HELICOPTER HISTORY

U. S. AIR FORCE

..SIKORSKY AIRCRAFT

XR-4 TO THE HH-53C

Shortly after World War I, the Army Air Corps began to pioneer the tactical use of our nation's air power. At the same time, the U.S. Army first gave serious thought to building an aircraft that could fly straight up or down, stand still in the air, and land almost anywhere.

In the early 1920s, Dr. George de Bothezat was awarded a contract to build a vehicle resembling today's helicopter. It was flown at McCook Field, but was not considered practical for continued development. More than a decade later – in 1940 – another attempt was made to construct a practical rotary wing aircraft for the Air Corps. This aircraft, the experimental Platt-LePage XT-1, was flown on June 23, 1941, but it never entered production. Interest then was focused on the successful helicopter built by Igor Sikorsky, the VS-300.

On January 10, 1941, the Army Air Corps awarded a contract to Sikorsky Aircraft to build an experimental helicopter. Designated XR-4, it was based on the VS-300. It made its first flight on January 14, 1942. Then, on April 20th, Sikorsky Chief Test Pilot Les Morris took off from the Sikorsky plant in an XR-4 enroute to Wright Field where the helicopter was to be demonstrated to Air Corps officials. Five days, 16 flights, and 761 airline miles later, the XR-4 landed at Wright Field, marking completion of the first helicopter delivery flight in the United States. Later, at simple induction ceremonies at its Bridgeport, Conn., plant on July 3, 1943, Sikorsky truly began its long Air Force career when Lt. Col. H.F. Gregory took formal delivery of the initial R-4A, the world's first production helicopter.

The R-4A was a small, 180-horsepower machine with a cruising speed that barely rivaled the automobile. The R-4A differed from earlier rotary wing aircraft designs. It incorporated a single main rotor above its cockpit and a smaller anti-torque tail rotor. Its 35 foot, 5 inch fuselage was tapered behind the cockpit. With the exception of its tail section, the aircraft was fabric-covered. Power was provided by a seven-cylinder, R-550-1 Warner Scarab engine. Pilot and passenger sat side by side.

Since the R-4A rolled off the production line in 1943, Sikorsky helicopters have served on both European and Asian fronts during World War II, over the rugged terrain of Korea and a decade later in Vietnam where the helicopter has rewritten the handbooks of military strategy. Through three conflicts and the intervening peacetime years, Sikorsky has supplied the Air Force with more than 900 helicopters.

WORLD WAR II OPERATIONS

During World War II, thirty R-4As were built and flown in C-46s to Alaska, Burma, India and China. Air Corps fixed-wing pilots were helicopter-qualified after two or three hours of dual instruction and 25 hours of solo flight.

Operating from floating aircraft repair stations off Guam, R-4As carried spare parts to shore-based B-29s. The feasibility of shipboard helicopter operations was established when an Air Corps R-4A made 162 successful landings and takeoffs from the troopship James Parker. The tests were run through rain and fog with ceilings often as low as 200 feet. First combat test of the R-4A came within a year of its production date. After Japanese airborne troops invaded Burma, allied personnel were trapped until, in April 1944, R-4As were rushed to remote sectors to evacuate them. The first helicopter combat rescue mission took place during this period when Lt. Carter Harmon picked up (one at a time) the three injured occupants of an observation aircraft forced down behind enemy lines. While Air Corps pilots were flying R-4As in combat and in development tests, other Sikorsky helicopters were proving valuable. These were contracted for by the Army but assigned to the U.S. Navy, Coast Guard and British forces. Navy interest had been stimulated by 34 demonstration landings and takeoffs by an Air Corps R-4A from the deck of a 10,000-ton tanker, the SS Bunker Hill, moving at various speeds through Long Island Sound. At the same time, work was begun on mechanical hoisting devices to enable crewman to lift wounded or injured personnel directly into a hovering helicopter.

