



INSTITUTO HIDROGRÁFICO DE LA MARINA



SPANISH HYDROGRAPHIC OFFICE



**NATIONAL IMPLEMENTATION
STRATEGY FOR S-1XX PRODUCTS**

**EAtHC ICCWG WORKSHOP ON S-100
IMPLEMENTATION**

November 23th, 2023



AGENDA:

- **BACKGROUND. IHO IMPLEMENTATION PLAN**
- **IHM IMPLEMENTATION PLAN**
- **INDICATORS and MONITORING PROCEDURE**
- **OTHER ASPECTS AND INITIATIVES**
- **CONCLUSIONS**



BACKGROUND. IHO IMPLEMENTATION PLAN (1/3)

Resolution of the IMO Maritime Safety Committee. MSC 530 (106)

IMO accepts S-100 as a valid format for ECDIS and introduction of the ENDS (Electronic Navigation Data Service) concept.

Gradual introduction: S-100 ECDIS: It will be legal in January 2026 and mandatory in January 2029.

IHO's commitment to IMO

Maintain implementation schedule of the S-101 and other standards (Work Plan 2023-2026)

Have adequate coverage of S-101 and other S-100 products (ENDS) by the time ECDIS S-100 becomes operational

IHO COMMITMENT

"Important" coverage of S-100 products in January 2026



BACKGROUND. IHO IMPLEMENTATION PLAN (2/3)

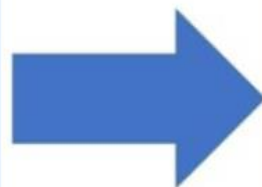
Phase 1 / Route Monitoring

Phase 1 Route Monitoring Mode

- S-101 ENC
- S-102 Bathymetry
- S-104 Water Level
- S-111 Surface Currents
- S-124 Navigational Warnings
- S-129 UKC Management

Critical Framework

- IHO Geospatial Information Registry
- S-98 Interoperability Specification
- S-100 Universal Hydrographic Data Model
- S-128 Catalogue of Nautical Products
- S-164 Test Data Set for S-100 and ECDIS Type Approval



