

UNITED STATES OF AMERICA

Office of Coast Survey, National Imagery and Mapping Agency

The United States has two charting organizations which are jointly National Representatives to the IHO. Their responsibilities are divided geographically. For national waters, the Office of Coast Survey (OCS), National Ocean Service, National Oceanic and Atmospheric Administration of the Department of Commerce surveys and produces the navigational charts and nautical publications required by the mariner for safe navigation. For the remainder of the world, the National Imagery and Mapping Agency (NIMA) of the Department of Defense, in cooperation with the Navy,

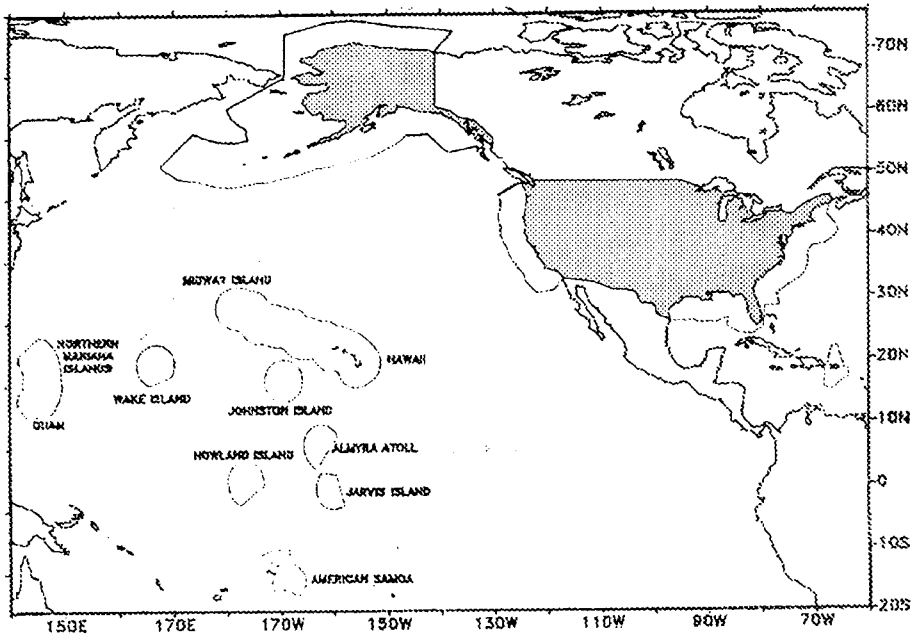


FIG. 1.- EEZ of the United States of America.

surveys selected areas and produces a worldwide portfolio of charts and nautical publications for military use, and by law makes those nautical products which enhance safety of navigation available to the civil mariner as well. In areas where both Agencies have interests, one or the other usually accepts responsibility for a product or service (e.g. OCS issues worldwide Tide Tables, NIMA issues weekly Notices to Mariners to correct both OCS and NIMA charts and publications) Important assistance is also received from the US Coast Guard in the work of both Agencies. Specific background on the two National Representatives follows.

The Office of Coast Survey is the oldest U.S. scientific organization, dating from 1807 when the United States Congress directed that a "survey of the coast" be carried out. In the ensuing years additional responsibilities were assigned to the young agency to meet scientific and engineering needs of a growing national population and economy. By 1836, it was called the U.S. Coast Survey. In 1871, a geodetic connection between the Atlantic and Pacific coasts was officially authorized and the name was changed to the U.S. Coast and Geodetic Survey (C&GS) in 1878. In 1926, the production of aeronautical charts was added to meet the requirements of the new air age. In 1970, U.S. Coast and Geodetic Survey became the National Ocean Survey under the newly established National Oceanic and Atmospheric Administration (NOAA) and in 1982, it was renamed the National Ocean Service (NOS). In 1991, the former acronym, C&GS, was re-established, but this time referred to the Office of Charting and Geodetic Services. Under the U.S. Government's 1994 streamlining process, C&GS was disestablished, but its former subordinate divisions were elevated to the status of an Office under the National Ocean Service. Thus the former Nautical Charting Division became the present Office of Coast Survey (OCS), which is responsible for NOAA's mapping, charting, and tidal programmes, rendering national leadership in these scientific and technical areas.

