

NATIONAL REPORT

TO THE 22nd MEETING OF THE MEDITERRANEAN AND BLACK SEAS HYDROGRAPHIC COMMISSION (MBSHC-22)

CADIZ, ESPAÑA (SPAIN) MAY 2019 – MAY 2021

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. Our organization, mission and different kind of services offered can be found at <u>http://www.armada.defensa.gob.es</u>

(<u>https://armada.defensa.gob.es/ArmadaPortal/page/Portal/ArmadaEspannola/cienciaihm1</u>/prefLang-es/)

This report covers the period May 2019 – May 2021.

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, <u>for this report, only multi</u> <u>beam surveys have been considered</u>: 45% 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 ten hydrographic surveys by using Multibeam Echosounders (MBES). 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 and Exclusive order surveys). For this purpose, IHM employed transportable hydrographic launches and small boats fitted with MBES.



Figure 4. Transportable hydrographic launches.



Figure 5. Small transportable hydrographic boat.



Figure 6. Very shallow water bathymetry system operated from a small rubber boat

Compiled bathymetric coverage conducted by Spanish navy survey ships from May 2019 to May 2021 is illustrated in the next figure.



Figure 8. Compiled bathymetric coverage conducted by Spanish navy survey ships from May 2019 to May 2021

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 launch 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 percentage is reaching the 85% of the total Cartography published by IHM.

2.2.2. Echosounders

New MBES (Kongsberg EM-2040P) and Teledyne RESON T-20P were acquired and installed on our boats in order to work in shallow waters.

Our Hydrographic Fleet is currently fitted as follows:

• Two Hydrographic Vessel, "Tofiño" and "Malaspina" (1000 Gross Tons, GT), are equipped with two hull-mounted MBES (for shallow and deep waters). Each vessel has two small hydrographic boats to cover very shallow waters with portable MBES and PDBS (Phase Differencing Bathymetric Sonars).

• One Coastal Hydrographic Vessel "Antares" (400 GT) is fitted with a shallow water MBES and with one small hydrographic boat operating high resolution shallow-water portable MBES and PDBS.

• Three Transportable hydrographic launches, and a small rubber boat, have either hull or pole mounted MBES or PDBS in order to conduct Special and Exclusive Order Surveys.

2.2.2.1 Bottom Mapping Sonars

Seafloor mapping is achieved mostly by using MBES. Over the last two years, new high resolution portable systems have been purchased and are in use onboard our hydrographic small boat and launches. These new sensors can provide simultaneous coregistered high-resolution side scan sonar imagery and bathymetry within IHO special and exclusive order accuracy standards. In addition, updated processing methods allow IHM hydrographers to process this data in a swift way so that the ping-to-chart workflow is executed timely.

2.3. New ships

IHM has proposed to replace the 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 consists of one oceanic vessel, two coastal hydrographic vessels and five survey boats.

3. NEW CHARTS AND UPDATES

3.1 ENC coverage, gaps and overlaps

To date, IHM has produced during this period <u>49 ENCs within the area of the MBSHC</u> (out of a total of 317 published for all areas).

Since the last MBSHC meeting, IHM has produced 11 new ENCs, and 38 new ENC editions. 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, Purpose 6 Project has started with the most important commercial ports.

Navigational purpose	Projected	Published
1 - Overview	0	0



Figure 9. Navigational purpose 2 and 3 ENC production in the MBSHC May 2019-Apr 2021



Figure 10. Navigational purpose 4, 5 and 6 ENC production in the MBSHC May 2019-Apr 2021 part 1

Figure 11. Navigational purpose 4 and 5 ENC production in the MBSHC May 2019-Apr 2021 part 2

3.2 ENC distribution method.

Spain is a member of the International Center for ENC (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.

3.3. RNCs.

NTR.

3.4. INT Charts.

Nowadays, IHM has produced 59 International charts, 25 within the area of the MBSHC (out of a total of 339 published for all areas).

Since last MBSHC meeting, IHM has produced 1 new INT Charts, and 5 new editions. 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	6
Charts projected for the second semester of 2021 and 2022/23	7
Status of the INT charts production assigned to IHM pending to	7
be published	
Leisure Charts published	9
Leisure charts pending to be published	2

Table 1

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

INT No	National No	Title	Edition
3184	489A	Aproches del puerto de Barcelona	VII Mar 2020
3113	49A	De Barcelona al Cap Cerbère con las islas de	I Mar 2020
		Mallorca y Menorca	
3164	464A	Aproches de Cartagena y Escombreras	IX Jun 2020
3168	4722	Puerto de Alicante	VI Dic 2020
3252	4511	Bahía y puerto de Ceuta	VIII Feb 2021
3150	105	Estrecho de Gibraltar. De cabo Roche a punta de	VI Mar 2021
		la Chullera y de cabo Espartel a cabo Negro.	

