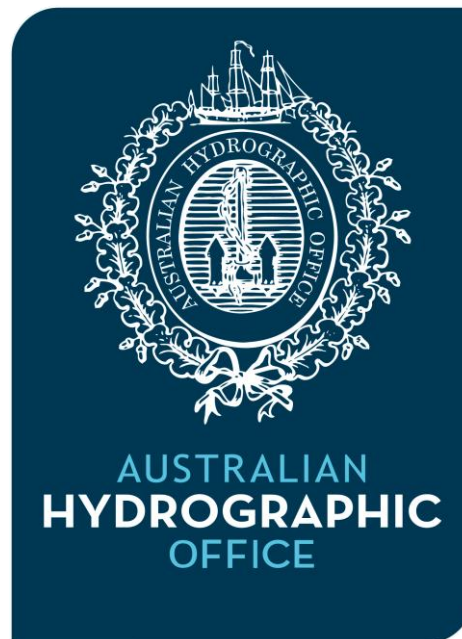


**20<sup>TH</sup> MEETING OF THE NORTH INDIAN OCEAN HYDROGRAPHIC  
COMMISSION (NIOHC20)  
VTC Meeting, 13-15 July 2021**



**NATIONAL REPORT FROM AUSTRALIA TO THE NIOHC20**

**1. Executive summary**

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

Key focus throughout 2020 has been the 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. 2021 will see the continued development of data and information release policies which will underpin the AHO moving towards a modern data and customer-focused organisation.

2020 was the 100<sup>th</sup> anniversary of the Australian Hydrographic Office, however travel and social restrictions throughout the year unfortunately limited a number of planned celebratory events.

**2. Surveys**

**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' which came into effect on 28 Feb 20. Since implementation 15 survey tasks have been contracted under the HIPP, with six completed and the remainder underway.

### Current activity

HydroScheme is the document produced by the AHO to provide a plan of surveying tasks to be undertaken. Traditionally this has covered a three to five year period. The new format is an annual plan to cover the survey activities to be contracted to the HIPP panellists for the next financial year. HydroScheme20 is the current annual plan of survey activities to be undertaken under the HIPP during the 2020/2021 financial year. HydroScheme21 is the annual plan of survey activities to be undertaken under the HIPP during the 2021/2022 financial year. Both are published on the AHO website as ESRI Story Maps at [www.hydro.gov.au/NHP](http://www.hydro.gov.au/NHP).

- Royal Australian Navy Surveys – 2020 Surveys planned for Australia, PNG and Solomon Islands were re-focused by COVID restrictions. RAN survey vessels operated a survey program with a focus on Torres Strait, Great Barrier Reef and Eastern Australian coast.

### 3. Nautical Charting

The AHO is the Primary Charting Authority (PCA) for two Pacific Island Countries, as well as the national authority for Australia and its territories. The total portfolio includes:

Nation	Paper Charts	ENCs	Total
Papua New Guinea	78	117	195
Solomon Islands	17*	41	58
Australia	309#	734	1043
<b>Total</b>	<b>404</b>	<b>892</b>	<b>1296</b>

\* Includes 2 SLB Index charts - # includes 2 Aus Index charts.

A project is underway to rebrand PNG charts and ENC with a PNG/ PG prefix. To date all 78 paper charts have been rebranded and published. Phase 1 of the ENC rebrand has been completed with all 35 usage band 5 cells renamed to PG prefix, currently rebranding remaining coastal cells – 117 cells rebranded so far.

### a) Electronic Navigation Charts

There is a total of 892 ENC cells published by the AHO. These include AU, PG and SB ENC cells. ENC covering Papua New Guinea waters will continue to be progressively updated and reissued as 'PG' ENC. Phase 1 has completed with all the harbour usage cells (5) renamed to PG. The next phase of the PG renaming to conclude in 2021 will include Approach, Coastal, General and Overview cells.

