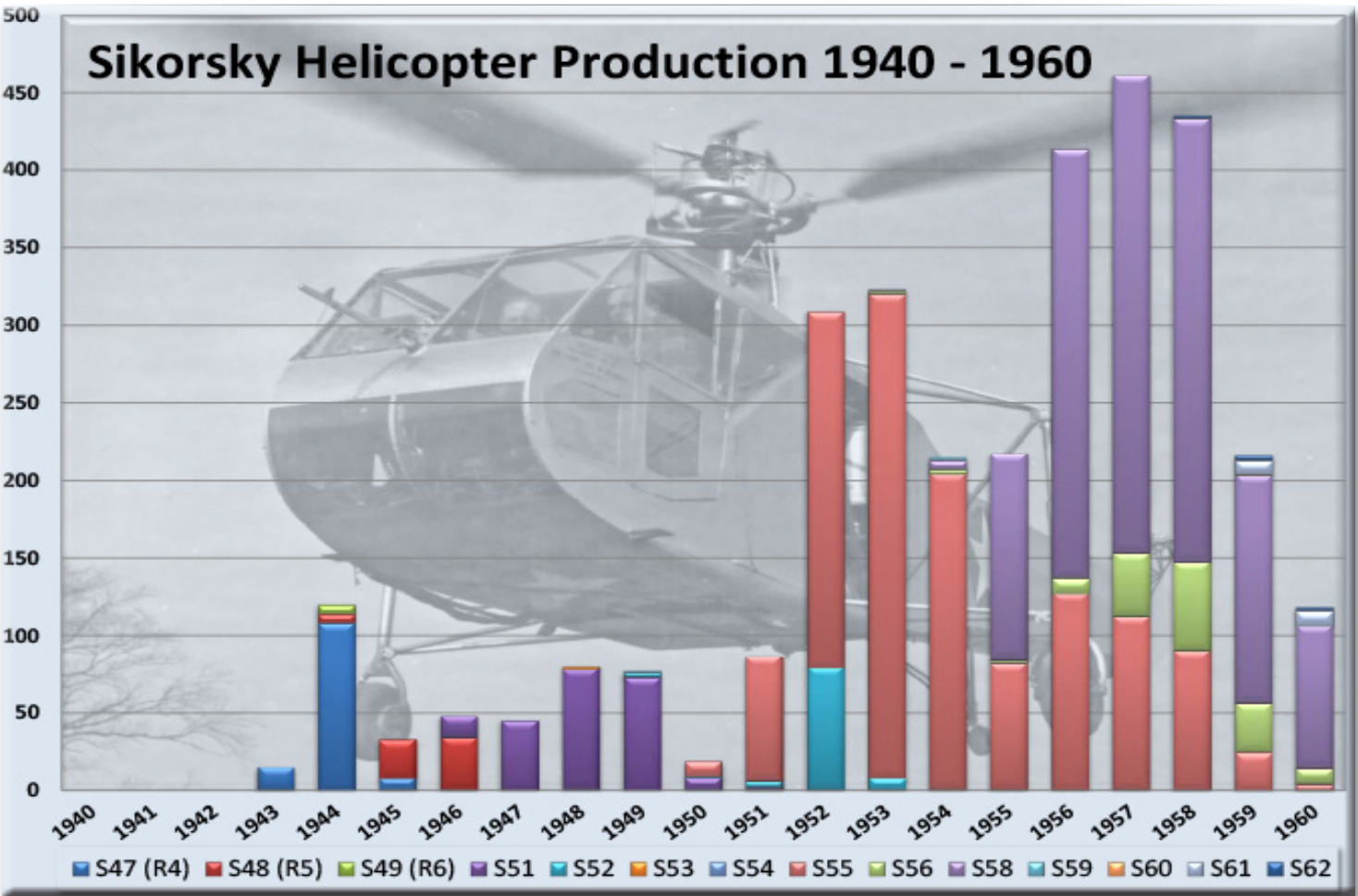




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Four Score at Sikorsky — Part 1: 1940 to 1960



In its first 20 years of helicopter production, Sikorsky Aircraft delivered more than 3,200 helicopters.

When Igor Sikorsky flew the first public display in his VS-300 helicopter on May 20, 1940, he showed the world a truly practical means of controlled vertical flight. He also saved the company that bears his name and spurred an aviation revolution. Between 1940 and 1960, today's most common helicopter configuration – a single main lifting rotor and a tail anti-torque rotor – evolved from a shaky experiment to an enduring military and commercial success.

