NATIONAL REPORT
THE REPUBLIC OF INDONESIA

18th NORTH INDIAN OCEAN HYDROGRAPHIC COMMISSION MEETING (NIOHC)

Goa, India
09th-12th April 2018

1. Hydrographic Office / Service:

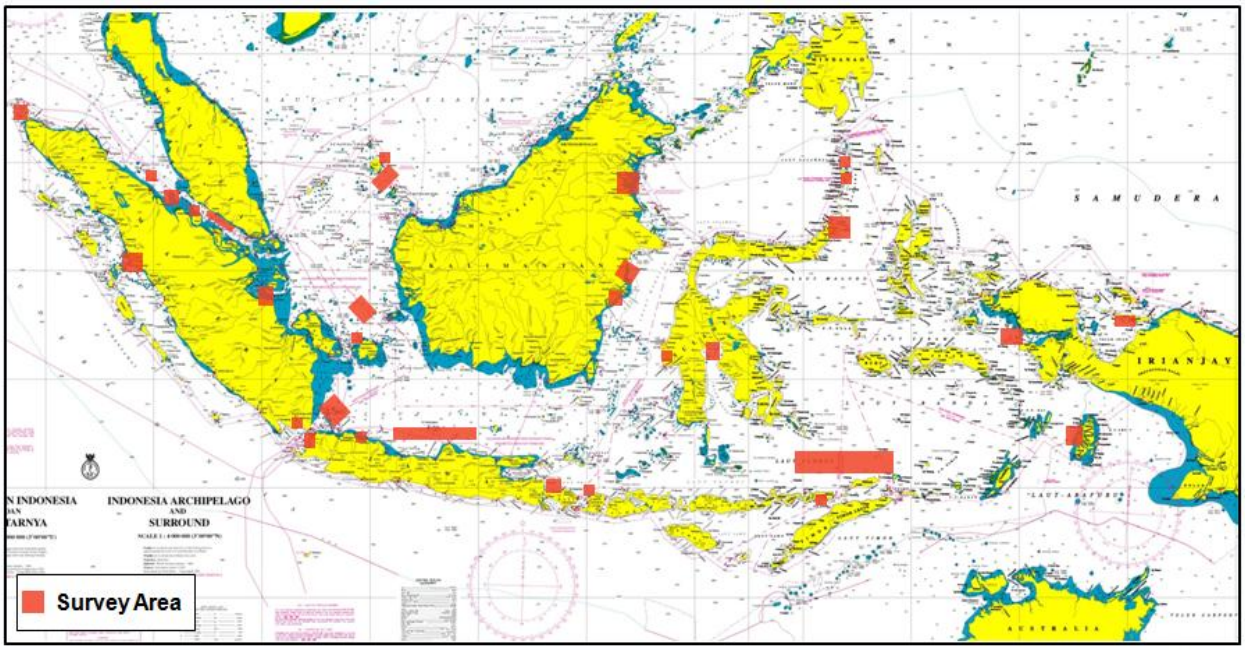
Establish in 1951, Pusat Hidrografi dan Oseanografi Angkatan Laut(Pushidrosal) or Indonesian Navy Hydrography and Oceanography Center, is a National Hydrographic officeof Indonesia under Indonesian Navy Headquarter. Pushidrosal has responsibilityto conducting hydrography and oceanography activities, including surveys, research, marine mapping, publications, marine environments and safety navigation of shipping, both for military and public purposes.

Detailed information to update IHO Publication P-5 (*Yearbook*) is submitted in Annex A.

2. Surveys

a) Coverage of surveys in 2017.

- Total Area had been surveyed in 2017: ± 58.000 square km
- Total Number Paper Chart had been updated in 2017 : 37 number



b) New technologies and /or equipment. Pushidrosal employed8 portable Multibeam Echosounder (MBES) and 4 hull mounted MBES. Multibeam Echosounders are professional tools for precision mapping of the seabed, complying with the performance standards defined by the International Hydrographic Organization's performance standards, S-44 New edition. Pushidrosal equipt by high mapping productivity in combination with exceptionally high sounding accuracy, and a dense pattern of soundings to cover the seafloor in order to reveal all details on the bottom. In addition,multibeam echosounders produce seabed image data similar to a side scan sonar image. And Pushidrosal recently using Konsberg EM 2040 (3), Reson Teledyne T-20 (1) and Reson Teledyne T-50P (4).

c) New ships. Pushidrosal has 2survey ships (KRI Rigel 933 and KRI Spica 934)equiped with modern survey instrument asmultipurpose research vessel and commissioning in 2015. The ship will also be assigned for search and rescue missions

because it comes equipped with an AUV (autonomous underwater vehicle) to take underwater images up to a depth of 1,000 meters and send data periodically.The new ship is also equipped with remotely operated vehicle (ROV) or an underwater drone equipped with mechanic arms to provide visual information and take samples from the bottom of the ocean.

d) Problems encountered

Detailed information about surveys to update IHO Publications P-5 (*Yearbook*) and C-55 (*Status of Hydrographic Surveying and Charting Worldwide*) is submitted in Annexes A and B, respectively.

