22nd MEETING OF THE SOUTH WEST PACIFIC HYDROGRAPHIC COMMISSION (SWPHC22)
3 – 7 March, Koror, Palau

NATIONAL REPORT FROM UNITED STATES OF AMERICA TO THE SWPHC22

References:

A. IHO Resolution 2/1997 as amended (see doc. C3-04.2A, Appendix to Annex A)
B. IHO Circular Letter 20/2019, The IHO Online Form System for responses to Circular Letters and input to IHO Publications (P-5 and C-55): link
   Online system for P-5 (Yearbook): link
   Online system for C-55 (Status of Surveys and Charting Worldwide): link
C. IHO Strategic Plan: link
D. IHO IRCC CL 01/2021 IHO Strategic Plan for 2021-2026 – Procedure for measuring the Strategic Performance Indicator (SPI) allocated to IRCC: link

Executive summary

1. Hydrographic Office / Service: This National Report provides specific information pertaining to individual products and services of primary interest to the South West Pacific Hydrographic Commission (SWPHC) Region. Multiple U.S. government agencies are responsible for the management of global, U.S. domestic, and international hydrographic products, services, and maintenance.

   a) Name of the institution:
      i. National Geospatial-Intelligence Agency (NGA)
      ii. National Oceanic and Atmospheric Administration (NOAA)
      iii. United States Navy
      iv. United States Army Corps of Engineers (USACE)

   b) Description: Information can be located in the latest edition of IHO Publication P-5. The U.S. updates P-5 periodically and no changes are submitted within this report.

2. Surveys:
   a) Coverage of new surveys
      i. In 2024, E/V Nautilus collected multibeam sonar data while transiting between Hawaii, American Samoa, Howland and Baker Islands, and Palau, in addition to more detailed surveys at each location in conjunction with oceanographic exploration supporting the broader Beyond the Blue campaign (see section 11b). In 2025, NOAA-supported work is planned to continue in the Marianas, Palau, Marshall Islands, Solomon Islands, and Fiji.
      ii. NGA has entered into a contract with Woolpert for LiDAR collection and bathymetric data extraction over coastal areas of the South Pacific, specifically in Yap, Federated States of Micronesia and Majuro, Marshall Islands.

   b) New technologies and /or equipment
      i. Satellite Computed Bathymetry Assessment (SCuBA)

The SCuBA project leverages publicly available NASA ATL03 ICESat-2 data with improved processing methodologies to produce coastal bathymetric data. Further information can be found in the International Hydrographic Review November 2023 issue: https://ihr.iho.int/articles/satellite-computed-bathymetry-assessment-developing-satellite-lidar-methods-to-enhance-coastal-bathymetry-coverage/

ii. ATL24
NASA is developing a publicly available ICESat-2 bathymetry product, ATL24, to support a wide range of coastal and ocean science applications. ATL24 is a level-3a data product focused on along-track bathymetry extraction based on ICESat-2 space LIDAR coverage. This product is projected to launch in early 2025. Further information can be found in the February 2024 issue of Earth and Space Science: https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2023EA003270

c) New ships
   i. Information on NOAA's hydrographic vessels can be found online at: https://nauticalcharts.noaa.gov/about/survey-vessels.html. Two new oceanographic vessels are under construction, Oceanographer and Discoverer. Both ships will support a wide variety of NOAA missions, ranging from oceanographic research and exploration to studying marine life, climate and ocean ecosystems, with the Oceanographer focused on work in the Pacific. They are anticipated to be completed in 2026. Two new charting and mapping-focused ships, Surveyor and Navigator, are planned for completion in 2027 and 2028.
   ii. The U.S. Navy is constructing its seventh hull of the T-AGS 60 "Pathfinder" class Oceanographic and Hydrographic Survey Vessel. USNS Robert Ballard expects to enter service in 2026.

d) Crowdsourced and satellite-derived bathymetry:
   i. The U.S. allows the collection and sharing of CSB data within all national waters and continues to support the IHO Crowdsourced Bathymetry Initiative, with improvements in 2024 that enhance the ability to discover and access CSB data from the NOAA-hosted IHO Data Centre for Digital Bathymetry
   ii. Satellite-derived bathymetry, including multi-spectral, satellite altimetry, ICESat-2 and other spaced based remote sensing is actively used throughout the region for bathymetry, shoreline, and nearshore topography.

e) Challenges and achievements
   i. The U.S. engages with multiple commercial and industry partners to collect hydrographic data globally using IHO S-44 standards. These commercial datasets are considered equivalent to data collected by national assets.
   ii. To expand awareness of industry and academic capabilities, the U.S. has established a Geospatial Innovation Center where U.S. government agencies can engage with industry partners and review innovative technology, methodology, and capabilties for potential use.

