21st MEETING OF THE SOUTH WEST PACIFIC HYDROGRAPHIC COMMISSION (SWPHC21)
Meeting, 28 February – 1st March 2024 – Nadi, Fiji

NATIONAL REPORT FROM AUSTRALIA TO THE SWPHC 21

1. Executive summary

The Australian Hydrographic Office (AHO) is the Australian Department of Defence agency responsible for the publication and distribution of nautical charts and other information required for the safety of vessels navigating in Australian waters.

The key focus throughout 2023-24 has been the continued implementation of the HydroScheme Industry Partnership Program, an innovative government-industry arrangement supporting the collection, assessment and publication of nautical information products in the Australian Charting Area. The HIPP achieved a significant milestone in 2023, securing funding for the next ten years of the program. 2023 saw the continued development of data and information release policies which will underpin the AHO moving towards a modern data and customer-focused organisation.

The AHO has embarked on a digital transformation of its products and services that will see the implementation of a new geospatial standard (S-100) from 2025, the migration of all printed publications to a digital format (PDF) and the automation of the production of paper charts.

In April 2023, AHO participated with the Australian Maritime Safety Authority in the IMO Member State Audit Scheme, where the AHO was successfully able to demonstrate that it meets the hydrographic office obligations under the Convention of Safety of Life at Sea (SOLAS).

In 2023, the AHO also released a new Strategic Plan providing a pathway for the achievement of key strategic goals over the five year period to 2028, with an energising Vision Statement:

Excellence in the provision of digital maritime environmental products, services and geospatial data.

2. Surveys

a) HydroScheme Industry Partnership Program

As outlined in the 2016 Defence White Paper, Defence is replacing its hydrographic capability with a more efficient combination of military and commercial hydrographic and oceanographic survey capabilities. This initiative led to the establishment of the HydroScheme Industry Partnership Program (HIPP). Through the

HIPP, the Australian Government is partnering with industry to meet the National Survey Function (NSF) obligations that will, over the medium to long term, help drive fundamental change in the delivery of defence hydrographic and oceanographic services and the development and innovation of environmental data collection capabilities.
After a competitive tender evaluation process, seven commercial providers were identified as successful candidates to undertake hydrographic surveys for HIPP and are collectively referred to as the 'HIPP panel-1' which came into effect on 28 February 2020. During 2023 this panel was refreshed with 'HIPP panel-2' coming into effect 2 October 2023 with an expanded panel of nine commercial providers and expanded operating zones.

b) Current activity

The AHO is in the third year of implementing the Hydrographic Industry Partnership Program (HIPP). Initial Operating Capability (IOC) has been achieved, and Full Operational Capability (FOC) is targeted for 2024. IOC and FOC are normally associated with introducing new Defence equipment and systems into service. HIPP fundamentally consists of a rolling annual survey program contracted out to a preselected panel of Hydrographic Survey companies. Each annual program is referred to as a HydroScheme. HydroScheme 2020, 2021 and 2022 are complete. HydroScheme 2023 is currently underway with HydroScheme 2024 open to tender. Each HydroScheme includes a cycle of:

- risk assessment and identification of survey areas
- prioritising
- stakeholder agreement at the inter-departmental level via the Hydrographic Review Board (includes the AHO, AMSA, Australian Antarctic Division, Geoscience Australia)
- defining specific survey areas and standards required
- releasing for tender
- assessing tender responses
- issuing contracts
- monitoring progress (including embarking client representatives)
- receipt, assessment and contractual acceptance
- application to charts.

Planning for a HydroScheme begins in February each year for the financial year commencing the following year, with final submissions for inclusion to be provided by Jun 30 each year. Requests for an area to be considered for inclusion into a HydroScheme can be submitted via the AusSeabed Survey Coordination Tool. The HydroScheme Review Panel (HRP) endorses a proposed HydroScheme in August each year for release in October. Operations for that HydroScheme commence the following July. The HRP provides oversight and endorsement of HIPP Survey activity to support the National Survey task and the National Charting task.

Details of current and past HydroScheme activities and the HIPP Statement of Requirements are published on the AHO website at www.hydro.gov.au/NHP/.

Royal Australian Navy Surveys

In 2023 a co-operative survey was undertaken by the RAN and TNI-AL (Tentara Nasional Indonesia Angkatan Laut) in adjoining waters of the EEZ to the North of Darwin. In 2024, Pushidrosal and the AHO will work together to update hydrographic products and services to improve the safety of navigation in those waters. The Maritime Geospatial Warfare Unit conducted foundation surveys in the approaches of major ports around the country.

c) AusSeabed

AusSeabed is a collaborative national seabed mapping initiative, hosted by Geoscience Australia, which is central to the Australian seabed information ecosystem. It was established in 2018 and delivers freely accessible seabed mapping data and coordinating efforts to map the gaps across the Australian maritime

region of responsibility. The initiative is governed by a cross-sector Steering Committee and Executive Board. The AusSeabed Strategy and 2025 Activities Roadmap guide the activities of the community as it works to collect and collate Australian seabed mapping data; create FAIR (Findable, Accessible, Interoperable, and Reusable) bathymetric data; and standardise data collection and processing. The AusSeabed data portal serves up data from individual surveys, integrated bathymetric grids, and a spatial index of all known survey data in Australian and adjacent international waters. Datasets in the portal come from a wide range of Australian state and federal government agencies, research institutions, and private industry. These holdings include 30 m resolution grids from HIPP surveys and high-resolution AHO National Reference Surfaces, which are used for calibrating multibeam echosounders.

To improve coordination of seabed survey activities and boost collaboration across the seabed mapping community, Geoscience Australia, in collaboration with the AHO and the community, developed the AusSeabed Survey Coordination Tool. This online geospatial web application serves three key functions to facilitate the coordination of survey activities across the government, academic and private sectors:

- The HIPP Survey Request function enables users to submit a request and business case for the Australian Hydrographic Office (AHO) to conduct survey activities in specific locations as part of the AHO's HydroScheme Industry Partnership Program (HIPP).
- The Areas of Interest (AOI) function allows users to register broader regions of particular value or potential collaboration. Submissions are made available to the public and to key data collection agencies, including CSIRO and AHO.
- The Survey Plans function is a register for the community to share details on planned data collection campaigns to encourage further collaboration and the sharing of costs that would normally be shouldered by a single organisation.
- The HIPP leverages the AOI build and incorporates them within a Risk Assessment Tool to enable future survey priorities. This is achieved through both the public AOI build or via a specific HIPP Request Tool. The request tool requires a business case be put forward to the National Hydrography Directorate.

3. Nautical Charting

The AHO continues to be committed to an ENC first approach with ENC updates for Maritime Safety priorities being actioned first. Paper chart Notices to Mariners complement this approach whilst maintaining the Paper Chart Portfolio.

The AHO is the Primary Charting Authority (PCA) for two Pacific Island Countries, as well as the national authority for Australia and its territories. Australia currently publish 11 paper charts within Timor-Leste.

The total AHO portfolio as of 1st Feb 2024 includes:

Nation	Paper Charts	ENCs	Total
Papua New Guinea	80	168	**248**
Solomon Islands	17	43	**60**
Australia	275	717	**992**
Total	**372**	**928**	**1300**

a) ChartScheme

ChartScheme is the annual program of Charting projects to be undertaken by the AHO. It is very closely aligned with the HydroScheme activities as they are delivered to the Charting team. ChartScheme details the

AHO's planned activities for the Financial Year (FY) in both, Australian waters and in waters of countries for which the AHO is the Primary Charting Authority (PCA) - See CHARTSCHEME 2024 (arcgis.com)

b) Papua New Guinea (PNG)

The AHO is focused on Pacific regional engagement, partnering with PNG via a bilateral MoU on hydrographic survey, specialist training and nautical cartography projects.

In partnership with PNG, Australia maintains 80 PNG paper nautical charts and 168 PNG (PG) electronic navigational charts, supporting maritime safety and environmental protection in PNG waters.

c) Solomon Islands (SI)

The AHO is the Primary Charting Authority (PCA) for Solomon Islands and in partnership produces nautical charts and publications to support safe navigation in Solomon Islands. As the PCA for Solomon Islands, Australia maintains 17 SLB paper nautical charts and 43 SB electronic navigational charts, supporting maritime safety and environment protection in Solomon Islands waters.

d) Timor-Leste

Letters were exchanged between Australia and Timor-Leste in November 2021, enabling Australia to provide increased hydrographic capacity building support to Timor-Leste. AHO published new charting products covering the Port of Tibar, Dili, Approaches to Caitehu and Approaches to Hera utilising surveys conducted in Timor-Leste by HMAS Leeuwin in 2022.

e) Electronic Navigation Charts

There are a total of 928 ENC cells published by the AHO. These include AU, PG and SB ENC cells. All ENC cells covering Papua New Guinea waters have been updated and reissued as 'PG' ENC cells. A project has been undertaken to update all usage code 5 ENCs to incorporate the new naming convention for Harbour ENCs based on the UN Location code system in lieu of previous naming convention based on large scale paper charts (e.g. AU5PKL01 – Port Kembla). To date 191 AU cells have been renamed with 20 cells remaining.

Currently the AHO has published 16 HDbENC's for ports of Brisbane, Townsville, Cairns, Sydney Harbour and Botany Bay.

