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Pictorial

The USCGC *Hamilton* (WHEC-715) Coast Guard Ship of the Future

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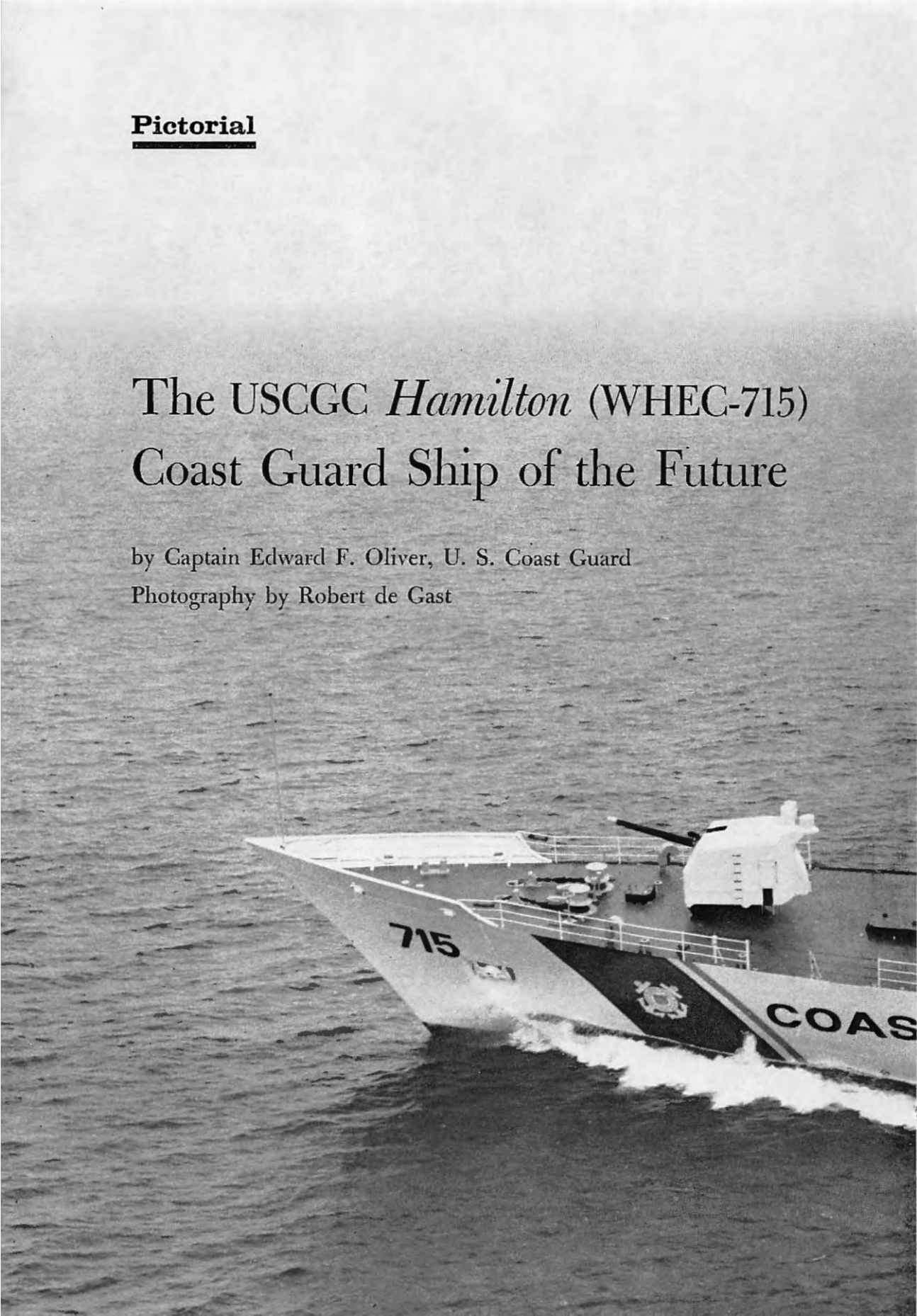


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The Coast Guard's ship of the future, the rakish-bowed *Hamilton* (WHEC-715), departed for a tour of duty off the coast of Vietnam in August, following two years of operations on the U. S. East Coast. Named for Alexander Hamilton, the first Secretary of the Treasury, the 378-foot vessel is the first of a new class of cutters having many dramatic new features. The cutter—long and lean—is driven by twin diesel engines for cruising and by twin jet aircraft-type turbines for speeds of up to 29 knots. The turbines are the same type of engines as those used in Boeing 707 airliners.

