ARHC2-02A

UNITED STATES OF AMERICA

National Report

To the Arctic Regional Hydrographic Commission (ARHC)

NOAA's Office of Coast Survey, National Geospatial-Intelligence Agency, and Naval Oceanographic Office

9/28/2011

This report represents an overview of the United States' hydrographic activities. Direct any specific questions to U. S. Hydrographic Office representatives or the relevant hydrographic component.

1. US Hydrographic Activities

1.1 This report uses the definition of the "Arctic" as defined by the U.S. Arctic Research and Policy Act and includes all United States and foreign territory north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering and Chukchi Seas, and the Aleutian chain.

Arctic Boundary as defined by the Arctic Research and Policy Act (ARPA)

All United States and foreign territory north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering and Chukchi Seas; and the Aleutian chain.[1]

Acknowledgement: Funding for this map was provided by the National Science Foundation through the Arctic Research Mapping Application (armap.org) and Contract #0520837 to CH2M HILL for the Interagency Arctic Research Policy Committee (IARPC).
Map author: Allison Gaylord, Nuna Technologies. May 27, 2009.
1. The Aleutian chain boundary is demarcated by the 'Contiguous zone' limit of 24-nautical miles.

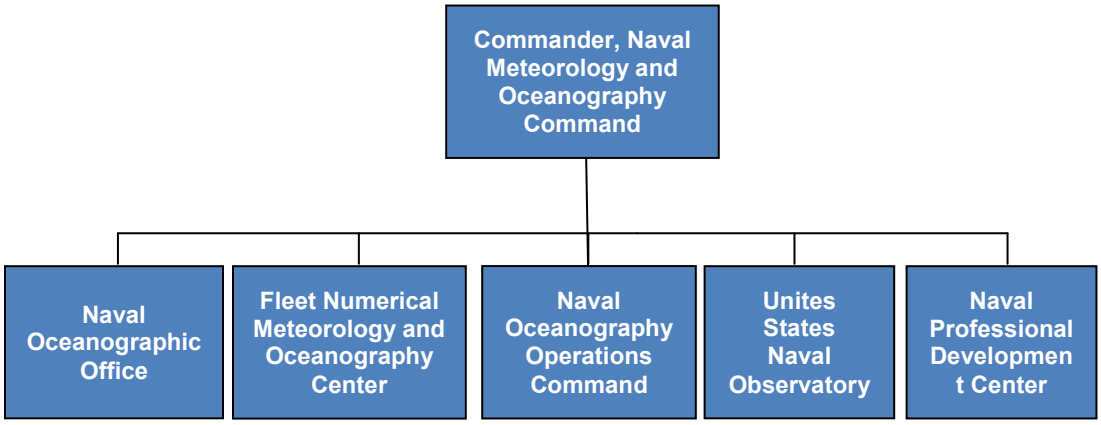
1.2 The Office of Coast Survey (OCS) is a line office within the National Ocean Service, part of the National Oceanic and Atmospheric Administration (NOAA). The administrator of NOAA reports to the Secretary of Commerce, a member of the Presidential Cabinet. OCS provides navigation products and services that ensure safe and efficient maritime commerce on America's oceans and coastal waters, and in the Great Lakes. In fulfillment of this mission, OCS is responsible for conducting hydrographic surveys and producing the nation's nautical charts for the U.S. Exclusive Economic Zone, an area of 3.4 million square nautical miles.

OCS is made up of the four following divisions: Hydrographic Surveys Division, Marine Chart Division, Navigational Services Division, and the Coast Survey Development Lab.

1.2 The National Geospatial-Intelligence Agency (NGA) provides timely, relevant and accurate geospatial intelligence in support of national security objectives. The term “geospatial intelligence” (GEOINT) means the exploitation and analysis of imagery and geospatial information to describe, assess and visually depict physical features and geographically referenced activities on the Earth. Geospatial intelligence consists of imagery, imagery intelligence and geospatial (e.g., mapping, charting and geodesy) information. NGA also contributes to humanitarian efforts, such as tracking floods and disaster support, and to peacekeeping. The NGA Maritime Safety Office is tasked with the responsibility to collect and analyze maritime safety information and to produce and provide global access to nautical charts, publications, and custom tailored digital hydrographic and bathymetric safety of navigation data.

