THE U.S. COAST GUARD:

ITS MISSIONS AND OBJECTIVES

DEPARTMENT OF TRANSPORTATION

1977

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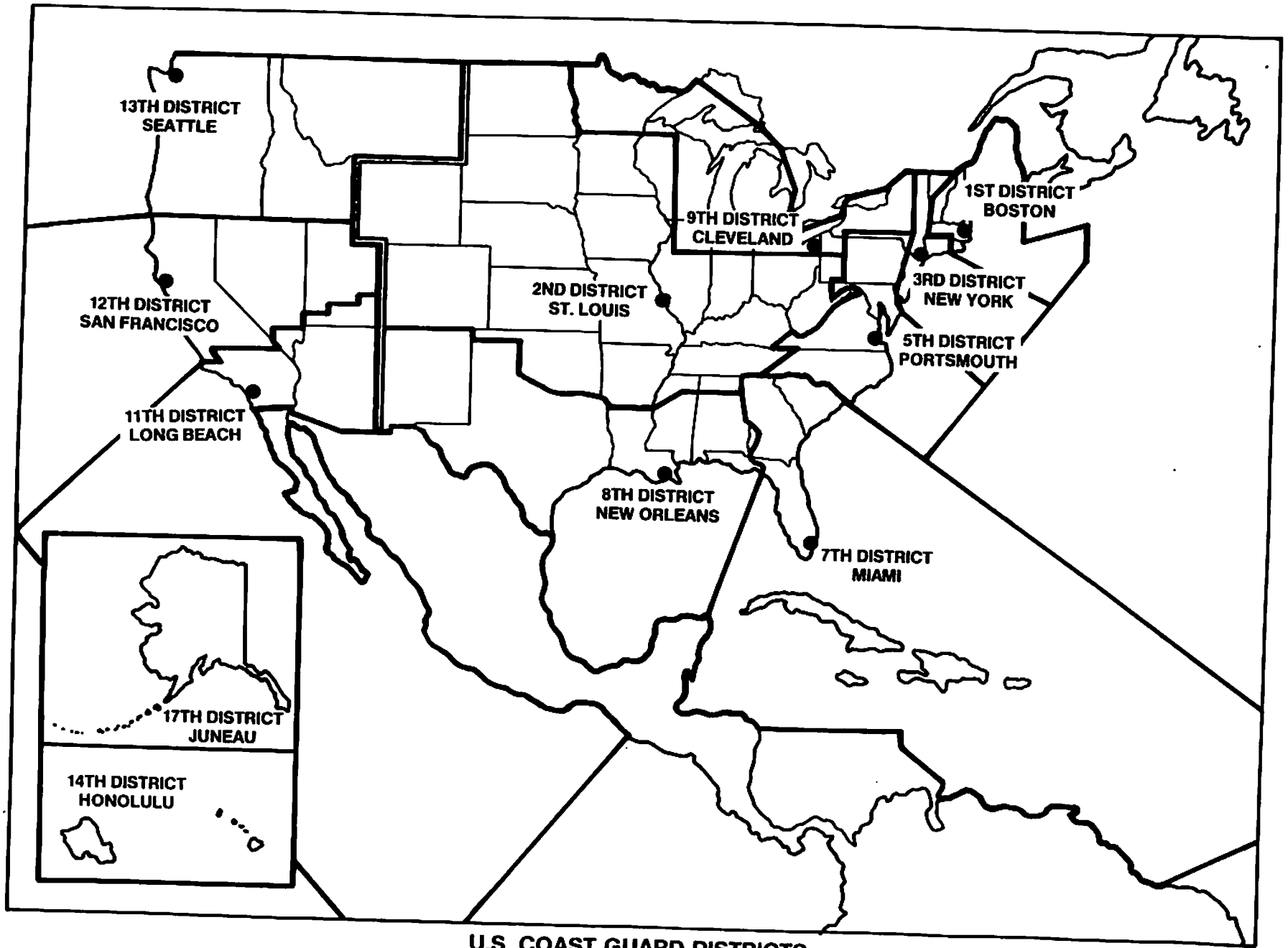


U.S. COAST GUARD DISTRICTS

INTRODUCTION

Although the Coast Guard is one of the oldest Federal agencies, there is a widespread lack of understanding of our purpose or mission as evidenced by questions occasionally raised by the general public and by members of other government bodies. This uncertainty indicates that we could do a better job of presenting the overall purposes, objectives and missions of the modern Coast Guard in its service to the nation and humanity. This booklet is written to that end. It contains detailed descriptions of each of our 13 operational missions and a summary description of our 13 support missions. (Operational missions directly serve the public, while support missions primarily serve other Coast Guard missions.) The diagram on pages 2 and 3 provides a temporal perspective on the development of our operational missions.

These missions must be considered in light of the service's purpose and objectives. The 37,000 military and 7,000 civilian personnel of the Coast Guard constitute at all times an operational law enforcement agency having a single purpose: to serve, preserve and protect our citizenry in the marine environment.

While it is difficult to describe succinctly the various services performed by the Coast Guard, there are seven basic objectives which collectively move us toward achievement of our purpose. They are:

- To minimize loss of life, personal injury, and property damage on, over, and under the high seas and waters subject to our jurisdiction;
- To facilitate waterborne activity in support of national economic, scientific, defense, and social needs;
- To maintain an effective, ready, armed force prepared for and immediately responsive to specific tasks in time of war or emergency;
- To assure the safety and security of vessels and of ports and waterways and their related facilities;
- To enforce Federal laws and international agreements on and under waters subject to the jurisdiction of the United States and on and under the high seas where authorized;
- To maintain or improve the quality of the marine environment;
- To cooperate with other governmental agencies and entities (Federal, State and local) to assure efficient utilization of public resources and to carry out activities in the international sphere where appropriate in furthering national policy.

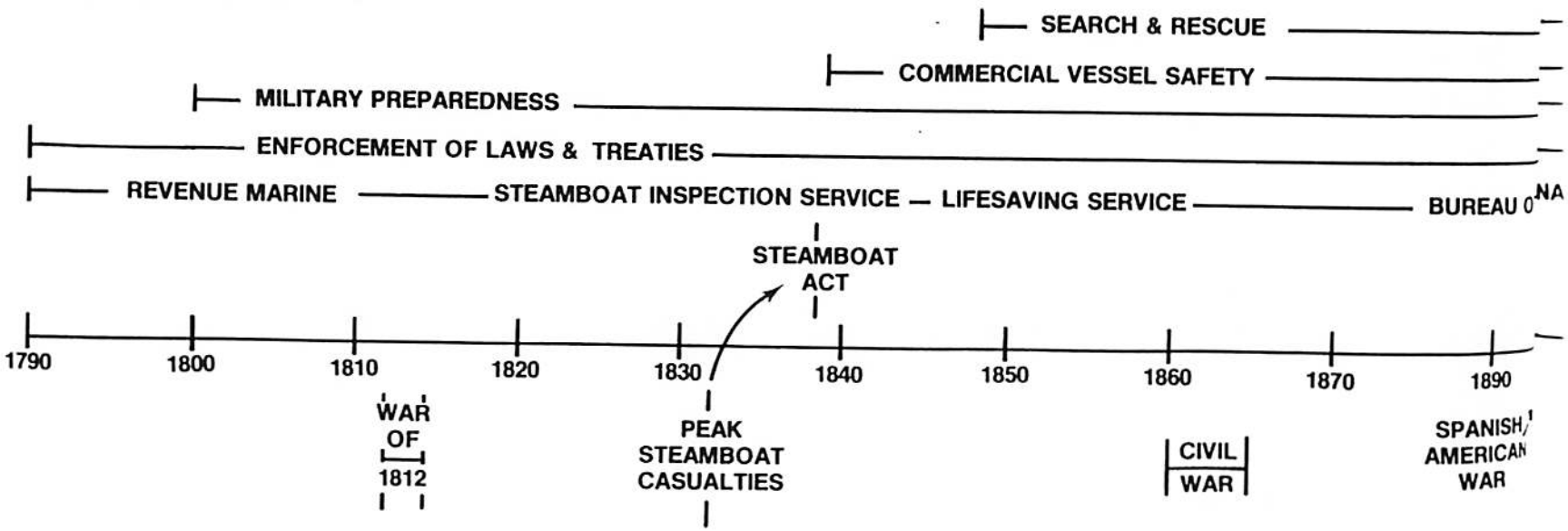
The operational missions or programs described herein contribute directly to achieving these objectives. The manner in which the operational activities of the Coast Guard have been divided into missions reflects the requirements of program budgeting, a useful management tool we adopted in 1965. It is imperative for the reader to remember that these divisions are reasoned but nonetheless artificial. Our small service functions effectively because it has successfully prevented such artificial divisions from obscuring its underlying multimission concept. Our ships, boats,

and planes are designed to optimize versatility across a broad range of operational missions. Similarly, while we have many professional specialities, we are essentially generalists, trained in many skills and ready to serve in many roles. Thus, members with extensive experience in Search and Rescue (SAR) may be assigned to develop recreational boating and safety regulations which in turn will reduce future SAR workloads.

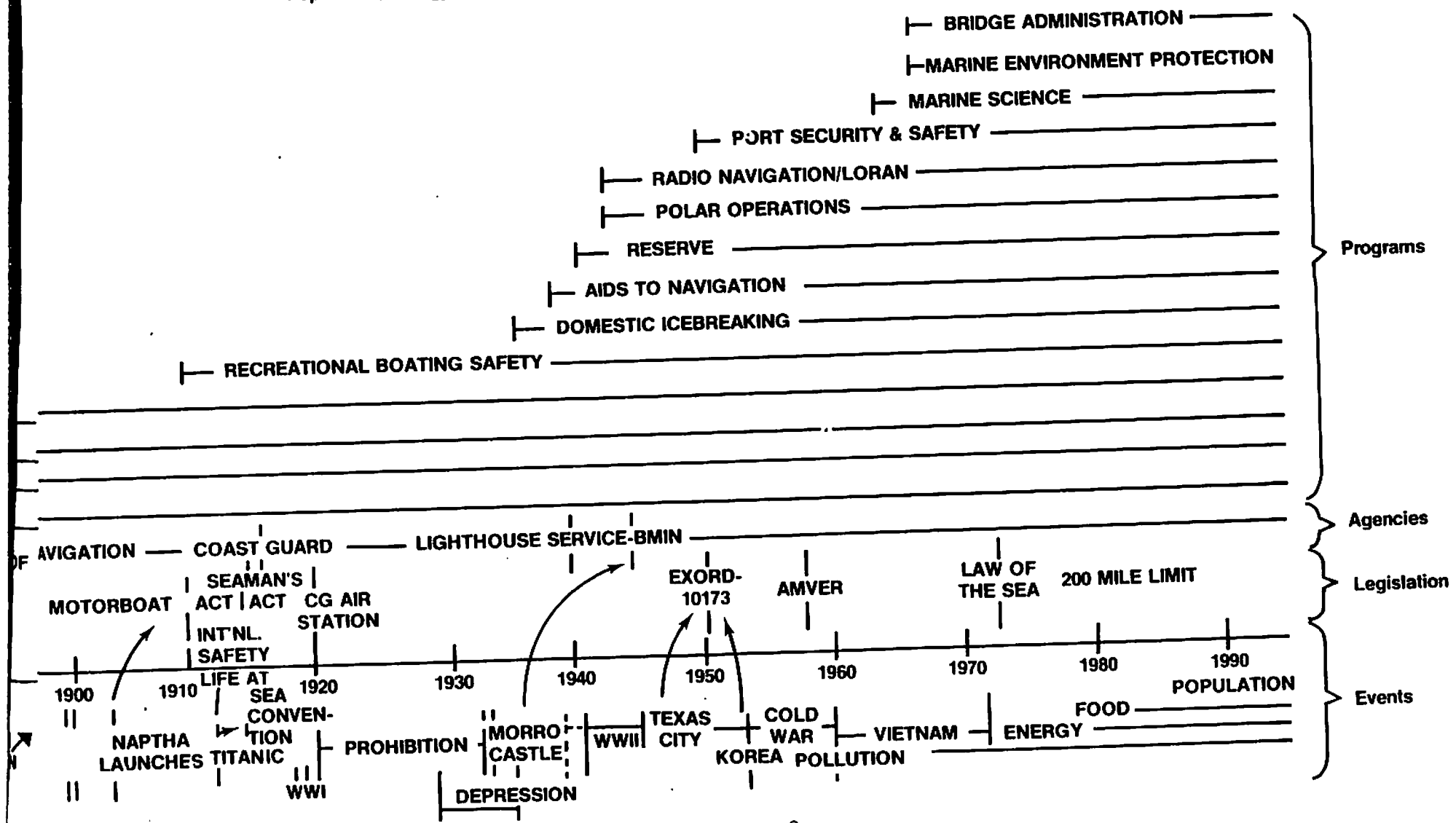
The Revenue Marine, our lineal forebear, was founded in 1790 to enforce customs laws and facilitate maritime commerce by suppressing piracy. Today, Enforcement of Laws and Treaties (ELT) is still one of our largest operational programs; facilitation of waterborne activity remains one of our objectives. Throughout our history, additional missions and objectives have developed in response to the needs of the country; the history of the Coast Guard reflects the growth and maturation of our nation. The collective wisdom of two centuries of government has produced the modern Coast Guard, today's optimum structure for the preservation and protection of life, property, and resources in the marine environment. While proud of our traditions, we are not bound by them. We look forward with anticipation to the next two centuries and the challenges they may bring.

O. W. Siler
Admiral, U.S. Coast Guard
Commandant

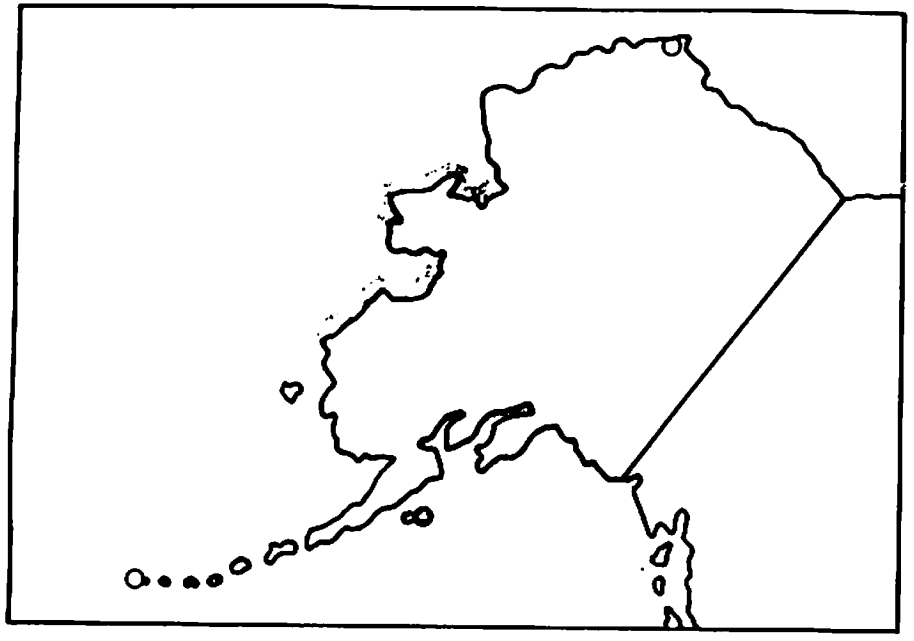
A LINEAR PERSPECTIVE
U.S. COAST GUARD 1790 - 2000

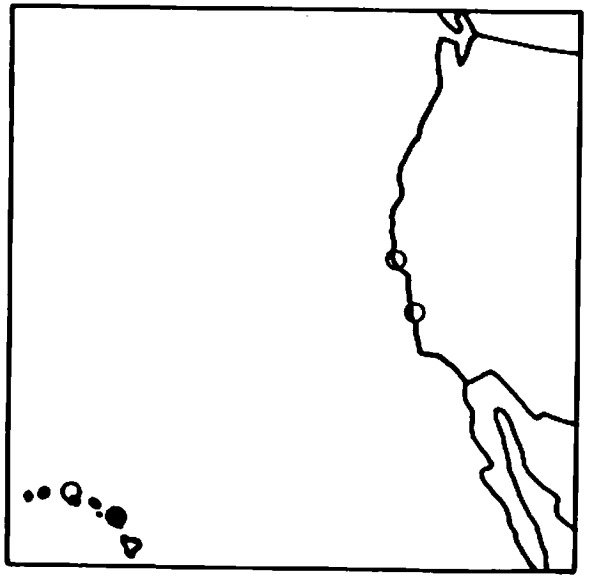


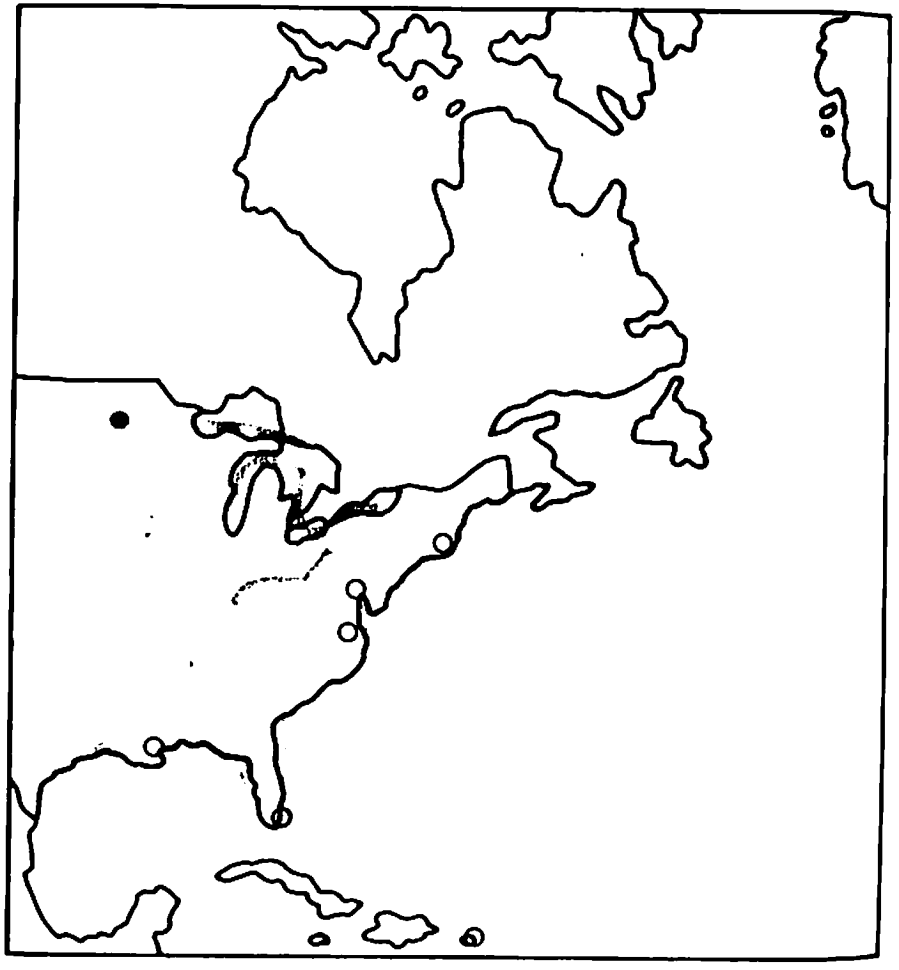
BMIN : Bureau of Marine Inspection & Navigation
EXORD 10173 : establishment of peacetime PSS program
Naptha Launches : early speedboats
Population, Energy, Food, Pollution : emerging problems



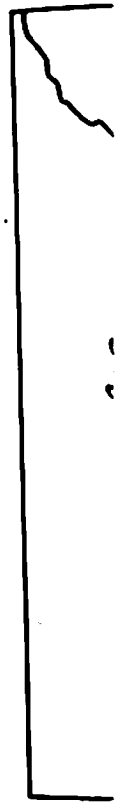
THE COAST GUARD'S OPERATIONS AROUND THE WORLD

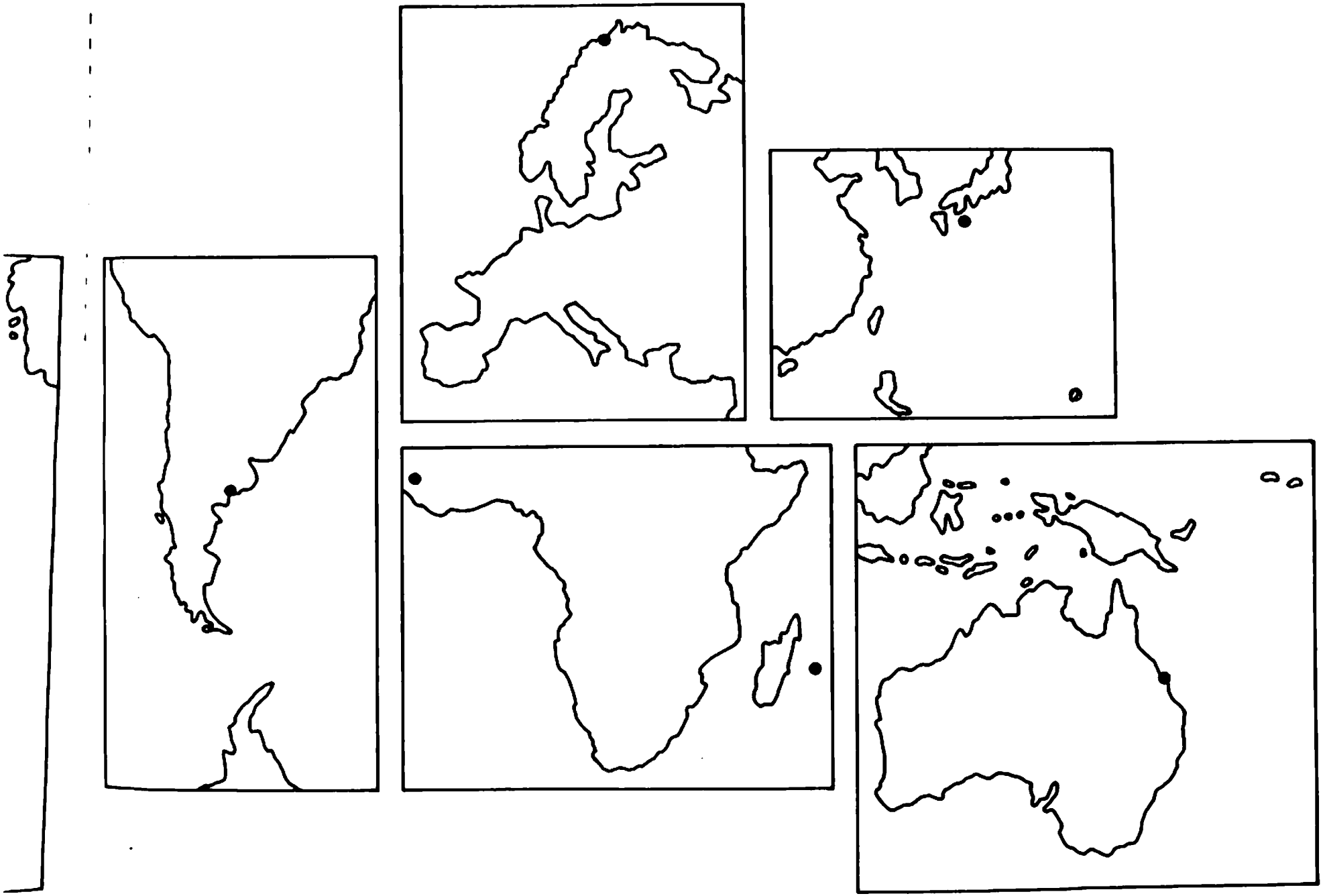


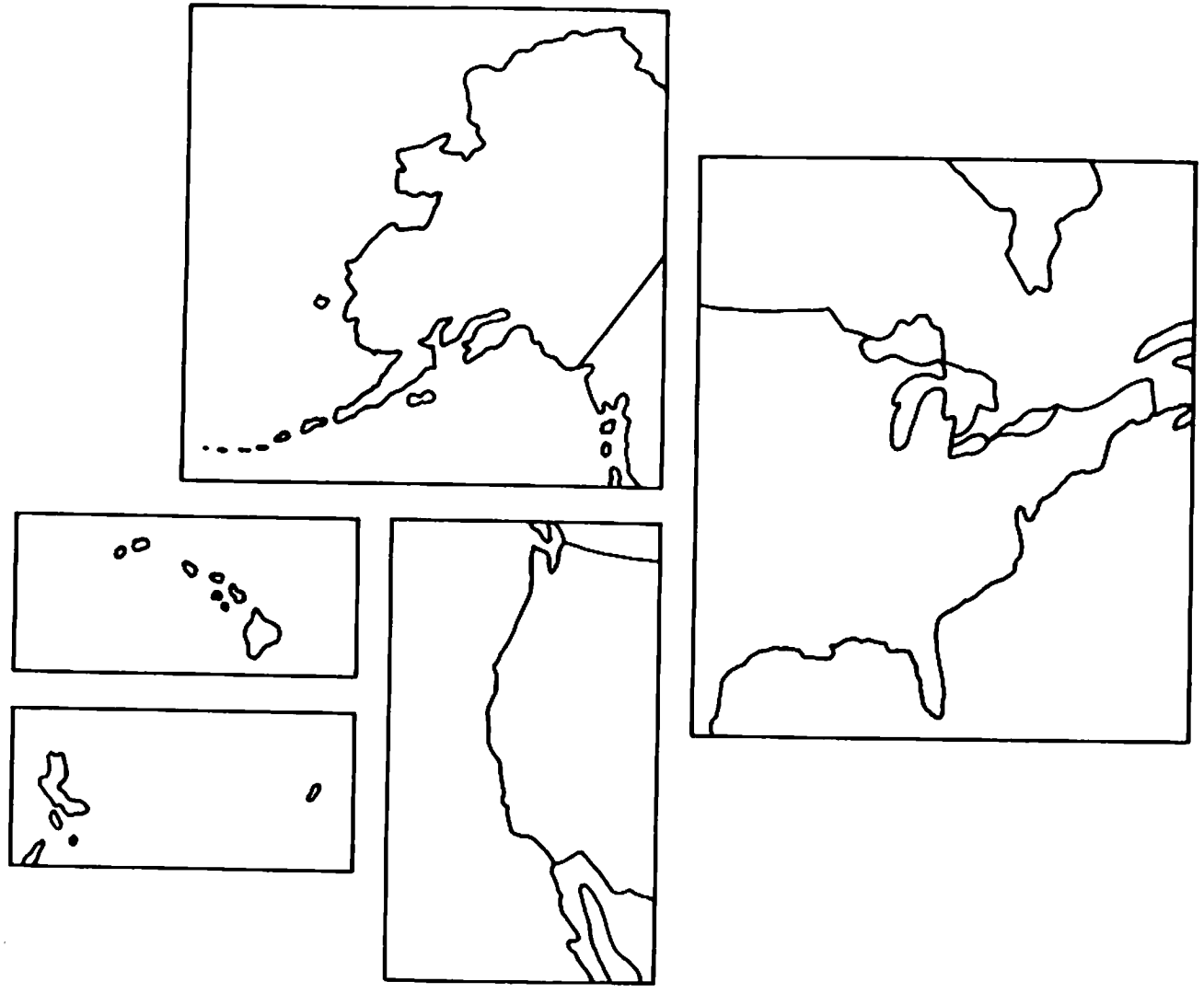




- Short Range Aids to Navigation
- ● Omega Stations
- ○ Communications-Radio Stations
- Marine Science Activities
- Enforcement of Laws and Treaties







