INTERNATIONAL HYDROGRAPHIC ORGANIZATION (IHO)

SOUTH WEST PACIFIC HYDROGRAPHIC COMMISSION (SWPHC)

14TH Meeting – Noumea, New Caledonia 30 Nov - 02 Dec 2016

AUSTRALIAN HYDROGRAPHIC SERVICE
NATIONAL REPORT

14th SOUTH WEST PACIFIC HYDROGRAPHIC COMMISSION (SWPHC) MEETING

Noumea, New Caledonia 30 Nov - 02 Dec 2016

AUSTRALIAN REPORT

1. GENERAL

As the result of the First Principles Review of Defence, the *Navigation Act 2012* was amended to reflect a whole-of-Defence responsibility, rather than just Navy, for providing hydrographic services. The Australian Hydrographic Office (AHO) is merging with the Australian Geospatial-Intelligence Organisation (AGO), with full merger aligned with appropriate amendments to the *Intelligence Services Act 2001*. The Defence White Paper 2016 indicated the future of Australia's hydrographic surveying capabilities will be 'an efficient combination of commercial and military hydrographic and oceanographic surveying capabilities'. The nature and scope of this mix is yet to be determined.

2. SURVEYS

2.1 Hydroscheme

Hydroscheme continues to be reviewed and targeted to best meet national and regional requirements. HydroScheme 2016-2019 was published in August 2016 and production of Hydroscheme 2017-2020 is underway, with publication due in June 2017. Hydroscheme 2016-2019 is available at www.hydro.gov.au.

2.2 Laser Airborne Depth Sounder (LADS)

LADS have conducted a range of HydroScheme tasks in the Great Barrier Reef and Torres Strait. Surveys were also conducted in the Coral Sea and extensively around Norfolk Island. LADS continues to be responsive to survey requests from the Australian Maritime Safety Authority (AMSA) and will be deploying more regularly in future to meet demand for surveys in southern waters.

2.3 Hydrographic Ships (HS) LEEUWIN and MELVILLE

HMAS *Leeuwin* conducted HI 586 Shelburne Bay, Qld in Feb-Mar 16, expanding navigable waters adjacent the Inner Great Barrier Reef (IGBR) two way route. *Leeuwin* then conducted a joint survey with *Paluma* and *Mermaid*, HI 587 Brunswick Bay, WA in May-Jul 16 in the Bonaparte Archipelago, and has returned for another survey HI 592, Brunswick Bay from Sep-Nov 16. HMAS *Melville* engaged in HI 585 Camden Sound in Mar-May 16, and has recently completed HI 588 Timor Sea in Jul-Sep 16. Melville is conducting HI 593 Arnhem Land, NT in Oct-Dec 16, focusing on Liverpool River (Maningrida). Planned surveys for early 2017 include Bass Strait, Timor Sea, and St Vincent Gulf.

2.4 Survey Motor Launch (SML) MERMAID, PALUMA, SHEPPARTON and BENALLA

HMAS *Paluma* and *Mermaid* completed HI 582 Shelburne Bay, in Jan-Mar 16, and HI 587 Brunswick Bay in May-Jul 16 in conjunction with *Leeuwin*. They also deployed to Torres Strait to conduct HI 575 Cook Reef in Aug-Oct 16. HMAS *Shepparton* and *Benalla* conducted HI 584 Montgomery Reef, WA in Feb-May 16, and returned to the Kimberleys for HI 592 York Sound, WA in Jul-Sep 16. Planned surveys for early 2017 include IGBR routes and deployment to Cape Nelson, PNG.

3. NEW CHARTS, ENCs & UPDATES

3.1 National Charting Scheme

Updating ENCs remains the AHS' highest priority. From here, where necessary for safe navigation the AHS updates the paper chart via Notices to Mariners (including blocks) and New Editions.