The AHO has moved from a trial program to full production of Navigation Purpose 6 ENC for selected ports. The product is referred to as a High Density bathymetric ENC (HDbENC), reflecting content that is substantially limited to high density bathymetry, and not extensive additional infrastructure detail that is also possible in this layer. Each ENC covers a segment of a dredged channel or manoeuvring area, and aligned to areas with different survey frequencies within the port. This allows for full 'update by replacement' as new surveys are received, without the need to merge new and existing data. Currently the AHO has published 10 HDbENC's for ports of Townsville, Cairns, Sydney Harbour and Botany Bay and has approved five new HDbENC for Brisbane Port.

Each ENC is shaped to fit the waterway, clipped to an agreed polygon and includes 1m or sub-1m depth contours. Aids to Navigation and sub-surface infrastructure are then added from the AHO's database. The AHO has developed and refined a business case template that captures specific user needs, and works with individual ports to ensure each HDbENC meets the stated requirement. The resulting ENC is then made available to both port pilots for use in Portable Pilotage Units, and to ships for use in ECDIS. In doing so, the AHO is contributing to effective pilot / crew Bridge Resource Management.

### b) ENC Distribution

Australia is a member of IC-ENC and distributes all AHO published ENCs through IC-ENC Australia.

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 exclusively within Australian, Solomon Islands and Papua New Guinean waters, and is priced to encourage use by domestic vessel operators, including coastal and port pilots. Toitū Te Whenua-LINZ published ENC of North and South Island New Zealand were released within the AusENC service on 08 Jan 2021 to support cross-Tasman operations.

For more information visit the AHO website at:

[www.hydro.gov.au/prodserv/digital/ausENC/enc.htm](http://www.hydro.gov.au/prodserv/digital/ausENC/enc.htm)

### c) Raster Nautical Charts

The AHO does not produce RNC. RNC are derived by the UKHO from UKHO copies of paper charts produced by the AHO. Only those charts adopted by the UKHO are available as RNC.

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

A review is currently underway regarding future requirements for INT paper nautical charts. A number have been identified as suitable for withdrawal without replacement. The

intention is that, for most areas, coverage will remain available at 1:3.5M only. One 1:10M and one 1:1.5M chart 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).
- Small scale ENC project is currently underway to update all overview and general usage ENC's – New Editions of AU130090, AU130120, AU130150, AU160120 and AU160150 and encompassing AU2 cells have published in 2021. Remaining cells to complete include AU130060 AU160060, AU160090 and their encompassing AU2 cells. Phase 2 of the project will be to remediate INT Paper Charts in Region L.

#### e) Paper Nautical Charts

There are currently 405 paper nautical charts produced and maintained by the AHO including 4 index charts covering Australia, PNG and Solomon Islands. 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>

#### Medium and large scale paper nautical charts

The AHO has commenced a program of transitioning to a completely electronic/digital chart production arrangement under the name Project *Muru*. This will see all manuscript products (such as traditional paper charts) generated from S57(63) datasets, and eventually derivation from S1XX as standard development is concluded. The transition is scheduled to conclude by 2026.

This project builds upon previous chart rationalisation activity commenced in mid 2019 with consultation across a wide variety of maritime industry representatives, including representatives from the Australian Maritime Safety Authority and the PNG National Maritime Safety Authority, domestic commercial vessel operators, the recreational vessel community and others. It was noted that demand for paper nautical charts had fallen to 16% of equivalent annual demand for ENC, yet traditional paper charts absorb 60% of total cartographic effort.

As a consequence, a rationalisation of Australian paper nautical charts commenced following the principles below:

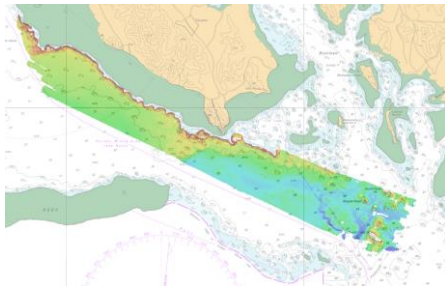
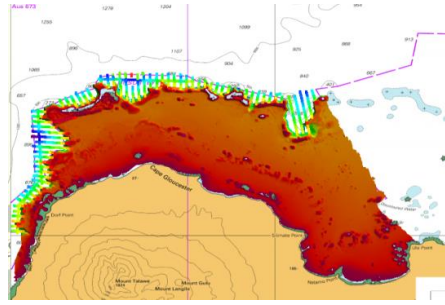

