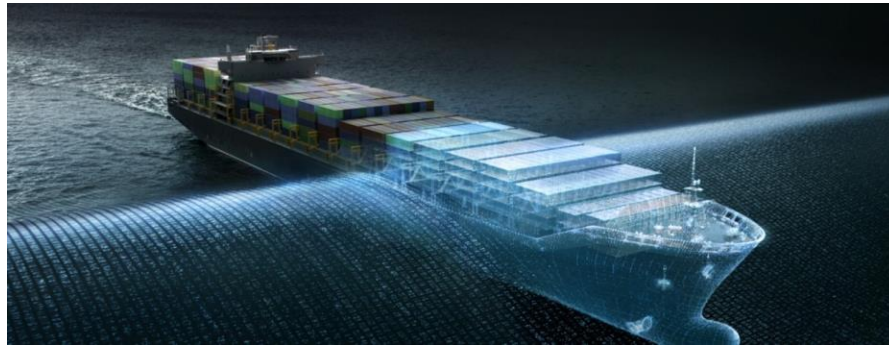




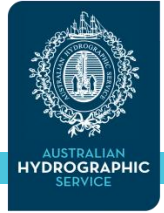
# S-100 and the future of Maritime products

AMPI Conference – October 2023



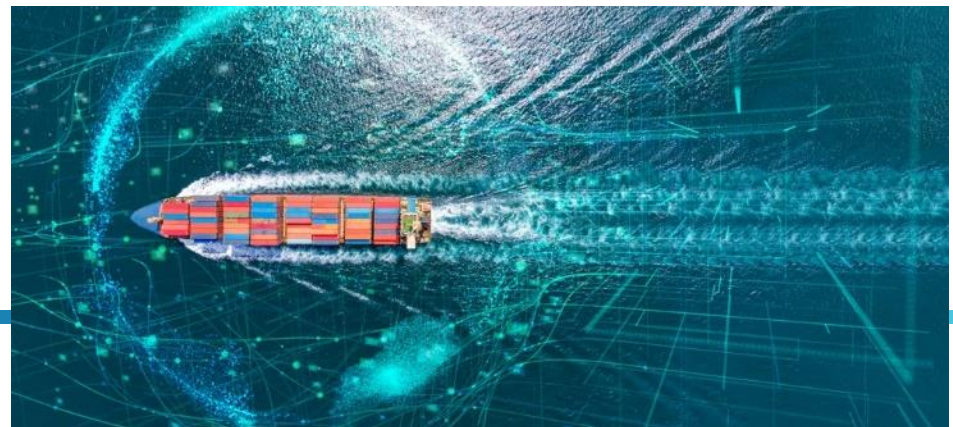
**Hilary Thompson**  
Executive Director  
Australian Hydrographic Office (AHO)

# IMO e-Navigation concept

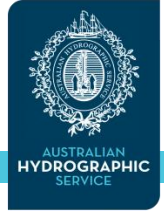


The International Maritime Organization (IMO) defines e-navigation as:

*"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 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 transmission methods to exchange of the relevant

MSC.1/Circ.1595  
Annex, page 22

## Relevant key enablers for e-navigation

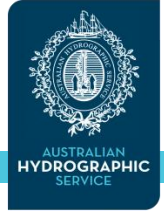
30 During the development of the SIP, a number of actions have been identified as key enablers for e-navigation. Some of them are listed below.

**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 <b>S-100</b> data model	IMO/IHO Harmonization Group on Data Modelling (HGDM), activated at MSC 98



# Current IHO Standard (S-57)



## ■ S-57 Edition 3.1.3 Standard (2000 – currently ‘active’ but ‘frozen’)

- **S-57** which is the **transfer standard** for exchanging **digital hydrographic data** between individual hydrographic offices and for its distribution to mariners and other users (First edition May 1992).

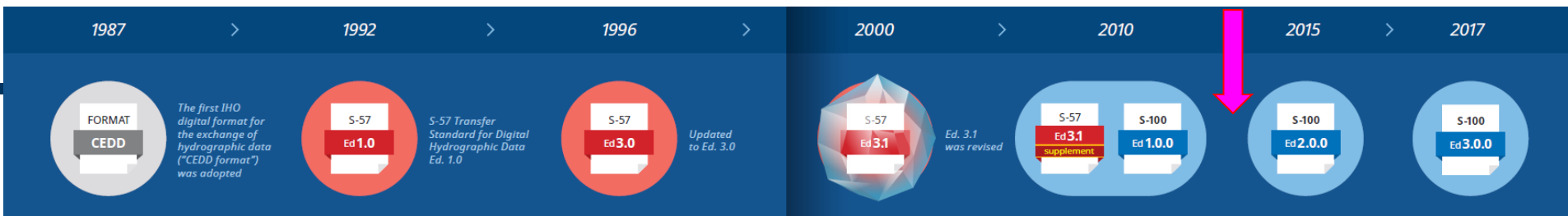
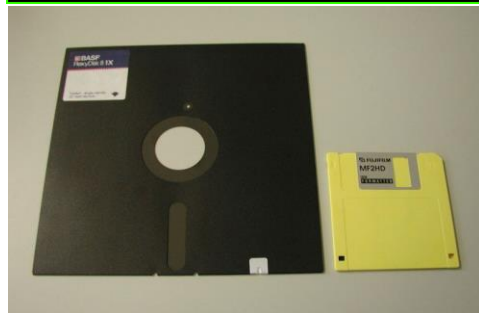
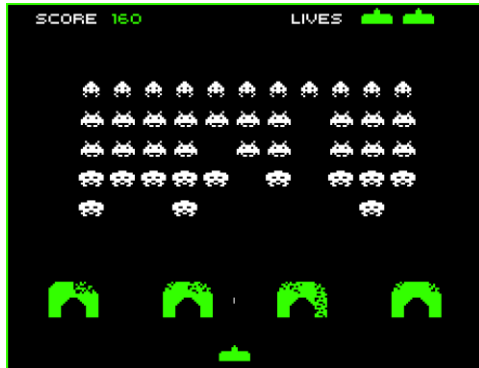
Basis for all official Electronic Navigational Charts (ENCs) used in ECDIS electronic navigation systems today