The AHS is also focussing on recompiling the ENC Port cells at a larger compilation scale to avoid over scale bars when in use in ECDIS. These updated Port ENC are currently at Nav Purpose 5 and may have an irregular shape as they extend from the pilot boarding place, along channels and anchorage areas to the

berths for the port. To date the AHS has recompiled 16 Port ENCs but have hundreds of AU5 cells still to undertake.

The AHS overall portfolio is approximately 850 ENC cells and 470 Paper charts. With the transition of Solomon Islands' Primary Charting Authority from the UKHO to the AHS in early 2017 the AHS portfolio will grow by approximately 50 ENCs and 30 paper charts. In some places the AHS has withdrawn paper charts where sales figures have indicated that charts at that scale are not needed by the mariner. In these cases, the ENC detail has been maintained to encourage Commercial users to shift to ENC.

ENC updates for Navigation safety remains steady at just over 1100 updates each year. New Edition ENCs is approximately 100 per year, with a few new cells usually due to Nav Purpose changes in scheming.

Paper Chart output has dropped in the last 12 months after the Two Way Route update of the previous year creating an inflation in New Editions. The AHS has published new paper charts for the new Port of Ashburton , Approaches to Barrow Island, Jomard Entrance, reschemes for Port of Gladstone, Port of Darwin and Port of Lae.

Notices to Mariners remains steady with just over 1300 Notices published each year.

CARIS Hydrographic Production Database (HPD) is the major ENC production platform and plans to upgrade to Version 3.2 are underway. The AHS is considering a new Usage layer to manage high density bathymetry ENC data in the future and intend to have a "Wrecks" usage implemented shortly.

The AHS has introduced CARIS Paper Chart Composer (PCC) as the main paper chart production software, which may transition to CARIS Paper Chart Editor (PCE) in the future for chart metadata management. Paper charts are currently managed in a raster data centre built on outdated software and transition to CARIS raster tools is likely in the new year.

The AHS is implementing CARIS Bathy Database (BDB) to streamline bathymetric data management and deconfliction. The AHS is soon to implement a bespoke Chart Product Management System to mange product versioning and metadata. New Survey and Chart Planning tools will also be implemented to streamline receipt and management of survey and chart product requests.

Whilst all this positive activity goes on the AHS has had to offset resources from activities such as plans to refresh the small scale INT portfolio of charts, which have been kept up to date for Notices to Mariners but are in need of full new editions to update boundaries, new bathymetry, magnetic variation and larger scale chart data. This activity is likely to be pushed back even further until these new systems are in place and the AHS can gain some production efficiencies in the small scale chart update process.

3.2 AusENC Service

Australia's national ENC service, known as 'AusENC' has been running since June 2012. The AusENC service was designed to support vessels operating within Australian and Papua New Guinean waters through simple ordering and easy availability. This AusENC service includes the full portfolio of published ENC covering Australian and Papua New Guinean waters. It is sold in a range of large and small geographical area packs at affordable prices. A free fortnightly web-based update service is included in the subscription price. For more information visit the AHS website at: www.hydro.gov.au/prodserv/digital/ausENC/enc.htm.

The local AusENC service complements the international services available through the global network of distributors of the International Centre for ENC (IC-ENC).

3.3 Chart Demand

Commercial demand for AHS ENC through the AusENC service grew by 34.7% in FY15-16 and 36.0% through IC-ENC services when compared to FY14-15. The AHS sells more ENC through the AusENC service than it does through IC-ENC. In comparison, demand for paper charts over the same period dropped by 32.1% and is predicted to drop further due to the transition from paper charts to ENC.

3.4 Challenges Ahead

The main challenges for the AHS continue to relate to workforce, budget and travel – all of which affect the AHS' ability to engage with and support regional and international hydrographic initiatives. Many of the systems-based challenges are being addressed. Following various pilot projects and investigations, new systems and processes are well underway. While the introduction of CARIS HPD has streamlined production and maintenance of ENC, the underpinning management of information themes and layers is an ongoing development activity, but very good progress has been made.

Other areas of the AHS, such as Data Management, Nautical Information, and Tides and Geodetic Control, have also undergone investigations and trials, with new solutions well advanced. Organisational restructure is also a critical component of harnessing the full potential of these new systems and process and will be undertaken in due course.

