

THE EYES AND EARS OF THE CONVOY:

Development of the helicopter as an anti-submarine weapon

By Robert M. Browning Jr.



FIRST COAST GUARD HELICOPTER DETACHMENT
SIKORSKY HELICOPTER AIRPORT BRIDGEPORT



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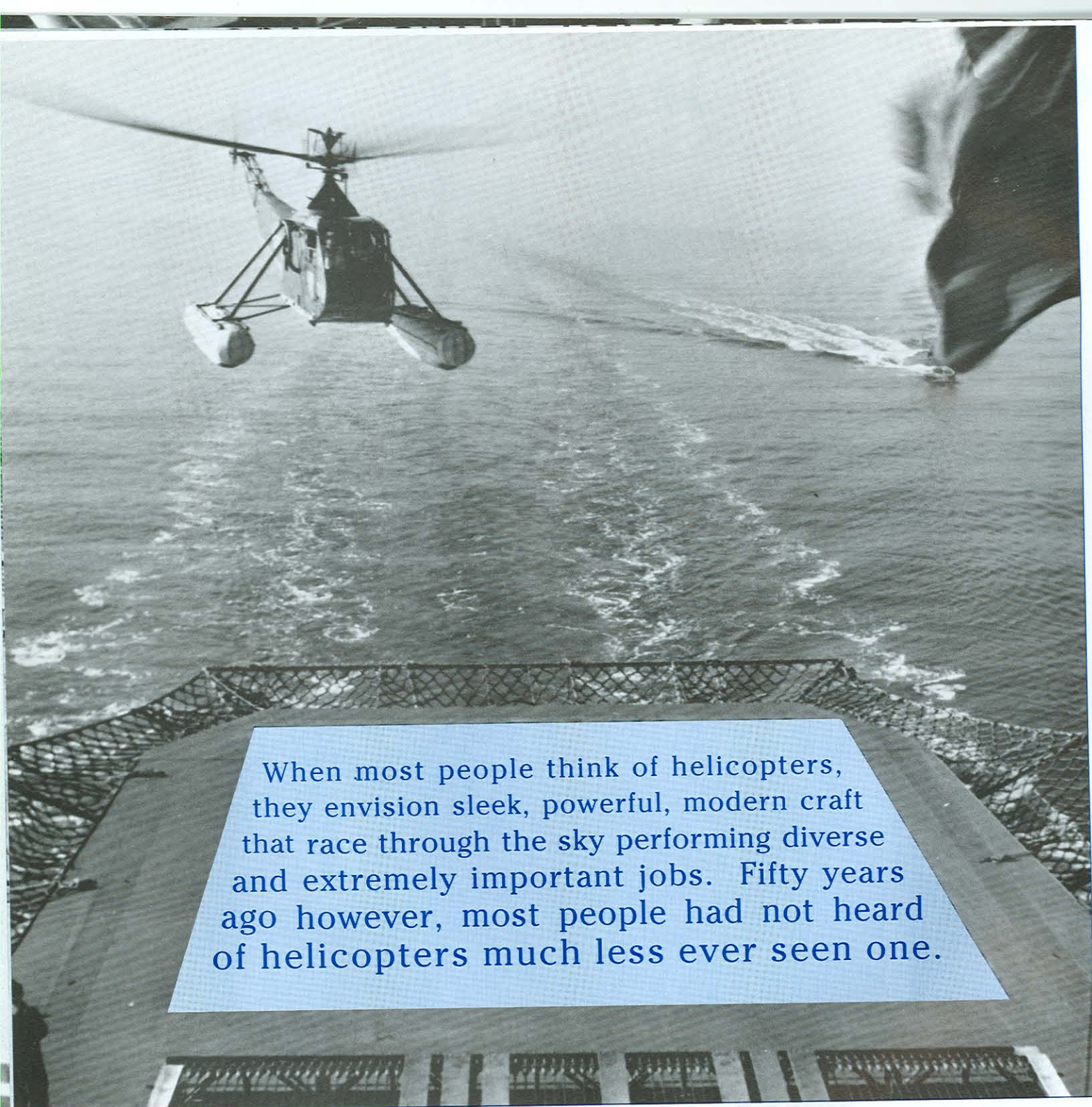
Front Cover: An HOS-1 helicopter (foreground) and an accompanying HNS-1 are the only two helicopters that were flown by the Coast Guard during developmental stages in the 1940s.

Inside Front Cover: The first Coast Guard helicopter detachment at Sikorsky Helicopter Airport in Bridgeport, Conn.

Above: The first helicopter operations off the CGC *Cobb* in June 1944.

Back Cover: A Coast Guardsman tries out an early helicopter-training simulator at Coast Guard Air Station Floyd Bennett Field in Brooklyn, N.Y., during the early 1940s.

F. A. ERICKSON LT. COMDR.
O. M. HELGREN LT.
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When most people think of helicopters, they envision sleek, powerful, modern craft that race through the sky performing diverse and extremely important jobs. Fifty years ago however, most people had not heard of helicopters much less ever seen one.

Above: An HNS-1 helicopter prepares to land aboard the British SS Dahgestan during early sea trials in the 1940s.

The development of the helicopter can be attributed to a few visionary men who foresaw the great potential of this aircraft. During World War II, due to the insistence of several Coast Guard officers, this revolutionary aircraft was developed for war and peacetime uses. Their efforts helped the helicopter to evolve into the machine that is known today.

The capability of the submarine to interdict trade effectively and to serve as a weapon of war was first revealed during

World War I. But it was not until World War II that its offensive capabilities were truly realized.

