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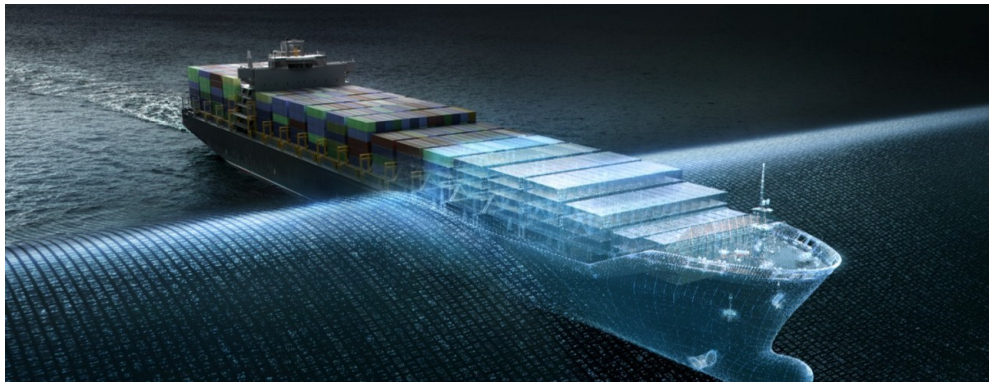
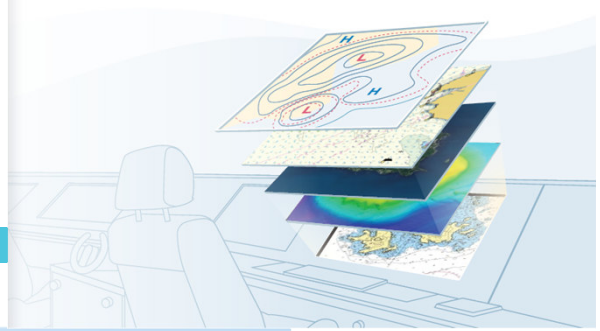
S-100 and eNavigation in Australia

Locate25 – April 2025



Alvaro Sanchez
Director National Charting
Australian Hydrographic Office (AHO)

The S-100 Universal Hydrographic Data Model



IHO KHOA KRISO

S-100 WORLD

Phase 1

Route Monitoring

- S-101 Electronic Navigational Chart
- S-102 Bathymetric Surface
- S-104 Water Level for Surface Navigation
- S-111 Surface Currents
- S-124 Navigational Warnings
- S-129 Under Keel Clearance Management

Critical Framework

- I H O Geospatial Information Registry
- S-98 Interoperability specification for ECDIS
- S-100 Universal Hydrographic Data Model
- S-128 Catalogue of Nautical Products
- S-164 IHO Test Data Sets in ECDIS

Phase 2

Route Planning

- S-122 Marine Protected Areas
- S-123 Marine Radio Services
- S-125 Marine Aids to Navigation
- 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)

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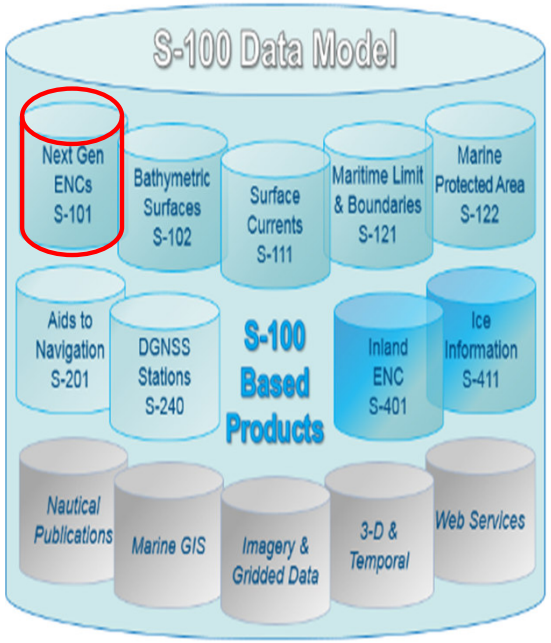
S-100 Products used in Monitoring Mode