The next major challenge is including the next generation of ENCs (S101) into the production mix, while continuing to produce S57 ENCs and paper charts.

4. PUBLICATIONS

4.1 Australian National Tide Tables (ANTT)

ANTT has continued to be published in October each year for the following year. For details see:
www.hydro.gov.au/prodserv/publications/antt.htm

4.2 AusTides (formerly known as Seafarer Tides)

AusTides has continued to be published in October each year for the following year. For details see:
www.hydro.gov.au/prodserv/publications/ausTides/tides.htm

4.3 Seafarers Handbook for Australian Waters AHP 20

The fourth edition of the Seafarers Handbook for Australian Waters was published in April 2016. For details of the publication see: www.hydro.gov.au/prodserv/publications/ash.htm.

4.4 Maritime Gazetteer of Australia

The AHS maintains the Maritime Gazetteer of Australia as a web product. The Gazetteer is a listing of all names shown on AHS chart products. The resulting search provides the latitude and longitude of the place, its feature code and the charts on which the place is depicted. For details see: www.hydro.gov.au/prodserv/publications/mga/mga.htm

4.5 Australian Chart and Publication Maintenance Handbook AHP 24

The third edition of the Australian Chart and Publication Maintenance Handbook AHP 24 is available as an electronic publication and is available for download at:
www.hydro.gov.au/prodserv/publications/cpmh.htm

4.6 Australia Pilot

The current editions of the relevant Admiralty Sailing Directions are:

- Australia Pilot NP13 (4th Edition 2014)
- NP 14 (13th Edition 2016)
- NP15 (13th Edition 2015).

5. MSI

Australia is the coordinator for NAVAREA X, which extends from the Antarctic coast to the equator and from 080E to 170E longitudes. The Self-Assessment report for NAVAREA X for the period July 2015 to June 2016 was submitted to the IHO World-Wide Navigational Warning Service (WWNWS) Sub-Committee Meeting (WWNWS8) held at Ålesund, Norway 12-16 September 2016. A copy of the Self-Assessment report has been submitted for consideration under SWPHC14 Agenda item 11 (GMDSS, MSI and NAVAREA coordination)).

The next meeting (WWNWS9) will be held in Cape Town, South Africa in August 2017.

6. C-55 and P-5 UPDATES

Data to update C-55and P-5 was provided to the IHB in May 2016. The latest information to update P-5 (Yearbook) is submitted in Annex A. (updates shown in Red text)

7. CAPACITY BUILDING

7.1 Tides & Water Levels Technical Workshop

The workshop, part of the IHO 2015 CBWP, was held at the Australian Hydrographic Office, Wollongong, Australia 26-30 October 2015. A total of 10 participants attended – 8 representatives from Pacific Islands Countries (Cook Is., Fiji, Kiribati, Niue, Samoa, Solomon Is., Tonga, Vanuatu) and 2 from the Pacific Community (SPC), one of which was funded by SPC. In addition to providing participants with a basic knowledge of tides and water level variations; the workshop also trained participants on the application of tides and water levels to hydrographic surveying. The workshop encouraged greater collaboration between Pacific Island States on exchange of tidal information pertaining to the marine environment in the region.

7.2 Capacity Building in Hydrography for Ocean and Coastal Development (SPC member countries)

The AHS coordinated this AusAID funded project which ran over 3 years (July 2012 - June 2015). The following activities, carried out in 2015, concluded the project:

- Funding representation of two SPC staff members at SWPHC13 Meeting the Hydrographic Governance Workshop in the Cook Islands (Feb 2015)
- Three week hydrographic survey in Tulaghi Harbour, Solomon Islands. Survey conducted by SPC hydrographic surveyor with supervision by AHS hydrographic surveyor (Apr-May 2015)
- Three week hydrographic survey in Betio Harbour, Kiribati. Survey conducted by SPC hydrographic surveyor with supervision by AHS hydrographic surveyor (May-Jun 2015)

7.3 RAN Hydrographic School

The RAN Hydrographic School continues to provide training courses in Hydrographic surveying for officers and sailors from Australia and the local region under the Defence Cooperation Programme.