Table 2

Figure 12. INT charts produced since the last MBSHC Conference

The	next	table	shows	INT	charts	projected	for	the	second	semester	of	2021,	and
2022	2/23.												

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

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

^[1] Delayed to 2020/2021 due to HPD conversion.

^[2] Depend on Spanish/Algerian Agreement.

^[3] Depend on Spanish/Algerian Agreement.

Figure 13. INT paper Charts projected in the MBSHC from May 2019-Apr 2021

The next table shows status of INT charts	production assigned to IHM.
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INT	National	Title	Edition	Scale
No.	No.			
303	4-C	Mar de Alborán y Mar Balear	97/97	1 000 000
3102	45	Estrecho de Gibraltar y Mar de Alborán	79/08	350 000
3108	47	De Cabo Tiñoso a Cabo Canet con las islas Ibiza,	76/05	350 000
		Formentera, Cabrera y Costa sudoeste de		
		Mallorca		
3110	48	De Cabo de la Noa a Barcelona con las Islas	78/04	425 000
		Baleares		
3112	49	Golfo de León – De Punta del Llobregat a Cabo	79/17	400 000
		d'Antibes		
3113	49A	De Barcelona al Cap Cerbère con las islas de	20/20	275.000
		Mallorca y Menorca		
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	84/06	25 000
3157	4551	Puerto de Málaga	95/06	10 000
3159	459	Golfo de Almería – De la Punta Sabinar al Cabo	59/07	50 000
		de Gata		

		Plan A – Roquetas de Mar		7 500
3160	4591	Puerto de Almería	93/07	10 000
3164	464 A	Aproches de Cartagena y Escombreras	85/20	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	87/20	10 000
3172	481 A	Aproches del Puerto de Valencia	87/10	25 000
		Plan A: Pobla de Farnals		10 000
		Plan B: Port-Saplaya		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	87/20	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	12	6
Large 80.000-10.000	18	18
TOTAL	31	25

Table 5

Figure 14. 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)

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

3.5 National paper charts.

National No	Title	Edition
D49AN	De Palamós a Portbou	I Jul 2019
4851	Puertos de Sant Carles de la Rápita y Alcanar	III Ago 2019
D49AS	De Vilanova i la Geltrú a Platja d'Aro	I Ene 2020
4865	Puerto de Cambrils y Rada de Salou	I Ene 2020
4792	Puerto de La Savina	II Mar 2020
489	Del puerto de Barcelona al puerto de Arenys de Mar	VI Mar 2020
4632	Rada de Mazarrón	III May 2020
4221	Isla de Cabrera y adyacentes	III jun 2020
4571	Puertos de Motril y Adra	III Jun 2020
4812	Puerto de Sagunto	VI Jun 2020
4331	Puerto de Melilla	III Jun 2020
4241	Porto Colom, Porto Cristo y Cala Ratjada	III Oct 2020

The next table shows national charts made since the last XXI MBSCH Conference: Table 6

Figure 15. National Paper Charts produced in the MBSHC May 2019-Apr 2021.

3.6 Other charts.

Leisure Charts

Since the new format for leisure charts was implemented, from May 2019 two booklets of leisure charts was published, chart D49AS Y D49AN. There is work in progress regarding three new editions of booklet of leisure charts in the MBS area.

Figure 16. Leisure charts

National No	Title	Edition	Published
D45	De Barbate a Estepona y de cabo Espartel a cabo Negro	I Dic 2014	Х
D45A	De Estepona a p unta de Torrox	I Dic 2013	Х
D46	De Marina del Este a San Pedro del Pinatar	I Dic 2017	Х
D47A	De Torre de la Horadada a Dénia	I Dic 2017	Х
D48	De Oliva a Vinarós	I Dic 2017	Х
D48N	De Les Cases de Alcanar a Segur de Calafell	I Abr 2018	Х
D48NE	De Cala Figuera a Sóller	I Jun 2016	Х
D49AN	De Palamós a Portbou	I Jul 2019	Х
D49AS	De Vilanova i la Geltrú a Platja d'Aro	I Ene 2020	Х
D48SW	Puertos de Mallorca SW	TBD	TBD
D48E	Islas de Ibiza y Formentera	TBD	TBD

Table 7

4. NEW PUBLICATIONS AND UPDATES.

4.1 New publications.

The Mariners Handbook. 2021 edition.

