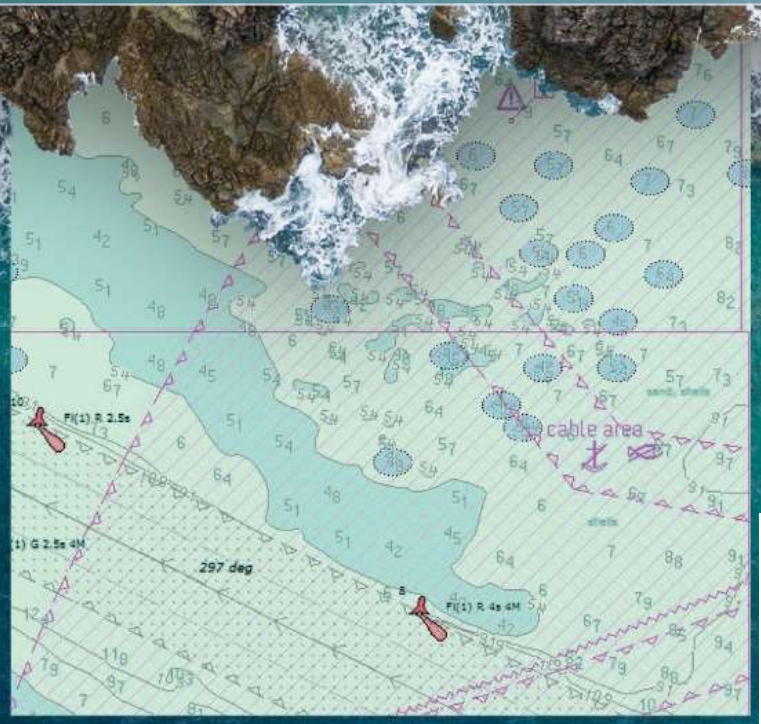
MARINA MILITARE

THE ROLE OF THE NATIONAL HYDROGRAPHIC SERVICE

1872 - 2022 150° Anniversario della Fondazione



Rear Admiral **Massimiliano Nannini**
Director of the Italian Hydrographic Institute

MPA SINGAPORE · UN-GGIM GLOBAL GEOSPATIAL INFORMATION MANAGEMENT · IHO International Hydrographic Organization · Open Geospatial Consortium