S-57 ENC products are now widely available and are increasingly being used by shipping companies around the world

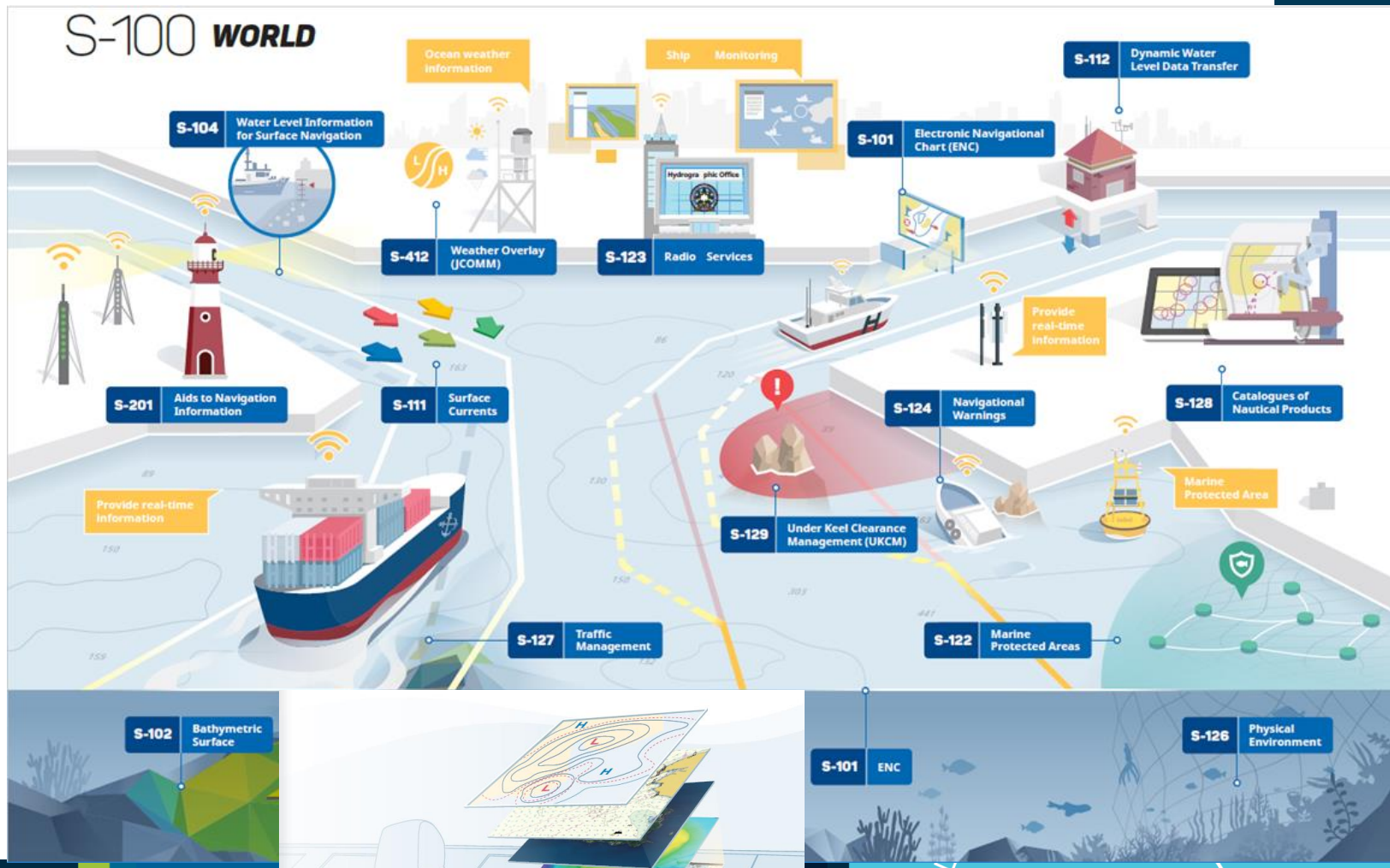
Limitations:

- Developed to meet ENC requirements in ECDIS
  - *ECDIS - A navigation information system which, with adequate back-up, can be accepted as complying with the up-to-date chart requirement by regulation V/20 of the 1974 SOLAS Convention*
- Does not separate data model and product specifications
- Does not use ISO 19100 series of geospatial standards
- No support for time varying depths, gridded bathymetry
- Inflexible maintenance and updating regime
- Data transfer mechanisms are limited
- Requires specialised software to process it

- S-57 ENCs will remain valid for many years to come even after new Standards have been officially implemented