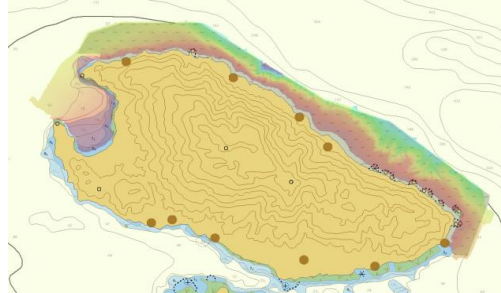
- Coastal areas – either 1:150,000 or 1:300,000, but not both
- Ports and approaches – coverage at a single scale for each area, generally in the range 1:25,000 to 1:50,000. Remaining charts will be sufficient for use as a back-up to ECDIS by permitting larger vessels to plan pilotage, and reach a pilot boarding ground, anchorage or place of refuge without assistance, noting that in most ports they are required to embark a marine pilot. Remaining paper charts will carry a note in areas where larger scale ENC coverage is available.
- Over 130 paper nautical charts considered to be no longer required have progressively been withdrawn once any necessary detail has been transferred to remaining charts. Most of

those being withdrawn are those that, due to scale and location, require the largest proportion of updating effort – reducing the paper chart portfolio by one third will result in a two thirds reduction in the number of paper Notices to Mariners required. The list of coastal and large scale charts for withdrawal was released to the public via Notice to Mariners on 7 Feb 2020. The chart withdrawal program is scheduled for completion by end of 2021. Intentions regarding INT charts will be announced separately once finalised.

Paper nautical charts covering Papua New Guinea and Solomon Islands will remain unaffected.

### **Papua New Guinea**

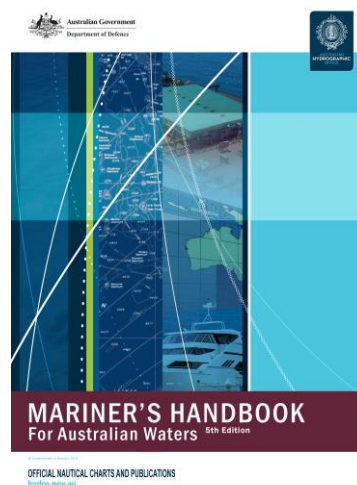
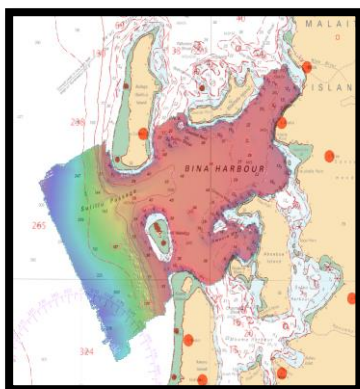
Some of the major updates are shown below:

<b>PNG621</b>	Port Moresby, PNG RAN GI 002  <b>Published – 12<sup>th</sup> Jun 2020</b>	
<b>PNG673 / 386</b>	Cape Gloucester Hydrographic Survey 2017-18 - MBES and SBES survey conducted by Fugro on behalf of NMSA between the 10th December 2017 and the 26th May 2018  673 - Published – 24th Jul 2020 386 - Published – 21st Aug 2020	
<b>PNG520</b>	PNG Northern (ORO) Province - Collingwood Bay 2018 - MBES Survey conducted by Fugro on behalf of NMSA PNG between 22nd February and 11th April 2018  Published – 2nd Oct 2020	
<b>PNG651/389</b>	SIRF2018019267 Kairiru Island-VIC Bay Hydrographic Survey 2017 Fugro on behalf of NMSA PNG between 24th November - 22nd December 2017  651 - Published – 21st Aug 2020 389 - Published – 11th Dec 2020	

Australia Paper Charts scheduled for publication in 2021				
Australia	Solomon Islands	PNG	Antarctica	INT
Total: 25 NC: 0 NE: 25	Total: 4 NC: 0 NE: 4	Total: 6 NC: 0 NE: 6	Total: 2 NC: 0 NE: 2	Total: 10 NC: 0 NE: 10

### Solomon Islands

- New Edition - SLB104, SB5104P6 – Anchorages in the Solomons Islands – Bina Harbour. Estimated to be published Aug 2021. Incorporate Bina Harbour-Point Cruz Hydrographic Survey (HMAS Leeuwin - 2019)



#### f) Other charts

Nil.