1.3 The Naval Meteorology and Oceanography Command (NAVMETOCCOM) provides Meteorology and Oceanography (METOC), Bathymetry and Hydrography (Bathy/Hydro), Precise Time and Astrometry (PTA), products and services that enable effective decision-making for operational safety, warfighting success by Naval and Joint forces, and Security Cooperation initiatives. The Naval Oceanographic Office (NAVOCEANO) is the primary command for collecting, analyzing and displaying hydrographic information for safety of navigation of Department of Defense (DoD) surface and subsurface vessels. NAVOCEANO’s core competencies include hydrography, bathymetry, geophysics, acoustics, physical oceanography, and geospatial intelligence. NAVOCEANO acquires and analyzes global ocean and littoral data to provide specialized, timely, and operationally relevant products and services for Department of Defense warfighters as well as other civilian, national and

international customers. Utilizing space-based, airborne, surface, and subsurface platforms, as well as state-of-the-art computing and modeling techniques, NAVOCEANO synthesizes this data into products and services tailored to the individual warfighter's needs. These products and services support virtually every type of Fleet operation, providing mission-essential environmental information to the warfighter and to U.S. allies. NAVOCEANO is the parent command of the Naval Ice Center and the Fleet Survey Team.



2. Surveys

2.1 The statutory mandate of the National Oceanic and Atmospheric Administration (NOAA) authorizes NOAA to provide nautical charts and related hydrographic information for the safe navigation of maritime commerce as well as to provide basic data for engineering, scientific, and other commercial and industrial activities. This mandate covers all US territorial waters and the US Exclusive Economic Zone (EEZ), a combined area of 3.4 million square nautical miles (SNM) which extends 200 nautical miles offshore from the nation's coastline. The production of high-quality navigation charts to support the safety of marine transportation depends on the availability of up-to-date, reliable hydrographic survey data.

2.2 Although the primary use for NOAA surveys is for chart compilation, they are also available to the general public via NOAA's National Geophysical Data Center (NDGC). NGDC is the data archive and distribution center for the Office of Coast Survey (OCS) digital hydrographic data. NGDC also maintains the National Ocean Service Hydrographic Data Base (NOSHDB) providing survey coverage of the coastal waters and Exclusive Economic Zone (EEZ) of the United States and its territories.

2.3 NOAA has designated 511,000 SNM of territorial waters as navigationally significant. From 1994 to 2010, 36,545 SNM of this navigationally significant area has been surveyed with full bottom coverage. In the 2011 calendar year, 1950 square nautical miles have been surveyed bringing the total of

navigationally significant area surveyed with full bottom coverage to 38,495 SNM.

2.4 Each year, the areas within NOAA's scope of navigation safety responsibilities are reevaluated. NOAA determines which areas are in greatest need of hydrographic surveys and publishes these in the *NOAA Hydrographic Survey Priorities (NHSP)* document, which can be found at http://www.nauticalcharts.noaa.gov/hsd/NHSP.htm. Priorities are assigned based on several factors, including survey vintage, vessel traffic, depth, and customer requests. As a part of this process almost 40,000 square nautical miles have been identified as new priorities in the Arctic. Based on these priorities, OCS has planned a series of survey projects in the Arctic. Just over 1,700 square nautical miles of modern surveys have been completed in the Arctic to date. Arctic survey projects are currently planned through the year 2015.

2.5 Information on NOAA's planned Arctic surveys can also be found in the *Office of Coast Survey Arctic Nautical Charting Plan*, which can be downloaded at http://www.nauticalcharts.noaa.gov/mcd/docs/Arctic_Nautical_Charting_Plan.pdf

2.6 NOAA's Office of Marine and Aviation Operations (OMAO) operates three full time survey vessels devoted to supporting OCS charting responsibilities. These vessels are FAIRWEATHER, THOMAS JEFFERSON, and RAINER. In addition to these platforms OCS's Navigational Services Division (NSD) maintains a fleet of six trailerable boats devoted to strategic and urgent survey requests and requirements, such as emergency response and ENC verification. NSD also operates a 54-foot catamaran survey vessel, BAY HYDRO II, devoted to research and development and limited hydrographic surveying in support of the OCS mission.