In what has been termed the Battle of the Atlantic, the Germans developed the submarine's use so effectively that their success reached grim proportions. Two years before America's entry into the war, the Allies began protecting their merchant fleets with convoys and scoured the coast with fixed-wing aircraft and blimps in an effort to spot the elusive U-boats.

By mid-1942, half of the merchant ships in

the Atlantic Ocean were being given escort protection, which stretched the resources of both the American and British navies to the limit. Despite the efforts of naval and Coast Guard vessels to combat the U-boat menace, in May 1942, 604,000 gross tons were sunk in the U.S. Strategic Area while world-wide losses to U-boats reached their highest point the very next month when 141 ships of 707,000 gross tons were sunk.

Aircraft assumed a role in anti-submarine warfare early in the war. Out of the New York area alone, they patrolled a zone of 10,000 square miles. Aircraft flying hours increased as Army and Navy aircraft attempted to locate submarines off the American coast. The limited range of aircraft favored the submarines, which could move further out into the ocean to attack shipping. This air-gap would become a weak spot for the Allies in the Battle of the Atlantic.

Due to the tremendous successes of the U-boats, American military leaders searched for solutions to this problem. Willing to try anything that might help curtail merchant vessel losses, the Navy, due primarily to the insistence of several Coast Guard officers, looked to the helicopter as a possible answer to this dilemma.

One of the first helicopters to be successfully developed and tested was the Sikorsky VS-300 (HNS-1) in mid-January 1941. A year later, two Coast Guard officers, CDR Watson A. Burton, commanding officer of Air Station

Floyd Bennett Field, Brooklyn, N.Y., and CDR William J. Kossler, chief of the Aviation Engineering Division at Coast Guard Headquarters in Washington, traveled to Stratford, Conn., to witness a helicopter test.

On a cold, gusty Monday, April 20, 1942, Kossler and Burton watched a helicopter hover 25 feet from the ground while a man ascended a suspended rope ladder. Impressed by this test, both Coast Guardsmen agreed that the helicopter would meet many of the service's requirements.

UNLIMITED USE OF HELICOPTERS

In Burton's report on the test, he noted that the helicopter had many advantages over the blimp and few disadvantages. The helicopter could hover and maneuver with more ease in rough air and it could land and take off in less space. Furthermore, it did not require as large of a ground handling crew as a blimp. Burton also thought it could be used for harbor patrols to detect saboteurs and investigate suspicious activities while also detecting oil-pollution violations. He also envisioned that it might be useful for hailing smallboats or vessels in the harbor. Burton and Kossler recommended that the Coast Guard buy three helicopters. To these men, the uses of the helicopter seemed almost unlimited.

The aviation operations officer at headquarters, CDR Frank Leamy, endorsed the purchase of a few helicopters for



Left: CDR Frank Erickson, one of the pioneers of the adoption of helicopters for practical purposes, stands beside an HNS-1 helicopter with ENS W.C. Bolton at the controls.

training and development.

But both RADM Harvey Johnson, chief engineer, and RADM Lloyd Chalker, the assistant commandant, thought that the price tag of a quarter million dollars for three flying machines was too high. And considering the moment's wartime priorities, it's understandable that one reportedly said to Kossler, "Hell, Bill, the Navy is not interested in lifesaving, they just want to get on with the business of killing the enemy."

Thus neither Johnson nor Chalker would readily endorse the project due to the high cost and, more importantly, because it was not considered essential to the war effort.

Just when the project looked as if it would die, LCDR Frank A. Erickson entered the picture.

Up to this point, the commandant, VADM Russell R. Waesche, had made no decision regarding the helicopter. Erickson, attached to AirSta Floyd Bennett Field, was invited to lunch by his close friend Kossler in June 1942. Kossler's real purpose, however, was to get Erickson to watch a

helicopter demonstration. Erickson had been a proponent of helicopters after reading an article in *Aero Digest*, nine months before. He was so impressed after the flight that he wrote a memorandum to the commandant.

In it, he noted that while the lifesaving and law-enforcement potentials of the helicopter had been stressed by others, he believed that it could fulfill an even more important role. Erickson pointed out that the helicopter could provide protection for convoys against submarine attacks and that any vessel which could mount a 30-square-foot platform for helicopters. This could give an unescorted freighter a means to detect submarines. And helicopters operating with convoys would give them additional methods of detecting submarines.

Thus, larger convoys could cope with larger numbers of enemy submarines using fewer escorts.

The lack of suitable escorts had been one of the United States' greatest shortcomings

Below: An HNS-1 begins to land aboard the Dahgestan. The ship was one of the first to engage in shipboard helicopter testing.



in the Battle of the Atlantic.

Helicopters also had several other attributes that airplanes did not have.

They could be refueled by lowering a hose to the smallest type of patrol boat and did not have the limitations of planes — which circled and maneuvered to maintain their position. Helicopters could hover and stay over a submarine and thus bomb the enemy with greater accuracy. Furthermore, the helicopters could rescue personnel from torpedoed vessels by lowering a rubber boat to the water and then hoisting it clear of the surface.

Erickson suggested that the Coast Guard use the HNS-1 helicopter that was currently being built for the Army.

To bolster his argument, Erickson included in his memo an artist's concept of a helicopter hovering over a burning tanker while the ship's men climbed up its flexible ladder. The HNS-1 could carry a crew of two and a 325-pound depth charge, radio and other equipment. It could cruise for about four hours at between 25 and 60 mph —

possibly reaching a speed as high as 100 mph — and would be in production by early 1943.

There was one factor that would severely delay any fast development of the helicopter.

All helicopters then being produced were made to Army specifications and needs, thus, not designed for the specific missions of the Coast Guard. The earliest helicopters also had several aerodynamic, structural and power plant limitations. Perhaps most damning to the early implementation of a helicopter program was the fact that there was only one service helicopter in existence in mid-1942.