The H2 course was re-recognised in 2016 and continues to provide a FIG/IHO International Board on Standards of Competence for Hydrographic Surveyors Category B course with Option 1 (Hydrography for Nautical Charting) and Option 6 (Military Hydrography). There is capacity for up to 15 students per course.

The student body of the H2 course conducted in 2015 included 2 New Zealand sailors and 2 Malaysian officers along with 6 Australian officers and 5 sailors. The H2 course of 2016 graduated on 11 Nov 16 and included 2 New Zealand sailors, 1 Fiji officer, 1 Malaysian officer along with 4 Australian officers and 3 sailors. Students for the 2017 course are you to be determined.

In 2015 two Basic Courses and one Intermediate Course were conducted for RAN sailors. A total of 20 students attended the Basic Courses (14 weeks duration) and 7 students attended the Intermediate Course (8 weeks duration). The 2016 period trained another two Basic Courses and one Intermediate Course. A total of 21 students attended the Basic Courses and 7 students attended the Intermediate Course.

7.4 Tides Workshop

The National Tidal Unit (Bureau of Meteorology), in association with the Permanent Committee for Tides and Mean Sea Level, has held two Tides Workshops since the last SWPHC meeting – i.e. in May 2015 and May 2016. This 4-day programme provides theoretical and practical training in aspects of tides and sea level to people involved in hydrographic surveying and tidal data collection, and incorporates a field trip to the Adelaide Outer Harbor Tide Gauge site. A total of 12 people attended the workshop held in May 2015 - 4 from government organisations in Australia and New Zealand, 6 from industry in Australia and Singapore, and 2 from the Geotechnical Section, Secretariat of the Pacific Community.

8. OCEANOGRAPHIC SERVICES

8.1 Tide Gauge Networks

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

8.1.1.1 The Australian Baseline Sea Level Monitoring Array currently consists of 16 permanent Gauges around the Australian Coastline, including one at Cocos Island. Locations of the gauges are shown in **Figure 1** (below). In December 2010 the station at Port Stanvac, South Australia was decommissioned because the site owners, Mobil Refining Australia, decided to shutdown the oil refinery and rehabilitate the site. A replacement site is being investigated. The installation of an additional Baseline gauge at Thursday Island in Torres Strait has been successful, with ancillary meteorological and primary sea level sensors already supplying data. Monthly reports are published by the Bureau and can be located on their website at: www.bom.gov.au/oceanography/projects/abslmp/reports.shtml

