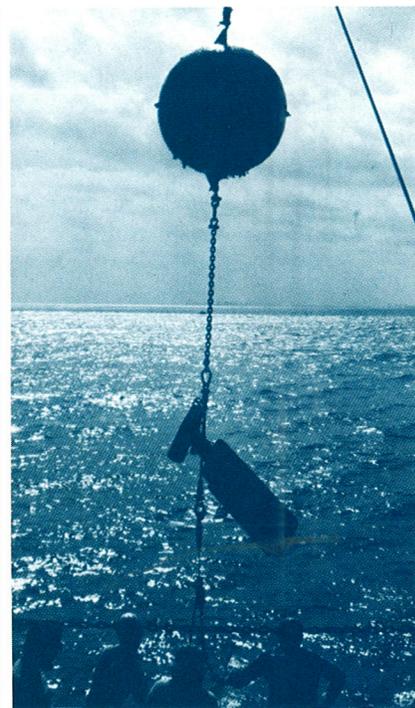
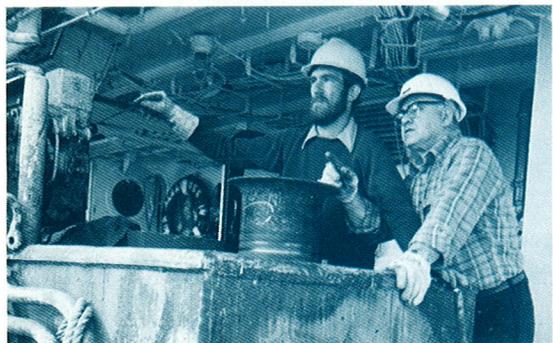
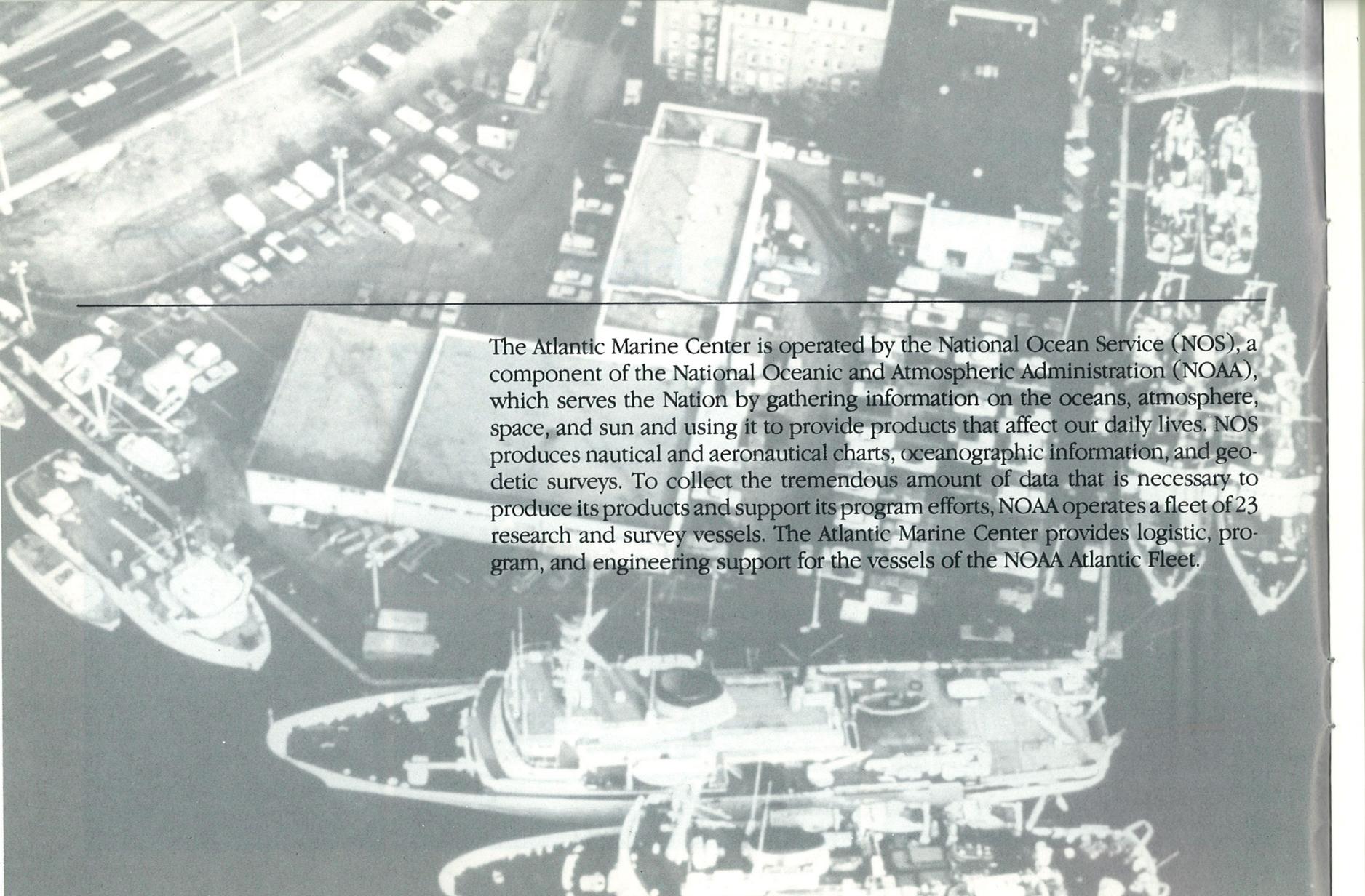


