibeam Echosounders (MBES). These surveys were performed by our hydrographic vessels in the Tarragona, Valencia, Castellón, Almería and Ibiza coastal waters. One of them, it was carried out by an Unmanned surface Vehicle (USV) of recent acquisition. Besides, during the months of May and June of 2022 a hydrographic survey was carried out to obtain data in the Spanish Economic Exclusive Zone (Figure 1).

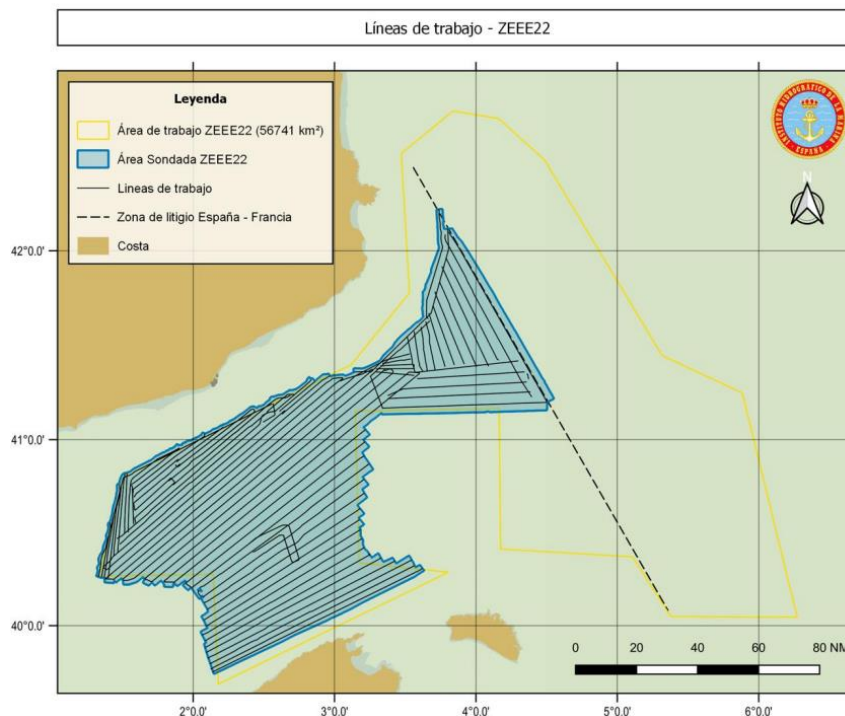


Figure 1. Hydrographic survey during the months of May and June 2022 in the Spanish EEZ.

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 and Exclusive order surveys). For this purpose, IHM employed transportable hydrographic launches, small boats and Unmanned Surface Vehicles, fitted with MBES (Figures 2 and 3).

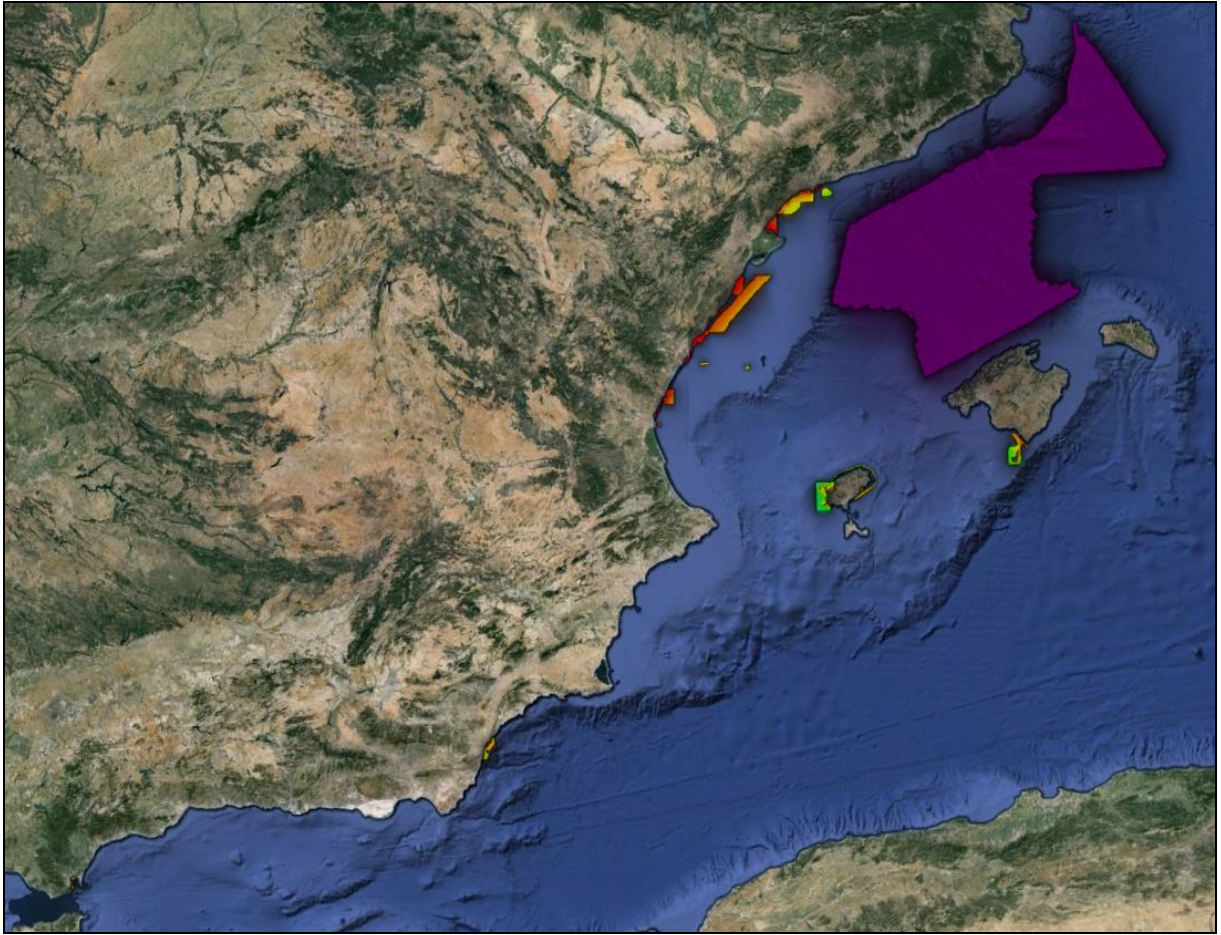


**Figure 2. Unmanned surface Vehicle VERIL class.**



**Figure 3. Unmanned surface Vehicle SONDA class.**

Compiled bathymetric coverage conducted by Spanish navy survey ships from Apr 2022 to May 2024 is illustrated in the next figure 4:



**Figure 4. Compiled bathymetric coverage conducted by Spanish Navy survey ships from Apr 2022 to May 2024**

### Survey planning

IHM surveys were conducted in accordance with the current IHO standards (IHO S-44 6.1.0<sup>th</sup> 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**

### **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 percentage is reaching the 97% of the total Cartography published by IHM.