The Army was interested in the development of the helicopter, believing it would be useful in reconnaissance. Although the helicopter had potential for the Navy, the Navy had from the beginning shown little enthusiasm for the applications of

rotary-wing aircraft.

Congress had appropriated \$2 million in 1938 to conduct research on rotary-wing aircraft. At that time, the potential use of the helicopter for anti-submarine warfare was pointed out to the Navy, but they considered it a minor application and considered that a project to develop it would hardly justify an expenditure of funds.

HELICOPTERS LOANED TO CG

After initially receiving a cool reception within the Coast Guard, a few other officers gradually began to see the value of the helicopter. Burton pointed out that, since the Navy had placed the helicopter as a low priority, the Coast Guard should proceed with the helicopter's development. A helicopter at Wright Field could be immediately used for experiments and if it was found to be of value, a decision could be made to purchase more at a later date. The service also had hopes that the Army, which was buying 13 helicopters, might lend a few to the Coast Guard.

In June 1942, submarine attacks reached their peak. Over 4 percent of the total tonnage of U.S. merchant vessels, more than 1,000 tons, was sunk by the enemy. Following these losses, Waesche formally approved the proposal for the Coast Guard development of the helicopter. The service had no helicopters of its own and Johnson recommended that the Coast Guard try to borrow two from the Army. Faithful to the tradition of Coast Guard frugality, Waesche wrote in pencil on the document, "Do we pay for these?" The Coast Guard requested one HNS-1 and three HOS observation craft from the Army. Thus, on a small scale, the Coast Guard's helicopter program was born.

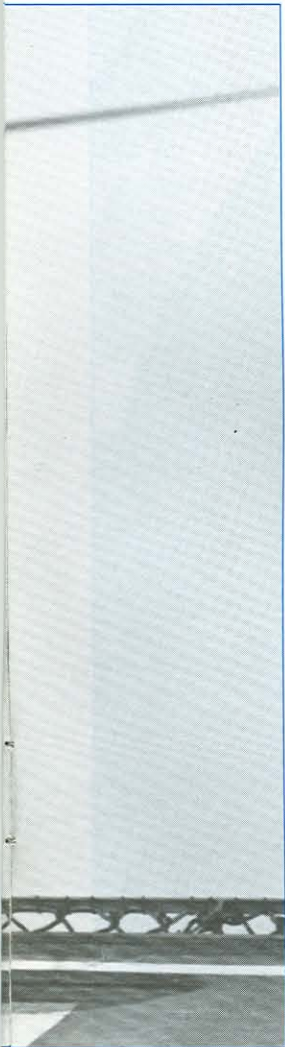
ARMY, NAVY DISAGREE ON DEVELOPMENT OF HELICOPTER

Despite the mounting threat to shipping, the development of helicopters slowed for a year, due to differences between the Army and Navy.

The Army felt that it was not its function to develop the helicopter for anti-submarine warfare. The Navy, on the other hand, felt that the Army had been given the job of developing the helicopter and that until this was done, the Navy should not butt in.

The Navy based its limited interest in rotary-wing aircraft on the thesis that a helicopter could never be built large enough to carry a sufficient load to be of any value.

One of the main figures who pushed for



the development of the helicopter was Grover Loening, who had built the first amphibious aircraft to go into production for the Coast Guard.

He was currently a consultant to the War Production Board which exercised general direction over war procurement and production programs. Loening believed that any further development of the helicopter for anti-submarine warfare should be carried on by the Maritime Commission, War Shipping Administration or the Navy through the Coast Guard — not through the Navy Bureau of Aeronautics. He predicted that the involvement of a half-dozen different bureaus would result in inconclusive arguments and delays.

Thus, he recommended that one person coordinate the pro-

gram with full authority to see to it that helicopters were developed to sink submarines. Loening candidly stated that the helicopter had gotten the “runaround” for a year and

Right: Erickson (left) takes a break with other Coast Guard aviation personnel at AirSta Floyd Bennett Field. **Below:** During an early rescue test, two Coast Guardsmen adjust a stretcher holding a man. Early tests eventually laid the groundwork for medical evacuations during the Korean War.



that the Bureau of Aeronautics should not be allowed to have anything to do with it since they had never taken serious interest in it.

Unfortunately, the Coast Guard, due to legal requirements, had to purchase helicopters through the Navy's Bureau of Aeronautics and could not use the Army contract.

In January 1943, the British ordered 200 Sikorsky helicopters with 450-horsepower engines — twice the horsepower which had been demonstrated to the Coast Guard. The British were also negotiating to buy another 800 HOS helicopters at a time when the Coast Guard had only two on order.

COMMANDANT IMPRESSED WHILE OBSERVING HELICOPTER

On Feb. 13, Waesche travelled to Bridgeport, Conn., to personally observe the helicopter. He was so impressed that when he returned to Washington, he confided with Navy ADM Ernest King, commander in chief, U.S. Fleet, and chief of naval operations.

On Feb. 19, King issued a directive which placed the responsibility for the development of the helicopter with the Coast Guard. Thus, all the Navy's helicopters during World War II, except for those flying out of the Air Test Center at Patuxent River, Md., or other test facilities, were under Coast Guard control.

King issued a directive to the Bureau of Aeronautics that there was a continuing need to exhaust every practicable means for combating enemy submarines.

To do so, he thought it highly desirable to begin testing and evaluating helicopters immediately. He ordered that it should be determined if the helicopter had any potential to operate from merchant ships in ocean convoys. King felt that the helicopter should have a minimum crew of one man with a parachute, life raft, a radio capable of a minimum of a 100-mile range, and should have no less than four hours of flying-time endurance.