The Atlantic Marine Center Serves NOAA's Atlantic Fleet



U.S. DEPARTMENT OF COMMERCE
National Oceanic and
Atmospheric Administration
National Ocean Service



An aerial, black and white photograph of a port facility. Several large ships are docked at a pier. In the background, there are buildings and a parking lot filled with cars. A horizontal line is drawn across the middle of the image, separating the top part from the text.

The Atlantic Marine Center is operated by the National Ocean Service (NOS), a component of the National Oceanic and Atmospheric Administration (NOAA), which serves the Nation by gathering information on the oceans, atmosphere, space, and sun and using it to provide products that affect our daily lives. NOS produces nautical and aeronautical charts, oceanographic information, and geodetic surveys. To collect the tremendous amount of data that is necessary to produce its products and support its program efforts, NOAA operates a fleet of 23 research and survey vessels. The Atlantic Marine Center provides logistic, program, and engineering support for the vessels of the NOAA Atlantic Fleet.

The Atlantic Marine Center



A working ship at sea requires much more than the personnel and equipment needed to accomplish its mission. NOAA ships serve as both homes and workplaces, so maintenance and provisioning of them require careful planning and the expertise of many people. The ships must be supplied with fuel, spare parts, and household goods and supplies. Mission schedules must be precisely arranged, and the right equipment must be on board and operating properly. While at sea, the crew of a ship may need medical assistance or advice on how to repair a part or perform a task. In many ways, the vessel's link with the land is vital to its ability to fulfill its needs and perform its mission.



NOS's Atlantic Marine Center in Norfolk, VA, provides these and many other services for the vessels of the NOAA Fleet located on the east coast. Under the command of a rear admiral in the NOAA Corps, one of the Nation's seven uniformed services, the Marine Center provides logistic and engineering support for the vessels, and processes and compiles hydrographic and photogrammetric survey data.



Ships of the NOAA Fleet

Approximately 400 personnel work at the Marine Center and aboard the ships. These include officers of the NOAA Corps, and wage marine and civil service employees who provide a wide range of skills. The officers and crews of the NOAA vessels, with their varied skills and experience, work closely with the Marine Center personnel to accomplish program objectives.

The Marine Center's location in Norfolk, VA, serves as home port to the NOAA ships *Mt. Mitchell*, *Peirce*, *Whiting*, *Ferrel*, *Rude*, and *Heck*. Norfolk, a major center of the maritime industry, is an ideal location, providing ready access to marine repair yards and other marine services.

The Marine Center also provides support to the *Researcher*, based in Miami, FL; the *Albatross IV* and *Delaware II* in Woods Hole, MA; and the *Oregon II* and *Chapman* in Pascagoula, MS.