### 2.2.2. 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 7000 meters.
- *BH Malaspina* is fitted with *Kongsberg EM302* and *EM 2040 MKII MBES* acquired in December 2020 with *Seapath 380* (RTK positioning capable). Recently, a second receive transducer was installed to improve the multibeam echosounder.
- *BH Tofiño* has the MBES *EM304* fitted in May 2022 and *EM 2040* with *Seapath 380* (RTK capability). The IHM intends to acquire a second receive transducer to improve the MBES installed on the *Tofiño* and a MBES for very shallow waters dual head.
- For very shallow water surveys, both vessels are provided with *Kongsberg Geoswath+ PDBSS*, *EM 2040 Portable* with *Seapath 130* (RTK positioning capable), *RESON T20P* with *Applanix* (RTK positioning capable) and a *RESON T20R* with *Applanix* (RTK positioning capable) to be fitted on their small launches. The IHM intends to acquire a MBES for very shallow waters dual head.
- Coastal Hydrographic Vessel *BH Antares* was fitted with a *Kongsberg EM3002*. 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 was provided with *Kongsberg Geoswath+ PDBSS*, *EM 2040 Portable* and *RESON T20P* to be fitted on her small launches. Past February 16<sup>th</sup> the BH Antares was removed from the official list of ships of the Spanish Navy.
- All the *Kongsberg Geoswath+ PDBSS*, *EM 2040 Portable*, *RESON T20P* and *RESON T20R* mentioned are shared among the vessels of the Hydrographic Flotilla. IHM has a total of two *Geoswath+ 500*, one *Geoswath+ 250*, two *EM 2040P*, one *RESON T20P* and one *RESON T20R*.
- *LHT Astrolabio* is fitted with a *Kongsberg EM2040 MKII DUAL Compact MBES* with *Seapath 380* (RTK positioning capable).
- *LHT Escandallo* was fitted with a *Kongsberg EM2040 MKII DUAL Compact MKII MBES* with a *Seapath 380* (RTK positioning capable).
- *LHT Sondaleza* has no permanent echosounder installed and can be fitted either with a *Kongsberg Geoswath+ PDBSS*, *EM 2040P* or a *RESON T20P* when deployed.

- Three Unmanned surface Vehicle, two of them OTTER PRO model (VERIL class) and one of them MARINER model (SONDA class), of Maritime Robotics Company. During 2024, the IHM intends to acquire a third USV model “Otter Pro” equipped with an EM 2040 portable and a SEAPATH 130 OEM.



**Figure 5. USV VERIL01 and SONDA01**

- Remotely Pilot Aircraft System (RPAS).

The IHM has also acquired in two RPAS MATRICE 300 RTK for surveying use and autonomous capabilities. It is a quadcopter weighing 8 kg and with a wingspan of 90 cm, equipped with a high-resolution camera, LIDAR laser scanner, multispectral sensor and positioning with centimetre precision. This RPAS has a range of up to 55 minutes per flight and will be used to quickly obtain digital terrain models, beach profiles and estimate the bathymetry of very shallow waters in locations that are difficult to access. It is planned to increase the acquisition capacity with other new sensors.



**Figure 6. RPAS and devices.**



Figure 7. New coastline in La Palma Island formed after a volcanic eruption. Data collected by RPAS.

### 2.2.2.1 Bottom Mapping Sonars

Although seafloor mapping is achieved mostly by using MBES. IHM have got:

- A Klein 3900, 4000 and 4900 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 are acquired during surveys with this equipment. This allows for precise geo-referenced bottom images.
- Small boats are also fitted with pole-mounted *Starfish* SSS for very shallow water surveys.
- Sub-bottom profiler “Innomar Compact”, for shallow waters, with the ability to detect buried objects and classify the layers of the marine subsoil up to 200 m deep is obtained.
- The IHM has acquired two submarine cameras designed for the collection of high-definition still images for biological and geological mapping, by collecting stationary images; the system can collect precise measurements of seafloor features and biology.
- 

The operational use of these new means is expected to begin in hydrographic surveys and expeditionary missions in the second quarter of 2024 after initial tests and the generation of employment procedures.

### 2.3. New ships

IHM proposed to replace its hydrographic fleet with new survey vessels for modern, sophisticated and low-noisy vessels and boats by means of an operational requirements

document. The submitted proposal was approved. The new hydrographic fleet will be made up of one oceanic vessel, two coastal hydrographic vessels, five survey boats and several autonomous surface vehicles to cover from the coastline to deep waters.



Figure 8. New coastal hydrographic vessel.

### 3. NEW CHARTS AND UPDATES

#### 3.1 ENC coverage, gaps and overlaps

To date, IHM has produced during this period 97 ENC's within the area of the MBSHC (out of a total of 330 published for all areas).

Since the last MBSHC meeting, IHM has produced 6 new ENC's, and 91 new ENC editions. This shows the increasing workload associated with maintaining and updating the ENC catalog, which slows the production of new ENC's.

While it continues the work to finish Purpose 5 Project, Purpose 6 Project has started with the most important commercial ports.

Purpose 2	Purpose 3	Purpose 4	Purpose 5	Purpose 6
General	Coastal	Approach	Harbour	Berthing
1	4	17	71	4

Table 1. Distribution of ENC production in the MBSHC area

MBSHC ENC Production until May 1, 2024					
Purpose	Total	Published	Pending	% Published	% Pending
2	1	1	0	100%	0%
3	10	10	0	100%	0%
4	44	44	0	100%	0%
5	118	115	3	97,45%	2,55%
6	21	5	16	23,8%	76,2%
<b>Total</b>	<b>194</b>	<b>175</b>	<b>19</b>	<b>90,2%</b>	<b>9,8%</b>

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





Figure 9. Navigational purpose 2 and 3 ENC production in the MBSHC Apr 2022-May 2024

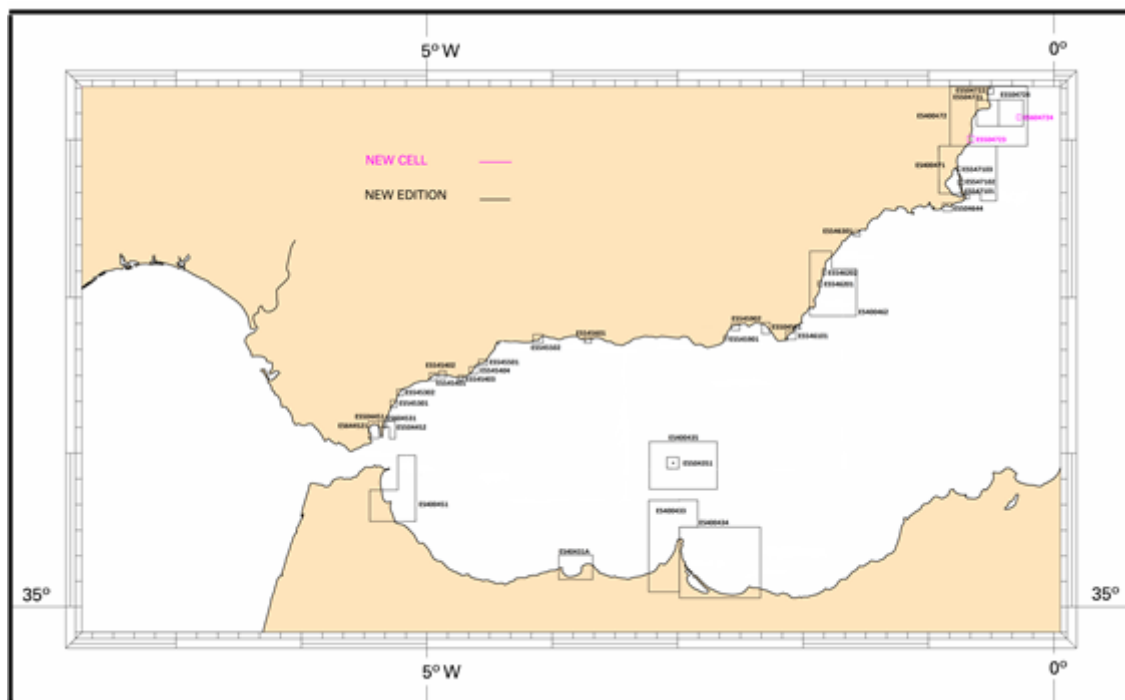


Figure 10. Navigational purpose 4, 5 and 6 ENC production in the MBSHC Apr 2022-May 2024 part 1

