



Sikorsky Archives News

July 2022

Published by the Igor I. Sikorsky Historical Archives, Inc. M/S S578A, 6900 Main St., Stratford CT 06615

Sikorsky Lifts the Army



S-70 Dust-Off or Medevac-configured Black Hawks (here, the Army HH-60M) have saved lives on battlefields from Grenada to Iraq. (U.S. Army)

Igor Sikorsky and pilot Les Morris delivered the experimental XR-4 (VS-316) helicopter to the U.S. Army Air Corps at Wright Field on May 17, 1942. Their flight from Bridgeport, Connecticut to Dayton, Ohio covered 761 miles in 16 hours, 10 minutes logged over five days. In *The Story of the Winged S*, Sikorsky later wrote, "It would be right to state that with the successful flight of the XR-4 in the summer of 1942, the helicopter became a reality in the United States. Its practical value and potential possibilities were proven beyond any trace of doubt."

Visit us at Sikorskyarchives.com

Contact us at iisha@snet.net 203.386.4356

The Army saw helicopter possibilities soon after World War I, but hover tests by the Air Service Engineering Division in 1922 concluded a 24-bladed de Bothezat quadcopter was too complicated to develop. Igor Sikorsky flew his single-main-rotor VS-300 (S-46) for the first time on September 14, 1939. In July 1940, he invited Army Air Corps helicopter project officer Major Frank Gregory to fly the one-of-a-kind demonstrator. Gregory wrote in *Anything a Horse Can Do – The Story of the Helicopter*, “After about eight minutes of flying I finally got the craft back on the ground, much to the relief of Sikorsky; although, of the group which had been watching my flight, he was most enthusiastic in his congratulations.”



Igor Sikorsky, Orville Wright, and Col. Frank Gregory acknowledged delivery of the VS-316 (Army XR-4) to the Army at Wright Field, Ohio in 1942.

Gregory became the first American military helicopter pilot. The Vought-Sikorsky Division of United Aircraft Corporation proposed a two-seat VS-316 (S-47) to the Army and received a \$50,000 development contract -- the Army wanted an alternative to the Platt-LePage XR-1 with its outrigger rotors. Then-Colonel Gregory accepted the experimental XR-4 on May 30, 1942. That June, Secretary of War Henry Stimson directed Army ground forces to attach fixed-wing

observation aircraft to artillery units and began organic Army aviation.

Gregory's XR-4 evaluation earned Sikorsky an Air Corps contract for 15 developmental YR-4As on December 21, 1942. A production contract in May 1943 covered 100 more powerful R-4Bs. The first YR-4A was delivered on July 3, 1943. Sikorsky separated from Vought that year and began R-4 (S-47) production in a renovated and expanded Bridgeport factory. The 100th helicopter came off the line on September 7, 1944. That same month, the Army Air Forces established a helicopter school at Freeman Field, Indiana. Sikorsky News reported on an impromptu medical evacuation mission on October 20, 1944 when an R-4 landed near dense woods to recover an injured student pilot.

Off to Wars

The 2,500 lb R-4B was acquired by the Army as a training helicopter. Sikorsky designed the 5,500 lb R-5 (S-48) observation helicopter around a 1942 U.S. Army Air Forces (USAAF) lift requirement. The first two-seat YR-5A flew on August 18, 1943, and the Army ordered 26 helicopters for testing in March 1944. However, with the bigger R-5 in development, the 1st Air Commando Group took six underpowered YR-4s to the China-Burma-India theater over Greg-



Lt. Carter Harman flew the S-47 (Army YR-4B) in the first combat rescue in 1944.

ory's objections. Lt. Carter Harman flew the first combat rescue, recovering three wounded British soldiers and their American pilot down behind enemy lines with four sorties over two days in April 1944.

The 2,600 lb R-6 (S-49) flew on October 15, 1943 and went to war alongside R-4s shuttling bomber parts to and from the Army's Ivory Soap depot ships in the Pacific. On June 15, 1945 the 5th Aircraft Repair Unit launched an R-4 to evacuate two wounded soldiers. From June to July 1945, R-4s and R-6s evacuated 75 to 80 wounded from the difficult highlands northeast of Manila.

The USAAF awarded Sikorsky a production contract in 1944 for 100 R-5D rescue helicopters. With the Bridgeport factory committed to the R-5, the USAAF Production Division ordered manufacture of the smaller R-6 licensed to Nash-Kelvinator in Detroit, Michigan. The end of World War II in August 1945 canceled major aircraft orders. Only 193 production R-6As were made for the USAAF, and some were sold to the U.S. Navy and U.K. Royal Air Force.



The S-49 (Army R-6) flew medical evacuation missions in the Philippines at the end of World War II.