Phase 2 / Route Planning

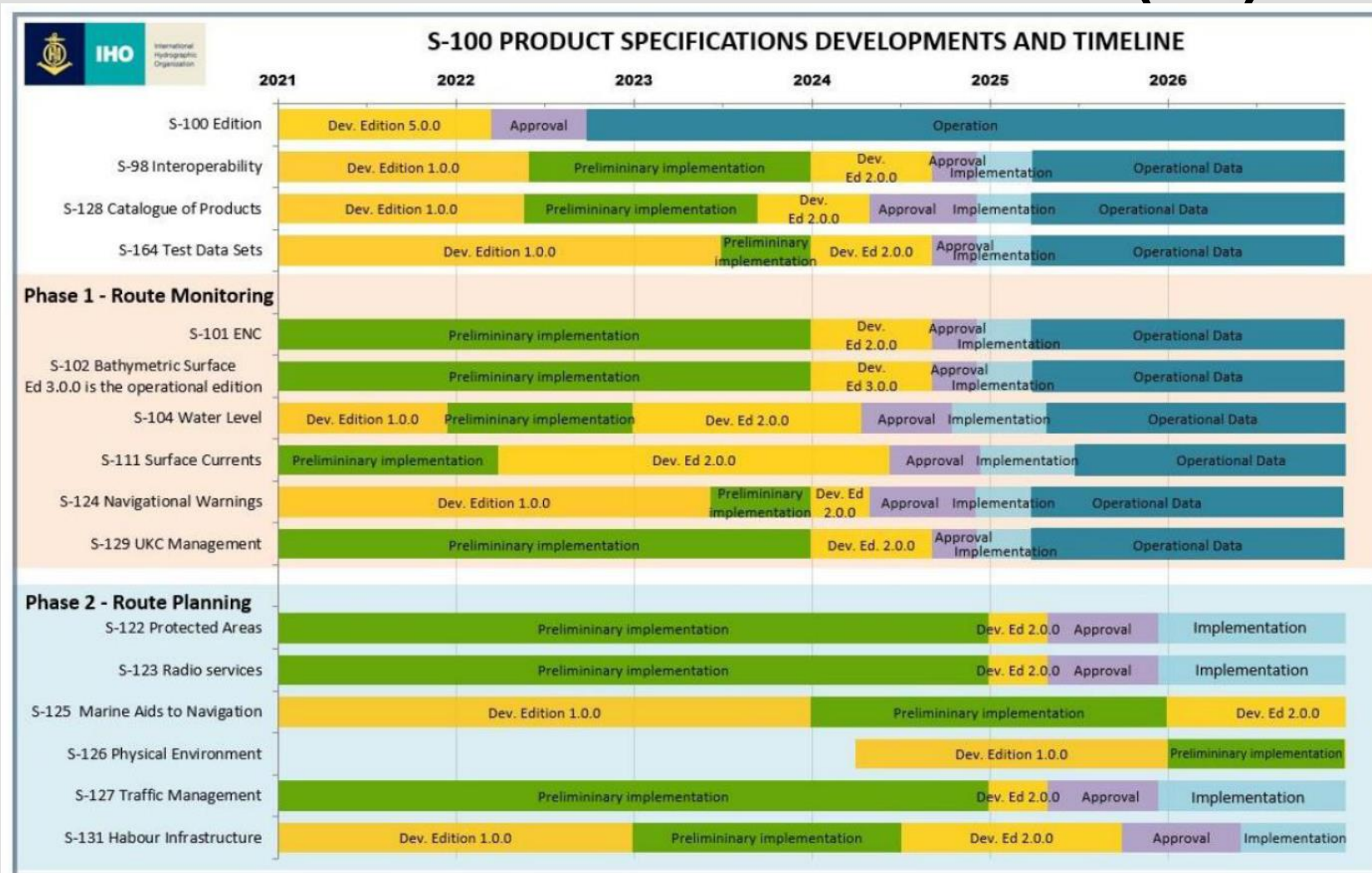
Phase 2 Route Planning Mode

- S-122 Marine Protected Areas
- S-123 Marine Radio Services
- S-125 Marine Aids to Navigation (AtoN)
- S-126 Marine Physical Environment
- S-127 Marine Traffic Management
- S-131 Marine Harbour Infrastructure
- S-411 Ice Information (WMO)
- S-412 Weather and Wave Hazards (WMO)

+ S-100 Products used in Monitoring Mode



BACKGROUND. IHO IMPLEMENTATION PLAN (3/3)





IHM IMPLEMENTATION PLAN (1/2)

PHASE 1: Initial phase

- Definition and establishment of the initial situation
- Product Specification Standard Definition
- Coordination with other national agencies involved