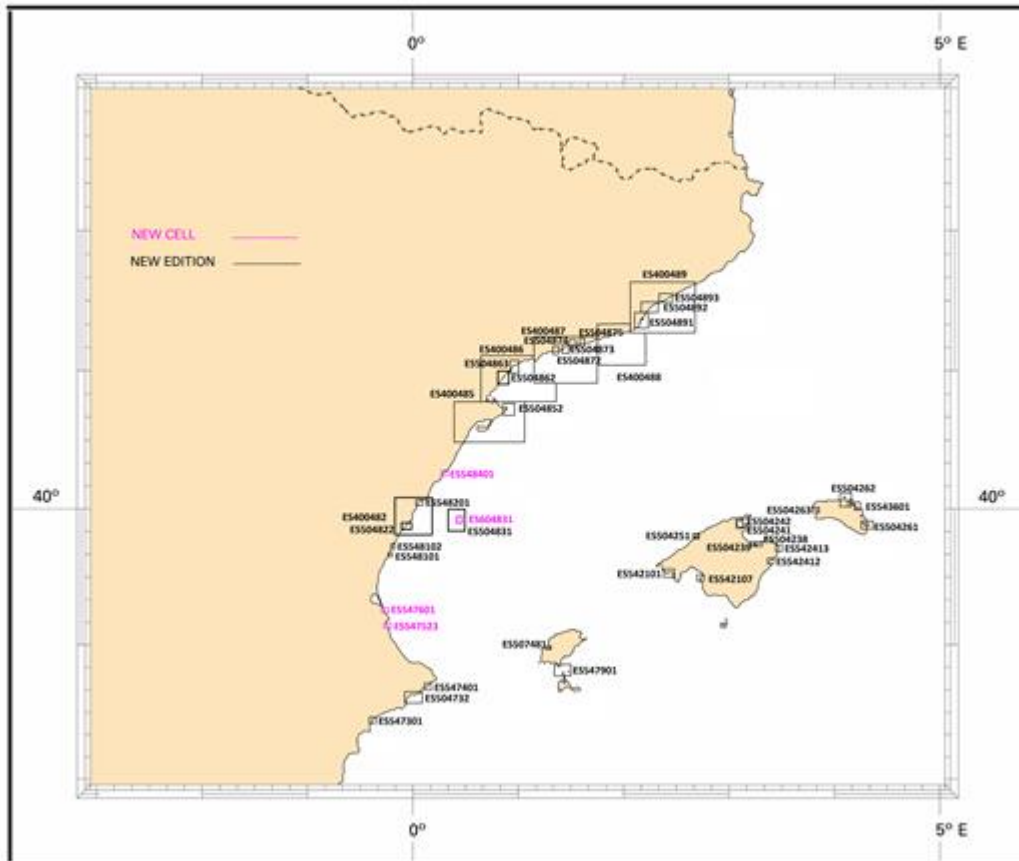


Figure 11. Navigational purpose 4 and 5 ENC production in the MBSHC Apr 2022-May 2024 part 2

### ENC distribution method.

Spain is a member of the International Center for ENC ([www.ic-enc.org/](http://www.ic-enc.org/)) RENC from the beginner of the IC-ENC. 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.

### RNCs.

Spain does not produce raster charts.

### INT Charts.

Nowadays, IHM has produced 57 International charts, 25 within the area of the MBSHC (out of a total of 304 published for all areas).

Since last MBSHC meeting, IHM has produced 2 new INT Charts, and 15 new editions. This table shows the increasing workload associated with maintaining and updating the INT Chart catalog.

<b>Navigational purpose</b>	<b>MBSHC ZONE</b>
INT charts made since the last MBSCH Conference	2
Charts projected for the second semester of 2024 and 2025/26	5
Status of the INT charts production assigned to IHM pending to be published	7

**Table 3**

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

<b>INT No</b>	<b>National No</b>	<b>Title</b>	<b>Edition</b>
3185	4891	Puerto de Barcelona	XI Dic 2022
3156	455A	Aproches del puerto de Málaga	VIII Oct 2023

**Table 4. INT charts made since the last MBSCH Conference**

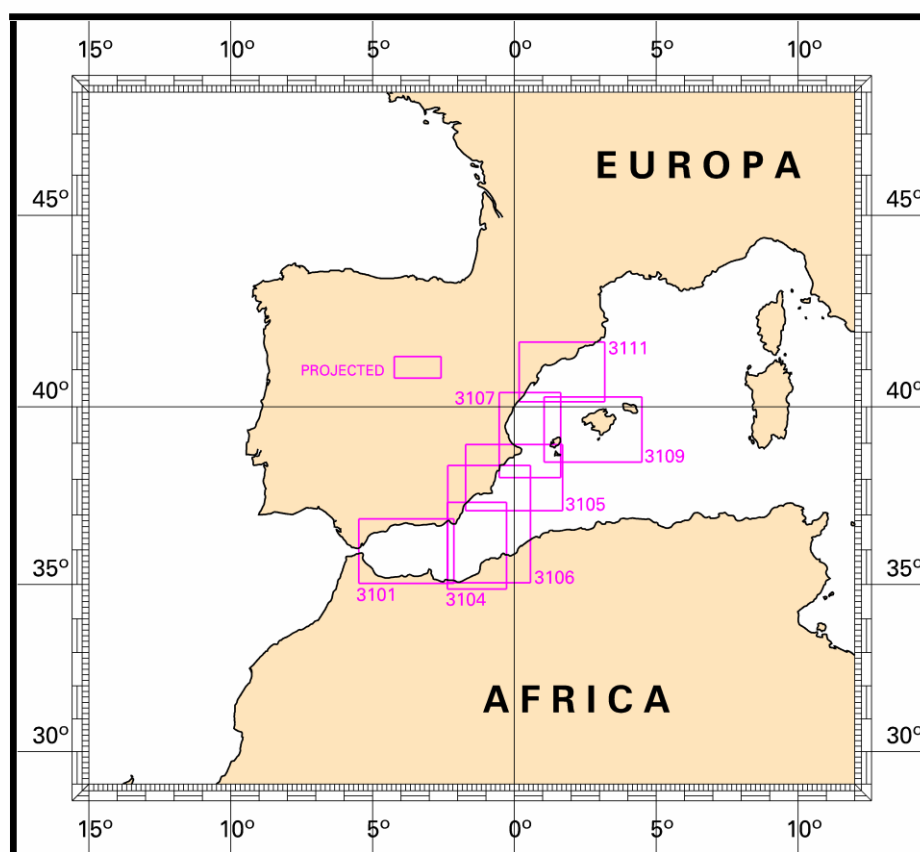


**Figure 12. INT charts produced since the last MBSHC Conference**

The next table shows INT charts projected for the second semester of 2024, and 2025/26.

INT No	National No	Title	Edition
3101	45A1 (1:275 000)	Estrecho de Gibraltar y Mar de Alborán	TBD <sup>[1]</sup>
3104	46A1 (1:250 000)	Del Cabo de Gata Punta el Caño y de Saídía a Cap Carbón	TBD (2021) <sup>[2]</sup>
3105	47A1 (1:250 000)	De Punta El Cañon a Gandia con Ibiza y Formentera	TBD <sup>1</sup>
3106	46 (1:350 000)	De cabo de Gata a cabo de las Huertas y de cabo Milonia a cabo Ivi	TBD (2020) <sup>[3]</sup>
3107	48A1 (1:250 000)	De la Isla de Tabarca a Peñíscola con Ibiza y Formentera	TBD <sup>1</sup>
3109	48 B1 (1:275 000)	Islas Baleares	TBD <sup>1</sup>
3111	48C1 (1:250 000)	De Las Fuentes a Tossa de Mar	TBD <sup>1</sup>

\* INT 3106, Coproduction as INT Chart between Algeria and Spain. Exist as National Spanish Chart  
**Table 5. INT charts projected for the second semester of 2024, and 2025/26.**



**Figure 13. INT paper Charts projected in the MBSHC second semester 2024 to 2025/2026**

<sup>[1]</sup> Delayed to 2025/2026 due to HPD conversion.