He directed the Bureau of Aeronautics to carry out tests, and the Maritime Commission to provide a ship, and arranged through the Army Air Force for three HNS-1 helicopters. Since the test was to evaluate the helicopter's capability to operate from a merchant ship to combat submarines, the production of helicopters in large numbers was to be withheld until this effectiveness was established.

But the Army, which had by then con-



tracted with Sikorsky for 800 helicopters, decided to divert some for naval use.

The day after King's directive was issued, Waesche appointed Kessler to lead the Coast Guard's helicopter program. On the same day Kessler was appointed by Waesche to head the program, Harvey Johnson, engineer in chief at headquarters, directed Kessler to establish a close liaison and coordinate activities with the Bureau of Aeronautics, the Maritime Commission, the

Above: Hoist and harness experiments begin in the early 1940s at AirSta Floyd Bennett Field.



Above: *The Mal de Mer, or "sea sick," was built by the Coast Guard Special Services Division to simulate the movement of a ship's deck when a helicopter was about to land on it.*

Army Air Force and the British who were also interested in the project.

Kossler, however, found the Navy difficult to work with. The Navy's administrative organization complicated the relationship. Administratively, helicopters had been placed in the Battleship/Cruiser Section which had shown strong opposition to rotary-wing aircraft.

Kossler quickly arranged to train a pilot and a maintenance crew. He chose his friend, Erickson, to be the first pilot to learn how to fly the helicopter. Without a training facility, Erickson reported to the Sikorsky factory in Bridgeport for flight lessons.

As Kossler moved to create a program, a misunderstanding soon developed between the Coast Guard and the Bureau of Aeronautics over the responsibilities for the development and testing of the helicopter.

Both organizations believed that they were taking the lead role. King then stepped in and outlined a program in which the Coast Guard would test, evaluate and develop the helicopter for anti-submarine warfare. If the tests proved the helicopter to be valuable, then the Bureau of Aeronautics would supply the helicopters and the Coast

Guard would supply the personnel and maintenance — the same relationship as that concerning Navy aircraft loaned to the Coast Guard during the war. To expedite the evaluation and to avoid duplication, King suggested a combined board to supervise development.

In May 1943, a "Combined Board for the Evaluation of the Helicopter in Anti-Submarine Warfare" was formed. It eventually consisted of the Bureau of Aeronautics, the British Air Commission and a British Admiralty Delegation, the Coast Guard and the commander in chief, U.S. Fleet. Later, representatives from the War Shipping Board and the National Advisory Commission for Aeronautics joined the board.

HELICOPTER TERMED AS SUB KILLER

The board realized that the helicopter, as it existed, had too many limitations. But it believed that the limitations could be corrected and adapted to observe and detect enemy submarines.

Some members of the board still held out for a role for the helicopter as a *sub killer*. The helicopter could carry a MK IX 200-pound, fast-sinking-type depth charge and



drop it after surface contact had been made. The helicopters could be based on destroyers and could be directed by radio to the subs. Then, by hovering until a sonar signature was obtained, they could drop a depth charge and be rearmed by the destroyer. The one thing that had not been considered was that if the helicopter was rushed into mass production, it would inevitably interfere to some degree with airplane production. Thus, the actual value of the helicopter had to be weighed before a production program could be approved.

Production scheduling, however, was already a potential problem.

The HNS-1 was the helicopter in production in 1942. It was not until May 1943, that the first production aircraft was delivered to the Army. Of the first eight helicopters produced, the Army and the Navy each got three and the British received two. Due to early structural problems, the fifth production aircraft was not delivered until September.

Sikorsky had designed an improve-

ment to this early model, but Loening felt if Sikorsky mass-produced the new model, then the older HNS-1 would get lost in the shuffle. Loening suggested that the U.S. government should plan to build 200 of the improved models by December 1943 rather than 2,000 helicopters by December 1944. By doing this, Sikorsky would continue building the HNS-1, and have helicopters to immediately fight submarines.

Kossler and Erickson continued to promote the use of helicopters flying off ships. Erickson showed Dr. Igor Sikorsky and the president of War Cargoes Inc. a photo of a merchant ship with a cargo platform amidships. All agreed that it was possible to operate a helicopter from a merchant ship. The two men arranged to get a cargo ship for a test. The board thus forged ahead to test the helicopter as a ship-borne anti-submarine warfare weapon.

With 50 observers present, shipboard trials took place May 7, 1943, aboard the tanker *Bunker Hill*. COL Frank Gregory of the Army Air Force made more than 20 flights off the tanker, which was anchored two miles east of Stratford Point Light, Conn. Gregory, the Army Air Corps project officer, showed up unexpectedly and flew the tests because it was an army helicopter. He landed on a small strip of deck only 78-feet-long between the forward deck house and the mainmast. Operating in conditions of flat calm to 15 knots, the

Below: Dr. Igor Sikorsky greets his son, AD3 Sergei Sikorsky, an aircrewman at AirSta Floyd Bennett Field. Sikorsky's company built the HNS-1 and HOS-1 during the early 1940s.



helicopter had no problem in any of the landings.

A week after these tests, Loening wrote another memorandum, this time to the War Production Board, pointing out that the helicopter had proved itself. He called the take-offs "remarkable." The memo also noted that Navy observers had negatively commented that the trials had been done as if the seas would always be smooth. Loening defended the tests, pointing out that the helicopter could make up for a vessel's roll by its quickness and that the conditions during the test did not call for the head shaking that some of the observers indulged in.