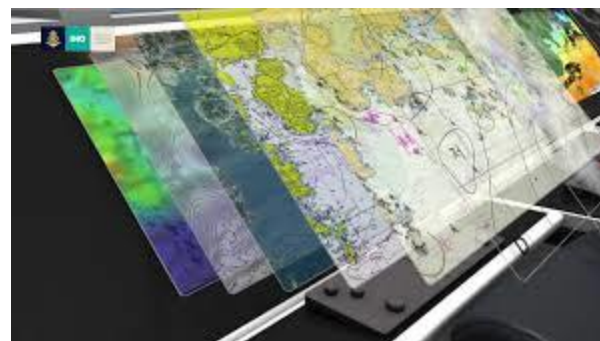
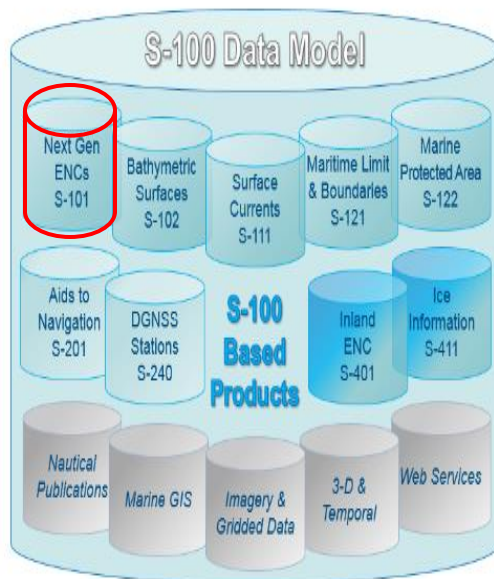


# The S-100 Universal Hydrographic Data Model



# 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.



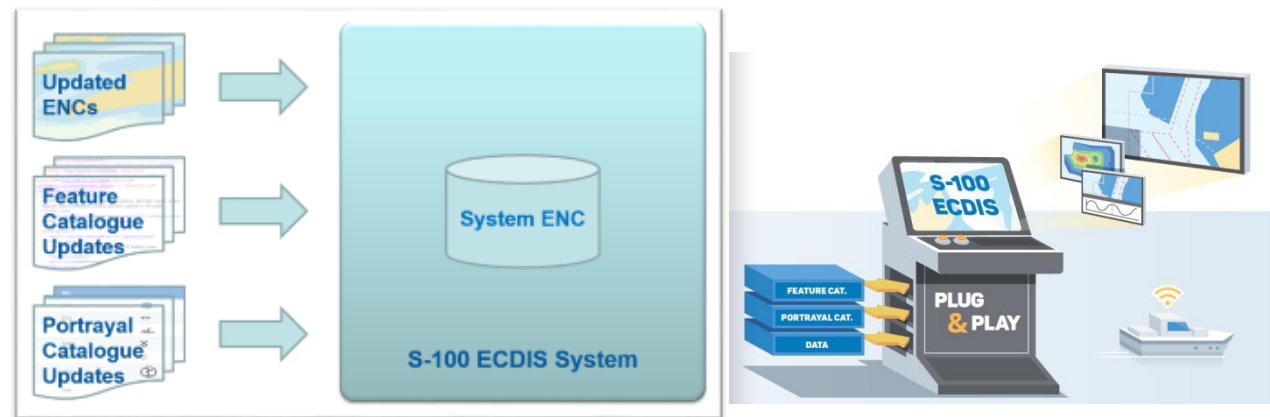
# Easy to update

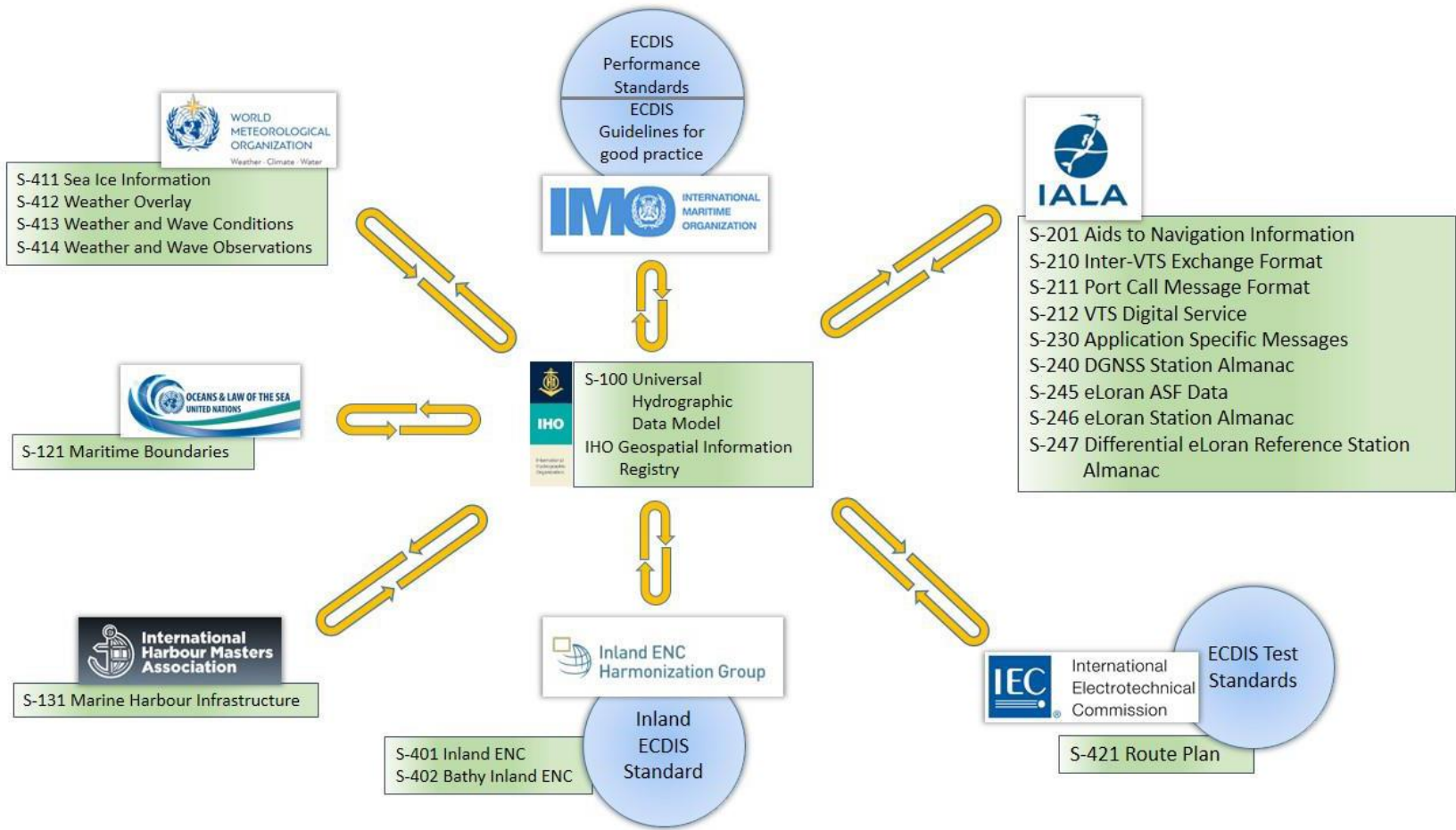
S-101 has a flexible design that includes a machine readable feature catalogue and a portrayal catalogue