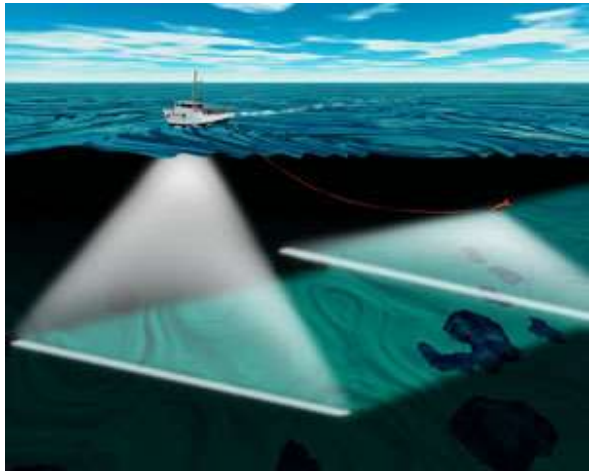
Singapore, 10th May 2022

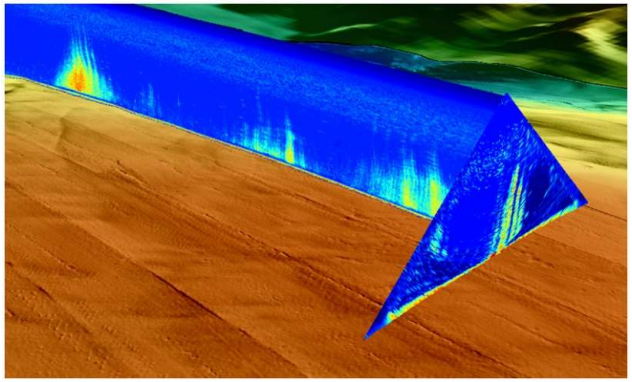
AGENDA

- Technology and data acquisition
- Data and information management
- People

TECHNOLOGY AND DATA ACQUISITION

MULTISENSOR AND MULTIMEASURE



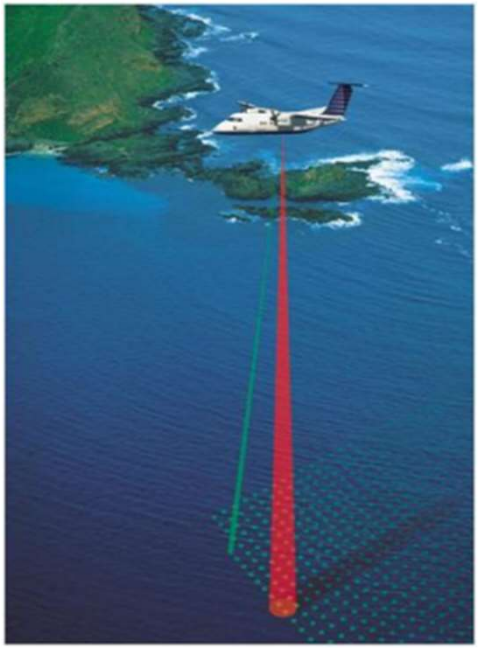


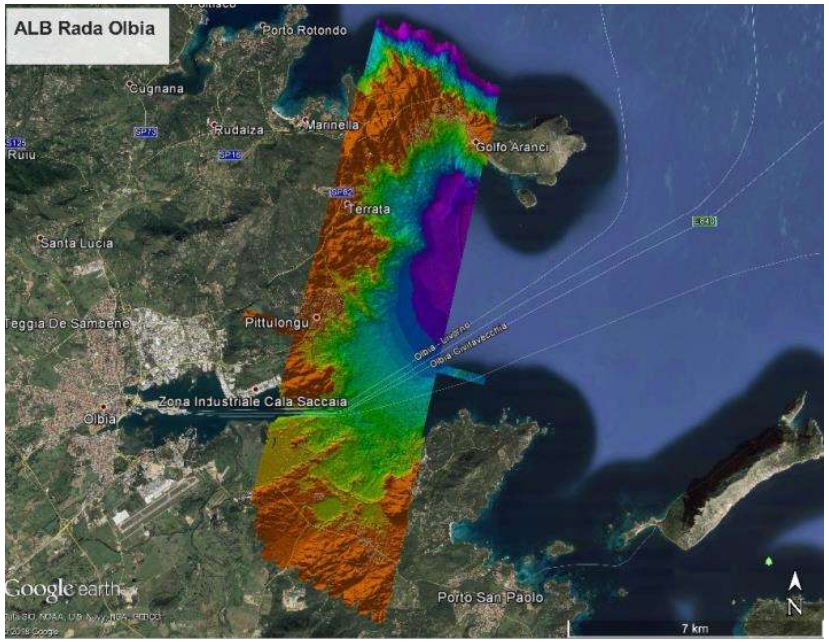
TECHNOLOGY AND DATA ACQUISITION

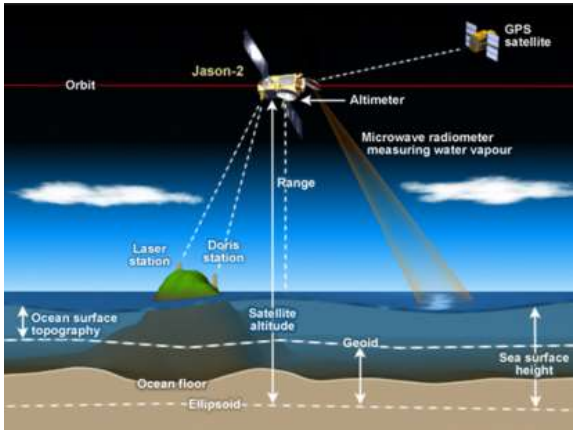
AUTONOMOUS

TECHNOLOGY AND DATA ACQUISITION

ELECTROMAGNETIC MEASURES

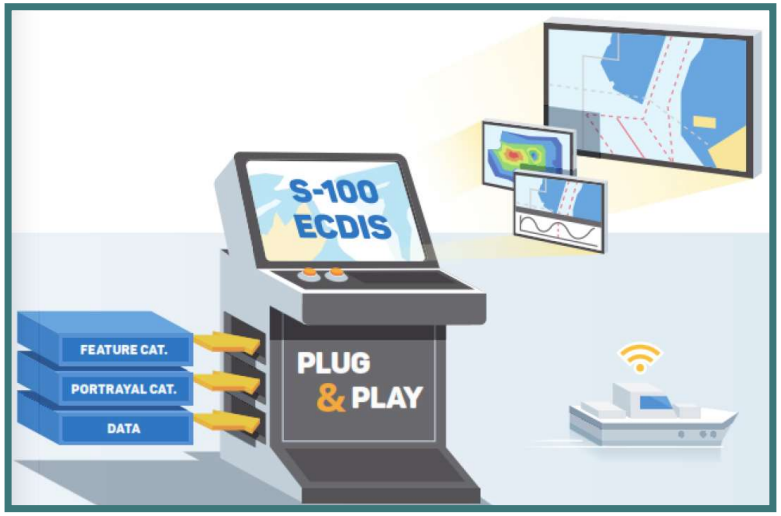


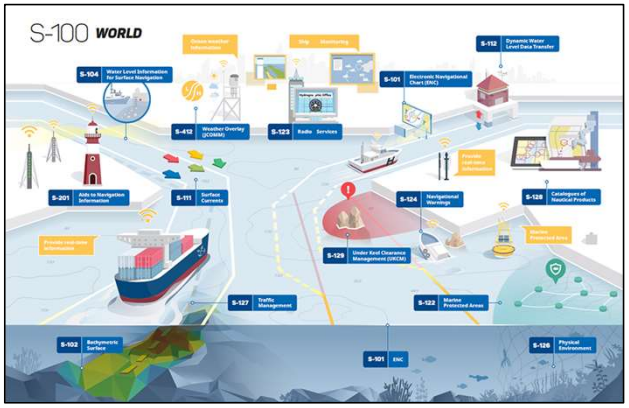




DATA AND INFORMATION MANAGEMENT

S100 - UNIVERSAL HYDROGRAPHIC DATA MODEL

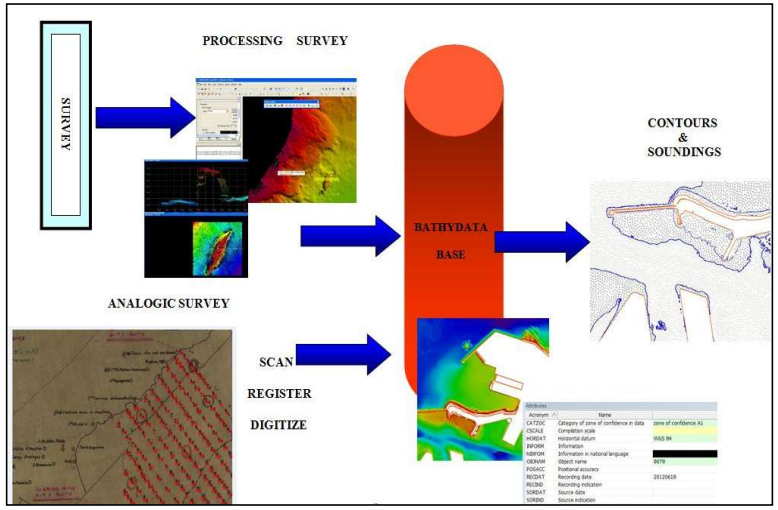


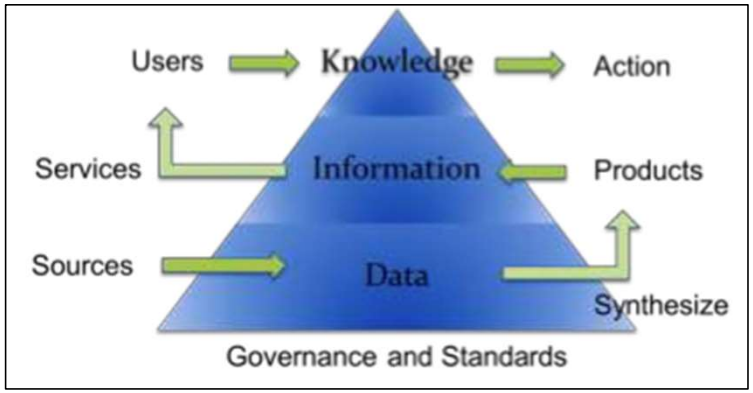