Australia ENCs published since the SWPHC20 Meeting		
Australia	**Solomon Islands**	**PNG**
Total: 1128 New ENC: 33 NE ENC: 26 Updates: 200 MSI Updates: 780	**Total: 26** New ENC: 0 NE ENC: 5 Updates: 0 MSI Updates: 21	**Total: 55** New ENC: 0 NE ENC: 17 Updates: 7 MSI Updates: 31

f) Australia ENC coverage by Usage Band

Australia

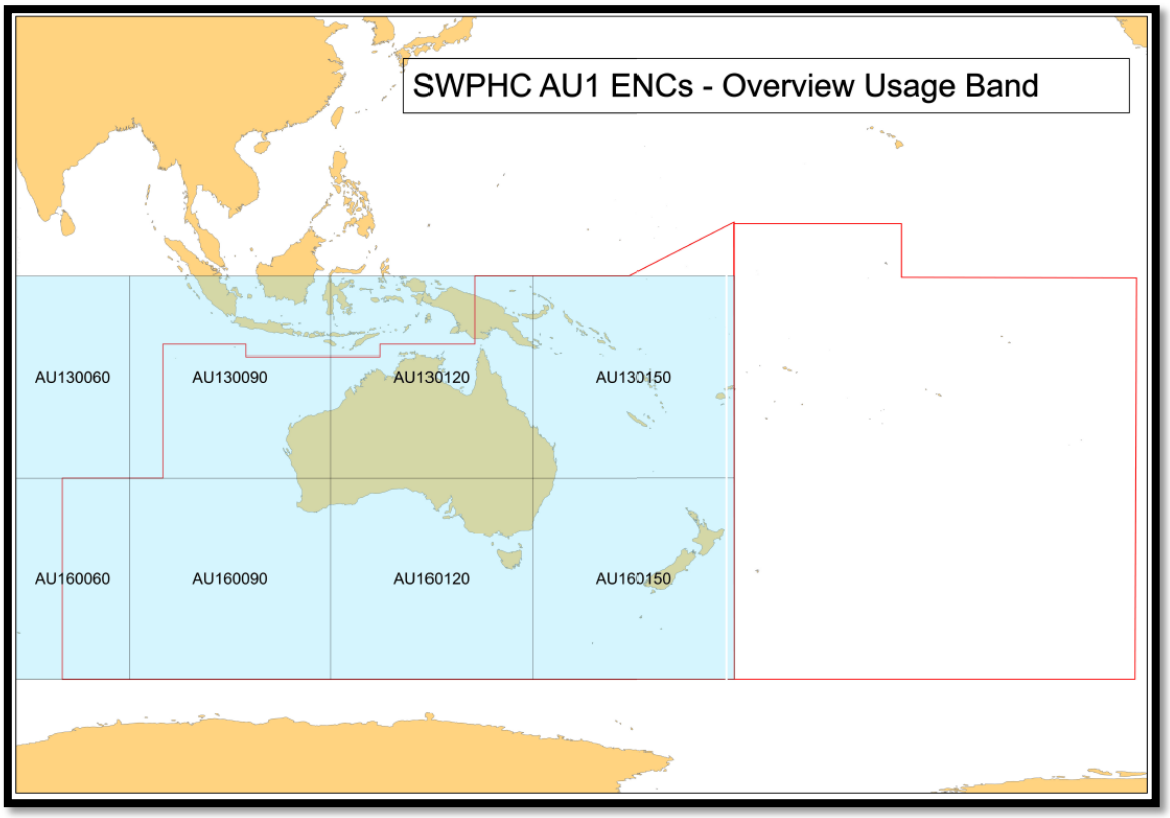


Figure 1 - Usage Band 1

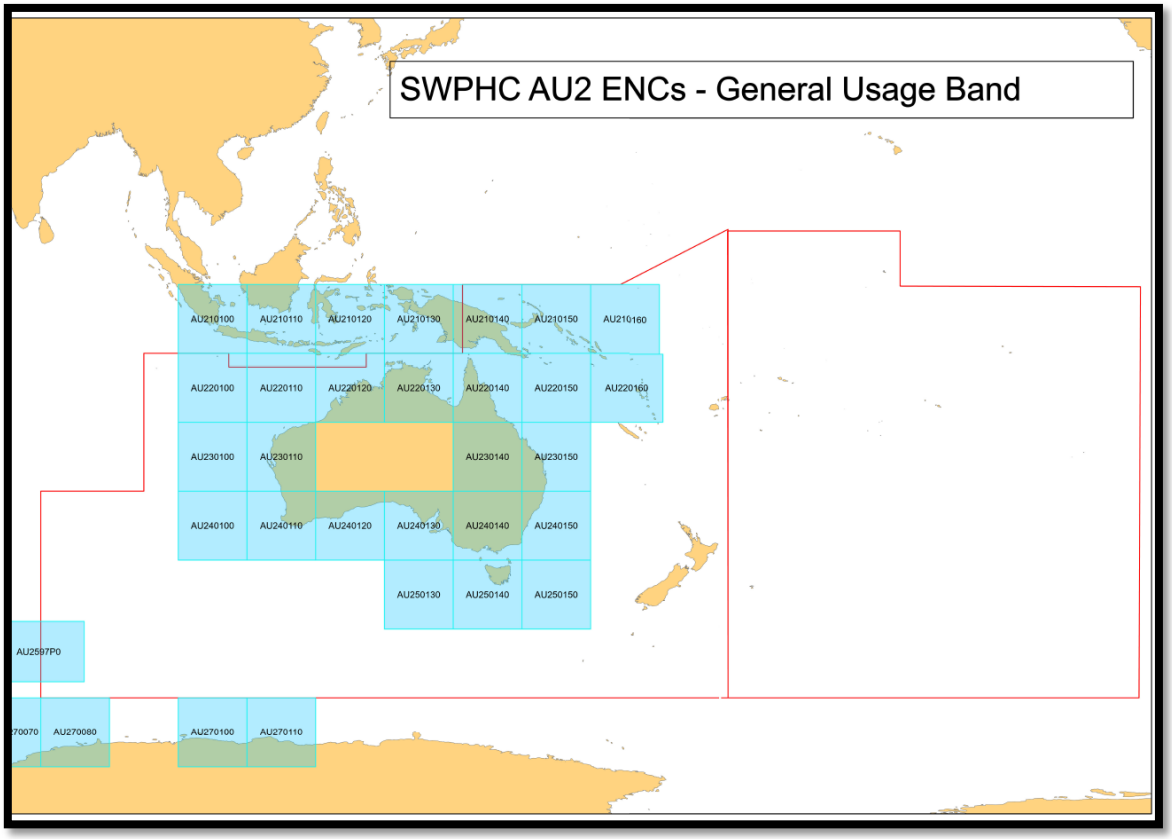


Figure 2 - Usage Band 2

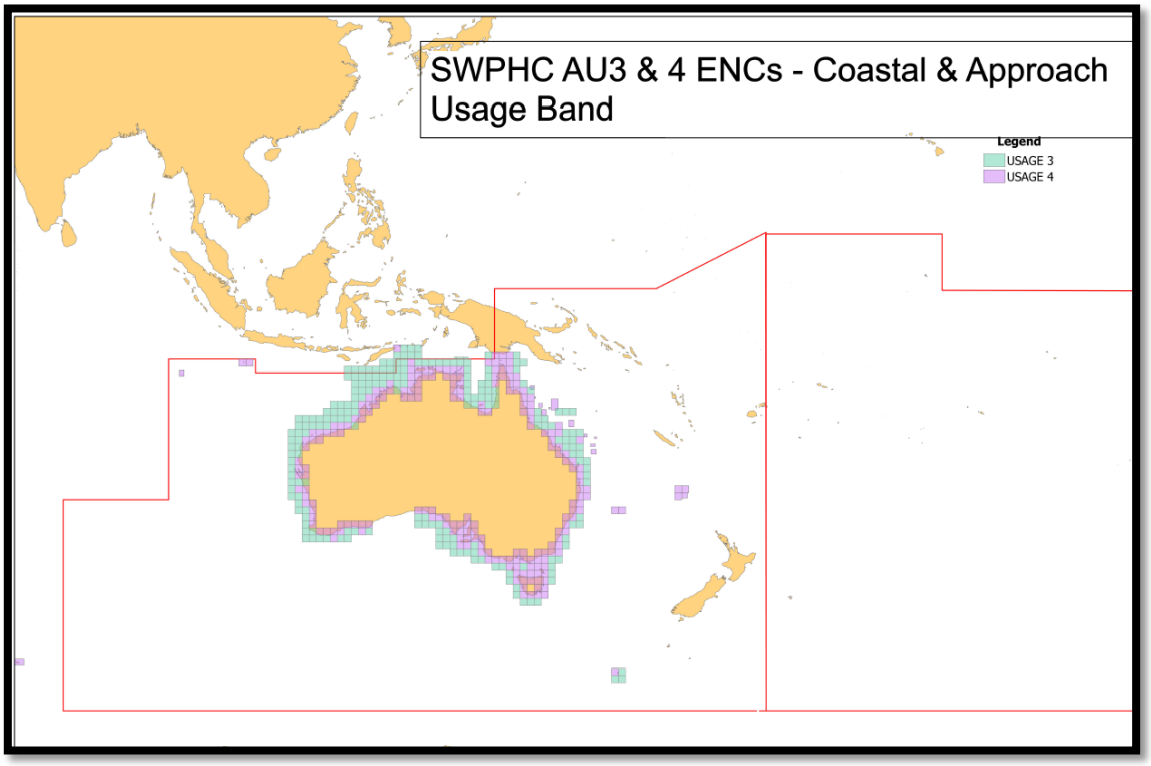


Figure 3 - Usage Band 3-4

PNG

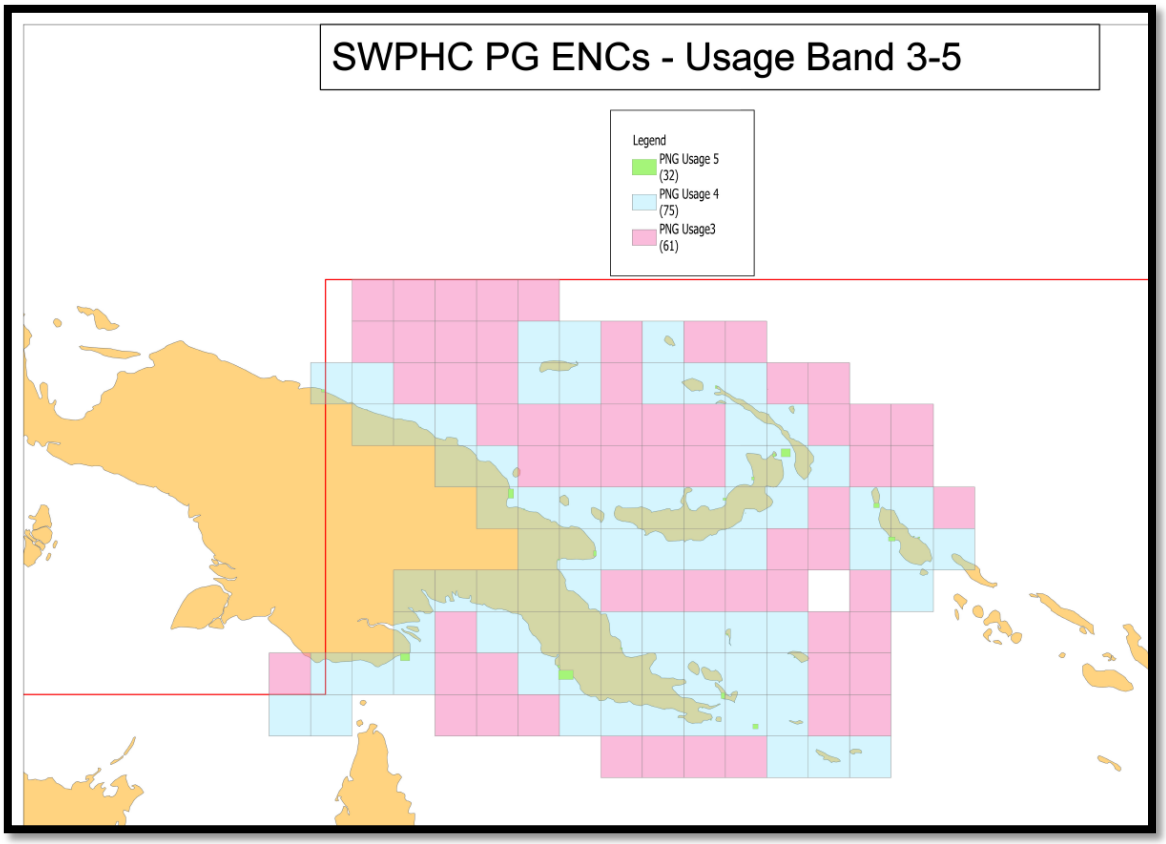


Figure 4 – PG Usage Band 3-5 (Papua New Guinea)

Solomon Islands

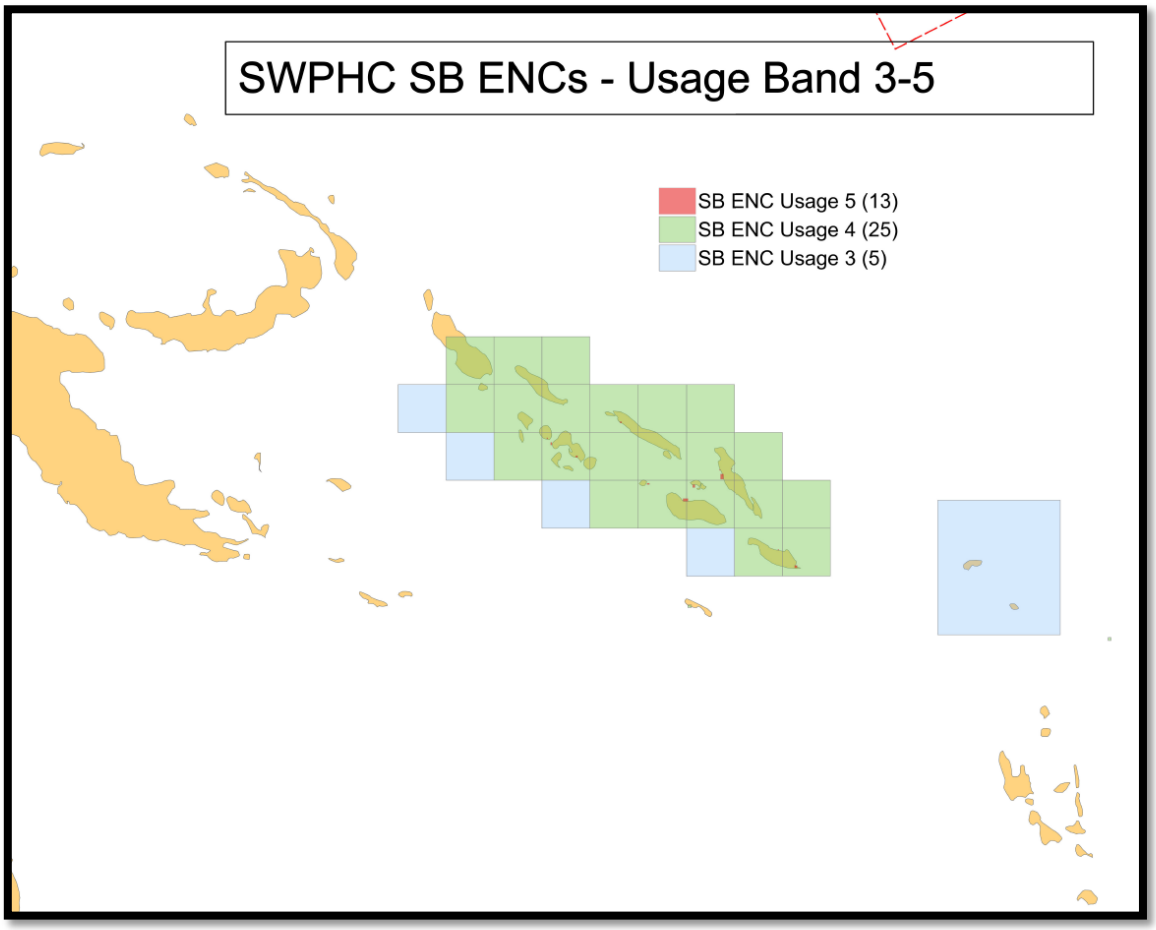


Figure 5 – SB Usage Band 3 (Solomon Islands)

g) ENC Distribution

Australia is a member of IC-ENC and distributes its full portfolio of AHO published ENCs through IC-ENC. Australia also hosts a regional IC-ENC office which provides support to SWP IC-ENC members. Australia is currently Vice Chair of the IC-ENC Steering Committee and an active participant in various IC-ENC technical and commercial working groups.

View the IC-ENC World Catalogue here:

http://geosig.hidrografico.pt/flexviewers/ICENC/

Australia also has a national ENC service, known as 'AusENC'. This supports vessels operating within Australian, Papua New Guinea, Solomon Islands, Timor Leste and surrounding waters and is priced to encourage use by domestic vessel operators, including coastal and port pilots. To support cross-Tasman operations, Toitu te whenua LINZ published ENC of North and South Island New Zealand have also been included in the service since Jan 2021.