#### g) Problems encountered

A low level of resistance to withdrawing many large scale and coastal paper charts has been encountered. This is being managed through continued consultation and engagement with stakeholders.

### 4. New publications & updates

It is anticipated that work will commence on The Mariner's Handbook for Australian Waters AHP20 6<sup>th</sup> Edition in mid 2021 with publication planned for 2022.

Similarly, the AHO is investigating an upgrade path for AusTides. It considers the most likely area of interest will be localised high density bathymetry, coupled with either real-time transmitted tides, or tidal time and height files generated by a suitable tidal application.

Following a significant revision of the content, Tide tables for 2021 were published in late 2020 for Australia (including Solomon Islands and Papua New Guinea), alongside separate publications for Solomon Islands and, for the first time, Papua New Guinea.





## 5. Maritime Safety Information (MSI)

Australia is the coordinator for NAVAREA X - outline maps of NAVAREA X are available from the Australian Hydrographic Office (AHO) Seafarers Handbook for Australian Waters (AHP20) publication. Existing infrastructure for MSI dissemination include Inmarsat SafetyNET, HF digital selective calling (DSC) and radiotelephone. Australia is also progressing with implementation of Iridium SafetCast services.

The Self-Assessment report for NAVAREA X for the period July 2019 to June 2020 was submitted to the Twelfth IHO WorldWide Navigational Warning Service (WWNWS) Sub-Committee Meeting (WWNWS12) held virtually on 1 to 3 September 2020.

An update for the period to December 2020, including information specific to the SWPHC, was submitted to the SWPHC18 Meeting agenda item 10 (doc. SWPHC18-10B):

<https://iho.int/en/swphc18-2021>

Current 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

Information shown in C-55 is current.

## 7. Capacity Building

### a) Training received, needed, offered

#### Maritime Geospatial Training Centre (MGTC)

The RAN Hydrographic School has been renamed the Maritime Geospatial Training Centre (MGTC). It 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 meteorological training to the RAN.

The hydrographic training consists of three levels: basic, intermediate and advanced level. The basic and intermediate courses are traditionally attended by Australian sailors while the advanced level course (H2) is attended by sailors and officers from Australia and the region.

In 2021 the advanced level H2 course consisted of students from Australia (11) , New Zealand (2), Malaysia (1), Fiji (1).

One Basic Course and one Intermediate Course are/will be conducted for RAN sailors in 2021; where 4 students attended the Basic Courses (14 weeks duration) and 12 students attended the Intermediate Course (8 weeks duration).