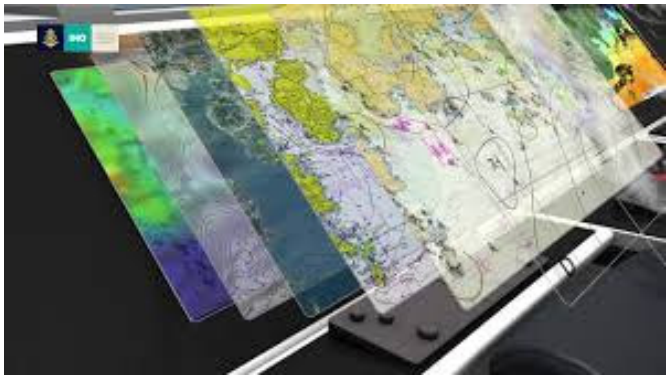
S-123 Radio Services
S-126 Physical Environment
S-129 UKCM
S-98 Interoperability catalogue
Up-to-dateness check using S-128
S-131 Marine Harbour Infrastructure
S-111 Surface Currents
S-124 Navigational Warnings
S-101 ENC
S-57 ENC
Dataset
Feature Catalogue
Portrayal Catalogue
Dual Fuel System
S-125 Marine AtoN
Under Keel Clearance Management (Optimized Loading)
S-127 Traffic Management
S-411 ICE Information
S-122 Marine Protected Areas
Water Level Adjustment using S-102 and S-104
S-412 Weather and Wave Hazards
S-104 Water Level
ebb tide
Vessel
high tide
tidal range
low tide
flood tide
S-421 Route Information
S-102 Bathymetric Surface
S-103 Sub-surface Navigation
Safety Depth Contour Improved Safety

S-97 Guidelines for Creating S-100 Product Specifications	S-98 Data Product Interoperability in S-100 Navigational System	S-99 Operational Procedures for the Organization and Management of the IHO GI registry	S-100 IHO Universal Hydrographic Data Model	S-164 Test Data Set for S-100 and ECDIS Type Approval	S-101 to S-199 International Hydrographic Organization (IHO)
S-201 to S-299 International Association of Marine Aids to Navigation and Lighthouse (IALA)	S-301 to S-399 Intergovernmental Oceanographic Commission (IOC)	S-401 to S-402 Inland ENC Harmonization Group (IEHG)	S-411 to S-414 WMO Service Commission (SERCOM)	S-421 to S-430 International Electrotechnical Commission - TC80 (IEC-TC80)	S-501 to S-525 NATO Geospatial Maritime Working Group (GMWG) for Additional Military Layers (AML)

S-100 Data Model

- **The IHO S-100 Standard defines the new Universal Hydrographic Data Model**
  - **Primary aim: to support a greater range of hydrographic-related digital data sources, products and customers**
  - Enables easier development of new applications that go beyond the scope of traditional hydrography
  - Aligned with ISO 19100 series of international geospatial standards, enabling integration of hydrographic data and applications into geospatial solutions
  - Provides the data framework for the development of the next generation Electronic Navigational Chart (ENC) products, as well as other digital products required by the hydrographic, maritime and GIS communities.





Why is S-100 important?

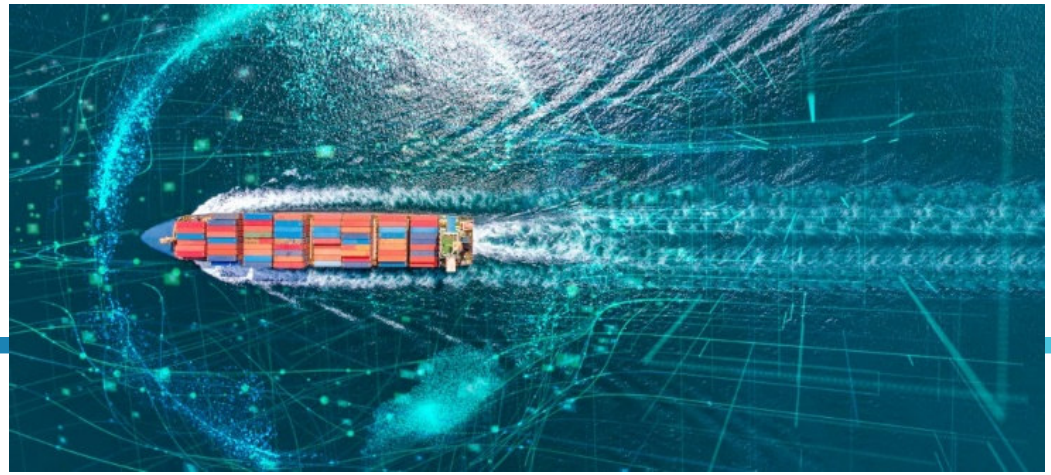
It has been identified as a ‘KEY ENABLER’ to eNavigation by the International Maritime Organizations (IMO)