3. New charts & updates

Currently Pushidrosal has 538 number of paper charts and 508 ENC cell. ENC production are based on paper charts. Indonesia striving to migrate to the Hydrographic Production Database (HPD) to improve chart and ENC's quality and consistency. Paper charts are distributed locally by Pushidrosal, but ENC are distributed locally and internationally through UKHO VAR, C-MAP and Primar. We also produced and maintain INT Chart, especially to cover the Indonesian Archipelaguc Sea Lane (IASL). Other chart products are for the internal uses of the Navy, and also to support tourism sector, environment, and maritime sector. Since 2017 we produced leisure charts called "Yacht Recreation" chart. Ou ENC is also utilized by cruise vessel visiting Indonesia. Our main problem are the availability of recent survey data, especially in some remote islands where tourism industry and local economy is growing.

Detailed information about charting to update IHO Publications P-5 (*Yearbook*) and C-55 (*Status of Hydrographic Surveying and Charting Worldwide*) is submitted in Annexes A and B, respectively.

4. New publications & updates

a) New Publications :

1) Nautical Charts And Publications Catalogue
2) Chart Number 1
3) Nautical Almanac
4) Tidal Stream Tables
5) Tide Tables
6) Sailing Handbook
7) Indonesian Notices To Mariners
8) Sailing Direction Section I
9) Sailing Direction Section II
10) Sailing Direction Section III
11) Sailing Direction Section IV
12) Indonesian List Of Lights
13) Indonesian Port Information
14) List Of Submarine Pipelines And Cables Indonesian Waters
15) List Of Wrecks Indonesian Waters
16) Former Mine Areas Indonesian Waters

17) List Of Coastal Indonesian Radio Station
18) IALA "A" Maritime Bouyage System
19) Current Charts Indonesian Water Eastern Region
20) Current Charts Indonesian Water Western Region
21) Tracks And Distance Between Ports In Indonesia
22) Indonesia List Of Buoys
23) The Rise and Set of the Sun and the Moon Time Table In Indonesian Archipelago.

b) Updated publications:
1) Tide Tables Of Indonesian Archipelago 2018
2) Tidal Stream Tables Of Indonesian Archipelago 2018
3) Nautical Almanac 2018
4) Indonesian Notices To Mariners
5) Catalogue Indonesian Nautical Charts And Publications
6) Electronic Navigational Charts Catalogue
7) Sailing Direction Section IV
8) Sailing Handbook
9) Indonesia List Of Buoys
10) Port Information
11) List Of Submarine Pipelines And Cables

c) Means of delivery, e.g. paper, digital:
Delivery of all publications is still in paper form with direct purchase to the store.

d) Problems encountered:
Publication and updating publication still manually, not online

Detailed information to update IHO Publication P-5 (*Yearbook*) is submitted in Annex A.

5. Maritime Safety Information (MSI)

a) Pushidrosal have a system information called Indonesian Marine Geospatial Information Center (I-MaGIC). As a portal, this system can be used to display important and actual information related to the hydro-oceanographic data in Indonesia, such as survey data, research, Electronic Navigational Charts (ENC), publication, marine environment implementation and navigation safety of both military and public. For the purpose of navigation safety, Pushidrosal has sole authority and legality in the field of hydrography in preparing and providing data and Hydro-oceanography information in the form of nautical chart (paper chart and Electronic Navigation Chart) and nautical publications.

b) New infrastructure in accordance with GMDSS Master Plan

In Indonesia, infrastructure of GMDSS under Director General Sea Transportation (DGST) of Minister of Transportation. In carrying out responsibilities to inform mariners in Indonesia waters concerning safety of navigation, Pushidrosal compile

information from the mariners and all Indonesia ports authority regarding sea accident in Indonesia waters. Information from the mariners and ports authority be included into Navigational Warning and send the informations to Jakarta Radio. Jakarta Radio will inform it to all mariners which are sailing in Indonesia waters and also share to the Navtex through the coodinator of NavArea XI (Japan).

c) Problems encountered.

Detailed information about MSI to update IHO Publication C-55 (*Status of Hydrographic Surveying and Charting Worldwide*) is submitted in Annex B. The national self-assessment of MSI is submitted in Annex C.

6. C-55

The table with the latest information to update IHO Publication C-55 (*Status of Hydrographic Surveying and Charting Worldwide*) is provided in Annex B.

7. Capacity BuildingOffer of and/or demand for Capacity Building

a) Training received, needed, offered

1) Training received :

(a) MCDA Training Course in UK
(b) Oceanography Course in India
(c) Hydrographic Course Cat – B Japan
(d) Master of Science in USA
(e) Long Hydrography Course in India
(f) 10^{th} Course in Marine Cartography and Data Assesment (FIG-IHO-ICA-Cat B) in UK.
(g) EAHC CB (A Week Training)
- ENC Production;
- Maritime Boundary Delimitation;
- Seabed Classification;
- Satellite Derived Bathymetry (SDB) and LIDAR;
- Hydrographic Survey For Disaster Management and Relief;
- Hydrographic Survey for Inundation Mapping;
- Maritime Safety Information (MSI);
- Hydrographic Training For Trainer (TFT);
- Cat. B Marine Geospatial Information Programme;
- SeaBed Classification and Multibeam Survey;
- Digital Reference Tool for Cartographers;

2) Training Needed

(a) Training for Trainers Hydrographic Course;
(b) Hydrographic Course (Cat A).