4.2 Updated publications.

Publications are updated via Notice to Mariners: Avisos a los Navegantes - Avisos a los navegantes - Instituto Hidrográfico de la Marina - Armada Española - Ministerio de Defensa - Gobierno de España

<u>https://armada.defensa.gob.es/ArmadaPortal/page/Portal/ArmadaEspannola/cienciaihm1</u> /<u>prefLang-es/02ProductosServicios--01avisos</u> 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 first quarter 2021.

4.2.2 Nautical publications

- IHO S-4 associated publication INT *1 Symbols, Abbreviations and Terms use on Charts (Spanish version)*, 6th edition 2018.
- Regulations for International (INT) Charts and Chart Specifications of the IHO (Spanish: Edition 4.8.0, October 2018). S-4
- *List of lights and fog signals, part I 2021 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 2021 edition.* Gibraltar Strait, Balearic Islands and Mediterranean coasts of Spain, Morocco and Algeria.
- Sailing Directions num. 1. From Río Bidasoa to Río Rivadeo.2021 edition.
- Sailing Directions num. 2. From Río Rivadeo to Cabo Finisterre. 2020 edition.
- Sailing Directions num. 3. From Cabo Finisterre to Río Miño.2021 edition.
- Sailing Directions num. 4. From Río Miño to Río Guadiana, and Azores Islands. 2020 edition.
- *Sailing Directions num. 5.* From Río Guadiana to Cabo Sacratif and the North and South coasts of Gibraltar Strait. 2020 edition.
- *Sailing Directions num. 6.* From Cabo Sacratif to Cabo La Nao, North Coast of Morocco and Coast of Algeria to Cabo Kramis. 2021 edition.
- Sailing Directions num. 7. From Cabo La Nao to France Border. 2020 edition.
- *Sailing Directions num.* 8. Balearic Islands and North Coast of Algeria from Cabo Kramis to Tunisia Border. 2021 edition.
- *Sailing Directions num. 9.* Northeast coast of Africa from Cabo Espartel to Cabo Verde. Madeira, Selvagens, and Cape Verde islands. 2021 edition.
- Sailing Directions num. 10. Canary Islands. 2020 edition.
- Radiosignals book 2020 y 2021 edition.
- International Regulations for Preventing Collisions at Sea (1972)
- Marine Signaling 2020 edition
- International Signal Code 4^a 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:

<u>Agencias de Ventas - Instituto Hidrográfico de la Marina - Armada Española -</u> <u>Ministerio de Defensa - Gobierno de España</u> (IHM sales agents)

https://armada.defensa.gob.es/ArmadaPortal/page/Portal/ArmadaEspannola/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://armada.defensa.gob.es/ihm/Aplicaciones/LibroFaros/V3/index.html

Figure 18. Screenshots of the 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/ArmadaEspannola/ciencia ihm1/prefLang-es/02ProductosServicios--045PrevisiondeMareas

Figure 19. 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

<u>Coordinator: SASEMAR</u> (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.

<u>NAVAREA III Coordinator.</u> NAVAREA III warnings are broadcast via SAFETYNET 2 through Burum Land Earth Station and AOR-E Satellite 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 andTarifa.

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.

	А	В	С			
Dephts < 200 m	40	60	0			
Dephts > 200 m	90	0	10			

Table 9

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

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	Α	B ¹	С
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)

SERVICE	Yes	No	Partial	Notes
LOCAL WARNINGS	Х			
COASTAL WARNINGS	Х			
NAVAREA WARNINGS	Х			
PORT INFORMATION	Х			Agreements with all Port Authorities

Table 11

GMDSS IMPLEMENTATION (IMO Publication 970–GMDSS Manual)

SERVICE	Yes	No	Partial	Notes
Master Plan	X			
Area A1	х			
Area A2	х			
Area A3	Х			
NAVTEX	Х			
SafetyNET	Х			For NAVAREA Warnings only.
		-	11.40	

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

¹ Spain does not produce raster charts.

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.

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 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

Category A course:

Academic year 2020-2021.

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

Academic year 2019-2020.

- 4 Officers from the Spanish Navy
- 1 Officer from Uruguay

Category B course:

Academic year 2020-2021.

- 3 Petty Officers from the Spanish Navy

Academic year 2019-2020.

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

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 different Master degrees:

- Master in Subaquatic Archaeological Heritage (University of Cádiz) from September 2019 to July 2020.
- Geospatial Information Course (Geodesy Department from the Spanish Army College) from November 2018 to July 2020. Madrid.
- Master in Advanced Hydrography for Professionals (University of Plymouth) from May 2018 to July 2020.

In terms of needs of capacity building, there is nothing to remark.

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 though 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.

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.

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

The IHM, as a partner, has been part of the EMODNET Project from 2013 to June 2016. Therefore, GEBCO grid is currently making use of data from the EMODNET Project.