What is eNavigation?

IMO e-Navigation concept

The International Maritime Organization (IMO) defines e-navigation as:

"the harmonized collection, integration, exchange, presentation and analysis of marine information on board and ashore by electronic means to enhance berth to berth navigation and related services for safety and security at sea and protection of the marine environment."



IMO's e-Navigation concept

The IMO developed the e-navigation Strategy Implementation Plan (SIP).The main objective of the e-navigation SIP is to implement the following five e-navigation solutions:

- S1: improved, harmonized and user-friendly bridge design;
  S2: means for standardized and automated reporting;
  S3: improved reliability, resilience and integrity of bridge equipment and navigation information;
- S4: integration and presentation of available information in graphical displays received via communication equipment; and
- S5: improved communication

The SIP proposes a list of r
transmission methods to co
exchange of the relevant in

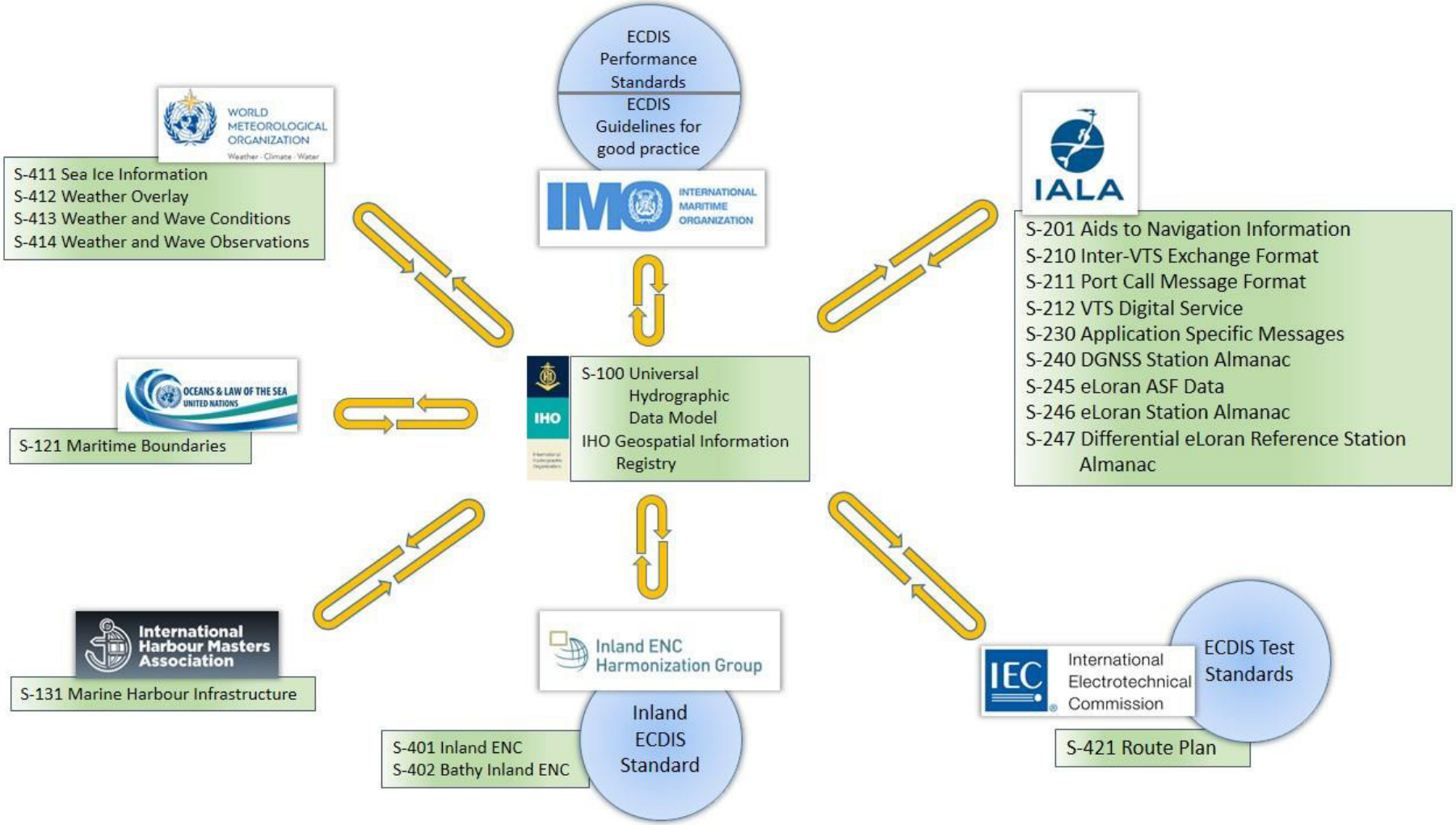
MSC.1/Circ.1595
Annex, page 22

Relevant key enablers for e-navigation

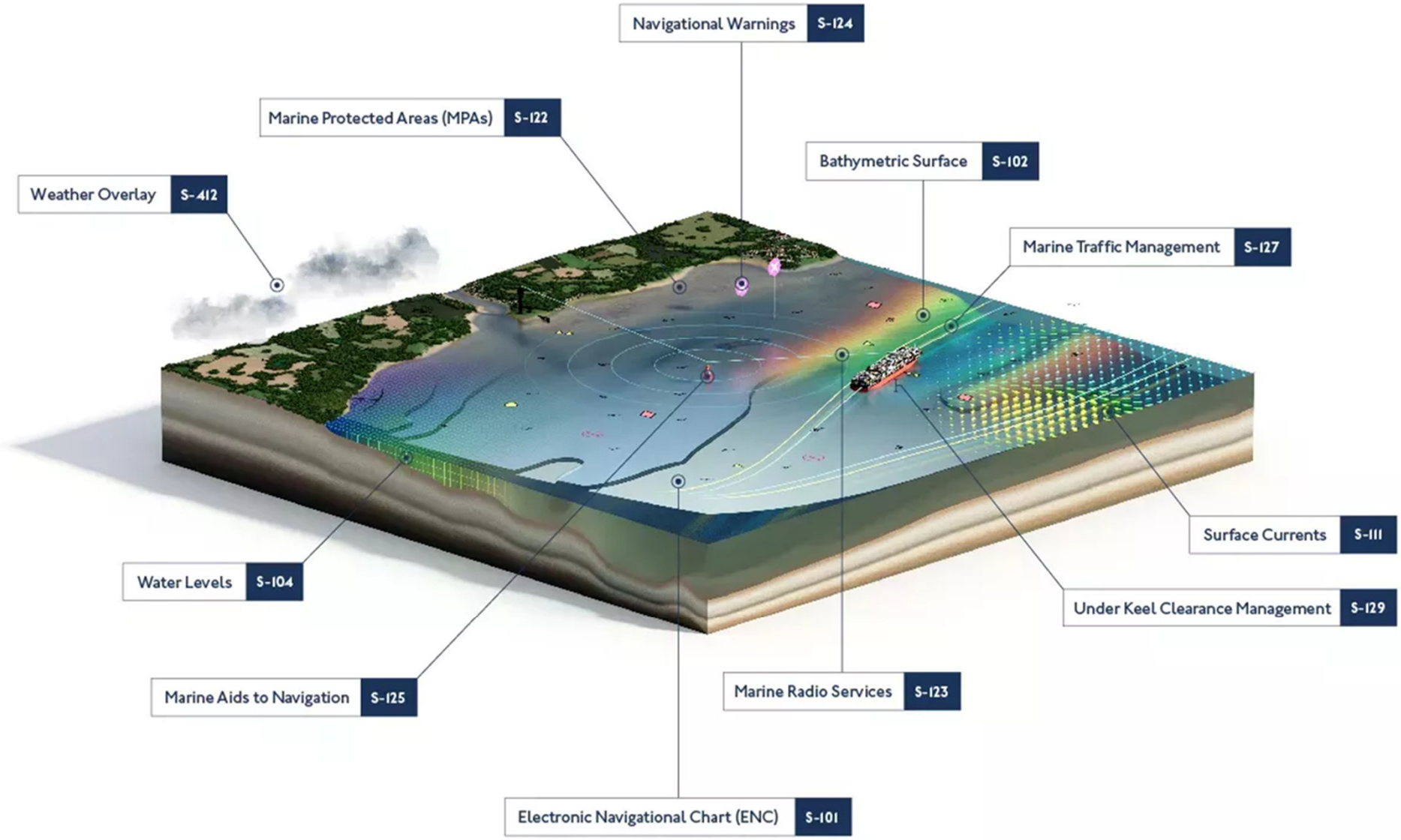
30 During the development of the SIP, a number of actions have been identified as key enablers for e-navigation. Some of them are listed below.

