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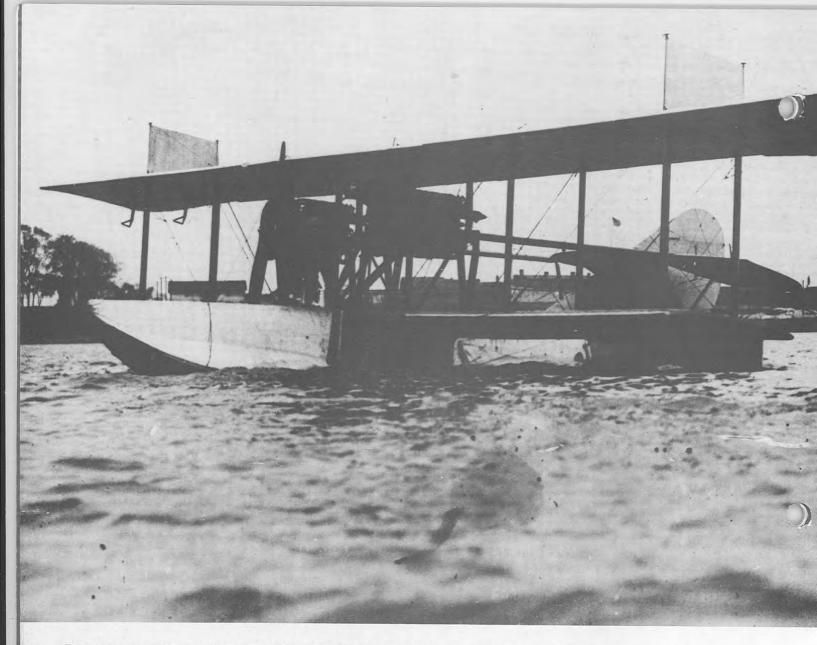
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A History of Coast Guard Aviation

By Dr. Robert L. Scheina Coast Guard Historian



Previous page: Commander Frank A. Erickson sits at the controls of an HNS-1 in 1947. Erickson, who made the first pickup of a man by helicopter, was a pioneer in the use of a helicopter as an effective tool for search and rescue. He developed the rescue hoist and other related lifesaving equipment. As head of the Coast Guard Rotary Wing Development Project, Erickson had a key role in the creation of emergency flotation gear for helicopters.

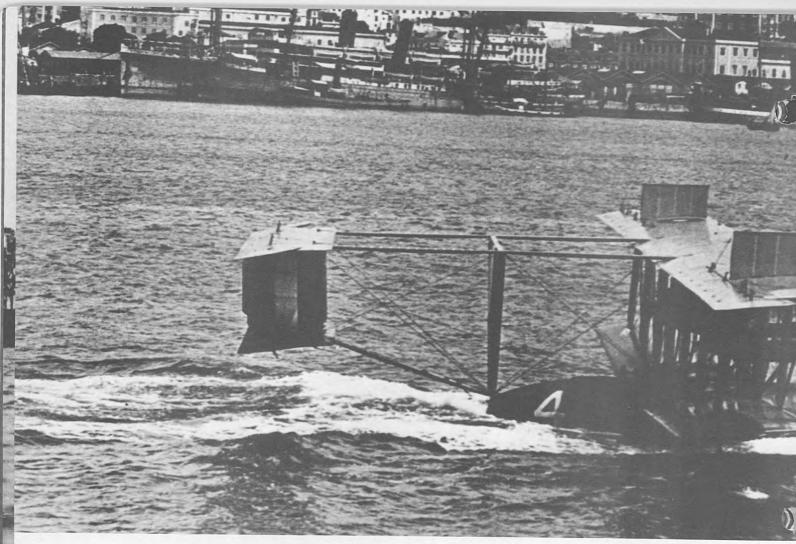
he Coast Guard was introduced to aviation in 1903 when the surfmen from the Kill Devil Hill Lifeboat Station in North Carolina provided the Wright Brothers with added muscle during the prelaunch activities of that epic flight. Three surfman helped carry the fragile biplane from its shelter to the launch site on 17 December. Surfman J.T. Daniels took the only photograph of the event using the Wrights' camera.