<sup>[2]</sup> Pending on Spanish/Algerian Agreement.

<sup>[3]</sup> Pending on Spanish/Algerian Agreement.

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

INT No.	National No.	Title	Edition	Scale
303	4C	Mar de Alborán y Mar Balear	97/97	1 000 000
3102	45	Estrecho de Gibraltar y Mar de Alborán	79/17	350 000
3108	47	De Cabo Tiñoso a Cabo Canet con las islas Ibiza, Formentera, Cabrera y Costa sudoeste de Mallorca	76/16	350 000
3110	48	De Cabo de la Noa a Barcelona con las Islas Baleares	78/16	425 000
3112	49	Golfo de León – De Punta del Llobregat a Cabo d’Antibes	79/17	400 000
3113	49A	De Barcelona al Cap Cerbère con las islas de Mallorca y Menorca	20/20	275.000
3150	105	Estrecho de Gibraltar	98/21	100 000
3152	445 A	Côte Sud d’Espagne – Bahía de Algeciras	86/08	25 000
3156	455 A	Aproches del Puerto de Málaga	84/23	25 000
3157	4551	Puerto de Málaga	95/21	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	93/21	10 000
3164	464 A	Aproches de Cartagena y Escombreras	85/20	30 000
3165	4642	Puertos de Cartagena y Escombreras	96/17	10 000
3167	472 A	Aproches del Puerto de Alicante	87/09	25 000
3168	4722	Puerto de Alicante	87/20	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	94/21	10 000
3175	482 A	Aproches del Puerto de Castellón	95/03	25 000
3176	4821	Puerto de Castellón	91/16	10 000
3179	487 A	Aproches del Puerto de Tarragona	89/22	25 000
3180	4871	Puerto de Tarragona	80/21	10 000
3184	489 A	Aproches del Puerto de Barcelona	87/20	25 000
3185	4891	Puerto de Barcelona	92/22	12 500
3252	4511	Bahía y Puerto de Ceuta	92/21	10 000

**Table 6. INT charts production assigned to IHM**



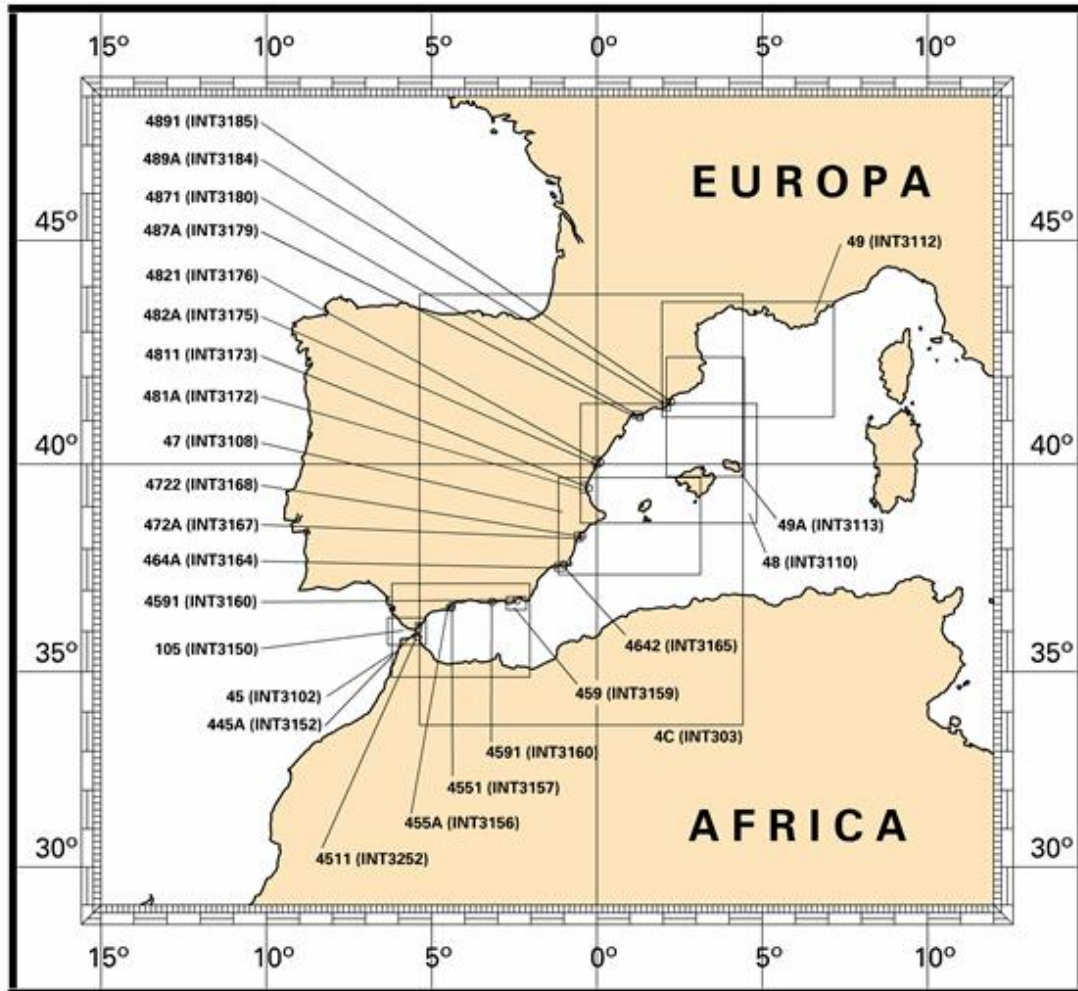


Figure 14. Status of the INT charts production assigned to IHM

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	13	6
Large 80.000-10.000	18	18
TOTAL	32	25