3) Training Offered

Nautical Charting Hydrographers and Cartographers to Support Port Management and Coastal Engineering at Cat B Level.

b) Status of national, bilateral, multilateral or regional development projects with a hydrographic component. (In progress, planned, under evaluation or study)

1) Research in Satellite Derived Bathymetry collaboration with Lembaga Penerbangan dan Atariksa Nasional (LAPAN) or Indonesia National Institute of Aeronautic and Space ;

2) Development of Hydrography Data Center cooperation with other national Institution and agencies;

3) Development of Malacca Straits ENC collaboration with Singapore Maritime Port Authority (MPA), National Hydrography Service of Malaysia;Japan Hydrography Assosiation (JHA) and Malacca Strait Council (MSC)

4) Development of Marine Geospatial Database collaboration with Indonesia Geospatial Agencies (BIG).

5) Research in underwater features in Indonesia waters collaboration with Minister of Maritime Coordinators Affairs.

6) Development of conservation area (protected area for marine corservation) collaboration with Ministry of Marine and Fisheries.

7) Development of tourism area collaboration with Ministry of Environment and Forest.

8. Oceanographic Activities

a) General

1) **Tides**. The tides is a periodic rise and fall of water. At a certain place it happens twice a day. Tides that reach the maximum height are called high tides or hight water, and that reach the minimum level are called low tide or low water. From the tidal curves obtained in various places can easily see the difference between time, water riding and the type of tide because of the influence of topography. That difference are the basic character of the tide is the type of tide. Tidal types can be divided into three:

(a) Semidiurnal (two high waters and two low waters each day). The two highs and the two lows are about the same height

(b) Diurnal (one tidal cycle per day). The high water and one low water occur per day

(c) Mixed (mixed). This type has character from both of diurnal and semidiurnal type. The high and two low tides has a different heights.

A mixture that approaches a semidiurnal character is called a Mixed Semidiurnal Tides. A mixture that approaches a diurnal character is called a Mixed Diurnal Tides. Tidal data conducted during survey based from observation along 29 days,

while tidal data from telemetry data at least 1 year, we also get secondary tidal data from other National Agency. The tools that used for measurement are Palm, AOTT, Thalimedes, Tide Master.

2) **Currents**. The horizontal movement of sea water are called current. The current can be classified into tidal currents and non-tidal currents. Tidal currents are periodic horizontal motions of seawater along with tidal events. Non-tidal currents are currents unrelated to the tides caused by meteorological effects. Current observation results are a combination of tidal current and non-tidal currents. In navigation activity, the effect of tidal currents is greater than the effect of tidal depth. Current data that obtained from the survey is 15 or 29 days observational data. The tools that used for measurement are Current Meter DNC-3, DNC-3M, Current Meter Valeport 106 and ADCP.

3) **CTD**. CTD (Conductivity, Temperature and Depth) is the main tool for determining important physical properties of seawater, like Conductivity, Temperature (temperature), and Depth of the sea. This tool provide the distribution and variation of water temperature, salinity, and density that helps us to understand how the ocean affects life in it. CTD can measure Conductivity, temperature, salinity and speed of sound from the sea water. The tools that used for measurement are CTD Alec ASTD and CTD Midas., Midas Valeport SVK-2, CTD AML Minos, CTD AML Oceanographic.

4) **Sediments.** Sediments are all materials (rock fragments, minerals, or organic materials) that are transported and deposited by transport media (water, wind and ice). Sedimentary materials in the form of minerals or rock fragments derived from the destruction of existing rocks through weathering mechanisms, erosion and transportation by wind and ice and ground motion. Sedimentary materials in the form of organic materials, such as shells or skeletons derived from the activity of organisms.Sediment data were collected to determine the type of seabed and sedimentation rate. The data taken are Suspended load and Bedload.The tools that used for measurement arenansen bottle and grab sampler.

5) **Sea Brightness.**Measurement of sea water transparency is done in coastal and inland waters. Observations are made by drowning a secchi disk into the ocean until the maximum depth of a secchi disk is visible to the eye. The brightness data obtained is the maximum depth data secchi disk that can still be seen by the eye and expressed with the meter in accordance with the length of the rope from sea level to secchi disk.Observations just did only in the afternoon. The weather and cloud conditions must be recording.The purpose of the measurement of the data are to determine the condition of the brightness of a survey area. The tool that used for measurement is Secchi Disc.

6) As normal practice, oceanographic ussually are conducted to accompany hydrographic survey (tide; current; CTD, Sea Brightness) in more than 40 survey area per year for any specific purposes survey.

b) GEBCO/IBC's activities

In bathymetry data services for updating nautical charts, Pushidrosal still use data from hydrography survey not use data from GEBCO/IBC's.

c) Tide gauge network

1) **Telemetry Technology using Live Uninterrupted Water Sensor (LUWES).** This tidal meter uses a radar system equipped with an ultrasonic sensor that will read the sea level based on the water height from Tide Level. The sea level reading results will be sent to the cloud / web and then forwarded to the software to read the sea level data. This tool is able to measure the tidal data in real time every second, minute or hour. The telemetry sensors placed in the outermost island and sensitive navigation area.

2) **Shipping Illustration and Download of tidal data.**Sea level data that has been measured with LUWES tidal tool will be processed in Logger and then the data will be transmitted to Cloud / web that has been prepared. The data from the cloud / web recording of sea level can be downloaded using laptop, HP and other devices (multiple acces) with GPRS network system. The downloaded tide data is real time with variations of data per second, every minute and every hour as we needed. Data resulted from this tool is a graphics and numerical with accuracy up to mm.

