

# NEWS

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## The Coast and Geodetic Survey

BY REAR ADMIRAL JAMES C. TISON, JR.

The Coast and Geodetic Survey views with much pride its long history of dedicated accomplishment as a principal scientific agency of the Federal Government. The present generation looks forward with enthusiasm and great expectations to a new era as a component of the Environmental Science Services Administration.

On the 10th of February 1966, the Coast and Geodetic Survey will complete 159 years of service. Beginning early in the 19th century, this agency started and developed the science and art of higher surveying and cartography in the United States and has maintained one of the world's leading higher surveying and charting organizations for more than a century and a half. The Coast and Geodetic Survey and its leaders played a prominent part in the 19th century renaissance of science and technology in the United States. They were identified with a great variety of scientific developments, such as the organization of the National Academy of Sciences, the Smithsonian Institution, and the National Bureau of Standards.

First called "A Survey of the Coast," later the "Coast Survey," and, since 1878, the "Coast and Geodetic Survey," this organization had its origin in the recognition of Federal responsibility to provide nautical charts and related publications to ensure the safety of maritime commerce. This is still a major function of the agency, and practically all of today's activities are an outgrowth of the scientific and engineering work required to produce and maintain up-to-date nautical charts for the coastal waters of the United States.

Before charts could be compiled and printed, however, a great amount of surveying had to be done to measure the coastline and the adjacent waters. When the Bureau was authorized in 1807, the tidal shoreline

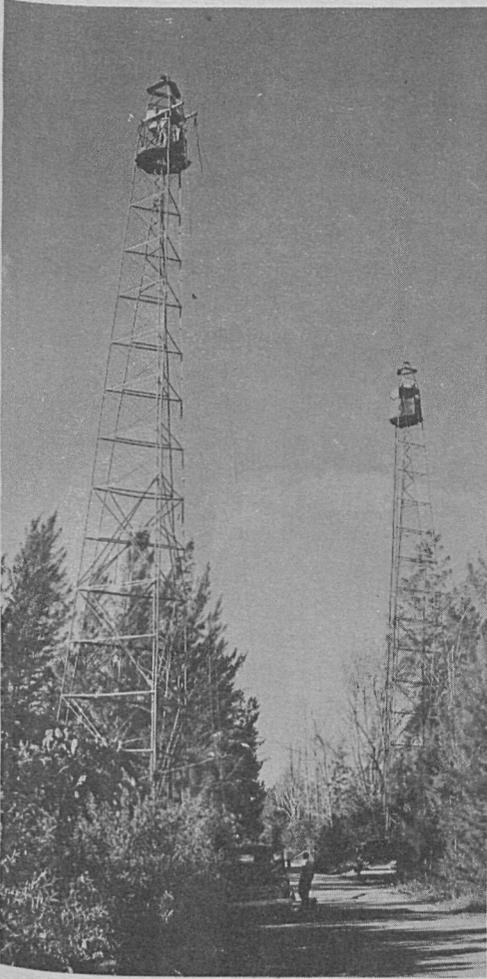
of the Nation comprised about 30,000 statute miles along the Atlantic seaboard. The acquisition of new territories on the gulf coast and the Pacific coast, the acquisition of Alaska and the Hawaiian Islands, and the stewardship that we assumed over the Philippine Islands increased the shoreline of the country to 110,000 statute miles. Bordering this extensive coastline was a belt of over 2,500,000 square miles of coastal waters that required surveys in the interest of waterborne commerce and navigation.

The field surveys required to produce nautical charts included: GEO-DETTIC SURVEYS to establish the latitude and longitude, and elevation above sea level, of selected places or points--so that each place on each chart would be uniquely related to all other places on the earth, and so that each chart would fit exactly into a perfectly connected series of hundreds of charts that would be required to cover the coastal waters of the United States; TOPOGRAPHIC SURVEYS to map the coastline and to position features of importance to navigation; HYDROGRAPHIC SURVEYS to determine the depths of the waters, to locate submerged dangers to navigation, and to find and position the safe passages for shipping; TIDE OBSERVATIONS AND TIDAL CURRENT OBSERVATIONS to reduce the soundings to least depths and to provide the navigator with information about the tidal forces affecting his movements; and OBSERVATIONS OF THE EARTH'S MAGNETISM to map the direction and force of the magnetic field, so that the mariner could know the relationship between magnetic north and true north at any place.