3. Charts

3.1 NOAA produces and maintains a suite of nautical charts that cover the coastal waters of the U.S. and its territories. NOAA's charts are available in a variety of formats, including:

- Traditional paper charts
- Print-on-Demand charts: up-to-date paper charts with current Notice to Mariners corrections
- Raster Navigational Charts® (NOAA RNCs): bitmap electronic images of paper charts
- Electronic Navigational Charts® (NOAA ENCs): vector charts that conform to international standards

3.2 Details about NOAA's nautical chart program can be found at http://www.nauticalcharts.noaa.gov/staff/chartspubs.html. At this site, users can find more information about NOAA's various chart products, download chart

catalogs, access links to critical updates, and submit consumer inquiries and chart discrepancies through the NOAA inquiry system.

3.3 NOAA maintains a suite of 1019 paper charts. These charts are maintained as color separate raster images. The raster files are updated with new source and critical updates, and then sent to the Federal Aviation Administration (FAA) for the lithographic printing process.

3.4 NOAA maintains S-57 compliant ENCs equal to 885 chart equivalents. These ENCs are maintained to critical corrections through the issuance of new editions and incremental updates available through NOAA's Chart Downloader, which can be accessed through the following URL: http://www.nauticalcharts.noaa.gov/mcd/enc/index.htm.

3.5 NOAA's Print-on-Demand (POD) nautical charts provide up-to-date navigation information to mariners. These paper charts are updated on a weekly basis and include all of the latest critical chart corrections. Although NOAA produces POD charts, NOAA does not sell POD charts directly to the public. Instead, POD charts are made available through NOAA's commercial partner OceanGrafix, who has 46 retail agents located throughout the U.S. and overseas, including Canada, Japan, and Panama. Twenty of these agents have the capability to print charts on-site. Just over half of all NOAA paper charts distributed to mariners are POD charts.

3.6 NOAA has identified the need for additional chart coverage in the Arctic and has developed the *Office of Coast Survey Arctic Nautical Charting Plan* to address this need. This document provides detailed plans for the layout of additional nautical chart coverage and describes the requisite activities needed to build and maintain these charts. The plan can be downloaded at http://www.nauticalcharts.noaa.gov/mcd/docs/Arctic_Nautical_Charting_Plan.pdf

4. Nautical Publications

4.1 The United States Coast Pilot® consists of a series of nautical books that cover a variety of information important to navigators of coastal and intracoastal waters and the Great Lakes. Issued in nine regionally focused volumes, they contain supplemental information that is difficult to portray on the nautical chart. See table below for currently available and forthcoming editions.

Publication	Region	Publication Date
CP 1	West Quoddy Head , ME to Provincetown, MA	41th Ed., 2011
CP 2	Cape Cod, MA to Sandy Hook, NJ	40th Ed., 2011
CP 3	Sandy Hook, NJ to Cape Henry, VA	44nd Ed, 2011
CP 4	Cape Henry, VA to Key West, FL	43st Ed., 2011
CP 5	Gulf of Mexico, Puerto Rico, and Virgin Islands	39th Ed., 2011
CP 6	Great Lakes	41th Ed., 2011