## 8. Oceanographic activities

### a) Tide gauge networks

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

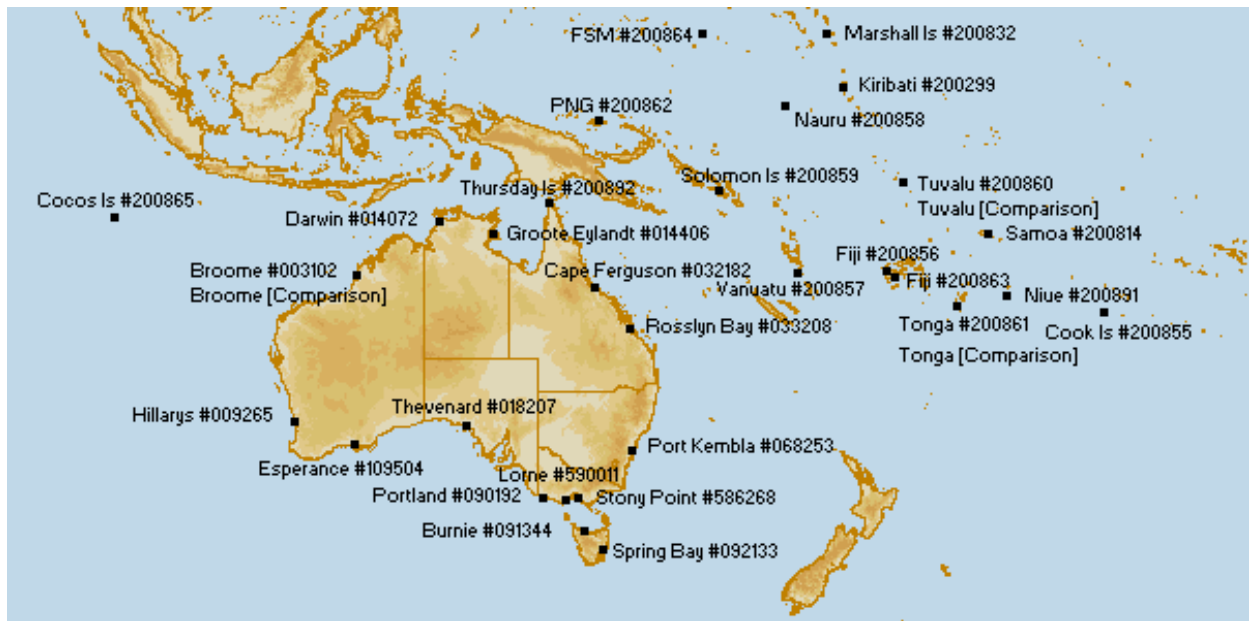
The Australian Baseline Sea Level Monitoring Array currently consists of 16 permanent gauges monitoring sea level and ancillary meteorological parameters around the Australian Coastline, including one at Cocos Island. The locations of the gauges are shown in **Figure 1** (below). ). An additional station at Port Stanvac, South Australia operated from 1992 until December 2010 when it was decommissioned with the closure of the oil refinery and rehabilitation of the site, but a replacement site is being investigated.

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

The Pacific Sea Level 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 1** (below). The gauge at Niue was destroyed by Severe Tropical Cyclone Tino in January 2020, but is intended to be re-instated.