The USAAF ultimately received 14 R-5A and 20 R-5D helicopters from July 1945 to October 1946. Aviation units fell under the Army Transportation Corps in 1946. However, when the U.S. Air Force (USAF) became an independent service in 1947, new Army aircraft had to be acquired through USAF channels. The struggle over roles and missions led the Air Force to refuse an Army request for helicopters in 1948. Sikorsky first flew the 6,700 lb YH-19 (S-55) in November 1949, but

the Air Force blocked Army orders in 1950. While the Marines deployed S-55s to mountainous Korea in April 1951, the Army's 6th Transportation Company (Helicopter) was not activated with H-19 Chickasaws until July 1952.

With room for up to eight troops or six casualty litters, H-19s were the Army's first transport helicopters. They flew their first Korean mission on March 20, 1953, when the 6th Transportation Company hauled 17 tons of supplies to elements of the 3rd Infantry Division. The 13th Transportation Company joined the 6th, and in late June the two units formed an air bridge to supply isolated infantry. More actions followed, and before the Armistice, Army H-19s flew in Operation Little Switch to repatriate sick and wounded American POWs.

Back in the U.S., Exercise Snowstorm in February and March 1953 took 11 H-19s of the 506th Transportation Company from Fort Benning, Georgia to Camp Drum, New York, the first time Army cargo helicopters flew in an extended field exercise. In June 1954, the 328th Transportation Helicopter Company with H-19s enabled the Seventh Army in Europe to experiment with air mobility tactics and techniques. In 1957, Colo-



The S-55 (Army H-19 Chickasaw) gave the Army an interim cargo helicopter for the Korean war and the formative 1950s.

nel Jay Vanderpool, Chief of the Army Aviation Schools combat development office, built a Sky Cav platoon at Fort Rucker, Alabama including an armed H-19. The Army ultimately received 72 H-19Cs and 240 H-19Ds that served into the 1960s.

Heavy Haulers



The S-58 (Army H-34 Choctaw) was the “light” cargo helicopter used to develop early airmobile concepts.

Army Aviation plans in the early 1950s classed the H-19 (S-55) as an interim cargo helicopter. The Army followed the Marine Corps lead for its “light” H-34 (Sikorsky S-58) and “medium” H-37 (Sikorsky S-56) cargo helicopters. A 46,700 lb tandem-rotor “heavy” cargo helicopter was canceled before production. The Army ordered the 14,000 lb S-58 in 1953, borrowed Marine helicopters for testing, and took delivery of its first H-34 Choctaw in April 1955. Unit helicopter training on H-19s and H-34s moved from Fort Sill, Oklahoma to Camp Rucker, Alabama. The Army Aviation Center was established at Fort Rucker in 1955.

The Choctaw was soon deployed with U.S. Army-Europe, and in January 1958, 47 H-34s moved 950 soldiers and 15 tons of equipment from Heilbronn, Germany to the Baumholder training area

in Operation Lion Lift. Sikorsky News quoted Eighth Infantry commander Maj. Gen. P.F. Lindeman, “It is a good example of what Army Aviation can do under difficult conditions. It proved, too, that a tactical combat lift can take place even under worse conditions than we had anticipated.” In a joint Executive Flight Detachment, Army and Marine H-34s became the first helicopters to transport the President of the United States routinely. The Army received 437 Choctaws through 1965 and returned early H-34s to Sikorsky for automatic stabilization equipment.

The “medium” S-56 (Marine XHR2S) first flew at Bridgeport in December 1953. The Army borrowed one YH-37 from the Marine Corps for testing in 1954 and took delivery of its first CH-37A Mojave in December 1956 at Fort Rucker. The twin-engine, 31,000 lb cargo helicopter could load 26 combat troops, 24 litter patients or up to 10,000 pounds of cargo through clamshell nose doors. The H-37 could also airlift a Little John rocket, launch crew, and tow jeep internally – the Armair Brigade proposal in 1956 used the nuclear-capable Little John for long-range aerial artillery support.

In February, 1958, the 4th Transportation Company (Medium Helicopter) at Fort Benning, Georgia became the first unit equipped with the H-37. Sikorsky News reported in July 1958 on Project AMMO at Fort Bliss, Texas and White Sands, New Mexico where three H-37As sling-lifted a



The twin-engine S-56 (Army H-37 Mojave) was a “medium” cargo helicopter with cabin space for 26 troops and power to carry heavy cargo.

nuclear-capable Honest John rocket, launcher, support trailer and prime mover to a launch demonstration. In the same exercise, the H-19s and H-34s of a notional Sky Cav fired guns and rockets.

The 4th Transportation Company deployed the H-37 to Germany in 1959 and the 90th Transportation Company in 1961. Sikorsky concluded S-56 production in May 1960, but 90 of 94 H-37As returned to Stratford through 1962 to become H-37Bs with auto-stabilization equipment. Between 1963 and 1966, nine Army CH-37Bs served in Vietnam sling-lifting downed aircraft. The big, piston-engined Mojave retired from Army National Guard service in 1969, a placeholder pending more powerful turbine-engined helicopters.