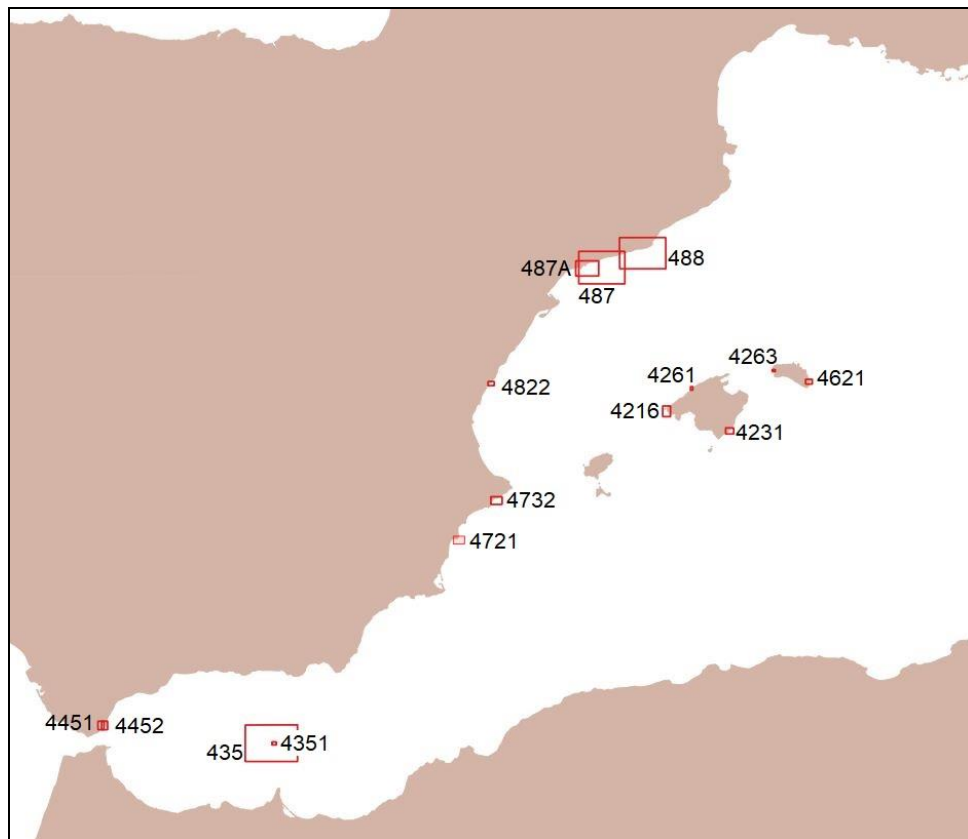
Table 7. INT charts assigned to Spain

### 3.5 National paper charts.

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

National No	Title	Edition
4251	Puerto de Sóller	II Apr 2022
4822	Puerto de Burriana	III Apr 2022
487A	Aproches de Tarragona	V Apr 2022
4351	Isla de Alborán	IV May 2022
4721	Santa Pola e Isla de Tabarca	III May 2022
435	Isla de Alborán	III Jun 2022
4451	Puerto de Algeciras	XII Jul 2022
4231	Cala Figuera, porto Petro y cala Llonga	II Sep 2022
488	De Vilanova i la Geltrú a Barcelona	V Dec 2022
4263	Puerto de Ciutadell	II Feb 2023
487	Del cabo de Salou al puerto de Vilanova i La Geltrú	V Mar 2023
4732	Del puerto de Altea al puerto de Calpe	III Oct 2023
4261	Puerto de Mahon	II Nov 2023
4452	Puertos de La Línea y Gibraltar	VII Dec 2023
4216	Freu de Dragonera y puerto de Andratx	II Apr 2024

**Table 8. national charts made since the last MBSCH Conference**



**Figure 15. National Paper Charts produced from April 2022 to May 2024.**

### 3.6 Other charts.

#### Leisure Charts

Its production was canceled to develop the Electronic Chart Display (ECD) product supported by the RENC IC-ENC.

## 4. NEW PUBLICATIONS AND UPDATES.

### 4.1 New publications.

Nothing to report (NTR).

### 4.2 Updated publications.

Publications are updated via Notice to Mariners:

<https://armada.defensa.gob.es/ArmadaPortal/page/Portal/ArmadaEspañola/cienciahm1/prefLang-es/02ProductosServicios--01avisos> booklet which can also be downloaded free of charge from the IHM section in the Spanish Navy Official Website.

Translation into Spanish of the following publications:

- IHO S4 Publication, “Regulations of the IHO for International (INT) Charts and Chart Specifications of the IHO”, Edition 4.9.0.
- IHO S-44 Publication, “International Hydrographic Organization Standards for Hydrographic Surveys”, Edition 6.1.0.

#### 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 first quarter 2024.



Figure 16. Catalogue of Nautical Charts and other Publications

#### 4.2.2 Nautical publications

- *IHO S-4 associated publication INT 1 – Symbols, Abbreviations and Terms use on Charts (Spanish version)*, 7<sup>th</sup> edition 2022.
- *Regulations for International (INT) Charts and Chart Specifications of the IHO (Spanish: Edition 4.9.0, March 2021). S-4*
- *List of lights and fog signals, part I 2024 edition*. Atlantic Spain and Portugal coast and occidental Africa coast from Espartel Cape to Verde Cape (Senegal) and Azores, Madeira, Canary and Cape Verde islands.
- *List of lights and fog signals, part II 2024 edition*. Gibraltar Strait, Balearic Islands and Mediterranean coasts of Spain, Morocco and Algeria.
- *Sailing Directions num. 1*. From Río Bidasoa to Río Rivadeo. 2023 edition.
- *Sailing Directions num. 2*. From Río Rivadeo to Cabo Finisterre. 2022 edition.
- *Sailing Directions num. 3*. From Cabo Finisterre to Río Miño. 2023 edition.
- *Sailing Directions num. 4*. From Río Miño to Río Guadiana, and Azores Islands. 2022 edition.
- *Sailing Directions num. 5*. From Río Guadiana to Cabo Sacratif and the North and South coasts of Gibraltar Strait. 2024 edition.
- *Sailing Directions num. 6*. From Cabo Sacratif to Cabo La Nao, North Coast of Morocco and Coast of Algeria to Cabo Kramis. 2023 edition.
- *Sailing Directions num. 7*. From Cabo La Nao to France Border. 2024 edition.
- *Sailing Directions num. 8*. Balearic Islands and North Coast of Algeria from Cabo Kramis to Tunisia Border. 2023 edition.
- *Sailing Directions num. 9*. Northeast coast of Africa from Cabo Espartel to Cabo Verde. Madeira, Selvagens, and Cape Verde islands. 2023 edition.
- *Sailing Directions num. 10*. Canary Islands. 2022 edition.
- *Radiosignals book* 2023 edition.
- *International Regulations for Preventing Collisions at Sea* (1972)
- *Marine Signaling* 2023 edition
- *International Signal Code* 4<sup>a</sup> edition
- *Official Annual Tide tables from Spanish Hydrographic Office*

#### 4.3. Means of delivery

Charts and other nautical publications produced by the IHM can be purchased through the net of authorized sales agents. Contact information with these sales agents is available in the following internet address:

[https://armada.defensa.gob.es/ArmadaPortal/page/Portal/ArmadaEspañola/ciencia\\_ihm1/prefLang-es/02ProductosServicios--05Agencias](https://armada.defensa.gob.es/ArmadaPortal/page/Portal/ArmadaEspañola/ciencia_ihm1/prefLang-es/02ProductosServicios--05Agencias)

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

[https://ideihm.covam.es/apps\\_ihm/librofaros/index.html](https://ideihm.covam.es/apps_ihm/librofaros/index.html),

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Esta aplicación facilita, a todos los usuarios interesados, el acceso a los datos sobre señalización marítima existentes en las publicaciones "Faros y Señales Marítimas, Partes I y II". De ningún modo, esta aplicación sustituye a las publicaciones anteriormente citadas, y por lo tanto los navegantes no están exentos de continuar llevándolas a bordo, así como el resto de las publicaciones náuticas, debidamente actualizadas.

La cartografía que se facilita en alguna de las versiones de esta aplicación puede llevar retrasos de actualización con respecto a los datos de las señales marítimas, lo que puede provocar que las localizaciones de alguna de estas señales sobre la cartografía puedan parecer erróneas.

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**Buscador de Faros y Señales de Niebla**

**Ayuda**

Instrucciones:

1. Hago zoom sobre la zona que le interese y pulse sobre el botón **luzes**.
2. O bien, introduzca un **Criterio de búsqueda** (nombre, localización o número de una señal marítima) o seleccione una carta náutica del desplegable.
3. Pulse sobre el icono lupa para mostrar los señales marítimos sobre el mapa.
4. Puede escotar los resultados o la vista marcando la casilla correspondiente.
5. El número de señales mostrados se ajustará automáticamente a medida que ajuste el zoom sobre una zona del mapa.
6. Pulsando sobre el icono de la papelera, borrará los resultados.

[Manual detallado de uso](#)

[Enlace al Portal de la IdeHM](#)

<https://idehm.covim.es/portal/>

**Desarrollo:**

Este visualizador está desarrollado con la Herramienta API CNIG, lo cual permite integrar de una forma muy sencilla un visualizador de mapas interactivo en cualquier página web y configurarlo consumiendo ficheros WMS, servicios WMS, servicios WFS, ficheros KML, etc. Además, provee la capacidad de añadir una gran cantidad de herramientas y controles.