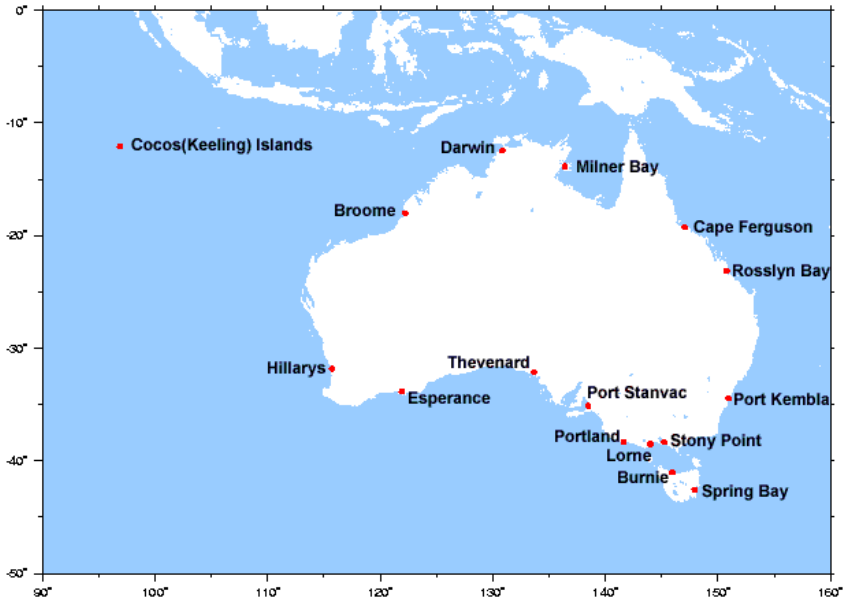

Figure 1: Australian Baseline Sea Level Monitoring Project sites

8.1.1.2 The Pacific Sea Level Monitoring Project, which currently consists of 12 permanent gauges throughout the South Pacific region monitoring sea level and related parameters. Locations of the gauges are shown in **Figure 2** (below). Originally installed in the early 1990s, they have since been upgraded with modernised data loggers, real-time satellite communications and additional radar-type water level sensor through 2011-2013 under an Observation Network Upgrade Project (ONUP). Installation of an additional gauge at Niue has occurred but is yet to be commissioned.

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

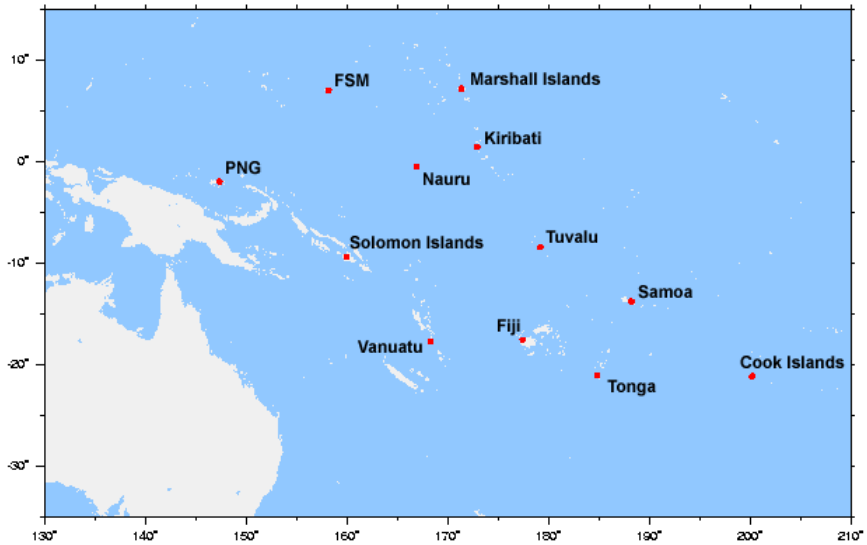

Figure 2: South Pacific Sea Level and Climate Monitoring Project Sites

8.1.2 The Australian Tsunami Warning System (ATWS) is supported by the 29 permanent Australian and Pacific tide gauges as well as an additional network of 17 radar-type tide gauges at four Pacific and 13 Australian sites (46 tide gauges in all) and six deep-ocean tsunameters (DART buoys) as shown in **Figure 3**. 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