FASE 2: Identification and coverage of needs

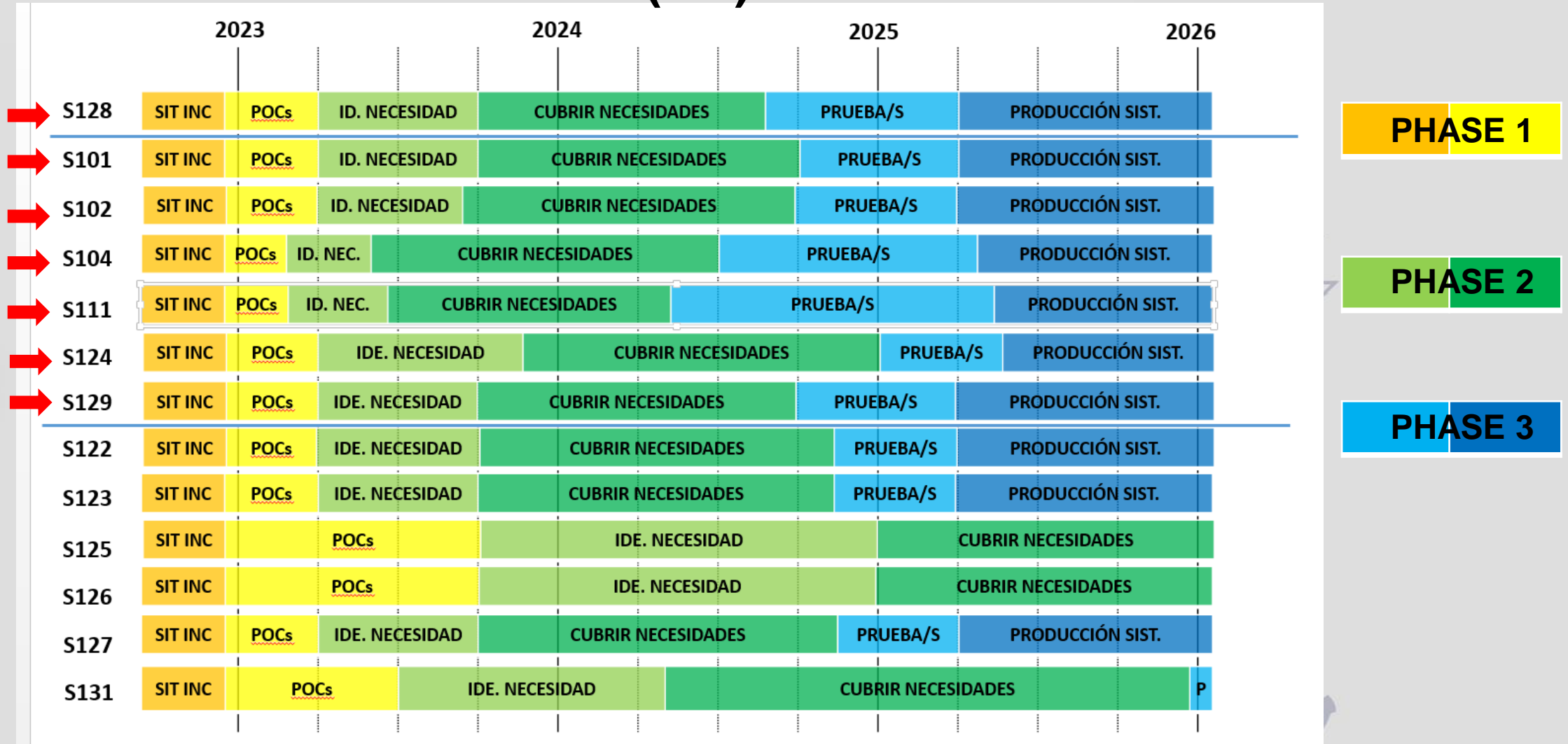
- Hardware and/or necessary material
- Software and/or necessary licenses (acquisition and/or development)
- Establishment or adaptation of DB
- Personnel and/or training needs

FASE 3: Testing and start of systematic production

- First test and/or tests. Referral to future validating agency (if already known)
- Establishment of validating agency and validation procedures/tools
- Establishment of production procedures



IHM IMPLEMENTATION PLAN (2/2)





INDICATORS and MONITORING PROCEDURE (1/4)

	SIT. INI	STANDARD SPECIFICATION	AGENCY/IES	HARDWARE/MATERIAL	SOFTWARE/LICENSES	DATABASES	TRAINING	PERSONAL	FIRST TEST	VALIDATION	DISTRIBUTION
S128	SI										

OBSERVACIONES

COLOR CODE



STANDARD SPECIFICATION	Progress status of development of standard specifications
AGENCY/IES	Relations and coordination with other external organizations
HARDWARE/MATERIAL	Hardware or other type of material needs
SOFTWARE/LICENSES	Software needs (programs, applications,...) or licenses
DATABASES	Identification of the need to create new databases or adapt existing ones
TRAINING	Staff training needs
PERSONAL	Needs to hire additional personnel or external services
FIRST TEST	First production test and referral to the organization that will carry out its validation and distribution
VALIDATION	Monitoring progress in the development of validation procedures systems
DISTRIBUTION	Monitoring progress in the development of distribution systems and procedures