The *Hamilton*, launched in December 1965 at the Avondale Shipyard in New Orleans, was the first new high endurance cutter to enter the Service in more than 20 years. The cutter is called "high endurance" because of her ability to stay at sea for extended periods and to undertake mid-ocean rescue operations.

The 2,478-ton cutter's cruising range is 12,000 miles at 20 knots—approximately the distance from New York to Melbourne, Australia, via the Panama Canal. She has a welded steel hull and an aluminum superstructure. An angled freestanding foremast and mainmast carry air search and surface search radars, as well as the usual number of halyards, antennas, beacons, and lights. The base of the foremast provides a shelter for signalmen, and ladders up the interiors of the masts give ready access to the radar platforms.

An unusual feature is a closed-circuit television system, which gives the commanding officer and bridge personnel firsthand knowledge of activities that they cannot personally observe. A portable TV camera permits observation of flight deck operations, machinery spaces, towing, damage control, and related activities. Fixed cameras also permit transmission of information from the surface and aerial plots in the vessel's combat information center during search and rescue operations or in combat. There are six TV monitors—three on the bridge, one in damage control central, and one in each of two repair lockers.

The Hamilton's *pilothouse top and foremast*

In the charthouse

A bridge TV repeater

The *Hamilton* and 14 other cutters of her class projected for completion by the early Seventies will give the Coast Guard a new fleet of multipurpose vessels and greatly extend its capability in search and rescue, oceanography, military readiness, and law enforcement. Eight sister ships, also named after Secretaries of the Treasury, have already been commissioned and have joined the *Hamilton:* the *Dallas* (WHEC-716), *Mellon* (WHEC-717), *Chase* (WHEC-718), *Boutwell* (WHEC-719), *Sherman* (WHEC-720), *Gallatin* (WHEC-721), *Morgenthau* (WHEC-722), and the *Rush* (WHEC-723). The remaining ships of this class will be named for Coast Guard heroes. Two are currently under construction and have been designated the *Munro* (WHEC-724) and the *Jarvis* (WHEC-725). In the future, the class will probably be known as the "Secretary-Hero" class.

The *Hamilton* has a complement of 15 officers and 149 enlisted men. Because of the ship's mission and extended operational endurance capability, particular attention was given to habitability in the design. All living spaces are completely air-conditioned and painted with eye-resting color schemes to minimize the discomforts associated with long periods at sea. Special measures have been taken to reduce engine noise level to a minimum.

The crew's berthing compartments have been partitioned off into four-man living spaces. Each space has four Northampton-type bunks, four standing lockers, individual lights, and a writing desk. Each of the berthing compartments has its own adjoining head facilities and a small recreational area with tables and chairs. The warrant officers' and chief petty officers' quarters include private conference rooms.

The commanding officer's cabin is well fitted out with a combination lounge/office/dining room separated from his sleeping quarters. Each officer's stateroom has its own deck-to-overhead wardrobe and its own head facilities. The wardroom features comfortable contemporary furnishings and a large lounge area.

A large, modern galley ensures preparation of food in keeping the usual high standards of the Coast Guard. The crew's messing space is spacious and well-lighted. Six-man messing tables with attached upholstered swivel chairs help create an informal, congenial atmosphere. Recreational equipment on the *Hamilton* includes television, AM/FM high fidelity radio receivers, and tape recording and playback equipment which can pipe taped music and radio programs throughout the ship.

The Captain's cabin

The wardroom

The crew's mess

The *Hamilton* and her sisters are the first American ships to use high-horsepower, jet aircraft-type turbines for propulsion. They are also the first U. S. vessels to be powered by a major-sized Combination Diesel or Gas Turbine (CODOG) installation.*

The *Hamilton*'s two 3,500-h.p. diesel engines are used for operating at cruising speeds; her two 18,000-h.p. gas turbines are for high speed operation. When cruising in the diesel mode, up to 149 r.p.m. may be attained on each of the ship's twin shafts for a speed of 20 knots. For higher speeds, the diesels are de-clutched from the reduction gears and the gas turbines are clutched in to deliver up to 235 r.p.m. for a maximum speed of 29 knots. The diesels and turbines do not operate together except for a momentary period during changeover. The transition from diesel to gas turbine drive is automatically sequenced within the control system, which is designed to synchronize the two types of machinery. To reduce noise and radiated heat in the engine room, the Pratt and Whitney gas turbines are isolated in soundproofed enclosures constructed of light, removable sections which permit access for maintenance.