Ten days after the *Bunker Hill* tests, representatives of the Maritime Commission, War Shipping Administration, Coast Guard, and Navy Bureau of Aeronautics met and raised questions on the uses of helicopters for anti-submarine warfare. Some of the questions included the following:

- Should it be based on a cargo or escort vessel?
- How many helicopters would form a protective screen?
- What is the relation between flying hours and major overhauls to hours of a convoy run?
- Will helicopters have two-way radios, an observer, a detecting device, bombs or depth charges?
- How quickly could helicopters in large numbers be rushed into convoy duty if tests should prove them successful?

If the helicopter was to be used for anti-submarine warfare, these questions would have to be answered.

A month later, Erickson brought out perhaps the most relevant observations about the helicopter. He stated that helicopters could fly in weather that would ground fixed-wing aircraft. Helicopters could fly in low visibility or low ceilings and could land on small platforms. Thus at sea, they would be more useful than airplanes. He further stated that the usefulness of the rotary-wing aircraft was not as a killer craft, but as the "eyes and ears" of the convoy escorts, because after all, the Navy's greatest problem was not killing submarines, but finding them.

Given that less than one half of one percent of all depth charges dropped had any destructive effect, it would not be desirable for helicopters to carry them. Erickson felt that the helicopter could carry radar and sound-ranging equipment to detect submarines.

CONVERTED STEAMER BECOMES FIRST CG HELICOPTER CARRIER

After the positive tests on the *Bunker Hill*, two vessels were scheduled to be used for further experimentation. Both were converted to helicopter carriers: the *S.S. Daghistan*, which the British had taken over under the lend-lease program, and the *Governor Cobb*, which was acquired by the Coast Guard from the War Shipping Administration.

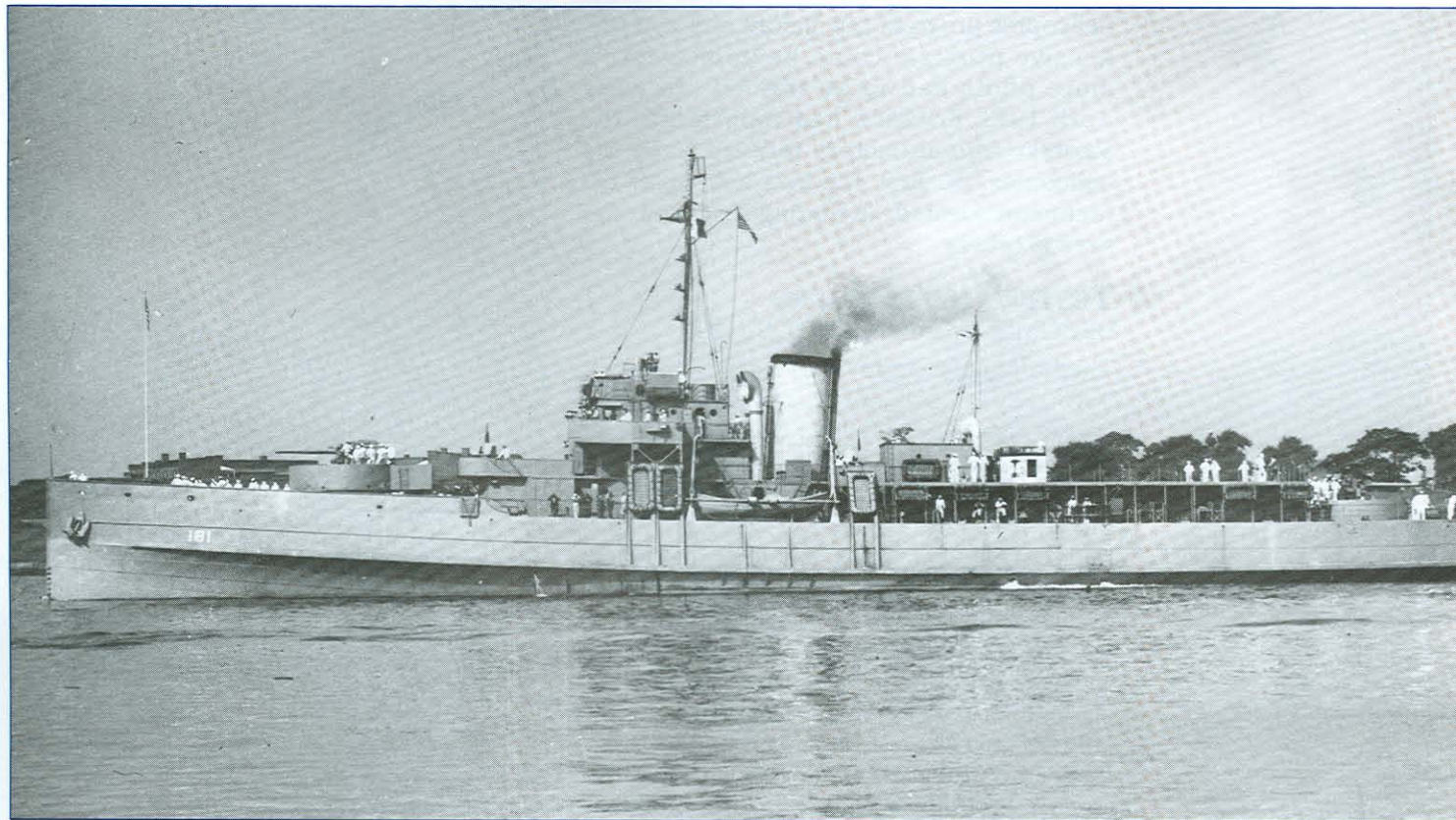
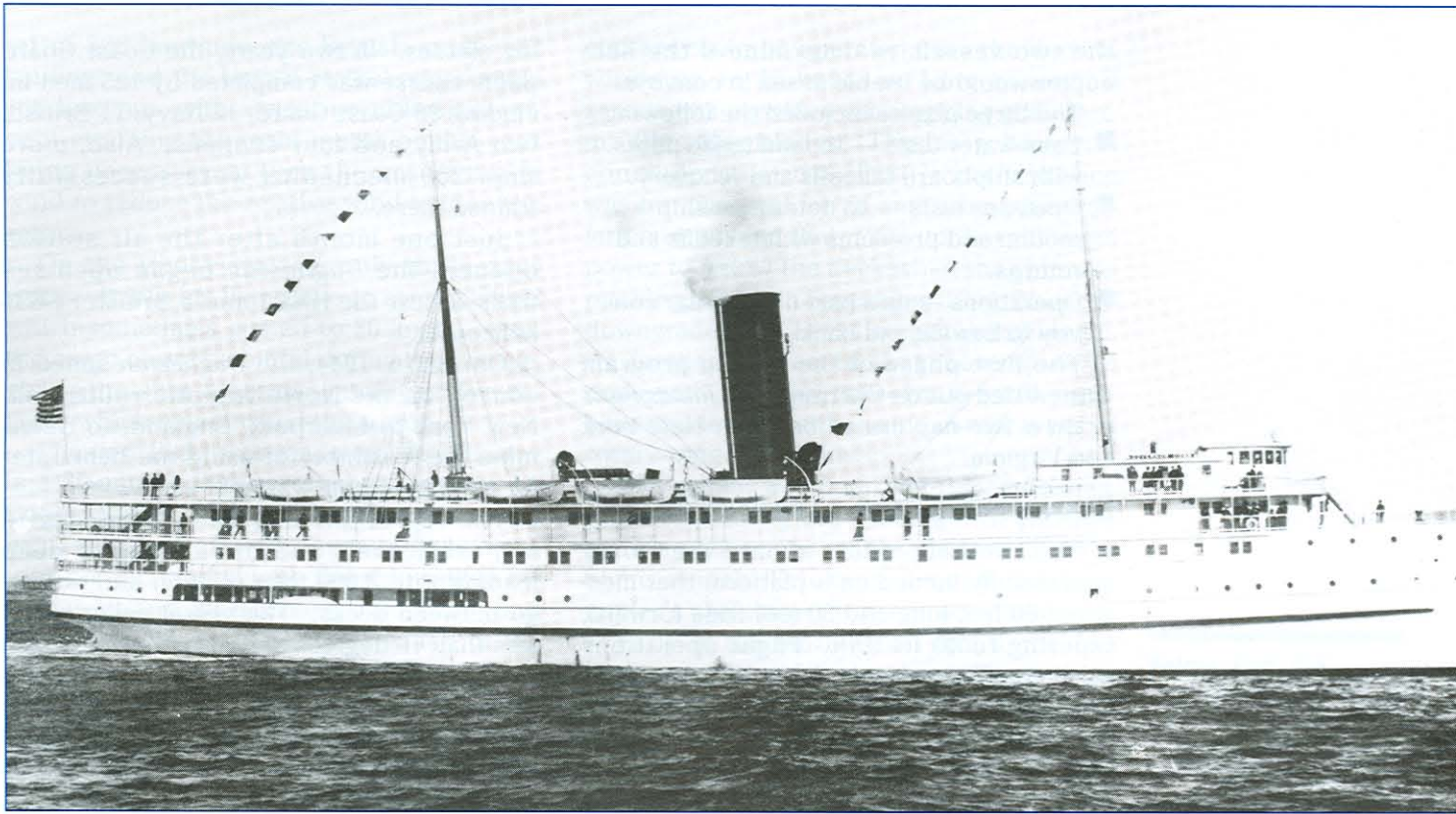
A former coastal passenger steamer, the *Cobb's* superstructure was cut down and a 38-foot by 63-foot flight deck was added aft. After major modifications and the addition of armor, the Coast Guard commissioned the cutter on July 20, 1943.