SHORT RANGE AIDS TO NAVIGATION OPERATIONAL AREAS

SHORT RANGE AIDS TO NAVIGATION PROGRAM

OBJECTIVE

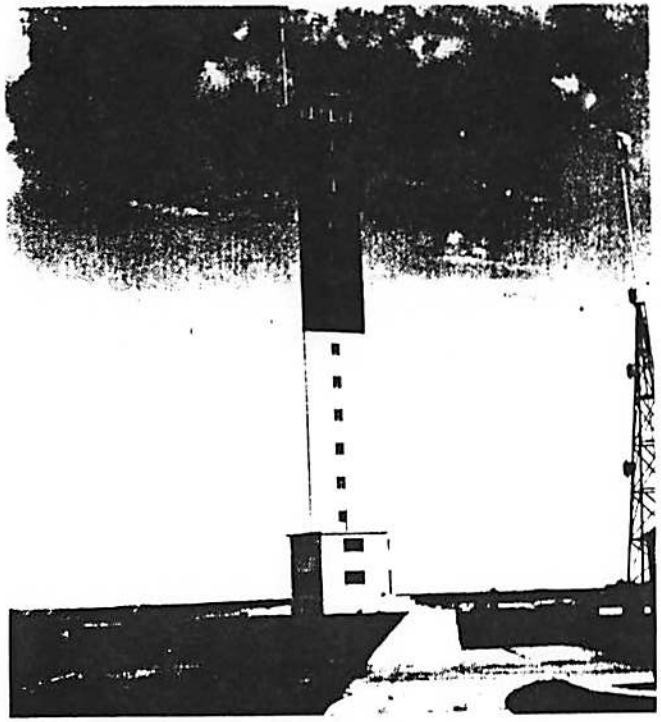
The objective of the Short Range Aids to Navigation (AN) Program is to assist the mariner in determining his position and to warn him of dangers and obstructions so that he may follow a safe course. This is accomplished by providing navigational references such as audio, visual or electronic signals, using buoys and lights.

PROGRAM DESCRIPTION

In order to understand the application and impact of the short range aids to navigation program it is useful to have historical perspective of the evolution of the program. This evolution is depicted in the illustrations on pages 8 and 9. The AN program has broad geographic scope in that aids to navigation are established and maintained in or near U.S. navigable waters, territories and possessions of the United States, the Trust Territory of the Pacific Islands, and where required to support the Department of Defense.

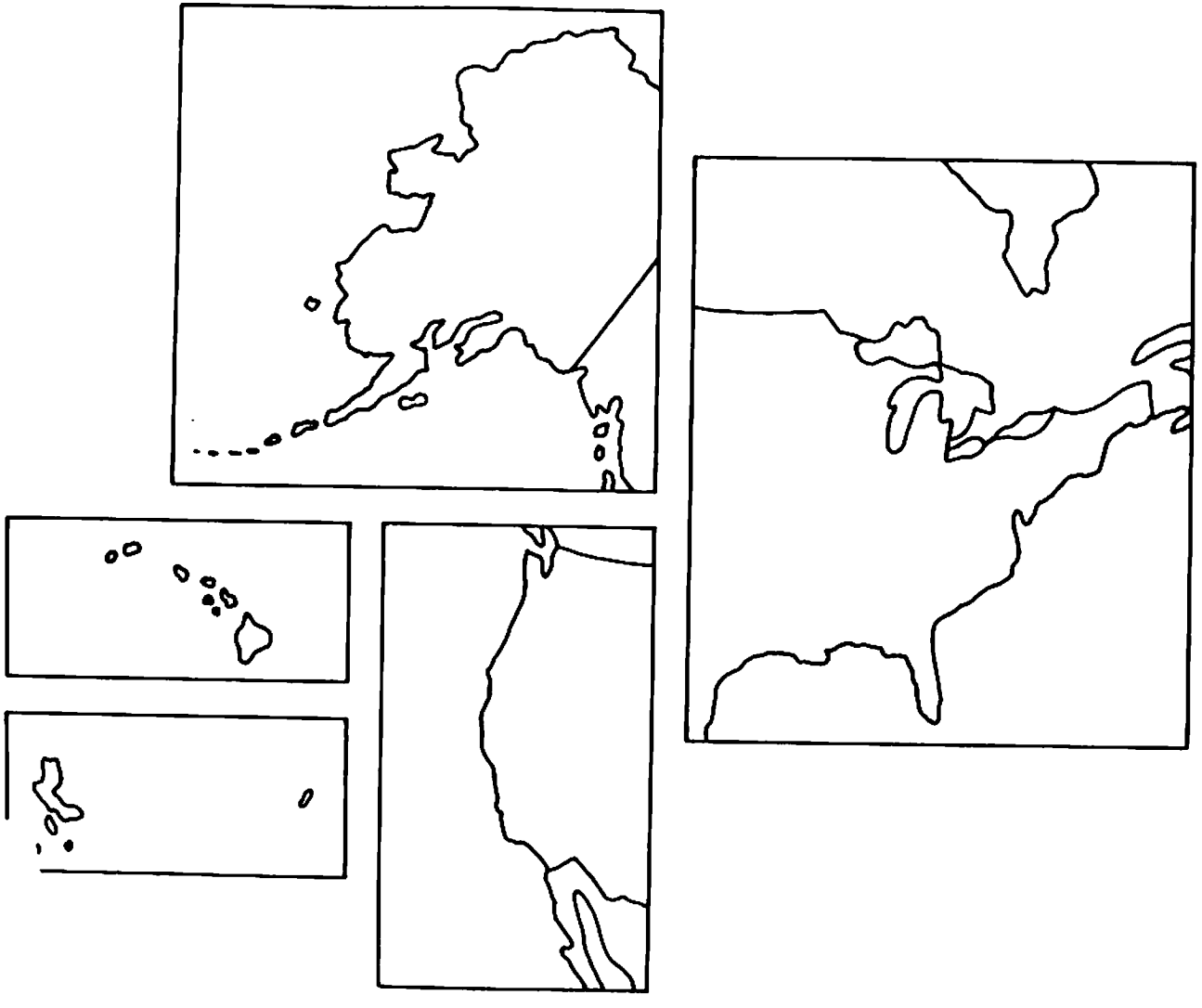
Effective use of the services provided requires some degree of knowledge by the user in order to employ the system properly. Users range from the sophisticated professional navigator to the relatively untrained and unskilled recreational boater. The differing level of these abilities means that the Coast Guard must satisfy a broad spectrum of user needs.

Of the roughly 78,000 short range aids to navigation in use, nearly 60% are aids for which the Coast Guard is wholly responsible. The remainder are privately owned aids for which the Coast Guard has a management responsibility.



Traditional lighthouse of recent construction.

The popularly held image of the traditional AN program exemplified by manned lighthouses and "Bee Ohh" sound signals, is not completely accurate today since the current operations of the program incorporate many modern technological advances. For example, transistorized flashers and photocell daylight controls are standard equipment on minor aids to navigation. Similarly, automation and remote monitoring of lighthouses have reduced operating costs considerably and have released many Coast Guard personnel for other duty. A major effort to replace light ships with less expensive and more effective offshore towers and large navigational buoys has left only two lightship stations in existence.



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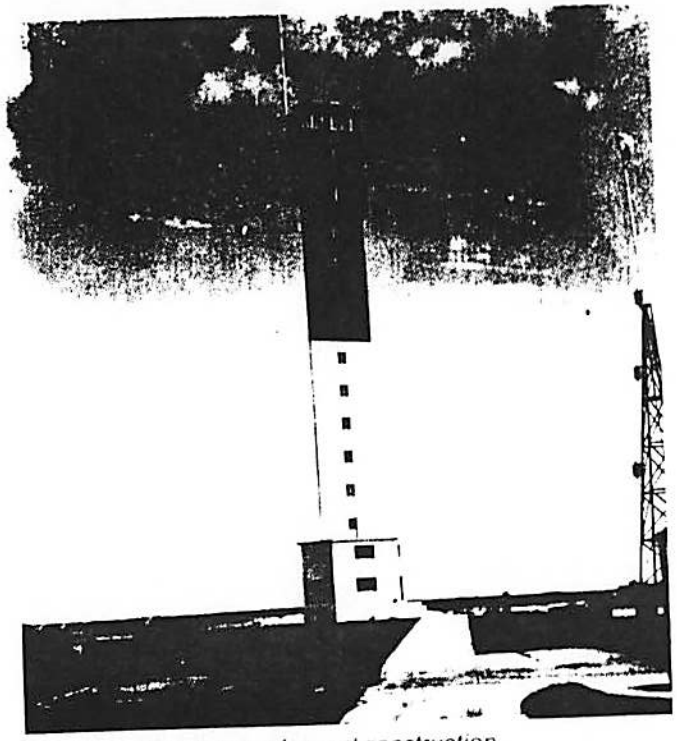

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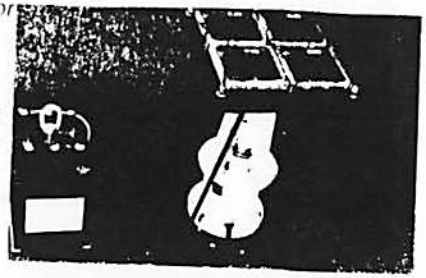
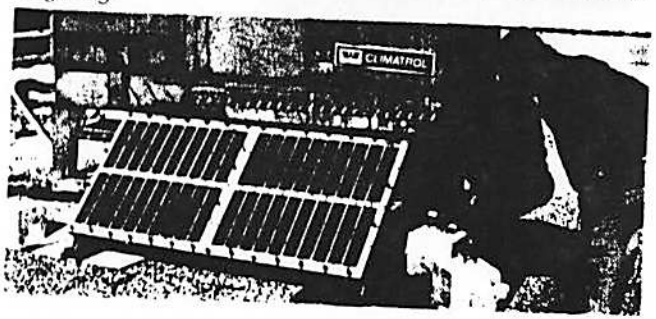
Experimental solar energy collectors for buoys and low-power lights are shown at right and below; the collector at right is for buoys and is equipped with spring-type prongs to discourage gulls from alighting.





CAPITAL ASSETS

Just as the buoys and light structures of the short range aids to navigation system are unique, so too are many of the vessels and shore facilities that establish and service them. In fact, while all Coast Guard vessels are properly termed "cutters," those which are designed primarily to service navigational aids are informally referred to as "tenders." Appendix III contains photographs of several different types of tenders and a table summarizing their performance characteristics.

Shore units provide extensive support to the AN program, although the units which are dedicated exclusively to providing aids to navigation constitute a

1716

First permanent lighthouse - Little Brewster Island, Boston Harbor. Original destroyed and rebuilt several times. This light was rebuilt in 1783 and is now a national historic landmark.

1767

First records of buoys. These were made of spars banded together with iron straps. Used in Delaware River.

1820

Maintenance of aids to navigation transferred from State to Federal control under the Secretary of the Treasury, Alexander Hamilton.

1820s

In 1820, the first lightship in the U.S. was established near Norfolk. In 1823, the first of a long line of Sandy Hook lightships was established.

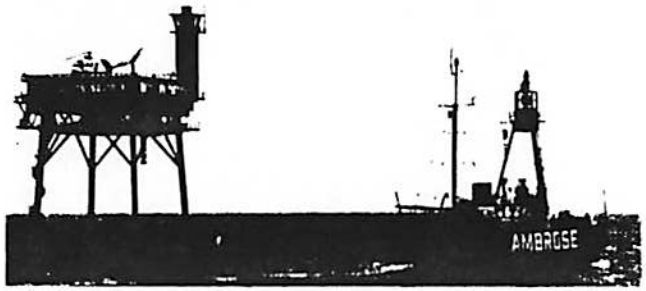
1852

Lighthouse operations transferred to the newly created Lighthouse Board. Advanced methods of lighthouse construction introduced. Channel marking and operation of lights implemented with scientific precision for first time.

relatively minor part of the total Coast Guard shore establishment. The large AN support facilities are called bases.

PROGRAM TRENDS

With the advent of modern, relatively inexpensive and dependable radio navigation, the need for major short range aids to navigation is diminishing. Simultaneously, advances in technology are permitting significant productivity increases in servicing the remaining required aids. A combination of these factors



As the new permanent Ambrose Offshore Light Tower went into operation on August 23, 1967, it replaced Ambrose Lightship which had served since 1952. Her farewell signalled the end of a succession of red lightships that guarded the lower bay entrance to busy New York Harbor since 1823. Helping to usher in the new era of navigational aids for New York Harbor area, a Coast Guard HH-52A amphibious helicopter alights on the 70-foot square helicopter pad of the tower.

1880s

Acetylene used in place of kerosene, the first electric lighted buoys were introduced powered by generators on shore via waterproof cable.

1960s-1970s

During the late 1960s and early 1970s large navigational buoys equipped with lights, radar reflectors, fog signals, radio beacons, engine generators, and environmental data sensors helped replace lightships.

1970s

Improved paints and solid state technology extended service and relief periods. Aids to Navigation Teams established. Automation is reducing number of manned light stations.

1980s

As we approach the 1980s, solar energy is being developed experimentally for use on buoys and small, unmanned lights like the one shown.

indicates that future emphasis in the AN program will be toward providing a more cost-effective service to the mariner. Toward that end, the Coast Guard has already initiated major efforts to improve the present aids to navigation system by:

- developing improved system design procedures;
- optimizing the size and number of servicing vessels through the development of boat-transported servicing teams (Aids to Navigation Teams), and the replacement of selected buoys by fixed structures;
- developing natural energy sources such as solar cells and hybrid (solar, wind, wave) systems for major aids to navigation.

BRIDGE ADMINISTRATION PROGRAM

OBJECTIVE

The objective of the Bridge Administration (BA) Program is to preserve the public right of navigation on the waters of the United States by assuring that all bridges over navigable waters are constructed, maintained and operated so as to provide for the reasonable needs of navigation.

PROGRAM DESCRIPTION

The Program includes bridge lighting for navigation, drawbridge operation regulations, approval of location and plans, and alteration of bridges found to be unreasonable obstructions to navigation mainly due to changes in the character of navigation on the waterway. The Program utilizes a dual approach, one preventive and the other remedial.

By requiring approval of location and plans of proposed bridges and deviation of plans of existing bridges, the preventive approach assures that the navigational clearances will provide or will continue to provide for the reasonable needs of navigation.

Drawbridge operation regulations are both preventive and remedial. The regulations assure that the ordinarily low level drawbridges are operated so as to provide for the reasonable needs of both navigation and land transportation.

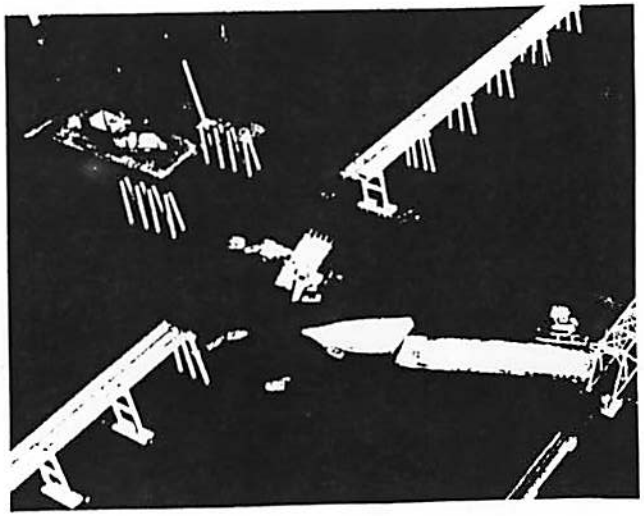
Bridge lighting is preventive to facilitate passage through the bridge at night.

The major remedial authority is found in 13 U.S.C. 511 (the Truman-Hobbs Act) wherein a lawful bridge may be altered at public expense when it is found that the bridge unreasonably obstructs navigation because of changes in the needs of navigation. The expenditure of public funds is restricted to those costs of alteration related to navigation needs.

The goals of the dual approach are to assure that:

- bridges over navigable waters of the United States are constructed, maintained and operated so as to provide for the reasonable needs of navigation;
- bridges which are found to be unreasonable obstructions are altered or removed.

The Pass Manchac Bridge, Louisiana after a tow boat with two barges hit the bridge, knocking out two spans and killing one person.

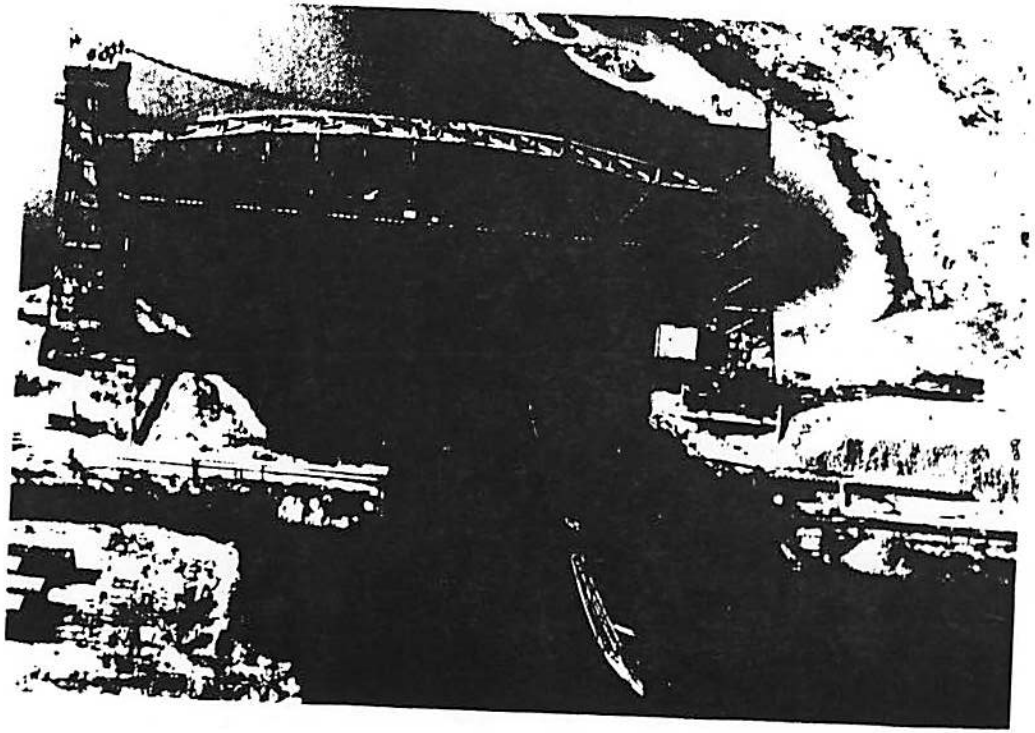


PROGRAM TRENDS

Program activity will grow for the foreseeable future. The number of abandoned bridges to be removed is anticipated to increase as railroads consolidate operations, merge, or abandon service on many branch lines. The replacement of a number of drawspans will be necessary in order to accommodate simultaneously the needs of land and water traffic. Because a greater number of inland ports will be developed to accommodate ocean traffic, bridges that formerly would not have been considered obstructive will become so and will need to be modified or removed.

The growing public debates on the proper exercise of Federal jurisdiction, on the legal primacy of the water mode, and on the definition of the term "navigable," may require changes in bridge laws and regulations. Cooperation with other Federal, State and local agencies will continue to be essential for successful execution of the program.

The railroad bridge in the foreground is an obstruction to navigation and will be removed when it is replaced by the bridge under construction.



COMMERCIAL VESSEL SAFETY PROGRAM

OBJECTIVE

The objective of the Commercial Vessel Safety (CVS) Program is to minimize deaths, personal injuries and property loss or damage in the marine environment associated with the design, construction and manning of merchant vessels and with their cargoes.