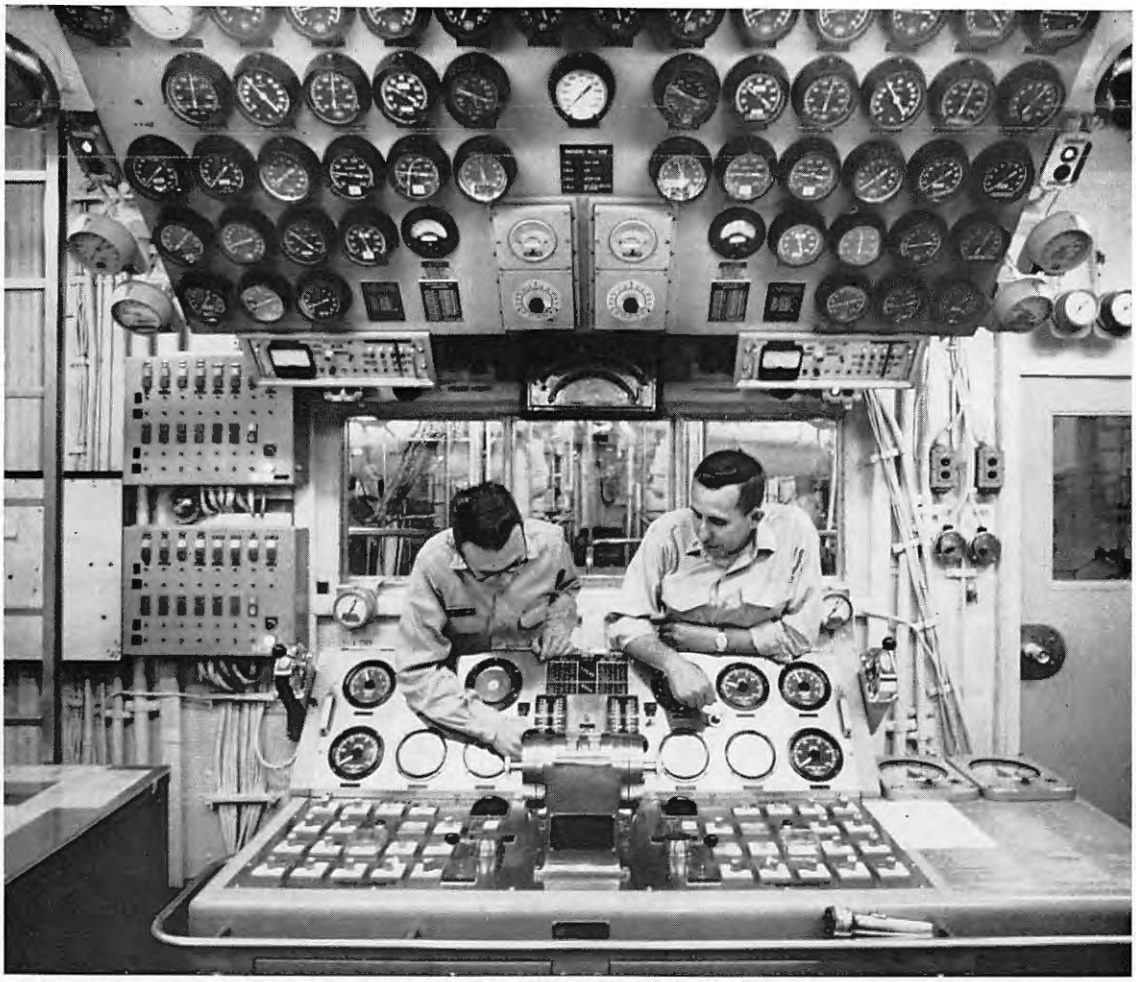
The *Hamilton*'s two controllable-pitch propellers, 13 feet in diameter, are the largest of the type ever installed on a U. S. ship. The four-bladed propellers are inward turning for greater backing maneuverability. Propeller pitch is automatically reduced in the event of engine overload. This permits the engines to develop full r.p.m. (i.e., maximum thrust) when towing, regardless of the size of the tow. Backing down is achieved by reversing propeller pitch rather than by reversing shaft rotation. The propellers may be shifted from full pitch ahead to full pitch astern in 30 seconds. The ship is able to come to a "crash stop" from full ahead before the pitch is completely reversed—within the equivalent of one or two ship's lengths.