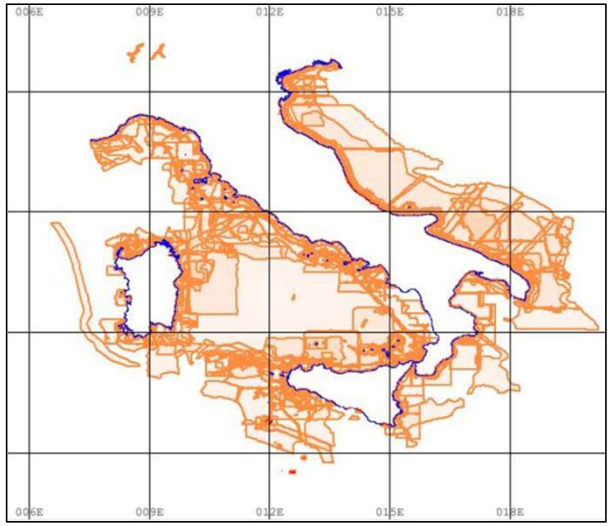
	2021	2022	2023	2024	2025	2026
S-100	Finalize Edition 5.0.0	Edition 5.0.0 Published			Work begins on future editions of S-100	
ENC S-101	Development and Finalization Edition 1.1.0	Preliminary Implementation	Development & Finalization Edition 2.0.0	Implementation	Operational Data	
Bathymetry S-102	Development and Testing and Finalization of Edition 3.0.0			Implementation	Operational Data	
Water Levels S-104	Edition 1.0.0	Preliminary Implementation	Development and Finalization of Edition 2.0.0	Implementation	Operational Data	
Surface Currents S-111	Development and Testing and Finalization of Edition 2.0.0			Implementation	Operational Data	