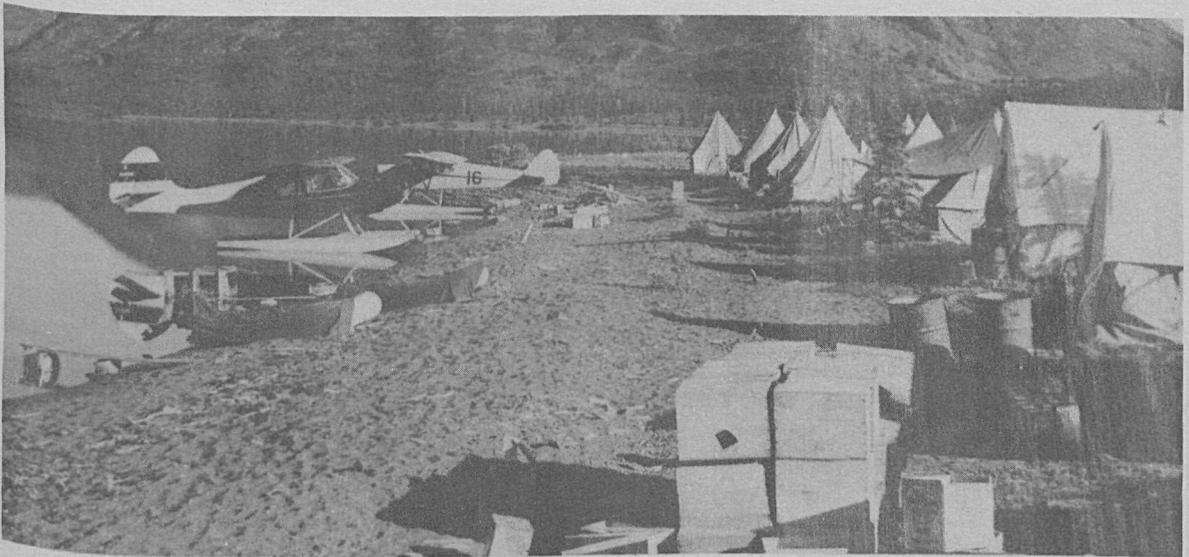
Today the Coast and Geodetic Survey conducts six national programs, and its organization includes four major offices from which these six programs are managed. The Survey by necessity is field oriented; that is, a major part of its activity is concerned with the operation of ships, aircraft, mobile field survey parties, and field observatories to make the measurements and collect the data required for the publication of aeronautical and nautical charts and for scientific studies in geophysics and oceanography. The six programs are:

**GEODESY** • The Office of Geodesy and Photogrammetry conducts the basic geodetic program of the United States. This program, which was started in 1816, includes a continuing study of the figure of the earth, of geodetic astronomy, of the earth's gravity, of standards of measurement, of the mathematical adjustment of geodetic surveys on a continental scale; and the actual field surveys and office computations to establish a framework of many thousands of monumented geodetic control stations throughout the country that provide a unified framework for the control of local surveys, engineering works, and mapping.

The Office of Geodesy and Photogrammetry also makes the photogrammetric surveys required for production of aeronautical charts and of nautical charts such as, for example, the mapping of airports and the mapping of the coastline of the United States.