This allows the content, content definition (feature catalogue) and presentation (portrayal catalogue) to be updated *without* the need for software or hardware upgrades

This means that new navigationally significant features can be defined and added, along with new portrayal instructions

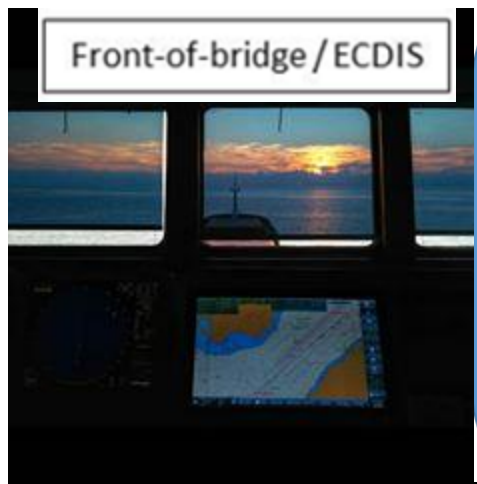
- These additions will be supplied with new ENC's
- These changes will be correctly interpreted by an S-100 compliant ECDIS system







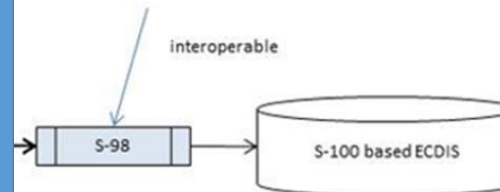
# S-100 ECDIS – Multi Product approach



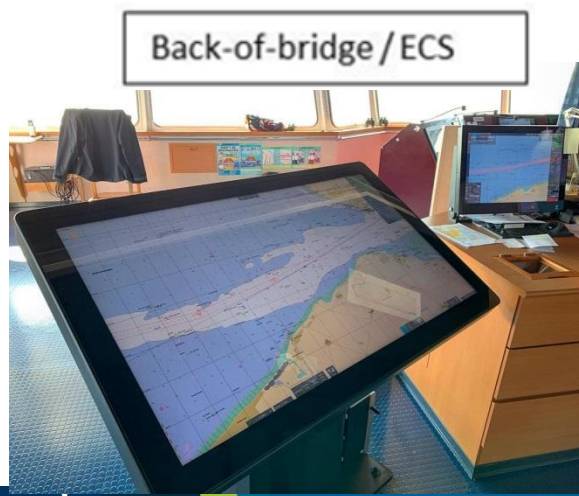
## Navigational Route Monitoring Mode S-98 Edition 1.0.0

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

## Navigation - *Meets* IMO Chart carriage requirements



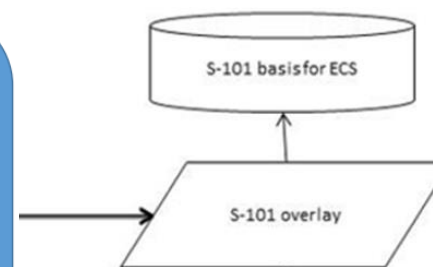
## Planning and assessment – *Does not meet* IMO chart carriage requirements



## Navigational Route Planning Mode Future S-98 Editions

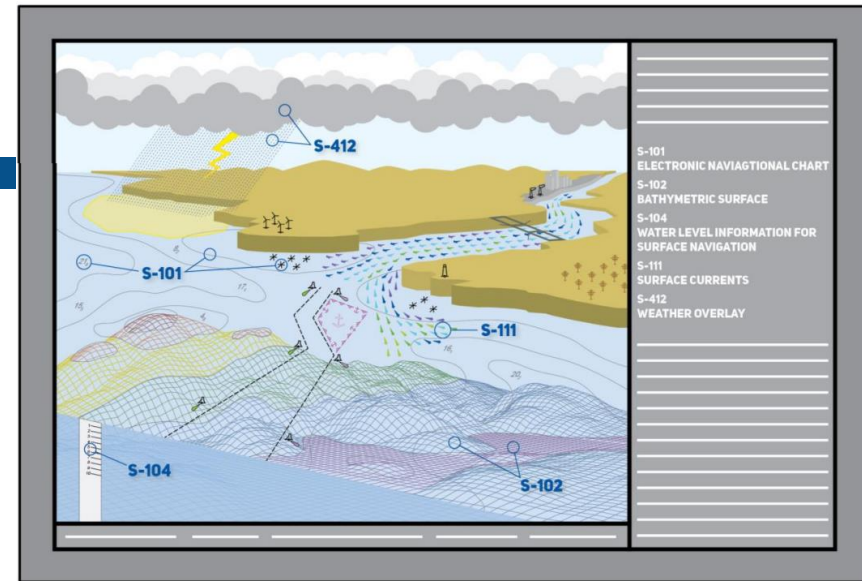
- S-122 Marine Protected Areas
- S-123 Marine Radio Services
- S-125 Marine Navigational Services
- S-126 Marine Physical Environment
- S-127 Marine Traffic Management
- S-131 Marine Harbour Infrastructure