Nav Warnings S-124	Development and Finalization of Edition 1.0.0		Preliminary Implementation	Development and Finalization of Edition 2.0.0	Implementation	Operational Data
Catalog of Catalogs S-128	Development and Testing and Finalization of Edition 1.0.0			Implementation	Operational Data	
UKC Management S-129	Development and Testing and Finalization of Edition 2.0.0			Implementation	Operational Data	

DATA AND INFORMATION MANAGEMENT

HYDROGRAPHIC DATABASE





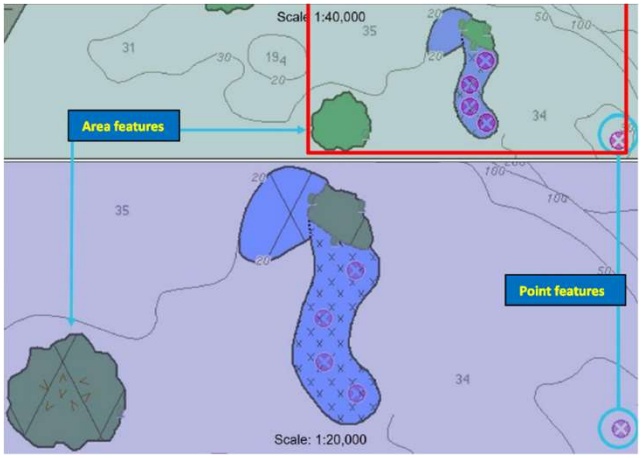


DATA QUALITY

7.3 TABLE 1 - Minimum Bathymetry Standards for Safety of Navigation Hydrographic Surveys

To be read in conjunction with the full text set out in this document, m = metres, all uncertainties at 95% confidence level, * = Matrix Reference.