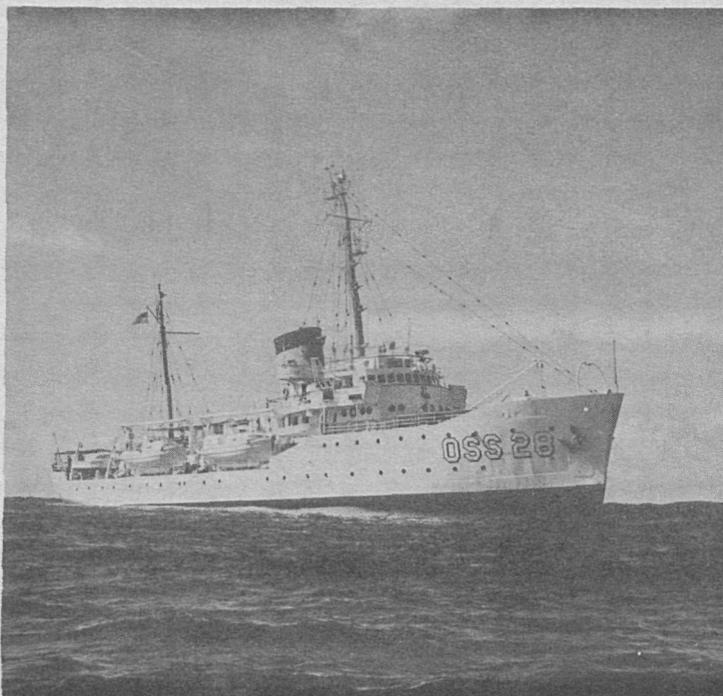


THESE PORTABLE STEEL TRIANGULATION TOWERS ARE USED IN THE SURVEY'S GEODETIC PROGRAMS.



A CAMP SITE IN ALASKA PROVIDES A TEMPORARY HOME FOR A GEODETIC SURVEYING PARTY.

C&GS SHIPS SUCH AS THE EXPLORER  
PERFORM VITAL MISSIONS IN HYDRO-  
GRAPHY AND OCEANOGRAPHY.



**HYDROGRAPHY AND OCEANOGRAPHY PROGRAMS** • These interdependent programs are handled by the Office of Hydrography and Oceanography, which operates all ESSA vessels, makes the surveys required for the production of nautical charts, publishes nautical charts and related publications, and makes the oceanographic surveys necessary to provide data for the Institute of Oceanography.

Surveys for the production and up-to-date maintenance of nautical charts include: photogrammetric mapping of coastal areas (done by the Office of Geodesy and Photogrammetry); hydrographic surveys to map the bottom topography, to find and chart submerged dangers to navigation and to chart safe channels for shipping; and tide and current surveys to provide information for the prediction and publication of the time and range of the tide, and the direction and velocity of tidal currents.

Oceanographic surveys include deep-sea hydrography as needed to study and chart the bottom topography of the oceans and the collection of

many types of oceanographic data for study of the physical, chemical, and biological properties of the world's oceans.

**AERONAUTICAL CHARTS** • This program includes the publication and up-to-date maintenance of the several series of aeronautical charts of the United States and its territories that are required for the safety and control of air navigation. The program includes field surveys and investigation; compilation, reproduction, and distribution; and research and development in portrayal of aids to the navigator. This program is conducted by the Office of Aeronautical Charting and Cartography, which also provides cartographic services for the ESSA organization, including the reproduction and printing of both the aeronautical charts and the nautical charts compiled by the Office of Hydrography and Oceanography.

**PROGRAMS IN SEISMOLOGY AND GEOMAGNETISM** • These are conducted by the Office of Seismology and Geomagnetism.

The primary purpose of the seismology program is to protect life and property from the destructive effects of earthquakes and, within this overall mission, to provide data for the design of buildings and structures in areas subject to earthquakes-- and eventually to find means of predicting the place and time of occurrence of destructive earthquakes.

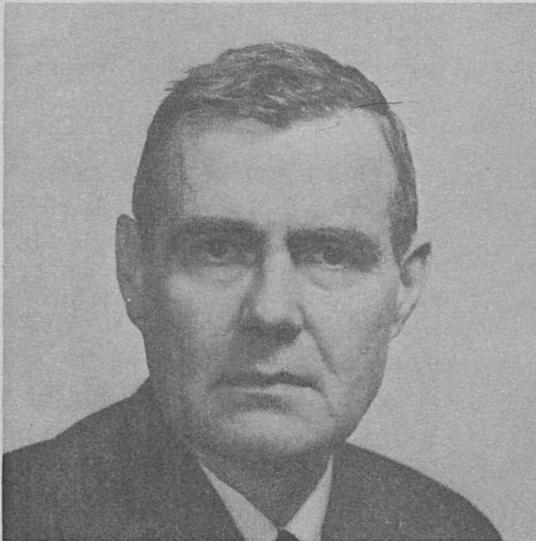
This activity includes the operation of a worldwide system of seismograph stations, in cooperation with American universities and foreign governments, for the location of earthquakes; the operation of strong-motion seismographs in western United States, Latin America, and Alaska to study the nature and magnitude of destructive earthquake motions; the operation of a seismic sea-wave warning system in the Pacific to protect life and property on the islands and around the rim of the Pacific Ocean; and a continuing study and distribution of data on seismology.