+ S-100 Products used in  
Monitoring Mode

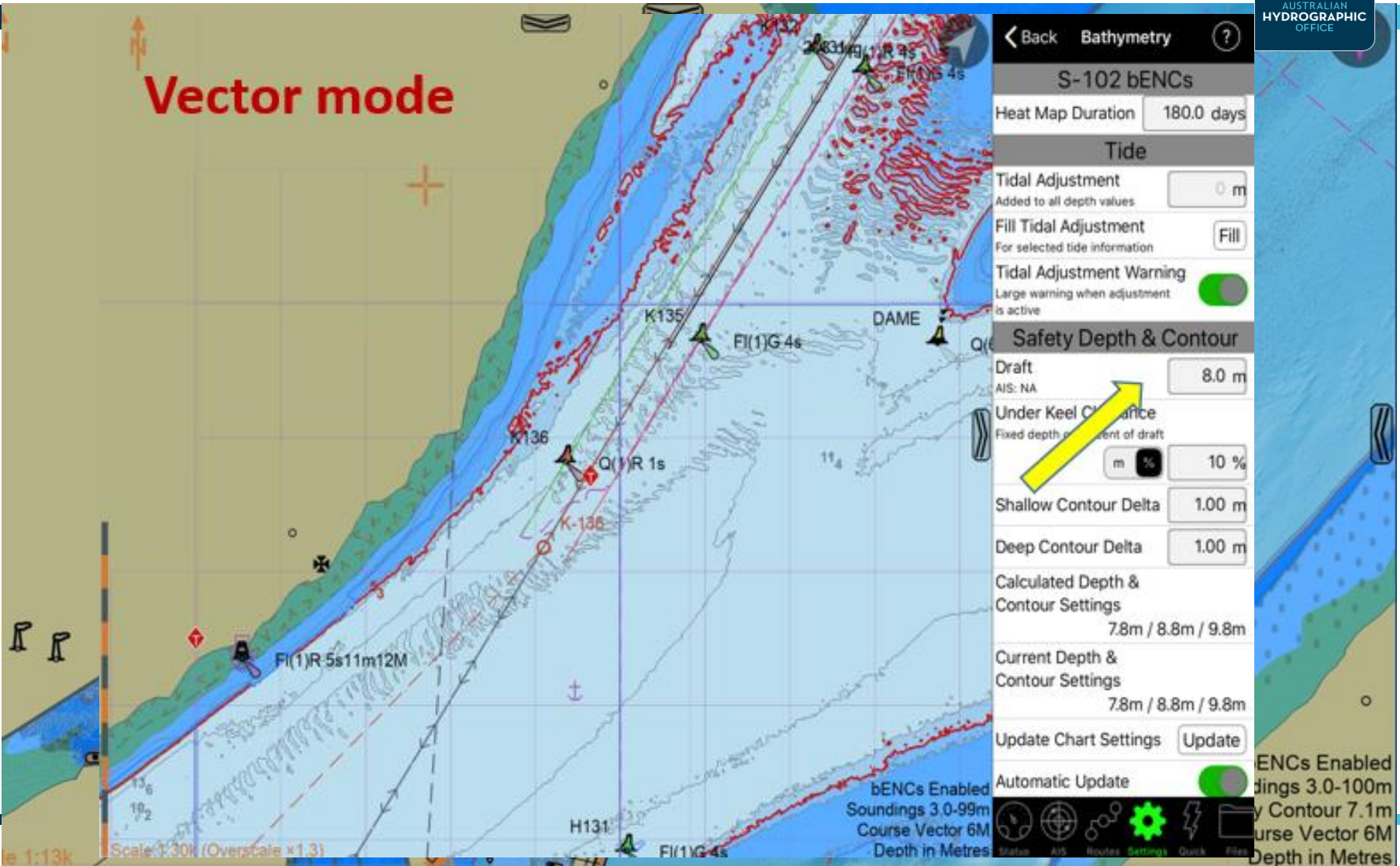


## Plan for the production of:

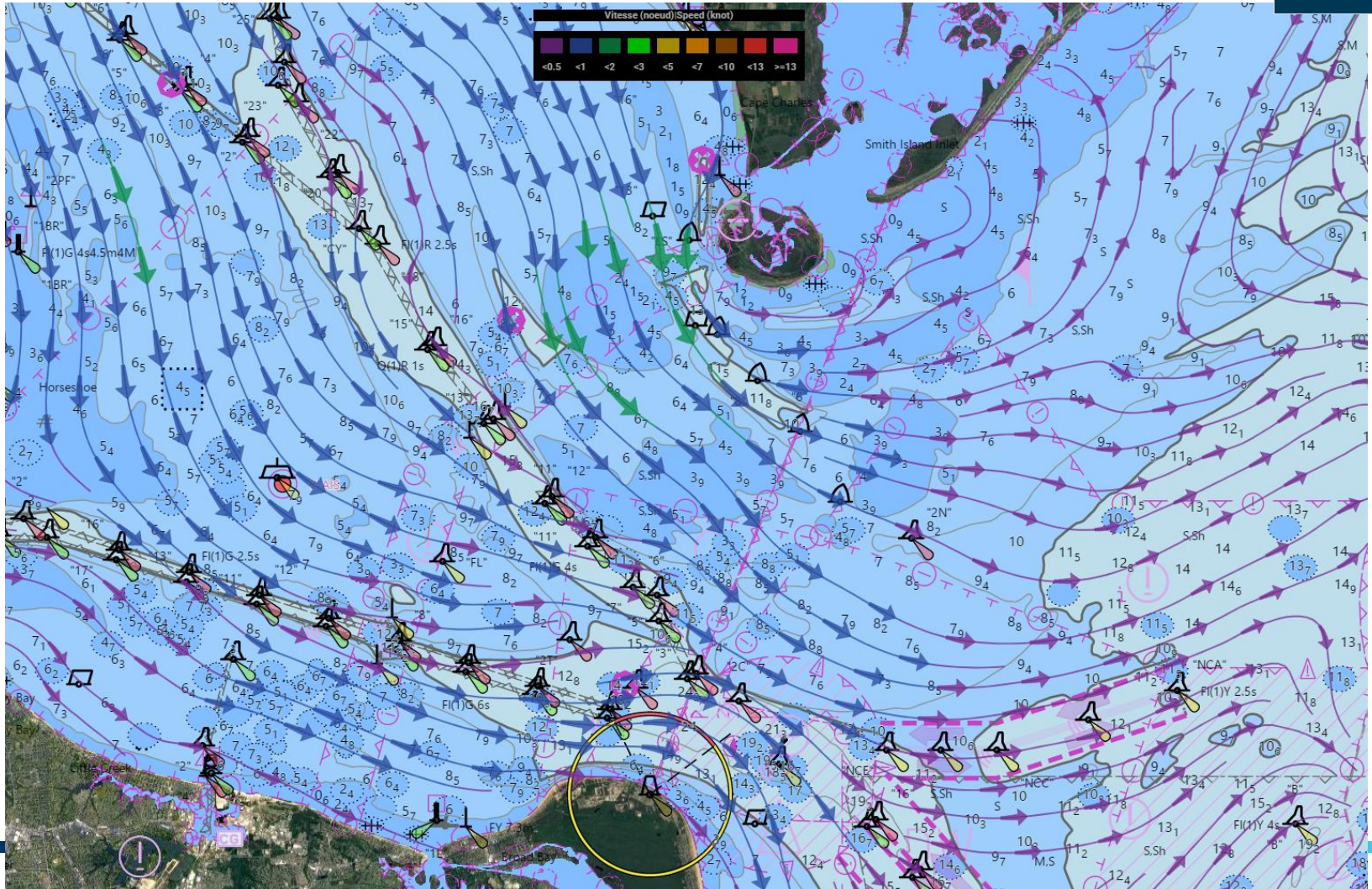
- S-101 Electronic Navigation Chart
  - S-102 Bathymetric Surface
  - S-104 Water Level Information for Surface Navigation