3) **Synchronization and Field Calibration.** This tidal measurement tools is designed in a simple way so it can make the process of calibration and field data synchronization easier. The calibration process by comparing the reading of this tool with the result of high water manual reading on the palm will make a good observation of quality operation. The result from this instrument, which is the distance from the sensor to the surface of the water, are automatically converted by Logger and calculating the reading offset of the tool with the palm manual readings

4) **Ultrasonic Sensor Logger Data.** This long period telemetry tool is equipped with Data Logger that serves as the processor. LUWES equipment system components consist of data logger, ultrasonic sensor, GPS timing, solar cell power supply system and free maintanance battery, and wireless communication. Ultrasonic sensor has a 42 KHz frequency and 1 millimeter resolution measurement with 10 Hz sampling rate data. Controlled time-monitoring system diagram with GPS time is to minimize time drift, the magnitude significantly distorts the observations on conventional systems using the usual clock. Data logger as in Figure 7 is equipped with a micro controller that can manage sensors, data storage and transmission as well as timing accurate because of GPS. Power consumption is quite efficient with a total of 1.5 Watt Hour, so the use of 12 Volt 24 AH battery voltage will be able to survive for 30 days although there is no solar radiation on solar sell. The sensor used in this tidal gauge is an Ultrasonic Sensor with a 200,000 hours life time. Maximum sensor

distance to sea level is 10 meters. The sensor should be set perpendicular to the LUWES tool using the waterpas, so the data result is match according to the calculation of the water level in the tidal palm.

d) New equipment

1) Currents
   (a) Current Meter DNC 2M.
   (b) Current Meter Valeport 106.
   (c) Current Meter ADCP Nortek.
   (d) Current Meter ADCP Sontek.
   (e) Current Meter ADCP Teledy.
   (f) Current Meter AEM 213 D.
   (g) Ocean Surveyor Vessel-Mount ADCP (Lounge Range 3D Current Profiling).

2) Tides
   (a) Cee Tide.
   (b) Thalimedes.
   (c) Tide Master Valeport Press.
   (d) Tide Log.

3) Waves
   (a) SBE 26.
   (b) SBE 26 Plus.
   (c) RBR Duo.

4) CTD.
   (a) CTD Midas.
   (b) CTD Minos.
   (c) CTD Alec Astd.
   (d) CTD AML Plus X.

5) Sediments
   (a) Bottle Nansen.
   (b) Grab Sampler.
   (c) Cooring.

e) Problems encountered

1) Tides and currents permanent observation station in Indonesia waters is still very limited due to vast of Indonesia water territory. Pushidrosal carry out tides and currents observation parallel with hydrography and oceanography activities, this tides and currents data as periodical data.

2) Lack of collaboration in data oceanography exchange between government institutions or agencies.

3) Software standarization or file compiling to netCDF extension with standart format from International Oceanographic Commission (IOC).

9. Other activities

a) Participation in IHO Working Groups. Pushidrosal active in several IHO Working Groups, such as:

1) Data Quality Working Group (DQWG) IHO
2) Marine Spatial Data Infrastructure (MSDI) Working Group (WG) IHO
3) Nautical Cartography Working Group (NCWG) IHO
4) S-100 Working Group IHO
5) Hydrographic Services and Standard Committee (HSSC) Working Group IHO
6) Nautical Information Provision Working Group (NIPWG) IHO
7) Tides, Water Level and Current Working Group (TWCWG) IHO
8) ENC Standards Maintenance Working Group (ENCWG)
9) Advisory Board On the Law of the Sea (ABLOS)

b) Meteorological Data Collection(mohon koreksi dan tambahan dari Disosemet)

1) **Winds.** Wind is a moving air, due to a pressure difference, moving from high pressure to low pressure, from cold air to warmer air.Wind measurements include direction and speed, wind direction units in degrees and wind speed units in knots.Tools : AWS (Auhomatic Weather Station), include direction sensor and wind speed inside.

2) **Temperature.**Air temperature is the level of heat or cold that is measured using a thermometer. The surface temperature is the air temperature at 1.25 - 2 meters.Air temperature measurements during the survey results are daily average temperature, maximum temperature and minimum temperature, and the units in ^{0}C.Tool: AWS, include air temperature sensor inside.

3) **Humidity.**Air humidity is the amount of water vapor contained in air or atmosphere or the ratio of water vapor to the mass of saturated water vapor at the same temperature, multiplied to 100%.Results of air humidity measurement during the survey is humidity daily average, Units in %.Tools: AWS, include air humidity sensor inside.

4) **Pressure.**Air pressure is a force per unit area caused by an air.Results of air pressure measurement during the survey is average daily pressures, unit in mb (milibar).Tools: AWS, inside there is air pressure sensor.