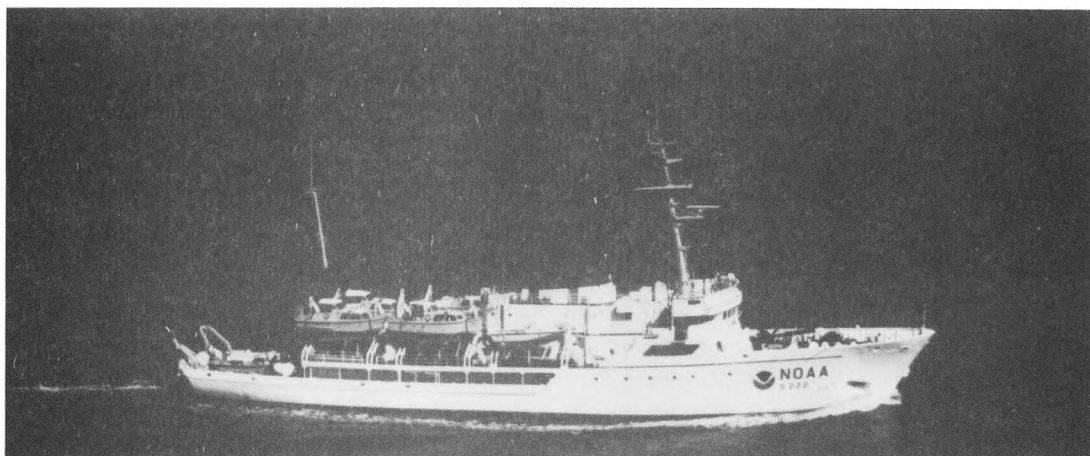


FIG. 2.- SV Mt MITCHELL.

The United States claims 12 nautical miles for its territorial sea and 200 nautical miles fisheries jurisdiction and Exclusive Economic Zone (EEZ) for the exploration and management of both living and nonliving marine resources. This vast area covers approximately 3.4 million nautical M². OCS provides accurate and timely nautical charts, maps, and related products for the coastal and adjacent ocean areas of the United States (including possessions and territories), the Great Lakes, other inland navigable waters, for the safety and efficiency of marine transportation, offshore engineering projects, naval operations, and recreational activities.

OCS is responsible for satisfying the requirements of the United States for marine navigation information to facilitate the electronic integration of accurate chart data, Global Positioning Reference systems, and real-time tide, current, and environmental information. This information is fundamental to efficient navigation for the safety of life and property. The Nation's commerce, of which 98% by weight is waterborne, will move with greater efficiencies as data bases supporting navigation information systems provide mariners, engineers, managers, scientists, and environmentalists with basic layers of information of navigational and related geographic information at the touch of a button.

The components of the Coast Survey include the Marine Chart Division, the Hydrographic Surveys Division, the Ocean Products Services Division, and the Coast Survey Development Laboratory. The Marine Chart Division collects marine navigational data to construct and maintain nautical charts, Coast Pilots, and related marine products for the United States. The Hydrographic Surveys Division directs programmes for ship and shore-based hydrographic survey units and conducts general hydrographic survey operations. The Ocean Products Services Division manages the national water level programme which provides essential information on tides, currents, and water levels, a critical part of safe navigation. The Coast Survey Development Laboratory plans and manages the development of mapping, charting, hydrographic surveying, and automated data for the modernization of nautical charting programme operations and supports the development of nautical charting programme products and data standards.

OCS processes marine mapping and charting data obtained from many other sources in addition to the basic hydrographic survey data used to produce the approximately 980 nautical charts and 9 volumes of Coast Pilot publications. The update cycle for nautical charts is as often as every 6 months or as infrequently as 12 years for remote areas. The average revision interval per nautical chart is 2½ years. As a part of its national leadership role, OCS provides guidance in mapping and charting procedures. The office assists national, state, and local organizations through a variety of cooperative programmes. To judge the value and usefulness of its products and services, the agency maintains close contact with its users. Personal contacts are made between C&GS personnel and local users during field surveys. The Cooperative Charting Programme involving the U.S. Power Squadrons and the Coast Guard Auxiliary provides valuable feedback information on nautical charts. Additional contacts are made through professional organizations, technical conventions, boat shows, and similar activities. Marketing studies are conducted to determine user reactions to existing products and to formulate plans for new products, formats, and coverage.