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Soon after the VS-300 (Sikorsky S-46) debut, TIME magazine reported, "After work, and on Sundays, Sikorsky and helpers had puttered for months over a strange, spindle-shanked machine in a corner of United Aircraft Corp.'s Vought-Sikorsky plant, across the road from the municipal airport at Bridgeport, Conn." The Vought-Sikorsky Division then under general manager Charles McCarthy was building the big, new VS-44 flying boat on South Main Street in Stratford. However, with the flying boat market in decline, the United Aircraft board had decided to consolidate Vought-Sikorsky within Chance Vought Aircraft as of April 1, 1939.

The United Aircraft plan was to taper-off Sikorsky commercial airplane manufacture and concentrate on naval aircraft. Igor Sikorsky convinced corporate vice president Eugene Wilson to fund development of the helicopter. The VS-300 demonstrator made its first tethered flight on September 14, 1939 and with months of testing and modification showed incremental progress. The November-December 1940 issue of the United Aircraft *Bee-Hive* magazine reported, "In its ability to hover, the machine represents fulfillment of the long-awaited dream of controlled flight at zero miles per hour."

The VS-300 had powerful implications for military and commercial aviation. The *Bee-Hive* cover picture showed three brand-new Vought-Sikorsky Kingfishers, observation-scout monoplanes to be equipped with floats and catapulted from Navy battleships and cruisers. Less than a decade later, the Navy would start to replace floatplanes with helicopters. Sikorsky helicopters would replace rescue seaplanes and amphibians in the Air Force and Coast Guard. They would give Army ground forces and Marine amphibious assaults new speed, reach, and agility. In successive generations, Sikorsky helicopters would bring airmail and airlines to communities without runways, accelerate construction in remote locations, and build new businesses.

Formative Forties

The VS-300 as flown in May 1940 had three tail rotors – one vertical to counter torque and two horizontal to control pitch and roll. That July, US Army Captain Frank Gregory flew the one-of-a-kind demonstrator after only a few minutes' instruction. His technical evaluation led the Army Air Corps to award a \$50,000 contract to build the Vought Sikorsky VS-316 (Sikorsky S-46 or Army XR-4) as an alternative to the troubled Platt-LePage XR-1 with its big outrigger rotors. Gregory was the Project Officer for the Army Air Corps Helicopter Program and urged Igor Sikorsky to restore the single tail rotor on his evolving testbed. The VS-300A flew in its definitive configuration on Dec 8, 1941, the day after Japan attacked Pearl Harbor.

The Vought-Sikorsky Division of United Aircraft Corporation officially launched its War Production Drive in April 1942 "to increase and accelerate production and to bring home to labor and management alike the supreme importance of war production." The first employee slogan posted on Drive bulletin boards was **"Fighting words are not enough; Let's get on the job and produce the stuff."**

As the Stratford plant produced gull-winged Corsair fighters, the experimental XR-4 benefited from VS-300 flight testing. A compact, controllable helicopter with a single tail rotor could operate from ships and other confined areas.



Igor Sikorsky flew his first public helicopter demonstration in 1940 with the VS-300 configured with three tail rotors.

Vought-Sikorsky presented the Army with plans for “construction of a suitable factory space capable of handling the construction of 300 helicopters per year.” On June 26, 1942, Coast Guard Lt. Cmdr. Frank Erickson inspected the VS-300 and days later recommended helicopters to protect merchant convoys from submarines and rescue sailors from the sea. That July, the Navy Bureau of Aeronautics issued a Planning Directive covering procurement of four Sikorsky helicopters, a YR-4 and three XR-6s, for Navy and Coast Guard evaluation. In October, the XR-4 demonstrated the use of hydrophones to locate submarines.

With successful XR-4 tests at Wright Field in Ohio, Vought-Sikorsky received an Army contract for 15 YR-4A helicopters on December 21, 1942. A contract supplement soon added 14 more helicopters. In early 1943, Sikorsky Aircraft separated from Vought. The company moved to a renovated and expanded facility on South Avenue in Bridgeport and began helicopter production.

In open-sea trials, British and American pilots flew the S-47 (YR-4B) from merchant ships. Bernard Whelan became general manager of United Aircraft’s dedicated Sikorsky Aircraft Division in October 1943.

One YR-4 made the first helicopter combat rescue on April 25, 1944 shuttling a US Army pilot and three injured British soldiers away from contested territory in Burma. Another Army helicopter successfully evacuated a wounded soldier in Burma in January 1945, but the mountain rescue underscored the performance limitations of the R-4 at high density-altitudes. The more powerful



The XR-4 demonstrated ship operations aboard the British freighter MV Daghestan in November 1943. Production R-4s flew from the ship in the Atlantic in 1944.