Reference	Criteria	Order 2	Order 1b	Order 1a	Special Order	Exclusive Order
Chapter 1	**Area description** (Generally)	Areas where a general description of the sea floor is considered adequate.	Areas where underkeel clearance is not considered to be an issue for the type of surface shipping expected to transit the area.	Areas where underkeel clearance is considered not to be critical but features of concern to surface shipping may exist.	Areas where underkeel clearance is critical	Areas where there is strict minimum underkeel clearance and manoeuvrability criteria
Section 2.6	**Depth THU** [m] + [% of Depth]	20 m + 10% of depth *Ba5, Bb2	5 m + 5% of depth *Ba8, Bb3	5 m + 5% of depth *Ba8, Bb3	2 m *Ba9	1 m *Ba10
Section 2.6 Section 3.2 Section 3.2.3	**Depth TVU** (a) [m] and (b)	a = 1.0 m b = 0.023 *Bc7, Bd4	a = 0.5 m b = 0.013 *Bc8, Bd6	a = 0.5 m b = 0.013 *Bc8, Bd6	a = 0.25 m b = 0.0075 *Bc10, Bd8	a = 0.15 m b = 0.0075 *Bc12, Bd8
Section 3.3	**Feature Detection** [m] or [% of Depth]	Not Specified	Not Specified	Cubic features > 2 m, in depths down to 40 m; 10% of depth beyond 40 m *Be5, Bf3 beyond 40m	Cubic features > 1 m *Be6	Cubic features > 0.5 m *Be9
Section 3.4	**Feature Search** [%]	Recommended but Not Required	Recommended but Not Required	100% *Bg9	100% *Bg9	200% *Bg12
Section 3.5	**Bathymetric Coverage** [%]	5% *Bh3	5% *Bh3	≤ 100% *≤ Bh9	100% *Bh9	200% *Bh12



ZOC	Position Accuracy	Depth Accuracy	Seafloor Coverage	Typical Survey Characteristics	Symbol
A1	± 5m	=0.50 + 1%d Depth [m] / Accuracy [m] 10 / ± 0.6 30 / ± 0.8 100 / ± 1.5 1000 / ±10.5	Full area search undertaken. Significant seafloor features detected and depths measured.	Controlled, systematic survey high position and depth accuracy achieved using DGPS or a minimum three high quality lines of position (LOP) and a multibeam, channel or mechanical sweep system.	
A2	± 20m	=1.0 + 2%d Depth [m] / Accuracy [m] 10 / ±1.2 30 / ± 1.6 100 / ± 3.0 1000 / ± 21.0	Full area search undertaken. Significant seafloor features detected and depths measured.	Controlled, systematic survey achieving position and depth accuracy less than ZOC A1 and using a modern survey Echosounder and a sonar or mechanical sweep system.	
B	± 50m	=1.0 + 2%d Depth [m] / Accuracy [m] 10 / ±1.2 30 / ± 1.6 100 / ± 3.0 1000 / ± 21.0	Full area search not achieved; uncharted features, hazardous to surface navigation are not expected but may exist.	Controlled, systematic survey achieving similar depth but lesser position accuracy less than ZOC A2 and using a modern survey echosounder, but no sonar or mechanical sweep system.	
C	± 500m	=2.0 + 5%d Depth [m] / Accuracy [m] 10 / ±2.5 30 / ± 3.5 100 / ± 7.0 1000 / ± 52.0	Full area search not achieved, depth anomalies may be expected.	Low accuracy survey or data collected on an opportunity basis such as soundings on passage.	
D	Worse than ZOC 'C'	Worse Than ZOC 'C'	Full area search not achieved, large depth anomalies may be expected.	Poor quality data or data that cannot be quality assessed due to lack of information.	
U	Unassessed - The quality of the bathymetric data has yet to be assessed.				U

**In practice, it is usually assumed that the reliability error of bathymetric data measurements estimated for ZOC (D) and ZOC (U) zones assumes values at least 10% higher than the values estimated for the ZOC zone (C), which can also be recorded as: (2.0m ± 5% · d) · 1.1.*