In January 2024, the U.S. launched a 1-million-U.S.-dollar Grand Challenge to forecast industrial fishing. This challenge includes the detection of illicit activity to support the enforcement and prevention of illegal, unreported, and unregulated (IUU) fishing activity. Ten finalists were selected to pitch their proposed solutions directly to the judging panel for the chance to win the grand prize. For more information, visit: https://home.nga.mil/news/Challenge_finalists_vie_for_chance_to_help_NGA_for.html

iii. The U.S. Navy deactivated its Fleet Survey Team in 2023. Navy maintains a limited capacity to conduct shallow water, littoral hydrographic survey via personnel and equipment from the Naval Oceanographic Office and Naval Oceanography Mine Warfare Center.

iv. The U.S. Navy conducted a partnered airborne LiDAR survey with the Federated States of Micronesia in late 2023 – early 2024.

3. New charts & updates:
   a) Charting Plan
      i. In June, 2024, NOAA released a new Nautical Charting Plan. The focus of this plan is the continued transition away from the production of traditional paper nautical charts and Raster Navigational Charts (RNCs) and continuously improving the production of NOAA electronic navigational charts (NOAA ENC®). Part of the plan involves "re-scheming" the current suite of ENCs—based on the original paper chart extents—to a gridded format with standardized sizes and scales. The new layout will include 7,200 ENCs with new charts often providing larger-scale and more detailed coverage.
      i. Over the past few years, NGA created populated a Worldwide ENC grid for use in building its ENC portfolio. NGA will also employ this grid for the Primary Charting Authority (PCA) ENC that is produced in the SWPHC region. The PCA ENC re-scheme to the ENC grid will take place over the next few years. Please see the ICCWG Report to SWPHC22 for more details.

   b) ENC coverage, gaps and overlaps
      i. The U.S. has no known significant gaps or overlaps. However, as reschemed ENC grids are implemented by both NOAA and NGA, additional work with ENC coverage may be needed. This will generally be conducted bi-laterally and in concert with the SWPHC as appropriate.

   c) ENC distribution method
      i. U.S. S-57 ENC produced in domestic waters and over Prime Charting Authority (PCA) waters are available either directly from the NOAA website, or via the RENC system and additional value-added distributors.
         i. NOAA website at: https://nauticalcharts.noaa.gov/
         ii. NOAA's Interactive Catalog at: https://www.charts.noaa.gov/InteractiveCatalog/nrnc.shtml

iii. International Center for ENC's Distributors at: http://www.ic-enc.org/Distribution.html.
iv. PRIMAR Distributors at: https://www.primar.org/home

d) Raster Navigational Charts (RNCs)
   i. In December 2024, NOAA cancelled its last traditional paper charts and RNCs products, concluding a five-year phase-out of these products. NOAA continues to improve its NOAA Custom Chart application, which allows users to create customized paper charts directly from the latest ENC data.
   ii. With the continued transition to electronic navigation, NGA is shifting paper chart production activities to a smaller suit of paper charts, that will be created via the Certified Printed Electronic Navigational Charts (CPENC) process. This process efficiently converts ENC data directly to a paper chart, including a graphical update service.

e) INT charts
   i. The U.S produces INT charts within the SWPHC region, primarily over areas where they serve as the Prime Charting Authority (PCA).
   Information for Certified Chart Agents for NGA public sale charts can be found at the following link: https://nauticalcharts.noaa.gov/publications/print-agents.html#nga-paper-charts

f) Other charts
   i. NGA produces many Digital Nautical Charts (DNCs) in SWPHC waters. The DNC is an unclassified, limited distribution vector-based, digital database containing maritime significant features essential for safe marine navigation. NGA will cease production of DNC in March 2026 and maintain S-57 ENC as we move into the S-100 transition.
   ii. Certified Printed Electronic Navigational Charts (CPENCs) are automatically rendered and printed versions of NGA's ENCs that are certified safe for maritime navigation where U.S. hardcopy requirements still exist. CPENCs are maintained via a new corrections process utilizing ENC change detection results, which symbolically highlight and communicate critical changes on an updated, digital "CORRECTED" version. This new corrections process saves substantial internal resources compared to the traditional textual Notice to Mariners process.