For more information visit the AHO website at:

www.hydro.gov.au/prodserv/digital/ausENC/enc.htm

h) Raster Nautical Charts

The AHO does not produce RNC

i) INT paper nautical charts (1:1 500 000 and smaller)

A review was undertaken in 2021 regarding future requirements for INT paper nautical charts. A number were identified as suitable for withdrawal without replacement. For most areas, coverage will remain available at 1: 3 500000 only. One 1:10M and three 1:1 500000 charts are likely to remain from within the existing portfolio. The intention is that remaining INT paper charts will be the minimum necessary to:

- Facilitate route planning and monitoring in areas not fully covered by the coastal series (e.g. offshore reefs, neighbouring countries and Antarctica).
- Display maritime claims (EEZ and Continental Shelf limits).

INT Charts of waters adjoining Indonesia are currently being reviewed following the joint RAN TNI hydrographic survey activity. New Editions are expected in 2024.

j) Paper Nautical Charts

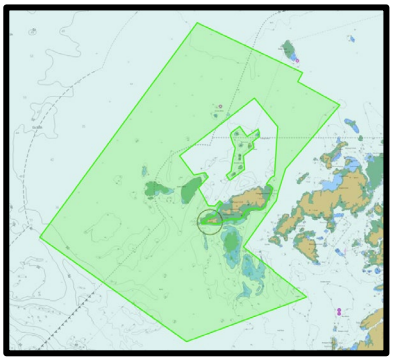
There are currently **377** paper nautical charts produced and maintained by the AHO. Detailed information of the full Australian chart portfolio can be found on the AHO website at:

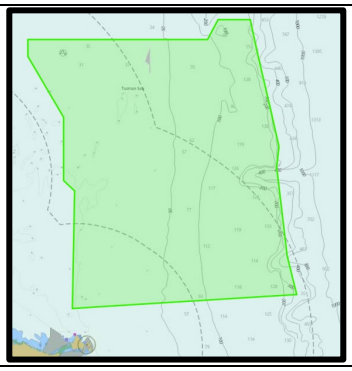
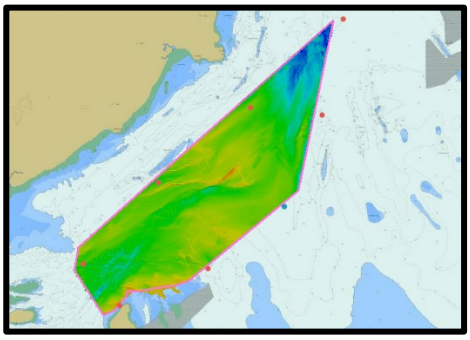
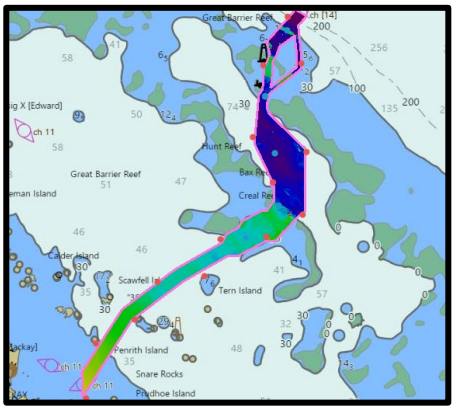
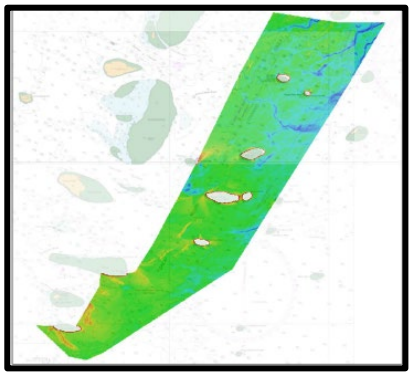
http://www.hydro.gov.au/prodserv/paper/auspapercharts.htm

Australia Paper Charts published since the SWPHC20 Meeting			
Australia	**Solomon Islands**	**PNG**	**INT**
Total: 192 NC: 2 NE: 12 Updates: 0 MSI Updates: 178	**Total: 14** NC: 0 NE: 1 Updates: 0 MSI Updates: 13	**Total: 25** NC: 0 NE: 3 Updates: 1 MSI Updates: 21	**Total: 16** NC: 0 NE: 1 Updates: 0 MSI Updates: 15

Australia

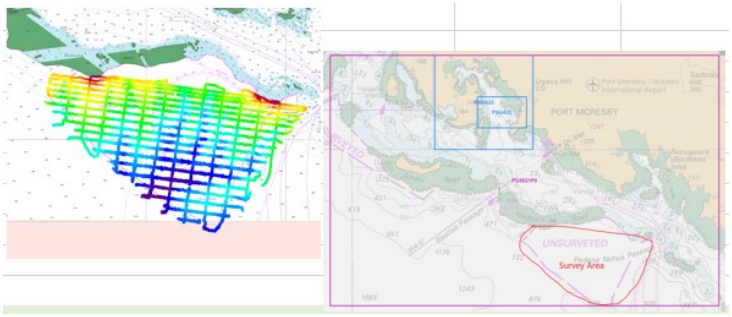
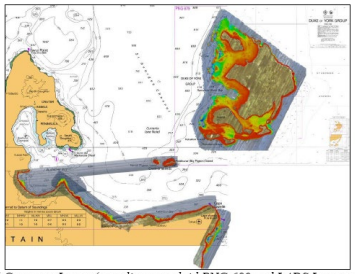
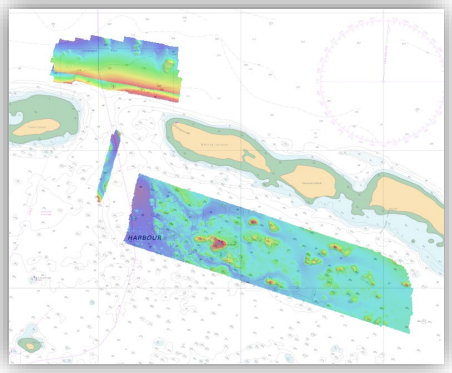
Some of the major updates are shown below:

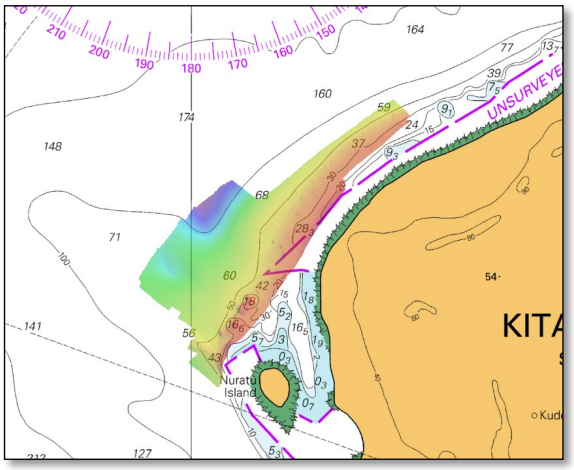
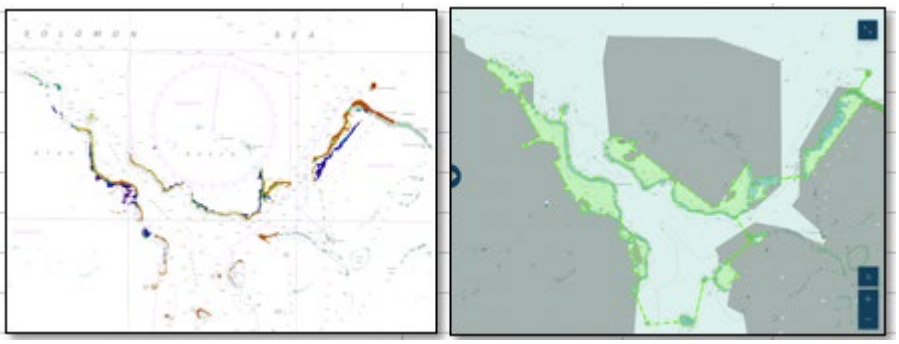
Survey Details	Thumbnail	Products	Published
HIPP SI 1015 Camden Sound, WA		AU416123 AU416124 AU220120 AU130120 Aus730 Aus732 Aus320 Aus323 Aus4603 Aus4722	16/02/2023 23/02/2023 16/02/2023 16/02/2023 09/06/2023 09/06/2023 09/06/2023 09/06/2023 09/06/2023 09/06/2023

Survey Details	Thumbnail	Products	Published
HIPP SI 1036 Flinders Island - North East, Offshore TAS		AU440148 AU240140 AU160120 Aus800 Aus487	09/05/2023 09/05/2023 09/05/2023 08/06/2023 24/05/2023
HIPP SI 1027 Clarence Strait to Dundas Strait, NT		AU412131 AU413131 AU220130 Aus20 Aus720 Aus721	13/07/2023 13/07/2023 13/07/2023 17/08/2023 17/08/2023 17/08/2023
HIPP SI 1029 Hay Point to Hydrographers Passage, QLD		AU5250P0 AU420150 AU421149 AU421150 AU422149 AU220150 AU230140 AU230150 Aus249 Aus251 Aus821 Aus823 Aus824 Aus367	21/09/2023 28/09/2023 28/09/2023 28/09/2023 21/09/2023 12/10/2023 12/10/2023 05/10/2023 10/11/2023 10/11/2023 10/11/2023 24/11/2023 10/11/2023 24/11/2023
HIPP SI 1018 Great North East Channel QLD		AU410143 AU411142 AU411143 Aus292 Aus837 Aus839 Aus840 Aus841	02/02/2023 17/02/2023 09/02/2023 07/03/2023 27/03/2023 13/04/2023 27/03/2023 27/03/2023

Papua New Guinea

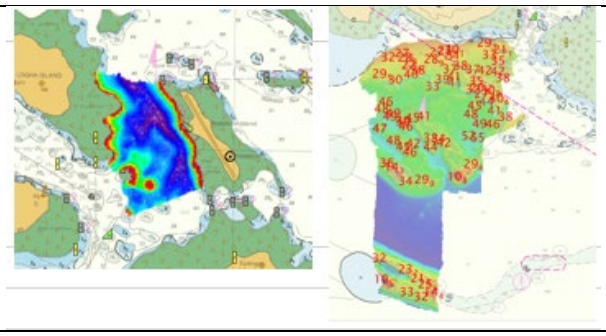
Some of the major updates are shown below:

Survey Details	Thumbnail	Products	Published
Bathymetry survey of Nadeara Reef, PNG 2021		PG5621P0 PG410147 PNG621	9 Feb 23 15 Feb 23 Mar 23
Rabaul PNG LADS Survey	 *Rabaul Coverage Image (soundings overlaid PNG 680 and LADS Imagery)*	PG5679P0 PG405152 PNG554 PNG679	Expect completion Apr 24
RAN GI 041 Manus Island, Papua New Guinea		PG402147 PG403147 PNG662	9 Mar 23 9 Mar 23 30 Mar 23
RAN GI 015 - Dampier Strait - PNG - MBES/SBES Dampier Strait PNG 2019 RAN GI 013 Resupply	 	PG406148 PNG 673	12 Oct 23 11 Nov 23

Survey Details	Thumbnail	Products	Published
RAN HI 630 – Kitava Island - PNG - MBES		PG409151 PNG 637	25 Jul 23 10 Aug 23
MHY159467-65 Star Reef Passage Offshore Northern Province PNG		PG409149 PG409150 PNG 519	10 Aug 23 10 Aug 23 31 Aug 23