The United States is an active member of the IHO. OCS, along with the Defense Mapping Agency, share responsibilities associated with IHO membership. OCS maintains close contacts with other countries either through the IHO or through nation-to-nation agreement to exchange information, establish international standards, and avoid duplication of effort through joint cooperative projects.

The National Imagery and Mapping Agency (NIMA) was established by the Imagery and Mapping Act of 1996, effective 1 October 1996, but its nautical programme roots go back over 165 years, to the establishment by Navy of the "Depot of charts and instruments" on 6 December 1830. Initially, all charts were

simply purchased from civilian firms and distributed by the Depot, but a press was installed in 1835 to print charts still engraved by the private sector. The first 4 such charts appeared in 1837. The Depot's first foreign scientific survey, in the South Atlantic from Brazil to Antarctica and throughout the Pacific, took place from 1838-42. It resulted in 87 charts in addition to a mass of scientific data. The Depot expanded into astronomy, and as a result in 1854, its name was changed to the United States Naval Observatory and Hydrographic Office.

In 1866, the Naval Observatory and Hydrographic Office separated, and the latter was subsequently renamed the U.S. Navy Hydrographic Office (HYDRO) with a charge by law of "improvement of the means for navigating safely the vessels of the Navy and of the mercantile marine by providing, under the authority of the Secretary of the Navy, accurate and cheap nautical charts, sailing directions, and navigators' manuals of instruction for the use of all vessels of the United States, and for the benefit and use of navigators generally". Issuance of Notice to Mariners to correct charts on issue began in 1869, and the first Pilot Chart was produced in 1893. Survey efforts of foreign waters intensified during the period. Radio navigational warnings broadcasts were implemented by HYDRO in 1921, following ice warnings broadcasts which had been initiated shortly after, and as a result of, the TITANIC disaster. In 1922, the sonic echosounder was first used by HYDRO, and the first bathymetric chart based on sonic soundings was published a year later. Aircraft were first used in surveys in 1926, and, in 1928, the first gravity observations were taken from a submarine. HYDRO also implemented rather parallel products and services for Naval Aviation in the 1920s.

World War II dramatically increased the demand for HYDRO products, and gave impetus to the field of oceanography to a degree that the Navy, largely through HYDRO, became the leader in federal oceanographic efforts. The National Oceanographic Data Center and National Oceanographic Instrumentation Center (both later transferred to NOAA) were established under HYDRO in 1960, and in 1962, the Office name was changed to the U.S. Naval Oceanographic Office (NAVOCEANO). In 1967, the Office of the Oceanographer of the Navy was established to oversee the entire Naval Oceanographic Programme.

In 1972, the Defense Mapping Agency (DMA) was created to consolidate the map and chart production and distribution functions of Army's Army Map Service, Air Force's Aeronautical Chart and Information Center, and Navy's NAVOCEANO at the Department of Defense level. Surveys remained with NAVOCEANO, but nautical products production and services physically moved to DMA premises. By that action, the rapidly advancing technology that was driving production changes for topographic and the aeronautical products could be applied also to nautical products, and the interoperability of the widely different types of products required to be produced under DMA's mission could be ensured.

Under DMA, the production of worldwide portfolios of topographic, aeronautical and nautical maps and charts continued, but the transition to standardized vector and raster digital data bases to ultimately replace the paper products was expedited. Navy's goal of a "paperless ship" was strongly supported by a production emphasis on digital charts and publications. DMA played a leading role in the maintenance of the World Geodetic System, 1984 (WGS-84), the "datum" for positions determined from the Global Positioning System (GPS). Navigation

safety services, such as Notice to Mariners and the preparation of Radio Navigational Warnings, remained major activities, and benefitted from new production systems. The utility of existing charts for many areas of the world had been called into question by GPS navigation, which allowed the mariner to navigate with more accuracy than could the surveyor who had collected the chart data, and brought into glaring prominence the differences between datums used. DMA was a leader in the still continuing effort to restore accuracy to the nautical chart.

In 1996, the National Imagery and Mapping Agency (NIMA) was formed to combine DMA's assets and programmes with those of related agencies, in order to further focus government efforts and obtain maximum benefit from emerging technology. The future holds great challenges for the nautical chart and services producer, but even greater potential benefits to safety of navigation when those challenges are met. The IHO can facilitate the spread of improvements, and NIMA, with its counterpart civil agency OCS, looks forward to working closely with that organization.