In a typical year, the Coast and Geodetic Survey receives information on some 40,000 earthquakes that occur throughout the world, and 3,000 to 4,000 of these are located very accurately. Not all of them are destructive earthquakes, of course, but many would cause damage if they occurred in heavily populated areas. Our historical record of earthquakes in the various States of the Union shows that not all of the destructive earthquakes occur on the west coast. In fact, the Charleston, South Carolina, earthquake of 1886 was one of the most destructive earthquakes in history.

Studies of the earth's magnetism were first undertaken by the Coast and Geodetic Survey in 1833, to determine the direction and force of the magnetic field so that the mariner could know the relationship between magnetic north and true north at any place. This information also was needed by land surveyors and later for air navigation. These important phases of our work still continue, but today this program is part of an

international effort to understand, to predict, and to utilize the phenomena of the earth's magnetic field, not only as an aid to navigation and to surveying but also as an important part of the overall study of space and for space exploration. The Coast and Geodetic Survey operates 11 magnetic observatories in the United States, many of these in cooperation with universities, and three observatories in Antarctica; conducts field surveys for repeat measurements of the force and direction of the magnetic field; and is the central repository for worldwide geomagnetic data for the United States.

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**REAR ADMIRAL JAMES C. TISON, JR.** The new Director of the Coast and Geodetic Survey, Rear Adm. James C. Tison, Jr., has been Deputy Director of the agency since August 1961. Joining the Survey in 1929, Adm. Tison has served aboard the C&GS Ships Natama, Hydrographer, Surveyor, the old and new Explorer, Westdahl, and Lydonia, and also with survey parties in the United States, the Gulf of Mexico, the British West Indies, and the Bahama Islands. In 1955, he was named geodetic officer for technical liaison and cooperation between C&GS and the Air Force Missile Test Center at Cape Kennedy, where he remained for two years until coming to C&GS headquarters in Washington as Assistant Chief of the Geodesy Division. After spending an academic year (1958-1959) at the Industrial College of the Armed Forces, he served as Assistant Director for Administration until his appointment as Deputy Director in 1961.

Adm. Tison served with the Air Force from 1942 until 1949, advancing to the rank of colonel. He was awarded the USAF Legion of Merit in 1946. A native of South Carolina, he graduated from The Citadel with a B.S. degree in civil engineering. He is a member of the American Geophysical Union and the Society of American Military Engineers.

Capt. Horace G. Conerly



Capt. Raymond H. Tryon, Jr.



**CAPTAIN HORACE G. CONERLY.** The Acting Associate Director for the Coast and Geodetic Survey (Hydrography and Oceanography) is Captain Horace G. Conerly, former Chief of the Survey's Operation Division.

A graduate of Mississippi State University with a B. S. degree in civil engineering, Capt. Conerly joined the C&GS in 1930. His early service included a short period on a west coast field party and duty on board the Survey ships Surveyor, Guide, and Westdahl. After transferring to the east coast in 1942, he sailed with the Oceanographer and Lydonia out of Norfolk.