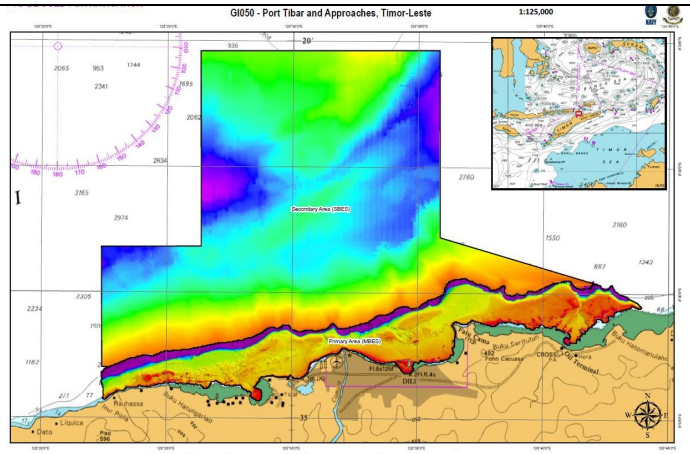
Solomon Islands

Some of the major updates are shown below:

Survey Details	Thumbnail	Products	Published
Gizo Island Solomon Island Hydrographic Survey 2019 RAN GI 018		SB409156 SLB 102	3 Jul 23 21 Jul 23

Timor-Leste

Some of the major updates are shown below:

Survey Details	Thumbnail	Products	Published
GI050 Survey MBES - HMAS LEEUWIN - 2022		AU409125 AU409126	Feb 23 Feb 23

k) S-100

The AHO has been actively collaborating and engaging with other Hydrographic Offices and industry partners on S-100 products and services. The AHO have established project Theseus, which is looking at our S-100 implementation plan with focus on our path to duel fuel ENC production from 2025. The AHO is currently planning to manage the existing S-57 database already in production and derive S-101 Products via automated conversion from this database. Initial focus and release of S-101 products will be AHO's larger scale ENC's first, with the remaining cells to follow over time.

S-102 datasets have been created and are being tested by multiple port authorities in Australia, with a focus on creation of S-102 products in areas where we currently have HDENCs as the first phase of production of S-102.

Australia's National S-100 Working Group (S-100WG) was stood up to take the leadership role in 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 control that will harmonise the Australian e-Navigation data chain.

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. It is chaired by the AHO and vice-chaired by AMSA.

The inaugural meeting of Australia's S-100 Working Group was hosted by Australian Hydrographic Office (AHO) on Wednesday the 2nd of November 2022. The meeting was conducted virtually and it was attended by almost 50 representatives from a diverse number of state, federal and private organisations. Representatives from Land Information New Zealand (LINZ) was invited by AHO and attended as observers. The S-100WG members meet three times a year; two virtual and one face-to-face meetings.

See S-100 Working Group | Intergovernmental Committee on Surveying and Mapping (icsm.gov.au)

A S-100 Testbed Focus Group (S-100TBFG) project team was established in October 2023 under S-100WG. The project team's main objective is creating a national testbed to enable the development and testing of a different S-100 product prototypes to support IHO S-100 Implementation Priorities, Phase 1 – Route Monitoring.

Table A – IHO list of S-100 products with special focus	
Phase 1 / Route monitoring	
S-101	Electronic Navigational Chart (ENC)
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
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

Figure 6 - Phase 1 is product specifications for Route Monitoring which must be supported by the Critical S-100 Framework (source IHO Roadmap for the S-100 Implementation Decade (2020-2030), Annex2, V3.0 19 October 2023).

.

The S-100TBFG project team is actively collaborating and engaging with other Hydrographic Offices and industry partners on S-100 dataset products available. The project team also supports and participates in various IHO S-100WG meetings.

The AHO has also participated in the IHO S100 Working Group held in Singapore in 2023, the IHO S128 (underkeel clearance) Project Team and is currently Vice Chair of the IHO S100 Security Scheme Project Team.

l) Paper Chart automation

The AHO is investigating options to implement an automated solution for the generation and updating of paper charts from validated S-57 product data. A preferred solution will be selected in March 2024, and the plan is to invest time and money post March 2024 with the successful vendor to further develop this capability over the following years with the aim of stopping manual paper chart compilation and updating by the end of 2025.

m) Australian Chart Index Application

The AHO has a web service to facilitate the discovery of our charting products (paper charts and ENC) in an easy to use graphical interface that has the option to display ENC content as background. The Chart Index Application provides the capability for chart agents, mariners and other stakeholders to search and discover the AHO portfolio of both ENC and Paper chart limits online and query basic metadata information (e.g. Product number, Title, Edition, Update number, links to NtM and AusENC Pack information). This information is updated fortnightly in line with the NtM publication and AusENC service.

See https://services.hydro.gov.au/AHOChartIndexPUBLICApplication/

4. New publications & updates

2024 Australian National Tide Tables were released as a digital (.pdf) download from the AHO website, and via new interactive web service featuring an enhanced user experience that allows specific port discovery with the ability to view and download individual port tidal data. Downloads incorporate the latest applicable Notice to Mariners update.

AusTides has been upgraded to provide better functionality. It now incorporates a feature where if the user's computer is connected to the internet upon launch, AusTides will perform an auto check for new updates published on the AHO website and automatically install them. 2024 AusTides is only available as a digital download from the AHO website.

Separate 2024 National Tides Tables for Papua New Guinea, the Solomon Islands and Timor-Leste have been published. 2024 Papua New Guinea National Tide Tables were released as a digital (.pdf) download from the AHO website only. The 2024 Solomon Islands and Timor-Leste National Tide Tables were released as printed books available from the Solomon Islands Hydrographic Authority and Timor-Leste Government; and as a digital (.pdf) download.

Work is underway on the Mariner's Handbook for Australian Waters AHP20 6th Edition with publication now planned for 2024. The publication will be released as a digital (.pdf) download from the AHO website and via a new dynamic web service.

Figure 7 – AHO Digital Publications

The AHO Digital Products Portal is being developed to enable AHO publication users to download publications and their updates, receive portfolio based update notifications, compare the currency of their last download with the latest published version and download compliance certificates for their vessels. Publications initially to be included are Australian National Tide Tables, AusTides, The Mariners Handbook for Australian Waters and the Australian Chart and Publication Maintenance Handbook. Launch is planned in 2024.

Figure 8 – AHO Digital Products portal

5. Maritime Safety Information (MSI)

Australia is the coordinator for NAVAREA X with operational services delivered by Joint Rescue Coordination Centre (JRCC) Australia within the Australian Maritime Safety Authority (AMSA). AMSA is Australia's national agency responsible for maritime safety, protection of the marine environment, and maritime aviation search and rescue.

Information, outline maps and coordinates for NAVAREA X and the coastal warning areas are available on the AMSA website at: https://www.amsa.gov.au/safety-navigation/navigation-systems/maritime-safety-information.

MSI is promulgated by Inmarsat SafetyNET, Iridium SafetyCAST, HF digital selective calling (DSC) and radiotelephone.

The MSI Assessment for NAVAREA X for the period 1 January 2022 to 31 December 2022 was submitted to the Fifteenth IHO World Wide Navigational Warning Service (WWNWS) Sub-Committee Meeting (WWNWS15) held at the IHO HQ in Monaco from 4 to 8 September 2023. An update for the period 1 January 2023 to 31 December 2023 has been submitted (document SWPHC21-10B).

In-force NAVAREA X MSI can be obtained from the AMSA website at: https://www.amsa.gov.au/safety-navigation/navigation-systems/maritime-safety-information-database.

.

6. C-55

Navigationally significant areas within Australian area of jurisdiction.

Navigationally significant area	Location	Products
Approaches to Darwin	Beagle Gulf, NT	Aus722, AU5025X6, AU413130
Clarence Strait, Van Diemen Gulf	South of Melville Island, NT	Aus20, Aus720, Aus722, AU412130 AU412131, AU413130 AU413131
Torres Strait Two Way Route	Torres Strait	Aus299, Aus293, Aus296, AU5299P0 AU411141, AU411142
Western Approaches to Torres Strait	Gulf of Carpentaria, Torres Strait	Aus842, Aus700, AU411140, AU411141
Great North East Channel	Coral Sea	Aus839, Aus840, AU410143
Adolphus Channel	Torres Strait	Aus292, AU411142
Hydrographers Passage	Great Barrier Reef, Coral Sea QLD	Aus251, Aus252 Aus255, Aus821, AU5255P0, AU421148 AU421149
Approaches to Newcastle	East Coast, Newcastle	Aus207, Aus809, AU5NTL01
Gulf St Vincent	Adelaide	Aus 130, AU435138 AU436137, AU436138
Backstairs Passage, SE Kangaroo Island	Approach to Adelaide	Aus780, AU436137, AU436138
Banks Strait	Bass Strait, between NE Tasmania and Furneaux Group	Aus798, AU442148 AU441147, AU441148
East Flinders and Cape Barren Islands, offshore	Tasman Sea	Aus179, Aus800 Aus767, Aus798, AU440148, AU441148
Furneaux Group Inshore	Bass Strait	Aus179, Aus800, AU5FIW01, AU5LAB01
King Island	Bass Strait, North of King Island	Aus789, AU440143, AU440144
Northern Approaches to Broome	West Coast, Indian Ocean	Aus50, Aus324, AU5050P0, AU418122 AU318121
Bonaparte Archipelago, Camden Sound	Kimberley Coast	Aus730, Aus732, AU416123, AU416124
Lacepede Channel to King Sound	Kimberley Coast	Aus323, AU417122 AU418122
Cape Leeuwin, WA	Indian and Southern Ocean	Aus116, Aus335, AU334114, AU335114

MSI and GMDSS

The changes to MSI and GMDSS information in C-55 are being collated and C-55 entries will be updated in 2024.

7. Capacity Building

a) Maritime Geospatial Training Centre (MGTC)

Figure 9 – 2023 MGTC course

The Maritime Geospatial Training Centre is located at HMAS Penguin in Sydney on the North Shore. MGTC provides training courses in Hydrographic surveying for officers and sailors from Australia and the SW Pacific region under the Defence Cooperation Programme. It also provides meteorology and oceanography (METOC) training to the RAN.

