

**23<sup>rd</sup> MEETING OF THE NORTH INDIAN OCEAN HYDROGRAPHIC  
COMMISSION (NIOHC23)  
Chiang Mai, Thailand, 21-23 May 2024**

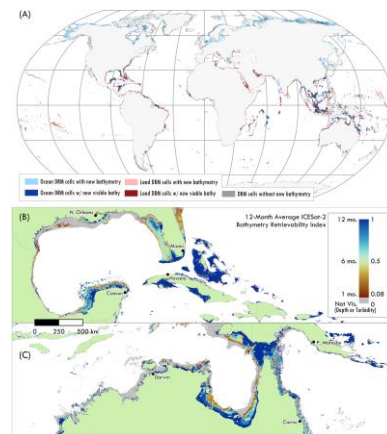
**NATIONAL REPORT FROM UNITED STATES OF AMERICA TO THE NIOHC23**

References:

- A. IHO Resolution 2/1997 as amended
- 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)  
Online system for P-5 (Yearbook)  
Online system for C-55 (Status of Surveys and Charting Worldwide)
- C. IHO Strategic Plan
- D. IHO IRCC CL 01/2021 IHO Strategic Plan for 2021-2026 – Procedure for measuring the Strategic Performance Indicator (SPI) allocated to IRCC

**Executive summary**

1. Hydrographic Office / Service: This National Report provides specific information pertaining to individual products and services of primary interest to the North Indian Ocean Hydrographic Commission (NIOHC) 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 annually and no changes are submitted within this report.
2. Surveys:
  - a) New technologies and /or equipment
    - i. NASA utilizes ICESat-2 bathymetry to support a wide range of coastal and marine science needs, from coral reef monitoring to studies of nearshore processes. Utilizing these new bathymetric capabilities, NASA is developing a new Level-3a data product focused on along-track bathymetry extraction with the designation ATL24. This product is projected to launch summer of 2024. Source: <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2023EA003270>



b) New ships

- i. Information on NOAA’s hydrographic vessels can be found online at: <https://nauticalcharts.noaa.gov/about/survey-vessels.html>. As of 2024, 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. They will also incorporate the latest clean energy technologies, including vessel emission controls and high-efficiency diesel engines. They are anticipated to be completed in late 2024 and early 2025, respectively.<sup>1</sup>
- 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.

c) Crowdsourced and satellite-derived bathymetry - national policy:

- i. The U.S. allows the collection of CSB within all national waters and continues to support the IHO Crowdsourced Bathymetry Initiative, with improvements in 2023 that enhance the ability to manage Crowdsourced Bathymetry receipt, filtering and provisioning.

d) 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 capabilities for potential use. On 8 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. For more information, visit: [https://info.nga.mil/news/NGA\\_NSIN\\_host\\_\\$1M\\_challenge\\_for\\_forecasting\\_IUU\\_fi.html](https://info.nga.mil/news/NGA_NSIN_host_$1M_challenge_for_forecasting_IUU_fi.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



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<sup>1</sup> For additional information on the NOAA fleet, please see <https://www.oma.noaa.gov/marine-operations/news-media/article/keeping-noaa%E2%80%99s-science-afloat-maintaining-noaa%E2%80%99s-fleet-research-vessels#:~:text=The%20Next%20Generation%20of%20NOAA%20Ships&text=Going%20forward%2C%20we%20will%20continue,under%20construction%2C%20Oceanographer%20and%20Discoverer.>

### 3. New charts & updates:

#### a) Charting Plan

- i. In August 2023, NOAA released a new [Nautical Charting Plan](#). The focus of this plan is the continued transition away from the production of paper nautical charts 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.
- ii. Over the past couple of years, NGA created and is in the process of populating a Worldwide ENC grid for use in building its ENC portfolio.

#### 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.

#### 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. By January 2025, NOAA will end production and maintenance of NOAA traditional paper charts and RNC products. Six months before a chart is canceled, NOAA updates the chart with a note in the lower left corner stating the chart’s status as a “last edition” and the date on which it will be canceled. NOAA also updates its Lists of Latest Chart Editions to indicate that the last edition of the chart has been published. When the chart is canceled, the chart number will be moved from its position in the list of active charts to a cumulative list of canceled charts at the bottom of the page. The List of Latest Chart Editions can be found at: <https://nauticalcharts.noaa.gov/charts/list-of-latest-editions.html>. Other products and services based on the paper chart that will be or have been canceled by January 2025 include: 1) Full-size nautical chart PDF images, 2) BookletCharts™, 3) RNC Tile Service, 4) Seamless Raster Navigational Chart Services, and 5) RNC Viewer.
- ii. With the continued transition to electronic navigation, NGA is shifting paper chart production activities to a smaller suit, 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) Other charts

- i. The U.S. produces many Digital Nautical Charts (DNCs) in NIOHC waters. The DNC, produced by NGA, 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 a substantial amount of internal resources compared to the traditional textual Notice to Mariners process.