Sikorsky S-48 (Army R-5) in production through 1945 and 1946 became the first helicopter used by the Army Air Forces Air Rescue Service.

The R-5 also provided the basis for the commercial Model S-51. The S-51 first flew on February 16, 1946, and was certified a month later by the Civil Aeronautics Authority. In 1947, Los Angeles Airways initiated the world’s first scheduled helicopter airmail service with five S-51’s connecting Los Angeles International Airport with pickup



Bridgeport produced 65 S-48 (R-5) helicopters from August 1944 to October 1946. The R-5D with rescue hoist and auxiliary fuel was the first helicopter of the USAAF/USAF Air Rescue Service.



Sikorsky helicopters evolved through the S-47, -48, and -49 (Military R-4, -5, and -6) design series, here in a simultaneous flight display at Bridgeport.



Production of the S-48 (Army R-5) at Bridgeport was cut-short by the end of the Second World War, but the design evolved into the successful military and commercial S-51.

points in a 50-mile radius. The mail routes would provide the template for helicopter passenger services.

The start of the Cold War in 1947 drove development of more capable military helicopters. The US Air Force became an independent service that



Igor Sikorsky and Army Colonel Frank Gregory pose with an S-49 (R-6) helicopter. The Army directed wartime production of the R-6 be licensed to Nash-Kelvinator.

year and supplemented the S-48 (Air Force H-5D) with S-51s (H-5Fs) in the Air Rescue Service. In July 1947, the Chief of Naval Operations issued a requirement for a helicopter to transport assault troops with combat equipment and supplies from escort carriers to shore. The US Marine Corps used S-51 (HO3S-1) light observation helicopters to first demonstrate the concept in 1948.



The S-51 was civil-certified in 1946 and flew an airmail demonstration at Bridgeport that year. Airmail service in Los Angeles and elsewhere provided route structures for helicopter passenger service.

The December 9, 1949 issue of *Sikorsky News* featured the new 12-seat S-55 and declared, "The sleek, silver-painted helicopter, carrying an H-19 Air Force designation, made seven flights during the demonstration, and proved itself capable of taking its place in the air-world's passenger and cargo picture."

Fifties Families

Bridgeport delivered the first production H-19A to the Air Force in April 1950, and the Navy placed its first order for the S-55 (Navy HO4S-1) soon after to evaluate the helicopter in antisubmarine warfare (ASW). With the start of the Korean War in June 1950, the big-cabin helicopter found missions with all the US armed services. The Marines deployed S-55s (HRS-1s) to Korea in January 1951 with Medium Helicopter Squadron HMR-161. In their first mass troop movement, the helicopters turned

a nine-hour road march into an eight-minute airlift. The Air Force sent two prototype YH-19s with an Air Proving Ground team to the combat theater in March 1951 to recover downed pilots, and production H-19s replaced H-5s in rescue squadrons over the course of the war.

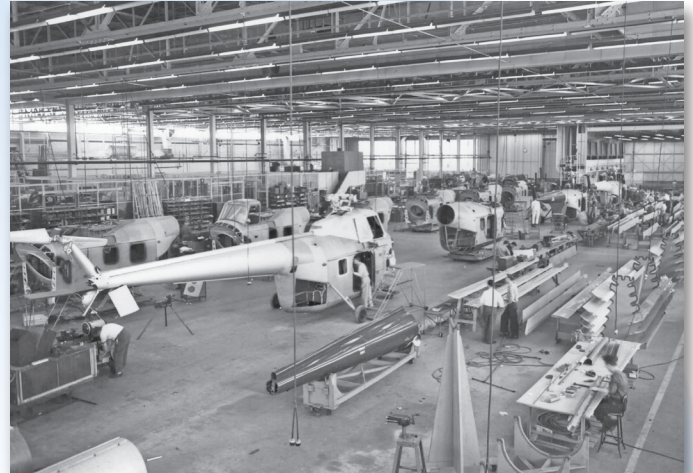
The last of more than 200 S-51s came off the Bridgeport line in March 1951 for the Royal Australian Air Force, and by the end of the year, the Sikorsky factory was busy with both the three/four passenger S-52 (Marine HO5S-1) and the 10-passenger S-55. The Navy established its first helicopter antisubmarine squadron, HS-1, on October 3, 1951 with S-55s playing "hunter" and "killer." Bridgeport delivered 10 S-55s in 1950, 80 in 1951, 230 in 1952, and 312 at peak production in 1953.