The Office of Marine Operations in Rockville, MD, provides the Marine Center with administrative, policy, and program planning direction, but the Marine Center performs the myriad tasks that the operation of a fleet of ships requires.

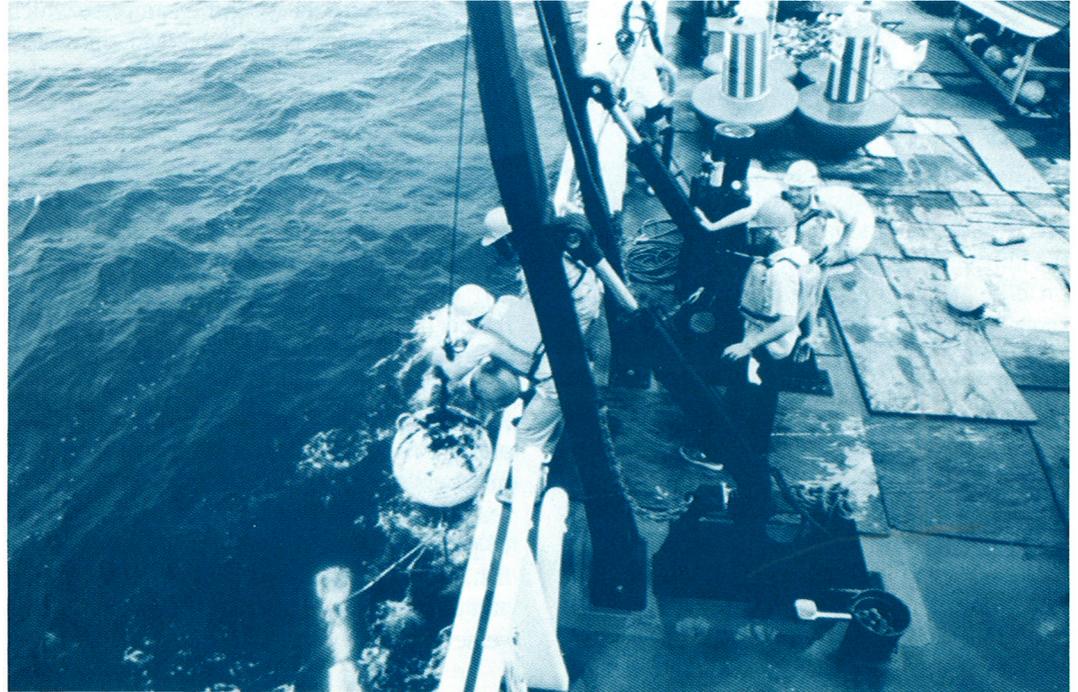
The fleet of research and survey ships that the Atlantic Marine Center supports operates in the Atlantic Ocean and adjoining seas, the Gulf of Mexico, the Great Lakes, and U.S. territorial waters of the Caribbean. On occasion the *Researcher*, one of the largest vessels in the NOAA fleet, undertakes oceanographic research in the Pacific Ocean.

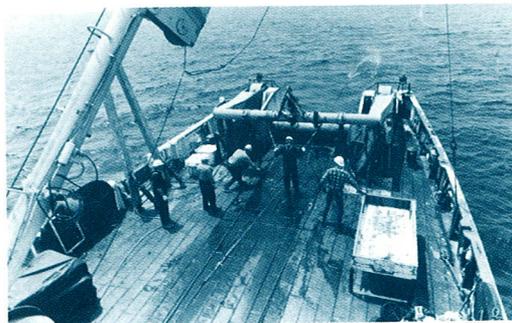
The NOAA Fleet conducts surveys and performs research that support the work of all NOAA components, which are the National Ocean Service; the National Weather Service; the National Marine Fisheries Service; the National Environmental Satellite, Data, and Information Service; and the Office of Oceanic and Atmospheric Research. To perform the varied tasks they are faced with, the vessels are equipped with specialized scientific laboratory facilities, deck machinery, small boats and launches, and electronic systems that support communications, navigation, scientific investigations, and data acquisition and processing.