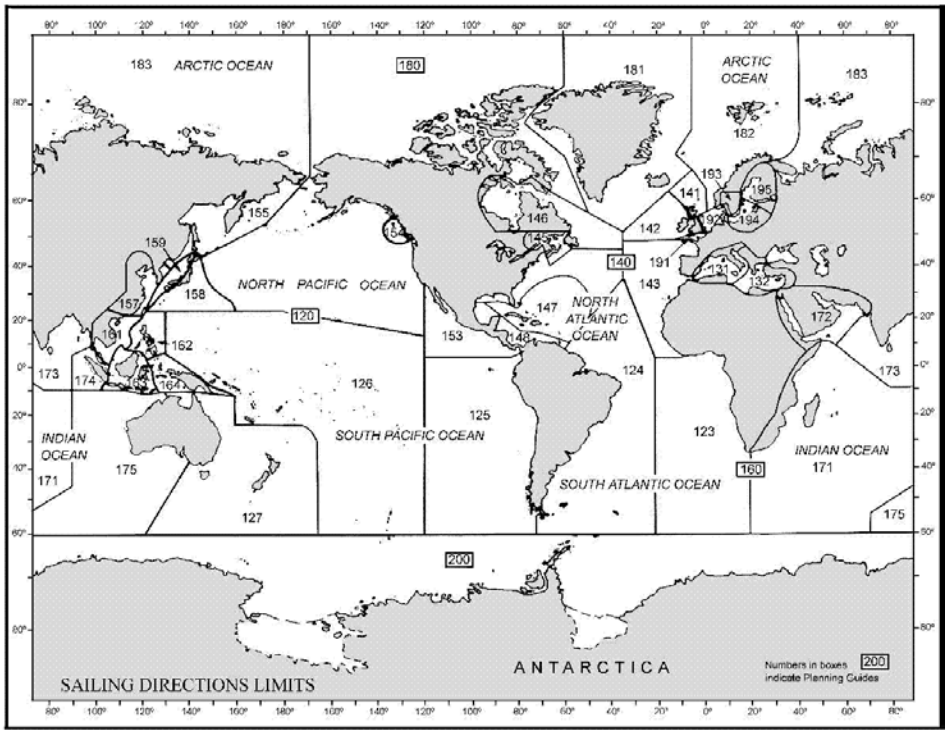
CP 7	Pacific Coast, Hawaii, and Pacific Islands	43st Ed., 2011
CP 8	Dixon Entrance, AK to Cape Spencer, AK	33st Ed., 2011
CP 9	Cape Spencer, AK to Beaufort Sea, AK	29th Ed., 2011

4.2 Digital versions of the United States Coast Pilot® are available from http://www.nauticalcharts.noaa.gov/nsd/cpdownload.htm. These digital files are available as complete books or by chapter in PDF and RTF formats. Select volumes of the United States Coast Pilot® are available as an XML file with other volumes to follow throughout 2010.

4.3 OCS has modernized the Coast Pilot production system, streamlining the process and providing enhanced products beyond the traditional annual hard copy printed editions. On-line versions with updates are now available for free download from the OCS website. These digital files have made possible partnerships with private industry for print on demand publishing, binding, and distribution as an alternative to large scale single press runs. E-publishing and other web applications have also been promoted by expanding the ability of customization with our ongoing efforts at Extensible Markup Language (XML) tagging of the Coast Pilot content. All nine volumes are scheduled to be available by May 2012.

4.4

Sailing Directions are published by the US/NGA in 42 Planning Guide and Enroute volumes as part of a global portfolio of publications. Sailing Directions (Planning Guide) are intended to assist mariners in planning ocean passages and include relevant physical, political, industrial, navigational, and regulatory information about the countries adjacent to a particular ocean basin. Sailing Directions (Enroute) are intended to supplement the largest scale charts of the area and include detailed coastal and port approach information. They are subdivided into geographic regions, called sectors, which contain information about the coastal weather, currents, ice, dangers, features, and ports. NGA Sailing Directions are updated via digital updates. All of these publications and their digital updates are available to the public and are posted at the NGA Maritime Safety website at http://msi.nga.mil/NGAPortal/MSI.portal. A graphic of NGA Sailing Directions global coverage is shown below:



4.5 Four volumes of Sailing Directions cover the Arctic region. They are listed below:

Publication	**Edition Date**
Pub 180, Sailing Directions (Planning Guide) Arctic Ocean	9th Edition (May 2011) No digital updates
Pub 181, Sailing Directions (Enroute) Greenland and Iceland	11th Edition (June 2010) No digital updates
Pub 182, (Enroute) North and West Coasts of Norway	9th Edition (August 2010) No digital updates
Pub 183, Sailing Directions (Enroute) North Coast of Russia	9th Edition (May 2011) No digital updates

5. MSI

5.1 NGA is the NAVAREA IV and XII Coordinator within the IMO/IHO World-Wide Navigational Warning Service (WWNWS) and also acts as Chairman for the WWNWS-SC.