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

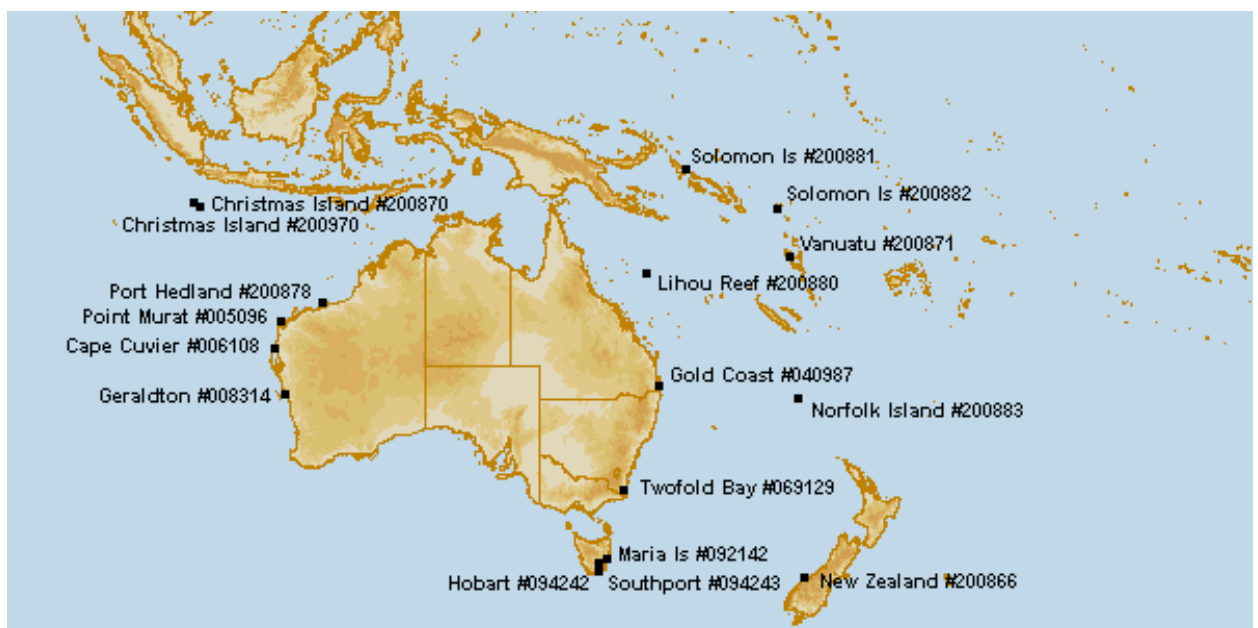




**Figure 1: Permanent tide gauge network operated by the Bureau of Meteorology, including the Australian Baseline Sea Level Monitoring Array (16 sites) and Pacific Sea Level Monitoring Project (14 sites).**

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 17 radar-type tide gauges at four Pacific and 13 Australian sites as shown in **Figure 2**. An array of six deep-ocean tsunameters (DART buoys) brings the Australian tsunami-monitoring network to 53 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 international tsunami warning systems in the Pacific and Indian Oceans. Further information about the Australian Tsunami Warning System is available at <http://www.bom.gov.au/tsunami/about/atws.shtml>



**Fig. 2: Additional ATWS radar gauges (17 sites) that 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. All sites have now been equipped with radar gauges which are acting for now as backup to the primary, but with the longer-term intention of replacing the acoustic systems.

**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.

The Niue tide gauge and geodetic monitoring site was completely destroyed by cyclone Tino which hit on January 17<sup>th</sup> 2020. Waves were reported to have crashed on to cliff tops between 20-30 metres high.

It was intended that reconstruction of a replacement tide gauge and GNSS sensor together with housings would commence immediately to be completed before the end of 2020. However with the restrictions on travel due to COVID, this has been deferred for the foreseeable future.



**Figure 3** Niue wharf with tide gauge hut and mast in left foreground and tide gauge mount behind the red roofed structure in August 2019



**Figure 4.** Photo of the tide gauge hut and mast, GNSS sensor and tide gauge mount after TC Tino 17<sup>th</sup> January 2020.