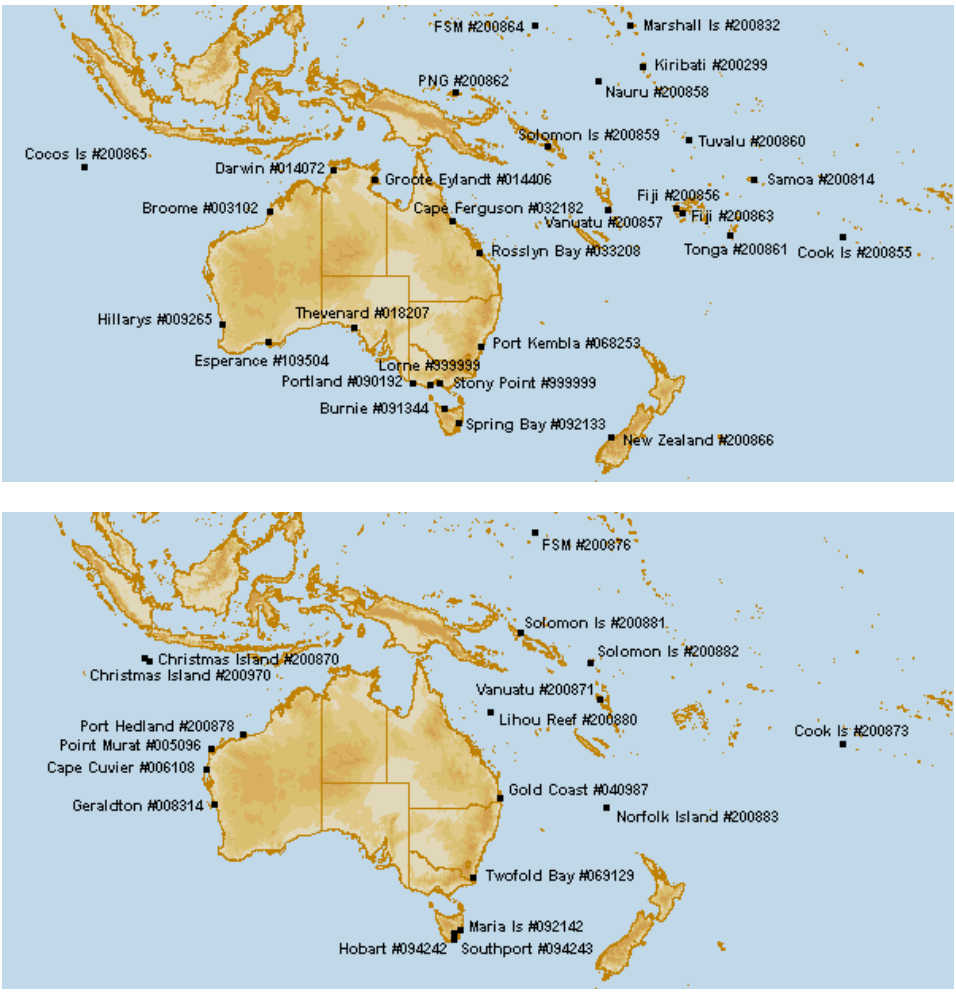

Fig. 3: Australian Baseline and South Pacific SEAFRAME stations (top) and additional ATWS radar gauges (bottom) used for monitoring of tsunamis in the Australian region.

8.1.3 An array of five Permanent Data Transmitting Tide Gauges and one Transmitting Tidal Stream Gauge is operated in Torres Strait by the Australian Maritime Safety Authority. The Tide Gauges are located at Booby Island, Goods Island, Turtle Head, Nardana Patches and Ince Point. The Tidal Stream Gauge is located at Nardana Patches. Further information is available on pages 6-8 of the Australian National Tide Tables, 2017 edition.

8.1.4 Several State departments and individual Port Authorities also operate approximately 100 permanent gauges throughout Australia. Details are contained in the Australian National Tide Tables (ANTT).

8.1.5 The Australian Hydrographic Service (AHS) operates tide gauges in support of survey operations, but has no permanent gauge locations.

8.1.6 The AHS Tides Information System (TIS) is being further developed to include tidal height analysis and predictions. The ANTT 2016 and 2017 were produced with the TIS.

9. CONCLUSION

9.1 The AHS continues to improve the content of the ENC coverage with richer data levels to support commercial maritime activity, while also maintaining an extensive folio of paper charts. Improvements to AHS systems and processes will reap significant rewards in the years to come, but there is still a good deal of work to do.

9.2 Notwithstanding current and future challenges, the AHS is strongly committed to supporting capacity building in the SWPHC Region.