PEOPLE

TECHNICAL COMPETENCE

INTERNATIONAL FEDERATION OF SURVEYORS | INTERNATIONAL HYDROGRAPHIC ORGANIZATION | INTERNATIONAL CARTOGRAPHIC ASSOCIATION

STANDARDS OF COMPETENCE FOR CATEGORY "A" HYDROGRAPHIC SURVEYORS

Publication S-5A
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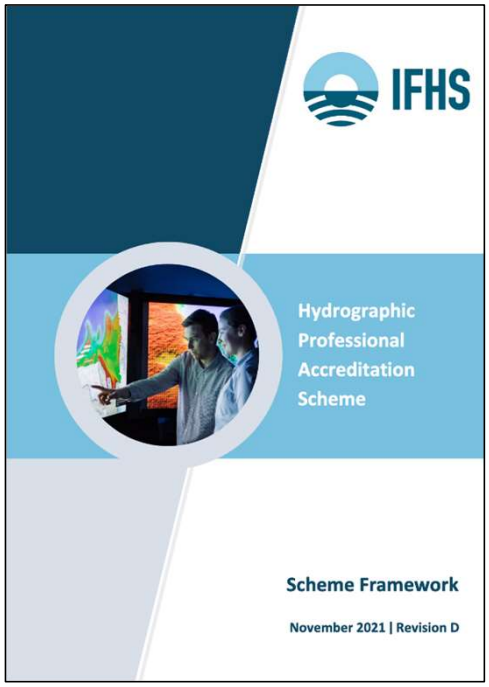
Comments arising from the experience gained in the application of the guidance are welcome. They should be addressed to the Chair of the International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers at the above address. This document is published periodically. Please check with IHO for the latest edition, including current amendments.



INTERNATIONAL FEDERATION OF SURVEYORS | INTERNATIONAL HYDROGRAPHIC ORGANIZATION | INTERNATIONAL CARTOGRAPHIC ASSOCIATION

STANDARDS OF COMPETENCE FOR CATEGORY "A" NAUTICAL CARTOGRAPHERS

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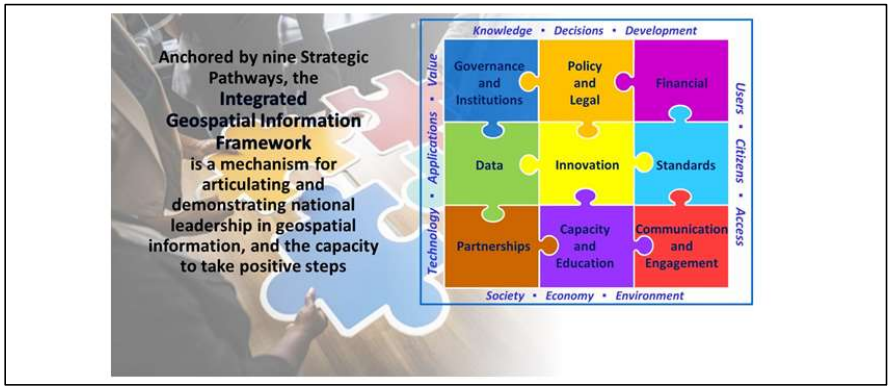
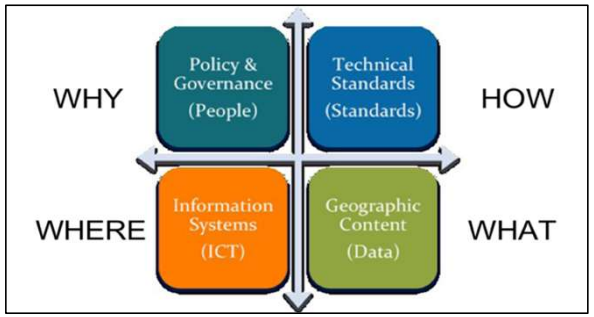
DIGITAL COMPETENCE

PEOPLE

NETWORK

STRATEGIC REFERENCES





Future trends in geospatial information management: the five to ten year vision

THIRD EDITION

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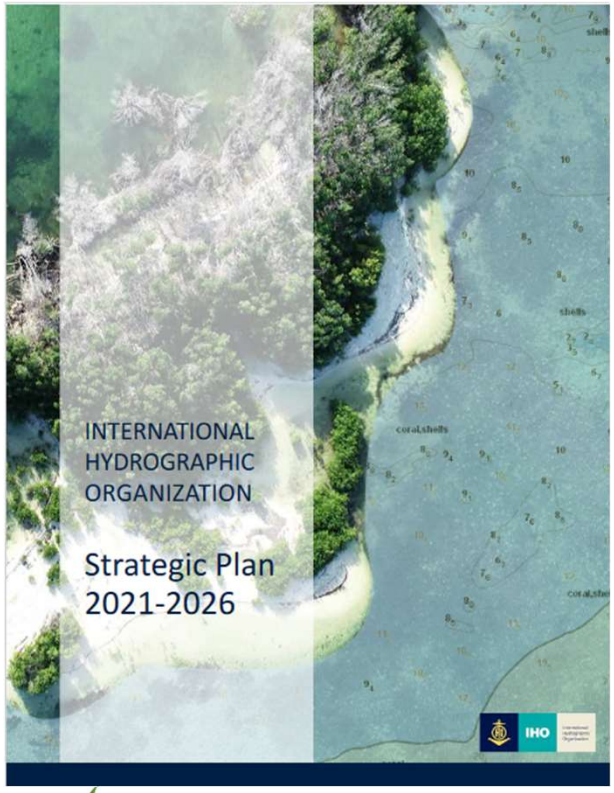