The first practical steps toward a Coast Guard air arm occurred in early 1915 when Lieutenants Elmer Stone and Norman Hall conceived of using aircraft for Coast Guard missions. With the backing of their commanding officer, Captain Benjamin Chiswell, they approached the Curtiss Flying School at Newport News, Va., discussed their idea and were taken on experimental flights in the school's aircraft. A Curtiss F flying boat was used for much of the experiment. The aircraft lacked navigational equipment and therefore never ventured beyond the sight of land. In spite of the technological limitations of the aircraft, the experiment proved successful and as a result Stone and five others were assigned to the Naval Aviation School at Pensacola for training in April 1916. Hall was sent to the Curtiss factory to study aeronautical engineering. Later in 1916, Congress authorized the Coast Guard to esta-



Right: Norman B. Hall, a pioneer in U.S. Coast Guard aviation, is pictured second from left with a Curtiss crew in 1916. Left: The Curtiss flying boat was one of the earliest aircraft borrowed by the U.S. Coast Guard for patrol, search and rescue experiments. This Curtiss H-10 plane was used by Norman B. Hall, a pioneer in Coast Guard aviation, in developing aero-navigation systems in 1916. Hall, a second lieutenant of engineers at the time, assisted with Sperry Gyroscope Company's experimental radio and compass work at the Curtiss Flying School, Newport News, Va. The H-10 was used for the early tests.





Above: The Navy flying boat NC-4 arrives in Lisbon, Portugal, following the first successful trans-Atlantic flight. The year was 1919, eight years before Linbergh's famous solo crossing. The aircraft was piloted by Coast Guard Aviator No. 1, Elmer Stone.

Right: The first Coast Guard aviation Group was trained at the Naval Air Station, Pensacola, Fla., during 1916-17.





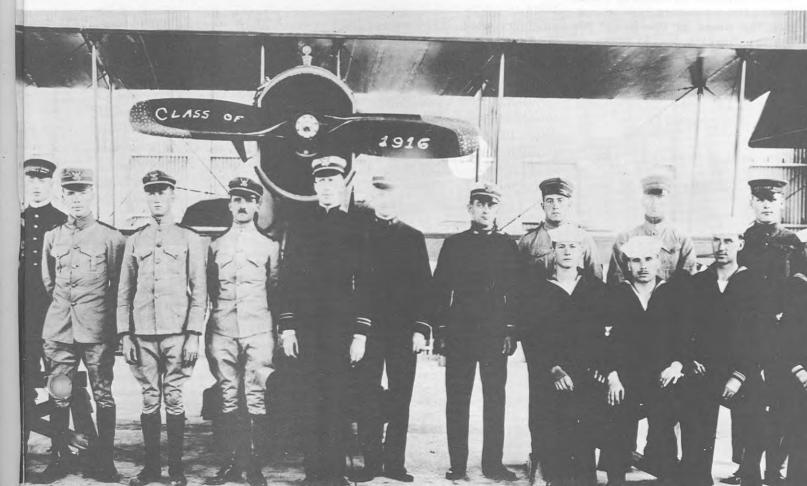
blish ten air stations but no money was appropriated and this effort was stillborn.

During World War I, Coast Guard aviators were assigned to naval air stations in this country and abroad. One Coast Guardsman commanded the Naval Air Station, Ille Tudy, France, and won the French Chevalier of the Legion of Honor. Another commanded the Chatham Naval Air Station. He piloted one of two HS-1 seaplanes which bombed and machine-gunned a German U-boat off the coast of New England. The bombs failed to explode and the submarine escaped.

A by-product of the war effort was the stimulus and potential to fly

the Atlantic. In May 1919, four Navy-Curtiss seaplanes, each crewed by five, began the great experiment. One plane, the NC-4, ultimately succeeded — captained by Lt. Commander A.C. Read, USN, and piloted by Lieutenant Elmer Stone, USCG. In 1983 Elmer Stone was the first Coast Guard pilot enshrined in the Naval Aviation Museum in Pensacola, Fla.

A second false start for Coast Guard aviation occurred in 1920. In March the Coast Guard's first air station was established at Morehead City, N.C., when the service took over the abandoned naval air station and borrowed a few Curtiss HS-2L flying boats and possibly one or two





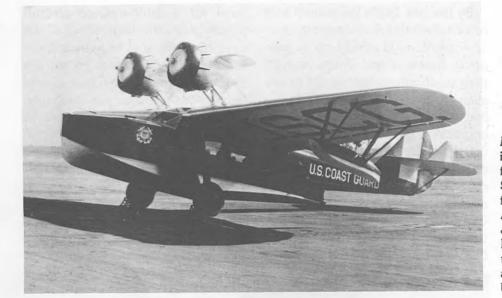
Above: Commander Norman B. Hall stands in front of a PJ-1 while a crew works on the seaplane at water's edge. Hall, then attached to the Aviation Division at Coast Guard Headquarters, was inspecting the plane at the Naval Air Station, Norfolk, Va., in 1932.