The cutter measured 289 feet long, 54 feet wide and had a draft of 18 feet. It carried two 5-inch 38 caliber guns, two 3-inch 50 caliber guns, six 20mm anti-aircraft guns and

Below: Coast Guardsmen load a person onto a stretcher during early experiments with the HNS-1 helicopter at AirSta Floy Bennett Field.

Facing page: The before and after photos of the CGC *Governor Cobb*. The coastal passenger steamer had the double distinction of being the first turbine-propelled ship built in the United States and the country's first helicopter carrier during the 1940s.





several depth charge arrangements. After conversion, the 37-year-old ship had the double distinction of being the first turbine-driven ship built in the United States and the first helicopter carrier.

Due to the cutter's aging engines and

weak framing, it was constantly in need of repair and its tanks leaked. In fact, all but nine of the first 115 days of service were spent at a Navy yard receiving repairs.

The Combined Board decided to implement a three-phase testing program aboard

the two vessels to determine if the helicopter would be usable at sea in convoys.

The three phases included the following:

- Calm-water tests — to familiarize pilots with shipboard takeoffs and recovery.
- Open-sea tests — to determine ship motion and problems with takeoffs and returns.
- Operations — as a part of a regular convoy to Europe and back.

The first phase of the testing program was carried out on the transport *James Parker* on a two-day cruise between New York and Virginia.

SUCCESSFUL SHIP LANDINGS

The two helicopters aboard the *Parker* successfully landed on a platform that measured 60 feet long and 50 feet wide forward, tapering to 40 feet aft. Flight operations were continuously conducted while underway. A total of 98 landings and takeoffs were made in winds ranging from 5 knots to 25 knots while the ship pitched up to 6 1/2 degrees.