PROGRAM DESCRIPTION

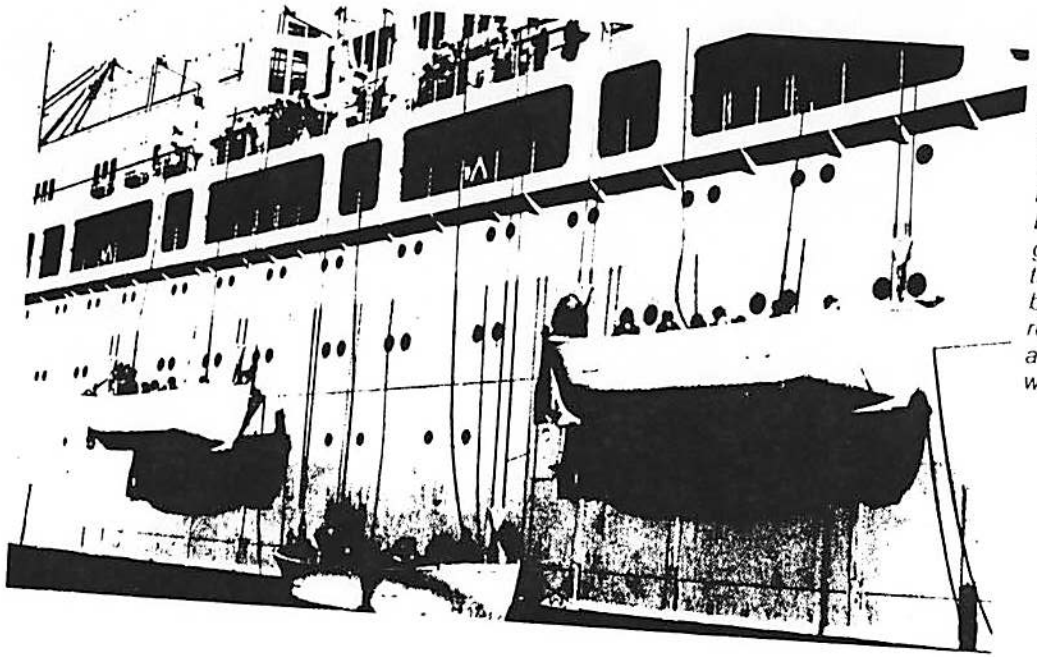
The roots of the current CVS program go back to the first half of the nineteenth century.

The enforcement of Federal safety statutes upon commercial vessels of the United States began in 1838, prompted by a number of explosions of steamboat boilers causing numerous passenger deaths. By 1852, a Steamboat Inspection Service was formed with authority for safety inspection of steamboats, licensing of pilots and engineers, and regulation of vessel operations through nautical rules of the road. Subsequent statutes expanded these marine safety efforts to include protection of crews as well as passengers. After a series of reorganizations and expansions in 1946 the administration of these responsibilities was permanently transferred to the Coast Guard. Since then, additional legislative authority has broadened the scope of the CVS Program to include the development and enforcement of standards applicable to successive additional classes of commercial vessels. The Program now embraces all U.S. commercial vessels.

In addition to these domestic duties, the Coast Guard conducts a safety program for foreign vessels founded primarily on a series of international agreements. These include the Safety of Life at Sea (SOLAS) Convention and various other international agreements drawn up under the auspices of specialized agencies of the United Nations such as the Intergovernmental Maritime Consultative Organization (IMCO). In those areas of safety where there are no internationally agreed upon standards, the Coast Guard imposes standards parallel to existing national regulations. Where necessary to protect U.S. interests, the Coast Guard imposes standards which go beyond the requirements of international accord. Safety regulation of foreign vessels carrying hazardous cargoes in bulk to U.S. ports is one example.

In addition to strong and obvious emphasis on conventional vessels, the CVS program includes regulations applicable to:

- fixed structures and artificial islands on the outer continental shelf;
- offshore nuclear power plants and offshore thermal energy conversion facilities;



During Coast Guard inspection of this passenger ship, lifeboats were lowered and were waterborne within five minutes. Some boats were halted in midair to test the braking mechanism. With the gravity type davits installed on this liner, one man can lower a boat by lifting a handle, releasing the brake that allows a boat to lower under its own weight.

- vessel cargo containment and transfer systems, including safety certification of cargo containers;
- unique operating vessels (e.g., hydrofoils, surface effect ships, manned undersea vessels and structures, and commercial diver work system);
- recordkeeping relating to crew employment and vessel ownership.

Coast Guard authority in the field is vested in the Officer in Charge Marine Inspection (OCMI) whose regional area of jurisdiction is designated by Federal regulation. Most OCMI functions are consolidated with Captain of the Port responsibilities. Such consolidated units are termed Marine Safety Offices, whereas unconsolidated units are Marine Inspection Offices.

Tasks assigned to CVS personnel fall into two categories:

- duties related to safety, including vessel inspections, onsite investigations, and proceedings related to marine casualties;
- duties related to facilitation of transportation, including vessel documentation and licensing and certification of seamen.

Operational experience afloat is a prerequisite for performance of vessel inspection and investigation functions. Because of the complexity of the duties, it takes the average commissioned officer about three years

to become fully qualified after an initial formal orientation training period.

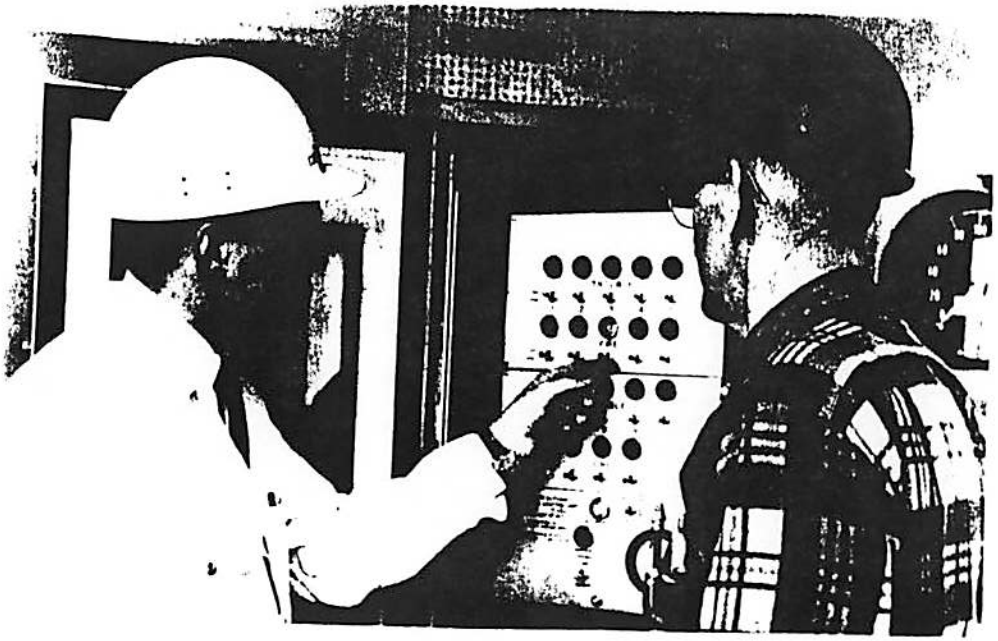
About 65% of all CVS duties are related to vessels and 35% related to personnel.

There is the strong and obvious relationship between the 'cure' aspects of the Search and Rescue Program and the 'prevention' aspects of CVS.

PROGRAM TRENDS

A number of rapidly evolving technologies are likely to result in a substantial increase in the size and complexity of the CVS workload. Advances in ship design and construction such as nuclear powered ultra-large crude carriers, and the emergence of radically different marine vehicle concepts such as deep ocean mining vessels are examples of this trend. Further, the shipment of new and exotic materials (such as chemicals) may actually exceed the current state-of-the-art in preventive engineering. Other changes in the CVS program are expected to be:

- expanded inspection of foreign vessels operating in the navigable waters of the U.S. for compliance with U.S. statutes and international agreements;
- improvements in methods of enforcement of regulations concerning the competence of commercial vessel personnel.



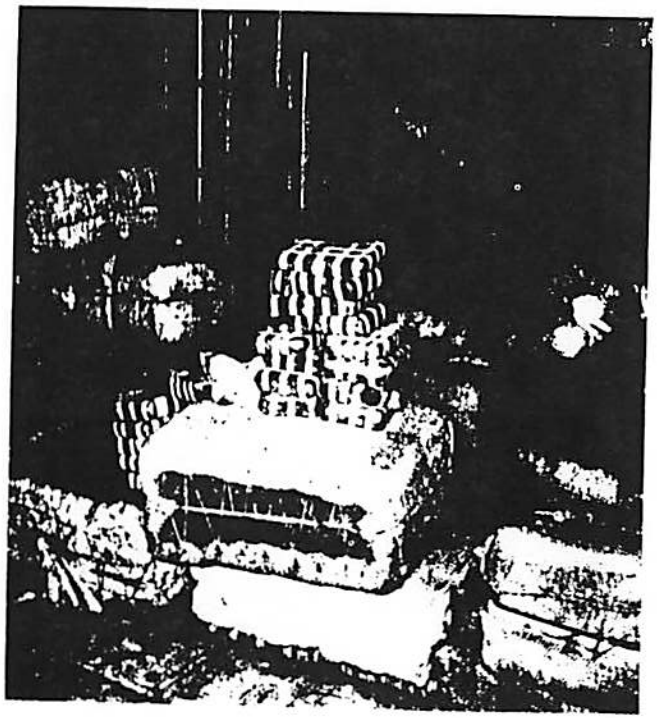
A Coast Guard marine inspector examines the fire detector panel on the bridge of a new passenger and cargo ship during final outfitting stages in drydock at the Bethlehem Steel Shipyard, Sparrows Pt., Baltimore, MD. The Marine Inspection Office, Baltimore, which handles the marine safety work in this major seaport, checked the new vessel throughout all her construction phases to see that U.S. safety standards for passenger and cargo vessels were met.

ENFORCEMENT OF LAWS AND TREATIES

OBJECTIVE

The objective of the Enforcement of Laws and Treaties (ELT) Program is to enforce *all* Federal laws in the marine environment, except those specifically assigned to other Coast Guard programs—i.e., vessel safety, marine pollution, vessel traffic control, and port safety and security. In recent years ELT enforcement efforts have focused particularly on laws relating to fisheries protection, immigration and drug smuggling.

Part of a large haul of marijuana seized from the Panamanian vessel DON EMILIO after interception by a cutter on ELT patrol



PROGRAM DESCRIPTION

ELT can claim to be the oldest Coast Guard program, since the Revenue Marine—the ancestor of the modern Coast Guard—was established in 1790 to suppress smuggling. Today, as *the* Federal maritime enforcement agency, the Coast Guard is responsible for enforcing all Federal laws on the navigable waters of the United States and its possessions and on the high seas. The laws to be enforced fall into two categories: laws relating to marine safety for which the Coast Guard has sole responsibility; and laws relating to customs and revenue, immigration, quarantine, neutrality, protection of fish and game, marine environmental protection, and other matters that fall within the jurisdiction of other Federal agencies for which:

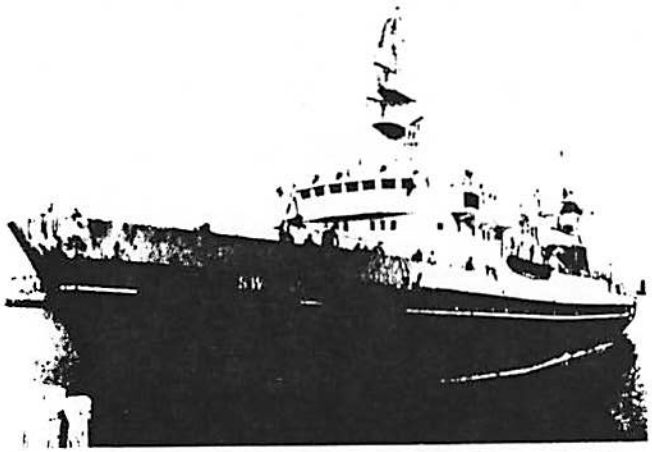
- the Coast Guard shares enforcement responsibility; and
- the Coast Guard's unique facilities are required to accomplish maritime law enforcement.

The ELT program encompasses a wide variety of duties covering a broad geographic area. Included are:

- enforcing laws and regulations governing the fishery conservation zone extending 200 nautical miles off the U.S. coasts;
- interdicting drug and alien smuggling in areas such as the Caribbean;

- ensuring that U.S. tuna boats off the shores of South America comply with the Inter-American Tropical Tuna Convention;
- minimizing damage and loss of fishing gear caused by conflicting deployment of mobile and fixed equipment, such as the simultaneous use of lobster pots and bottom trawls off the New England coast.

The functional elements of an enforcement system are detection, surveillance, and apprehension. While aircraft are excellent for detection, they are of limited use for surveillance and are virtually incapable of apprehension. While the detection capability of cutters is limited by their speed, their ability to effect seizures by use of boarding parties makes them unrivaled for apprehension. At the present time, the best enforcement tool is a cutter-helicopter team.



The Polish fishing vessel HUMBAK sitting in Boston harbor after seizure by USCGC BIBB for violation of the 12-mile Contiguous Fisheries Zone. The HUMBAK was originally spotted by a Coast Guard aircraft on Offshore Fisheries Patrol. The violation resulted in a monetary settlement of $560,000 in lieu of forfeiture.

ELT patrols are most effective when cutter-helo teams such as the one shown below are used.

CAPITAL ASSETS

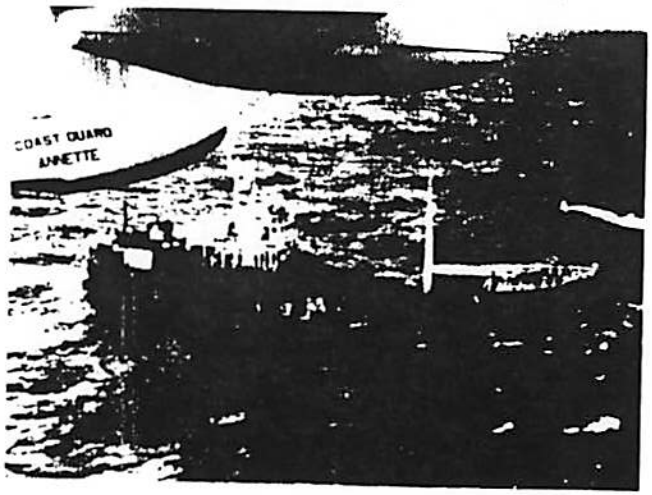
A wide variety of vessels and aircraft is used in performing the duties of the ELT program. Some of the major assets utilized are discussed in this section. The Appendices contain photographs of the major types of Coast Guard vessels and aircraft and summarize their performance characteristics.

Cutters—The conduct of ELT patrols is a primary mission for the helicopter flight-deck equipped 378' high endurance and 210' medium endurance cutters presently in the Coast Guard's inventory of operating facilities. Other high and medium endurance cutters ranging in size from 205' to 327' in length and of World War II era construction, also provide a significant contribution to this offshore law enforcement effort. Additionally, 95' and 82' patrol craft perform ELT patrol duties on the coastal and internal navigable waters of the United States as part of their multimission responsibilities.

In looking to the future replacement of its older cutters, the USCG plans to procure a new class of 270' medium endurance cutters. The first of this new class of cutters is expected to be operational in 1981 and will, with its modern electronic equipment and helicopter carrying capability, greatly enhance ELT mission performance.

Fixed Wing Aircraft—ELT patrols are a major mission of C-130 Hercules aircraft. Other fixed wing aircraft (HU-16E, C-131A) at Coast Guard air stations perform ELT patrols as part of their multimission responsibility. A modern medium-range search aircraft, the HU-25A, is expected to join the existing aviation inventory by the end of this decade.

A Coast Guard HU-16E from Annette Island, AK stays with a Japanese fishing trawler caught fishing illegally within the 12-mile zone. Aircraft maintains "hot pursuit" until cutters can arrive on scene to effect boardings and seizures.



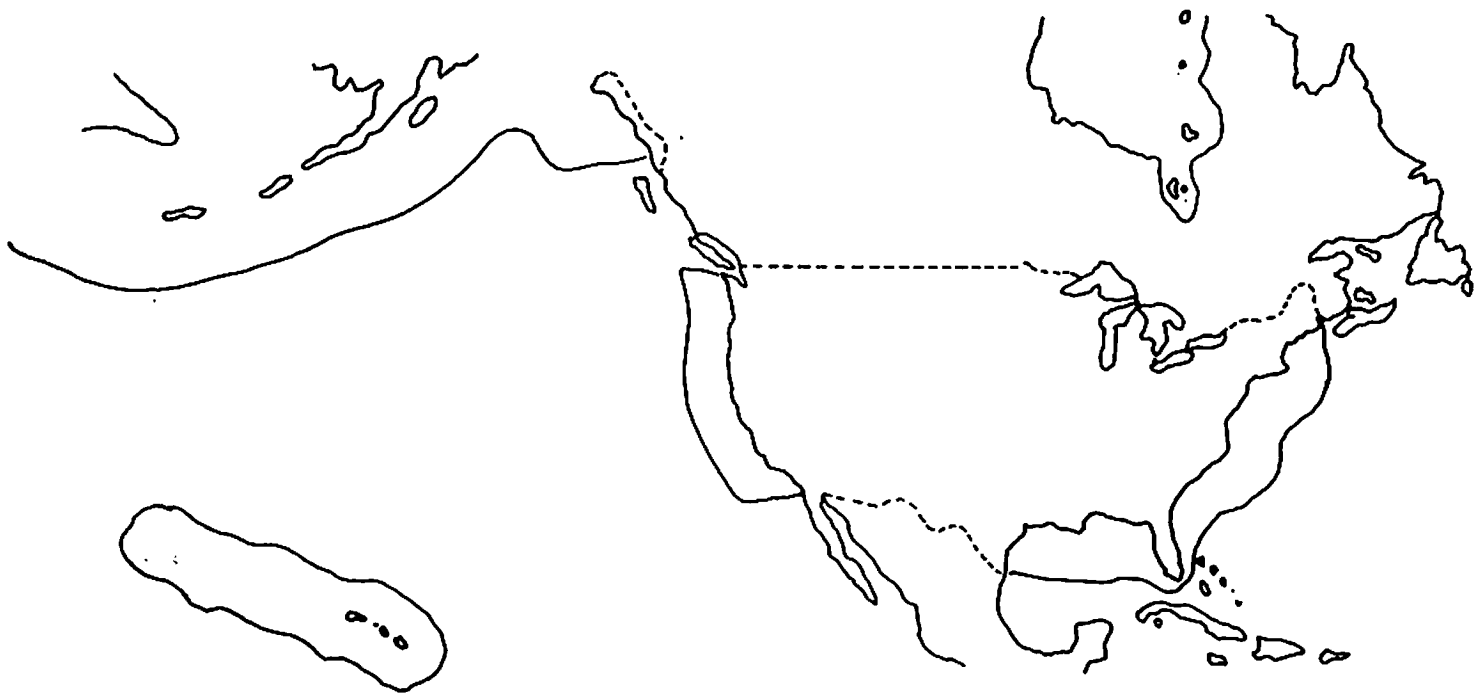
PROGRAM TRENDS

The extension of fishery conservation and management authority of the United States to 200 miles seaward on 1 March 1977 caused a significant increase in ELT program surveillance and enforcement duties. Should the United States extend its jurisdiction in the 200-mile zone to encompass mineral resources, or if deep-sea mining becomes a reality, the requirements of the ELT program could be expected to expand substantially.

Coast Guard participation in antismuggling operations will continue to increase and these operations, particularly in the field of narcotics interdiction, will continue to receive extensive publicity. The Coast Guard will continue to monitor closely the problems of peacetime protection of offshore assets. Efforts will be directed toward the development of necessary equipment, procedures, and expertise to deal with this area.

The expected increase in the Coast Guard's law enforcement role will spur greater emphasis in research and methods to improve operational capability, personnel skills and productivity of the ELT program.

THE 200-MILE FISHERIES CONSERVATION ZONE UNDER SURVEILLANCE BY ELT PATROLS



ICE OPERATIONS PROGRAM

OBJECTIVE

The objective of the Ice Operations (IO) Program is to facilitate maritime transportation and other activities in the national interest in ice-laden domestic and polar waters. The services provided in the IO program also assist in meeting the needs of marine safety and environmental protection in the ice environment.

PROGRAM DESCRIPTION

In 1936, a Presidential Executive Order established national policy on use of vessels for icebreaking operations in channels and harbors. The Coast Guard was directed to keep channels and harbors open for the reasonable demands of commerce insofar as practicable by performing icebreaking operations. In response to a determination that the national interest would best be served by concentrating all icebreaking resources in one agency, the U.S. Navy transferred its icebreakers to the Coast Guard in 1965.

Icebreaking services are provided for three major purposes:

- to assist in the safe and timely movement of maritime traffic;
- to prevent and control flooding resulting from ice accumulation on domestic waterways;
- to support scientific research and other national interests in the polar regions.

Because of the differences between the geographic areas in which these activities are conducted, the IO program can be best understood by considering polar and domestic operations separately.

Polar Operations—In the polar regions, icebreakers escort resupply ships into ice-laden areas, carry fuel and cargo to isolated U.S. installations, survey uncharted waters, collect meteorological and oceanographic data, and serve as platforms to carry research scientists into remote and otherwise unreachable areas.

The polar icebreaking fleet currently consists of one GLACIER class vessel, built in 1955, three smaller and older WIND class vessels (two of which have been reengined to extend their service lives) and two new POLAR class icebreakers. Three other WIND class icebreakers were decommissioned in recent years as construction of the POLAR class was nearing completion, and an additional WIND is scheduled for decommissioning in 1978.

The replacement of the WIND class vessels by the two POLAR class icebreakers will decrease the total number of available icebreaking days. This deficit may be partially overcome by increasing the operation of the POLAR class by 33% over previous icebreakers. This increase would exceed personnel constraints for time away from home port and will require the use of a multiple crewing concept similar to that used on the Navy's nuclear submarines. As planned, the ashore crew, together with a small permanent staff, would comprise the Icebreaker Support Facility located in Seattle, Washington, the POLAR class homeport. They would be tasked with the coordination of crew training and maintenance for the POLAR class icebreakers.

Domestic Operations—One of the most important responsibilities of the Coast Guard is to keep open to shipping domestic traffic routes and ports that are normally utilized year-round. The Ice Operations Program also attempts to extend navigation seasons in ice-laden areas when such extensions are considered in the national interest. For example, the Coast Guard has been one of the major participants in the multiagency Great Lakes season extension project. The Coast Guard also cooperates with other agencies to prevent and control flooding caused by ice jams.

Performance of these duties requires icebreaking services as well as the collection and dissemination of information.

The United States domestic icebreaking fleet currently consists of one dedicated icebreaker (on the Great Lakes) assisted part-time by a WIND class polar icebreaker and a multitude of smaller, multipurpose cutters with icebreaking capabilities.

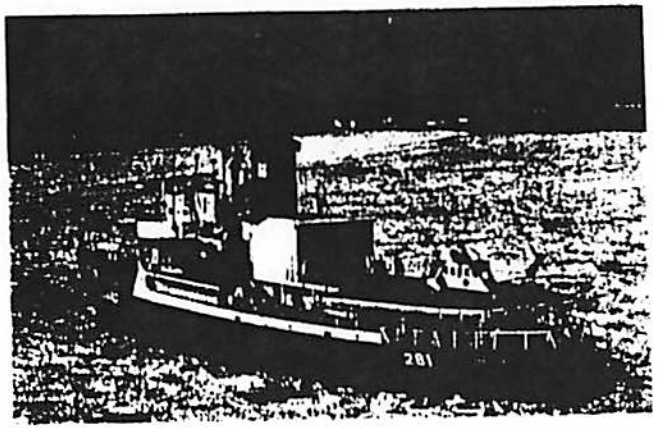
Aircraft perform surveillance patrols to evaluate ice conditions and recommend ship routes through areas having ice formations.

PROGRAM TRENDS

Future natural resource development in Alaska and northern Canada together with efforts to extend the navigation season on domestic waterways will necessitate an expansion of Coast Guard ice operations. Increased maritime traffic in icy waters will require additional icebreaking and ice information collection and dissemination.

Within the four major geographic operating areas of the IO program, the future appears to be:

- Northeast Coast where the main objective is to meet the reasonable demands of commerce, icebreaking capability will be maintained at approximately its current level;
- Great Lakes/St. Lawrence Seaway System where the current program to demonstrate the feasibility of an extended navigation season will continue. The initial demonstration program has been extended through FY79 by Congress. As a result of the program, the Coast Guard will continue to provide icebreaking services in support of an extended shipping season. However, to provide these improved services, icebreaking resources will need to be upgraded. Toward this end a new 140' harbor tug with an icebreaking capability has been designed to replace the aging 110' tugs. Four of these are expected to be delivered by 1980;



Domestic icebreaking operations are carried on using both icebreakers and ice reinforced vessels. Above, a WIND class breaker operates in the St. Clair River between Lakes Huron and Erie.