Aeromarine Model 40s from the Navy. The aircraft were particularly useful at locating those in distress and finding derelicts. However, funds were not provided to support the operation and the station was closed on 1 July 1921.

Despite the early promise of aviation, the Coast Guard did not receive any money from Congress during or immediately following the war. In 1925, Lt. Commander C.G. Von Paulsen borrowed a Vought UO-1 seaplane from the Navy. Operating from Squantum, Mass., and later Ten Pound Island in Gloucester Harbor, he demonstrated the poten-

tial of aviation in combating the smuggling of whiskey. Prohibition had become the law of the land in 1920 and soon its enforcement became the dominant mission of the Coast Guard. As a result, Congress appropriated \$152,000 for five aircraft, the first to be owned by the service. Three Loening OL-5 amphibians and two Chance Vought UO-4s were purchased. These aircraft were flown from air stations at Gloucester, Mass., and Cape May, N.J., until 1931 when they were replaced. Thus, Coast Guard aviation owed its first aircraft to the mission of law enforcement.

Right: Congress appropriated \$152,000 for the first purchase of aircraft for the Coast Guard in 1926. Three OL-5s, one of which is shown taking off, and two UO-4s were bought. Two were assigned to the first Coast Guard air station on Ten Pound Island, Gloucester, Mass. The other was assigned to Cape May, N.J.



Left: A single RD-1 was purchased in 1932 for \$36,500. The Sirius, flown by Lt Commander Elmer F. Stone, participated in the search for survivors of the Navy dirigible Akron, which crashed off the New Jersey coast in 1933. When the Navy blimp J-3 also crashed during the search, Stone landed nearby and recovered the body of the blimp's commanding officer.

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By the late 1920s the search and rescue clientele had changed primarily from coastal sailers to oceangoing motor ships. Ships moved their trade routes farther out to sea away from the dangers of the shoreline as the use of steam and diesel engines for propulsion and steel for construction increased. Now when emergencies arose, they were frequently far off the coast. In 1928 an aviation section was established at Coast Guard Headquarters under the command of Commander Norman Hall. It drew up specifications for a multi-mission aircraft which, given the technology of the day, could be met only by a large seaplane or amphibian. To aid distressed mariners, the Coast Guard developed the concept of the "flying lifeboats." These aircraft could fly hundreds of miles, land in an open and frequently uninviting sea, and carry out a rescue. Seven aircraft were acquired, two Douglas Dolphin RD-2s, which were modified to Coast Guard requirements, and five General Aviation Flying Life Boat PJ-1s which were specifically designed for



Right: Commander Elmer F. Stone, photographed in the late 1930s, was the Coast Guard's first aviator. He piloted the first successful trans-Atlantic crossing in a Navy NC-4 in May 1919. At that time, large sea planes carried commanding officers in addition to the pilot and co-pilot.

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Left: Two UO-4s were among the first five aircraft purchased for the Coast Guard in 1926. They were used for patrol and law enforcement work out of Cape May, N.J., and Gloucester, Mass.

Below: Coast Guard aircraft No. 303, which flew many missions out of Miami, Fla., was one of six Navy O2U-2 planes transferred to the Coast Guard in 1934 and 1935.





Above: One of the O2U-2s given by the Navy to the Coast Guard in 1935. Based at a temporary Coast Guard installation in San Antonio, Texas, this particular aircraft was used briefly in patrolling the Mexican border for illegal aliens and later the Canadian border for rum runners. The aircraft was fabric covered. Upon acceptance from the Navy, condition of the fabric was so bad that the plane was stripped and re-covered by personnel and their wives at a "sewing bee."

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The R3Q-1 "Reliant" operated out of Cape May, New Jersey in 1937.



Below: Among the aircraft received from the Customs Service were two New Standard biplanes. Like most of the aircraft received from that service, CG-312 had a short Coast Guard career. It was obtained by the Coast Guard in September 1934 and crashed in November 1935.



the service. All were named for important stars. These aircraft were involved in numerous rescues. In one such incident Lt. Commander Carl von Paulsen set the Arcturus down in a heavy sea in January 1933 off Cape Canaveral and rescued a boy adrift in a skiff. The aircraft sustained so much damage during the open water landing that it could not take off. This was the fate on a number of ocean rescues which had to be tried when no other rescue craft could be directed to the scene by the aircraft. Ultimately, the Arcturus washed onto the beach and all including the boy were saved.