These tests showed real promise for the helicopter program but before any comprehensive program could be implemented, more pilots had to be trained. In early April 1943, Erickson had reported to the Sikorsky Aircraft factory to learn to fly the helicopter. In July, the first helicopter detachment formed, including Erickson and several others.

TESTING HELICOPTERS BECOMES A DANGEROUS JOB

The training program did have its mishaps.

On July 4, 1943, only three days after the first British helicopter had been delivered to the Sikorsky factory, Erickson was invited to fly the machine. Just as Erickson brought the aircraft into a hovering position, everything “seemed to break loose” and the helicopter fell to the ground, shredding all three blades. The British were on the scene to see if Erickson had been hurt, and when he walked away, they accused him of celebrating Independence Day by “pranging Britain’s only helicopter.”

The Sikorsky plant, however, was only meant to be a temporary training facility. On Nov. 19, 1943, the chief of naval operations designated AirSta Floyd Bennett Field as a helicopter-training base equipped with three HNS-1 helicopters.

Not only were pilots trained there, but there was also a course for mechanics. In June 1944, the air station began formal train-

ing classes. In two years, the Coast Guard pilots course was completed by 125 men including 96 Coast Guard, 12 Navy, 11 British, two Army and four civilians. Also, more than 200 mechanics were successfully trained there.

Just one month after the air station opened, the *Daghestan* began open-sea trials to test the HNS-1 and a British FT-834 helicopter.

On Jan. 6, 1944, the *Daghestan* sailed in convoy on the North Atlantic route from New York to Liverpool, England, to determine the feasibility of using the helicopter for anti-submarine warfare.

The 10,000-ton ship had a tendency to roll excessively and to yaw due to deep loading with 8,000 tons of grain and no cargo between decks. The vessel never rolled less than 10 degrees and sometimes it rolled as much as 45 degrees from port to starboard. The pilots landing for the test flight landed on a flight deck measuring 50 feet by 96 feet, 22 feet above water. Of a to-



tal of 328 landings, the British made 162 landings and the United States' pilots made 166 landings, with almost no difficulties except stopping the main motor blades — it being necessary to turn the vessel downwind to reduce the relative wind to stop the rotors.

On the 16-day voyage, only three days were suitable for flying due to strong winds which sometimes gusted to 80 knots. Also, the cargo of grain shifted during the voyage, giving the ship a permanent list of five degrees which complicated the trials.

The first flight was made on the 10th day in a 30-minute flight around the convoy by Coast Guard LTJG Stewart Graham. Graham, who had only 65 hours of flight time, took off and landed with the ship rolling between 10 and 20 degrees, a 20-knot wind over the deck and the rise and fall of the deck between 10 and 20 feet.

The helicopters used float-type alighting gear which provided good traction on the wooden deck. It was found that the heli-

copters could be operated from the deck in winds up to 40 knots so long as a wind screen was provided for stopping and starting the rotor blades. The tests, however, concluded that the HNS-1's performance was too marginal for an anti-submarine warfare mission and that it did not have enough power to follow the deck when the ship was pitching. Thus, in September 1944, Waesche downgraded the HNS-1 to a training model. He further suggested that more work be done with the *Cobb* to solve present problems and to assess the value of new types of rotary-winged aircraft.

As Graham was boarding the *Dahgestan*, the usefulness of the helicopter in anti-submarine warfare was still in question. But the same month, Erickson proved the helicopter's usefulness in rescue activities.

Early in the morning on Jan. 3, the *USS Turner*, anchored in Ambrose Channel between New York and New Jersey, suffered a series of shattering magazine explosions after escorting a convoy from Gibraltar, Spain.

Below: Early helicopter flights were not without mishaps. This crash occurred in February 1944.





Above: The Coast Guard demonstrated the use of the helicopter in an air-sea rescue on the Chicago River, in Illinois, during the 1940s. The pilot was hoisted to safety by using the helicopter's hydraulic hoist.

The destroyer later sank with a heavy loss of life. More than 150 men were picked up by Coast Guard craft and rushed to Sandy Hook Hospital in New Jersey.

Due to the numerous casualties, the hospital quickly exhausted its supply of blood plasma. With many men's lives at stake, Erickson lashed two cases of plasma to the floats of a helicopter and took off from the Battery in New York in sleet-driven, 20- to 25-knot winds. The weather had deteriorated to such an extent that all the air fields in the New York area had closed.

Erickson delivered the plasma in 14 minutes, weaving among the confines of high buildings and landing directly on the hospital grounds. Delivery by car would have taken hours.

This event awakened many to the possi-

bility of using the helicopter as a fly ambulance.

Waesche fought to get money for the helicopter program at a time when it looked as if it could be cancelled due to diminished attacks on American merchant shipping.

In April 1944, the commandant testified before the House Appropriations Committee to support the Navy Department's 1945 budget. The appropriation as it stood would have given the Coast Guard money to operate 210 helicopters.

Just over a month later, however, it became evident that a suitable anti-submarine warfare helicopter would not be ready to play an important role in the war effort. Thus, the Navy cut the original order for helicopters from 210 down to 36.

As the war progressed, the Coast Guard became increasingly involved in different training techniques. To help train pilots to deal with a pitching and moving ship, the Coast Guard Special Devices Division constructed a movable platform measuring 60 feet by 60 feet. Finished April 1, 1944, it was placed in commission and christened *Mal de Mer* or "sea sick." It could be adjusted to simulate a 5- to 10-degree roll with a 10-second interval between rolls.

The *Cobb* also began to be used by the Coast Guard for training. In January 1944, the cutter was ordered to Groton, Conn., for sound and radar training. The machinery and hull were in such disrepair that it could only be considered for limited duty. In April, headquarters weighed assigning the cutter to New York to work with the helicopter landings aboard ships.