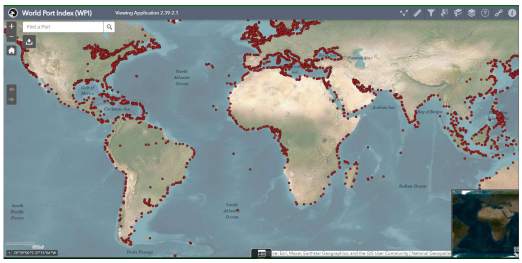
4. New publications & updates:
   a) New publications

   b. Updated publications
      i. NGA has updated the Maritime Safety Information (MSI) interface to reorganize the information and improve the efficiency of the user. The information found on the MSI website includes Notice to Mariners, Publications, Navigational Warnings, Piracy, Drill Rigs, the Product Catalog, and several miscellaneous products and calculators. Users can also submit questions or subscribe to update services for some of following products as well. The interface can be found at: https://msi.nga.mil/

ii. The United States Coast Pilot consists of a series of ten regionally focused nautical books that cover a variety of useful information important to navigators for coastal and intra-coastal waters and the U.S. Great Lakes. Coast Pilots 10 (ed. 4, 2023) provides information for Hawaii and the Pacific, including Trust Territories of the Pacific Islands. U.S. Coast Pilots, updated on a weekly basis, can be downloaded at: https://nauticalcharts.noaa.gov/publications/coast-pilot/index.html

iii. NGA Sailing Directions consist of useful information important to navigators of coastal waters. Digital updates can be downloaded from NGA at: https://msi.nga.mil/

iv. World Port Index (WPI) – Pub 150 contains the location and physical characteristics as well as the facilities and services offered by major ports and terminals worldwide. The WPI is also available via the IHO Online catalogues and can be used as an API for other web services. Digital updates are available to the public and posted at the NGA Maritime Safety website, at: https://msi.nga.mil/Publications/WPI.



v. The NGA List of Lights and their digital updates are available to the public and posted at the NGA Maritime Safety website, at: https://msi.nga.mil/Publications/NGALOL.

vi. The NGA Radio Aids and Fog Signals (Pub 117) and their digital updates are available to the public and posted on the NGA Maritime Safety website at: https://msi.nga.mil/Publications/RNA.

c) Means of delivery, e.g. paper, digital

i. All of the publications are available digitally in PDF format from the NGA website at: https://msi.nga.mil/Publications.

ii. Users can enroll in a Publication Updates Subscription Service to receive e-mail notifications of nautical publication updates and new editions.

iii. NGA publications can be ordered from commercial vendors found on the NGA website at: https://msi.nga.mil/Products.

5. Maritime Safety Information (MSI)

a) Existing infrastructure for MSI dissemination

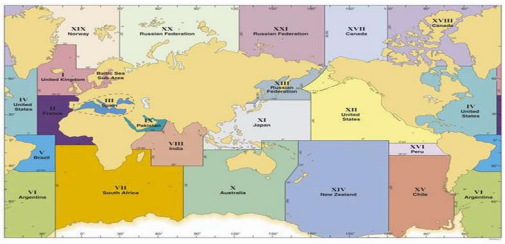
i. Maritime Safety Information (MSI) is navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages broadcast to ships. NGA is the NAVAREA IV and XII Coordinator and promulgates warnings via Inmarsat's SafetyNET II service and Iridium's Safetycast service. The USCG promulgates coastal warnings for the United States via NAVTEX, and operates one NAVTEX station in NAVAREA XI, which is located in Guam. That station continues to broadcast on 4209.5 kHz because its 518 kHz transmission capability remains out of service. USCG has no current plans to repair the 518 kHz antenna.