In 1934 Henry Morgenthau became the Secretary of the Treasury. He was an aviation enthusiast and supported its expansion within the Coast Guard. He transferred the aviation detachment of the Customs Service to the Coast Guard in 1934. In fact, the materiel benefits of this transfer were small because they introduced into the Coast Guard a conglomeration of aircraft that were mostly poor in condition and impossible to maintain. Notwithstanding, the Secretary's enthusiasm for Coast Guard aviation was important to its development. He obtained Public Works Administration funds for the

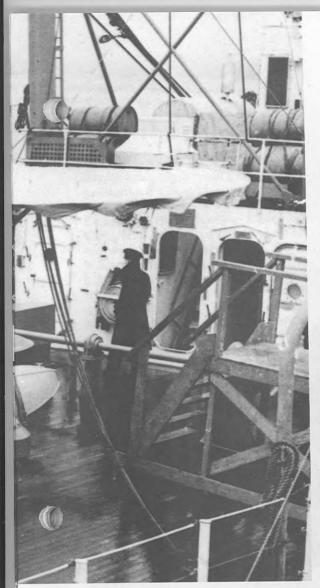


A J2W-1, secured for sea, is shown here on board the Spencer at Cordova, Alaska, in February 1938. These aircraft were used with floats or wheels or fitted with skis for takeoffs and landings on ice.

purchase of new aircraft and additional air stations. By 1936 the Coast Guard had six air stations, two air detachments and 42 aircraft.

Also during the 1930s, the marriage between the cutter and aircraft took place. The 327-foot cutters each embarked a Grumman JF-2 amphibian. These aircraft-equipped cutters were designed to patrol against opium smuggling off the West Coast and fisheries violations in Alaskan waters, and to serve on plane guard duty in the Atlantic to protect the embryonic transcontinental commercial air service.

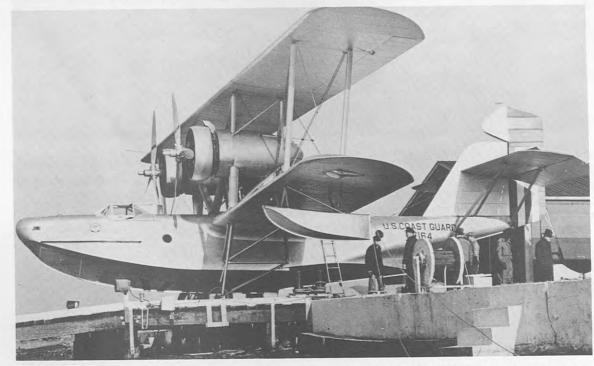
World War II accelerated the growth of aviation within all of the armed services including the Coast Guard. Coast Guard aviation played a critical role in the defense of Greenland. Prior to the United States' entry into World War II, the cutter Duane, with a Curtiss SOC-4 on board, surveyed the coast of Greenland for potential airfield sites during the summer of 1941. After fighting began, aircraft flying from cutters searched for and helped locate German weather stations in the frozen northern areas of Greenland. These stations were providing critical data to U-boats operating in the North Atlantic; the stations were captured by the Coast Guard. Also, Coast Guard aircraft performed harrowing rescues by flying through snow storms and landing on the ice



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This Viking 00-1 was the first of five acquired by the Coast Guard late in 1936. These aircraft were U.S. licence-built versions of the Schreck -F.B.A. 17HT-4, a French design. In 1931, the Coast Guard had purchased a single model 17HT-4. This earlier aircraft was identified as CG-8, later re-serialled V-107.



The PH2, built in 1938, had a take-off time of less than 20 seconds in calm weather. The Coast Guard Magazine reported that Lieutenant Carl B. Olsen lifted the V-164 off the water in five seconds during take-off performance tests.



Above: Four N3N-3s were purchased by the Coast Guard in 1940-1941 to be used for preliminary flight training of pilots. They had a cruising speed of 72 mph and a top speed of 126 mph. cap to aid distressed Allied air crews who had crashed while attempting to ferry aircraft across the Atlantic. During one such rescue in December 1942, Lieutenant John Pritchard and Radioman Benjamin Bottoms lost their lives after having rescued part of a B-17 air crew the previous day. In late 1943, Patrol Bombing Squadron Six was activated in Greenland.