[Enlace a los recursos de la API CNIG: https://api.cnig.es/cnig-gui/](https://api.cnig.es/cnig-gui/)

Nivel de zoom 5 | Escala = 1 : 17.000.000  
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**Buscador de Faros y Señales de Niebla**

Criterio de búsqueda:

Acorar resultados a extensión de vista

Nº Nacional	Nombre	Buscar	Latitud Longitud	Apertura Periodo	Alcance millas
00120	PASAJIA	Faro de La Plata	43 20 081 N 1 50 034 W	OCW 4s	13M
00123	PASAJIA	Bajo de recogado	43 21 315 N 1 56 288 W	MANAW 7s	7M
00126	PASAJIA	Brancho del Este. En agua	43 20 222 N 1 55 652 W	FIR 5s	7M
00128	PASAJIA	Brancho del Oeste. Bajo	43 20 239 N 1 55 828 W	FG 5s	2M
00130	PASAJIA	Punto Arco de Aunil	43 20 144 N 1 55 676 W	FL2R 7s	7M
00135	PASAJIA	Asalaya. Semifaro	43 20 108 N 1 55 470 W	2BR 2s 3G 3BR (vert)	3M
00140	PASAJIA	Sanokozulua	43 19 905 N 1 55 609 W	DHOCCZWRG	12s
00150	PASAJIA	Sanokozulua	43 19 888 N 1 55 660 W	CW 1s	18M
00191	PASCAL	Semáforos	43 18 905 N 1 55 909 W	2W 7s	18M

Nivel de zoom 14 | Escala = 1 : 34.000  
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Figure 17. List of Lights and Fog Signals interactive tool



Since 2018, a new online interactive application for the *Spanish Tidal Predictions* is available in the following internet address:

[Spanish Tidal Predictions](#)

<https://armada.defensa.gob.es/ArmadaPortal/page/Portal/ArmadaEspañola/cienciahm1/prefLang-es/02ProductosServicios--045PrevisiondeMareas>

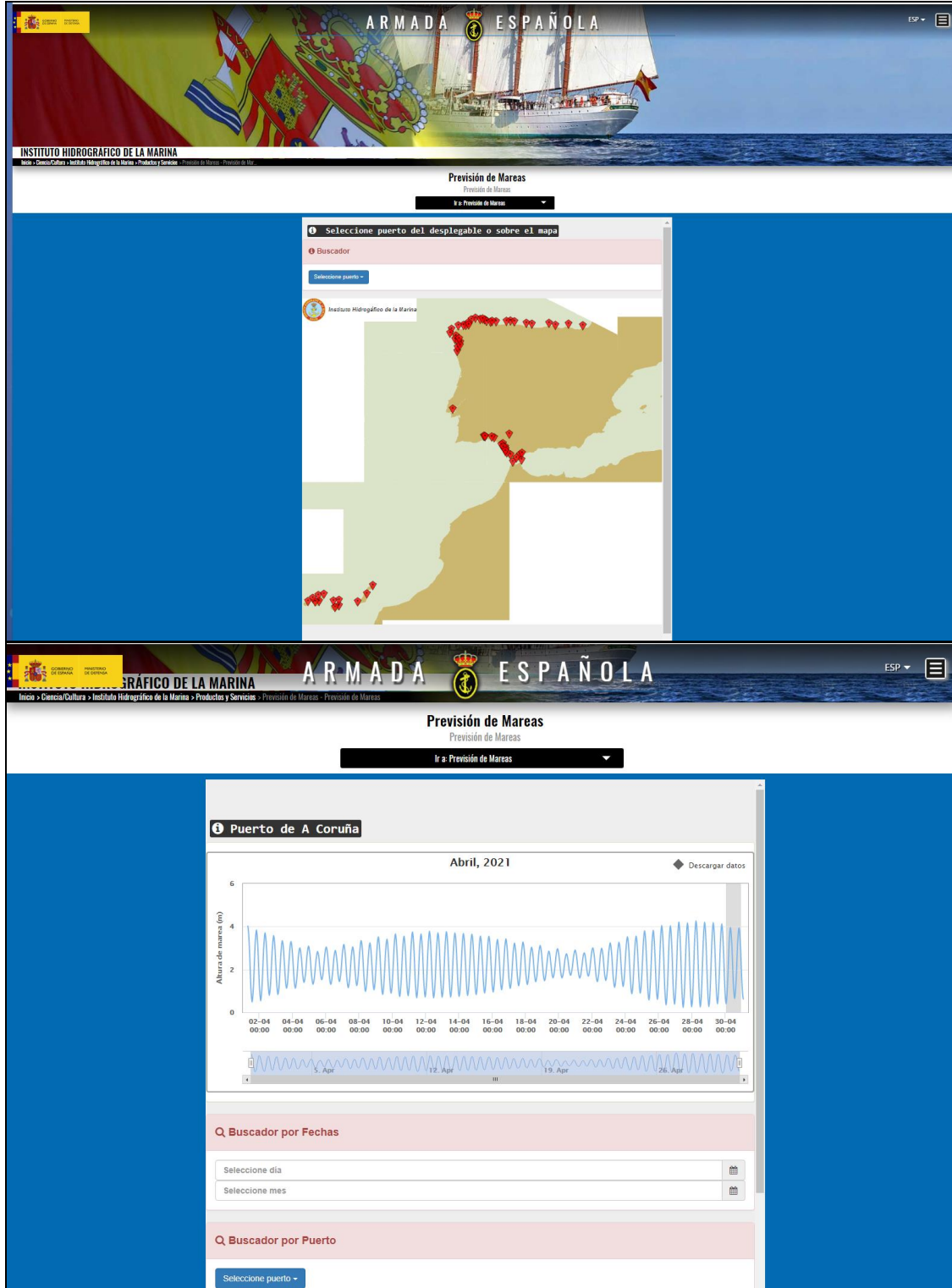


Figure 18. Screenshot of the Spanish Tidal Predictions online application

## 5. MSI

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

### 5.1. Existing Infrastructures for MSI dissemination

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.

Control Remote Stations (CCRs): Valencia, Las Palmas.

Valencia CCR: NAVTEX Station: La Nao [ X ] [ M ] (490 Khz, Spanish)  
MF Coast Radio Stations (CRSs): La Nao, Palma de Mallorca, Cabo de Gata.  
VHF Coast Radio Stations (CRSs): Cabo de Gata, Melilla, Cartagena, La Nao, Castellón, Tarragona, Barcelona, Begur, Cadaqués, Menorca, Palma de Mallorca, Ibiza.

Las Palmas CCR: NAVTEX Station: Tarifa [ G ] [ T ] (490 Khz, Spanish)  
MF Coast Radio Stations (CRSs): Tarifa.  
VHF Coast Radio Stations (CRSs): Tarifa, Malaga, Motril,

SASEMAR liaises with IHM for broadcasting coastal warnings through NAVTEX Stations.

NAVAREA III Coordinator. NAVAREA III warnings are broadcast via SAFETYNET 2 and SAFETYCASR through Burum Land Earth Station and AOR-E and IRIDIUM Satellites constellation over the whole region.

IHM liaises with SHOM and SASEMAR 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 Rescue Coordination Centre (CNCS) located in Madrid and 10 Maritime Rescue Coordination Centres (CCSs): Palamós, Barcelona, Tarragona, Castellón, Valencia, Palma de Mallorca, Cartagena, Almería, Algeciras and Tarifa.