b) Notice to Mariners

i. The U.S. Notice to Mariners, provides timely information for the correction of all U.S. Government navigation charts and publications from a wide variety of sources, both foreign and domestic. Information published in Notice to Mariners provides for the correction of unclassified nautical charts, the unclassified NGA/DLA Catalog of Hydrographic Products, United States Coast Pilots, NGA List of Lights, U.S. Coast Guard (USCG) Light Lists, and other related nautical publications produced by NGA, NOAA, and the USCG. The U.S. Coast Guard issues Local Notices to Mariners for NOAA charts, while NGA issues Notices to Mariners for the worldwide suite of NGA paper charts.
Local Notice to Mariners are updated weekly and available for download in several formats. For future chart cancellations, Local Notice to Mariners will announce "no new editions" and the cancellation date. It will subsequently announce the cancellation six months later.
Mariners can download applicable Notices from the web at:
https://www.navcen.uscg.gov/?pageName=lnmMain
The U.S. Notice to Mariners are posted at the NGA Maritime Safety website at https://msi.nga.mil/NTM.

c) Navigation Warnings

i. The NAVAREA coordinator is the authority charged with coordinating, collating, and issuing navigational warnings for a designated NAVAREA within the IMO/IHO World-Wide Navigational Warning Service (WWNWS).



SWPHC Waters primarily lie within NAVAREA X (Australia is Regional Coordinator), NAVAREA XIV (New Zealand is Regional Coordinator), and NAVAREA XI (Japan is Regional Coordinator).

6. C-55
The U.S. updates its C-55 entry periodically. C-55 (January 2025) can be found at: https://iho.int/uploads/user/pubs/cb/c-55/c55.pdf The U.S. entry to C-55 (pages 489-512) covers INT regions A, B, L, K and N.

7. Capacity Building

a) Offer of and/or demand for Capacity Building

i. The United States is an active participant in the IHO Capacity Building Sub-Committee (CBSC).

ii. NOAA hosted three capacity building candidates aboard NOAA ships for a hands-on experience during the 2022, 2023, and 2024 survey seasons. The 2024 survey season hosted three candidates hailing from Colombia, Cyprus, and Fiji.

b) Training offered

i. Category-A Competence Training for Hydrography

Training opportunities are available at various institutions in the United States. Two Category A certified hydrographic programs are available through:

- The University of Southern Mississippi (USM)
- The University of New Hampshire (UNH)

ii. Category-B Competence Training for Nautical Cartography
- NGA conducts annual training with an IBSC recognized S-8 Cat B course.
- NOAA's program for S-8 Cat B is on a temporary hold.

iii. Category-B Competence Training for Hydrography
U.S. Navy offers an IBSC recognized Cat B International Hydrographic Management and Engineering Program (IHMEP), commencing annually in February. This training is available to both uniformed and civilian government personnel. U.S. Navy's Category A and B programs and mobile training all qualify for Security Cooperation assistance.

iv. Maritime Safety Information (MSI) Training – The US supports the IHO MSI training course and provides support to nations through on site and remote guidance. NGA is currently finalizing a virtual MSI training course which will be available to the IHO and our international partners in the months to come.

v. Other training partnerships

a. In 2020, the University of South Florida (USF) College of Marine Science entered into a five-year cooperative agreement with NOAA's Office of Coast Survey to launch the Center for Ocean Mapping and Innovative Technologies (COMIT) with the aim to develop new technologies and approaches to ocean and coastal zone mapping in line with NOAA's commitment to building resilient coastal ecosystems, communities, and economies.

b. In 2023, NOAA and the University of New Hampshire (UNH) expanded a 24-year ocean and Great Lakes mapping partnership through the creation of a new Center of Excellence for Operational Ocean and Great Lakes Mapping. The center will focus on: delivering practical hydrographic training and fostering workforce development for ocean mapping operations, providing technical expertise and systems support for NOAA's mapping operations on an increasingly diverse set of platforms, including new ships and uncrewed survey vessels, and partnering with academia and industry to transition ocean mapping research to operations.