While the R-4A was being used to train Air Corps helicopter pilots, Sikorsky was awarded contracts to build two more production helicopters, the R-5A and the R-6A. The R-5A, designed for observation missions, was first flown on August 18, 1943. It was 5 feet longer than the R-4A. Its metal-skinned fuselage had a contoured Plexiglas nose and an elongated tail section. Its Pratt

and Whitney R-985 engine produced 450 horsepower, compared with the 180 horsepower of the R-4A, and its dynamic components were uprated accordingly. The R-5A had greater speed, rate of climb, service ceiling, gross weight and useful load than the R-4A. It had a range of 250 nautical miles.

The R-5A was the first American-built production helicopter to establish official world speed, endurance, and altitude records. On May 13, 1946, it flew for 9 hours, 32 minutes, and 47 seconds. The following month, it flew a 20-kilometer course at 110.849 miles per hour, breaking the record of 76.151 set in 1937 by the German FW61-VI. On November 14, it remained aloft for 9 hours, 57 minutes and on a 1000-kilometer closed circuit course flew 621.4 miles at 66.642 miles an hour.

The R-6A entered production late in the war. It was slightly larger and more powerful than the R-4A. Its design was more refined. The R-6A had a gross weight of 2,623 pounds, could cruise at 65 knots, attain a speed of 82 knots, and carry a 589-pound payload. It was 38 feet, 3 inches long and had a 245-horsepower Franklin engine.

Col. H.F. Gregory of the Army Air Corps, a leader in the early Air Corps helicopter program, established an unofficial helicopter non-stop flight record with the R-6A on March 2, 1944. He flew 387 miles from Washington, D.C., to Wright Field in 4 hours, 55 minutes, carrying Sikorsky engineer Ralph P. Alex.

By the end of World War II, Sikorsky Aircraft had supplied 131 R-4As, 65 R-5As and 225 R-6As. The three models had accumulated a total flight time of more than 136,000 hours. Before being replaced in active Air Force duty, the R-5A logged another entry in helicopter flight records on February 10, 1947. Piloted by Maj. Ernest A. Cassell, chief of the helicopter section at Wright Field, an R-5A climbed to 19,000 feet, almost 8000 feet above the previous record set in 1939 by Germany's Karl Bode in an FW61-VI.

The Sikorsky S-51, designated H-5 by the Air Force, made its first flight in February 1946. In less than two years, H-5s became an active tool of the newly formed Air Rescue Service (ARS) which became a branch of the Military Air Transport Service (MATS) in June 1948.

In June 1950, while nations were still adjusting to peace, the Korean conflict commenced. On June 25, a pair of H-5 helicopters of the Third Air Rescue Squadron took off from Johnson Air Force Base, outside of Tokyo, on a supposedly routine air taxi mission. After a brief stop at Ashiya to paint the yellow helicopters an olive drab, they took off again to ferry high-ranking officers across the Tsu Shima Straits to Korea. The H-5 taxi role had come to an abrupt end. Three hours before the takeoff from Japan, North Korean troops had crossed the 38th parallel.

In the next three years of conflict, Sikorsky helicopters of the U.S. Air Force and other services were to become the difference between rescue and capture, life and death, for thousands of United Nations troops. Military strategists, who had viewed the helicopter with skepticism, now became enthusiastic supporters.

By war's end, more than 10,000 United Nations personnel owed their lives to rescue or evacuation by Sikorsky helicopters. Chief contributor to the proud total was the Air Force Air Rescue Service.

ACTION IN KOREA

The first helicopter hoist rescue ever recorded had a Army Air Corps pilot as a participant. In November 1945, Capt. Jackson E. Beighle and Sikorsky test pilot D.D. Viner twice flew an R-5A out over Long Island Sound to rescue two men from a barge that had run aground on a reef. Only a helicopter could have made that rescue in heavy rain, turbulent air, and winds gusting to 60 miles an hour.