The hydrographic training consists of three levels: basic, intermediate and advanced level. The basic, intermediate and advanced level course is attended by sailors and officers from Australia and the region. In 2023 MGTC's advanced level H2 course was reaccredited by the FIG/IHO/ICA International Board on Standards of Competence as a Category "B" programme for a further 6 years.

In 2023 the advanced level H2 course ran for 25 weeks and consisted of students from Australia (6), Indonesia (2), New Zealand (1) and Tonga (1) - (*see photo above*). The Intermediate course (10 weeks duration) conducted in the middle of the year was attended by 10 students from Australia. The two Basic courses (12 weeks duration) consisted of students from Australia (18) and Fiji (2).

At the end of the 2023 MGTC also held a Military Meteorology and Oceanography (Mil METOC) Course over 12 weeks; where 7 students in total attended, 6 RAN and one Malaysian.

b) S-5B Hydrographic Surveyors Course and S-8B Category B Marine Geospatial Information Program (IIC)

AHO have five staff enrolled in the S-8B Marine Geospatial Information Program. The AHO are also sponsoring a PNG NMSA Surveyor on the IIC S-5B Hydrographic Surveyors Course and a PNG NMSA officer and two personnel from Kiribati on the S-8B course under hydrogaphic capacity building initiatives. AHO had 3 officers complete the S-8B Marine Geospatial Information Program in Nov 2023 and 2 officers complete the S-5B Hydrographic Surveyors Course.

The courses run by IIC Technologies are accredited by the FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) and is designed to maximize the advantages of online delivery.

The S-5 Category B program, designed primarily for entry level hydrographic surveyors, particularly those involved with emergent national hydrographic offices wishing to conform to the IHO standards. The program components include: introduction to nautical science, bathymetry, tidal flows, geodesy and map projections, hydrographic practice, hydrographic data management, environmental science and legal issues.

S-8 Category B program is to prepare candidates with the theoretical and practical competencies necessary to carry out the planning and implementation of nautical chart production effectively. The course follows a modular program that follows the IHO IBSC S-8 Category B Standards of Competence for Nautical Cartographers.

c) Solomon Islands Tripartite Meeting – Aug 2023

In Aug 2023, Assistant Director International Charting Development, AHO attended the Solomon Islands Maritime Authority (SIMA) for Tripartite meeting between AHO, SIMA and Japan International Cooperation Agency (JICA) in Honiara, Solomon Islands. The Tripartite meeting was attended by SIMA, AHO and JICA representatives. Aero Asahi Corporation, who are undertaking the surveys under contract to JICA gave an update on the project outcomes to date for Port Noro and Honiara surveys and an outline of project outcomes.

SIMA and AHO representatives met to discuss priorities for upcoming year on charting and surveying with the aim of raising awareness and support for SIMA and determine charting priorities for Solomon Islands waters for inclusion in next years charting projects as part of Australia's enduring commitment to the Solomon Islands charting under the MoU between the Department of Defence of Australia and the Solomon Islands Maritime Authority.

Figure 10 – August 2023 Tripartite Meeting, Honiara Solomon Islands

d) Papua New Guinea National Maritime Safety Authority (NMSA) Workshop – Aug 2023

In Aug 2023, Assistant Director International Charting Development, AHO attended the Papua New Guinea National Maritime Safety Authority (NMSA) for Awareness Workshop on Hydrography & Maritime Safety Information and National Hydrographic Meeting. The Workshop set out to achieve the aim of raising awareness and support for NMSA about hydrography in support of safety of navigation and to enable dialogue with stakeholders on the requirements for a national hydrographic service. The Hydrographic meeting focussed on SOLAS conventions, importance of hydrography and Nautical charting.

Figure 11 – Papua New Guinea National Maritime Safety Authority Workshop on Hydrography & Maritime Safety Information and National Hydrographic Meeting, Port Moresby, Papua New Guinea

e) Maritime Safety Information Training – July 2023

MSI capacity building training was provided from 25 to 27 July 2023 to Solomon Islands, Papua New Guinea, Vanuatu, Fiji, Palau, Marshal Islands, Kiribati, Cook Islands, Micronesia, Samoa and Tonga as Coastal States within and adjacent to NAVAREA X (Australia) and XIV (New Zealand). This course was presented by the NAVAREA Coordinators from Australia and New Zealand, with the assistance of Fiji and coordination by the United States.

Figure 12 – MSI Capacity Building Training, Fiji

A detailed report is provided in WWNWS15-5.3.2 available at: MSI_Course_Fiji_Report.pdf

8. Oceanographic activities

a) Tide gauge networks

Two permanent tide gauge networks are operated in the region by the Bureau of Meteorology.

The Australian Baseline Sea Level Monitoring Array currently consists of 14 permanent gauges monitoring sea level and ancillary meteorological parameters around the Australian coastline, including one at Cocos Island. The array is supplemented with 2 privately-operated tide gauges at Lorne and Stony Point. The locations of the gauges are shown in **Figure 13** (below).

Monthly reports and observational data are published by the Bureau and can be located on their website at: http://www.bom.gov.au/oceanography/projects/abslmp/abslmp.shtml

The array forms part of a wider Australian network of tide gauges operated by various port and marine agencies whose metadata and monthly sea levels are available from the Bureau website at: http://www.bom.gov.au/oceanography/projects/ntc/monthly/

The Pacific Sea Level and Geodetic Monitoring Project currently consists of 14 permanent gauges monitoring sea level and ancillary meteorological parameters throughout the South Pacific region. The locations of the gauges are shown in **Figure 14** (below).

Monthly reports and observational data are published by the Bureau and can be located on their website at: http://www.bom.gov.au/pacific/projects/pslm/index.shtml

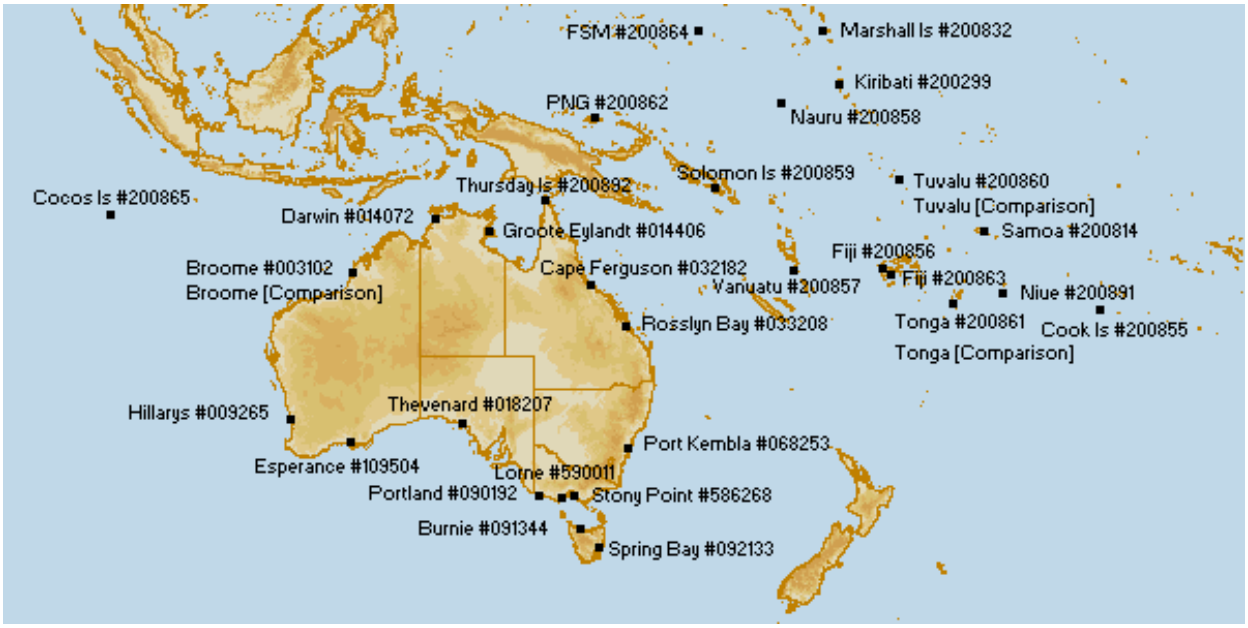


Figure 13: Permanent tide gauge network operated by the Bureau of Meteorology, including the Australian Baseline Sea Level Monitoring Array (16 sites) and Pacific Sea Level and Geodetic Monitoring Project (14 sites).

The permanent tide gauges were upgraded in 2009-2010 (Baseline) and 2011-2013 (Pacific) with modernised data loggers, real-time satellite communications and additional radar-type water level sensors. The stations at Hillarys and Nauru were temporarily removed in 2023 to accommodate wharf refurbishments, but are expected to return to service in 2024.

The Australian Tsunami Warning System (ATWS) is supported by the 30 permanent Australian and Pacific tide gauges (**Figure 1**) as well as an additional network of 16 radar-type tide gauges at four Pacific and 12 Australian sites as shown in **Figure 2**. An array of six deep-ocean tsunameters (DART buoys) brings the Australian tsunami-monitoring network to 52 sites in all.