Back along the American coasts, Coast Guard aircraft patrolled for U-boats. In August 1942 a Grumman J4F Widgeon flown by Chief Aviation Pilot Henry White sank *U-166* in the Gulf of Mexico. This aircraft is on display at the Naval Aviation Museum in Pensacola, Fla. Coast Guard aircraft also searched for merchant mariners who were the victims of enemy torpedoings. During the war, Coast Guard aircraft found one thousand survivors and directed rescue units to the scene. Coast Guard aircrews rescued one hundred survivors additionally by landing in the open sea. On occasion, the aircraft had to taxi ashore because weight of

Right: Survivors from a tanker torpedoed off Cape Hatteras in 1943 rest on the wings of an OS2U from **Coast Guard Air Station, Elizabeth** City, N.C. Three of these aircraft were on routine patrol from Elizabeth City when they spotted the sailors in the water about 30 miles east of Hatteras. All three planes made off-shore landings, and picked up the survivors who rested on the wings until a boat from Elizabeth City arrived for transfer. Beginning in March 1942, the Coast Guard eventually acquired 53 of these aircraft which carried the burden of early anti-submarine warfare along coastal waters. They were discontinued from service by October 1944.

Below: RT-1 Delta, an eight-place passenger transport version of the Gamma, is seen here at the U.S. Coast Guard Air Station, Floyd Bennett Field, Brooklyn, N.Y., on March 7, 1939. It was nicknamed the Golden Goose and was the official transport plane of Secretary of the Treasury Henry Morgenthau, Jr. The Secretary championed the development of Coast Guard aviation.



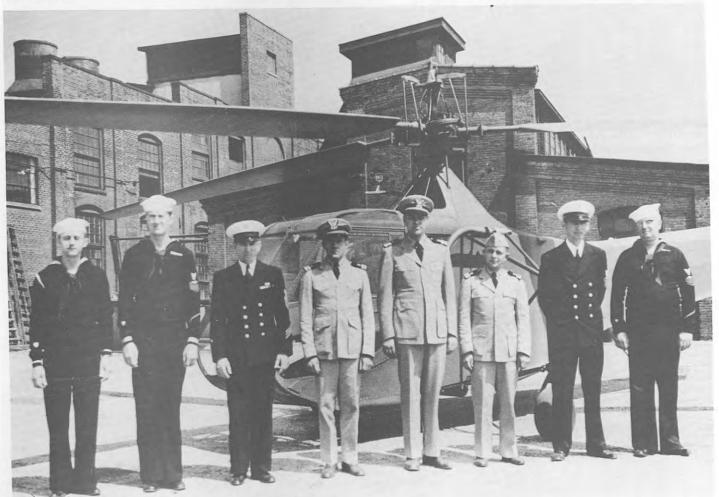




Left: Lieutenant John A. Pritchard Jr., watches crew members secure his aircraft to the deck of the Northland. Pritchard and his radioman, Benjamin Bottoms, were posthumously awarded the Distinguished Flying Cross for a daring rescue attempt of a bomber crew that had crashed in Greenland during 1942.

those rescued prevented the aircraft from taking off.

By 1941 the Coast Guard was seriously interested in developing the helicopter for search and rescue. Lt. Commander William Kossler had represented the Coast Guard on an inter-agency board formed in 1938 for the evaluation of experimental aircraft, including the helicopter. However, World War II interrupted these plans. The Coast Guard, incorporated into the Navy on 1 November 1941, was tasked in early 1943 with developing the helicopter for antisubmarine warfare. Sikorsky HNS-1 and HOS-1 helicopters were ordered and pilot training began at Brooklyn Air Station. Coast Guard personnel trained British pilots who undertook a joint British-American helicopter trial on board the merchant ship *Daghestan*. In fact, during the war all Allied helicopter pilots were trained by the Coast Guard at Brooklyn Air Station. The *Daghestan*, fitted with a landing deck and carrying two HNS-1 helicopters,



The first Coast Guard helicopter detachment was headed by the then Lt. Commander Frank A. Erickson, shown here fifth from left, who was the first U.S. Coast Guardsman to qualify as a helicopter pilot, and who pioneered rotary wing development for military use.



An HNS-1 lifts off the deck of the Cobb in June 1944. The helicopter, assigned to Brooklyn Air Station, N.Y., was demonstrating air-sea rescue techniques in Long Island Sound.

crossed the Atlantic in convoy in November 1943.

Additional helicopter evaluation tests were carried out on the cutter *Cobb.* This old coastal passenger ship had been converted into the world's first helicopter carrier. On 29 June 1944 Commander Frank Erickson made the first landing on its deck in Long Island Sound. As

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the war progressed and the U-boat threat moved deeper into the North Atlantic and then abated, the service re-oriented its helicopter research from antisubmarine warfare to search and rescue. Commander Erickson pioneered this Coast Guard activity, developing much of the rescue equipment himself and carrying out the first lifesaving flight. He delivered two cases of blood plasma

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lashed to an HNS-1's floats following the explosion on board the destroyer *Turner* off Sandy Hook on 3 January 1944.