The first helicopter rescue in Korea was recorded on July 27, 1950. The second, on August 6, was a deciding factor in a Pentagon decision to equip every infantry division with a helicopter company. The August 6th mission began when USAF Lt. Ray Costello, chief of helicopters in Korea, received word from an outlying medical aid station that a severely wounded soldier required immediate hospital treatment. The aid station was on a 3,000-foot mountain and was surrounded by enemy troops. Costello flew his H-5 over the circle of North Koreans, picked the injured soldier up from the mountaintop and evacuated him in time to save his life.

The next day, Maj. Gen. Earle Partridge, Far East Air Force Commander, directed that: "Hereafter, the helicopters assigned to this command will be used only for rescue and evacuation." The H-5s became welcome sights and definite morale boosters to scores of downed airmen and injured or trapped ground troops, bringing the element of rescue from the remote to the probable.

By early winter, ARS pilots, flying H-5s, recorded their 1,200th mission and were credited with saving more than 400 lives. As many as 50 missions a day were flown in the late summer and fall. Often operating on an 18-hour day, H-5 rescue helicopters had penetrated up to 125 miles behind enemy lines.

Typical of the courage of the pilots and reliability of the aircraft was the rescue of a downed British airman, who had crashed near Changyon, deep in enemy territory. ARS Lt. David C. McDaniel and Capt. John C. Schumate, a medical officer, dodged ground fire directed at their H-5 for more than 2 hours before they arrived at the rescue site. Schumate pulled the unconscious British pilot from the wreckage of his plane, carried him 200 yards through enemy fire and lifted him into the helicopter. The injured pilot was given a blood transfusion in flight and flown directly to a hospital ship moored at Inchon. Aboard ship, waiting surgeons performed a life-saving operation. For their actions, McDaniel and Schumate received the Silver Star, and Schumate was awarded the British Military Cross in 1955.

FIRST AIRCRAFT RETRIEVAL

The H-5 air fleet was augmented in the early months of 1951, when the Sikorsky H-19, a 10-passenger helicopter, was delivered to the Air Force. Within months after its arrival in Korea, the H-19 performed one of the most difficult, unusual assignments given the ARS – retrieval of a downed Russian-built MIG fighter from a canyon 35 miles behind enemy lines and just west of "MIG Alley," rendezvous spot for enemy air strikes. ARS Captains Joseph D. Cooper and Russell Winnegar, with a small party of South Koreans assigned to dismantle the MIG, lowered their H-19 between the canyon walls. Quickly, the South Koreans stripped vital parts from the disabled jet and hooked the load to the H-19. With a 1,000-pound overload, the helicopter strained up out of the canyon and returned safely through heavy enemy fire. The recovery was the only one of its type made in Korea, but the aircraft retrieval mission for helicopters had been established.

The Third ARS was the most decorated Air Force unit in the Korean War and the first unit to win the Presidential Unit Citation in Korea. More than 1,000 individual citations were won by members of the squadron.

COUNTERINTELLIGENCE OPERATIONS

While air rescue was the most publicized mission of the USAF helicopter pilots, it was not the only role they performed. In September 1952, a small unit of airmen, flying H-19s under the designation of Helicopter Flight-581st Resupply Squadron, launched flights to drop intelligence agents behind enemy lines. Five 581st crews from the ranks of Air Training and Tactical Air Commands formed the key link in allied counter intelligence measures in Korea. The nature of their undercover mission entailed some disregard of the flight manual. Unarmed and unescorted flights north of the 38th parallel were often made in adverse weather, poor visibility, at night, and with almost no navigational aids.

Between intelligence missions, pilots of the 581st also sandwiched in rescue flights. Capt. Lawrence A. Barrett, with 1st Lt. R. F. Sullivan as copilot, took off on January 15, 1953 to retrieve a downed F-51 pilot more than 100 miles into North Korea. Just as they spotted the fighter pilot on the ground, enemy gunfire opened up. Barrett lowered the H-19 to the side of the flyer and Sullivan hoisted him aboard. The H-19 then flew to the safety of the Yellow Sea through a heavy concentration of small arms fire. For his rescue of the F-51 pilot, Barrett was awarded the Distinguished Flying Cross. In a subsequent rescue mission, Sullivan brought back the late USAF flying ace, Joe McConnell. During six months and 1,100 hours of combat flights, 581st pilots flew more than 300 missions.