Oceanographic Research

The NOAA ship *Researcher*, AMC's largest research vessel, engages in worldwide research, primarily investigating marine geology, air-sea interactions, and the ocean's physical and chemical properties. The vessel is equipped to analyze much of the data that it collects. Physical samples can be analyzed in the ship's laboratory or in one of the specialized vans that may be brought on board for processing chemical, biological, or gaseous samples. Mud, silt, and other bottom marine geological samples are analyzed in the ship's wet lab, which can be hosed down afterwards. The *Researcher* is also capable of housing meteorological, photographic, and gravity laboratories and has a portable helicopter landing platform.





Electronic equipment used for oceanographic research occupies many locations throughout the ship. On deck, electronics equipment is attached to cables to show the amount paid out, the tension under tow, and the cable angle during dredging operations for hard samples such as manganese nodules. Electronic equipment mounted in the hull of the ship includes sonic depth finders; current profilers, which measure the direction of currents at various depths beneath the ship; and a narrow beam echo sounder, which provides depths in deep water. In the laboratory, electronic equipment is used to analyze water samples for salt content and traces of metals and microscopic organisms.

The *Ferrel* is used to collect fish and bottom sediment samples, which are prepared and stored on board so that they can later be analyzed in a laboratory. The *Ferrel* is equipped with echo sounders and fish nets and mechani-

cal devices for collecting the samples, which scientists prepare and analyze in the ship's laboratory.

Fishery Research

The Atlantic Marine Center provides support to the *Oregon II*, the *Albatross IV*, the *Delaware II*, and the *Chapman*, which are outfitted to conduct fishery research.

Each vessel of NOAA's Fleet that supports fishery research was designed for the study of a particular species and habitat of fish, so each is unique in its configuration, but all are engaged in estimating the populations of various species of fish and determining whether their numbers are increasing or decreasing. Fishery research also involves assessment of the effects of pollution on fish habitats, examination of fish, and analysis of water. Tests of fishing nets and equipment are also conducted aboard the vessels.





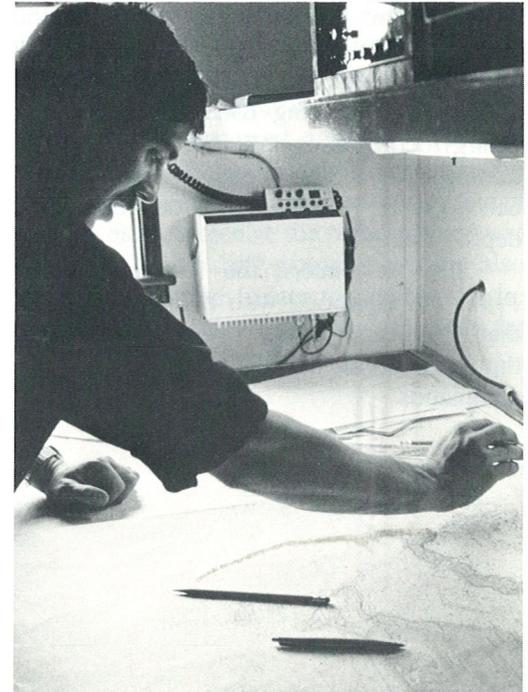
Their laboratory facilities vary, but all the vessels provide wet laboratories where biological specimens are washed, examined, and preserved and sea water is analyzed. The ships' dry laboratories contain instrumentation needed for further analysis.

In addition to the electronic equipment necessary for safe navigation and communication, all of these vessels have echo sounders to determine the depth of the water and fish finders and sonars to find and track the movement of fish. The fishfinder on the *Oregon II* also provides a video display. The *Oregon II* and *Chapman* are equipped with netsondes, acoustic devices that provide information on the operation of the net. Doppler speed logs on the *Albatross IV*, the *Delaware II*, and the *Chapman* report the speed of the ship's movement over the sea floor.

Researchers usually provide any specialized nets that are needed. The crews use winches and net reels to deploy and return the nets and use winches and A-frames for fishery operations and oceanographic measurements made "over-the-side," that is, in the water and away from the ship. Cranes and booms may be used in these operations and to resupply the vessel.