- in Alaska, the main program objective will remain to meet the reasonable demands of commerce, especially in the Cook Inlet/Bristol Bay area and on the North Slope. In order to fulfill this objective, a medium icebreaker with the necessary characteristics to effectively operate in this region needs to be designed and built;
- in Polar Regions, the Coast Guard will continue to support the activities of other government agencies. National interest in the Arctic and Antarctic will continue to require surface marine access at least through 1987 and therefore will depend on Coast Guard icebreaker support. In Antarctica, Coast Guard icebreaking activities are conducted primarily in support of the National Science Foundation. Without this icebreaking support, United States' presence in Antarctica would probably be severely reduced.

Requirements in the Western Arctic and Antarctica are met by large icebreakers including the new POLAR class. It may be possible to fulfill missions in the

Eastern Arctic with an icebreaker smaller than the POLAR class but having similar endurance.

Although icebreakers are expected to remain the primary means of implementing this program for the foreseeable future, new concepts, such as air cushion vehicles and special channel clearing devices are being investigated to uncover means of improving the efficiency of icebreaking operations. In the event that a season extension program for river systems is instituted, such devices may be of particular value since the effectiveness of traditional icebreaking techniques is limited by restrictive operating areas.

The Coast Guard's new 399-ft., 13,000-ton icebreaker USCGC POLAR STAR (WAGB-10) is shown during ice tests in the Arctic off Alaska during May and June 1976. Her hull is painted red for easy visibility in ice, as are her HH-52A ice reconnaissance helicopters. The POLAR STAR is America's largest and most powerful icebreaker. Her propulsion system consists of three shafts which combine 60,000 gas turbine horsepower for heavy icebreaking and 18,000 diesel-electric horsepower for normal icebreaking. Operating on gas turbines, she can break up to six-foot thick ice at a continuous speed of 3 knots. In a backing and ramming mode, she can smash ice 21 feet thick. Other features include a unique bow form, computerized scientific research facilities, and modern habitability for the crew.

A 110' harbor tug breaks ice in the Hudson River. The 110' tug can negotiate ice up to 12 - 14 inches thick

The navigation season has been extended in the Great Lakes by use of ice strengthened vessels and big breakers like the MACKINAW shown here breaking out a lake carrier.

MARINE ENVIRONMENTAL PROTECTION PROGRAM

OBJECTIVE

The primary objective of the Marine Environmental Protection (MEP) Program is to maintain or improve the quality of the marine environment through preventive measures. The secondary objective is to minimize the damage caused by pollutants discharged into the marine environment by providing coordinated and effective response to remove discharges of oil or hazardous substances.

PROGRAM DESCRIPTION

Congress has established the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters as a national objective. The Coast Guard is the primary maritime agency empowered to meet this national objective.

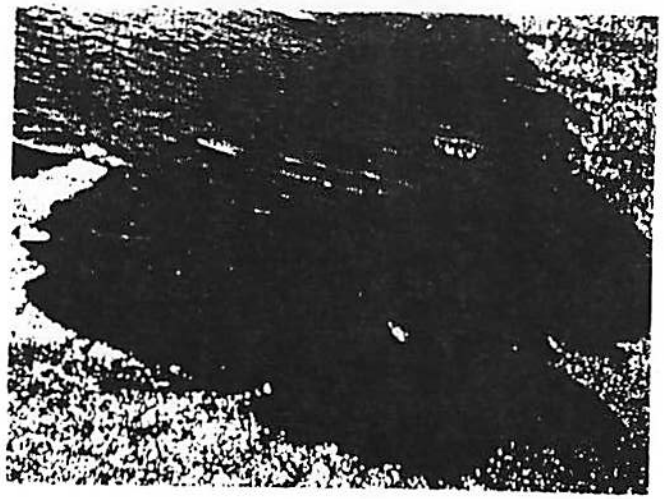
The role for the Coast Guard in marine environmental protection is a logical extension of its traditional missions in marine and port safety and law enforcement. The Service's operating experience and talents in maritime transportation provide a strong foundation for the MEP Program. The protection of the marine environment is a challenging and needed role in contemporary society and one that the Coast Guard considers an integral part of its future activities.

Some adverse effects of pollution are shown in the accompanying photographs.

The MEP Program is divided into six major operational components: RESPONSE, ENFORCEMENT, PREVENTION, MONITORING and SURVEILLANCE, IMPACT ASSESSMENT, and IN-HOUSE ABATEMENT.

Oil spills such as this one which occurred in the Straits of Magellan off Chile resulting from grounding of the very large crude carrier METULA, cause extensive damage to the environment . . .

. . . such as difficult-to-clean-up shores



. . . and destruction of thousands of shore and aquatic birds such as this oil-covered penguin.

Initial efforts were designed to solve the immediate problem of minimizing the effects of pollution. More recent actions have concentrated on developing an adequate cleanup (RESPONSE) capability to effectively remove most oil discharges. Current efforts in this area are concentrating on special technical problems for oil removal, removal of hazardous substances, and the removal of pollutants in the arctic environment. A significant example of response capability is the National Strike Force which consists of three highly trained Coast Guard Strike Teams. These teams, located on the Atlantic, Pacific, and Gulf Coasts, have been called upon to render assistance throughout the world.

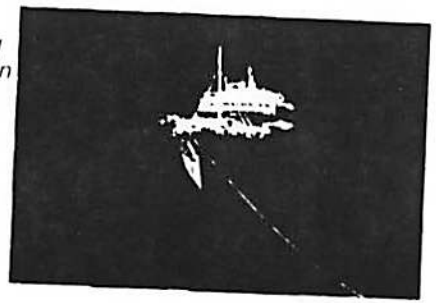
The National Response Center has been established to receive reports of discharges of oil or other hazardous pollutants at any hour of the day or night. To facilitate reporting such discharges, the Coast Guard provides a toll free telephone number: 800-424-8802.

In addition to attempting to resolve the immediate problems of cleanup, a second phase has been initiated to eliminate all types of discharges. Efforts are being directed at establishing an effective ENFORCEMENT program, coupled with public awareness and education campaigns. Future efforts in this area will attempt to improve the level of enforcement in the coastal areas and to provide limited coverage in those outlying areas where little or no enforcement activity is conducted presently.

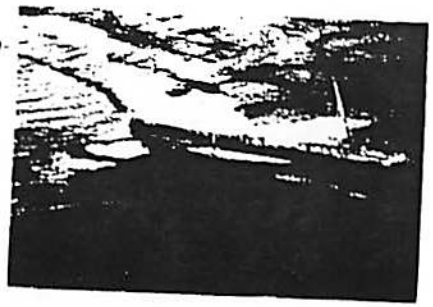
The U.S. Coast Guard Pollution Prevention Regulations for vessels and oil transfer facilities, which went into effect on 1 July 1974, signified the beginning of the third phase of the Program—PREVENTION. Additional regulations, such as those dealing with hazardous substances, will be developed as necessary in conjunction with public education efforts, in a unified enforcement approach.

Several other initiatives support the RESPONSE, ENFORCEMENT and PREVENTION phases of the MEP Program. MONITORING and SURVEILLANCE serve to meet program objectives in two ways: First, adequate detection enhances enforcement capabilities as well as being a deterrent which aids in preventing

Polluting oil is clearly seen flowing from the bow portion of the stranded OCEAN EAGLE . . .



while an equally heavy spill is escaping from the stern portion some dis- . . . tance away.



discharges. Second, this activity provides the Coast Guard with an IMPACT ASSESSMENT capability which can be used to judge the damage or the impact of pollutants on the marine environment. This information is required to ensure effective cleanup and to establish effective prevention policies. Initial steps to accomplish this are taken by providing surface and air surveillance in coastal and port areas. The Coast Guard also has developed an airborne surveillance system which can detect oil discharges from ships at night or under adverse weather conditions. Chemical analyses can then be used to compare the samples taken from the discharge with those obtained from suspected vessels, and identify the discharger.

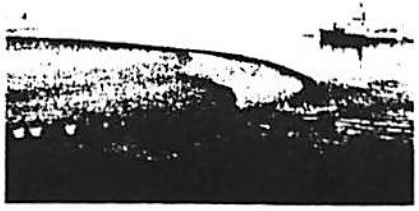
To complement the aircraft, cutters, and boats that conduct the bulk of the MEP Program, three major items of response or cleanup equipment are in use. These are: (1) the Air-Deliverable Anti-Pollution Transfer System (2) a high seas oil containment device, and (3) two types of oil recovery devices.

PROGRAM TRENDS

Many initiatives that are presently in the formative stages are likely to have a major impact on the MEP Program

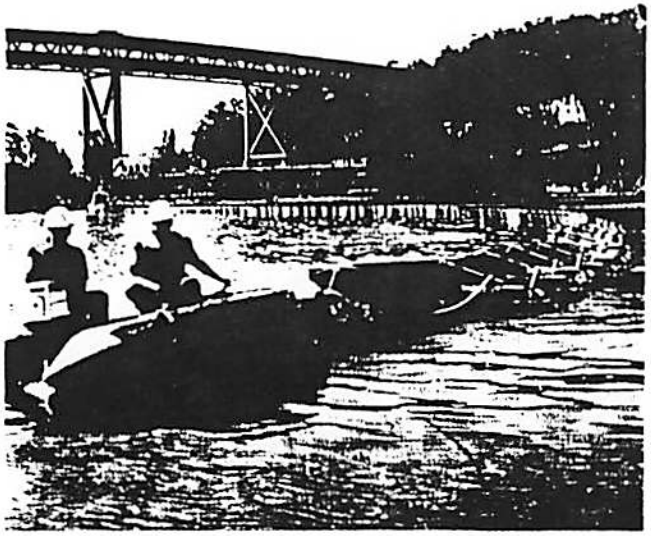
International cooperation to reduce pollution worldwide and congressional mandates are likely to place more requirements on the Coast Guard. This is likely to result in the Coast Guard's pollution control exper-

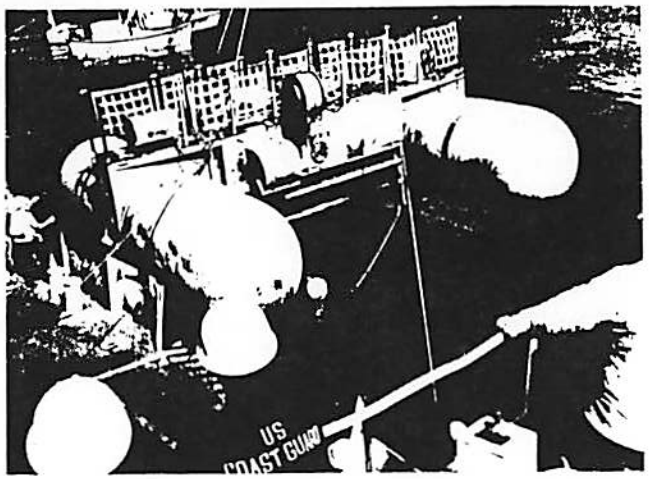
Airborne Remote Sensing Equipment has been installed in this Coast Guard HU-16E aircraft. This closeup view shows a pod housing an infrared camera that can photograph spills at night as well as during the day.



Oil containment barrier deployed during R&D tests. High seas containment systems are under active development.

Oil Recovery Device.





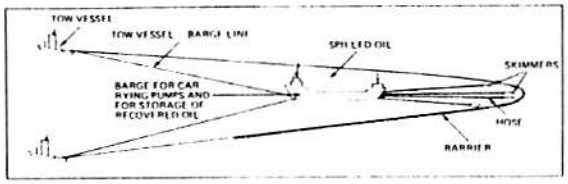
The High Seas Oil Recovery System, an air-transportable machine used by the Coast Guard's Atlantic and Pacific Area Pollution Strike Teams is capable of recovering up to 1,000 gallons of oil per minute under certain conditions. It was derived from a commercial oil-water separator which is being used in many parts of the world in oil-spill recovery at refineries, petrochemical plants and railroad maintenance facilities.

tise on the high seas being used in a greatly expanded area of jurisdiction.

Within the national arena, various cooperative programs with State and local governments will be encouraged where it is legally and operationally feasible. The creation of Deep Water Ports will bring Very Large Crude Carriers (VLCCs) to U.S. waters and decrease the number of smaller tank vessels entering U.S. ports.

There are many research projects now underway which are expected to make useful contributions to the objectives of the MEP Program. Illustrative of these efforts are the development of a high speed sled used to tow response equipment to the scene of pollution incidents, and a surface sensor system to detect oil pollution.

Recovery barge pumping oil from contained oil spill.



The oil recovery rate for skimmers is maximized by locating them where the oil depth is greatest.

Oil pollution greatly concerns Americans. Miles of ugly tide lines are painted on the beach at Yorktown, Va., by oil swept ashore from a foreign tanker's bilges emptied in the York River. An oil smothered turtle saddens a boy, who once enjoyed the water sports and wildlife here.

MILITARY OPERATIONS/PREPAREDNESS PROGRAM

OBJECTIVE

The objective of the Military Operations/ Preparedness (MO/MP) Program is to maintain the Coast Guard as an effective and ready armed force prepared for and immediately responsive to assigned tasks in time of peace, war, or national emergency. This includes readiness to function as a specialized service in the Navy in time of war, responding to national disasters and domestic emergencies, and the efficient conduct of peacetime missions. The program unifies both preparedness and operations.

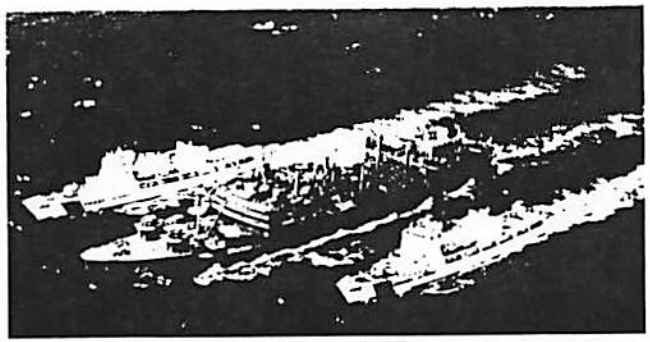
PROGRAM DESCRIPTION

The command and control system and the operational training provided by the Military Program are the "glue" which holds the Coast Guard together—they are essential to our ability to respond rapidly and effectively under all conditions.

In order to maintain the Coast Guard as an effective and ready armed force, MO/MP combines training with the preparation of contingency plans based on realistic assessments of Coast Guard capabilities.

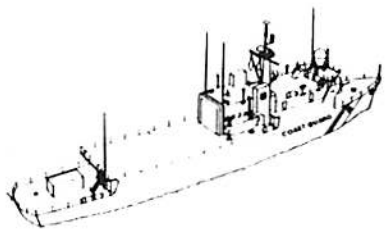
Personnel readiness is achieved for both peacetime and wartime tasks through on-the-job training, augmentation training, specialized training exercises, and formal classroom instruction. Training standards and programs are based on the Coast Guard's routine and contingency responsibilities. Joint command post, joint operational, multiunit, and individual exercises are scheduled periodically to promote military preparedness. The Coast Guard participates in DOD's Worldwide Military Command and Control system. Participation in fleet and interservice exercises is geared to ensure that personnel and material performance are equal to Navy standards. Personnel contingency requirements to be met by Reserve personnel are established in conjunction with the Reserve Forces Program. Reserves constitute a very valuable and essential element of the overall Coast Guard military capability.

Material readiness consists of equipping and maintaining Coast Guard operating facilities and personnel



Two 378'-class cutters being replenished while underway by a Navy Fleet Oiler.

The new 270' class medium endurance cutter will replace old high endurance cutters and will be able to support the Navy's Light Airborne Multipurpose System (LAMPS) helicopters.



with combat gear necessary to maintain a state of readiness to perform its combat, combat support, and peacetime duties such as law enforcement. The goal is to ensure that operating forces are outfitted and equipped as required for full mission performance.

CAPITAL ASSETS

Multimission assets include cutters, patrol boats, aircraft, and shore facilities which provide a valuable resource for meeting military contingency requirements as well as for civil and domestic emergency operations. Cutters are not built exclusively for military missions; nonetheless, military capabilities are incorporated into cutter design when it can be done at a reasonable cost. Even though aircraft are not configured specifically to participate in military operations, they are available for wartime SAR, ASW, surveillance, and logistic support. Close coordination is maintained with the Navy during the design and equipping of aircraft and cutters to ensure effective utilization of CG assets in the Total Force Concept.

Readiness is achieved and maintained to enable the service to be ready and able to:

- damage/destroy enemy naval forces;
- board and search suspicious craft;
- patrol coastal waters;
- provide gunfire support;
- convoy ships;
- supervise loading/unloading of explosives at ports;
- provide for port security;
- provide aids to navigation worldwide;
- participate in natural disaster relief and domestic emergency operations;
- develop techniques required for military and non-military missions;
- provide immediate response in politico-military crises.

PROGRAM TRENDS

The Military Program can make vital contributions to situations requiring trained and organized military combat and combat support forces, including reserves. Coast Guard multimission cutters, boats, aircraft and stations provide a particularly cost effective resource.

With the termination of Coast Guard operations and involvement in Vietnam, the trend in the Military Program has focused on the participation of Coast Guard operating units in military contingencies, natural disaster, or domestic emergencies on an individual unit or small task force basis. Participation in such events may escalate to the extent that some peacetime programs of the Coast Guard may be reduced. Reserve forces may be called even without mobilization.

A major goal of the program will be to continue the present high level of planning effectiveness through a process of continual review and updating. Where appropriate, these plans will be congruent with those of the Navy. Coast Guard can anticipate increased inclusion in DOD crisis management planning.

A viable military role for the Coast Guard will depend on outfitting the service's facilities and personnel with adequate and appropriate offensive and defensive armament, thus improving the military and operational capabilities of cutters. Both adequate armament and trained crews are needed for wartime and peacetime operations. The MO/MP program determines what weapons and associated systems are acquired, installed, and adequately maintained.

The 200-mile economic zone could have far-reaching effects on military preparedness. The question of providing protection for offshore assets such as deep water ports, floating power plants and oil platforms/pipelines has yet to be resolved.

MARINE SCIENCE ACTIVITIES PROGRAM

OBJECTIVE

The objectives of the Marine Science Activities (MSA) Program are to provide marine science support to all Coast Guard programs and to support national economic, scientific, defense, and social needs.

The specific objectives of the Marine Science Activities Program are to conduct the International Ice Patrol, provide oceanographic services for the support of the Search and Rescue, Marine Environmental Protection, Ice Operations and other Coast Guard programs and to cooperate with and provide assistance to other government and scientific organizations in support of national marine science objectives.

PROGRAM DESCRIPTION

The Coast Guard marine science effort emphasizes applied oceanography in support of Coast Guard programs and missions. Coast Guard activities in Search and Rescue, Marine Environmental Protection and Ice Operations rely heavily on the oceanographic and meteorological information obtained through MSA operations.

The Coast Guard has the greatest Federal presence in the coastal zone and has the sole U.S. capability for surface transit of ice-covered waters. Outside of the Department of Defense, the Coast Guard has the greatest Federal capability for gathering marine information.

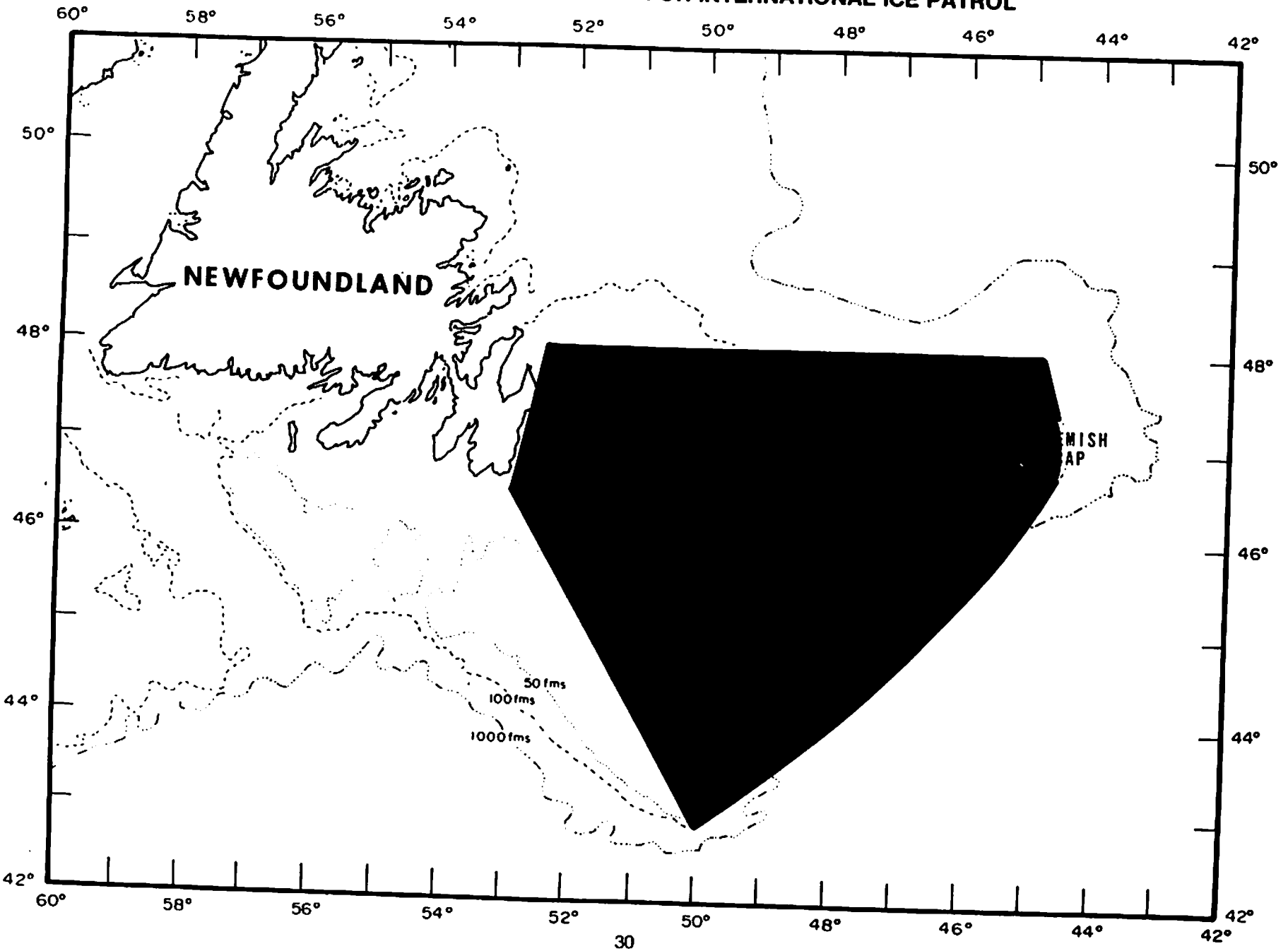
In fulfilling its MSA responsibilities, the Coast Guard cooperates with other government agencies to insure the efficient use of public resources and the furtherance of national interests in the marine environment.

The Coast Guard has a long history of cooperation with the National Oceanic and Atmospheric Administration (NOAA) through projects with the National Weather Service (NWS), National Marine Fisheries Service (NMFS) and National Ocean Survey (NOS). Additionally, mutual interests have stimulated exchanges of services between the Coast Guard and the Department of Defense.