INSTITUTO HIDROGRÁFICO DE LA MARINA



PHASE 1

PHASE 2

PHASE 3

	SIT. INI.	STANDARD SPECIFICATION	AGENCY/IES	HARDWARE/MATERIAL	SOFTWARE/LICENSES	DATABASES	TRAINING	PERSONAL	FIRST TEST	VALIDATION	DISTRIBUTION
S128	SI										
PRIORIDAD UNO											
	SIT. INI.	STANDARD SPECIFICATION	AGENCY/IES	HARDWARE/MATERIAL	SOFTWARE/LICENSES	DATABASES	TRAINING	PERSONAL	FIRST TEST	VALIDATION	DISTRIBUTION
S101	SI										
S102	SI										
S104	SI										
S111	SI										
S124	SI										
S129	SI										
PRIORIDAD DOS											
	SIT. INI.	STANDARD SPECIFICATION	AGENCY/IES	HARDWARE/MATERIAL	SOFTWARE/LICENSES	DATABASES	TRAINING	PERSONAL	FIRST TEST	VALIDATION	DISTRIBUTION
S122	SI										
S123	SI										
S125	SI										
S126	SI										
S127	SI										
S131	SI										



INDICATORS and MONITORING PROCEDURE (3/4)

WEND 100 IGIF MATRIX

- Plan Indicators IHO Strategic Plan 2021-2026 (SPI 1.3.1).
- Determine capacity of member countries to execute the S100 Implementation
- Capacity: Technical, legal, responsibilities, financial, resources, national organization
- Current version under review (WENDWG)