Hydrographic and Bathymetric Surveying

The *Mt. Mitchell*, the *Peirce*, the *Whiting*, the *Rude*, and the *Heck* are equipped to perform hydrographic and bathymetric surveys, which provide the bottom configuration and obstruction and water depth information that is needed for preparing nautical charts and bathymetric maps. This work is especially important on the east coast, where the waters and shoreline change rapidly as a result of high activity and population density.





Since knowledge of a ship's exact position is necessary during hydrographic surveying, all the ships are equipped with modern navigation equipment, including Loran-C receivers, radars, gyrocompasses, and survey accuracy positioning systems. Water depths are measured by echo sounders, which provide continuous depth profiles.

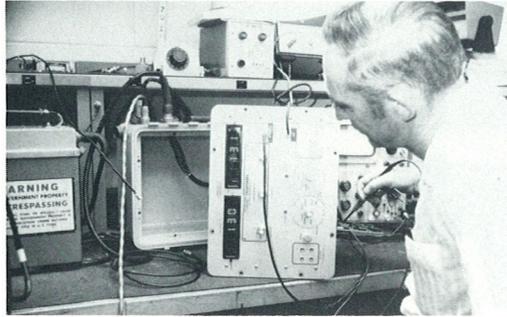
The *Mt. Mitchell*, the *Whiting*, and the *Peirce* are equipped with computer systems that acquire and display sounding data in real-time and provide the helmsman with steering commands.

Each of the ships outfitted for hydrographic surveying is equipped with launches that are used to survey areas close to shore where the larger vessels cannot go. The launches are also equipped with echo sounders, survey positioning systems, and computer systems that are compatible with those of the mother ships.

Deck machinery on the vessels includes oceanographic winches with conductive cable and wire rope, A-frames, cranes, and booms. The winches and A-frames are used to make over-the-side oceanographic measurements, and the cranes and booms lift heavy gear, small boats, and supplies for the ship.

The *Rude* and *Heck* are unique hydrographic survey vessels, having been specially built to perform wire drag operations. These vessels suspend a weighted wire between them at preselected depths and then travel parallel courses anywhere from a few hundred yards to 2 miles apart across the survey area. As the wire is towed, it and the buoys attached to it describe a gentle "U" shape, but if the wire encounters an obstruction, the apparatus will show a "V." The ships' launches are then used to precisely locate the obstruction and measure the least depth over it, and divers may also examine the obstruction. These ships are also capable of performing independent side-scan sonar surveys to locate wrecks or obstructions and are equipped to conduct independent hydrographic surveys.

Fleet Support Services



Shore-based personnel at the Atlantic Marine Center provide the many services needed to keep the ships operating. Engineering personnel prepare specifications for repair, maintenance, and modification and oversee contractors' work to ensure that it conforms to the specified standards.

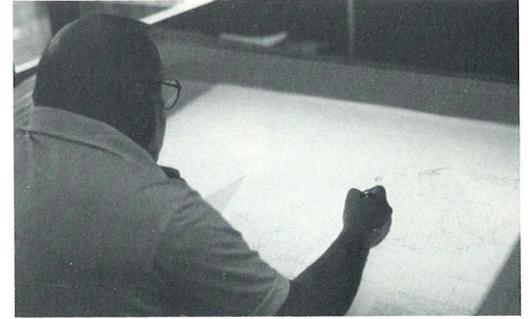
Electronics engineers and technicians direct their attention to the on-board equipment. Before each voyage, they ensure that a vessel has the proper equipment to perform its assigned mission, that it is in good working order, and that navigation and communication equipment is properly functioning. When electronic systems require modification or new systems must be acquired and installed, they prepare specifications for the work. Technicians at the Marine Center repair equipment as needed and often accompany the ship to provide maintenance service during its mission.

The officers and crew of a vessel are responsible for its supply and maintenance. They work with the electronics and engineering personnel to ensure that the vessel is capable of performing its assigned missions and that equipment is in working order. At the end of each mission, ship personnel process data, write reports, and begin to prepare for the next project by purchasing fuel and supplies, performing needed maintenance activities, and taking aboard equipment and gear to test and store it.

The Marine Center also maintains diving equipment, ensures that all divers working off its ships are properly trained and in good physical condition, and provides assistance in emergency and problem situations involving diving operations.