ACROSS THE ATLANTIC

While H-5s and H-19s performed outstandingly over Korean battlefields, USAF H-19 pilots were logging other helicopter achievements in the United States. Two H-19s, nicknamed Hop-A-Long and Whirl-O-Way, completed the first helicopter crossings of the Atlantic Ocean in August 1952. The trip from Westover Air Force Base to Prestwick, Scotland, covered 3,535 air miles in 42 hours, 25 minutes. Hop-A-Long was piloted by Captains Vincent H. McGovern and Harry C. Jeffers, and the Whirl-O-Way was flown by Captain George O. Hambrick and 1st Lt. Harold W. Moore.

POST-KOREAN YEARS

With the end of the armed conflict in Korea in July 1953, the H-5s and H-19s were assigned elsewhere by the Air Force. Figures compiled from 1949 to 1955 clearly reflect the activity and reliability of these helicopters. In the six-year period, 320 Air Force H-19s recorded more than 410,000 flight hours.

In the years after Korea, the Air Force used the Sikorsky CH-37 for experimental purposes. The 66-foot-long aircraft had a gross weight of 31,000 pounds and could transport 26 troops – two and one-half times more than the H-19. The CH-37 later flew aircraft and equipment recovery missions for the U.S. Army and Marine Corps in Vietnam.

Rescue work continued as a major Air Force role through the remainder of the 1950s. In February 1953,

a USAF H-19 rescued 20 men from the U.S. Navy freighter Hennite, which had run aground off Okinawa. A year later, an H-19 lifted 18 persons off the Swedish freighter Dalsand as it broke up in heavy seas off Morocco. In April 1955 – during a violent storm – two USAF H-19 pilots rescued 93 persons from a lake in South Carolina. In September, two UH-19s evacuated 60 persons from a flood-damaged area on the Japanese island of Hokkaido.

When Air Force requirements demanded a long-range turbine-powered transport helicopter in 1962, Sikorsky Aircraft produced the CH-3B (S-61A). The first CH-3B was delivered to the 551st Air Base Squadron at Otis AFB one month after the order was placed. A modified version of the U.S. Navy SH-3A anti-submarine helicopter (an executive version is used by the President of the United States), the CH-3Bs were assigned to transport Texas Tower radar station personnel to points 75 and 100 nautical miles off Cape Cod in the Atlantic. During 15 months of Texas Tower duty, the CH-3Bs ferried 1750 tons of cargo and 17,000 passengers, in 567 flights and 2,944 hours of flying time. Three times the helicopters were used to evacuate personnel and equipment from the towers in advance of approaching hurricanes. When the towers were no longer used, CH-3Bs helped dismantle them.

ATLANTIC CROSSING AGAIN

The Air Force made a second transatlantic helicopter crossing in May 1963, when Captains John D. Arthurs, William B. Lehman, and William A. Scott III flew the CH-3B Otis Falcon on an eight-stop journey from Otis AFB to the International Air Show in Paris in 35 hours, 35 minutes.

Other CH-3Bs were assigned by the Air Force to the 341st Strategic Missile Wing at Malmstrom AFB for transporting launch control crews and equipment. In the Carolinas, the CH-3Bs carried troops and cargo under simulated battlefield conditions in the joint Air Force/Army Operation Swift Strike III. The CH-3Bs flew 175 missions during the 12-day maneuver. In Florida, a trio of CH-3Bs assigned to drone recovery

duty with the 4756th Drone Squadron at Tyndall AFB made 53 of 57 drone recoveries credited to helicopters during Operation William Tell. The CH-3Bs were subsequently assigned to Hickam AFB for duty with recovery units, to Malmstrom AFB for further missile site support, and to Olmstead AFB for assignment with the Systems Command and further maneuvers with Tactical Air Command.