Coherence and Realization	Coherence and Realization	Policy and Legal Title	Policy and Legal	Date Title	Date Description	Financial Title	Financial Description	Innovation Title	Innovation Description	Standards Title	Standards Description	Partnerships Title	Partnerships Description	Capacity and Education	Capacity and Education	Communication and	Communication and	IS
Coherence and Realization [B]	The product is part of a documented national or regional institutional plan, and its realization is guaranteed by the organization. The product has been identified and has accepted the responsibility. All have been agreed at the national authority and the RRC level.	Policy and Legal [B]	Product has been developed following the national policy, laws, regulations, and standards. The product has been approved by the national authority and the RRC level.	Date [B]	Product is supported by national or regional data, including surveys, charts, and publications. There is a regular process for data update and the product has been updated regularly for product.	Financial [B]	The product is supported by a business model that includes several funding sources, including financial risks, and other income has been completed. The agreed upon business case has been completed. The product has been developed, will define business revenue value. [B]	Innovation [B]	Product is globally available for use in infrastructure technological advances, innovation, and academic work at the world level.	Standards [B]	Product is following the most advanced version of the format (IHO or other IHO related standard) (IHO or other IHO related standard).	Partnerships [B]	Product is distributed through a Regional IHO Center (REIC).	Capacity and Education [B]	Product availability has been presented through the RRC, including the needs, values and benefits of the product. Opportunities for training on how to produce and use the product is available throughout the RRC region of a significant amount in Member States.	Communication and [B]	Product news, availability, and use [B] and have been included in a compelling narrative for all audiences. Technical relationships, including education, partners, users, and third parties have been identified at the national level.	1,000
Coherence and Realization [B]	The product is part of a documented national institutional plan, and its realization is guaranteed by the organization. The product has been identified and has accepted the responsibility. All have been agreed at the national authority and the RRC level.	Policy and Legal [B]	Product has been developed following the national policy, laws, regulations, and standards. The product has been approved by the national authority and the RRC level.	Date [B]	Product is supported through national data, and innovation and in regularly updated and available. There is a regular process for data update and the product has been updated regularly for product.	Financial [B]	The product is supported by a business model that includes several funding sources, including financial risks, and other income has been completed. The agreed upon business case has been completed. The product has been developed, will define business revenue value. [B]	Innovation [B]	Product is globally available for use in infrastructure technological advances, innovation, and academic work at a national and with some limitations.	Standards [B]	Product is following the most advanced version of the format (IHO or other IHO related standard) (IHO or other IHO related standard).	Partnerships [B]	Product is distributed through a Regional IHO Center (REIC).	Capacity and Education [B]	Product availability has been presented through the RRC, including the needs, values and benefits of the product. Opportunities for training on how to produce and use the product is available throughout the RRC region of a significant amount in Member States.	Communication and [B]	Product news, availability, and use [B] and have been included in a compelling narrative for all audiences. Technical relationships, including education, partners, users, and third parties have been identified at the national level.	1,41
Coherence and Realization [C]	The product is part of a documented national institutional plan, and its realization is guaranteed by the organization. The product has been identified and has accepted the responsibility. All have been agreed at the national authority and the RRC level.	Policy and Legal [C]	Product has been developed following the national policy, laws, regulations, and standards. The product has been approved by the national authority and the RRC level.	Date [C]	Product is supported through national data, and innovation and in regularly updated and available. There is a regular process for data update and the product has been updated regularly for product.	Financial [C]	The product is supported by a business model that includes several funding sources, including financial risks, and other income has been completed. The agreed upon business case has been completed. The product has been developed, will define business revenue value. [B]	Innovation [C]	Product is available only for use in infrastructure technological advances, innovation, and academic work.	Standards [C]	Product is following the most advanced version of the format (IHO or other IHO related standard) (IHO or other IHO related standard).	Partnerships [C]	Product is distributed through a Regional IHO Center (REIC).	Capacity and Education [C]	Product availability has been presented through the RRC, including the needs, values and benefits of the product. Opportunities for training on how to produce and use the product is available throughout the RRC region of a significant amount in Member States.	Communication and [C]	Product news, availability, and use [B] and have been included in a compelling narrative for all audiences. Technical relationships, including education, partners, users, and third parties have been identified at the national level.	1,71
Coherence and Realization [D]	Product has been produced, but there is no documented national institutional plan, or agreement at the RRC level, or requested product realization.	Policy and Legal [D]	Product has been produced, but there is no documented policy.	Date [D]	Product has been produced but data is not regularly updated for updates.	Financial [D]	Product has been produced, but the business model, including financial risks, and other income has been identified.	Innovation [D]	Product has been produced, but is not available for use in infrastructure technological advances, innovation, and academic work.	Standards [D]	Product has been produced, but does not use an IHO related standard.	Partnerships [D]	Product has been produced but is not distributed through a Regional IHO Center (REIC).	Capacity and Education [D]	Product has been produced, but availability has not been presented through the RRC, including the needs, values and benefits of the product. Opportunities for training on how to produce and use the product is not available throughout the RRC region of a significant amount in Member States.	Communication and [D]	Product news, availability, and use [B] and have been included in a compelling narrative for all audiences. Technical relationships, including education, partners, users, and third parties have been identified at the national level.	1,81
Coherence and Realization [E]	This product is not being considered by an hydrographic office in the region.	Policy and Legal [E]	This product is not being considered by an hydrographic office in the region.	Date [E]	This product is not being considered by an hydrographic office in the region.	Financial [E]	This product is not being considered by an hydrographic office in the region.	Innovation [E]	This product is not being considered by an hydrographic office in the region.	Standards [E]	This product is not being considered by an hydrographic office in the region.	Partnerships [E]	This product is not being considered by an hydrographic office in the region.	Capacity and Education [E]	This product is not being considered by an hydrographic office in the region.	Communication and [E]	This product is not being considered by an hydrographic office in the region.	1,81

EFFECTED SPANISH TRANSLATION ALREADY PUBLISHED ON OHI WEB



DETAILS OF MORE ADVANCED STANDARDS (IHO PRIORITY 1)

All pending approval, definitive standards, validation and quality control procedures and tools.