5) **Clouds.**Clouds are water particles / water points or ice particles floating in the atmosphere / air.Cloud observations can be visually (observation without using tools), observations include the amount and type of clouds that exist during observation. Observations are held once in hour for 24 hours.Unit to determine the number of clouds are in octane, with the following classification:

(a) 1 - 2 Octan Sunny.
(b) 3 - 4 Octan Cloudy partly
(c) 5 - 6 Octan Cloudy a lot
(d) 7 - 8 Octan Cloudy

While the type of cloud includes:

(a) low clouds (Cb, Cu, Sc, St)
(b) medium cloud (Ac, As)
(c) high cloud (Cc, Cs, Ci)

6) **Visibility (Visibility Distance).**Visibility is the furthest distance where a black body with the corresponding size can be seen and clearly recognized with the skyline as the background (in the afternoon). The furthest distance from where a black body with the certain size can be seen and known as the skyline in the background, if the lighting is enhanced as bright as afternoon bright. (at the night).Visibility observation can be visually, by using benchmark objects around the survey area that has been known the distances. Visibility observation are held once every hour for 24 hours. These observations are carried out in all directions, especially toward the sea. Visibility units is km and there is something that can be affect the size of the visibility:

(a) Rain
(b) Light rain - Vis. (3 - 10) km
(c) Medium rain - Vis. (0.5 - 3) km
(d) Heavy rain - Vis. (50 - 500) meters
(e) Fog (fog) - Vis. <1 km
(f) Smoke (smoke)

7) **Rainfall.**Rain is a fall hydrometeor to be water particles, with the pieces shape and has a 0.55 m diameter or more.The shape of the rain & the nature of the rain are:

(a) Rain Showers - from convective clouds (Cb, Cu)
(b) Rain intermittently - from stratiform clouds (St, Ns)
(c) Continual rain - from stratiform clouds (st, Ns), if held 1 hour continuous without interruption.

Rainfall measurements are held for 24 hours and the unit of rainfall in mm. A rain gauge with AWS, has a rainfall sensor inside the tool.

8) **The duration of solar radiation.**The survey was held to know how long the sun shines in a day until it burn the sunshine recorder.The tool used to measure is Campbell stokes, this tool can be measure the duration of the sun shines, in a percent unit. The observation were held from 8:00 to 16:00 LT (for 8 hours / True Solar Day), because the sun radiation is said to be 100% when the sun shines for 8 hours a day.Campbell stokes contain a solid / solid glass bulb

used as a sun-collected and focuses on a single point on the paper so that it can burn (forming a black mark). Pias is made from special paper with 0.4 mm thick and will only burn on the intensity of solar radiation ≥ 0.3 cal / cm2menit or 120 W / m2. This value can be seen from the AWS results on the solar radiation sensor. (Recommendations by 16, CIMO-X).There are 3 kinds of Pias Campbell Stokes, namely:

(a) The long curved pias was installed between 11 October - 28/29 February.
(b) Short-curved pias installed between 11 April to 31 August.
(c) The straight pias is installed between March 1 - April 10 and September 1 - October 10.

The installation time above applies to the southern hemisphere and is adjusted to the location of the observation station.

9) **AWS Data Telemetry.**Meteorological data in real time at distant places accessible on Pushidrosal at the moment. This is because we were installing AWS placed in a representative place to obtain meteorological data. The same way as other AWS, that installed in the Pushidrosal Meteorology Laboratory and also used in the field during the survey, which is telemetry, data transmission with Telkomsel services, using Halo Prime Card.Weather data taken from AWS telemetry are:

(a) Wind (direction and speed)
(b) Air Temperature
(c) Air Pressure
(d) Air humidity
(e) Rain
(f) Solar radiation

10) **Meteorological Data from Pushidrosal Laboratory.**Not only meteorological data from field survey results and climatology, Pushidrosal labaratorium data is also used as an enrichment of meteorological data in Pushidrosal. This data is obtained from the AWS and Sun Shine Recorder data tapes on the Laboratory. The data can be adjusted time for many minutes, depending on our needs. AWS data that needs to be taken are:

(a) Wind (direction and speed).
(b) Air Temperature.
(c) Air Pressure.
(d) Air humidity.
(e) Rain.
(f) Solar radiation.

11) **Climatology Data from BMKG.**Climatological data was obtained when the Survey Team request a climatological data at BMKG Meteorological Station nearest the survey area. It will be used to compare a field result data during the

survey with climatologi conditions with the same month as survey held. Climatological data taken include:

(a) Air Temperature (Average temperature, maximum temperature and minimum temperature).
(b) Rain (rain fall and rainy days).
(c) The duration of solar radiation
(d) Air Humidity.
(e) Air Pressure.
(f) Wind (wind direction and speed, both average and maximum).

12) Problems encountered

Software standarization or file compiling to GRIB extension with standart format from World Meteorological Organization (WMO)

13) NKRI actively and proactively on a nationally, bilaterally and internationally has committed to support research in Indian Ocean. Indonesia recently conducted the second Sea-International Sea Sea Exception (IIOE-II) to understanding the interactions between physics, chemical and biological aspects of oceanography and its optimal utilization for future development and supporting the blue economic program through some countries such as Australia, India and the UK. Indonesia has established a consortium of oceanic research supported by ministries and agencies related to the task of marine and water management.

c) Geospatial Studies

To develop Marine Spatial Data Infrastructure Pushidrosal conducted training Geospatial Hydrography and Oceanography System Information. Those system information created how to publish marine system information to support government marine development program, such as: to provide system information for navigate from port to port with safe.