The versatile S-55 drew more customers. US Army deployment of H-19Cs to Korea was delayed by inter-service conflict until January 1953, but by the armistice that July, the 6th Transportation Company (Helicopter) had airlifted five million pounds of supplies, 500 troops, and 1,400 sick and wounded. The Coast Guard received its first HO4S-2Gs in November 1951. Four years later, one of the helicopters drew national attention when it rescued 138 California flood victims in 29 continuous operating hours. The story helped make the helicopter the primary air rescue platform of the seaplane-centric Coast Guard.

Sikorsky realized commercial sales for the S-55 early in production. Los Angeles Airways ordered the first two civil S-55As in 1951 to begin airmail runs between Los Angeles and San Bernardino. The FAA certified the helicopter in March 1952. Belgian national airline SABENA launched the first international helicopter service on September 1, 1953. Los Angeles Airways, National Airlines, and Mohawk Airlines all started scheduled passenger services in 1954. Chicago Helicopter Airways followed suit in November 1956.

The UK Royal Navy formed 706 Squadron for anti-submarine warfare with Bridgeport-built S-55s in 1953, and Westland Helicopters be-

gan license production of the British Whirlwind soon after. License manufacture of the S-55 in France was begun by the Societe Nationale de Construction Aronautiques Sud Est (SNCASE) in 1952. Mitsubishi in Japan started S-55 production in 1958.



The 12-seat S-55 entered production for the U.S. Air Force in 1949 and went on to equip all the US services, civil airlines, and international military operators.

Sikorsky had won a contract for the big, powerful S-56 (the Marine Corps HR2S-1) in May 1951 and flew the prototype XHR2S-1 at Bridgeport on December 18, 1953. The big, twin-engine helicopter quickly drew Army interest and orders. With the heavy lift helicopter still in development, the Marines and Army both ordered versions of the new Navy Seabat (Sikorsky S-58, Navy HSS-1, Marine HUS, Army CH-34). Demand for military and civil S-55s meanwhile continued. The December 23, 1954 issue of *Sikorsky News* showed an aerial view of the new factory campus being built on North Main Street in Stratford to produce the S-56, S-55, and S-58.

Navy Helicopter Antisubmarine Squadron HS-3 was the first to receive powerful new HSS-1 subhunter in 1955. The first Army S-58s (CH-34s) arrived at Fort Sill, Oklahoma the same year, and the Department of Defense released S-58 data for commercial sales. S-58s joined SABENA and other operators in airline service. By 1956, New York Airways S-58s were carrying 60,000 passengers a year. Automatic Stabilization Equip-

ment (ASE) introduced by the Navy for hands-off night hover was certified for commercial S-58s by the Civil Aeronautics Administration. ASE also helped fly the President of the United States. The Army stood up its Presidential helicopter detachment in the fall of 1957 with four VCH-34s at Fort Belvoir, Virginia. Marine experimental squadron HMX-1 meanwhile received five similar HUS-1Zs for a Presidential Flight Detachment at Quantico.



In 1953, the S-58 (CH-34 Choctaw) gave the US Army a transport helicopter powerful enough to recover downed aircraft. The S-58 went on to global military and commercial service and international production.

S-58 production peaked at 308 helicopters delivered in 1957. The 1,000th S-58, an HSS-1N, was built in the Bridgeport plant and turned over to the US Navy in November 1958. License production by Westland in the UK, Fiat in Italy, and Sud Aviation in France put more of the big helicopters in service around the world.

Turbine Revolution

The S-56 that joined Army Transportation Companies as the CH-37A Mojave in 1956 could carry 6,000 pounds of cargo, a Jeep with towed howitzer and gun crew, or 23 fully-equipped troops. With the record-setting HR2S-1, the Marines could airlift two combat assault squads, radio jeeps, or 5-ton sling loads from ships to shore.

The experimental S-59 (Army XH-39) set speed- and altitude records in 1954 with turboshaft power. Two S-58s (Navy HSS-1Fs) started turboshaft test flights in 1957, and compact turboshafts with their high power-to-weight ratios and reduced vibration promised to increase helicopter payloads and remedy traditional helicopter drawbacks.



The 100th S-56 (a Marine HR2S) is celebrated August 28, 1958 by factory manager Alex Sperber, engineering manager Michael Gluhareff, general manager Lee Johnson, and Air Force Lt. Col. Charles Wilkins.