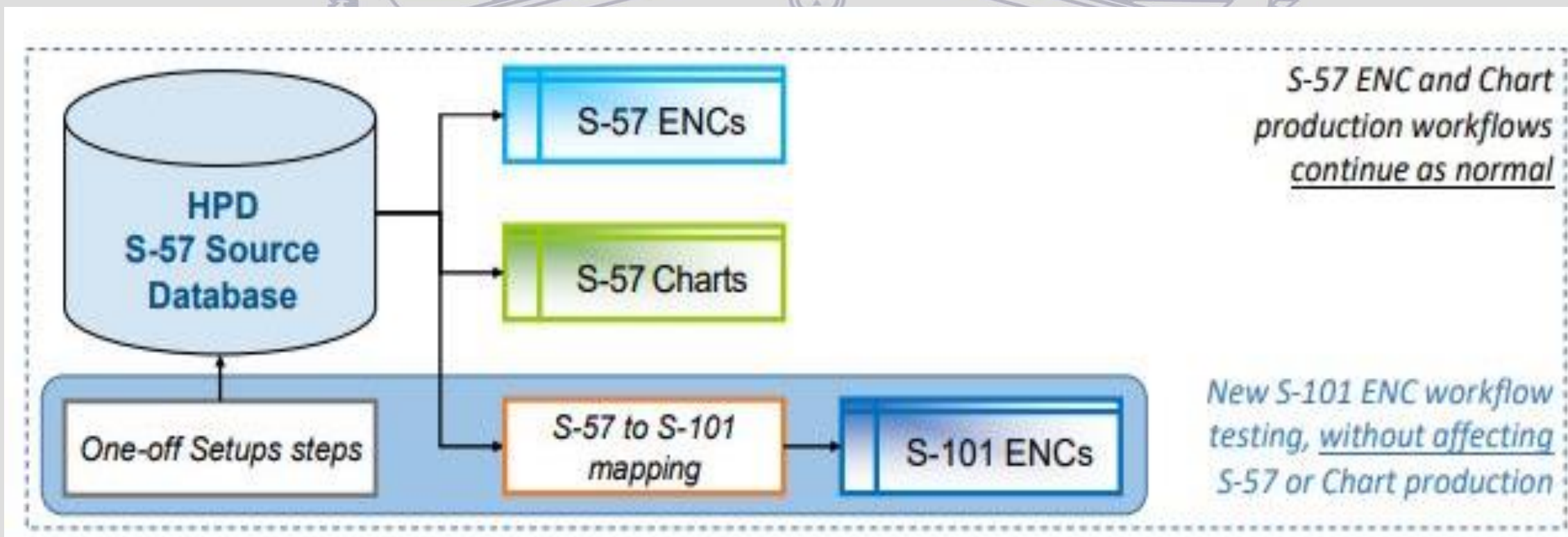
STDR	SUMMARY OF CURRENT IMPLEMENTATION STATUS	DISTRIBUTION VALIDATION
S128	Planned production by IC-ENC (Data from IHM)	IC-ENC INToGIS III (OHI)
S101	First test sent to IC-ENC February 23.	IC-ENC
S102	First test sent to IC-ENC May 23.	IC-ENC
S104	Software development actions started	IC-ENC
S111	Software development actions started	IC-ENC
S124	Efforts initiated for financing and software development. SHOM collaboration received	WWNWS
S129	Standby	¿?



DETAILS OF MORE ADVANCED STANDARDS (IHO PRIORITY 1)

S101

- PRODUCTION SOFTWARE: CARIS HPD 4.1.38 and MODULE S101
- CARTOGRAPHIC DB MIGRATION CARRIED OUT TO ADAPT TO CARIS HPD
- TRANSFORMATION TOOLS S57 to S101 NOT DEFINITIVE
- TOOLS and PROCEDURE VALIDATION/QUALITY CONTROL IN DEVELOPMENT
- WORK SCHEME FOR PRODUCTION S101