One of the early helicopter's most successful rescues occurred in 1945. A Royal Canadian Air Force plane crashed in a remote area of Labrador. Two ski-equipped aircraft tried to rescue the nine survivors; however, one crashed on landing and



An HNS-1 drops gently to the surface of a frozen-over lake near a remote weather station with one of nine Canadian plane-crash victims rescued by the Coast Guard craft from the bleak wilderness of northern Labrador. The helicopter lands on a strip of canvas to prevent the floats from freezing to the ice. The helicopter took on board the marooned fliers by means of a rope ladder and moved them, one at a time, to the weather station 32 miles away.

Right: Coast Guardsmen at Brooklyn Air Station unload the HNS-1 that rescued 11 Canadian airmen from the North Labrador wilderness in 1945. They are shown easing the dismantled helicopter from an Army Air Transport Command plane, which it carried from Goose Bay, Labrador.

the other was trapped on the ground by the snow after having successfully flown out two survivors. The only way to rescue the remaining men was by helicopter. A Coast Guard HNS-1 was disassembled at Brooklyn Air Station, loaded into a C-54 transport, and airlifted to Goose Bay, Labrador. There, Lieutenant August Kleisch flew it 150 miles to a staging station and then on 35 miles more to the crash site. Obstacles such as a frozen engine and skis that would freeze solid to the ground

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were overcome and all were rescued.

In 1943 an Air Sea Rescue Squadron was formed at San Diego, Calif. The primary impetus for this was the increasing number of offshore crashes, mostly by student pilots. These were the result of the rapid expansion of military aviation during the war. Initially, the amphibious PBY-5A and high speed rescue craft were chosen as the rescue vehicles and additional squadrons were formed. In December 1944 the Office of Air Sea Rescue was established at



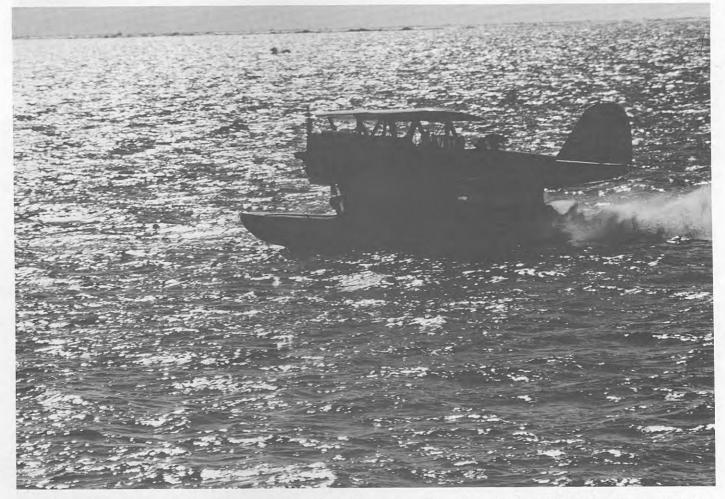


Left: This is the Coast Guard's only B25J aircraft. Apparently, it was unofficially borrowed from the U.S. Army Air Force in 1945.





A PBY-5A makes a jet assisted takeoff from Coast Guard Air Station Miami, Fla. This aircraft was used by the Coast Guard during the early days of the Korean War throughout the Pacific for search and rescue.



Coast Guard Headquarters. By 1945 Air Sea Rescue was responsible for 165 aircraft and nine air stations. During that year, it had responded to 686 plane crashes. The PBY-5As were replaced by Martin PBM-5Gs follo wing the war.

The post World War II years brought an explosion in the number of recreational boats and created a new search and rescue clientele. The helicopter was ideally suited to this mission. Able to react swiftly, it could lift entire pleasure boat crews from imminent disaster, or in less trying circumstances, deliver dewatering pumps and fuel. Admittedly, during its early years the helicopter had a major handicap -the pilot needed three hands in order to fly it! A Coast Guard J2F, attached to the Northwind in 1947, takes off in the Antarctic during "Operation Highjump".



Above: An HO3S-1, photographed in May 1959, was capable of carrying a pilot and two passengers. It had a flying speed of 60 knots and a maximum range of 120 miles. Soon, helicopters rescuing distressed boaters became a commonplace event.