Table 9:
Examples of key enablers of e-navigation

Key enabler	Initial action	Status
Globally Standardized Data Exchange	Data providers to adapt to IMO recognized data standards such as IHO's S-100 data model	IMO/IHO Harmonization Group on Data Modelling (HGDM), activated at MSC 98


ECDIS Performance Standards
ECDIS Guidelines for good practice
IMO INTERNATIONAL MARITIME ORGANIZATION
WORLD METEOROLOGICAL ORGANIZATION
Weather · Climate · Water
S-411 Sea Ice Information
S-412 Weather Overlay
S-413 Weather and Wave Conditions
S-414 Weather and Wave Observations
IALA
S-201 Aids to Navigation Information
S-210 Inter-VTS Exchange Format
S-211 Port Call Message Format
S-212 VTS Digital Service
S-230 Application Specific Messages
S-240 DGNSS Station Almanac
S-245 eLoran ASF Data
S-246 eLoran Station Almanac
S-247 Differential eLoran Reference Station Almanac
OCEANS & LAW OF THE SEA UNITED NATIONS
S-121 Maritime Boundaries
IHO
S-100 Universal Hydrographic Data Model
IHO Geospatial Information Registry
International Harbour Masters Association
S-131 Marine Harbour Infrastructure
Inland ENC Harmonization Group
S-401 Inland ENC
S-402 Bathy Inland ENC
Inland ECDIS Standard
IEC International Electrotechnical Commission
ECDIS Test Standards
S-421 Route Plan

Interoperability – the game changer



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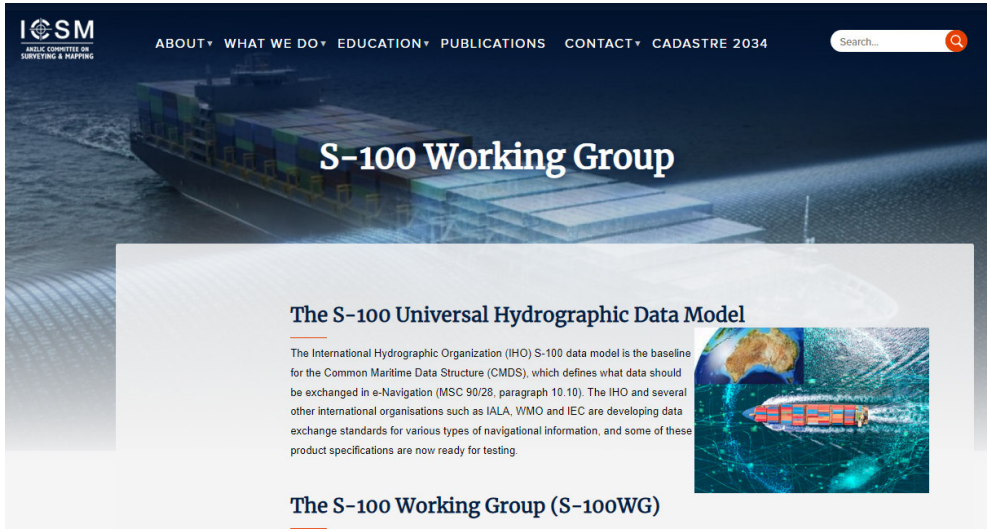
What are we doing in Australia?