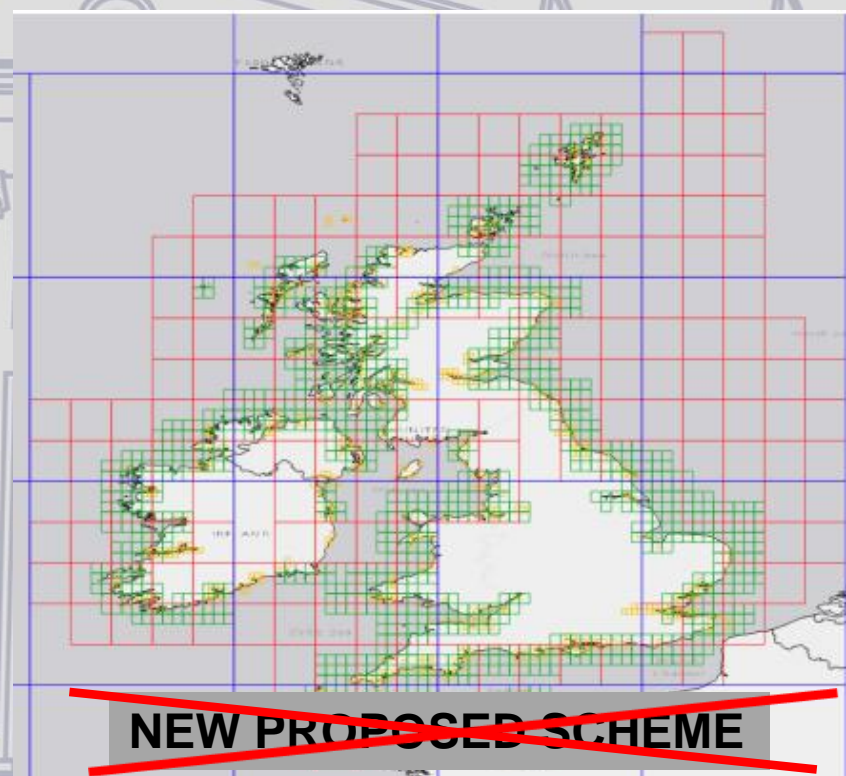
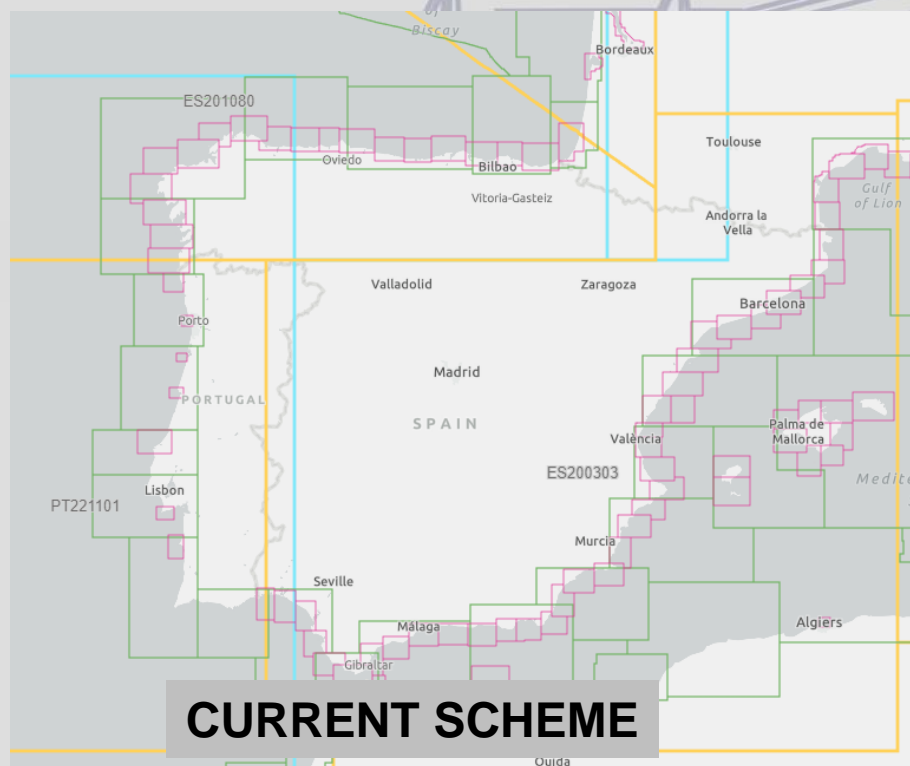


DETAILS OF MORE ADVANCED STANDARDS (IHO PRIORITY 1)

S101

WE INTEND TO MAINTAIN SIMILAR SCHEME AS WITH S57

- Facilitates the S57 to S101 transformation process
- No ENC changes (cells) in sensitive/special interest areas
- No coverage/overlap problems with neighboring countries