8. Oceanographic activities

a) GEBCO & Seabed 2030

i. The U.S. is a strong supporter of the IHO/IOC GEBCO Programme and the Nippon Foundation/GEBCO Seabed 2030 Project. Using a shared resource approach, the U.S. provides technology and software in support of the NOAA-hosted IHO Data Centre for Digital Bathymetry and the GEBCO Gazetteer of Undersea Feature Names. These activities work to support the GEBCO and have great potential to create partnerships and cooperation between interested

parties, significantly improving our understanding of the sea floor and empower sustainable ocean management.

b) Crowdsourced Bathymetry Activities
    i. The U.S. provides support for the IHO-initiated initiative to maintain a global database for crowdsourced bathymetry hosted by IHO DCDB. The IHO DCDB, co-located with NOAA's National Centers for Environmental Information (NCEI), continues to enhance the ingest, discovery, display and retrieval of global crowdsourced bathymetry data from mariners around the world. The online database can be found at: https://www.ncei.noaa.gov/maps/iho_dcdb/

9. Spatial data infrastructures
    a) Status of MSDI
        i. The United States actively supports MSDI. The MSDI capability is important for supporting non-traditional users of hydrographic data to allow them to complete their environmental research, port development, disaster support projects, etc. The U.S. MSDI efforts help build a larger community of users for this marine data than the traditionally intended hydrographers and cartographers making Safety of Navigation products and data.

        The U.S. supports implementation of the UN Statement of Shared Guiding Principles for Geospatial Information Management. Access to data and services, usable to the public, can help fuel entrepreneurship, innovation, and scientific discovery—all of which improve lives and contribute significantly to job creation—is the foundation of the U.S. Open Data Policy. The open data policy has led to public availability of most hydrographic data, products, and services produced by U.S. Hydrographic Offices for data downloads at no cost.

    b) Involvement in regional or global MSDI efforts
        i. The U.S. holds active roles in supporting the work of several international MSDI-focused working groups:
        -IHO MSDIWG
        -United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) Working Group on Marine Geospatial Information (WG-MGI)
        -Open Geospatial Consortium (OGC) Marine Domain Working Group (Marine DWG)
        -Regional MSDI working groups where applicable, including the SWPHC MSDIWG
        ii. In 2022-2023, NGA sponsored Phase 3 of the ongoing Open Geospatial Consortium (OGC) Federated Marine SDI-Pilot (FMSDI-Pilot) which was an overarching, sea-based health and safety scenario incorporating the land/sea interface in the Arctic that demonstrated the technology and data used with OGC, IHO, and other community standards in response to a grounding event and the evacuation of a cruise ship or research vessel in the Arctic. The OGC Engineering Report summarizes the outcomes of this phase and is available at the link below. Furthermore, NGA is co-sponsoring the current phase of the

pilot, FMSDI 2024, and looks forward to the pilot's outcomes later this year. This pilot directly responds to the OGC-IHO MSDI Concept Development Study.
Source: https://www.ogc.org/initiatives/fmsdi3/

c) MSDI national portal
   i. The Federal Geospatial Data Committee (FGDC) is is an organized structure of federal geospatial professionals that provide executive, managerial, and advisory direction and oversight for geospatial decisions and initiatives across the United States federal government. FGDC works collaboratively with federal, state, and local governments, non-Federal collaborates, communities, constituents, and professional bodies providing the enabling foundation of standards, data catalogs, partnerships, and tools that make up the National SDI (NSDI). For more information visit: https://www.fgdc.gov/

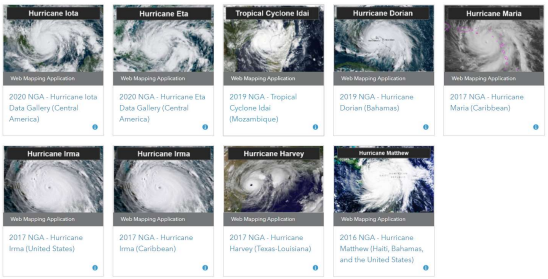
   Related to MSDI is the U.S., "MarineCadastre.gov." This is an integrated marine information system that provides data, tools, and technical support for ocean planning. The team for MarineCadastre.gov continually works "to increase access to data through data and map services. The services are designed to deliver data without replication and directly from the 21 sources." MarineCadastre.gov supports complementary efforts: Digital Coast, Data.gov, and Geoplatform.gov (a FGDC initiative). For more information see: https://marinecadastre.gov/

d) Other intitiavtives
   i. NGA's Arctic DEM Portal
   The National Geospatial-Intelligence Agency (NGA) and the National Science Foundation (NSF) partnered with the University of Minnesota and other members of the academic research community, private sector, and international partners to create this first-ever publicly available, high-resolution, satellite-based elevation data map of the Arctic. The 3-D digital elevation models, are the product of the ArcticDEM project, which was created after a January 2015 executive order calling for enhanced coordination of national efforts in the Arctic. ArcticDEM is a collection of digital elevation models at 2-meter resolution that encompasses all land area north of 60° north latitude, as well as all territory of Greenland, the State of Alaska in its entirety, and the Kamchatka Peninsula of the Russian Federation. U.S. agencies agreed to extend the ArcticDEM and its continued public access through 2032.
   Available on NGA's Arctic GEOINT Services portal: Digital Elevation Data, Reference Graphics, Vector/Thematic Maps and their Service Endpoints, and Nautical Charts and Sailing Directions