Shortly after its first flight, on June 17, 1963, the rear-loading twin-turbine Sikorsky CH-3C was selected by the Air Force for the long-range, rotary-wing aircraft requirement. A sister ship of the CH-3B, the CH-3C was delivered to the USAF in December of the same year. On the day of its delivery, the aircraft was also certified by the Federal Aviation Agency. It was the first helicopter delivered to the military and FAA certified on the same day.

JOLLY GREEN GIANTS TO THE RESCUE

In Vietnam, the CH-3C offered a strategic edge over the North Vietnamese: swift transport of men and equipment to track enemy troops, and rescue efforts that penetrated heavy jungle growth and ranged deep into enemy territory.

The CH-3C was quickly adapted for combat rescue work. It was fitted with an external hoist and reinforced with armor plate. It was armed, had increased power and could fly greater distances. It was given a new designation – HH-3E – and quickly earned the nickname Jolly Green Giant. The Air Rescue Service (ARS) also won a new name when, on Jan. 1, 1966, a far more descriptive title, the Aerospace Rescue and Recovery Service (ARRS) was adopted.

The size and payload of the Jolly Green Giants permitted the aircraft to significantly enlarge the rescue range, an important factor as allied air strikes penetrated into North Vietnam. The Jolly Greens logged thousands of air miles above enemy territory, often at brush-skimming altitudes. To accomplish their pickups of downed airmen and injured ground troops, ARRS rescue crews often hovered for minutes just above the tree tops, defying enemy machine gun and rifle fire.

During the first six months of 1966, Air Force crewmen of the ARRS rescued 65 men from the jungles and deltas of Vietnam. By October 1975, total rescues by H-3s had grown to more than 980.

On one of the early Jolly Green Giant missions, USAF Capt. William E. Cowell went into a valley to retrieve a downed flyer. Enemy marksmen scored 11 direct hits on the HH-3E, disabling one of the two engines. Cowell's base advised him to ditch and wait for a second helicopter to rescue him and his crew. Cowell decided instead to dump as much fuel and equipment as he could and try to fly his aircraft home. Cowell taxed the remaining engine, but took advantage of air drafts along the mountainsides and eventually brought the aircraft up into the protection of cloud formations. From there, he flew safely to friendly territory.

In January 1966, for exploits such as Cowell's, President Lyndon Johnson awarded the Presidential Unit Citation to the 38th Aerospace Rescue and Recovery Squadron — the Jolly Green Giant crews.

ASTRONAUT RECOVERY

While the ARRS brings instant mobility to troops and near-immediate recovery to downed American fixed-wing pilots, a special unit of this service hovered in readiness close to the missile lift-off pads at Cape Canaveral. Detachment 15, based at Patrick AFB, had the task of rescuing U.S. astronauts in the event of an emergency during launching of a manned spacecraft. CH-3Cs were aloft with pararescuemen and flight medics aboard.

INSTANT RESCUES

In 1965 the Air Force extended the range of helicopter rescue by developing a system of air-to-air refueling. The feasibility of air refueling of an Air Force CH-3C helicopter by C-130 tanker was demonstrated in December 1965. Then, in May 1967, two HH-3Es proved the practicality of the concept when they flew non-stop from New York to the International Air Show at Paris. Enroute, each was refueled 9 times by tanker. At the end of the flight, the Air Force was able to claim a new world speed record for helicopters. In spite of strong headwinds, they averaged 118 miles an hour for the 4,157-mile trip.

With air refueling capability, USAF HH-53Cs have achieved almost "instant rescues". Instead of waiting at landing strips for alarms from combat areas, helicopters have flown on the perimeter of the strike area waiting for distress calls and have been able to reach downed airmen just after they landed. Additionally, HH-53C Super Jolly Green Giants (BUFFs) have been ferried from the U.S. West Coast to Southeast Asia with in-flight refueling enroute.