GUIA DE IMPLANTACIÓN DE PRODUCCIÓN ENC S101

ANEXOS

- I. Plan OHI de implantación de estándares de la familia S100, para 2023-2026
- II. Definición de indicadores de seguimiento de implantación de los estándares S100
- III. Programación y contenidos del curso de formación HPD 4.1
- IV. Programación y contenidos del curso de formación del módulo S101
- V. Procesos de trabajo para la transformación y producción de S101 a partir de S57

1.- INTRODUCCIÓN

El pasado 07 de noviembre de 2022, el Comité de Seguridad Marítima (MSC) de la Organización Marítima Internacional (OMI), adoptó la resolución MSC.530 (106) "Normas de funcionamiento de los sistemas de información y visualización de cartas Electrónicas", que es una revisión y actualización de la anterior resolución MSC.232(82). Esta revisión contempla la introducción gradual de la próxima generación de cartas de navegación electrónica (ENC), conforme a las nuevas especificaciones de la Organización Hidrográfica Internacional (OHI) (productos cartográficos de la familia de estándares S-100), estableciendo lo siguiente con respecto las consolas ECDIS:

- Los equipos instalados a partir del 1 de enero de 2029 deberán cumplir con estas normas revisadas, es decir, que estarán obligados a soportar formatos S100.
- Los instalados a partir del 1 de enero de 2026 pero antes del 1 de enero de 2029, pueden ajustarse a estas medidas revisadas o las anteriores del MSC.232 (82), es decir, que podrán soportar formatos S57, S100, o ambos a la vez (concepto de trabajo "Dual-Fuel").

La adopción esta resolución supone un importante avance para alcanzar la implantación de los productos S100, pero también supone un fuerte compromiso por parte de la Organización Hidrográfica Internacional (OHI) para cumplir con el plan de trabajo y cronograma de implantación de la S101 y del resto de estándares de la familia S100, establecido para los años 2023-2026 (Anexo I).

Destacar que dentro de los plazos establecidos en este Plan de implantación 2023-2026 de la OHI, se establece la necesidad de contar con una cobertura aceptable de los principales productos de la familia S100 a principios del año 2026. En este sentido, se da prioridad a aquellos estándares dedicados a la monitorización de la navegación: S101 (ENC), S102 (superficie batimétrica), S104 (mareas) y S111 (corrientes), así como aquellos relativos a la catalogación (S128), desarrollo de procedimientos de validación, control de calidad y distribución de todos estos nuevos productos. Otros estándares más relacionados con labores de planeamiento se establecen como segunda prioridad. Además, la OHI recomienda a los países productores centrar sus primeros esfuerzos en las zonas de mayor relevancia para la navegación, atendiendo a criterios de densidad del tráfico, puertos relevantes, restricciones, variaciones de sonda, etc.

PRODUCTION IMPLEMENTATION GUIDE ENC S101 IN SPANISH LANGUAGE

- Preparation and definition of the starting situation
- Definition of monitoring indicators
- Minimum hardware requirements
- Minimum software requirements
- Staff training plan
- S101 Database Configuration
- Transformation processes from s57 to S101 (in testing phase)
- Processes of sending to the RENC



CONCLUSIONS

- Awareness: 2026 very close. Coverage commitment (OHI with OMI)
- IHM implementation plan in accordance with the OHI Plan (2021-2026)
- IHM sole interlocutor from Spain with IC-ENC
- Priority most relevant areas / S101, S102, S104, S111, S128, S124 and S129
- It is important to continue producing S101 and S102. IC-ENC referral.
- It is important to start production as soon as possible in tests of S104 and S111
- S128, it is intended to be produced with the collaboration of IC-ENC
- Continue with line started for software development S124 (SHOM)
- S129, currently waiting (first production S104)



INSTITUTO HIDROGRÁFICO DE LA MARINA



SPANISH HYDROGRAPHIC OFFICE



**NATIONAL IMPLEMENTATION
STRATEGY FOR S-1XX PRODUCTS**



**EAtHC ICCWG WORKSHOP ON S-100
IMPLEMENTATION**

November 23th, 2023