10. Innovation
    a) Use of new technologies

11. Other activities

a) Preparation for responses to disasters
   i. NGA Humanitarian Support Portal - NGA maintains a Humanitarian Assistance Disaster Response (HADR) website to support Hurricanes and various disasters around the World. It contains maps and documents to support the first responders in their relief efforts. It can be found at: https://nga.maps.arcgis.com/home/index.html

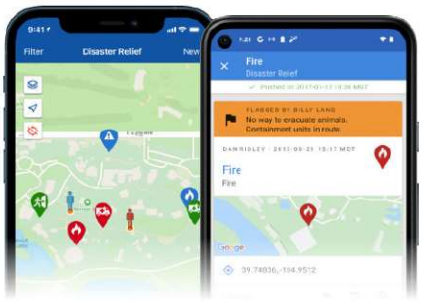


b) Beyond the Blue: Illuminating the Pacific Campaign: Beyond the Blue is a new campaign run by NOAA Ocean Exploration that aims to expand the footprint of coastal and ocean mapping, exploration, and characterization throughout the Pacific Islands region. Large participation is expected by U.S. federal agencies. Specific goals of the campaign are to:
   i. Close bathymetry gaps in U.S. and international waters in support of the National Ocean Mapping, Exploration and Characterization (NOMEC) strategy, Seabed 2030, and safe navigation.
   ii. Locate and characterize diverse ecosystems to gain new insights into biogeographic patterns and connectivity of benthic and pelagic fauna to better understand how these ecosystems are responding to climate change and other stressors.
   iii. Enhance predictive capabilities for sensitive marine habitats, marine geohazards, oceanographic conditions, seafloor composition, and marine resources, and ground truth remotely sensed data to feed into next generation models.
   iv. Collect high-quality data to support effective place-based management of marine resources and ecosystems, sustainable energy development, and improved taxonomic characterization of undescribed organisms to build reference libraries.
   v. Increase understanding of the maritime cultural heritage of the region through archaeological investigation and the search for missing ships and aircraft.
   vi. Optimize resources to improve understanding of both our ocean and other ocean worlds through support of innovative technology testing and implementation, ensuring reusability of data collected, and leveraging collaborative opportunities.
   vii. Data and samples are archived in public repositories with robust metadata and generate accessible products that support local community needs.
   viii. Engage broad audiences through inclusive outreach activities, robust community engagement, and STEM educational opportunities that inspire and prepare the next generation of ocean professionals.
   ix. Support capacity development and science diplomacy, both domestically and internationally, to address shared ocean challenges.

c) Magnetic and gravity surveys
   i. The U.S. is working on outyear plans to continue support for the World Magnetic Model and WGS84 reference frame maintenance.
   ii. NOAA National Centers for Environmental Information released the World Magnetic Model (WMM2025) in December 2024. This cycle introduced the

WMMHR (High Resolution), which is more detailed and captures some effects due to the Earth's crustal magnetic field. This model predicts the Earth's main magnetic field from 2025-2030

d) Mobile Awareness GEOINT Environment (MAGE)
   i. MAGE is a situational awareness and mobile data collection platform customizable to support teams with a variety of different missions and use cases. While operating in a low bandwidth or disconnected environment, team members can continue to collect data offline which MAGE automatically shares with the team when a data connection is available. https://ngageoint.github.io/MAGE/



MAGE IOS and Android displaying observations on the map and showing the details.

12. Conclusions
    a. The U.S. is committed to support the global hydrographic community.

Annex A

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

The United States updates Publication P-5 on an annual basis and is not regionally specific.

Annex B

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

The United States updates Publication C-55 on an annual basis for all regions

Annex C

National MSI Self-Assessment

The United States updates National MSI Self-Assessments on an annual basis, and are not regionally specific