The versatility of the helicopter was demonstrated during a series of floods which occurred in the United States during the 1950s. To carry out this kind of rescue work, the helicopter had to hover among trees, telephone poles, television antennas and the like. In 1955 Coast Guard helicopters rescued more than 300 people as rivers overflowed in Connecticut and Massachusetts. In December of that year the Coast Guard on-scene commander directed the rescue of thousands in California. Included among the 21 rescue aircraft were Coast Guard helicopters. In one incident an HO4S rescued 138 people during a 12 hour period; this was accomplished by two air crews. The helicopter soon grew from a thoroughbred requiring pampering to keep it flying to a reliable workhorse. 0

The responsibilities of Coast Guard fixed wing aviation also increased following World War II. In 1946, Coast Guard aircraft were used for the first time on the International Ice Patrol, a practice that





The Coast Guard received the P5M-2G from the Navy in 1956, but the T-tailed "Marlins" were all returned by early 1961 in order to reduce the number of types of aircraft in the Coast Guard inventory.

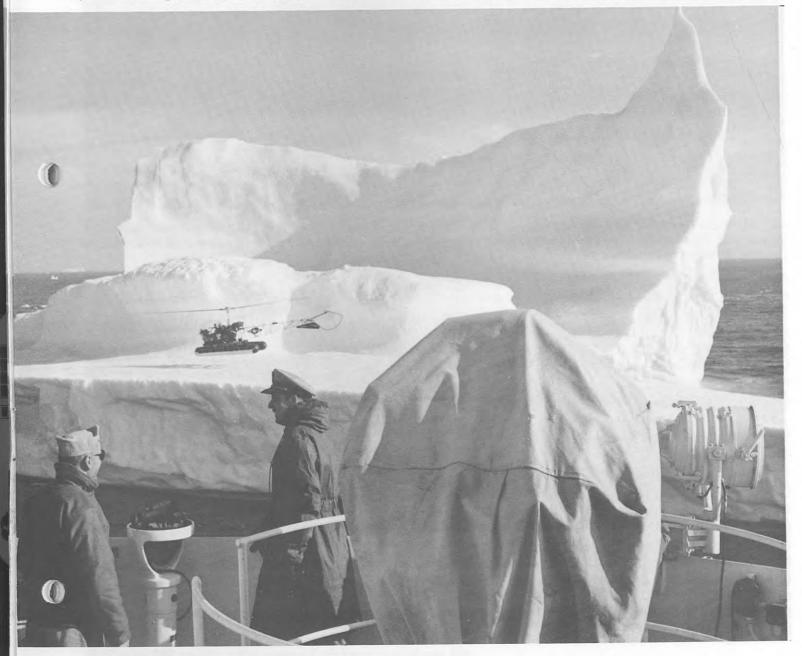
Right: In 1954 an HTL-1 from the Westwind lands on an iceberg in Baffin Bay between the northern region of Canada and Greenland. Helicopters are used in scouting for leads through the ice and for transporting personnel and materials ashore over ice-blocked areas inaccessible by foot or boat.



continues today. The primary objective of these Ice Patrol flights is to observe ice floating in the vicinity of the Grand Banks, so that shipping in that well-travelled area can be advised of current conditions throughout the iceberg season. Ice Patrol flight tracks are normally between 1,000 and 1,500 nautical miles long (from six to eight hours' flight time). Since 1983 the flights have used HC-130 aircraft carrying Side-Looking Airborne Radar (SLAR) equipment as the primary reconnaissance tool. At the normal altitude of 8,000 feet, the SLAR can cover a swath extending 35 miles on each side of the aircraft.

After the end of World War II,

Coast Guard aircraft were also used increasingly to intercept and escort aircraft that were experiencing mechanical problems. The presence of the Coast Guard aircraft was reassuring to both passengers and flight crews. During the 1950s, the Coast Guard developed open-ocean ditching techniques that are still in use by commercial airliners today





An HH-52 air-lifts an ill 74-year-old passenger from the merchantman Olivia some 270 miles northeast of Miami, Fla. The helicopter extended its range by refueling from a Coast Guard amphibious plane at Marsh Harbor, Great Abaco Island.

through the experiments conducted by Captain Donald MacDiarmid. In 1986 Donald MacDiarmid was enshrined in the Naval Aviation Museum, in Pensacola, Fla. In 1959 the Coast Guard obtained its first Lockheed HC-130 Hercules. Large, rugged, and extremely reliable, this aircraft could cruise on two of its four engines thereby greatly extending its range.