d) Disaster Prevention

Pushidrosal conducted TRDC in hydrography survey for disaster management relief at Jakarta, Indonesia in 2017 under IHO and EAHC Capacity Building Program. The objectives of this program is aiming at developing perspective among the participants in the fundamental issues of hydrographic survey for disaster management and relief. The primary materials of the training include the following primary subjects:

(1) National missions, policies, and programs relatef to disaster relief and management in Indonesia.
(2) Technical and Societal aspects of the full cycle of disaster relief management, that entail:

(a) Recovery;
(b) Risk identification and assessment;

(c) Prevention and mitigation; and
(d) Preparedness

e) Environmental protection

Pushidrosal active in supporting Indonesia government for marine environmental protection program, such as surveying marine conservation area with others government agencies and drawing into nautical charts, cultivate mangrove plants in coastal area, up dating hydrographic and oceanographic data along Indonesia coastline.

f) Astronomical observations

Pushidrosal have bilateral agreement with UKHO to reproduce astronomical data.

g) Magnetic/Gravity surveys

Indonesia conducted magnetic survey in the Indonesia waters to support engineering project for national development such as, pipe and cable underater laying, harbour construction, port development and searching ship wreck also underwater mine buried from World War II.

h) MSDI Progress

Pushidrosal continue to developing Indonesian Marine Geospatial Information Center (I-MaGIC) as implementation of Global Marine Spatial Data Infrastruture (MSDI). It is the component of the National SDI that encompasses marine, chart catalogue, coastal geographic and business information in its widest sense. I-MaGIC provide marine data include information on seabed bathymetry (topography), geology, infrastructure (e.g. wrecks, offshore installations, pipelines, cables); administrative and legal boundaries, areas of conservation and marine habitats and oceanography.

i) International

Pushidrosal active in International affairs with others International hydrography offices or agencies to sharing data and information concerning development of hydrography and oceanography technology and survey method, sharing data and information for updating nautical charts and others publication.

j) Etc:

Development is the branch of applied sciences which deals with the measurement and description of the physical features pf oceans, coastal areas, as well as with the prediction of there change over time, for the primary purpose of safety of navigation and in support of all other marine activities, including economic development, security and defense, scientific research, and environmental protection. Recently, Pushidrosal is developing Indonesian Marine Geospatial Information center (I-MAGIC) as implementation of Marine Spatial Data Infrastucture (MSDI). It is the component of the national SDI that encompasses marine, chart catalogue, coastal geographic and business information in its widest sense. I-MAGIC provide marine data include information on seabed bathymetry (elevation), geology, infrastructure (e.g. wreck, offshore installations, pipelines, cables); administrative and legal boundaries, areas of conservation and marine habitats and oceanography.

Instead of providing Maritime Safety Information, Pushidrosal also support Indonesian Government Policy to develop maritime sectors, including provide necessary data and information of Map Policy project, sharing information with other Government bodies like Department of Internal Affairs, Ministry of Foreign Affairs, Ministry of Marine and Fisheries, etc.

Pushidrosal doing research in Satellite Derived Bathymetry (SDB) collaboration with Indonesia National Institute for Aeronautica and Space or LAPAN. The objective of this research is to develop, analyse and conduct processing data bathymetry from satellite image to support updating bathymetry data in nautical charts especially in the area couldn't survey by boat.

10. Conclusions

a) *Areas of significant achievement*

Pushidrosal's priority of hydrographic survey program to conduct hydrography and oceanography survey in the Archipelagic Sea Lanes (ASL), archipelagic water, coastal area, Ports, Port Approach, the river/inland waterways and channel.

b) Areas of particular concern

Updating hydrography and oceanography data in the Indonesian archipelagic sea lanes (ASL) and conduct investigation survey for navigation hazard to make sure safety of navigation all around Indonesia Waters, pasticularly the areas where are conciderated have high density of ship tracks

c) Any other matters of interest to the RHC

Indonesia active to carry out capacity building program in EAHC, with this, Pushidrosal want to share the experience with SWPHC member state. Pushidrosal had been several time hosted the implementation of capacity building programs, such as:

(1) Training in ENC Production – 2010
(2) Training in Maritime Delimitation – 2014
(3) Training in Seabed Classification – 2015
(4) Training in Hydrographic Survey for Disaster Management and Relief – 2017.
(5) Training in The Use of GNSS for tide correction, 2018.

Pushidrosal was decided to be a chairmain and coodinator of Mallaca and Singapore Strait ENC and also as a candidat of EAHC vice chairman.

Pushidrosal proposed for providing ocean going survey vessel with basic platform that can be configured to a variety of roles that include hydrographic oceanographic survey in the deep sea area, submarine support, diving operations, rov and uav deployment, search & rescue. With the development of modern instruments, as well as space and communication technology, significant changes have taken place in surveying and charting science and techniques, surveyors using multiple tools to observe and monitor our oceans.