At this time, it was still doubtful that the *Cobb* would be used in shipboard helicopter training for anti-submarine duty. The cutter was equipped with a special landing deck with a net around it. The first flight off the cutter occurred on June 29, 1944. For the rest of the war, the cutter was involved in limited operations, not more than one week out of each month.

HELICOPTER 'DIPPING SONAR' HELPS KEEP TRACK OF SUBMARINES

In an attempt to make helicopters more proficient in the role of a submarine hunter, a project began in April 1944 to equip them with a "dipping sonar" similar to what blimps carried.

The major concern was the noise transmitted to the water by the wash from the helicopter's rotors. Working off the *Cobb*

was found that the noise level was insignificant and did not interfere with equipment operation.

During flight operations, it was discovered that the HNS-1 helicopter was extremely helpful when used as a target for the alignment of fire-control radar, anti-aircraft radar and loran testing. This use was so helpful, in fact, that it later became the chief operational function during the war.

RESCUE HARNESS TESTED

From the beginning of the helicopter program, the Coast Guard had also shown interest in the machine's capabilities as a rescue craft. Numerous successful tests had been made using different hoists and stretchers lowered to the ground and to ships. As early as December 1943, rescue tests were conducted by suspending a stretcher under the fuselage.

Erickson, who had been the greatest proponent of this, now began to develop ideas and techniques for power-hoist equipment for these aircraft. He demonstrated the usefulness of a helicopter hoist in Jamaica Bay, N.Y., in August 1944, by picking up a man floating in the water and later one from a life raft in a 10- to 15-knot wind. The hoist was limited to a 170-pound load.

In October, a new rescue harness was tested. The helicopter picked up four men, one at a time, and placed them on the *Cobb* — all in less than 10 minutes. Also demonstrated was the effort of two men picking up a helpless man in under 30 seconds.

As the helicopter increasingly showed potential as a lifesaving tool, the anti-submarine role for the helicopter gradually decreased.

BUDGET PREVENTS ADDITIONAL RESEARCH AND DEVELOPMENT

By April 1944, Kossler stated that helicopter training aboard the *Cobb* would now be a "minor" activity. Kossler projected that the Coast Guard probably would no longer pursue development of the helicopter for anti-submarine warfare. Developing the rescue attributes of the aircraft would be the major focus of the Coast Guard for the duration of the war.

The Coast Guard's limited budget, however, prevented it from backing any project for research and development of the helicopter for rescue operations. This was the stated function of the Bureau of Aeronautics.

In July, Waesche officially discontinued the development of the helicopter for in-

shore patrol activities connected with anti-submarine warfare. He began pushing for its development in air-sea rescue and started training pilots for this duty. For the remaining months of the war, the Coast Guard continued to train pilots and test various rescue equipment for helicopter applications.

One of the many applications that was tested proved to be extremely unusual.

In August, preliminary tests were made to determine if insect spray could be applied to crops from the air. At an altitude of 30 feet and a speed not greater than 10 knots, the task could be accomplished. To implement the testing, two Coast Guard members were transferred to Florida to work with the Bureau of Entomology and Plant Quarantine with the U.S. Department of Agriculture.

By mid-January 1945, the monthly sinkings of U.S. merchant vessels had declined to 15,745 tons, or, about .0007 of the United States' total tonnage of 1,000 tons or over. At the time, there were 18 HNS-1 and one HOS-1 helicopters at the air station in Brooklyn. With the threat of the submarine all but

Below: The HNS-1 pilot had the task of operating the hoist and harness system while maintaining the helicopter's position.



gone, the helicopter likewise was virtually forgotten as a weapon.

The Coast Guard had envisioned many roles for the helicopter during its development and now began putting its full effort to shifting all that they learned to reap peacetime dividends.

The Coast Guard held onto the *Cobb* for a short time after the war. Neither the engineering officer, Johnson, nor the air sea rescue officer, RADM Robert Donohue, felt any need to keep the vessel.

Donohue wrote an endorsement that the helicopter program would not justify the retention of the *Cobb*. Thus it was decommissioned at pier 18 on Staten Island, N.Y., Jan. 1, 1946.

Had the submarine menace increased rather than declined in 1942, more resources might have been poured by the United States into the development of the helicopter as an anti-submarine-warfare weapon.

The allies eventually solved the problem of the air-gap in the Atlantic Ocean with long-range bombers and escort carriers. Planes from the escort carriers in particular played the role that had originally been envisioned for the helicopter.

Rotary-winged aircraft appeared on the scene about two years before the helicopter could be adapted for any type of active anti-submarine warfare role.

UNDEVELOPED HELICOPTER SITS OUT WORLD WAR II

As it was, helicopters remained largely untested and undeveloped and thus never played the role that many envisioned for them during the war. Given the declining submarine threat, those that wanted to develop the helicopter found it difficult to shift national policy.

Perhaps more important was the fact that technology is evolutionary rather than revolutionary. The helicopter could not be developed fast enough to be effectively used and, so it sat out the war.

The story of the helicopter, of course, just began for the Coast Guard during World War II.

The helicopter would quickly become the backbone of the service's search-and-rescue program. New technology and further development would prove the early visionaries of the helicopter to be correct — that the uses of the helicopter are almost limitless.

Below: One of the many unusual applications of the HNS-1 helicopter was spraying insecticide on crops from the air. The helicopter was tested in conjunction with the Bureau of Entomology and Plant Quarantine of the U.S. Department of Agriculture.

Facing page: CAPT William Kossler was a driving force in adapting the helicopter for Coast Guard purposes.



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