The following brief summary highlights some of the most significant activities carried out by the Coast Guard through MSA:

- International Ice Patrol—Commenced in 1914 after the sinking of the TITANIC, now conducted under international agreement. Aircraft and ships are deployed each year from February to August to detect icebergs near the North Atlantic shipping lanes and to study ice and current conditions;
- Oceanographic Services—Applied oceanography to support Coast Guard operations. Sea surface current studies are conducted to assist in computerized Search and Rescue planning. Computerized models of sea currents for the entire U.S. coastline are being developed. In addition to SAR operations, these models have application in pollutant drift prediction and the planning of deep water ports. Other coastal projects being conducted include estuarine pollution studies, time dependent current modeling and bays and sounds modeling;
- Data Buoy Project—This project is administered by the National Oceanic and Atmospheric Administration with Coast Guard providing operational support for deployment and servicing of buoys, a technical staff and a communications system to relay buoy data. An extensive network of buoys provides marine environmental data over the coastal U.S. from the Gulf of Maine to the Gulf of Alaska and the Great Lakes;

AREA OF MSA RESPONSIBILITY FOR INTERNATIONAL ICE PATROL

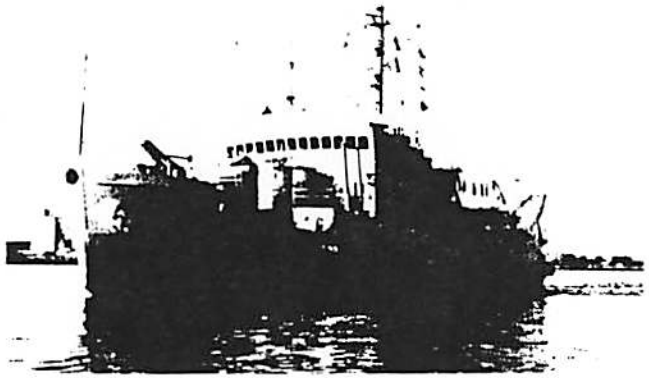


- Marine and Coastal Weather Observation and Reporting—This project is conducted as a cooperative effort with the National Weather Service and the Naval Weather Service Command for use in preparation of marine weather forecasts. Approximately 170 shore stations and 50 cutters report weather data several times daily. National Weather Service prepared weather forecasts are broadcast to local marine users over Coast Guard communications facilities ;
- Cooperative Projects—The Coast Guard engages in cooperative projects with various Federal agencies and provides marine science expertise and resources to further national goals in open ocean and coastal programs. Many of these projects represent unique efforts, where the Coast Guard contributes most or all of the data and services:

  Airborne Radiation Thermometer Surveys—Chartlets of sea surface temperatures in continental shelf regions are compiled from data acquired monthly by Coast Guard aircraft using infrared radiation thermometers. These chartlets of both the East and West coasts are provided to U.S. Government agencies and the civilian maritime community for use in search and rescue, marine environmental protection, and fisheries related problems.

  Ocean Sounding Program—Bathymetric data are routinely supplied to the Defense Mapping Agency Hydrographic Office by cutters engaged in regular Coast Guard functions. These data become an input to charts used by all members of the maritime community.

  IGOSS Marine Pollution Monitoring Pilot Project (MARMOPP)—High endurance cutters conduct tarball sampling on a regular basis. Tarballs are lumps of floating petroleum residue of both natural and man-induced origin. The monitoring of ocean surface tar is useful in evaluating the effectiveness of oil control measures and the dispersion of marine pollutants.

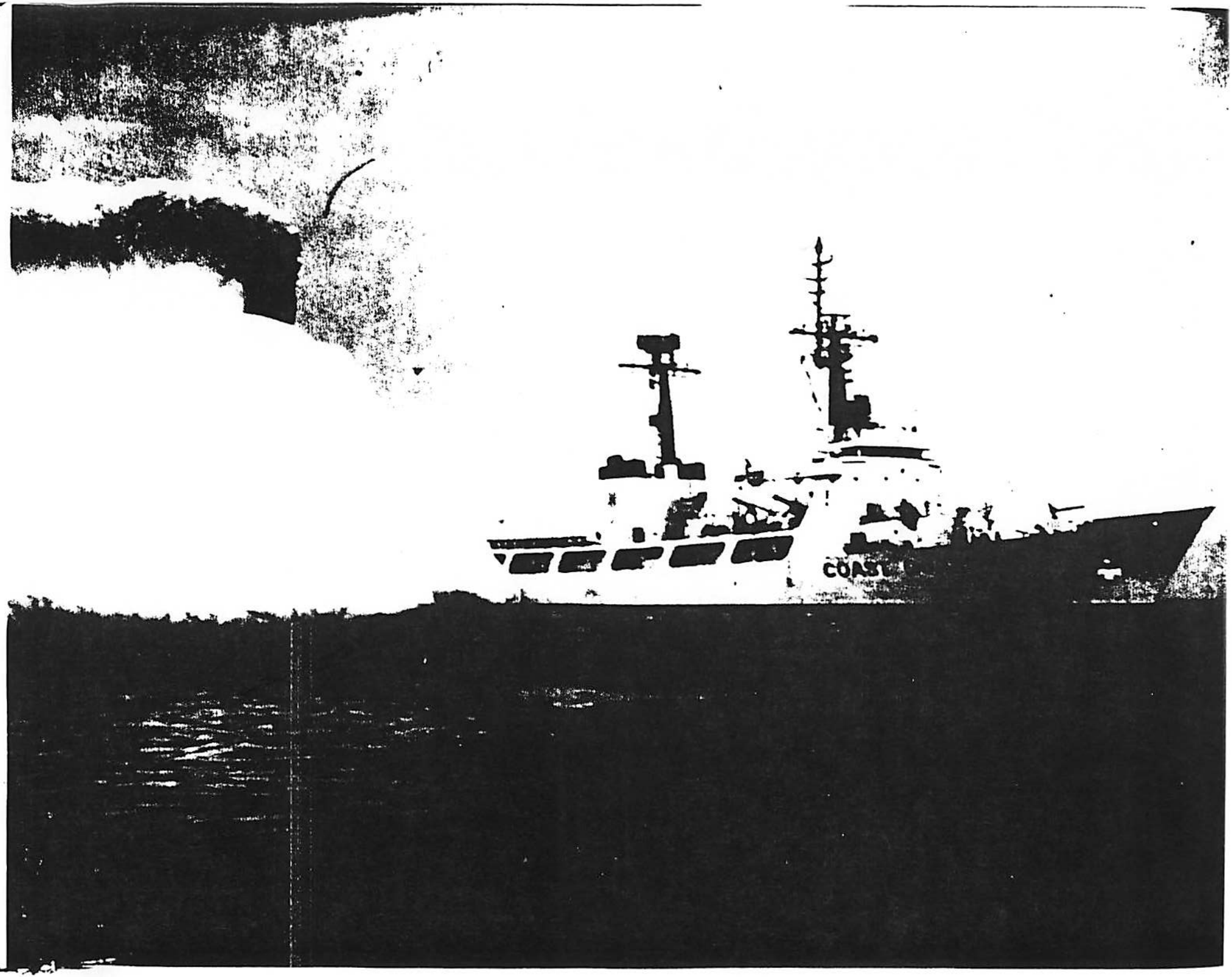


The cutter EVERGREEN is utilized primarily for MSA. Her major duties include oceanographic operations during the International Ice Patrol, instrument test and evaluation cruises, and research on ocean current systems for use in Search and Rescue and in Marine Environmental Protection.

A member of the crew of a cutter on International Ice Patrol observes an iceberg from the comfort of the bridge.

PROGRAM TRENDS

MSA is expected to grow with continued emphasis on providing support for other Coast Guard programs.


COAST

PORT SAFETY AND SECURITY PROGRAM

OBJECTIVE

The objective of the Port Safety and Security (PSS) Program is to safeguard the nation's navigable waters and adjacent shore areas, including ports and their related facilities, from accidental or intentional harm. By assuring the safety of the ports and waterways and of persons and property nearby, the utilization of these vital marine transportation links is facilitated.

PROGRAM DESCRIPTION

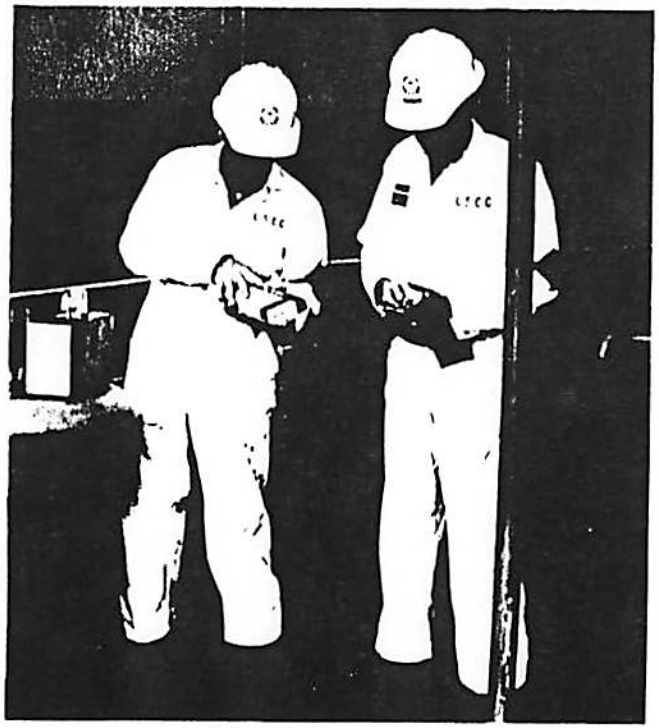
Early legislation basically limited the port safety and security activities of the Coast Guard to those periods during which the President declared a state of national emergency or made a finding that the security of the U.S. was endangered by reason of subversive activity. Regulations applicable throughout the continental United States, Alaska, Hawaii, Puerto Rico, and Guam were issued.

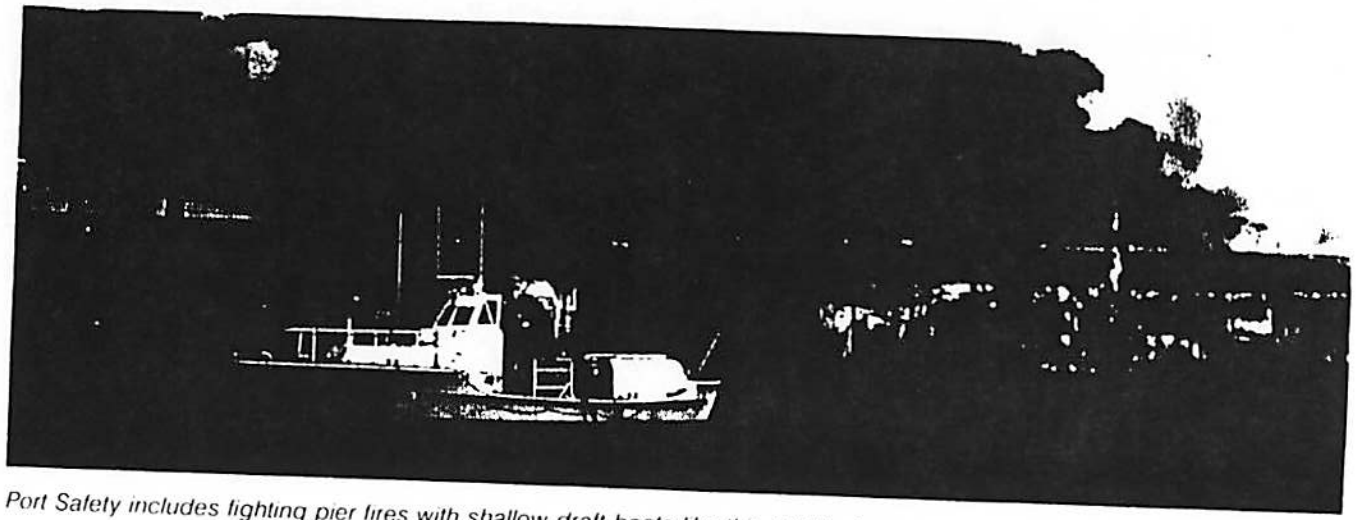
The Ports and Waterways Safety Act (PWSA) of 1972 enlarged the scope of the Port Safety and Security Program. The purposes of this legislation were to prevent damage to, or destruction or loss of any vessel, bridge, or other structure on, in or near the navigable waters of the U.S. and to protect the navigable waters and the resources therein from environmental harm resulting from vessel or structure damage.

The Port Safety and Security Program is administered by the Coast Guard Captains of the Port (COTPs). The Program is complex and interfaces with several other program areas.

Currently, there are over 50 Captains of the Port with approximately 1600 field billets designated for Port Safety/Security and Marine Environmental Protection duties. These functions include monitoring and supervision of oil transfer and hazardous cargo operations, cleaning-up pollution, conducting harbor patrols, inspecting and surveying waterfront facilities, establishing safety and security zones as required, and controlling vessel movements and anchorages.

Inspectors from Captain of the Port Office, New York harbor, check for hazardous materials and conditions on board a freighter before the vessel is permitted to dock.





Port Safety includes fighting pier fires with shallow draft boats like this 44' life boat.

The activities of the PSS program are many and varied, but can be categorized into the following major areas:

- prevent intentional or accidental mishandling of cargo in U.S. ports and waterways;
- prevent threats and acts of espionage, sabotage and intelligence gathering;
- reduce the likelihood of fires and explosions in the port areas;
- reduce the probability of ship collisions or groundings;
- assist vessels to transit U.S. ports safely and economically in a minimum of time;
- promote unified and consolidated rules of the nautical road in accordance with International Regulations for Preventing Collisions at Sea;
- enhance cargo security within the entire marine terminal complex.

Vessel traffic management is an important means of assuring safe operation in certain ports and waterways. This function is provided by Coast Guard Vessel Traffic Services (VTS) using the following procedures. Using a VHF-FM communication network, and in most cases some form of electronic surveillance, information on vessel positions and movements is collected by a shore-based vessel traffic center. After analyzing the data, the VTS provides accurate and comprehensive information to vessels on the status of other vessels and other relevant navigation information. In addition, congestion or other conflict situations are predicted as far in advance as possible. Vessels are alerted to such potential problems so that corrective measures can be taken.

Once a port or waterway has been selected to have VTS it is necessary to develop a procedure that embodies effective traffic control measures for that area. Basic parameters considered include:

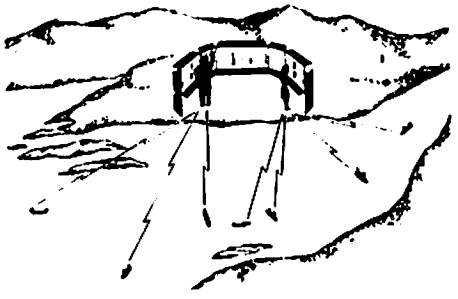
- area characteristics;
- traffic density and volume;
- casualty history;
- vessel characteristics;
- human ability.

VTS are now installed and operational in Puget Sound, San Francisco, Houston, New Orleans, and Valdez (Alaska). VTS will become operational in New York in 1978.

PROGRAM TRENDS

The importance of the PSS Program will continue to expand in the foreseeable future. The construction of offshore facilities and the growth in shipments of hazardous material combined with new and stricter safety standards will focus attention on the need for improved port safety.

At national and local levels, the Coast Guard will become increasingly active in the site selection process for liquid natural gas and hazardous materials facilities. Safe operating standards for such facilities will be set and enforced by the Coast Guard, as will those for the transit of vessels to and from such terminals.



Two Operators Man the Automated Console in San Francisco Harbor

To keep pace with expanding responsibilities brought on by the advent of more sophisticated materials and highly complex vessel operations, training of Coast Guard personnel in handling, storage, and stowage of dangerous cargoes, port safety and law enforcement, port industry operations, and the like will be broadened.

The high priority currently assigned to safeguarding U.S. ports and waterways as vital national resources will continue. The Coast Guard will be required to strictly enforce all regulations aimed at minimizing damage and losses from acts of sabotage and terrorism. Terrorism is expected to increase as a means of achieving political ends. Port facilities, offshore terminals and production platforms, and vessels in U.S. waters may become targets for terrorist activity. Coast Guard port security forces will be more frequently employed in the suppression of terrorism.

The Coast Guard will continue to establish, operate, and maintain Vessel Traffic Services in U.S. ports and waterways where required. Congestion of ports and waterways, coupled with the increasing amounts of exotic bulk chemicals and other hazardous cargoes that are shipped, make it imperative that the incidence of collisions, groundings, and rammings be reduced. VTSs, where established, will reduce these risks to ports, and will facilitate utilization of such ports and waterways.

Methods of managing waterway traffic other than constructing Vessel Traffic Services, will be pursued. Anchorage areas and nonanchorage areas will continue to be established by regulations to meet the needs of shipping, and to prevent the obstruction of channels and harbor approaches. The speed of vessels in selected waterways will be regulated to protect waterfront property and improve navigation safety. Regulated navigational zones will be established and traffic separation schemes will be devised for harbor approaches and other congested waterways.

RADIONAVIGATION AIDS PROGRAM

OBJECTIVE AND SCOPE

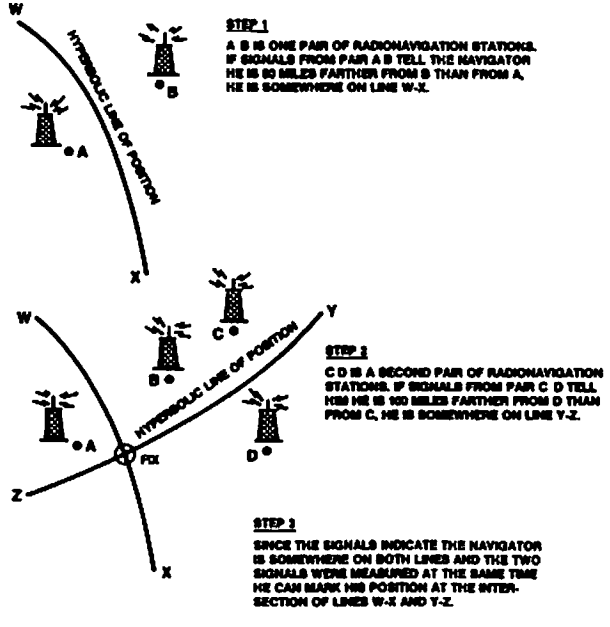
The objective of the Radionavigation Aids (RA) Program is to facilitate the safe and expeditious passage of marine and air traffic by providing a continuous, accurate, all-weather position fixing capability.

The Coast Guard is responsible for providing radionavigation aids and facilities to ensure safe and efficient navigation. Federal law authorizes the Coast Guard to establish, maintain, and operate electronic aids to navigation which are required to serve the needs of the armed forces and United States commerce in domestic areas and international waters or airspace in response to Department of Defense requirements, or through international agreements.

PROGRAM DESCRIPTION

In the 1920's, radiobeacons were introduced as the first electronic aids to navigation. Their use has continued, and today over 200 radiobeacons provide service to U. S. waters. Further developments in electronics technology led to LORAN (Long Range Navigation) first used in World War II. LORAN is based on measurement of the difference in time of arrival of radio pulses radiated by a pair of synchronized transmitters which are separated by several hundred miles. This difference in time is shown as a line of position (LOP) on a LORAN chart or can be converted to a LOP using LORAN tables. Time difference measurements from two pairs of stations yield two LOPs, the intersection of which indicates the position of the receiver. In practice, three LORAN stations can provide the two pairs necessary to obtain a fix. In a chain of three stations, the middle station usually serves as master or secondary for the two pairs. This relationship is shown in the accompanying figure.

The accuracy of a LORAN position fix varies with the location of the user in the service area, the relative geometry of the transmitting station pairs, the time of day and propagation conditions, and the accuracy of the time difference measurement.



THE PRINCIPLE OF HYPERBOLIC NAVIGATION

The LORAN—A System—Early LORAN stations, designated LORAN—A, became operational during World War II and provided the Armed Forces with the most reliable long-range radionavigational aid available within the existing state-of-the-art.

As the peacetime value of LORAN-A was realized, the number of stations which the Coast Guard operated reached 41. The Coast Guard also funded a number of foreign stations pursuant to international agreements.

It was recognized early in the LORAN development program that a low-frequency LORAN system would provide improved accuracy, and greatly extend the navigational coverage provided by medium frequency LORAN. Comprehensive tests showed that the low-frequency system could operate with substantially longer baselines than was feasible with LORAN-A providing expanded coverage with fewer transmitting stations. Additionally, the new low-frequency system could provide service over land, which was not possible with the LORAN-A system. The low-frequency system was called LORAN-C.

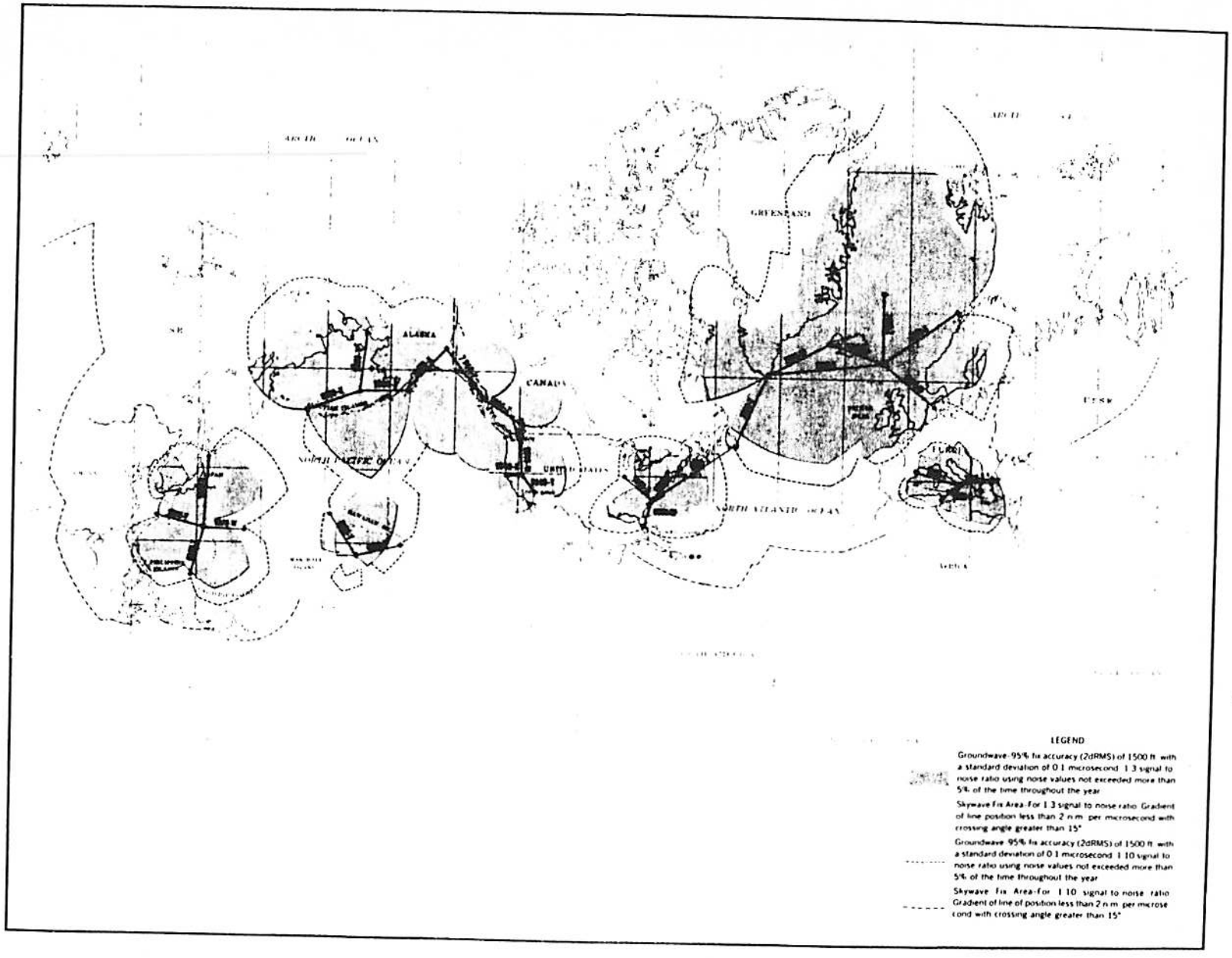
The LORAN-C System—Loran-C is a high precision, reliable and versatile radionavigation system, having a wide scope of applications. Summarized below are some of the possible applications of the LORAN-C system. While many of the applications are now in use, others require the completion of existing research and development projects.