S-100 Working Group



- The S-100WG is a working group under Intergovernmental Committee on Surveying and Mapping (ICSM) and is responsible for coordinating and managing the timely and effective implementation of a broad range of S-100 products and services in Australia and New Zealand.
- The S-100WG inaugural meeting was hosted by the Australian Hydrographic Office (AHO) in November 2022.
- The S-100WG members meet three times a year; two virtual meetings and one face-to-face meeting.
- Next meeting is scheduled for July 2025 (Hybrid – LTBD).

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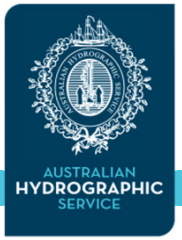
S-100WG Members



AUSTRALIAN HYDROGRAPHIC OFFICE

Australian Government
Department of Agriculture, Water and the Environment
Australian Antarctic Division

Australian Government
Australian Fisheries Management Authority

Australian Government
Australian Maritime Safety Authority

Toitū Te Whenua
Land Information
New Zealand

Australian Government
Bureau of Meteorology

Australian Government
Geoscience Australia

PORT of BRISBANE
Here for the future

Australian Government
Parks Australia

Australian Government
Department of Climate Change, Energy,
the Environment and Water

Australian Government
Great Barrier Reef
Marine Park Authority

Gladstone Ports Corporation
Growth, prosperity, community.
1914 - 2024

Australian Government
Department of Infrastructure, Transport,
Regional Development, Communications and the Arts

Port of Melbourne

Bathy

Flinders Ports

DHI

Hydro Survey

SOUTHERN PORTS
ALBANY BUNBURY ESPERANCE

Navigate
Hydrographic

OMC INTERNATIONAL
Safer Shipping | Smarter Ports

Seaport OPX
Digital operational services for ports

VICTORIAN PORTS MELBOURNE

SVITZER

MID WEST PORTS

PORT AUTHORITY
OF NEW SOUTH WALES

P&O
BRINGS US
ALL TOGETHER

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ICSM S-100WG Roadmap

Planning our route for efficient navigation

Establish S100WG

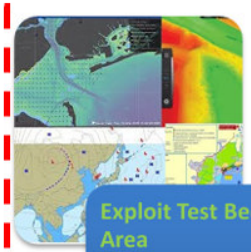
- November 2022
- Draft ToR
- Identify and contact stakeholders
- Develop Roadmap and Strategic Plan

Accelerate S-100 awarness and eductaion at the national level

- Regular meetings
- Educational sessions
- exposure to IHO WG/PT

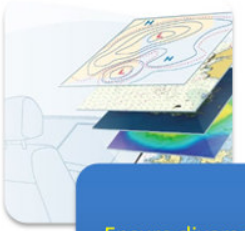
Establish Test Bed Area

- Appoint Test Bed lead
- Build the PT
- Prepare scope of work
- Develop Test Bed Plan

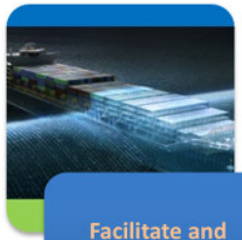


Exploit Test Bed Area

- Execute and Report findings and recommendations



Ensure diverse S-100 products and services are available



Facilitate and coordinate the growth of S-100 products and services

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S-100 Benefits

- **Underpins IMO's eNavigation strategy**
- **Is aligned with a contemporary International Geospatial standard (*ISO 19100*)**
- **Facilitates Interoperability between complementary products - value adding** *(e.g. Water Level Adjustments)*
- **Supports dynamic data layers - real or near-real data feed** *(e.g. Weather; Water levels)*
- **Enhances route planning and the optimisation of voyages -'just in time arrivals' and reduction of CO2 emissions**
- **Supports emerging technologies such as Autonomous vessels**
- **Enables *safer and more efficient navigation***
- **and MORE ….**

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Thanks

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