The following boundaries are:

Limits of NAVAREA IV: From the east coast boundary of Suriname to 07-00N out to 035-00W, from there to 067-00N and the coastline of Greenland, following 067-00N to the coastline of Canada (Baffin Islands area).

Limits of NAVAREA XII: from the coast line at 03-24S to 120-00W, then to 00-00, then to 180-00, then to 50-00N, and then following the International Date Line to 67-00N.

Schedule of broadcasts for Navigational Warnings/Meteorological Information (see appendix 1)

5.2 NAVTEX Coverage:

Eleven NAVTEX stations are operational in NAVAREA IV and XII. Please note that the United States also has an operational NAVTEX facility on Guam (NAVAREA XI).

Since the U.S. Coast Guard originally only installed NAVTEX at sites where Morse telegraphy transmissions were made previously, propagation analyses show some coverage gaps, particularly in Alaska. NAVTEX coverage is reasonably continuous in the area around Kodiak Alaska. NAVTEX broadcasts from Adak Alaska were permanently terminated in December 1996 due to closure of the Naval facility there.

5.3 Operational Issues:

NAVAREA IV and XII have fully redundant and site separated NAVAREA operational systems to include satellite transceivers, telecommunications, internet and desktop PC's. System operations are exercised on a daily basis at this location to ensure full continuity of NAVAREA operations.

5.4 Capacity Building:

NGA continues to provide training and practical guidance for those who are concerned with drafting radio navigational warnings or with the issuance of Maritime Safety Information (MSI) for the high seas through the IHO World-Wide Navigational Warning Service. The training effort intends to translate into safer navigation for the region and establish an active regional coordination team of experts who will continue to collaborate with the respective NAVAREA in the area of influence. These courses are organized on the behalf of the IHO's Capacity Building Sub-Committee along with leadership oversight and instructor support from NAVAREA's I, IV and XII. In support of the new Arctic NAVAREAs XVII and XVIII, NGA has provided onsite training support for Canadian Coast Guard personnel who will be staffing the NAVAREA watch operations.

5.5 NAVAREA Website:

www.nga.mil/maritime

In-Force NAVAREA IV and XII messages are posted each morning from the previous 24hrs. Active NAVAREA IV and XII messages can be queried by a

variety of menu options to include by specific NAVAREA, by NAVAREA number, by a NAVAREA number range and by date and date range.

5.6 NAVAREA Contact Information:

Mr. Peter DOHERTY
Deputy Director
Office of Maritime Safety
ATTN: SH (Mail Stop SH-N65)
7500 Geoint Drive
Springfield, Virginia 22150-7500
Tel: +1 (571) 557 6746
Fax: +1 (571) 557 3261
E-mail: Peter.M.Doherty@nga.mil

6. C-55 Update

The United States recognizes the importance IHO C-55, "Status of Hydrographic Surveying and Nautical Cartography Worldwide" and is working to update this database with current survey and chart information. The US is aiming to have C-55 information updated by the International Hydrographic Conference in April 2012.

7. Capacity Building

7.1 Training Opportunities available in the United States

See Appendix 1 for a list of specific opportunities.

8. Oceanographic Activities

8.1 NOAA's Center for Operational Oceanographic Products and Services collects, analyzes and distributes historical and real-time observations and predictions of water levels, coastal currents and other meteorological and oceanographic data. This is part of an integrated National Ocean Service program supporting safe maritime zone management, engineering and surveying communities. The Center manages the National Water Level Observation Program and the national network of Physical Oceanographic Real-Time Systems in major U.S. harbors. It conducts its programs through university, industry, Federal and State partnerships as appropriate.

8.2 The United States participates on the IOC-IHO Guiding Committee for GEBCO and hosts the IHO Data Centre for Digital Bathymetry at NOAA's National Geophysical Data Center. The United States actively participates in the International Bathymetric Chart of the Arctic Ocean, the International Bathymetric Chart of the Caribbean Sea & Gulf of Mexico, and the International Bathymetric Chart of the Southern Ocean

8.3 NOAA's Center for Operational Oceanographic Products and Services maintains the domestic tide gauge system for the United States.