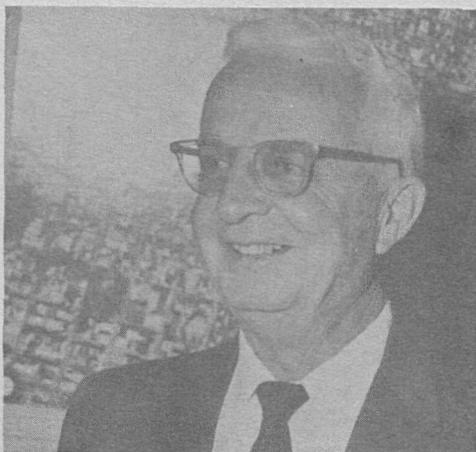
From July 1942 to 1946 he was with the Marine Corps in the Pacific Theater.

In 1946 he returned to the Coast and Geodetic Survey, where he again served on West Coast ships and in the Arctic. In 1962, he came to the Survey's headquarters to become Assistant Chief, Operations. He was named Chief of the division in January 1963.

**CAPTAIN RAYMOND H. TRYON, JR.** Captain Raymond H. Tryon, Jr., Acting Associate Director of the Coast and Geodetic Survey (Aeronautical Charting and Cartography) is a 35-year veteran of the C&GS. For a year before the formation of ESSA, he was Assistant Director of the Survey, in charge of the Office of Cartography. Before that assignment, Capt. Tryon was Chief of the Aeronautical Chart Division for seven years.

Capt. Tryon joined the Coast and Geodetic Survey in 1930 as a junior engineer, immediately following his graduation from the University of Vermont with a degree in civil engineering. Since then he has served on 12 ships of the Survey's fleet in the Atlantic and Pacific and also has seen extensive service in the United States from Florida to Alaska with numerous geodetic survey parties.

Capt. Tryon served with both the Army and Navy during World War II.



**Capt. Joseph E. Waugh**



**Capt. Edgar F. Hicks**

**CAPTAIN JOSEPH E. WAUGH.** The Associate Director (Acting) of Geodesy and Photogrammetry, Captain Joseph E. Waugh, has spent 22 of his 34 years of C&GS service aboard 12 ships of the agency's "white fleet."

After graduating from the University of Florida with a B.S. degree in civil engineering, he joined the Survey in 1930. Capt. Waugh came to C&GS headquarters at Washington in 1958 as Assistant Chief of Photogrammetry. He was Chief of the Nautical Chart Division for a year and a half, until February 1962, when he assumed his most recent position of Chief, Photogrammetry Division.

Awarded the Department of Commerce Silver Medal for outstanding service in 1964, Capt. Waugh is a member of the American Society of Photogrammetry, American Congress of Surveying and Mapping, and the Society of American Military Engineers.

### **CAPTAIN EDGAR F. HICKS**

Captain Edgar F. Hicks is the C&GS's Acting Director, Executive and Technical Services. He has been on the Survey's headquarters staff since 1957. Before the ESSA consolidation, he was Assistant to the Director, Executive Office.

On graduating from the University of Tennessee in 1930 with a B.S. degree in civil engineering, Capt. Hicks joined the Coast and Geodetic Survey in Washington, D.C. During his career with the Survey he has served aboard nine C&GS ships and several U.S. Navy ships from the Gulf of Mexico, throughout the South Pacific, to the waters of Alaska. He is a member of the Society for American Military Engineers.



**JAMES M. KLAASSE** James M. Klaasse, Acting Associate Director of the Coast and Geodetic Survey for Seismology and Geomagnetism, brings a variety of experience in Government and private industry to his new position. From 1941 to 1948, Mr. Klaasse worked at the U.S. Naval Ordnance Laboratory on the development and application of the airborne fluxgate magnetometers to oil exploration. Employed in private industry from 1948 to 1954, he participated in the development and manufacture of first-order optical theodolites, station-type portable fluxgate magnetometers, meteorological instruments, and high-precision optical measuring systems. For a two-year period during this time, he served as chief seismologist for a firm of consulting geophysicists, assisting in the organization and direction of one of the earliest major research programs on detection of clandestine underground nuclear explosives by seismic means.

In 1954, Mr. Klaasse briefly resumed his Government career as Supervisory Electronic Scientist, U.S. Air Force Headquarters, Office of Chief of Staff, Office for Atomic Energy. He then returned to private industry as Director of Research and Chief Engineer at the American Instrument Company, where he led the development of a wide variety of advanced laboratory research instruments. For two and a half years prior to joining the Coast Survey, he was Assistant Scientific and Technical Director for the Roland F. Beers Company, engaged in research on close-in seismic and engineering effects of underground nuclear detonations in the VELA Uniform, Plowshare, and weapons testing programs.