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.

8.4 New equipment

In 2019, a VALEPORT RADAR marker was acquired, increasing the capacity to deploy tide stations along the national coastline.

In 2020 and early 2021, acoustic tide gauges and GNSS stations have been acquired, with the aim of improving the Hydrographic Reference Surface model.

9. SPATIAL DATA INFRAESTRUCTURES

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 Infraestructure (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 (<u>http://www.idee.es</u>), which constitutes the NSDI.

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).

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.

http://ideihm.covam.es/index1.html

Currently, this IDE-IHM is offering the following services:

GOBIERNO DE ESPANA MINISTERIO DE DEFENSA ARMADA ESPAÑOLA Geoportal de la Infraestructura de datos espaciales del Instituto Hidrográfico de la Marina Geoportal de la Infraestructura de datos espaciales del									
Presentación	INSPIRE-IDE	Servicios web	Visor	Licencias	Legislación	Metadatos	Contáctanos		
	Presentación								
	Con la apertura de este GeoPortal, el <u>Instituto Hidrográfico de la Marina (IHM</u>), se suma a la ya nutrida lista de Organismos que ofrecen sus datos geográficos al público bajo la Infraestructura de Datos Espaciales de España (IDEE) basada en la <u>Lev 14/2010 sobre</u> <u>las Infraestructuras y servicios de información geográfica en España (LISIGE)</u> que nace, a su vez, como transposición de la <u>Directiva Europea 2007/2/CE (INSPIRE)</u> .								
	T	HM	Esta apertura nac atender, de acuer información geogr	ce por la necesidad rdo a ella, la crecie ráfica náutica para o	de cumplir con la nte necesidad que la tros fines distintos a	mencionada legisla a sociedad tiene de I de la propia nave <u>c</u>	ción y para e emplear la gación.		
 Es necesario recalcar que la misión principal del IHM es contribuir a la seguridad en la navegación mediante la edición y producción de la cartografía náutica y publicaciones asociadas, misión asignada por la Ley 7/1986 de Ordenación de la cartografía náutica oficial del Estado, tanto en su versión de papel como digital. Sin embargo, las peculiaridades de este tipo de cartografía, principalmente debidas a su continua actualización (semanal) y el compromiso con la seguridad que conlleva, tiene compresultado un producto digital (Electronic Navigational Chart, ENC) muy específico que se encuentra normalizado internacionalmente para su uso exclusivo en las consolas ECDIS (Electronic Chart and Display Information System) a bordo de los buques y protegido mediante un sistema de seguridad rígido que evita su difusión ilegal. Así, la demanda de la información náutica digital, por parte de la sociedad, no ha podido ser atendida mediante este producto debido, principalmente a dos factores: el primero es que, el IHM, no debe salir de este esquema de seguridad estableción mediante acuerdos internacionales; y segundo, los demandantes no disponen de las consolas apropiadas capaces de «leer» este tipo de producto. 									
Por las razones expuestas, hasta la apertura de este GeoPortal, el IHM, se ha visto en la obligación de atender las demandas de información náutica, que se han producido a lo largo de los últimos años, mediante la creación de productos específicos muy concretos y adaptados a la demanda recibida. Evidentemente, este tipo de servicios han supuesto una carga de trabajo y asignación de personal específico para ello, que ha supuesto un considerable esfuerzo más allá del propio que el IHM ha de									
Geoportal of Spatial Data Infrastructure									
Presentation	INSPIRE-SDI	Web Services	Viewer	de la Marina	Legislation	Metadata	Contact us		

Figure 21. Screenshot of the 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 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 signaling 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, step by step, to get the final data.

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

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 has taken part in the Assembly 2020 and Council 2019 and 2020.

IHM takes part in several IHO Hydrographic Commissions:

- Hydrographic Commission on Antarctica (HCA)
- East Atlantic Hydrographic Commission (EAtHC)
- Mediterranean and Black Sea Hydrographic Commission (MBSHC)
- Meso American Caribbean Sea Hydrographic Commission (MACHC)

And in a wide variety of IHO working groups:

- Hydrographic Services and Standards Committee (HSSC)
- ENC Standards Maintenance Working Group (ENC-WG)
- S-100 Working Group (S-100 WG)
- 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).
- IHO-EU Network Working Group (IENWG)

IHM also takes part in several NATO working groups:

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

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 5 years. The latest tests, were performed in 2020, as in 2021 the tests were cancelled due to the COVID19 pandemic.

10.4 International engagements

Two bilateral agreements with Algeria are in process to be signed:

- 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.

One bilateral agreement is in process to be signed with The United Kingdom:

- Bilateral agreement between United Kingdom Hydrographic Office and IHM.