ANNEX A

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

AUSTRALIA

AUSTRALIAN HYDROGRAPHIC SERVICE 8 Station Street WOLLONGONG, NSW 2500	
Department of which the Hydrographic Office is part - *Ministère dont dépend le Service Hydrographique – Ministerio del que depende el Servicio Hidrográfico*	Department of Defence
Principal functions of the H.O. - *Attributions principales du S.H. - Principales funciones del S.H.*	Hydrographic and bathymetric surveys. Nautical charts. Australian Hydrographic Data Archive. Notices to Mariners. Tides, Tidal Streams, Currents, Tide Tables. Military Maritime Geospatial Products and Services.
National day - *Fête nationale – Fiesta nacional*	26 January (Australia Day)
Telephone : **Fax :** **E-mails :** **WEB site:**	+ 61 (0) 2 4223 6500 + 61 (0) 2 4223 6599 international.relations@hydro.gov.au http://www.hydro.gov.au Australian Hydrographic Office 8, Station Street Wollongong NSW, 2500 Australia
Date of establishment and Relevant National Legislation - ***Date de fondation et législation nationale concernée*** - *Fecha de establecimiento y Leyes nacionales de referencia*	Hydrographic Service , R.A.N.-Established 01 October 1920; Commonwealth Naval Order 275 dated 14 December 1920. Navigation Act 2012
Name and rank of the Director or Head - *Nom et grade du directeur - Apellidos y graduación del Director*	Commodore Brett BRACE, RAN
Tonnage – *Tonelaje*	September 2016 = 1,917,550
Total Budget - *Budget total – Presupuesto Total*	Aust. $127 million per annum.
Staff employed - *Effectifs – Plantilla*	For details consult the WEB site : http://www.hydro.gov.au
N° of charts published - *Nombres de cartes publiées - N° de cartas publicadas.*	474
N° of INT charts published - *Nombres de cartes INT publiées - N° de cartas INT publicadas.* **N° of ENC cells published** - *Nombres de cellules ENC publiées - N° de células ENC publicadas.* **N° of Raster charts published** - *Nombres de cartes matricielles publiées - N° de cartas Ráster publicadas*	38 850 Nil – service withdrawn as full ENC coverage exists
Type of publications produced (e.g. Tide Tables, Sailing Directions, List of Lights etc.) – *Type de publications produites (par ex: Tables des marées, Instructions nautiques, Livres des Feux, etc. - Tipo de publicaciones producidas (por ej: Tablas de mareas, Derroteros, Libros de Faros etc.)*	▪ Australian (Au) ENC distributed nationally within Australia as 'AusENC' (AHP124) and distributed internationally through the IC-ENC. ▪ Australian Chart Index - Standard ACI (update status for Australian paper nautical charts and ENC) - web. ▪ Australian Chart Index – GoogleEarth™ ACI (graphical index of Australian paper nautical charts and ENC) - web.

	▪ Australian Paper Nautical Charts ('Aus' series). ▪ Paper Australian Index of Nautical Charts (Aus5000 - Northern Portion, Aus5001 - Southern Portion). ▪ Fortnightly Notices to Mariners (AHP18) - web. ▪ Seafarers Handbook for Australian Waters (AHP20) 4th Edition (release March 2016). ▪ Paper Australian National Tide Tables (AHP11) - annual release. ▪ Australian Electronic Tide Tables ('AusTides' - AHP114) - annual release. ▪ Australian Chart and Publication Maintenance Handbook 3rd Edition (AHP24) - web ▪ Maritime Gazetteer of Australia (geographic names as shown on Australian paper nautical charts) - web		
Surveying vessels/ Aircraft – *Bâtiments hydrographiques/aéronefs – Buques hidrográficos/ Aeronaves*	Displacement	Date Launched	Crew
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
LADS Unit Dash 8 (modified)		Commenced operational service in 1993	9 (naval) + 5 (contract)
Deployable Geospatial Support Team (DGST)	(Vessel of opportunity)		4
ASV WYATT EARP	6.3	Handed over to RAN in 1992	
Other information of interest - *Autres informations utiles - Otra información de interés.*	(1) Extensive use is made of LIDAR Surveys (2) Survey units, based in Cairns, QLD. (3) Chart publication is based in the Australian Hydrographic Office in Wollongong which employs a civil staff of 115 fte (full-time equivalent) and 16 Navy personnel.		