  - S-111 Surface Currents
  - S-124 Navigational Warnings
  - S-129 Under Keel Clearance Management (UKCM)
- **These represent the 'route monitoring mode' product specifications within ECDIS**



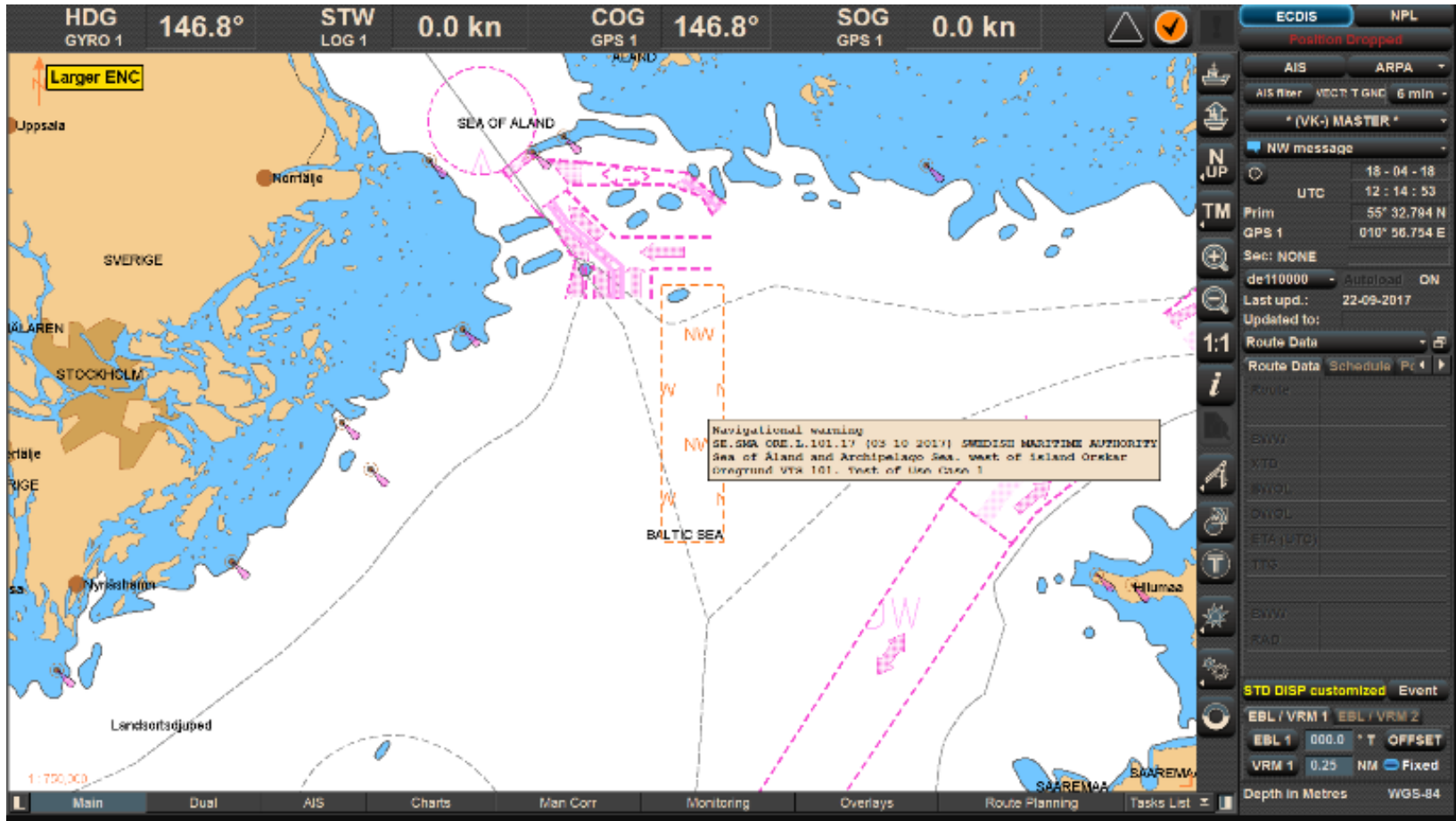
# S-102 & S-104 Bathymetric surfaces and real time tides