9. Other Activities

9.1 The U.S. is an active participant within the International Hydrographic Organization (IHO). U.S. IHO support includes participating in the CSPCWG, DQWG, HSSC, SNPWG, TSMAD, WENDWG, ISBC, HCA, CBSC, GEBCO, EUWG, ABLOS, S-23WG, SRWG, the Correspondence Group on the Definition and Length of the Coastline, and the Finance Committee. Additionally, the U.S. chairs the MSDIWG, DIPWG, HDWG, TWLWG, and the WWNWS.

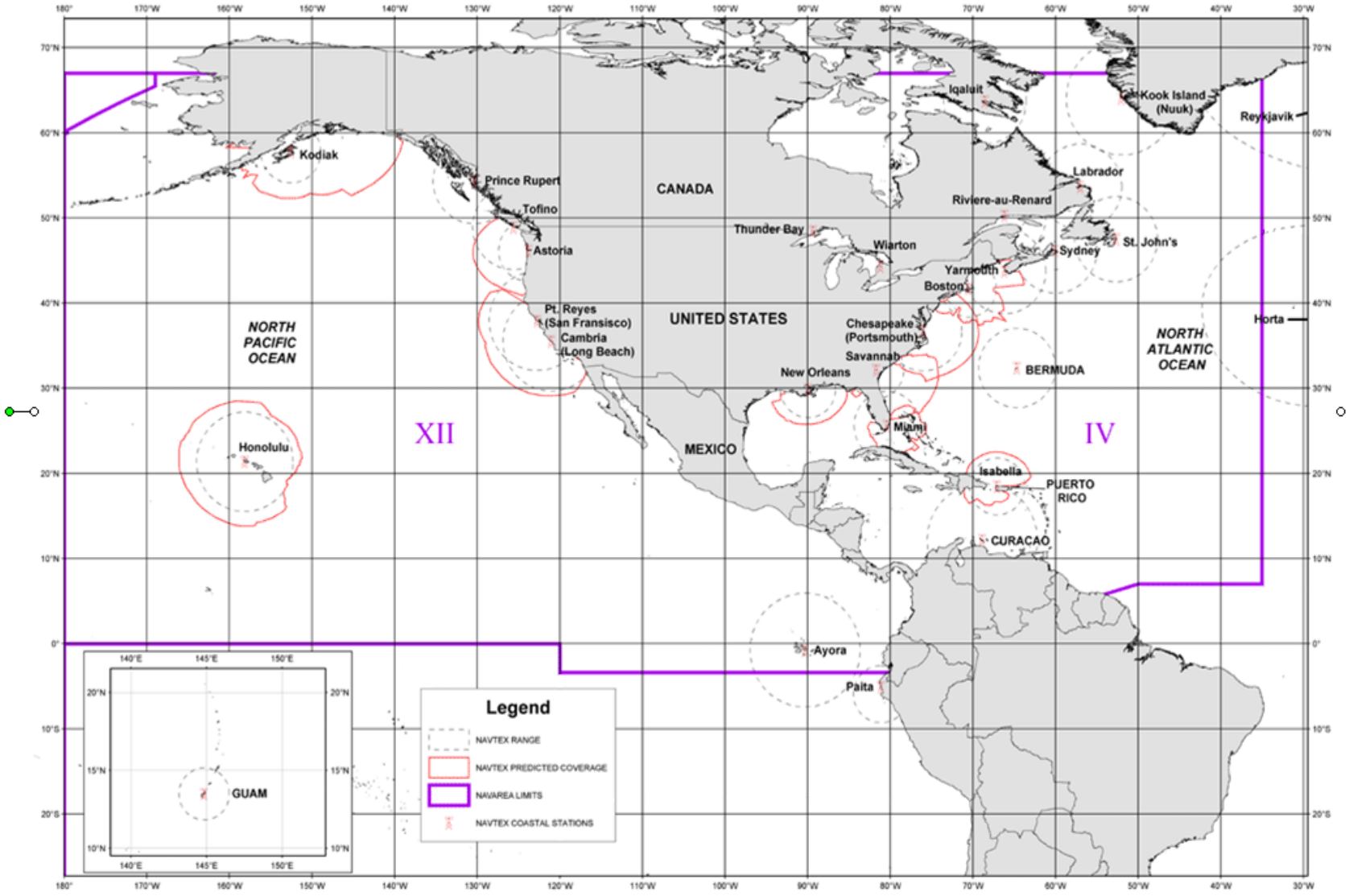
9.2 Capt. Andrew Armstrong, NOAA (ret.), the NOAA Co-Director of the Joint Hydrographic Center is a member of the FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers. As a member of the Board, Capt. Armstrong is available to advise Arctic institutions on establishing hydrographic training curricula and preparing submissions to the International Board for Category A or Category B recognition. (andy.armstrong@noaa.gov)