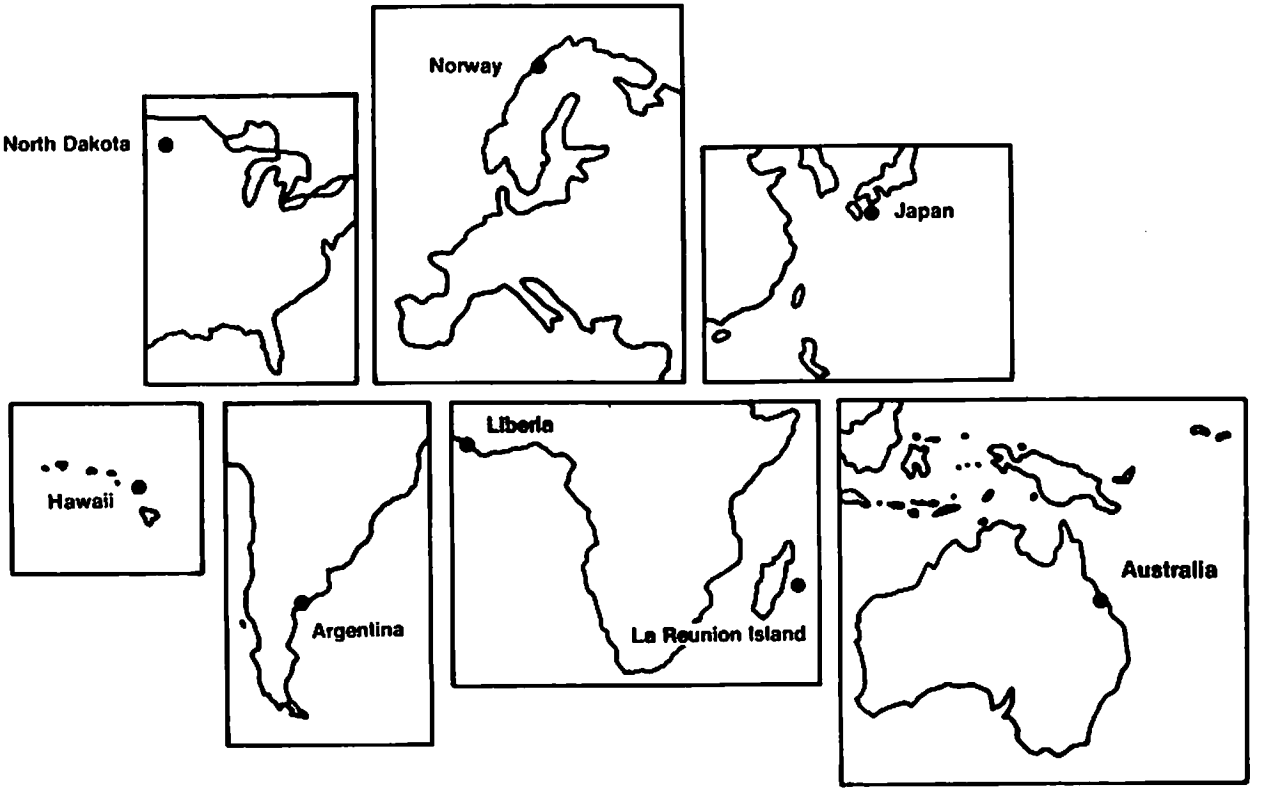
The Coast Guard network of LORAN-C stations and their groundwave coverage are shown on the accompanying map. Skywave coverage (i.e., the reception of signals reflected by the ionosphere) can also be used to obtain fixes over much greater areas of the earth's surface—though at a significant loss in accuracy.

The OMEGA Radionavigation System—OMEGA is a shore-based, very low-frequency hyperbolic radionavigation system which uses phase-difference measurement techniques for navigation (in contrast to LORAN which uses time-difference techniques). OMEGA is being implemented by the U.S. Navy. Coast Guard manages the operation of the system for the Navy and operates the two OMEGA stations located on U.S. soil. At very-low radio frequencies, signal transmission is reliable over thousands of miles and the time of transmission of a signal is predictable with errors of only a few microseconds. The OMEGA system will provide navigational fixes on the high seas and throughout the world with the four mile accuracy (95% of the time) required by the National Plan for Navigation. This high-seas, all-weather system will be available to users of all nations, in the air, on land or water, and aboard submersibles as well.

Seven permanent OMEGA Stations are now operational. Diplomatic negotiations are currently in progress with the Government of Australia for siting of the final transmitting station. Until such negotiations have been completed, no estimate of an on-air date can be made, but past experience has indicated that after host nation agreements are signed, about thirty-six months will be required for the system to become operational.

LORAN-C COVERAGE DIAGRAM





LOCATION OF OMEGA STATIONS

The map depicts the existing stations along with those under construction, and a probable location for the Australian station.

Summary of System Evolution—A chronological overview of the evolution of the U.S. radionavigation systems operated by the Coast Guard is provided in the figure on page 41.

Maintenance, equipment support, and manning problems associated with operating LORAN-C chains have become increasingly acute over the last five years. In order to stem and reverse the rising costs of operation and maintenance, the Coast Guard has initiated several major improvement and replacement projects. For example, third generation transmitters

encompassing updated electronics circuitry which will permit both system performance improvements and operating cost reductions are replacing out-dated, more costly transmitters. A solid-state LORAN-C transmitter, now under development, will have modular construction and reduce the level of on-station maintenance.

PROGRAM TRENDS

The coming years will witness a number of major changes in the Radionavigation Aids Program of the Coast Guard. An integrated radionavigation system consisting of worldwide OMEGA stations, a network of LORAN-C stations, and various Vessel Traffic Services (see PSS, pages 35 and 36) will allow the mariner to transit more safety and precisely from the high seas to harbor areas. The LORAN-A system will be disestablished by eliminating present LORAN-A stations and removing LORAN-A equipment at colocated LORAN-A/LORAN-C stations. The LORAN-C system will be expanded to cover the U.S. coastal confluence zone and the Great Lakes.

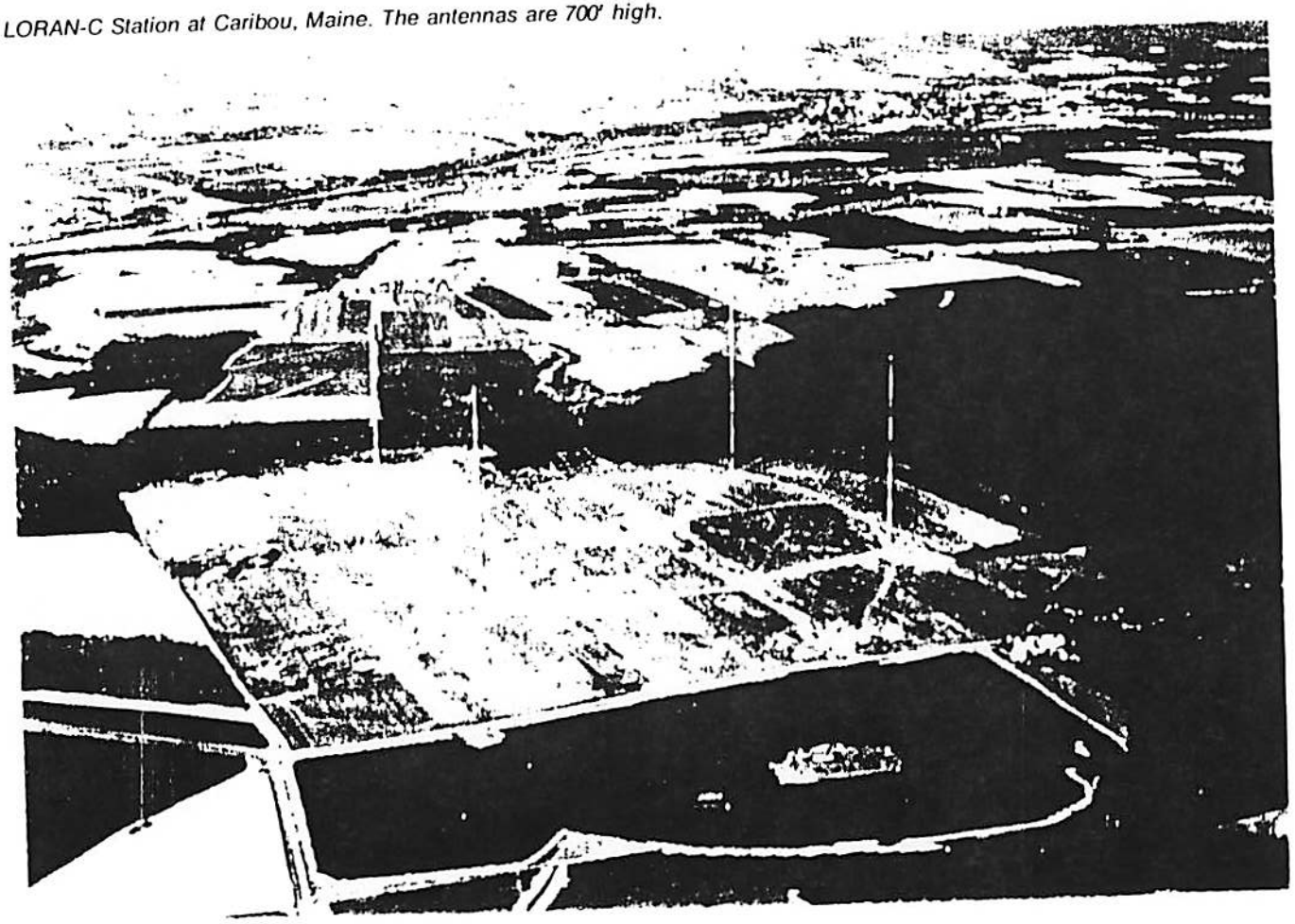
Equipment improvements, coupled with altered operating methodologies, will allow significant improvements in reliability, while both operating costs and maintenance costs will be reduced. In addition, new operating techniques may prove successful whereby the present method of monitoring of the LORAN-C system will not be required. This would permit the elimination of a number of remote stations and further reduction in the operating costs of the system.

Internationally, there is now considerable LORAN-C coverage in the Norwegian Sea area, the North Atlantic, the Mediterranean Sea, and in parts of the Pacific Ocean. With the availability of a low cost receiver, international maritime acceptance of LORAN-C should be equal to that enjoyed by LORAN-A.

Secondary uses of LORAN-C are expected to expand rapidly during the coming years. Land vehicle tracking, railroad car locating, precise timing, and retransmission of the LORAN-C signal for search and rescue "LOCATE" devices are a few of these secondary uses which offer exceptional promise.

OMEGA system implementation is continuing. Agencies of other participating nations are coordinating their programs with the United States. OMEGA stations located on foreign soil are operated by the host nation agencies who are responsible for maintaining the OMEGA signal with minimal interruption and in phase with the worldwide OMEGA Navigation System.

LORAN-C Station at Caribou, Maine. The antennas are 700' high.



RECREATIONAL BOATING SAFETY PROGRAM

OBJECTIVE

The objective of the Recreational Boating Safety (RBS) Program is to reduce the risk of loss of life, personal injury, and property damage associated with the use of recreational boats in order to provide boaters with maximum safe use of the nation's waterways.

PROGRAM DESCRIPTION

The Recreational Boating Safety Program incorporates a variety of activities directed toward reducing the loss of life and property damage. Integrated within this program are the efforts of regular and reserve Coast Guard personnel, volunteers of the Coast Guard Auxiliary, and State and local government employees. Coast Guard boating safety personnel maintain a close liaison with various State and local organizations through training programs and coordinated Federal/State programs that assist and promote effective State participation in safe boating programs. The Coast Guard administers a program providing financial assistance to States.

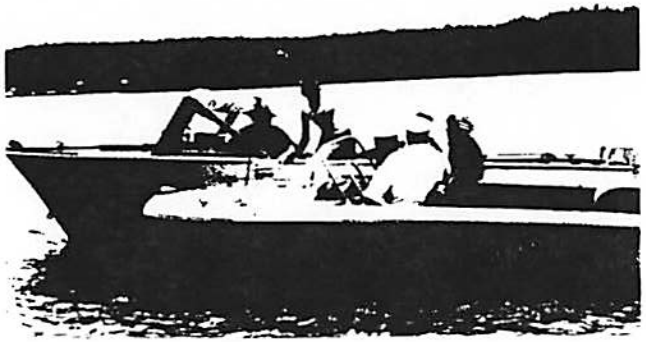
A unique element of the RBS program is the service rendered by the Auxiliary, an organization of more than 45,000 volunteer boaters. These individuals, using their own boats, augment regular Coast Guard forces by conducting rescue, assistance and patrol operations, education courses, and courtesy motorboat examinations.

Within each of the twelve Coast Guard Districts, there is a Boating Safety Team which has control over smaller operational units called Boating Safety Detachments (BOSDETs). There are over 50 BOSDETs located throughout the nation in areas with heavy concentrations of pleasure boaters. The BOSDETs are three- or four-man units with a boat, trailer, and vehicle. They conduct safety patrols; train Coast Guard regular and reserve personnel, State personnel and Auxiliarists; make informal visits to boat manufacturers and dealers; and promote boating safety through attendance at boat shows and other public contacts. Along with Auxiliarists and State personnel, BOSDET members man Boating Safety Centers (BOSCENs), which are both mobile and stationary displays. BOSCENs promote safe boating by providing safety information to the public and fostering cooperation.

On a regional basis, each district office has an organizational component for boating safety and Coast Guard Auxiliary. The district boating safety staff has responsibility for supervising Boating Safety Team activities; Auxiliary administration; State liaison; district standards compliance and technical information programs; penalty assessment; law enforcement; coordination of accident report submission; issuing regatta permits; administration of the program of financial assistance to States; training; and dissemination of public information.

The Coast Guard's Office of Boating Safety coordinates the overall national boating safety effort—establishing needed safety standards for boats and associated equipment, checking compliance and

BOSDET Safety Patrol



A Coast Guard boating safety detachment (BOSDET), on the alert to prevent unsafe pleasure boating, stops a boat to question the owner and passengers. There are 51 BOSDETs at work throughout the country. They report violations of Federal safety requirements for equipment and numbering of pleasure craft.

monitoring manufacturer defect notification campaigns; developing operator requirements and regulations; developing national public information campaigns and training programs; administering the national Auxiliary program; developing national education and law enforcement policy; and maintaining liaison with States and other authorities and organizations concerned with boating safety.

PROGRAM TRENDS

Accomplishment of the Recreational Boating Safety objective over the next ten years will be achieved through four major approaches:

- the Coast Guard will identify problem areas and proposed solutions based on accident analyses and the results of research and development efforts and, in consultation with the National Boating Safety Advisory Council, will establish appropriate safety standards and regulations;
- the Coast Guard will endeavor to insure that all new boats are built to the established safety standards and that safety-related defects are quickly remedied;
- the Coast Guard will strive to attain greater uniformity and comity in boating law enforcement by State and local authorities and to insure more effective enforcement of boating laws and regulations;
- the Coast Guard will guide the States, the USCG Auxiliary and other volunteer organizations in improving and expanding public education programs in order to raise the general level of operator knowledge and skill.

The Recreational Boating Safety Program will continue to emphasize voluntary, rather than mandatory, support in achieving its safety objectives.

Coast Guard's history is rich with the drama of rescue. In keeping with its proud tradition, the Coast Guard in 1977 alone responded to nearly 70,000 calls for help and prevented about 5,000 deaths. A member of the crew of the 44' motor lifeboat standing in the background helps an overturned boatman with a life ring, at left, and he is being taken aboard at right. RBS seeks to reduce the number and severity of such incidents through education and through construction standards.

RESERVE FORCES PROGRAM

OBJECTIVE

The primary objective of the Coast Guard Reserve Forces (RT) Program is to provide trained units and qualified persons for active duty in the Coast Guard in time of war or national emergency. In addition, the Reserve augments the active Coast Guard in its normal and peak period operations and in times of domestic emergency.

PROGRAM DESCRIPTION

The Reserve Forces Program serves as an integral element of the Coast Guard's total force. In order to develop and maintain the capability to augment active Coast Guard forces the Reserve Forces Program is aligned, to the extent possible, with the organization of the regular service.

In addition to their primary mobilization missions, Reserve forces are utilized in virtually all peacetime operations of the Coast Guard. For example, search and rescue seasonal workload peaks often are met, either wholly or in part, by Reservists manning SAR stations. Marine environmental patrols, port safety activities, and bridge inspections are other duties frequently performed by Reserve personnel. They also contribute significantly by providing assistance during natural disasters.

The operational elements of the Coast Guard Reserve are encompassed in the **Selected Reserve**, which is composed of Coast Guard Reserve groups and units in each district. Supplementing the Selected Reserve is the **Individual Ready Reserve**. This element consists of individuals generally considered to be fully trained due to extended active service in the Coast Guard, and of other reservists who participate in Volunteer Training Units, Inter-Service Training Units and other means of limited participation. These two elements, the Selected Reserve and the Individual Ready Reserve, combine to form the **Inactive Ready Reserve**, the primary vehicle for satisfying early response mobilization requirements in excess of those which can be filled by active duty forces of the Coast Guard.

Personnel who have completed their military obligation but desire to maintain a limited affiliation are members of the **Standby Reserve**. These Reservists constitute a back-up source of personnel who may be activated through Congressional action.

The final element of the Reserve Forces Program is the **Retired Reserve** which may be activated by Congressional action when it has been determined that there are not sufficient, qualified reservists in the active status in the required categories who are readily available for mobilization during war or domestic emergency.

The Logistics Support Mobilization Plan identifies the total operational requirement for approximately 22,000 early response mobilization billets to be filled by Reserve Forces. The majority of billets are assigned to units with a wartime Port Security mission. The remaining billets are assigned to other operating units that will require additional personnel to effectively perform their wartime missions.

Reservists participated in all phases of the aftermath of the catastrophic explosion, fire, and oil spill involving the Liberian tanker SANSINENA.

All mobilization billets are reviewed on a routine basis and assigned a priority which indicates their relative importance and the maximum lapsed time after mobilization for each billet to become operational. The 22,000 mobilization billets are distributed geographically to the various district commanders who assign them to specific Reserve units and, ultimately, to individual reservists.

To compensate for retirements and discharges, the Reserve Forces Program depends on two sources for new reservists.

The first, prior service personnel, consists of former petty officers from the Coast Guard and other services who choose to enlist in the Coast Guard Reserve. Approximately two-thirds of all new Selected Reservists enter through this program each year.

The second source, nonprior service personnel, consists of reservists who attend a 30 week initial active duty for training program (RP). Attending recruit training, a class A school (formal rate training) and advanced training on board a Reserve training vessel or an operational shore unit. Nonprior service recruits are normally qualified petty officers upon release from initial active duty. A variation of this program (RK) permits full time students to divide the initial period of active duty for training into two successive annual periods of not less than two months each.

The principal source of Reserve Officers is the Officer Candidate Program. After assignment to ships and shore establishments of the Coast Guard for a 3-year tour of active duty, these officers are obligated to remain in the Reserve until their total service equals 6 years. Although not required, those completing active duty are encouraged to affiliate with units of the Selected Reserve.

Ongoing training is vital to an effective Reserve Program preparing individuals for mobilization. The most effective method of mobilization training is a combination of actual performance of the same or related tasks in support of the everyday operational activities of the Coast Guard and participation in formalized training programs which develop experience in the individual's specific rating or mobilization mission that are not attainable through on-the-job training. In order to accomplish the required level of augmentation and formalized training for Selected Reservists, a program of 48 drills and 14 days annual active duty for training is required.

PROGRAM TRENDS

The Reserve Program will place major emphasis on the following areas during the next 10 years:

- increase the strength of the Selected Reserve to the level where it may meet its requirement for mobilization;
- balance prior and nonprior service recruit inputs to improve the match between on board rates and ratings and those required for mobilization;
- define the quality of training so that a truly valuable service is provided to Coast Guard peacetime programs through the augmentation training program, while at the same time insuring that individual reservists and units are prepared for their mobilization mission;
- align the Selected Reserve to the highest priority mobilization requirements;
- develop an effective afloat training program using 210' WMEC class cutters;
- establish qualitative measures for evaluating formalized training to focus it on areas not covered by augmentation training.

The ability of the Selected Reserve to respond effectively to either a partial or complete mobilization will remain the primary mission of the Reserve Forces Program. However, while developing the ability to meet these mobilization needs, benefits will also accrue to the Regular Coast Guard as the reservists prepare for their mobilization assignments by effectively performing normal, peacetime duties in support of regular Coast Guard activities.

SEARCH AND RESCUE PROGRAM

OBJECTIVE

The objective of the Search and Rescue (SAR) Program is to minimize loss of life, injury, and property damage by rendering aid to persons and property in distress in the marine environment, including the inland navigable waters.

PROGRAM DESCRIPTION

Search and rescue is the mission which the public most readily identifies with the Coast Guard. This mission is one of the Coast Guard's earliest and most traditional functions, and continues to demand the highest priority in all aspects of Coast Guard operations. The origins are twofold: the Revenue Marine was tasked by the Secretary of the Treasury in the early 19th century to render assistance to vessels in distress in the course of conducting its antismuggling patrols; within the same general time-frame, the U.S. Lifesaving Service was established to provide a network of beach patrols which launched surf boats to rescue crews from distressed ships. In 1915 these two services were combined as elements of the Coast Guard.

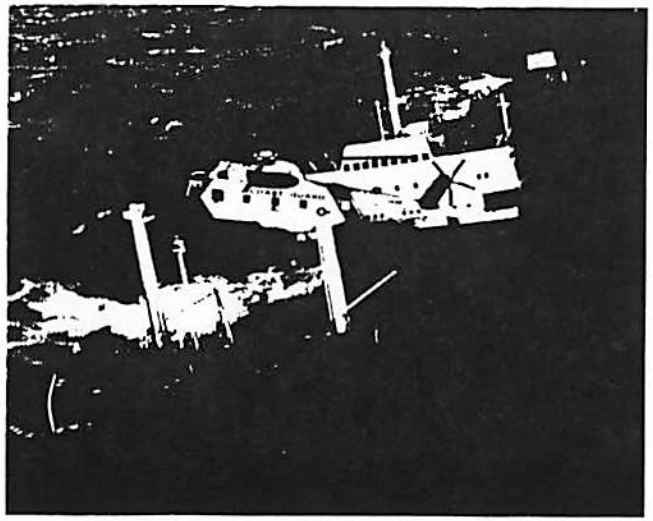
Economic and technological advances have changed the search and rescue clientele. The rapid expansion of recreational boating, the increase of powered fishing vessels, and the accepted responsibility of the United States to provide a greater degree of assistance to the mariner on the high seas, has created new demands for providing search and rescue capability. The Coast Guard has responded to these demands by evolving a search and rescue system that encompasses stations, ships, aircraft, and boats which are linked by a modern communications network, and centrally controlled and directed by rescue coordination centers.

The current national SAR plan has established three SAR regions: Inland, Maritime, and Overseas. The Coast Guard is the designated coordinator for the Maritime region. SAR facilities have been established at numerous points along the East, West, and Gulf Coasts, and in Alaska, Hawaii, American Samoa, and Puerto Rico.

The chart on page 48 delineates the Maritime SAR region. Although the region reaches deep into the Atlantic and Pacific and embraces all of the Gulf of Mexico, it should be noted that 92% of all SAR incidents occur within 25 miles of the U.S. coastline.

The Automated Mutual-Assistance Vessel Rescue (AMVER) system, operated by the United States Coast

During rescue operations a U.S. Coast Guard HH-3F helicopter hovers over the 640-ft. Liberian tanker ARGO MERCHANT that ran aground on shoals off Nantucket Island, MA, with a cargo of 7.6 million gallons of heavy crude oil on December 15, 1976. The 38 crew members who were on the foredeck when this photo was taken were lifted to safety



AREAS OF COAST GUARD RESPONSIBILITY IN THE NATIONAL SAR PLAN

Guard, is an international program designed to assist the safety of merchant vessels on the high seas. Merchant vessels of all nations on offshore passages throughout the world are encouraged to send sailing plans upon departure from port, and periodic position reports en route, to cooperating radio stations. These reports are forwarded to the AMVER Center located on Governors Island in New York Harbor. There, the information is entered into a computer which calculates positions by dead reckoning for the ships throughout their voyages, based upon most recent information. When a recognized Rescue Center of any nation learns of an emergency at sea, it may obtain a computer-predicted listing of ships in the vicinity of the emergency to determine which, if any, might be well suited to provide help. Valuable search and rescue data, such as each ship's radio watch schedule and whether she carries a doctor, is kept on file in the computer and is also printed for each ship listed. The location of an individual vessel, if participating, may also be obtained by rescue authorities if her safety is in question. Predicted vessel locations are disclosed only for reasons related to maritime safety. This system has proved to be an extremely cost-effective means of providing midocean SAR.