# S-111 Surface currents

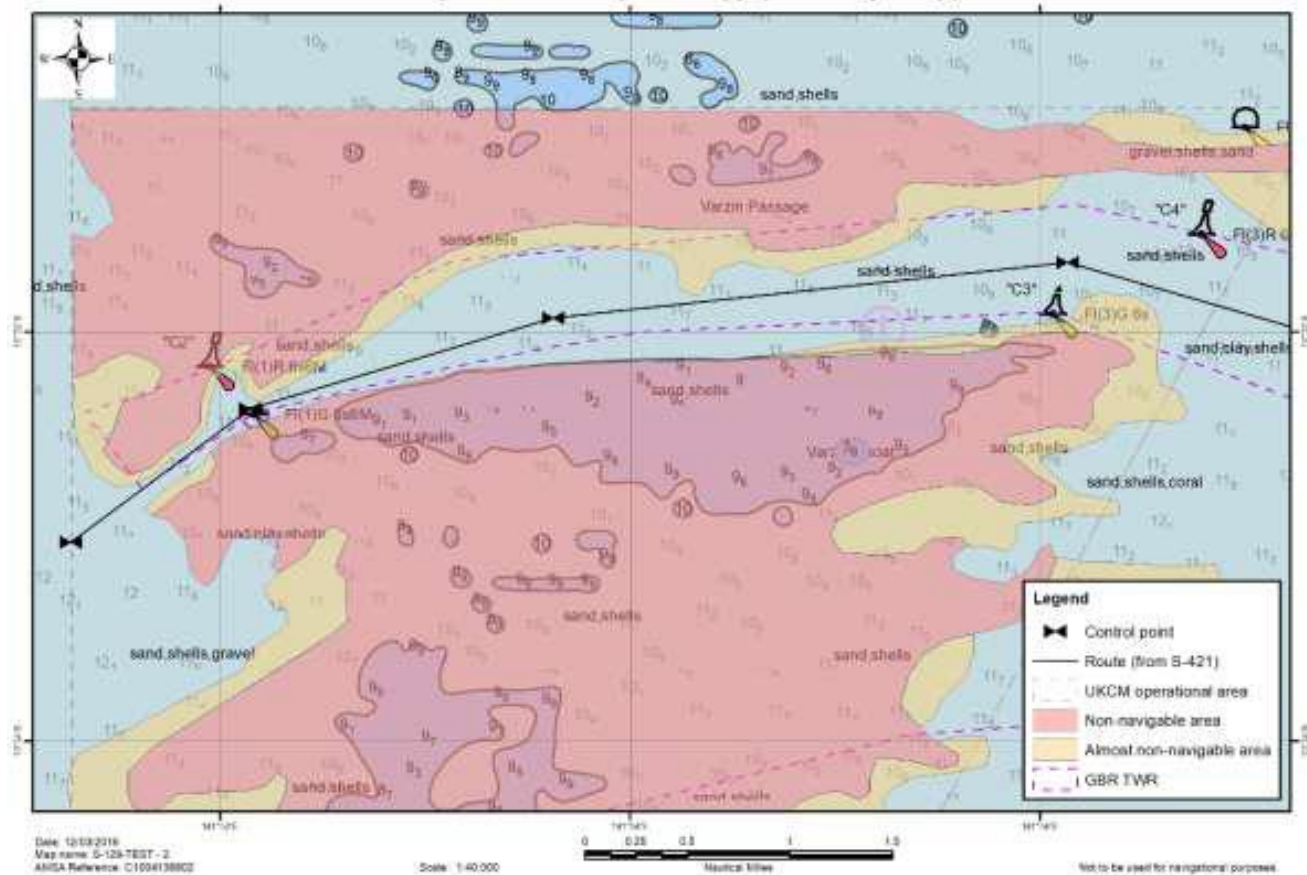


# S-124 Navigational Warnings

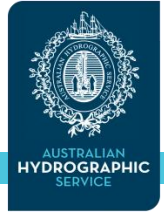


# S-129 Under Keel Clearance Management

Portrayal of S-129 symbology (mock-up only)

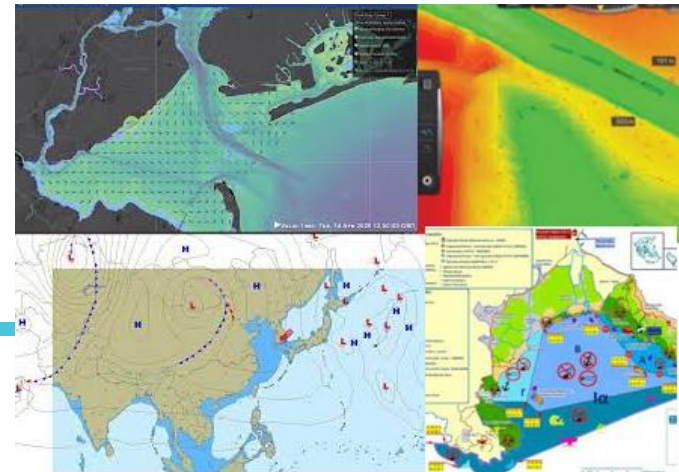


# AHO Strategic Plan



## Key Initiatives:

- *DF-ENC Production from 2025*
- *Production of S-102, S-104 & S-111 from 2026*
- *Coordinate a national approach to S-100 and e-Navigation (S100WG under ICSM)*