In May 1967, the American Helicopter Society, in recognition of the helicopter advances inherent in air refueling, presented the coveted Grover E. Bell Award to the Aerospace Rescue and Recovery Service "for conceiving and fostering operation of in-flight refueling of helicopters from standard tanker aircraft, thereby increasing effective helicopter ranges to the limits of crew capability."

WORLD WIDE RESCUE CAPABILITY

The two most recent additions to the Air Force ARRS inventory are the HH-53B and HH-53C long-range rescue helicopters. The former, sister ship of the Marine Corps CH-53A, has been used in Southeast Asia for rescue missions along with the smaller HH-3Es. The HH-53C, the largest and fastest helicopter in Air Force inventory, in addition to routine rescue duty, is assigned to airborne emergency standby at Cape Canaveral during the launch phase of manned space flights. The aircraft is capable of lifting the entire Apollo command module and its crew and carrying it to safety.

In addition to fulfilling its rescue role, the HH-53C is being used for deployment of the newly developed Air Force Tactical Air Control System (TACS). This system is comprised of self-contained modules, which can be air transported and logistically supported by the H-53. The merging of the helicopter and TACS allows movement and support independent of surface means and thus provides a significant gain in capability and a significant reduction in system vulnerability.

Since the 1941 contract for the XR-4, Sikorsky Aircraft and the USAF have worked together in war and peace in many parts of the world. By October 1975, Air Force H-53s had made 962 rescues in Southeast Asia alone. They were used in the daring Son Tay raid into North Vietnam to free American POWs, which did not result in any actual rescues, but did much to boost the morale of the prisoners and force the North Vietnamese

to move the POWs into better facilities near Hanoi. More recently, Air Force H-53s participated in the dramatic evacuations of Americans from Pnom Penh, Cambodia, and Saigon, South Vietnam, hours before those two capitals fell to Communist forces. H-53s also played a key role in the successful operation to recover the American merchant ship SS Mayaguez and its crew after the vessel was seized in international waters off the coast of Cambodia.

The relationship between Sikorsky and the Air Force has sponsored and fostered many of the technological advances of VTOL aircraft. Sikorsky Aircraft looks forward to many more years of aircraft history in the making with the U.S. Air Force.

U.S. AIR FORCE/SIKORSKY HELICOPTERS

Model	Mission	First Flight	Powerplant	Fuselage Length	Maximum Gross Wt (Lbs)	Useful Load (Lbs)	Cruise Speed (Kts)
R-4	Rescue	Jan. 14, 1942	180 hp Warner	35'5"	2,540	530	56
R-5	Observation	Aug. 18, 1943	450 hp P&W	40'10"	4,896	1,115	69
R-6	Rescue	Oct. 15, 1943	245 hp Franklin	38'3"	2,623	589	65
S-51 (H-5)	Rescue	Feb. 16, 1946	450 hp P&W	41'2"	5,500	1,450	74
S-55 (H-19)	Rescue	Nov. 10, 1949	700 hp Wright	42'3"	7,500	2,250	74
S-56 (CH-37)	Experimental	Dec. 18, 1953	(2) 2100 hp P&W	64'11"	31,000	11,587	100
S-61A (CH-3B)	Transport	Mar. 11, 1959	(2) 1250 shp GE	54'9"	21,500	11,876	126
S-61R (CH-3C)	Transport	Jun. 17, 1963	(2) 1250 shp GE	57'3"	22,000	9763	125
S-61R (HH-3C)	Rescue		(2) 1250 shp GE	57'3"	22,000	9550	123
S-61R (CH-3E)	Transport		(2) 1500 shp GE	57'3"	22,050	8615	134
S-61R (HH-3E)	Rescue		(2) 1500 shp GE	57'3"	22,050	8403	134
S-65 (HH-53B)	Rescue	Mar. 16, 1967	(2) 3080 shp GE	67'2"	42,000	18,875	150
S-65 (HH-53C)	Rescue		(2) 3925 shp GE	67'2"	42,000	18,310	150
S-65 (CH-53C)	Transport		(2) 3925 shp GE	67'2"	42,000	18,602	150

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