CAPITAL ASSETS

The SAR system is a cohesive network employing three basic platform types: aircraft, boats, and cutters. The Coast Guard selects its resource mix from alternatives that are within its technical and financial capabilities to acquire, support and maintain.

Recent statistics indicate that boats account for 77% of the SAR workload, aircraft 15%, and cutters 8%. Demands placed on shore facilities by each of these platforms vary as functions of utilization and physical constraints imposed by the geographic areas and climatic conditions. The characteristics of the mobile units will be described briefly for a better understanding of the facilities required. Selected characteristics of major types of Coast Guard vessels and planes may be found in the Appendices.

Boats—Boats in the Coast Guard are generally designed and deployed to perform primary missions for specific programs such as Search and Rescue, or for multimission requirements. SAR boats are uniquely designed for and capable of providing assistance under severe conditions.

Some boats, designed primarily for non-SAR missions, such as Aids to Navigation or Port Safety and Security are utilized for SAR purposes as back-ups during periods of peak case loads or to fill voids in SAR coverage.

Cutters—The cutters currently utilized by the SAR Program include 82′ and 95′ patrol boats, medium and high endurance cutters, icebreakers, tugs and buoy tenders. The major portion of distress cases responded to by cutters occur within 10 to 100 miles from the U.S. coast. A SAR cutter is expected to be capable of reaching the distress scene of 75% of these cases happening within 100 miles of the coast within 12 hours. In addition, the cutter is expected to reach 90% of the cases within 18 hours, search for two days at 12 knots and return to port with a tow if the case so requires.

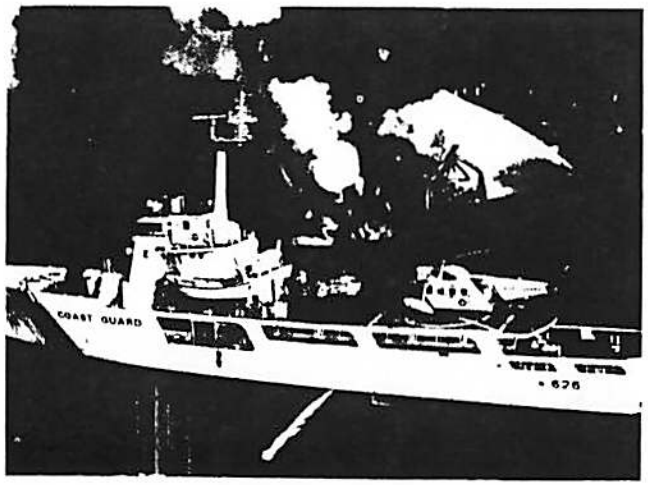
This 44-foot steel self-righting motor lifeboat, shown in heavy surf at Yaquina Bay, OR, is used for SAR tasks in severe weather and surf conditions, and has a range of 150 miles at full power

Aircraft Aircraft provide minimum response time, large area coverage, and immediate direct assistance in performing the SAR mission. These capabilities save time and, thus, save lives and property.

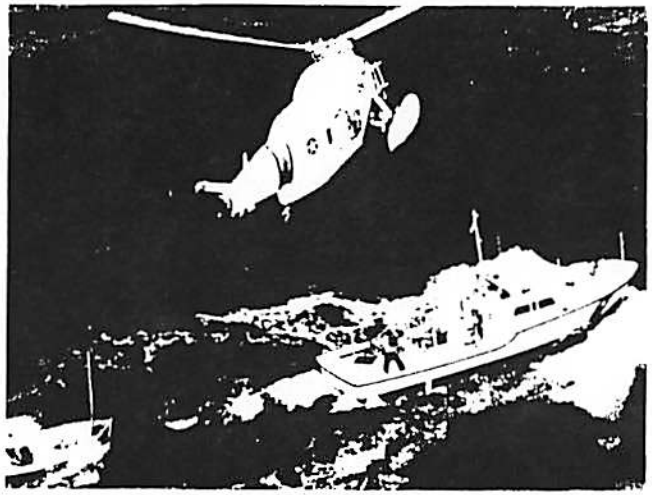
The search phase depends upon the range and endurance capabilities of aircraft. Aircraft can reach the SAR incident area swiftly. The search altitude also gives the aircraft an advantage over other SAR platforms because it enhances the visual search capability and performance of its electronic detection equipment.

The performance of the rescue phase depends upon the speed of the response to the distressed craft once it is detected and the ability to give direct assistance. During this phase, helicopters can effect recovery of persons while both helicopters and fixed-wing aircraft can deliver life saving or dewatering equipment.

The 210-foot U.S. Coast Guard Cutter DEPENDABLE (WMEC-626) investigates and assists a burning platform off the Louisiana coast in the Gulf of Mexico. The cutter edges close to the blazing inferno to determine which of the many wells within the oil rig are in flames.



The teamwork of a U.S. Coast Guard HH-52A helicopter and a 40-foot patrol boat saves seven Cuban refugees at sea. While the helicopter basket hoists one refugee having an infected foot and whisks him away to a hospital, the Coast Guard boat carries the remaining six refugees and tows their 15-foot sailboat to port.



PROGRAM TRENDS

The Coast Guard, as the primary agency conducting search and rescue in the U.S. maritime jurisdictions, will continue to provide timely and appropriate assistance to those in distress within reasonable limits. During the next decade, there will be continuing change in the scope and character of those persons served which will result in an increase of persons using the marine environment at an average annual rate of approximately 5%. In the maritime area, there will also be significant growth in the number of commercial vessels, offshore structures, and undersea activities. These factors will result in an anticipated average annual increase of approximately 6% in SAR incidents.

including increases in SAR activity in the Arctic and some underwater SAR.

SAR response in the high seas region will continue to be supplemented by expanded participation in the Automated Mutual-Assistance Vessel Rescue System (AMVER). This participation will require more cooperation with private industry, foreign governments, Federal executive agencies, and local agencies. The increased reliance on State and local government agencies for SAR on inland waters will emphasize the Coast Guard's role as SAR coordinator.

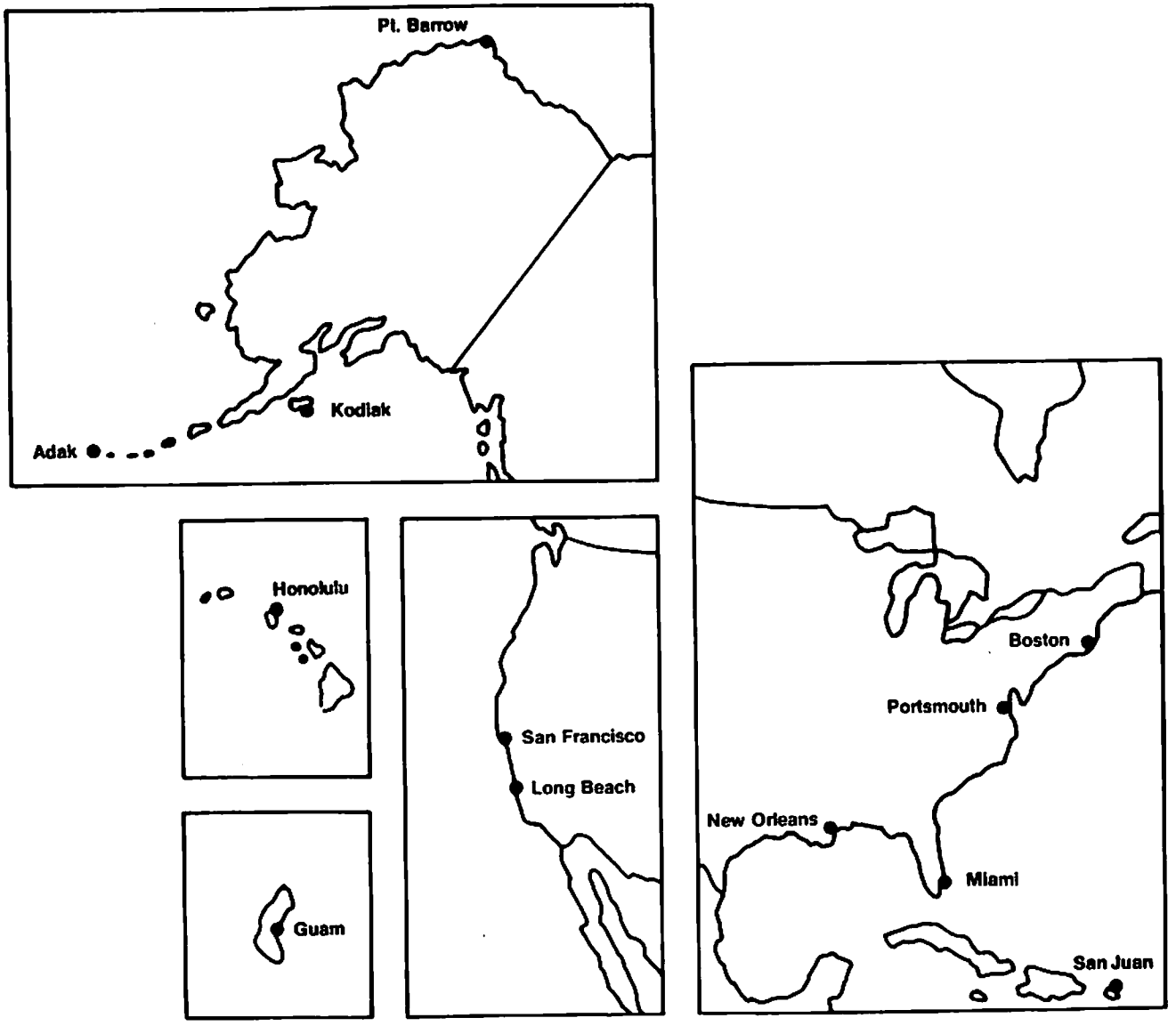
A crewman in the doorway of a U.S. Coast Guard helicopter surveys the wreckage along the Gulf coast area of Mississippi from Waveland to Biloxi in the wake of furious hurricane Camille in August, 1969. Large signs were held out the door for persons spotted below, inquiring whether anyone was injured. Aircraft from the Coast Guard Air Stations at Mobile, AL and New Orleans, LA, surveyed damages and evacuated sick and injured persons when Camille wrecked dozens of communities from St. Louis MO to Pascagoula, MS

The HH-3F is a long-range rescue helicopter equipped with an electronic brain that allows the pilot to concentrate on his mission, thereby improving the chances for survival for victims of sea disasters.

There will be an increasing use of the Reserve and Auxiliary to supplement regular Coast Guard SAR forces. Their use will be emphasized when regular forces are not available, where regular units have been disestablished to provide a more efficient allocation of resources, and in areas where seasonal factors result in short periods of peak SAR activity.

There will be a continuing improvement in resources including replacement of overage vessels. Replacements may include hydrofoils, surface effect vehicles, and underwater vehicles in addition to the more traditional types of vessels. Mission performance and effectiveness will require better communications and navigation equipment and survival equipment. Improved distress and locating systems can significantly improve program performance. Aggressive R&D and engineering support activities are underway in an effort to improve SAR performance.

COAST GUARD COMMUNICATIONS/RADIO STATIONS



COMMUNICATION SERVICES SUPPORT PROGRAM

OBJECTIVE

The objective of the Communications Services Support (GAC) Program is to provide efficient, rapid, reliable, and secure communications to meet the needs of all Coast Guard programs, and to provide the basic maritime telecommunications networks for the non-military agencies and departments of the Federal government.

PROGRAM DESCRIPTION

The Coast Guard Communications system serves four basic roles:

- to provide command and control of Coast Guard forces ashore, afloat and airborne;
- to satisfy the needs of the maritime community, both commercial and recreational, with radio coverage primarily in distress frequency bands and maritime mobile calling bands. In addition, the Coast Guard operates the Automated Mutual-Assistance Vessel Rescue (AMVER) System. This computerized system provides a picture of all ships in the vicinity of a distress or assistance call;
- to insure communications capability with other Military Services, especially the U.S. Navy, as an active member of the U.S. Armed Forces;
- to support other government agencies.

In order to carry out these roles effectively, the Coast Guard has established and operates long-range and short-range communications networks.

The Coast Guard's long-range communications network is now divided into two areas, one for the Atlantic and the other for the Pacific as shown in the accompanying map.

These two Area Communications Systems provide voice, radiotelegraphy, radioteletype, and facsimile communications support for ships and aircraft. Communications Station San Francisco is the West Coast System Control station while Communications Station Portsmouth is the East Coast System Control Station. The systems provide the Area and District Commanders with capability of direct communications with each other, and with shore and mobile units on an assortment of radio and landline circuits. Acting in concert or independently, the two Area Systems support long range operational, logistics, and administrative communications requirements and provide distress coverage in the contiguous U.S. coastal areas out to 300 miles offshore on 500 kHz, (MF-CW) with selective coverage in Alaska and Hawaii.

In addition to stationary communications and radio stations, the Coast Guard has also developed and constructed four Transportable Communication Centers (TCCs) which are located at San Francisco, CA, and St. Petersburg, FL. The TCCs, one of which is shown on page 54, are used for major disasters and unusual communications requirements. The TCCs have a complete multimode radio communication capability. They can be rapidly deployed by HC-130 aircraft, carried by HH-3F helicopters, or towed by 1/2-ton vehicles.

The coastal, or short-range communications network, is oriented toward command and control of smaller Coast Guard units such as aircraft, boats, groups, and stations. This network also provides radio distress coverage for recreational boaters and commercial craft.

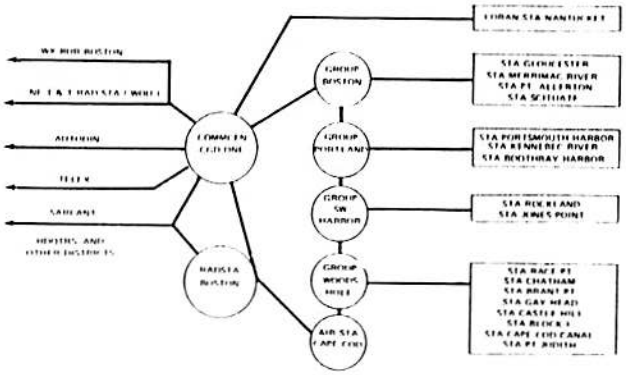
Coast Guard groups and stations continuously monitor International Distress Frequencies. Coverage is provided in all contiguous U.S. coastal areas out to 60 miles offshore on 2182 kHz (MF-voice) and 20 miles offshore on 156.8 mHz (VHF-FM). In the coastal areas

of Alaska and Hawaii, coverage is also being improved to the extent feasible considering the geographical characteristics of these areas.

The figures at right depict this network for the First Coast Guard District (New England) and illustrate the interplay the communications program has with the multimission operational units of the Coast Guard.

Elements of the short-range communications system function under the operational control of the Coast Guard District Commander within whose boundaries they are located. Short-range communications facilities are linked by teletype to Coast Guard telecommunication centers (COMMCEN), located in each district, as are the long-range or high seas network and other military and civil facilities and systems.

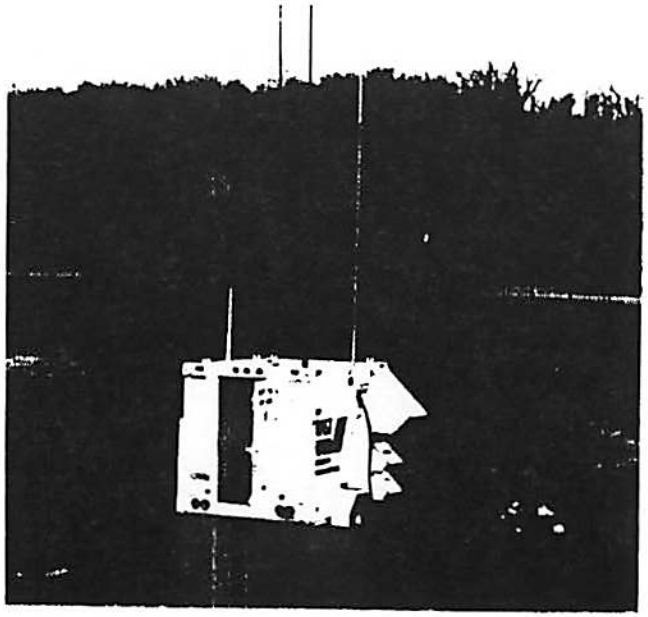
A district communications center is provided at the office of each district commander for the control of

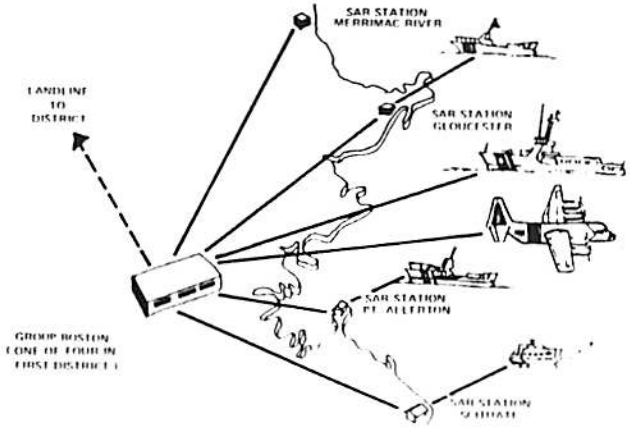


Typical District Communications (Boston, MA).

Typical Group Office and SAR Stations (Boston, MA).

Transportable Communication Center





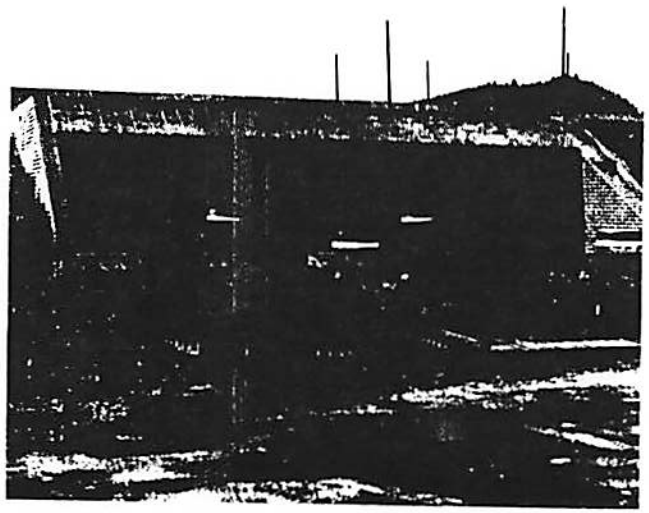
district rapid communications. The communications center also links the long and short range communications network together. Communications centers contain equipment which interface with other services and commercial systems.

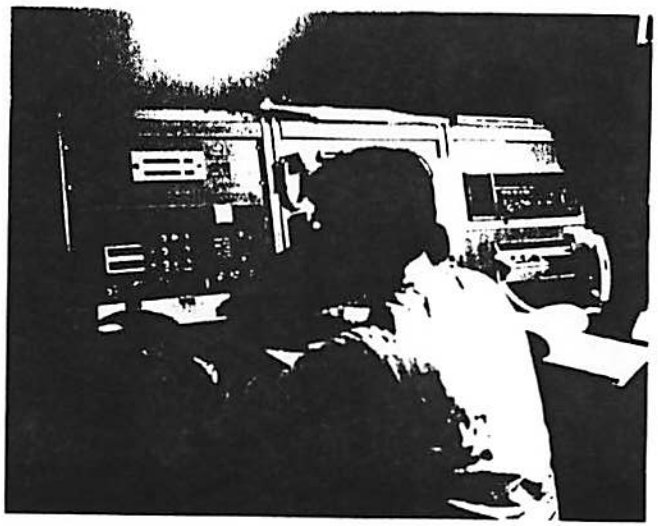
PROGRAM TRENDS

Growth of communications services will be directly related to expanded requirements generated by other Coast Guard programs and expanding requirements of other government agencies. A major area of interest for possible expansion is that of advanced alerting and locating systems which use the Coast Guard communications system.

Developments relating to technological improvements in all phases of communications will continue to be monitored closely and incorporated when available into the Coast Guard network.

External and internal views of a modern Communications/Radio Station located at Pt. Reyes, California are shown below.





SUPPORT PROGRAMS

SUPPORT PROGRAM	OBJECTIVE	DESCRIPTION
PUBLIC AND INTERNATIONAL AFFAIRS SUPPORT (GAA)	Coordinate participation in international matters involving the Coast Guard and keep public informed of the Service's objectives and activities.	The Public Affairs Support Program coordinates public information efforts involving mass communications media in order to make the best uses of these tools. This includes providing information to the general public on the operational missions of the Coast Guard. Internationally, the Coast Guard is widely engaged in activities which are the outgrowth of its domestic responsibilities. These include international maritime safety, marine pollution cooperation, LORAN and OMEGA coverage for both air and surface users, and the training of foreign nationals. Coast Guard officials participate in numerous international meetings, including at least one marine treaty conference each year.
ENGINEERING SUPPORT (GAE)	The objective of the Engineering Support Program is to provide efficient and effective engineering assistance to all Coast Guard activities. This assistance includes the design, construction, and maintenance of shore stations, cutters, boats, aircraft, equipment, and aids to navigation.	This complex program consists of five elements: Aeronautical Engineering, Civil Engineering, Electronics Engineering, Naval Engineering, and Ocean Engineering. A continuing interplay takes place among these elements stimulating the development of cost-effective methods and facilities to support operational missions. **Aeronautical Engineering Support**—The Aeronautical Engineering element is responsible for the planning, design, procurement, leasing, modification, maintenance, and logistic requirements of Coast Guard aircraft and associated equipment. **Civil Engineering Support**—The Civil Engineering element is responsible for the planning, design, procurement, construction, and maintenance of all Coast Guard shore facilities. **Electronics Engineering Support**—The Electronics Engineering element is responsible for the planning, design, leasing, procurement, fabrication, installation, modification, and maintenance of all Coast Guard electronic equipment and systems. **Naval Engineering Support**—The Naval Engineering element is responsible for the planning, design, construction, installation, maintenance, outfitting and alteration of Coast Guard boats and cutters, including related hull, machinery, ordnance, oceanographic winches, wire rope, deck cranes, and pollution control equipment. **Ocean Engineering Support**—The Ocean Engineering element is responsible for the planning, design, procurement, fabrication, placement, and maintenance of visual and audible Short Range Aids to Navigation, and provides technical support for Marine Science Activities, Ice Operations and the Marine Environmental Protection programs. Planning for the acquisition of a system or equipment is a "total" Coast Guard effort. The operating program and support managers together develop and analyze each support plan for reliability, availability, and maintainability. One part of the overall support plan is the maintenance plan which is developed by the engineering support managers. Integration of the maintenance plan with the other support elements permits effective evaluation of projected support requirements. These requirements are then translated into design criteria

SUPPORT PROGRAM (Cont'd)	DESCRIPTION
	and ancillary support needs. Because of the extent and diversity of Coast Guard equipment and facilities, a complex and effective maintenance system has been created. In general, maintenance facilities can be categorized as either fixed or mobile. The fixed facilities include industrial bases, electronic shops, central repair facilities and boat maintenance facilities. The mobile maintenance facilities consist of aids to navigation boats, buoy boats, buoy tenders and construction tenders. In addition, major engineering support is provided at the Aircraft Repair and Supply Center, the Electronics Engineering Center, the Electronics Engineering Laboratory and the Coast Guard Yard. Large installations called Support Centers provide services and facilities for "tenant" operating units. Currently, Support Centers are located in Boston, New York, Portsmouth (VA), Kodiak, Seattle, and Elizabeth City (NC). The change that has taken place in Coast Guard missions and the expectation that this change will continue at a rapid rate dictate basic revisions in engineering support, especially for the shore establishment. The continuation of the multimission facility concept, problems with the erosion of the buying power of the dollar, and the projected increases in funding for capital improvements require a new overview of the total shore plant planning, construction, and maintenance system. The Engineering Support Program is expected to undergo changes or modifications in several areas. The major areas are: • a shift to a more active facility coordination role in both construction and maintenance; • more reliance on the use of outside consultants for design of facilities; • improvement of overall Coast Guard standards for shore units, • changes in traditional design and maintenance concepts.
INANCIAL IANAGEMENT ERSONAL UPPLY AND UTOMATED NFORMATION UPPORT (GAF)	Provide the financial data, automated information, supply, and personal support needed to perform Coast Guard missions.