4. Publications:

a) 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. 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/>
- iii. 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>.
- iv. 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>
- v. 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.

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.

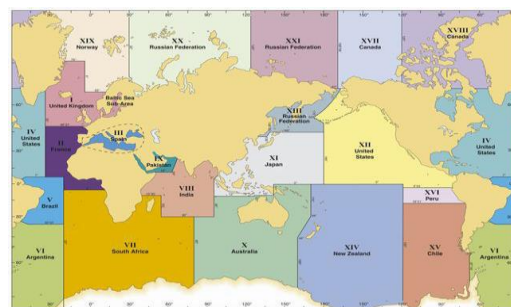
Mariners can download applicable Notices from the web at:

<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).



NIOHC Waters primarily lie within NAVAREA VIII (India is Regional Coordinator), NAVAREA IX (Pakistan is Regional Coordinator), and NAVAREA XI (Japan is Regional Coordinator).



6. C-55

The US updates its C-55 entry periodically. C-55 can be found at: December 2023 IHO U.S. C-55. <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 is supporting a capacity building initiative led by the IHO and Canada called '[Empowering Women in Hydrography](#),' via hosting three women aboard NOAA ships for a hands-on experience during the 2022, 2023, and 2024 survey seasons. The 2023 survey season successfully hosted three candidates hailing from Argentina, Kenya, and the Philippines. Solicitation of applications for the 2024 season was announced via [IHO CL 09/2024](#).

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 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
  - 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. COMIT will build on USF's expertise in ocean engineering, habitat and bathymetric mapping, modeling of coastal storm events, coastal geodesy, sea level rise, and safe navigation in ports such as Tampa Bay.

- 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

- The U.S. is a strong supporter of the IHO/IOC GEBCO and the Seabed 2030 project. Using a shared resource approach, the U.S. provides technology and software in support of the IHO Data Centre for Digital Bathymetry (DCDB) and the GEBCO Gazetteer. These activities work to support the GEBCO and has 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

- The U.S. provides support for the IHO-initiated project to develop a global database for crowdsourced bathymetry hosted by IHO DCDB. The IHO DCDB, co-located with NOAA's National Centers for Environmental Information (NCEI), is building the infrastructure necessary to provide archiving, 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/](https://www.ncei.noaa.gov/maps/iho_dcdb/)

## 9. Spatial data infrastructures

### a) Status of MSDI

- The United States actively supports MSDI within the country, as well as regionally, and internationally. The MSDI capability is important for supporting non-traditional users of Maritime Safety data to allow them to complete their environmental research, port development, or disaster support projects. 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.

### b) Involvement in regional or global MSDI efforts

- The U.S. holds active roles in supporting the work of several international MSDI-focused working groups:
  - IHO MSDIWG
  - UN-GGIM Working Group on Marine Geospatial Information (WG-MGI)
  - Open Geospatial Consortium Marine Domain Working Group (Marine DWG)