The main propulsion system may be controlled directly from the pilothouse, from either bridge wing, or from the engine room control booth. The control of engine speed and propeller pitch is incorporated in a single lever for each shaft, port and starboard. Rudder control is also incorporated into a single "joy stick" type of lever. The vessel may be steered by lever from the pilothouse or from either bridge wing. In addition to the "joy stick," the *Hamilton* has retained a conventional wheel installation where the helmsmen may stand traditional wheel watches. Later ships of the class, however, have dispensed with the wheel.

The engine room control booth is an air-conditioned and soundproofed enclosure located at the after end of the main engine room. The engine control console in the booth represents one of the most advanced steps in main propulsion control, and contains a myriad of indicators, flashing lights, push buttons, and meters. From this station the operator on watch can control all of the main machinery and the ship's service generators. He is able to monitor the propulsion machinery by means of a complete set of engine instruments and can maintain a watch over the engine room through the glass windows of the booth.

Another novel engineering feature is the ship's 350-horsepower bow propulsion unit. A diesel-powered, retractable propeller can be lowered from a vertical tunnel in the bottom of the hull and rotated in a complete circle to provide thrust in any direction. The bow propeller gives the *Hamilton* a high degree of maneuverability for use in restricted waters, for docking, and for precise station keeping when making oceanographic soundings.

* *The Coast Guard's 210-foot Medium Endurance Cutters are powered by a slightly different Combination Diesel and Gas Turbine (CODAG) installation. See Commander William F. Tighe, Jr., U.S. Coast Guard, "The New Medium Endurance Cutters," U.S. Naval Institute* PROCEEDINGS, *August 1965 pp. 92–107.*



The engine room control booth

The bridge main engine controls

Controlling the bow propulsion unit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An 80-foot-long flight deck, on the 01 level just abaft the ship's side-by-side stacks, is designed to accommodate the HH-52A (Sikorsky S-62) single engine, gas turbine helicopter now used throughout the Coast Guard air arm. With the addition of a new tiedown arrangement, the heavier HH-3F (Sikorsky S-61) dual-turbine helicopter can be accommodated. Although helicopters are not normally embarked, during search and rescue missions or ASW operations they will be able to land for refueling and for briefing of pilots. A homing beacon and touchdown landing lights will permit night helicopter operations.

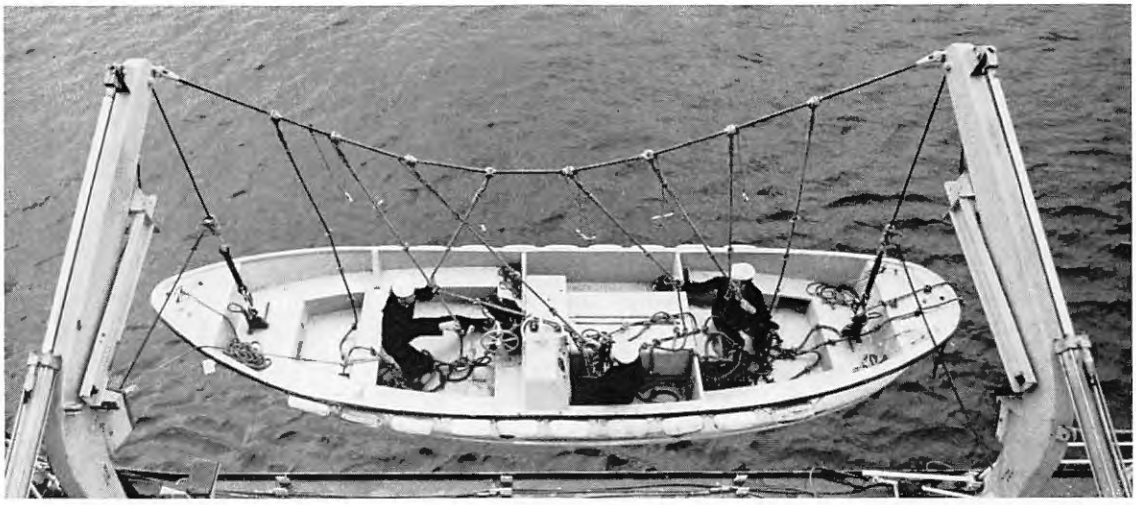
Experience has shown that the cutter can safely recover helicopters while rolling up to 10 degrees and with winds of up to 25 knots off the beam and up to 60 knots from dead ahead. Since the ship's period of roll is eight seconds and the tie-down evolution requires a minimum of 12 to 15 seconds, it has been found that the primary tiedown cannot always prevent a skid of the aircraft on the first roll after touchdown, particularly on a spray-covered deck. To prevent skidding, a technique developed on *Reliance*-class cutters, employing a jury-rigged wooden grid, is being used.