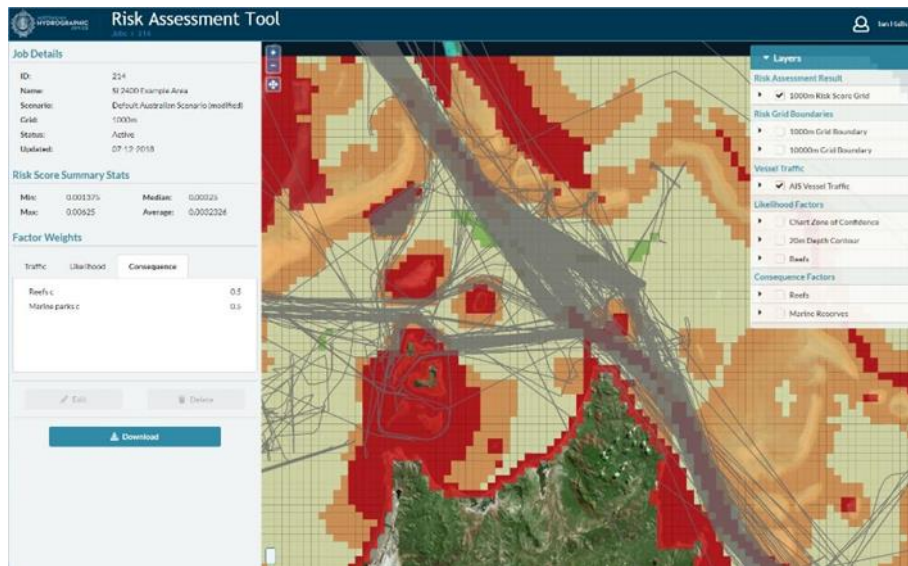
## 9. Other activities

### 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
HSWG	Hydrographic Standards 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
S-100	S-100 Working Group		M
S-101	Project Team	Vice Chair	M
S-104	Development Group	Project lead	M
S-111	Development Group		M
S-121	Development Group		M
S-129	Development Group		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	Chair Vice-Chair	M M M
EAHC	East Asian Hydrographic Commission		O
WWNWS	World-wide Navigational Warning Service Sub-Committee		M
IBSC	International Board on Standards of competence for Hydrographic Surveyors and Nautical Cartographers	Chair	M
SCUFN	GEBCO Sub Committee on Undersea Feature Names		M

## b) Survey Planning Risk Assessment Tool

The AHO has developed a Risk Assessment Tool based on the methodology first adopted by TTW-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.



## 10. Conclusions

AHO continues to implement the introduction of HIPP with upgrades to systems and processes, workflow and data management protocols.

Australian Navy ships will continue to spend considerable time deployed in the South Pacific region.



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

Country: AUSTRALIA

Organization: Australian Hydrographic Office

(updates shown in BLUE)

<b>Contact information/ Informations de contact / Información de contacto</b>	
-National Hydrographer or equivalent -Directeur du service hydrographique ou équivalent -Director del Servicio Hidrográfico o equivalente	Post: Hydrographer of Australia / <b>Director-General Maritime Geospatial (DGMG)</b> Name: <b>Commodore Stewart Dunne, RAN</b> Postal address: 8 Station St, Wollongong, NSW 2500, Australia Tel: +61 (0) 2 4223 6500 Fax: +61 (0) 2 4223 6599 Email: international.relations@hydro.gov.au
-Other point(s) of contact -Autre(s) point(s) de contact -Otros punto(s) de contacto	<a href="mailto:International.relations@hydro.gov.au">International.relations@hydro.gov.au</a>
-Web site -site web -sitio web	<a href="http://www.hydro.gov.au">http://www.hydro.gov.au</a>
<b>Country information / Informations sur le pays/ Información sobre el país</b>	
-Declared National Tonnage -Tonnage national déclaré -Tonelaje Nacional Declarado	Tonnage: 1,684, 678 Date: October 2019
-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	21/06/1921



-Fecha de adhesión a la OHI	
-Date ratification Convention -Date de ratification de la Convention -Fecha de ratificación de la Convención	25/11/1968
-Remarks on membership -Remarques sur l'adhésion -Comentarios sobre la adhesión	Included under “British Empire” with the U.K. from 1921.
<b>Agency information/ Information sur l'agence/ Información sobre la agencia</b>	
-Top level parent organisation -Organisme mère -Organización asociada 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	40
-Total number of paper charts published-Nombre total de cartes papier	309 Aus , 17 SLB and 78 PNG charts = 404 total (includes 2 AUS and 2 SLB Index Charts).

publiées-Número total de cartas de papel publicadas				
-Number of ENC cells published -Nombres de cellules ENC publiées -Número de células ENC publicadas	734 AU cells, 117 PG Cells and 41 SB cells = 892 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	Product Index – searchable website tool  Fortnightly Notices to Mariners (AHP18)  Seafarers Handbook for Australian Waters (AHP20) – printed and digital  Australian National Tide Tables (AHP11)  Australian Electronic Tide Tables ('AusTides' - AHP114)  Australian Chart and Publication Maintenance Handbook 4th Edition (AHP24)  Maritime Gazetteer of Australia (geographic names as shown on Australian paper nautical charts) – searchable website tool			
-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
	HMAS PALUMA	380	1989	13
	HMAS MERMAID	380	1989	13
	HMAS SHEPPARTON	380	1989	13
	HMAS BENALLA	380	1990	13

	Maritime Geospatial Warfare Unit (MGWU)	Vessel of Opportunity	Early 1980s	54
	ASV WYATT EARP	6.3	Handed over to RAN in 1992	
-Other information of interest				