The primary purpose of these additional stations is for the detection of tsunami with real time data made available to support the operations of the Pacific Tsunami Warning System. Further information about the Australian Tsunami Warning System is available at http://www.bom.gov.au/tsunami/about/atws.shtml

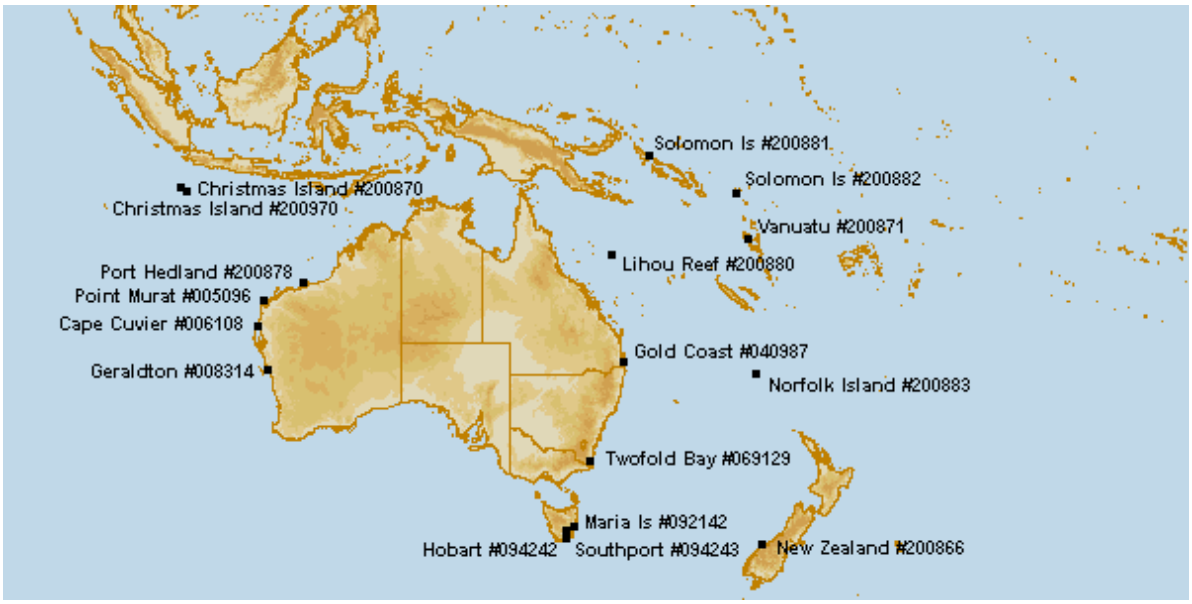


Fig. 14- Additional ATWS radar gauges (16 sites) that are used in conjunction with the permanent tide gauge network for monitoring tsunamis in the Australian region.

b) New equipment

Surveyable mounting of the secondary radar water level sensors and integration of mounting pillars for continuous GNSS/GPS equipment on the tide gauge infrastructure are slowly being introduced into the network, while acoustic water level sensors remain the primary sensor at most sites.

c) Problems encountered

Generally, the gauges operate autonomously in between calibration and servicing on a routine 18-month schedule, with average data return from the permanent tide gauge network exceeding 95%. The variety of day-to-day problems that do arise include power supply, data logger, data communications and sensor malfunctions, which are managed either remotely, by voluntary first in maintenance support or through contingency field trips.

Relocation or temporary removal of a tide gauge is occasionally required when the wharf is being developed or refurbished. Where possible a comparison gauge is established and run in tandem with the operational tide gauge for a period of time to help provide continuity in the record.

The Niue tide gauge and geodetic monitoring site was completely destroyed by Severe Tropical Cyclone Tino which hit on January 17th 2020. Waves were reported to have crashed on to cliff tops between 20-30 metres high. Reconstruction of a replacement tide gauge and GNSS sensor together with housings was finally completed in December 2023, having been interrupted by travel restrictions due to COVID.

9. Spatial Data Infrastructures

a) Status of Marine Spatial Data Infrastructure (MSDI)

The AHO operate a basic public facing MSDI, serving foundation hydrographic geospatial web services, and enhanced through a couple of supporting browser based applications. The AHO currently utilise two cloud-based infrastructures to support its MSDI capability; our own sovereign capability hosting the following

https://services.hydro.gov.au/site1/rest/services

https://services.hydro.gov.au/AHOChartIndexPUBLICApplication/

and ESRI's ArcGIS Online which hosts our HIPP HydroScheme

https://www.hydro.gov.au/NHP/

The mission for our MSDI is to ensure our data and products are secure-FAIR; findable, accessible, interoperable, and reusable where compatible with our security obligations . The OGC standards we currently present are Web Map Service, Web Map Tile Service, Web Feature Service, and GeoServices REST.

b) Relationship with the National Spatial Data Infrastructure (NSDI)

Australia does not provide a single NSDI, rather supports and enables a federation of spatial data infrastructures that, based on a common set of interoperable standards, are able to communicate between each other. The AHO is currently focussed on Marine/Maritime SDI's rather than National SDI's.

c) Involvement in regional or global MSDI efforts

The AHO is currently a member of the SWPHC MSDI WG, and has been very active in the past twelve months, contributing too five working group meetings, including two virtual workshops and growing participation throughout the region including PNG, Tonga, SPC, France, NZ, UK (Chair), and USA. A number of Australian Government organisations have been included in working group participation, as well as industry representatives from IIC Technologies.

d) National implementation of the UN Statement of Shared Guiding Principles for Geospatial Information Management – including any national data policy and impact on marine data.

The AHO is working with the SWPHC MSDI WG to respond, and make recommendations, to Goal 2 of the IHO Strategic Plan. This feedback is forthcoming through the SWPHC MSDI WG.

e) MSDI national portal

As addressed above in reference to NSDI's, the Australian position on SDI's is to federate them rather than have a single portal. Therefore there are a number of MSDI's available from Australia as recently updated in the IHO MSDI register https://iho.int/uploads/user/Inter-Regional%20Coordination/MSDIWG/MISC/SDI-portals.pdf. The AHO is currently providing geospatial web services in support of a number of port and national Marine Spatial Planning applications. The AHO is looking to federate its MSDI with Geosciences Australia AusSeabed Data Hub, which in turn, will federate with the international GEBCO Seabed 2030 portal.

f) Best practices and lessons learned

An MSDI is only as good as the management of data that underpins it. Don't over analyse it. Start small and grow MSDI capability, this includes people, technology and infrastructure, and of course data.

g) Challenges and achievements

Basic technology and infrastructure to support the AHO MSDI has been achieved, and is slowly growing. The biggest challenge we face as a product-centric organisation, is enabling our data holdings for secure-FAIR access, noting our core workflow is in support of navigational chart production. Unlocking, and exposing the myriad of data that supports that single production line is difficult, but possible through evolving the systems to better support enterprise data management first.

10. Innovation

a) Use of Technology

AHO is currently working to implement distributed printing of charts by Agents. This is a precursor to more automated paper chart generation and supply for regulated purposes via our agents. There are significant system changes underway to support provision of the print files; this will be followed by updated file creation processes over coming years.

b) Survey Planning Risk Assessment tool

The AHO continues to develop a Risk Assessment Tool based on the methodology adopted by LINZ. This operates on an Amazon Web Service cloud instance and was first employed during the survey planning process for HydroScheme21. It uses AIS data (supplied by AMSA) and geospatial data overlays to output a graphic risk display (see image example). The user has the flexibility to alter Traffic, Likelihood and Consequence weightings to develop Use Case Scenarios. Further development work is underway to improve the way AIS traffic data influences the output and to extend coverage to include Antarctica and Australian offshore territories.

c) Survey Rank Dashboard

ESRI Dashboards have been developed to leverage RAT functionality in decision making and preliminary survey assessment and triage. Unassessed surveys received by the AHO are passed through the RAT matrix and the surveys relative risk score and risk component composition are computed. These surveys are then automatically ranked on priority based on relative risk and this allows the survey assessor to make a preliminary assessment of the order in which the surveys should be assessed for inclusion on charts.

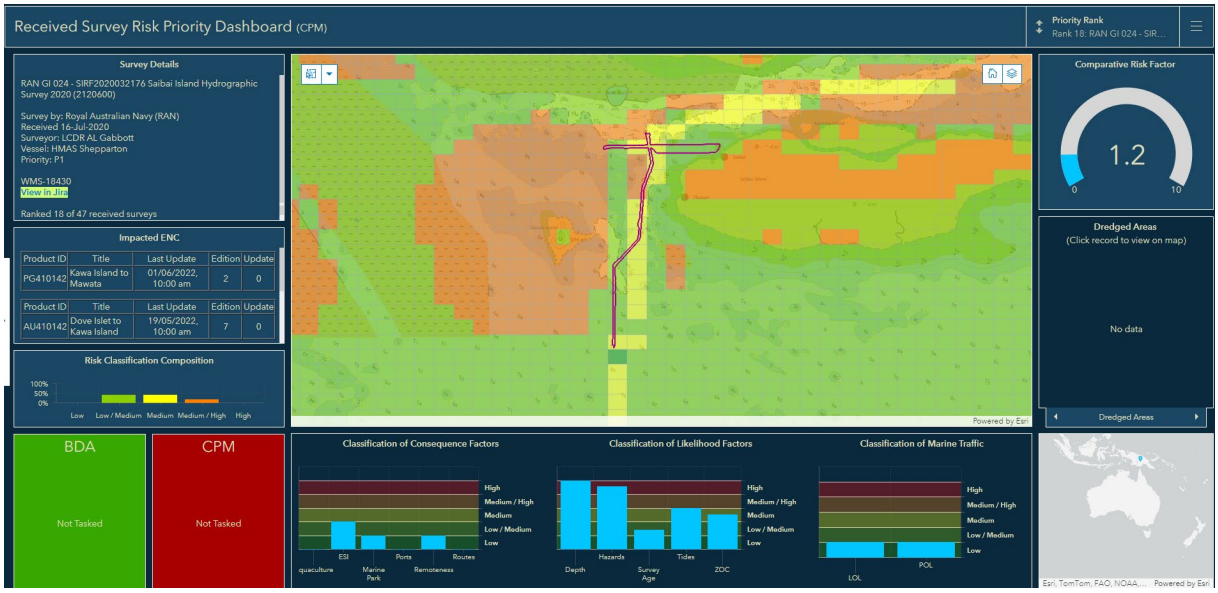


Figure 14 – Survey Rank Dashboard

d) VHF Data Exchange System

The growth in the amount of data transmitted over communication networks has created a pressing need for more bandwidth in the maritime sector, especially in e-navigation. One candidate technology is the VHF Data Exchange System (VDES). VDES is a technical standard developed by the ITU (Recommendation ITU-R M.2092-1) integrating the functions of the Automatic Identification System (including Application Specific Messages) and a protocol for VHF Data Exchange (VDE).