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

Country: Indonesia
Organization: Indonesia Navy, Hydrography and Oceanography Center (PUSHIDROSAL)

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: Real Admiral Daryanto Name: Rear Admiral Dr. Harjo Susmoro Postal address: Jalan Pantai Kuta V/1, Ancol Timur, Jakarta Utara 14430. Indonesia Tel: +62 21 64 71 48 09 Fax: +62 21 64 71 48 19 Email: infohid@pushidrosal.id or infohid@dishidros.go.id
-Head of the Hydrographic Office (if different from the person indicated above) -Directeur du Service Hydrographique (si différent de la personne indiquée ci-dessus) -Director del Servicio Hidrográfico (si diferente de la persona indicada anteriormente)	Post: Name: Rear Admiral Dr. Harjo Susmoro Postal address: Jalan Pantai Kuta V/1, Ancol Timur, Jakarta Utara 14430. Indonesia Tel: +62 21 64 71 48 09 Fax: +62 21 64 71 48 19 Email: infohid@pushidrosal.id or infohid@dishidros.go.id
-Other point(s) of contact -Autre(s) point(s) de contact -Otros punto(s) de contacto	-
-Web site -site web -sitio web	www.pushidrosal.id
Country information / Informations sur le pays/ Información sobre el país	
-Declared National Tonnage -Tonnage national déclaré -Tonelaje Nacional Declarado	Tonnage: 12. 944.000 Date: 2017
-National day -Fête nationale -Fiesta nacional	17th August
-Date of establishment and Relevant National Legislation -Date de mise en place et	31st March 1951

législation nationale pertinente -Fecha de constitución y legislación nacional pertinente	
-Date first joined IHO -Date d'adhésion à l'OHI -Fecha de adhesión a la OHI	18th October 1951
-Date ratification Convention -Date de ratification de la Convention -Fecha de ratificación de la Convención	28th November 1968
-Remarks on membership -Remarques sur l'adhésion -Comentarios sobre la adhesión	Member of IHO,EAHC and SWPHC
Agency information/ Information sur l'agence/ Información sobre la agencia	
-Top level parent organisation -Organisme mère -Organización asocieda de nivel superior	Indonesia Navy Headquarters, Indonesia Armed Forces Headquarters
-Principal functions of the organisation or the department -Attribution principales de l'organisme ou du département -Principales funciones de la Organización o departamento	Conducting hydrography and oceanography survey, produce nautical charts and nautical publications, marine research and marine environmental protection to serve public and millitary requirements.
-Annual operating budget -Budget annuel -presupuesto annual	US $ 4,304,286.36
-Total number of staff employed -Effectifs totaux -Número total de personal empleado	1.250 persons

-Number of INT charts published -Nombres de cartes INT publiées -Número de cartas INT publicadas	-			
-Total number of paper charts published-Nombre total de cartes papier publiées-Número total de cartas de papel publicadas	538			
-Number of ENC cells published -Nombres de cellules ENC publiées -Número de células ENC publicadas	506			
-Number of Other charts -Nombre d'Autres cartes -Número de Otras cartas	-			
-Type of publications produced -Type d'ouvrages produits -Tipo de publicaciones producidas	Nautical Charts, Tide and Tidal Stream Tables, Notice to Mariners (Weekly), Sailing Directions, List of Lights, Port Information, Nautical Almanac			
-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
	KRI Dewa Kembar	2800	1965	109
	KRI Rigel	515	2015	48
	KRI Spica	515	2015	48
	KRI Pulau Rote	516	1971	40
	KRI Pulau Romang	516	1971	40

	KRI Pulau Rempang	516	1973	40
	KAL Aries	50	1960	11
	KAL Vega	50	2007	20
-Other information of interest -Autres informations utiles -Otra información de interés				

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

Country: ___Indonesia_____

C-55 Summary for:				**Comments on Charts:**
Country:	Indonesia			
Country Iso Code:	IDN			Protentage counted from Indonesia water 6,400,000 km²
Country SubCode:	ID			
INT Region:	K			
Country/Depend:				
Last updated:	15 February 2018			
Provided by:	Indonesia Navy, Hydrography and Oceanography Center (Pushdirosal)			
Chart coverage	**Passage (%)**	**Coastal (%)**	**Port (%)**	
INT	100	19.3		**Comments on Surveys:**
RNC	-	36.5	2	- Limitation of Platform Capability
ENC	100	49.9	1.5	- 50% bathymetry data source from hystoric sounding data
Status of Paper Charts				- Pushidrosal still continue to update bathymetry data in Indonesia waters and collaborate with other national agency for any additional data. Our priority program is to proposed requirement on new ocean going survey ship with modern technology.
Paper charts with depths in meters (%)			100	
Paper charts referenced to a satellite datum (%)			100	
Status of surveys	**Adequate (%)**	**Resurvey (%)**	**No survey (%)**	
0-200m	100	50	-	
> 200m	50	100	-	

MSI	**Y/N**	**Comments on MSI:**
Local warning	Yes	
Coastal warning	Yes	
Nav warning	Yes	
Port warning	Yes	
GMDSS	**Y/N**	**Comments on GMDSS:**
Master Plan	No	