While at sea, vessel personnel communicate daily with the Marine Center. During these communications, shore-based personnel provide advice on how to handle any equipment problems that have occurred, and when the parts needed to repair the equipment are not in the ship's stock, Marine Center personnel arrange for the vessel to receive the parts as quickly as possible. These daily communications also enable the Marine Center to respond to the ship's administrative needs and requests for fuel, supplies, and services.

Program Support Services



The success of a vessel's mission greatly depends on the planning that goes into it. Marine Center personnel work closely with the users of NOAA vessels to ensure that the proper equipment is available and that proper scheduling arrangements are made. They assist users in preparing and reviewing project instructions, which provide detailed schedules and descriptions of tasks to be performed.

Other Marine Center personnel support NOS's mission of preparing nautical charts. To collect information needed to supplement the hydrographic data collected by the ships, the Atlantic Marine Center operates four hydrographic field parties, which use motor launches to survey coastal waters that may be inaccessible to the larger vessels.

Both the field parties and ships submit their hydrographic data in digital and analog formats to personnel at the Marine Center, who check its accuracy and resolve any discrepancies. Many corrections must be made, including those for tide level, sound velocity, and the positioning system that was used. To verify the accuracy of the data, it is compared with previously collected data and with data collected during other surveys on either side of it. Much more information is collected than will eventually be depicted on a chart to ensure that all dangers to navigation will be shown.

Once the information has been verified, it is electronically processed for storage on hard disks and magnetic tapes, and Marine Center personnel add information that the ship has not provided in a digital format. Such information includes the type of sea bottom sediment in a particular area and shoreline changes observed by the ship's crew.

The digitized information is run through a computer that produces a plot tape. This tape provides the information that the Marine Center's flatbed plotter needs to produce a smooth sheet, which is the Marine Center's final product—a graphic depiction of the hydrographic survey information. Depth curves, shorelines, and aids to navigation are later added to provide the chart that the public sees.



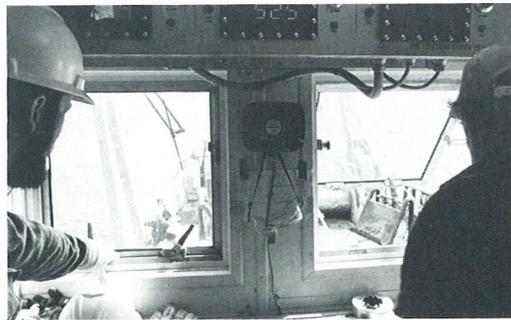
Fleet Activities

The Marine Center's photogrammetric field survey crews, using aerial photographs with photogrammetric and ground survey methods, provide control for hydrographic survey operations and data for locating shoreline features on nautical charts. They also survey approximately 180 major U.S. airports each year to provide data for locating obstructions, navigational aids, and airport features on aeronautical charts, which NOS produces for the Federal Aviation Administration (FAA).

Combining field survey data with data from aerial photographs, photogrammetric compilation personnel at the Marine Center use stereoplotters to construct shoreline manuscripts for nautical charts and airport obstruction charts for NOS and FAA aeronautical products.



NOAA vessels are well-suited to the nature of oceanographic research, which demands an interplay of a variety of disciplines. To derive information about the character of the ocean, scientists and technicians must study its geophysics, chemistry, physics, and biology. For instance, NOAA vessels have undertaken climate studies in which the interface of the air and sea are examined. Doing this requires a chemical analysis of the composition of the water column and an investigation of the physics involved in the movement of ocean water. NOAA vessels are, of course, also equipped to perform charting surveys, which support the National Ocean Service's nautical charting responsibilities.



While the vessels primarily support missions that are specified by NOAA, their resources are available to other government agencies, private industry, and academia. Using NOAA vessel time, an international group of academicians has studied the effects of hydrothermal vents on the ocean floor. The Navy and NOAA have worked cooperatively on NOAA vessels to chart the Caribbean, and private industry has contracted NOAA's services to obtain cable route surveys.