Roadmap for the S-100 Implementation Decade (2020 – 2030)

Version 2.0, 16 December 2021

References: A: Decision A2/29: endorsement by the Assembly of version 1.0 Rev1 following Proposal A2/2.1
B: List of actions and decisions from 2nd Meeting of IHO Council (C-2) 2018
C: List of actions and decisions from 3rd Meeting of IHO Council (C-3) 2019
D: List of actions and decisions from 4th Meeting of IHO Council (C-4) 2020
E: List of actions and decisions from 5th Meeting of IHO Council (C-5) 2021
F: HSSC13 Report to IHO Council (C-5)
G: IRCC13 Report to IHO Council (C-5)
H: IHO Report to IMO (NCSR8/13/1 dated 09 February 2021)
I: IHO Resolution 1/2021 – WEND 100 Principles

Introduction

The Roadmap for the S-100 Implementation Decade (2020-2030) constitutes a transition plan aiming to the regular and harmonized production and dissemination of S-100 based products. The referenced Meetings of the IHO Council confirmed repeatedly the decision to task the chairs of the Council, HSSC, IRCC and the Secretary-General, supported by subject matter experts and Member States as appropriate, to maintain the Roadmap as an incremental version-controlled document (including narrative and timelines) on an annual basis.

This task includes the mandate of the Secretary-General to engage with the IMO to regularly update on the status of the S-100 framework and potential future impact on IMO instruments (Ref. B: Action C2/32).

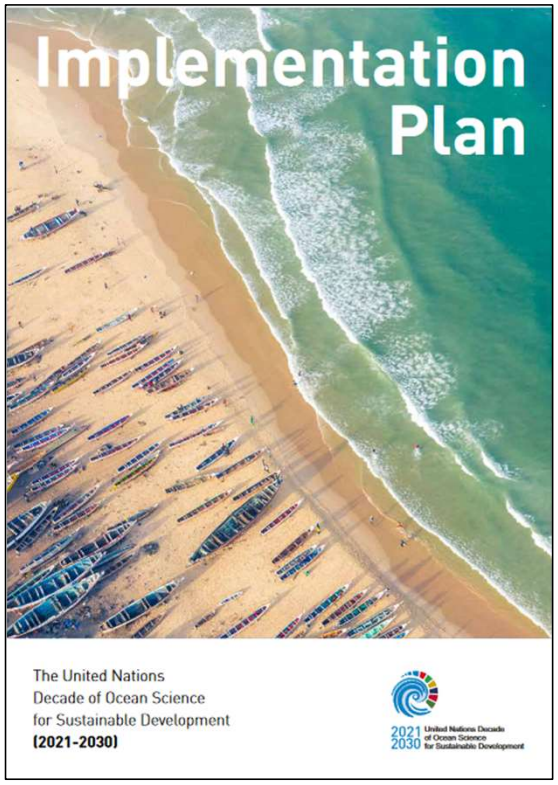
Based on the evolutionary process made with the subject matter under the auspices of IRCC and HSSC since C-2 in 2018, the 5th Meeting of the IHO Council decided to task the noted group of offices bearers to draft and the Secretariat to upload a version 2.0 of this document which includes endorsed amendments as proposed by HSSC as described in Annex B of the HSSC report and by the WENDWG as contained in Annex A of the IRCC report to C5. The structure of Version 1.0 of the document remains unaltered for Version 2.0:

1. Operational infrastructure
2. Technical standardization
3. Coordinated implementation of services
4. Synchronization with IMO
5. Collaboration with industry
6. Capacity Building of Hydrographic Offices
7. Development of Global Distribution Capability

Version 2.0 also include three new Annexes as follows:

Annex 1: Collaboration and timelines with IMO and other liaising organizations to incorporate S-100, in their respective instruments as presented by means of the various reports to C-5;

S100_Roadmap_Decade_v2.0_EN_16Dec2021.docx Page 1 of 5 16/12/2021



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