The GAF Program is divided into four elements:

Financial Management Support—Provides accounting and bill-paying services, financial analysis assistance, and fund-management support for Coast Guard operating commands and program managers.

Personal Support—Provides services directly to the individual. The services include pay and allowances; Non-Appropriated Fund Activities (NAFA) such as clubs, exchanges, and commissaries; messing and subsistance; and transportation and relocation services.

Supply Support Provides all operating units with material, services, and property as needed. The element includes real property management, contracting and procurement; quality assurance for engineering purchases; and supply logistics.

Automated Information Support Provides automated information and data processing support to all Coast Guard programs.

SUPPORT PROGRAM (Cont'd)	OBJECTIVE	DESCRIPTION
CIVIL RIGHTS SUPPORT (GAH)	Assure implementation of the civil rights and equal opportunity precepts within the Coast Guard.	The Civil Rights Support Program is directed toward increasing minority group and female representation and participation at all levels and in all aspects of the Coast Guard. This includes ensuring fair and objective opportunities and treatment for all personnel, both military and civilian. The program also ensures that certain contractors and organizations receiving Coast Guard funds practice full and affirmative equal opportunity.
	The Civil Rights Program provides all Guardsmen, including both minority groups and women, with equal opportunity to advance in all areas of Coast Guard activity.	
MEDICAL SUPPORT (GAK)	Provide comprehensive health care to active duty personnel and limited health care services to dependents and retirees.	The Medical Support Program provides for delivery of health care to active duty personnel, eligible dependents, and retirees and their dependents. Coast Guard active duty personnel are provided inpatient, outpatient, and emergency medical care and services on a contractual basis in areas lacking Coast Guard, Public Health Service, or Department of Defense facilities, or in cases needing special care. Casualties identified as a result of the Coast Guard search and rescue missions are afforded emergency care when necessary. In addition to direct patient care, the Medical Support Program provides medical personnel and emergency medical technicians in support of operational missions having medical requirements, i.e., SAR, polar ice breaking, training, and military readiness.
LEGAL SUPPORT (GAL)	Provide the legal services required in performing Coast Guard missions.	The Legal Support Program provides legal services to assure that the operations and activities of the service are consistent with law; provides review of proposed legislation and regulations; provides counsel to commands and staffs, and to individual personnel; participates in planning for and attending international meetings; reviews penalties imposed as a result of violation of law or regulations; administers the military justice system and adjudicates claims.
INTELLIGENCE and SECURITY SUPPORT (GAI)	Provide intelligence, personnel and criminal investigative data, and technical and physical security support to all Coast Guard programs.	The major elements of the Intelligence and Security Support Program are: • provides operational and strategic intelligence support to all CG programs; • conducts criminal, counterintelligence, and personnel security (background) investigations; • administers the National Agency Check (NAC) and Port Security Personnel Security Programs;

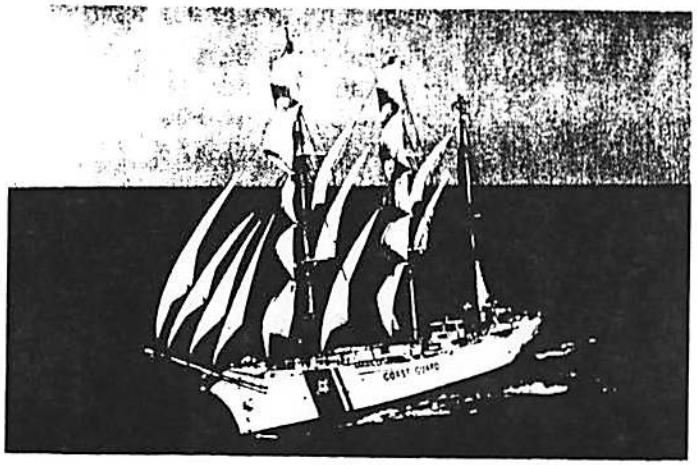
SUPPORT PROGRAM (Cont'd)	OBJECTIVE	DESCRIPTION
		• administers the Security (technical and physical) and Classification Management Programs; • maintains liaison and participates with other military and civil authorities on matters pertaining to intelligence, investigative, and security matters.
PERSONNEL SUPPORT PROGRAM (GAP)	Recruit and train sufficient numbers of capable and motivated personnel, military and civilian, to carry out the various programs of the Coast Guard.	The Personnel Support Program is directed to obtaining, training, maintaining, and retaining those military and civilian personnel necessary to the operation of the Coast Guard. In order to accomplish these tasks, the program has been divided into numerous elements which cover areas such as recruiting, training, career planning, job assignments, housing, and billeting. **Recruiting** to obtain the required numbers of capable military personnel, emphasis is placed on management approaches such as recruiter selection and training location of recruiting units, communication, advertising and other support. A special effort is made to attract qualified members of minority groups and women to all levels of the organization. **Training**—continuous process beginning with recruit or orientation training and ending with a preretirement counseling. Training can be divided into three broad categories: • On the Job Training; • Operational Training; and • Formal Training. On the Job Training refers to training conducted at the unit by unit personnel and may be either individual or team training. Operational Training refers to team training which the service member receives at his duty station or other approved locations. On the job and operational training are the responsibility of the Military Operations/Preparedness Program. Formal Training includes structured "classroom-type" training and indoctrination conducted at Coast Guard operated or approved educational centers. The three major types of formal training are Basic, Job Entry Level, and Specialized Training. The figure at left shows the locations of Coast Guard operated training centers. **Career Planning and Duty Assignments**--the control of officer and petty officer duty assignments is centralized at Headquarters and serves as the primary management tool for military personnel administration. Personnel with mission-specially training and experience are identified and coded to facilitate assignment to areas in which their expertise can be best utilized. Clearly defined promotion and rotation patterns for all personnel throughout their careers remains a goal of the program. **Housing** The Coast Guard strongly supports a policy of providing adequate and suitable family housing for its military personnel. Generally, each member is expected to rent or purchase in the private market near his duty station. Where private housing is generally unavailable because of

Coast Guard Operated Training Centers

Coast Guard Operated Training Centers

1 Training Center Petaluma, CA
2 Recruit Training Center Alameda, CA
3 CG Institute Oklahoma City, OK
4 Aviation Center Mobile, AL
5 Aircraft Repair & Supply Center Elizabeth City, NC
6 Recruit Training Center Cape May, NJ
7 Governors Island Training Center, NY
8 Academy New London, CT

SUPPORT PROGRAM (Cont'd)	OBJECTIVE	DESCRIPTION
		exorbitant costs, Coast Guard leases adequate housing for qualified military personnel; in return, the occupants must forfeit their Basic Allowance for Quarters. Where the private sector is unable to provide sufficient adequate housing, construction or purchase of Coast Guard-owned housing is approved. **Billeting**—all unmarried military members are expected to reside in adequate quarters near their duty stations. Generally, the Coast Guard provides bachelor quarters where on-base living is essential to mission accomplishment or where adequate private housing is not available.
SAFETY AND HEALTH SUPPORT PROGRAM (GAS)	Ensure maintenance of safe and hygienic conditions of employment through application of loss control management principles and provision of guidance and direction.	The safety and health program focuses on Flight Safety, General and Industrial Safety, Surface Vessel Safety and Industrial Hygiene. The major goal of the program is to identify those actual or potential conditions and practices which could adversely affect mission accomplishment and to ensure provision of management controls and systems to abate such conditions.
RESEARCH, DEVELOPMENT, TEST and EVALUATION SUPPORT PROGRAM (GRD)	Develop and obtain acceptance of technological advancements which improve the Coast Guard's ability to perform its missions.	The Research, Development, Test and Evaluation Program is directed towards improving the performance of current Coast Guard programs and towards the development of a capability which anticipates future roles and missions. The program can be characterized in two ways: the development of hardware, procedures and systems which directly contribute to increasing the productivity and effectiveness of the operating forces; and, the expansion of knowledge related



The 295-ft. three-mastered Coast Guard Academy training barque USCGC EAGLE with cadets at the helm and manning the lines, breezes easily under full sail en route to the historic port of Alexandria, VA, to participate in the "Tall Ships" bicentennial ceremonies. The EAGLE is used primarily to train Cadets.

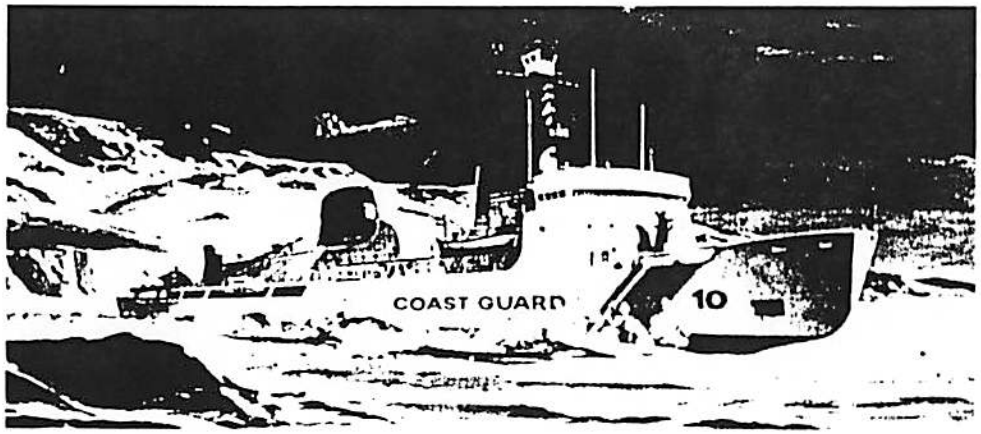
SUPPORT PROGRAM (Cont'd)	OBJECTIVE	DESCRIPTION
		to technical support for regulatory programs. In addition, independent research and exploratory development and technological assessments are conducted to identify promising innovations and evaluate their feasibility for Coast Guard programs. GRD administers two facilities, the Research and Development Center now at Groton, CT, and its subunit, the Fire and Safety Test Detachment at Mobile, AL.
RETIRED PAY (RP)	Pay retirees accurately and on time. Budget in advance for required funds.	Handled as collateral duty by Office of the Comptroller.

Appendix I

Major Characteristics of Selected CG Cutter Types*

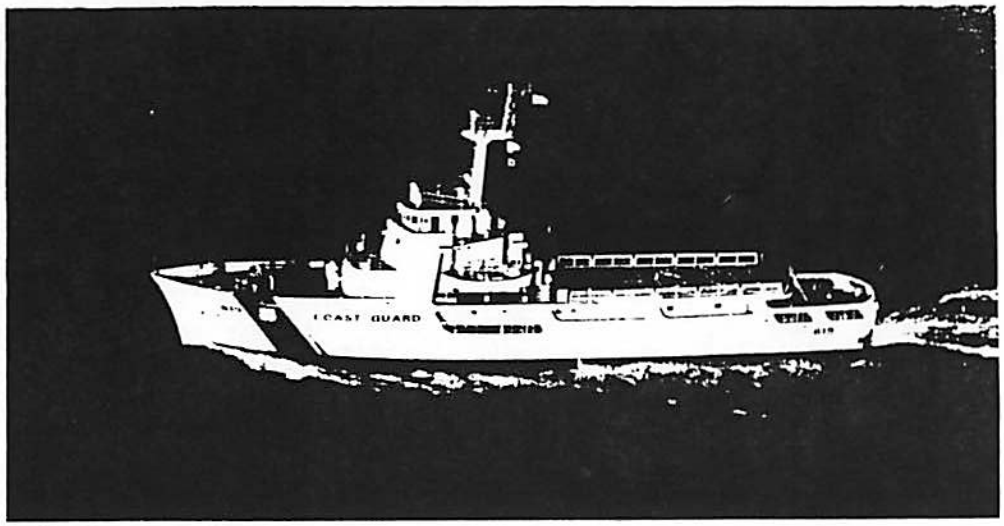
Type	*Major Missions*	*Length Overall (feet)*	*Maximum Speed (knots)*	*Maximum Range (100d mi.)*	*Entered CG Service*	*Remarks*
Icebreaker	IO, MSA SAR,	269-399	16-21	10-28	1944-77	All are equipped with helicopter flight decks.
High Endurance Cutter	ELT, MO/MP, SAR	327-378	19-29	8-14	1936-72	Older vessels of this type will be replaced by the new 270' medium endurance cutter. Post-WW II vessels are equipped with helicopter flight decks.
Medium Endurance Cutter	SAR, ELT,MO/MP, MEP	143-230	13-18	6-22	1939-69	New 270-foot cutter, due to enter service in 1981, will replace many WW-II era vessels. All post-WW II vessels are equipped with helicopter flight decks.
Patrol Craft	SAR, ELT MEP, RBS, AN	82-95	20-24	1-3	1953-70	
Harbor Tugs	PSS, MEP, SAR, IO	65-110	10-11	3-6	1939-67	Handle much domestic icebreaking. New 140-foot tug entering service in 1979 will replace some WW II era vessels.

*A "cutter" is defined as a Coast Guard vessel 65 feet or more in length having adequate accommodations for the crew to live aboard.

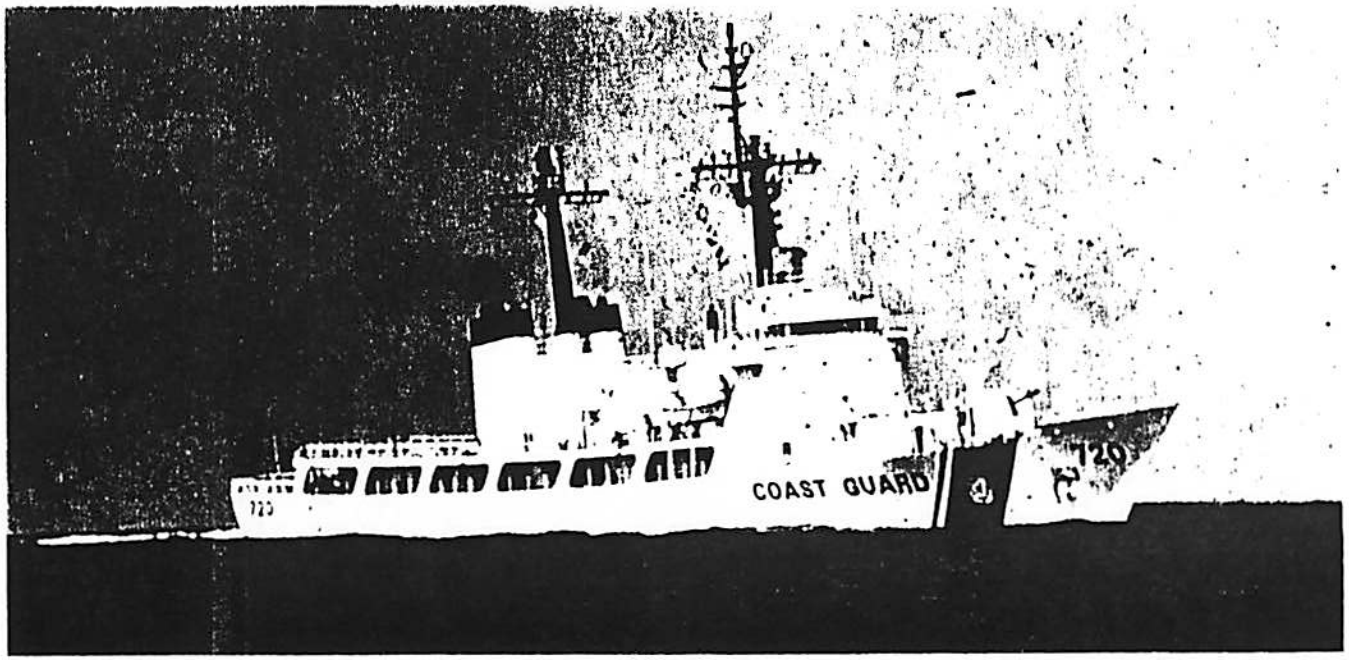


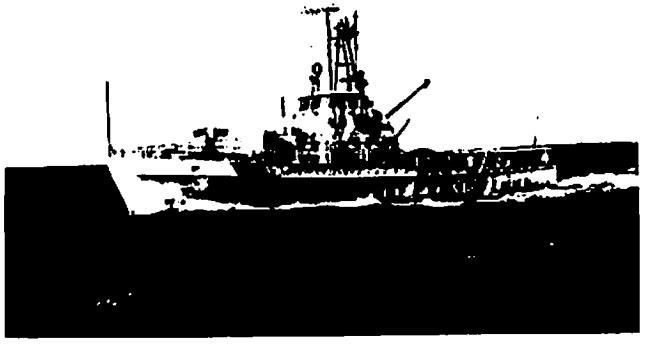
USCGC Polar Star - newest class of icebreakers.

210' Medium Endurance Cutter

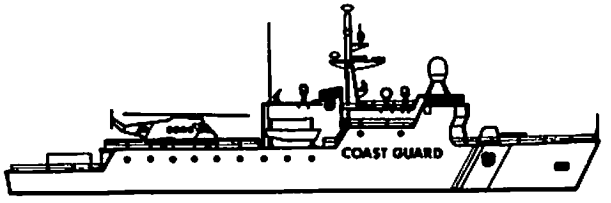


USCGC SHERMAN a 378' class High Endurance Cutter.





82' Patrol Cutter

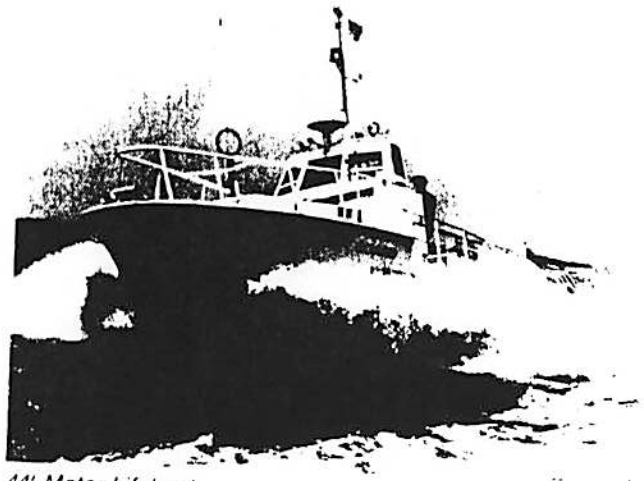


270' Medium Endurance Cutter

Appendix II

Major Characteristics of Selected CG Boats

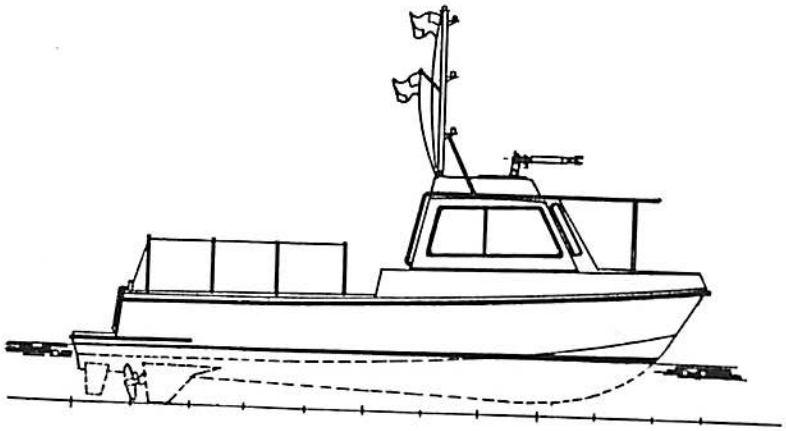
Type	*Major Missions*	*Length Overall (ft.)*	*Maximum Speed (knots)*	*Maximum Range (miles)*	*Remarks*
Motor Lifeboat	SAR, PSS, MEP	44-52	11-16	150-500	Designed to cope with extreme weather conditions. Equipped with fire-fighting and dewatering systems.
Motor Rescue Boat	SAR, PSS, MEP	25-26	12-24	70-150	Can operate in shallow water.
Utility Boats	SAR, PSS, MEP	16-41	20-40	70-280	For use in confined waters. Some are equipped to fight fires.
Ports and Waterways Boats	PSS, MEP, SAR	32	25	175	All are equipped to fight fires.
Aids to Navigation Boats	AN, MEP	45-63	9-15	190-300	These vessels are equipped with booms and open deck spaces to facilitate servicing navigation aids.



44' Motor Lifeboat

41' Utility Boat

32' Ports and Waterways Boat



Appendix III

Major Characteristics of Selected CG Buoy Tenders*

Type	*Major Missions*	*Length Overall (feet)*	*Maximum Speed (Knots)*	*Maximum Range (1000 mi.)*	*Entry Into Service*	*Remarks*
Seagoing	AN, IO, SAR, ELT MEP.	180	13-15	13-31	1943-44	Frequently respond to developing SAR, MEP, and ELT cases
Coastal	AN, SAR, IO MEP,	133-177	10-13	0.9-4.5	1937-71	Same as above
Inland	AN,	65-100	8-11	1.5-5	1942-69	
Construction (Inland)	AN	75-76	8-9	2.2-2.5	1962-65	These tenders include a construction barge.
River	AN	66-115	8-13	2.5-10.	1940-70	Some of these tenders include a 3-ton crane on a barge.

*A buoy tender is a Coast Guard cutter that has been designed and constructed primarily to install and service aids to navigation. Tenders typically are equipped with booms and open deck spaces to facilitate these operations.

Right- Seagoing Tender

Right below- River Tender

Coastal Tender

Appendix IV

Major Characteristics of Selected CG Aircraft

Purpose	*Type*	*Major Missions*	*Endurance (hours)*	*Speed (knots)*	*Entered CG Service*	*Remarks*
Long Range Search	HC-130 (Lockheed Hercules)	SAR, IO ELT, MSA, RA,	IO	300	1960	Can deliver 35,000 pounds of emergency equipment by parachute if necessary
Medium Range Search	HU-16 (Grumman Albatross)	SAR, ELT, MEP, MSA,	10	140	1951	Being retired due to age and condition
	HC-131 (Convair 24D)	SAR, ELT, MEP, MSA	5½	180	1977	Former USAF plane reactivated pending delivery of sufficient HU-25's (see below). Has limited anti-icing capability.
	HU-25 (Falcon 20)	SAR, ELT, MEP, MSA	4½	410	1979	Replacement for HU-16.

HELICOPTERS

Medium Range Recovery	HH-3F (Sikorsky Pelican)	SAR, ELT, MEP, AN, PSS	5½	115	1969	Equipped with twin engines and a sophisticated navigation system.
Short Range Recovery	HH-52 (Sikorsky Sea Guard)	SAR, ELT, AN, PSS, MEP, IO	3½	90	1963	Because of single engine configuration and limited navigational capability, requires escort for offshore operations.
	HH-X Manufacturer not selected	SAR, ELT, AN, PSS, MEP, IO	3½	145	1980	Replacement for HH-52 Procurement action now in progress. Will have twin engines, sophisticated navigation.

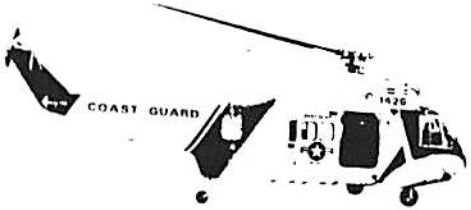
HC-130 Long Range Search Aircraft

HU-16E Medium Range Search Aircraft

HU-25 Medium Range Search Aircraft

HH-3F Medium Range Recovery Aircraft

HH-52 Short Range Recovery Aircraft



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