Igor Sikorsky announced his retirement in May 1957 but kept working in his Stratford office as an honored consultant. Long-serving general manager Bernard Whelan rose to vice president of United Aircraft that year, and Lee S. Johnson became Sikorsky general manager during a decade of turbine helicopter innovations. In an article for *Sikorsky News* Johnson noted, “While there is still some controversy among certain helicopter manufacturers and operators over the relative merits of the single main rotor versus twin main rotor design, it is interesting to note that the advocates of the twin rotor principle are fast becoming the minority. Sikorsky engineers’ unswerving conviction of the merits of single-rotor designs has been supported by the apparent trend toward that configuration by manufacturers both here and abroad.”

In December 1957, Sikorsky Aircraft announced development of the S-62 with S-55 dynamics driven by a single gas turbine engine. The boat-hulled helicopter flew on May 14, 1958 went into production for the Coast Guard as the HH-52.



The turbine-engined, boat-hulled S-62 demonstrated water operations in 1958 and went on to production for the Coast Guard as the HH-52A Seaguard.

Sikorsky flew the twin-turbine S-61 (Navy HSS 2) Sea King on March 11, 1959 with test pilots Robert Decker and Francis 'Yip' Yirrell. To support Sea King development, the company built at Stratford what was then the world's largest rotor test stand. The YHSS-2 prototype spawned a series of Sea King developments including shipboard sub-hunters, air-refuelable rescue helicopters, and land-based airliners that would continue in production at Stratford through 1978.



The S-61 mock-up at Bridgeport showed the twin turbine engines, boat hull, and five-bladed rotor system that would distinguish the record-breaking HSS-2 Sea King.



The S-61 Sea King flew in 1959 went into production at Stratford for the US Navy and spawned a series of derivatives for the US services, international civil and military

Igor Sikorsky had long forecast the value of a flying crane helicopter optimized for heavy external loads. In 1960, the Army began acquisition of a twin-turbine crane leveraging the production S-56 and the experimental S-60 Skycrane. The resulting S-64 (CH-54 Tarhe) remains in production with Erickson Aircraft today and is one candidate for Sikorsky autonomous flight technology.



The S-60 flying crane demonstrator first flew on March 25, 1959 with the rotor system and engines of the S-56 and provided the basis for the turbine-engined S-64 Skycrane.

In 20 eventful years, Sikorsky Aircraft delivered over 3,200 helicopters ranging from the exploratory VS-300 to the sophisticated Sea King and brought the power of vertical lift to users around the world.

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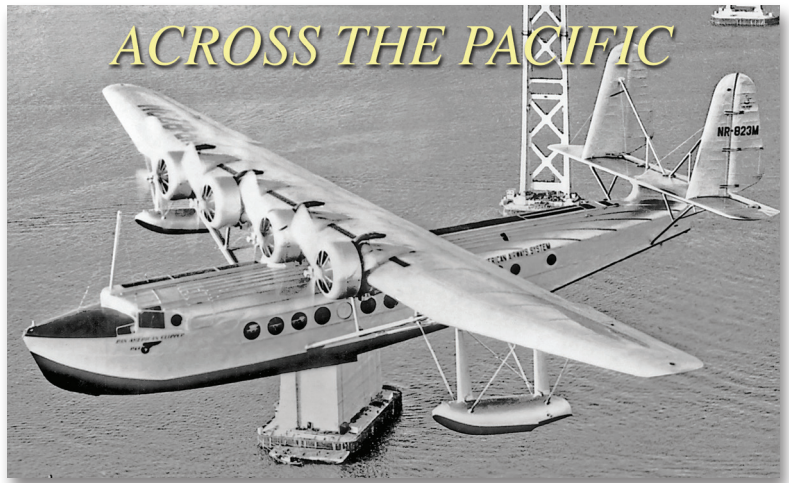
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“Across The Pacific”, a PBS show, documents Igor Sikorsky’s contribution to the development of air routes to Central and South America and across the Pacific with Pan American Airlines. It features the Sikorsky S-38, S-40 and S-42 as well as the Martin M-130. The Archives is recognized in the closing credits along with a special thank you to Dan Libertino. This three part series can be seen on:

<http://pbs.org/video/across-the-pacific-airborne-8ms7qa/>

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



“The end of the VS-300’s historic career marked the start of the helicopter saga. The XR-4 became the R-4, the “world’s first production helicopter” and the only helicopter to serve in World War II. From these beginnings sprang the helicopter industry.”

Igor Sikorsky—His Three Careers in Aviation— Frank J. Delear



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