When the vessel is rolling in a seaway, the portable grid is positioned on the flight deck. In landing, the pilot maneuvers to position the wheels within the grid and thereby avoid slipping. A prototype of a helicopter-haul-down-recovery system has been installed on a medium endurance cutter. If this system proves successful, it will be installed on the *Hamilton* class and should greatly facilitate landing operations in rough weather.

During flight operations, a rescue team, including a ready boat crew and firefighting party, stands by on the weather deck. A landing signal officer supervises the flight operations. A tiedown crew mans the safety nets at each side of the flight deck. These nets fold up to form a safety railing when operations are secured.

Although designed primarily for long range search and rescue operations in mid-ocean, the *Hamilton*'s electronic facilities and armament make her immediately adaptable to naval combat operations. A single 5-inch/38-caliber gun mount and two MK-10 "hedge hog" projectors are carried forward. Two MK-32 torpedo mounts, each with three tubes capable of launching the latest ASW homing torpedoes, are installed amidships. Additional armament includes two 81-mm. mortars and two 50-caliber machine guns. The *Hamilton* is also equipped with a MK-56 gunfire control system, a MK-105 underwater battery fire control system, and the latest in electronics countermeasures gear.

Recovering an HH-52A helicopter



A 26-foot plastic surfboat

Exercising the boats

In CIC

Two 26-foot surfboats are carried in support of the *Hamilton*'s primary mission of search and rescue. Designed and built by the Coast Guard, the boats are constructed entirely of plastic reinforced with fiberglass. Each surfboat is powered by a diesel engine developing 70 horsepower on a single propeller. The boats are stowed on the 01 deck in crescent davits, which can be hydraulically breasted from the stowed to outboard positions in 15 seconds.

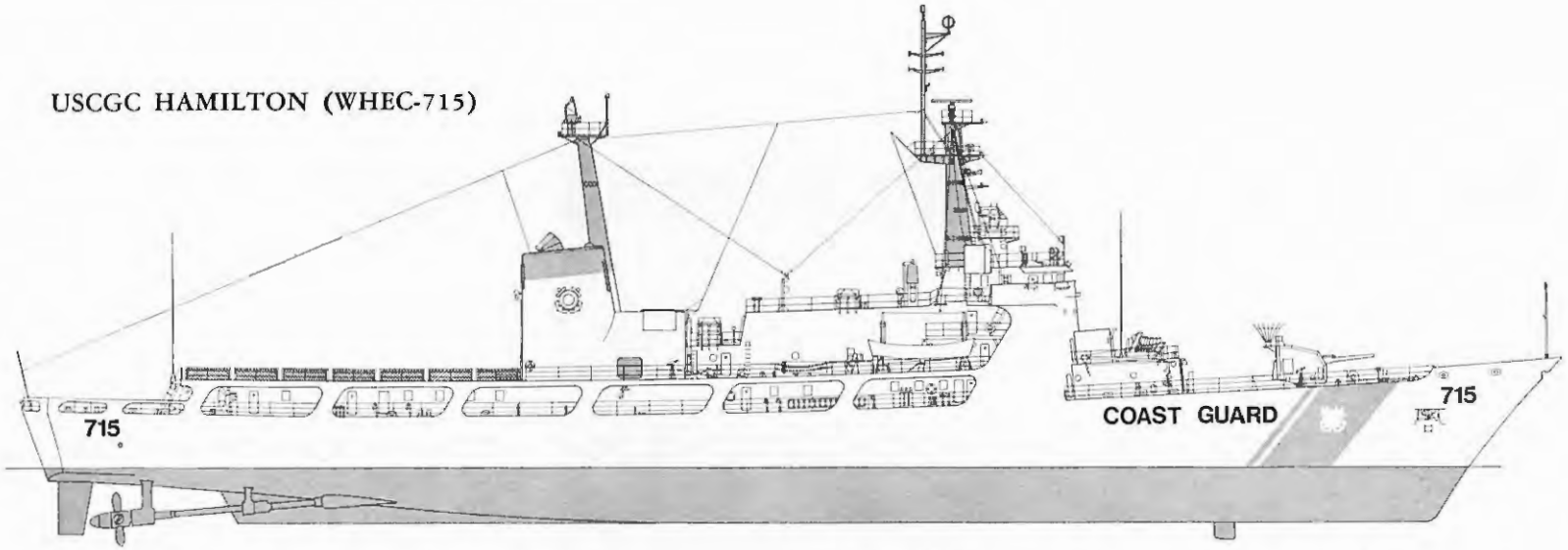
With her fully equipped CIC and sophisticated communications, the *Hamilton* can operate as a sea-based rescue co-ordination center, directing other surface ships and aircraft to a distress scene as was done so successfully following the *Andrea Doria-Stockholm* disaster, or as a command ship during combat operations. The bridge is equipped with the most advanced air search and surface radar. Both Loran A and Loran C are installed for highly definitive position keeping and navigation. Two depth sounders are carried—one for navigational use on the bridge, and one for deep-ocean oceanographic work. Medium frequency, high frequency, and ultra high frequency direction finders are installed for position finding and for homing on distressed ships and aircraft. Automatically tuned antenna multicouplers are provided, permitting four separate transmitters, each on a different frequency, to transmit simultaneously from each of the ship's various broadband antennae.