# Australia S-100WG



[S-100 Working Group | Intergovernmental Committee on Surveying and Mapping \(icsm.gov.au\)](https://icsm.gov.au)

A screenshot of the S-100 Working Group website. The header includes the ICSM logo (Intergovernmental Committee on Surveying and Mapping) and navigation links: ABOUT, WHAT WE DO, EDUCATION, PUBLICATIONS, CONTACT, and CADASTRE 2034. A search bar is also present. The main content area features the title "S-100 Working Group" and a section titled "The S-100 Universal Hydrographic Data Model". This section contains text explaining the IHO S-100 data model and its role in e-Navigation. To the right of the text is an image of a ship at sea with a digital overlay of data points and a map of Australia. Below this is another section titled "The S-100 Working Group (S-100WG)" with text describing its role in Australia and New Zealand.

**ICSM**  
INTERNATIONAL COMMITTEE ON SURVEYING & MAPPING

ABOUT ▾ WHAT WE DO ▾ EDUCATION ▾ PUBLICATIONS CONTACT ▾ CADASTRE 2034

Search...

## S-100 Working Group

### The S-100 Universal Hydrographic Data Model

The International Hydrographic Organization (IHO) S-100 data model is the baseline for the Common Maritime Data Structure (CMDS), which defines what data should be exchanged in e-Navigation (MSC 90/28, paragraph 10.10). The IHO and several other international organisations such as IALA, WMO and IEC are developing data exchange standards for various types of navigational information, and some of these product specifications are now ready for testing.

An image showing a ship at sea with a digital overlay of data points and a map of Australia, representing the S-100 data model.

### The S-100 Working Group (S-100WG)

The S-100WG was stood up to take a leadership role in the creation, implementation and oversight of the introduction of S-100 based services in Australia by developing documentation, creating national standards and policies, defining roles, responsibilities and controls that will harmonize the Australian e-Navigation data chain.

The S-100WG is responsible for coordinating and managing the timely and effective implementation of a broad range of S-100 products and services in Australia's and New Zealand.



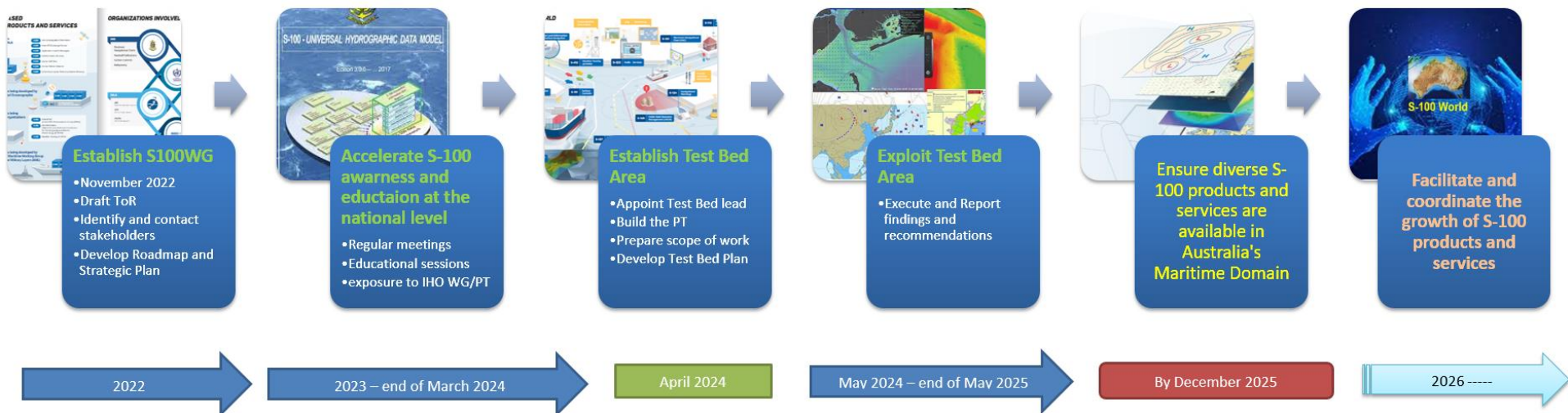
**Australian Government**  
**Department of Defence**



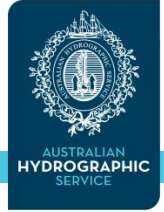
# Australia S-100WG



## S100WG Roadmap 2022-2026



# Summary



## S-100

- Underpins IMO's eNavigation strategy
  - Is aligned with a contemporary International Geospatial standard (*ISO 19100*)
  - Will enable wider use and transfer of hydrographic products than S-57
  - Will NOT make S-57 ENC's obsolete - No sunset date as yet
- 
- **NEW** Performance Standard for ECDIS approved by the IMO in November 2022 [IMO\_MSC.530(106)] – **S100 ECDIS**
  - IMO requires that ECDIS installed from 01JAN2029 comply with the new PS
  - S100 type approved ECDIS are expected to become available in 2026



# Useful links

[S-100 Working Group \(ICSM\)](#)

<https://iho.int/en/s-100-implementation-strategy>

<https://iho.int/en/s-100wg>