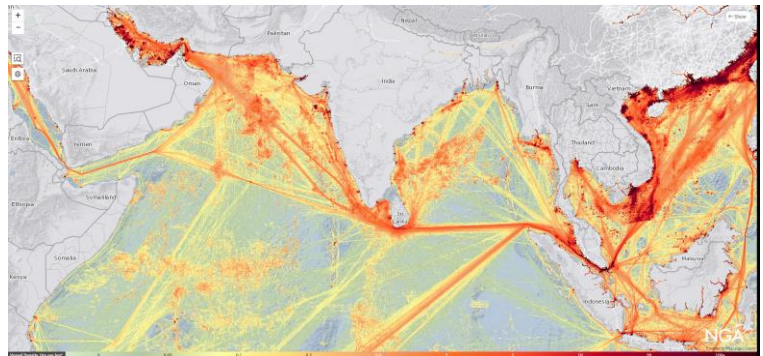
- ii. NGA recently sponsored Phase 3 of the ongoing Open Geospatial Consortium (OGC) Federated Marine SDI-Pilot (FMSDI-Pilot). This pilot directly responds to the OGC-IHO MSDI Concept Development Study and seeks to initiate a full-scale Pilot to demonstrate a multi-country, federated Marine Spatial Data Infrastructure (SDI) under land/ sea interface use-cases. Source: <https://www.ogc.org/projects/initiatives/fmsdi>
- c) National implementation of the UN Statement of Shared Guiding Principles for Geospatial Information Management – including any national data policy and impact on marine data. Ref: IHO Strategic Plan, Goal 2, Target 2.3, SPI 2.3.1 Number of HOs reporting success applying the principles in their national contexts.
  - i. 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 (HOs) for data downloads at no cost.
- d) MSDI national portal
  - i. The Federal Geospatial Data Committee (FGDC) 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](https://marinecadastre.gov/).” This is an integrated marine information system that provides data, tools, and technical support for ocean planning. The team for [MarineCadastre.gov](https://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](https://marinecadastre.gov/) supports complementary efforts: [Digital Coast](https://digitalcoast.gov/), [Data.gov](https://data.gov/), and [Geoplatform.gov](https://geoplatform.gov/) (a FGDC initiative). For more information see: <https://marinecadastre.gov/>.

## 10. Innovation

- a) Use of new technologies
  - i. NGA DNC to ENC Production Transition – In the next few years NGA will fully transition from producing the DNC product as the primary digital navigation product to ENC. This will bring NGA into line with the international community and allow for easier sharing of digital data with other hydrographic offices and provide a common operating picture when working together with other foreign partners.



- ii. Global Maritime Traffic Density Service - Leveraging space-borne Automatic Identification Systems (AIS), NGA developed the Global Maritime Traffic Density Service (GMTDS) to support hydrographic risk assessments at regional and global scales. Data can be filtered in several ways, including by ship type, ship draft, or ship loitering

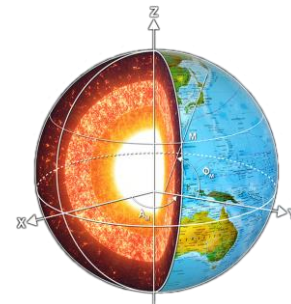


behavior. Users can visualize and filter data via web-map services or complete further analysis by downloading data via API. Source: [GMTDS | Data of Global Maritime Traffic Density Service](#)

## 11. Other activities

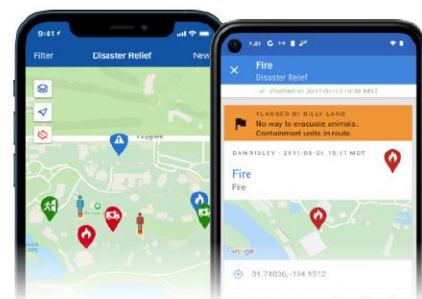
- a) Preparation for responses to disasters
  - i. NGA Humanitarian Support Portal - NGA maintains a Humanitarian Assistance Disaster Response (HADR) website to support Hurricanes and various disasters around the World. It contains maps and documents to support the first responders in their relief efforts.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

- b) 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



- c) Dynamic World Coastline
  - i. NGA is currently reviewing the public release of the Dynamic World Coastline (DWC), a global vector dataset collected at 1:50,000 or larger. Expected approval and public release is Spring to early Summer 2024.

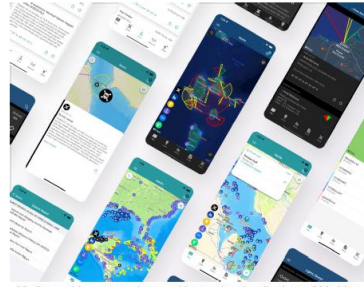
- d) Mobile Awareness GEOINT Environment (MAGE)
  - i. MAGE is a situational awareness and mobile data collection platform customizable to support teams with a variety of different missions and use cases. While operating in a low bandwidth or disconnected environment, team members can continue to collect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



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

e) Marlin – One-stop-shop for Maritime Safety Information in your hands

- i. Marlin brings NGA’s Maritime Safety Information datasets to devices in an offline-capable mobile application. Download the latest maritime safety reports and reference information before setting sail, then search and view the information on an interactive map, even without cell service.



*Marlin provides many unique and interactive visualizations of Maritime Safety Information displayed on iOS and Android mobile devices*

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