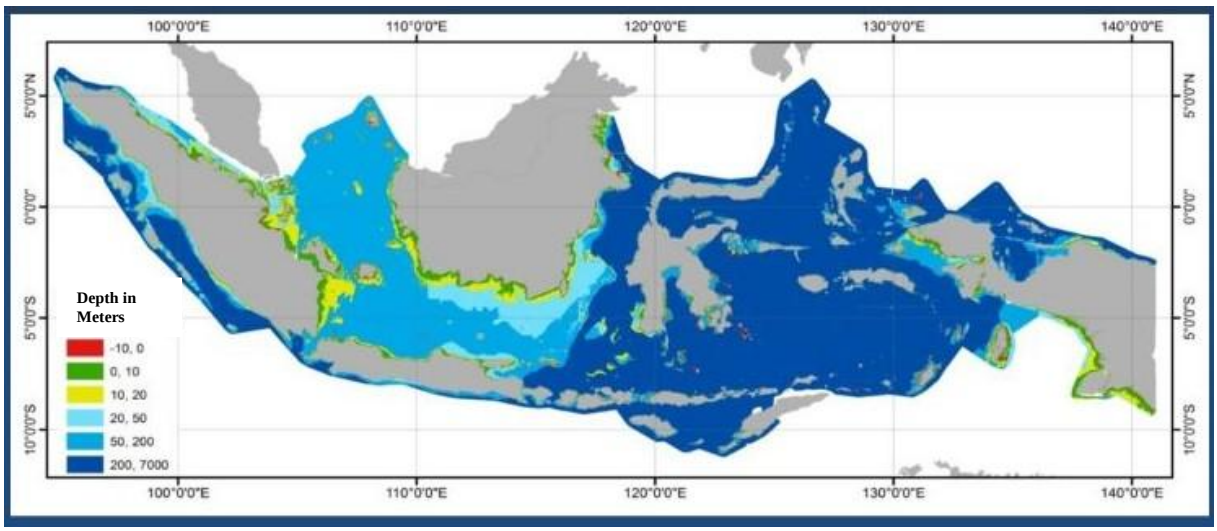
Area A1	No	
Area A2	No	
Area A3	No	
NAVTEX	No	
SafetyNet	No	

National MSI Self-Assessment

Country: Indonesia
Organization: Indonesia Navy, Hydrography and Oceanography Center (PUSHIDROSAL)

1. Maritime area

Indonesia is an archipelagic state extending about 5,120 kilometres (3,181 mi) from east to west and 1,760 kilometres (1,094 mi) from north to south. Indonesia has total land area of 1,904,569 square kilometres (735,358 sq mi), Including 93,000 square kilometres (35,908 sq mi) of inland seas (straits, bays, and other bodies of water). The additional surrounding sea areas bring Indonesia's generally recognised territory (land and sea) to about 5 million km^2. The government, however, also claims an exclusive economic zone, which brings the total area to about 7.9 million km^2. Indonesia waters have various depth with percentage as shown below:



Depth Ranges	Percentage
D < 10 m	4.44
10 m < D <20 m	4.51
20 m < D < 50 m	6.75
50 m < D < 200 m	26.70
D > 200 m	57.60

Indonesia have boundaries maritime with 10 neighbouring countries such as: India, Thailand, Malaysia, Singapore, Vietnam, Philipine, Palau, Papua New Guinea, Timor Leste and Australia.

2. Operational Points of Contact for the National Coordinator

INSTITUTION	TELEPHONE	FACSIMILE	EMAIL
Pushidrosal	+62 21 64 71 48 09	+62 21 64 71 48 19	infohid@pushidrosal.id

3. GMDSS Master Plan

In Indonesia, GMDSS infrastructure is under responsibility of Director General of Sea Transortation (DGST) of Minister of Transportation

Equipment Type for Ports and Local Area	Software Version	Date of Up-date

Year Y-2		Year Y-1		Year Y	
Total	Average elapsed time	Total	Average elapsed time	Total	Average elapsed time
Xx	xx.x Mins	Xx	xx.x Mins	xx	xx.x Mins

4. NAVTEX Coverage: Jakarta, Makasar, Ambon, Jayapura

5. Operational Issues:

GMDSS infrastructure is under responsibility of Director General of Sea Transortation (DGST)of Minister of Transportation.

6. Contingency Planning

Pushidrosal provide the emergency hydrographic survey team to handle marine accident and support disaster management-relief in order to reduce the number of risk and casualties.

7. Capacity Building

a) Cartography Course Cat C
b) Training in ENC Production – 2010
c) Training in Maritime Delimitation – 2014
d) Training in Seabed Classification – 2015
e) Training in Hydrographic Survey for Disaster Management and Relief – 2017
f) Training the use of GNSS for tides correction for survey - 2018

g) Indonesia already proposed Training in Maritime Safety Information (MSI) to EAHC under IHO Capacity Building for 2018

8. Other Activities

Pushidrosal active in several IHO Working Groups, such as:

a) Data Quality Working Group (DQWG) IHO
b) Marine Spatial Data Infrastructure (MSDI) Working Group (WG) IHO
c) Nautical Cartography Working Group (NCWG) IHO
d) S-100 Working Group IHO
e) Hydrographic Services and Standard Committee (HSSC) Working Group IHO
f) Nautical Information Provision Working Group (NIPWG) IHO
g) Tides, Water Level and Current Working Group (TWCWG) IHO
h) ENC Standards Maintenance Working Group (ENCWG)
i) Advisory Board On the Law of the Sea (ABLOS)

9. National Maritime Website

www.pushidrosal.id

Yes, we are put the date and time of the last update in our website.

10. Recommendations: -

11. Summary

Pushidrosal still continue to update bathymetry data in Indonesia waters and collaborate with other national agency for any additional data. Our priority program is to proposed requirement on new ocean going survey ship with modern technology.

Chief Hydrographer,

Rear Admiral Dr. Harjo Susmoro