During the Korean War, the Coast Guard established air detachments throughout the Pacific. These detachments, located at Sangley Point in the Philippines, Guam, Wake, Midway, Adak, and Barbers Point in the Hawaiian Islands conducted search and rescue to safeguard the tens of thousands of United Nations troops that were being airlifted across the Pacific. In January 1953 a PBM flying from Sangley landed in 12-foot seas in an attempt to rescue a Navy P2V crew. The Coast Guard amphibian crashed on take off when an engine failed. Five Coast Guard and four Navy men lost their lives.

Aviators were among the 7,000 Coast Guard personnel who served in Vietnam. In April 1968 three Coast Guard helicopter pilots were assigned to the 37th Aerospace Rescue and Recovery Squadron at Da Nang, Vietnam. Pilots were assigned there until November 1972 while their Air Force counterparts were assigned to stateside Coast Guard air stations. One Coast Guard pilot, Lieutenant Jack Rittichier, died in a rescue attempt. He was attempting to pick up a downed Marine Corps flier when his helicopter took heavy ground fire, touched down, and burst into flames.

The helicopter continues to be a primary rescue tool into the 1980s and the foreseeable future. In 1980 over 100,000 refugees fled communist Cuba. Many risked their lives in unsafe craft to cross the Straits of Florida. The rescue of those on board the Olo Yumi is illustrative of the situation confronting the Coast Guard. On the morning of 17 May the pleasure craft Olo Yumi, carrying 52 persons, sank when the people on board panicked because of rough seas, ran to the stern, and caused water to come over the transom. A Sikorsky HH-52 Seaguard on patrol from the cutter Courageous (WMEC-622) sighted



An HH-3F helicopter hovers over survivors of the *Prinsendam* disaster of 4 October 1980. Seven helicopters from the Coast Guard, U.S. Air Force, and Canadian Armed Services were employed. One by one, helicopters hovered over a lifeboat, dropped a sling or a basket, and hoisted until they met their weight limit. Well over 500 people were rescued without loss of one life.



The HC-130H, a long range surveillance and transport aircraft, is the newest series of HC-130 model aircraft in use. Coast Guard crews have flown the Hercules since 1959.

the people in the water and began rescue operations. Eleven survivors were hoisted to the helicopter. Other Coast Guard helicopters and the *Courageous* rescued 38 survivors and recovered 10 bodies. The boat had been grossly overloaded. The HH-52, now being replaced by the Aerospatiale HH-65 Dolphin, has rescued more persons from distress than any other helicopter in the world. In October 1980, the Sikorsky HH-3F Pelican, the service's medium range helicopter, was the primary rescue vehicle when hundreds of individuals, mostly senior citizens, were plucked from bobbing lifeboats some 200 miles out in the Gulf of Alaska. This followed a fire on board the cruise ship *Prinsendam* and was one of the most successful maritime rescues in history.

With the increasing responsibilities

in defense readiness, law enforcement, fisheries patrol, and environmental protection, the Coast Guard has acquired a new generation of aircraft. Today, the primary aircraft in the Coast Guard inventory are the HU-25A Guardian, the HC-130H Hercules, the HH-65A Dolphin, the HH-52 Seaguard, and the HH-3F Pelican. During the mid-1980s, 41 HU-25A medium range surveillance fan jets replaced the Grumman HU- 16E Albatross and the Convair C-131A Samaritan, both prop driven aircraft. The Guardian is the service's first multi-mission jet. It is nearly twice as fast as any aircraft in the inventory and can get to the scene quickly to perform its role. Sixteen new HC-130H Hercules turboprop aircraft have joined the Coast Guard fleet and replaced earlier models. The primary missions of the Hercules are long-range surveillance and

rently adding 96 short range HH- Guard flies some 200 aircraft from 65A helicopters to its fleet to replace 27 air stations, large and small, the aging HH-52A Sikorsky Sea- throughout the continental United guard. Primarily a search and rescue States, Hawaii, Alaska and Puerto vehicle, the twin engine Dolphins Rico. The Coast Guard is the seventh operate up to 150 miles off shore largest naval air force in the world. and will fly comfortably at 150 knots Coast Guard aviation, rotary and for three hours. The HH-3F Pelican fixed wing, moves into the future is the service's medium range helicopter.

To assist those in distress and to

transport. The Coast Guard is cur- patrol national waters, the Coast proud of its past and confident of its future. //



The HU-25A "Guardian", a new Coast Guard multi-mission jet, can operate from sea level to an altitude of 42,000 feet. Its 160-mile radius and five hour flight endurance make the Guardian a welcome addition to the Coast Guard's search and rescue and drug interdiction efforts.