Modified from the S-52 (Army XH-18), the fast S-59 (Army XH-39) was Sikorsky's first turbine-engined helicopter.

Sikorsky's first turbine-engined helicopter -- the experimental four-seat XH-39 (S-59) with a 400 shp Continental/Turbomeca Artouste turboshaft -- set a world helicopter speed record at 135.6 kt in August 1954 and an altitude record at 24,500 ft later that year. It nevertheless lost the pivotal competition for a turbine-powered air ambulance that would later fill Army airmobile units.

The S-60 Skycrane flew in 1959 with twin Pratt & Whitney R-2800 radial engines on a simple airframe with no cargo cabin. It demonstrated the lifting potential of the crane helicopter all through 1960. United Aircraft approved turbine-engined S-64 development in April 1961. Sikorsky flew the S-64 with twin Pratt & Whitney JFTD-12A-1 turboshafts on May 9, 1962 and in July delivered the company-funded demonstrator to Fort Benning, Georgia for Army evaluation.

The Tactical Mobility Requirements Board headed by General Hamilton Howze in 1962 formulated new helicopter air mobility concepts. The Army ordered six YCH-54s for testing and accepted the first Tarhe at Stratford, on June 30, 1963. The 478th Flying Crane Company, 44th Air Transportation Battalion deployed the big helicopters to Vietnam in 1965 and supported the 1st Cavalry Division (Airmobile) moving bulldozers and other heavy equipment and recovering downed aircraft. In Operation Masher-White Wing, CH-54s first airlifted 155 mm howitzers to firing positions. Skycranes in Vietnam hauled mobile command posts and dropped 10,000 lb bombs to clear jungle landing zones.



The company-funded S-60 demonstrated the potential of the crane helicopter, here carrying an Army H-34.

In April 1965, a CH-54A from the 478th Aviation Company carried a "people pod" packed with 87 troops. On December 30, 1968, Army pilots flew a CH-54A from Sikorsky's Stratford plant through 30,000 ft to break helicopter altitude records. The



The S-64 (Army CH-54 Tarhe) gave the Army a Skycrane with turboshaft power to lift heavy external loads.

CH-54A was succeeded by the more powerful CH-54B in 1969, and the big Sikorsky cranes remained in service until the last was retired by the Nevada Army National Guard in January 1993.

Hardened Helicopters

Lessons learned from helicopter combat in Southeast Asia helped define the crashworthy, ballistically tolerant Utility Tactical Transport Aircraft System (UTTAS) specified by the U.S. Army in 1971. Sikorsky flew the YUH-60 (S-70) with twin General Electric T700 turboshafts in October 1974, and won the competition in December 1976. In his book, *Black Hawk – the Story of a World Class Helicopter*, UTTAS program engineering manager Ray Leoni observed, “That award was the beginning of a new era in Army air mobility, and it brought about a major turnaround in Sikorsky’s prospects for the future.” Since the UTTAS decision, nearly 5,000 Black Hawk helicopters and derivatives have fought wars and saved lives with the U.S. Army, Navy, and Air Force, and Coast Guard, allied air arms, and civil agencies.



The S-70 (Army UH-60) Black Hawk won the UTTAS competition and gave the Army an evolving helicopter for air assault, Medevac, and Special Operations.

The Army received the first production UH-60A Black Hawk in October 1978 and took the 16,800

lb, twin-turbine squad carrier to war in the hurried invasion of Grenada in October 1983. During the Caribbean assault, the heavy-duty control components, redundant control runs, and self-sealing fuel tanks of the Black Hawk proved their value. One UH-60A with a wounded pilot kept flying with 45 bullet holes in the airframe, two in the main rotor, and one in the tail rotor.

Operation Urgent Fury also marked the special operations debut of the UH-60A with the 160th Aviation Battalion. In 1986, Special Operations pilots picked up new Black Hawks at Stratford for conversion to MH-60As and began a night/adverse weather evolution that continues today with the MH-60M in the 160th Special Operations Aviation Regiment (Airborne).

The Army UH-60L entered production in October 1989 and demonstrated it could reposition a 105 mm howitzer, six gun crew, and up to 30 rounds of ammunition in a single lift. Black Hawks again went to war in Panama during Operation Just Cause in December 1989. Stripped of crashworthy troop seats, they sometimes flew 25 soldiers into battle at a time.

Sikorsky had delivered more than 1,000 Army Black Hawks by 1990 when UH-60s were rushed to Operation Desert Shield in Southwest Asia. When Desert Shield became Desert Storm in January 1991, Black Hawks hauled troops, equipment, and supplies throughout the theater of war. They carried Special Operations Forces deep into Iraq, evacuated the wounded and the captured, deployed artillery, and rescued downed aircrew. The 101st Airborne Division launched a two-step air assault including 66 Black Hawks flying soldiers and equipment to landing zones deep inside Iraq to block enemy reinforcements and supplies.