A balloon shelter is located between the twin exhaust stacks. An aerological office is equipped with a radiosonde receiver and balloon tracking radar. Weather information is regularly transmitted to the U. S. Weather Bureau for compilation and inclusion in advisories to surface vessels and aircraft.

The *Hamiltons*' advanced environmental research capabilities will make the class one of the most effective instrumentalities employed by the Coast Guard in its century of experience in oceanography. Facilities include automated control and data systems and a research-oriented layout consisting of a large wet and dry laboratory. A deep-sea electro-hydraulic winch, capable of taking oceanographic readings at a depth of more than five miles, and a bathythermograph winch are installed. A salinity-temperature-depth sensor system can record readings continuously to a depth of 1,500 meters. A precision depth recorder can chart depth and topographical features of the ocean floor. All raw oceanographic data acquired can be stored, in a specially designed analog computer, for processing at the end of the voyage. A teletype communications system also provides rapid transmission of scientific data to oceanographic and meteorological stations ashore.

The *Hamilton*, her sister ships, and the cutters to follow, are in all respects ships of the future, geared to meet the challenges of the sea during the last third of the 20th century.

USCGC HAMILTON (WHEC-715)



Length, over-all	378 feet, 3 inches
Beam	42 feet
Draft	13 feet, 6 inches
Standard Displacement	2,748 tons
Full Load Displacement	3,050 tons
Complement	15 officers, 149 enlisted personnel
Engineering Plant	Two Fairbanks and Morse diesels Two Pratt and Whitney gas turbines One 350-horsepower bow thruster unit
Rated Speed (Diesels)	20 knots (7,000 horsepower)
Rated Speed (Gas Turbines)	29 knots (36,000 horsepower)
Cruising Range	12,000 miles at 20 knots
Armament	One 5-inch, 38-caliber single mount Two 81-mm mortars Two 50-caliber machine guns Two Mark 10 hedgehog projectors Two Mark 32 triple tube torpedo mounts

Keel Laid	4 January 1965
Launched	18 December 1965
Commissioned	18 March 1967
Builder	Avondale Shipyards, New Orleans
Cost	$14,500,000

Other ships in this class include:

USCGC *Dallas* (WHEC-716)	Commissioned 26 October 1967
USCGC *Mellon* (WHEC-717)	Commissioned 9 January 1968
USCGC *Chase* (WHEC-718)	Commissioned 11 March 1968
USCGC *Boutwell* (WHEC-719)	Commissioned 15 June 1968
USCGC *Sherman* (WHEC-720)	Commissioned 23 August 1968
USCGC *Gallatin* (WHEC-721)	Commissioned 3 January 1969
USCGC *Morgenthau* (WHEC-722)	Commissioned 10 March 1969
USCGC *Rush* (WHEC-723)	Commissioned 3 July 1969
Munro (WHEC-724)	Under Construction
Jarvis (WHEC-725)	Under Construction

Line Drawing by William Clipson