AMSA is currently working on a pilot project to demonstrate the suitability of the VDES technology for Australia's region. It demonstrates selected maritime services relevant to maritime authority operations,

and will provide a digital communications platform for test and trial of S-100 data sets under development. In the first stage of the project, VDES equipment for receiving enhanced navigational warning information (S-124 data sets) is installed onboard two ships and a prototypical service for the provision of these data sets was developed.

Figure 15 – VDES Hardware

Installation of the VDES hardware that is used to receive S-124 data onboard ships.

a) S-53 to S-124 Conversion

To complement existing text-based S-53 warning services, AMSA will also provide navigational warnings in the S-124 format. S-124 can directly be integrated into on-board information systems (including ECDIS) and can also support (semi-)automated/autonomous navigation systems through its machine-readability. The direct visualisation of the data on an ECDIS will also support the decision-making onboard and can significantly improve situational awareness.

AMSA is currently conducting trials to test such a service and analyse how existing processes might be adapted for the production of S-124 data sets. AMSA is developing an AI-based tool to generate S-124 data sets from S-53 navigational warnings. This machine-assisted approach could be helpful in an operational setup to increase the efficiency of the (human-supervised) data production process or in training courses for operators. This will support transitional phases, where both S-53 and S-124 are be provided by the responsible authorities. More details can be found in AMSA's report that was submitted to WWNWS15 in document WWNWS15-3.5.1.1.

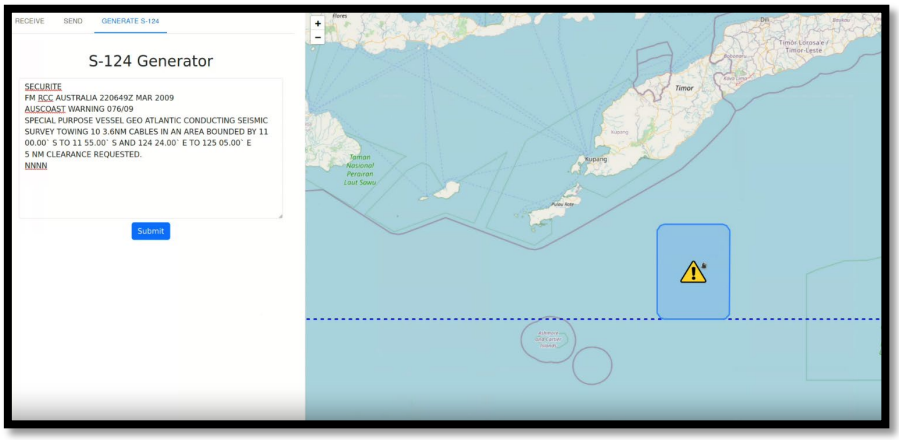


Figure 16 – S-124 Generator

11. Other activities

a) Participation in IHO Working Groups

	Meeting	Chair/Vice Chair	Member/ Associate/ Observer
	Council		M
HSSC	Hydrographic Services and Standards Committee		M
NCWG	Nautical Cartography Working Group		M
ENCWG	ENC Working Group		M
DQWG	Data Quality Working Group		M
MSDIWG	Marine Spatial Data Infrastructure Working Group		M
HSPT	S-44 Hydrographic surveys Project Team		M
NIPWG	Nautical Information Provision Working Group		M
TWCWG	Tidal, Water Level and Currents Working Group		M
WEND	World-Wide Electronic Navigational Chart Database		M
WWNWS-SC	World-Wide Navigational Warnings Service Sub-Committee		M
ABLOS	Advisory Board on the Law of the Sea		O
CSBWG	Crowd Sourced Bathymetry Working Group		O
ECSPT	Electronic Chart System Project Team		M
S-100	S-100 Working Group		M
S-100	S-100 Validation Sub-Group		M
S-100	S-100 Security Scheme Project Team	Vice Chair	M
S-101	Project Team	Vice Chair	M
S-102	Project Team		
S-104	Project Team		M
S-111	Project Team		M
S-121	Project Team		M
S-129	Project Team		M
S-412	Development Group		M
HCA	HCA Hydrographic Commission on Antarctica		M
NIOHC	North Indian Ocean Hydrographic Commission		A
SAIHC	Southern Africa and Islands Hydrographic Commission		O
SWPHC	South-West Pacific Hydrographic Commission SWPHC International Charting Coordination WG SWPHC Marine Spatial Data Infrastructure WG SWPHC Work Plan & Priorities WG	Chair Chair	M M M M
EAHC	East Asian Hydrographic Commission		O

IBSC	International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers	Chair	M
SCUFN	GEBCO Sub Committee on Undersea Feature Names		O

Input to the IHO Publication P-5 (*Yearbook*)

Country: AUSTRALIA

Organization: Australian Hydrographic Office

Contact information/ Informations de contact / Información de contacto	
-National Hydrographer or equivalent -Directeur du service hydrographique ou équivalent -Director del Servicio Hidrográfico o equivalente	Post: Hydrographer of Australia – Director General Maritime Geospatial (DGMG) Name: Commodore Robyn Phillips, RAN Postal address: 8 Station St, Wollongong, NSW 2500, Australia Tel: +61 (0) 2 4223 6500 Fax: +61 (0) 2 4223 6599 Email: AHO.international.relations@defence.gov.au
-Other point(s) of contact -Autre(s) point(s) de contact -Otros punto(s) de contacto	AHO.international.relations@defence.gov.au
-Web site -site web -sitio web	http://www.hydro.gov.au
Country information / Informations sur le pays/ Información sobre el país	
-Declared National Tonnage -Tonnage national déclaré -Tonelaje Nacional Declarado	Tonnage: 1,596,720 Date: July 2022
-National day -Fête nationale -Fiesta nacional	26 January
-Date of establishment and Relevant National Legislation -Date de mise en place et législation nationale pertinente -Fecha de constitución y legislación nacional pertinente	Hydrographic Office, R.A.N – Established 01 October 1920 ; Commonwealth Naval Order 275 dated 14 December 1920. Navigation Act 2012
-Date first joined IHO -Date d'adhésion à l'OHI -Fecha de adhesión a la OHI	21/06/1921
-Date ratification Convention -Date de ratification de la Convention	25/11/1968

-Fecha de ratificación de la Convención	
-Remarks on membership -Remarques sur l'adhésion -Comentarios sobre la adhesión	Included under “British Empire” with the U.K. from 1921.
Agency information/ Information sur l'agence/ Información sobre la agencia	
-Top level parent organisation -Organisme mère -Organización asocieda de nivel superior	Dept of Defence
-Principal functions of the organisation or the department -Attribution principales de l'organisme ou du département -Principales funciones de la Organización o departamento	Hydrographic and bathymetric surveys. Notices to Mariners Nautical charts. Tides, Tidal Streams, Currents Maritime Military Geospatial Products and Services. Australian Hydrographic Data Archive. PCA for Papua New Guinea and Solomon Islands
-Annual operating budget -Budget annuel -presupuesto anual	
-Total number of staff employed -Effectifs totaux -Número total de personal empleado	
-Number of INT charts published -Nombres de cartes INT publiées -Número de cartas INT publicadas	27
-Total number of paper charts published -Nombre total de cartes papier publiées -Número total de cartas de papel publicadas	275 AUS , 17 SLB and 80 PNG charts **= 372** total
-Number of ENC cells published -Nombres de cellules ENC publiées -Número de células ENC publicadas	717 AU cells, 168 PG Cells and 43 SB cells = **928** total
-Number of Other charts -Nombre d'Autres cartes -Número de Otras cartas	

-Type of publications produced -Type d'ouvrages produits -Tipo de publicaciones producidas	Australian Chart Index Application – Web Service Fortnightly Notices to Mariners (AHP18) Mariner's Handbook for Australian Waters 5th Edition (AHP20) – Digital PDF Australian National Tide Tables (AHP11) – Web Service and Digital PDF AusTides (AHP114) – Digital Application Australian Chart and Publication Maintenance Handbook 4th Edition (AHP24) – Digital PDF Maritime Gazetteer of Australia (geographic names as shown on Australian paper nautical charts) – Web Service			
-Detail of surveying vessels/ aircraft -Détail des bâtiments hydrographiques / aéronefs -Detalle de los buques hidrográficos / aeronaves	-Name -Nom -Nombre	-Displacement -Déplacement -Desplazamiento	-Date Launched -Date de mise en service -Fecha de botado	-Number of crew -Nombre de l'équipage -Tripulación
	HMAS LEEUWIN	2550	1997	56
	HMAS MELVILLE	2550	1998	56
	Maritime Geospatial Warfare Unit (MGWU)	Vessel of Opportunity	Early 1980s	16
-Other information of interest				

Input to the IHO Publication C-55 (Status of Hydrographic Surveying and Charting Worldwide)

Country: **AUSTRALIA**