In late 1964, Mr. Klaasse was appointed Deputy Assistant Director for Research and Development of the Coast and Geodetic Survey. A member of the New York Academy of Sciences, the Society of Exploration Geophysicists, the American Geophysical Union, and a senior member of the Instrument Society of America, Mr. Klaasse has a B.S. degree in mathematics and physics from George Washington University. He is the author of numerous scientific papers and holds patents on magnetometers and other methods and apparatus for conducting geophysical surveys from an aircraft.



D.A. DAVIES AND DR. WHITE DISCUSS INTERNATIONAL PROGRAMS AND PLANS DURING THE WMO SECRETARY-GENERAL'S RECENT VISIT TO ESSA HEADQUARTERS.

**WMO Secretary-General Tours ESSA Facilities** • D.A. Davies, Secretary-General of the World Meteorological Organization, visited ESSA headquarters in Washington and the Weather Bureau's National Hurricane Research Laboratory in Miami in connection with his recent visit to the United Nations' Headquarters in New York. He was briefed on the organization of ESSA and held discussions on future programs of the WMO, particularly the meteorological satellite program and plans for the World Weather Watch.

**Admiral Karo Attends Paris Meeting** • Deputy Administrator Karo is chairman of the United States delegation to the UNESCO Intergovernmental Oceanographic Commission, which is holding its Fourth Session in Paris from November 3 to 12. Accompanying Adm. Karo as an advisor to the delegation is Dr. Harris B. Stewart, Acting Director of the Institute for Oceanography.

**Weather Bureau Executive Assistant Named** • Earl W. Estelle has been appointed Executive Assistant to Dr. Robert H. Simpson, Associate Director of Weather Bureau (Meteorological Operations). Mr. Estelle was formerly with the Bureau's Systems Development Office.

**"Long Shot" Test Provides Valuable Seismic Data** • An 80-kiloton nuclear device exploded underground on Amchitka Island in the Aleutians on October 29 as part of the Department of Defense LONG SHOT project, was monitored by the Coast and Geodetic Survey's worldwide seismograph network and provided much valuable data on the nature of seismic signals from underground nuclear tests and long distance travel times. Data gathered are also expected to be assets in differentiating between earthquakes and man-made underground seismic disturbances.

**Red Cross Honors C&GS for Blood Program** • ESSA's Coast and Geodetic Survey has been honored by the District of Columbia Chapter of the American Red Cross for giving 152 percent of its blood program quota for FY 1965. The Red Cross has presented the C&GS with a certificate citing the organization for its efforts during the program.

**Financial Management Postgraduate Grants Offered** • The Federal Government Accountants Association is offering financial and resource assistance to master's and doctoral candidates willing to undertake, as part of their academic program, research in the broad field of government financial management. For information on these grants, contact: Secretary, Federal Government Accountants Association, 1523 L Street, N.W., Washington, D.C.

**Tiros VII Loses Camera** • After 28 months of photographing worldwide weather, TIROS VII's Camera 2 is out of operation. Since its launching in 1963, TIROS VII has produced more than 100,000 meteorologically useful pictures and remained operational longer than any other satellite in the TIROS series. The satellite's other camera is still operative.

**Weather Bureau Warning Coordination Centers Established** • A number of Weather Bureau Area Forecast Centers have been designated Warning Coordination Centers and given the responsibility for coordinating the issuance of public severe local storm forecasts from units within their areas. The Warning Coordination Centers are located at Seattle, San Francisco, Los Angeles, Denver, Kansas City, Chicago, New Orleans, Boston, Miami and Washington, D.C.

**Dr. Cressman Attends NATO Group Meeting** • Weather Bureau Director George P. Cressman attended the meeting of the NATO Advisory Group on Meteorology in Brussels on October 26.

# **National Oceanic and Atmospheric Administration**

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