Several types of arrangements are available for establishing the use of NOAA vessel time. *Ancillary projects* are added to the vessel's primary mission and are carried out by ship personnel under the supervision of the commanding officer or chief scientist. If no personnel or equipment are put aboard and the project is considered to be a legitimate and desirable element of the overall mission, no charge is made for the service. *Piggyback projects* are accomplished along with the primary

mission on a non-interference basis. The sponsor of a piggyback project may put personnel and equipment aboard, but must pay the food costs for additional personnel and the costs of any modification necessitated by the installation of equipment. Because *cooperative projects* provide valuable data to both NOAA and the cooperating organization, costs are shared. These projects may be conducted by personnel from the cooperating organization along with vessel personnel, or by vessel personnel alone. *Reimbursable projects* are primarily accomplished by vessel personnel for the benefit of the requesting organization, which bears the full cost of the project.

To make the necessary arrangements for conducting these types of projects, Atlantic Marine Center personnel work with potential users to identify project objectives, equipment

and personnel requirements, and the type of arrangements needed. The potential user may be referred to a NOAA laboratory with similar interests so that the two may maximize their resources.

Updated information on equipment and planned activities is provided through the NOAA Fleet Information Exchange publication that is available from the Atlantic Marine Center. A ship operation plan provides additional details on sailing schedules, planned missions, and availability of the various vessels.

The History of the Atlantic Marine Center

The Atlantic Marine Center was established as the Norfolk Office in 1933 when NOAA's predecessor agency, the U.S. Coast and Geodetic Survey, operated two ships in the Norfolk area. At that time the office served primarily as a public relations and processing office, but between 1936 and 1939 a shore plotting office and airport chart compilation unit were added and the number of ships increased to six. The office's involvement in activities associated with World War II resulted in an increase of its staff from 10 to approximately 100. During the war the number of ships assigned to the office varied from 6 to 10 depending on transfers to and from the Department of Defense, and the office became more active in compiling aeronautical charts, securing dock space, and performing administrative duties for the ships. Between 1959 and 1963,

the office became increasingly involved in oceanographic work, and during the 1960's the Coast and Geodetic Survey Fleet was modernized and expanded. In 1965 when the Coast and Geodetic Survey, the Weather Bureau, and the Central Radio Propagation Laboratory were combined under the newly formed Environmental Science Services Administration (ESSA), the office was renamed the Atlantic Marine Center and was made responsible for all field operations of ships, field parties, airport mobile parties, and field offices located in Boston, New York, and New Orleans. ESSA was reorganized and became the National Oceanic and Atmospheric Administration (NOAA) in 1970.

For further information on the Atlantic Marine Center or on the use of NOAA ship time, contact:

**Director, Atlantic Marine Center
National Ocean Service, NOAA
439 West York Street
Norfolk, VA 23510
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NOAA's Atlantic Fleet

CLASS	NOAA SHIP	HOMEPORT	GENERAL DESCRIPTION							MISSION					
			Length (feet)	Displacement (tons)	Cruising Speed (knots)	Endurance (days)	Survey Launches	Scientific Accommodation	Bow Thruster	Helicopter Platform	Laboratory	Charting & Mapping	Environmental Assessment	Fisheries Research	Atmospheric Research
	Researcher	Miami, FL	278	2,963	13	31		16	●	●	●				●
	Mt. Mitchell	Norfolk, VA	231	1,800	11	22	4	4	●		●	●			
	Peirce	Norfolk, VA	163	907	12	20	2	2				●			
	Whiting	Norfolk, VA	163	907	12	20	2	2				●			
	Oregon II	Pascagoula, MS	170	952	12	31		15			●			●	
	Albatross IV	Woods Hole, MA	187	1,089	10	16		15	●		●			●	
	Delaware II	Woods Hole, MA	155	758	11	24		9			●			●	
	Chapman	Pascagoula, MS	127	520	9	14		6	●		●			●	
	Ferrel	Norfolk, VA	133	360	8	9		6	●		●		●		
	Rude	Norfolk, VA	90	220	9	3		0				●			
	Heck	Norfolk, VA	90	220	9	3		0				●			





April 1986

* U.S. GOVERNMENT PRINTING OFFICE: 1986—152-106