In Army operations other than war, UH-60s performed with equal distinction. Black Hawks were part of the relief forces in Operation Provide Comfort after the first Iraq war, and they went on to support relief and peacekeeping operations in Somalia during Operation Restore Hope in 1992 and 1993. When floodwaters threatened lives in

Texas in 1994, one Army National Guard Black Hawk evacuated more than 200 people from a flooded sub-division. When brushfires charred vast areas of Idaho and other states in the summer of 1994, one UH-60 crew set a record by dumping 102 water buckets in one day on a strategic ridge, making quick turns at high altitude and high temperatures to fill fire buckets from mountain lakes. Fifty Black Hawks were part of the initial peacekeeping contingent when the U.S. Army launched Operation Joint Endeavor in Bosnia in 1995.

An Army Utility Helicopter Fleet Modernization Analysis in 1999 led to a Black Hawk operational requirements document in 2001 calling for better high-hot performance, lower operating and support costs, new digital interoperability, more lift, and greater range. After America was attacked on September 11, 2001, Black Hawks provided essential air mobility and Dust-Off medical evacuation in rugged Afghanistan. When Army aviation returned to Iraq in 2003, Black Hawks again moved troops and evacuated wounded.

Two-front war tripled UH-60 utilization compared with peacetime norms and added urgency to UH-60M modernization plans. The Army Aviation and Missile Command awarded Sikorsky a contract in 2001 to remanufacture one UH-60A and one UH-60L to UH-60M standards, convert another UH-60A into a MEDEVAC HH-60M, and build a new M-model Black Hawk from scratch.

Remanufacturing plans soon gave way to all-new production. By April 2022, Stratford had delivered 877 UH-60M and 298 HH-60M Black Hawks. Sikorsky's 10th H-60 multi-year production contract will stretch through June 2027. Army aviation plans call for 956 UH-60M, 419 HH-60M, and 760 digital-cockpit UH-60V Black Hawks in 2035 when Future Vertical Lift aircraft bring transformational speed and range to the Army's Objective Force.



The S-100 (SB>1) Defiant models the Army's Future Long Range Assault Aircraft that will partially replace the Black Hawk.

The stealthy, computer-smart RAH-66 Comanche became a casualty of the Global War on Terror in 2004 when funds were needed to modernize the Black Hawk and other Army aviation platforms. Today, Sikorsky is competing to build the Future Attack-Reconnaissance Aircraft (FARA) to fly the Comanche mission and the Future Long-Range Assault Aircraft (FLRAA) to succeed the Black Hawk. The proposed S-102 Raider-X FARA and S-103 Defiant-X FLRAA are based on the company's high-speed X2 technologies and draw on the heritage of Sikorsky Aircraft in U.S. Army.



The air-refuelable MH-60K Special Operations Aircraft gave the Army a long-range, night/adverse weather Black Hawk for Special Forces. (U.S. Army)



The Raider-X competitive prototype is Sikorsky's solution for a Future Attack Reconnaissance Aircraft.

Help Us Preserve the Igor Sikorsky Legacy

Memberships and Donations enable us to continue the Archives mission of acquiring, managing, protecting and disseminating historical documentation associated with Igor Sikorsky and his legacy

Please contact us at iisha@snet.net

or see our website

www.SikorskyArchives.com

for details on how you may help us

Thank You

A 501(C)(3) Non-Profit Organization

Except as noted, all pictures are from the Igor I. Sikorsky Historical Archives Collection

The RAH-66 Comanche Helicopter: Technical Accomplishment, Program Frustration

Arthur W. Linden and the Comanche Team



Sikorsky Archives board member Arthur W. Linden and the Comanche Team have authored a definitive history of the RAH-66 scout-attack helicopter newly published by the American Institute of Aeronautics and Astronautics. Art Linden served as Comanche engineering manager, Sikorsky program manager, and Boeing Sikorsky program director. The RAH-66 Comanche Helicopter: Technical Accomplishment, Program Frustration, tells the story of the U.S Army Light Helicopter Experimental in development at Sikorsky from 1991 to 2004. The book describes the challenges of the armed, low-observable, digitally interoperable reconnaissance aircraft, and the decisions that led to its demise. Copies can be ordered through the AIAA website: <https://arc.aiaa.org/doi/book/10.2514/4.106255>

Prepared by Frank Colucci and John Bulakowski with graphic art and layout by Jodi Buckley.



“For the first time anywhere, great numbers of lives were saved by helicopters during the war in Korea where thousands of lives were saved and hundreds of men rescued from behind enemy lines.”

Igor Sikorsky — *The Story of the Winged-S*