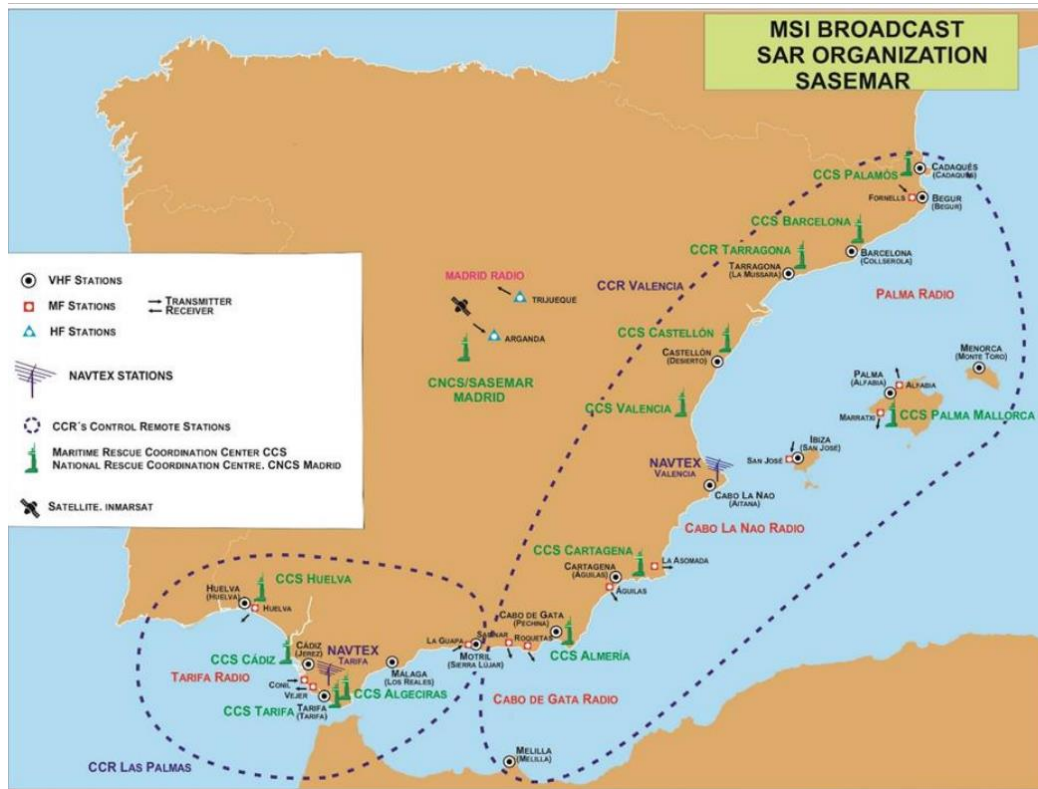


Figure 19. MSI Broadcast and SAR organization

## 5.2. New infrastructure in accordance with GMDSS Master Plan

NTR.

### 6. C-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
Depths < 200 m	32	68	0
Depths > 200 m	77	5	18

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.

<b>Purpose / Scale</b>	<b>A</b>	<b>B<sup>1</sup></b>	<b>C</b>
Offshore passage / Small	100	0	100
Landfall and Coastal passage/ Medium	100	0	100
Approaches and Ports / Large	100	0	85

**Table 10**

### 6.1.3 Maritime Safety Information (MSI)

#### NAVIGATIONAL INFORMATION (S-53)

<b>SERVICE</b>	<b>Yes</b>	<b>No</b>	<b>Partial</b>	<b>Notes</b>
<b>LOCAL WARNINGS</b>	X			Via SASEMAR
<b>COASTAL WARNINGS</b>	X			Via SASEMAR
<b>NAVAREA WARNINGS</b>	X			Via NAVAREA Coordinator
<b>PORT INFORMATION</b>	X			Agreements with all Port Authorities

**Table 11**

#### GMDSS IMPLEMENTATION (IMO Publication 970–GMDSS Manual)

<b>SERVICE</b>	<b>Yes</b>	<b>No</b>	<b>Partial</b>	<b>Notes</b>
<b>Master Plan</b>	X			
<b>Area A1</b>	X			Via SASEMAR
<b>Area A2</b>	X			Via SASEMAR
<b>Area A3</b>	X			Via NAVAREA Coordinator
<b>NAVTEX</b>	X			Via SASEMAR
<b>SafetyNET</b>	X			For NAVAREA Warnings only.
<b>SAFETYCAST</b>	X			For NAVAREA Warnings only.

**Table 12**

<sup>1</sup> Spain does not produce raster charts.

## 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 Hydrography Category A and B courses. These courses are 10-month long and are taught in Spanish. Minimum academic enrolling requirements should be fulfilled.

In 2019, the Specialization Program in Hydrography & Oceanography for Naval Officers (Category A) was presented and defended to the FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC), getting its recognition. The program is currently being revised for improving its quality in order to renew the category A recognition in 2025.

In 2020 the Specialization Program in Hydrography & Oceanography for Naval Petty Officers (Category B) was presented and defended to the FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC), getting its recognition. The program is also being revised for improving its quality in order to renew the category B recognition in 2026.

The virtual portal, as a supporting knowledge center for students including a repository for teaching documents, regulations, procedures, relevant links and various learning resources is implemented. Also, the 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 number of students who have attended these courses in the last two academic years

<b>Academic year</b>	<b>Category A course</b>	<b>Category B course</b>
<b>2022-2023</b>	3 Officers from Spanish Navy 1 Officer from Argentina 1 Officer from Tunisia 1 Officer from Perú 1 Officer from Dominican Rep.	4 Petty Officers from Spanish Navy
<b>2023-2024</b>	3 Officers from Spanish Navy 1 Officer from Argentina 1 Officer from Uruguay	4 Petty Officers from Spanish Navy

**Table 13**

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 Defense and other countries *Collaboration Program with*



*Foreign Countries regarding Military Training.* 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.**

Apart from the training received by Spanish Navy officers and petty officers in the courses reflected in paragraph 7.1 above, several Spanish officers have accomplished Master degrees:

1. Master's degree in Cartographic Geotechnologies, Engineering and Architecture (University of Salamanca) from September 2021 to July 2022.
2. Global Master in Affairs Audiences: Lobby, Corporate Diplomacy and Intelligence Analysis (IMF Smart Education), from September 2022 to October 2023.
3. Currently one officer is studying a Master's Degree in Data Analysis Engineering, Process, Improvement and Decision Making at the Polytechnic University from Valencia, from September 2023 to October 2024.

## **7.3 Definition of proposals and requests to the IHO CBSC.**

Specialization Course in Hydrography & Oceanography for Naval Officers (Category A) and Petty Officers (Category B):

As indicated in point 7.1 above, 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, through *The Collaboration Program with Foreign Countries regarding Military Training*. This agreement provides grants for the attendance to the above-mentioned courses. The point of contact for these matters is the Defence Attaché to the corresponding Spanish Embassy.

## **7.4. Status of national, bilateral, multilateral or regional development projects with hydrographic component.**

IHM has an updated bilateral agreement with France signed in 2006 in Brest and published in Spanish Official Bulletin in 2016.

IHM has an International Administrative Agreement with United Kingdom Hydrographic Office, signed in 2022.

IHM is in the final signature process for the bilateral agreement with the Portuguese Hydrographic Office. It's expected to sign it the short term.

## **8. OCEANOGRAPHIC ACTIVITIES**

### **8.1 General**

During the last years, one of main efforts of the Oceanographic Section in relation with tides has been aimed on making tide real time tide data available to IHM Hydrographic Commissions, this improves workflow and reduces times and data confidence while doing bathymetric works.

For this purpose, a WEB interface is required for remote access to the tide data. This interface provides access not only to IHM stations, but also to stations that belong to other organizations that have signed agreements to share tide data. This website is working and is subject to continuous improvements.

The installation of permanent tide stations at locations that will improve the current coverage of the national tide gauge network is almost completed. The data obtained are already being shared with other national tidal agencies that also have their own permanent tide gauges.

During the last three years, we have been working on the design of a Hydrographic Reference Surface (SRH) that allows the bathymetry data to be referenced to an in-situ Hydrographic Zero.

### **8.2 GEBCO/IBC's activities**

IHM has been part of the EMODnet Project from 2013 to June 2016. Therefore, GEBCO grid is currently making use of IHM data, from this project.

Moreover, IHM in collaborating in SEABED 2030 and GEBCO projects, providing data collected from Spanish Navy Schoolship «Juan Sebastian de Elcano» during her training cruises through Atlantic and Pacific Ocean.