PROMULGATION OF MARITIME SAFETY INFORMATION BY U.S. INFORMATION PROVIDERS

SCHEDULED BROADCAST TIMES

WHAT	WHO	WHEN (UTC)	HOW	NAVAREA/ METAREA	SATELLITE
High seas warnings and forecasts	NWS	0430, 1030, 1630, 2230	SafetyNET	IV	AOR-W
High seas warnings and forecasts	NWS	0545, 1145, 1745, 2345	SafetyNET	XII	AOR-W/POR
High seas warnings and forecasts	NWS	0515, 1115, 1715, 2315	SafetyNET	XVI	AOR-W
Hurricane advisories West Atlantic	NWS	as required	SafetyNET	IV	AOR-W
Hurricane advisories East Pacific	NWS	as required	SafetyNET	XII	POR/AOR-W
Hurricane advisories Central Pacific	NWS	as required	SafetyNET	XII	POR
Long range navigational warnings	NGA	1000, 2200	SafetyNET	IV	AOR-W
Long range navigational warnings	NGA	1030, 2230	SafetyNET	XII	POR/AOR-W
Long range search and rescue	USCG	upon receipt	SafetyNET	IV/XII	AOR-W/POR
Coastal MSI	USCG	4 to 6 times daily for routine traffic; upon receipt for distress	NAVTEX	Generally, within 200 miles of the coastline	None; see Pub 117 for stations and times
Status of ice in North Atlantic Ocean	USCG	1200	SafetyNET	IV	AOR-E/W

NAVAREA IV & XII NAVTEX COVERAGE



Institution and Point of Contact	Training Opportunity	Training Details
Florida Institute of Technology Graduate Admissions 1-800-944-4348 Fax: 1-407-723-9468	Master of Science in Ocean Engineering with a specialization in Hydrographic Engineering Master of Science in Earth Remote Sensing, including classes in hydrographic surveying and hydroacoustics	(More Information)
NOAA National Geodetic Survey NGS Workshop Program David R. Doyle 301-713-3178 Fax: 301-713-4327 Dave.Doyle@noaa.gov	NGS conducts workshops throughout the United States, involving the cooperation of professional societies, universities, and international, Federal, state, and local organizations. NGS also develops new workshops upon request, provided it has the necessary resources and the material is within NGS' mission.	(More Information)
University of New Hampshire Center for Coastal & Ocean Mapping Joint Hydrographic Center Abby Pagan-Allis 603-862-3433 Fax: 603-862-0839	Graduate Program in Ocean Mapping [Category A Certified Program]	(More Information)
U.S. Navy Commander Naval Meteorology Oceanography Command Jacqueline Bussell 228-688-5753 Fax: 228-688-5332 Jacqueline.bussell@navy.mil	International Hydrographic Management and Engineering Program (IHMEP) [Category B Certified Program]	(More Information)
U.S. Navy Commander Naval Meteorology Oceanography Command Jacqueline Bussell 228-688-5753 Fax: 228-688-5332 Jacqueline.bussell@navy.mil	International Hydrographic Science Applications Program (IHSAP) [Category A Certified Program]	(More Information)
U.S. Navy Commander Naval Meteorology Oceanography Command Jacqueline Bussell 228-688-5753 Fax: 228-688-5332 Jacqueline.bussell@navy.mil	Mobile Training Team (NMTT) Tailored Maritime Geospatial Training	(More Information)