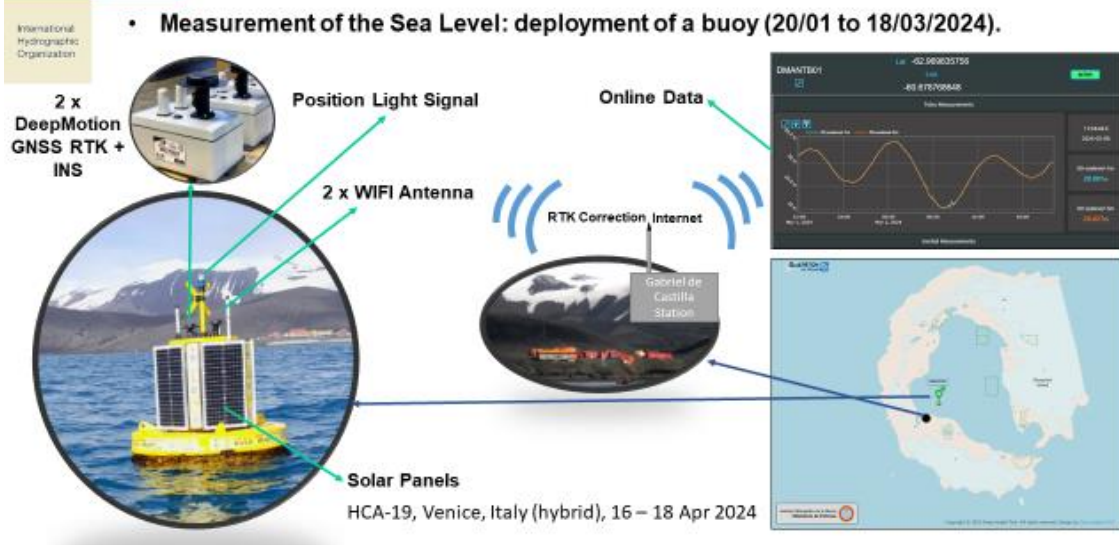
### **8.3 Tide gauge network**

Stations available have been deployed by hydrographic commissions together with fixed stations of IHM and collaborating organizations, so that the bathymetric work can include near real time tide data.

There is a network of IHM tide gauges throughout Spain with more than 25 sensors distributed along the coast. Another 15 are planned to be installed this year.

### **8.4 New equipment**

This year IHM has built an oceanographic buoy that have been anchored in Antarctica with the capacity to provide real time sea level data.



**Figure 20. Buoy for measuring sea level in real time**

IHM has also acquired a sensor to measure water depth, which is towed by the RPAS. Its purpose is to be able to work in areas inaccessible for any vessel.



**Figure 21. RPAS towing sensor**

## 9. SPATIAL DATA INFRASTRUCTURES

### 9.1 Relationship with the NSDI and status of MSDI national portal.

Within SDI's, this IHM is a participant in the GT-IDEE (Working Group on Infrastructure of Spatial Data of Spain), as well as in the Board of the Spanish

Geographic Information Infrastructure (Consejo Directivo de la Infraestructura de Información Geográfica de España – CODIIGE), 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>), which constitutes the NSDI.

In addition, 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 Northwestern Mediterranean. This information is available to free download in the following internet address:

Centro de Descargas del CNIG (IGN).

<http://centrodedescargas.cnig.es/CentroDescargas/index.jsp>

The IHM has developed its own SDI (IDE-IHM), with the purpose to give an answer to the increasing demand of users to have access to nautical information.

Currently, this IDE-IHM is offering the following services <https://ideihm.covam.es/portal/> :



**Figure 22. Spanish Maritime SDI (IDE-IHM)**

- **Nautical Chart WMS Services.**

These services 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.**

These services 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 provides 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.**

These services provide capabilities to display and download, the straight territorial sea baseline (LBR in Spanish language).

- **WMS/WFS for Maritime boundaries.**

These services provide capability to display and download the maritime limits as national territorial waters, contiguous zone, continental platform and exclusive economic zone.

- **WMS/WFS for IHM nautical chart catalogue scheme.**

These services provide capabilities to display and download the Spanish IHM nautical chart catalogue scheme, both for paper nautical chart and for Electronic Nautical Chart (ENC).

- **WMS/WFS for military maritime practice areas.**

These services provides capabilities to display and download, the scheme with the assigned areas for military training (amphibious, aerial, surface and submarine).

- **WMS/WFS for List of Lights and Fog Signals.**

This service provides capability to display, downloading and access to the data on maritime signalling existing in the publications "List of Lights and Maritime Signals, Parts I and II".

- **Application Programming Interface (API) for prediction of tidal data.**

This service provides access to the Tidal Prediction Tables published by the IHM. This API is intended to offer users the possibility of importing the data from that IHM publication, into their web pages, documents, etc., by an automatized licensing process. The service permits, in an intuitive manner, build the URL up, systematically, to get the final data.

URL: <https://ideihm.covam.es/apimareas>

- **Mobile application with nautical information**

It has been developed an application for electronic devices (for Android system and IOS) with access to the IHM WMS services, tidal prediction, nautical chart catalogue, maritime signals and notices to mariners.

## 9.2 Challenges and Achievements

The IDE-IHM has become an open service to satisfy the information requests from the public, by means of publishing interoperable services.

## 10. OTHER ACTIVITIES

### 10.1 Participation in IHO meetings

IHM takes part in the following Hydrographic Commissions:

- Hydrographic Commission on Antarctica (HCA)
- East Atlantic Hydrographic Commission (EAthC)
- Mediterranean and Black Sea Hydrographic Commission (MBSHC), acting as NAVAREA III Coordinator and leaving the chairmanship on 1 April 2022.
- Meso-American and Caribbean Sea Hydrographic Commission (MACHC), as Observer.
- South West Atlantic HC (SWAtHC), as Observer.
- South East Pacific Regional Hydrographic Commission (SEPRHC)

And in a wide variety of working groups:

- Hydrographic Services and Standards Committee (HSSC)
- ENC Standards Maintenance Working Group (ENC-WG)
- Worldwide ENC Database Working Group (WENDWG)
- S-100 Working Group (S-100 WG)
- S-100 Project Team (S-100 PT)
- Hydrographic Surveys Working Group (HSWG).
- Nautical Information Provision Working Group (NIPWG)
- Nautical Cartography Working Group (NCWG)
- Tidal and Water Level Working Group (TWLWG)
- World-Wide Navigational Warning Service Sub-Committee (WWNWS)
- Inter-Regional Coordination Committee (IRCC)
- Marine Spatial Data Infrastructure Working Group (MSDIWG)
- Capacity building subcommittee (CBSC).

It is important to highlight that IHM also takes part in the following NATO working groups:

- Geospatial Maritime Working Group (GMWG).
- Geospatial Maritime Working Group Technical Panel (GMWG TP)
- Defence Maritime Geospatial Exchange Model (DMGEM).
- AML NATO Co-Production Program (NACPP) (Additional Military Layers).
- Military Oceanography Working Group (MILOC).
- ACO Meteorological and Oceanographical Conference with cooperative partners (AMC+CP)
- IC –ENC Technical Panel (IC-ENC TP)



## **10.2 Meteorological data collection**

The IHM collaborates with the State Meteorological Agency (AEMET) in the collection of information in the maritime field, its analysis, and in the preparation of products for use in the Spanish Armed Forces and NATO countries.

## **10.3 Geospatial studies**

IHM participates in the several national projects and EU project GALILEO as the main researcher of the signals reception tests of the GALILEO GNSS constellation in high latitudes (Antarctica) compared to the others GNSS system during 10 years.

[https://www.euspa.europa.eu/sites/default/files/es\\_the\\_galileo\\_high\\_accuracy\\_service\\_has\\_is\\_now\\_operational.pdf](https://www.euspa.europa.eu/sites/default/files/es_the_galileo_high_accuracy_service_has_is_now_operational.pdf)

## **10.4 International engagements**

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