

Air and Space this Week

Item of the Week

IGOR AND THE HOVERFLY

Originally appeared April 22, 2024

KEY WORDS: Igor Sikorsky YR-4 Hoverfly Helicopter Burma Carter Harman

*Igor Sikorsky was a Russia-born aviation pioneer of considerable success. His accomplishments include the design and construction of several WWI-era aircraft and the famed Pan Am “Clipper ships” that plied the Atlantic and the Pacific in the inter-War years. He was also interested in vertical flight, and developed the first practical helicopter. One of his designs was the YR-4 “Hoverfly,” one of which made the first rescue extractions under combat conditions, **eighty years ago this week.***

IGOR SIKORSKY

Igor Sikorsky was born in Kyiv, then in the Russian Empire, on May 25, 1889. His father was a professor of psychology and his mother, a physician, took time off to raise young Igor. She imbued within him a love for art, especially that of da Vinci, and in the works of Jules Verne. A trip with his father to Germany in 1900 sparked his interest in natural sciences, including flight. When he returned home, he began building and playing with model flying machines, including a rubber band-powered device that flew vertically, not horizontally.

Igor enrolled in the St. Petersburg Maritime Cadet Corps in 1903; he was 14 at the time. He did well there, but soon realized that the sea was not his future, engineering was, and adjusted his educational path accordingly. Another father-led trip to Germany, in 1908, exposed him to the successes of the Wright brothers and Ferdinand von Zeppelin’s airships. He was smitten immediately. In the years immediately following, he began researching aeronautics and building airplanes.

Sikorsky’s first designs were so underpowered that they could not even lift their own weight. Undaunted, he kept making improvements. In 1912, he became the Chief Engineer at the Russian Baltic Railroad Car Works, where, in spite of his outfit’s name, worked on airplane development. He built the first four-cylinder aircraft engine, and his research culminated with the S-22 commercial “Ilya Muromets” airliner, named not for a Man from U.N.C.L.E., but rather a [Slavic folklore hero](#). Sikorsky militarized the S-22 design when WWI came, turning it into an effective bomber.

In spite of creating a four-engine bomber for use in WWI, the Russian Revolution caused him to flee his homeland and move to France, where he continued to design and build progressively

more-capable airplanes. After the War, funding for military-type planes waned, and Sikorsky decided to go to the United States in 1919.

Sikorsky began adapting to his new home, aided in no small part by several former Russian military officers and other ex-pats, including composer Sergei Rachmaninoff. Their support, and financing, allowed Igor to create the Sikorsky Manufacturing Company in 1923. His next aircraft, S-29, was one of the first twin-engine airplane built in the U.S. It was slower than some WWI-era aircraft, but could carry 14 passengers at a speed of 115 MPH.

Sikorsky became a U.S. citizen in 1928, and he continued to develop additional aircraft models. His S-42 design was particularly successful as the famed [“Clipper” flying boats](#) used for (at first) trans-Atlantic flights by Pan Am, then their trans-Pacific flights. But Igor never lost interest in the idea of vertical flight.

THE HELICOPTER CONCEPT

Airplanes can fly because the shape of their wing (airfoil) creates lift, *if* the wing’s forward speed is great enough. Another constraint in single engine aircraft is the tendency for the airframe to “counter rotate,” because the engine wants to spin both the propellor and itself in opposite directions. This propellor effect makes it easier to turn a single-engine in the opposite direction of propellor rotation and harder to turn in the same direction as the propellor is turning, but the air flow over wings, tail, and rudder act to keep the airframe going straight. One thing to know about propellers is that they, too, have the shape of an airfoil, the same as the wing. Simple flat-bladed fans are not enough to provide forward propulsion efficiently, so the propellor is in effect a rotary wing, pulling the aircraft forward.

If wind speed over an airfoil can create enough lifting force to fly, how could any aircraft be designed to produce the necessary lift without having to be going forward fast? Vertical flight had stimulated creative imaginations since the time of da Vinci. Sikorsky’s solution was to use a rotating wing, not as a propellor for going forward, but spinning above the airframe around the aircraft’s yaw axis. Mounting the propellor (rotor) that way would allow it to be much larger, since it would be spinning parallel to the ground, generating enough lift to fly, with no forward speed required.

Prop torque was a problem to be overcome for vertical flight, too; the helicopter airframe tries to spin in the opposite direction of the lifting rotor. The solution is to mount a smaller propellor on the tail, with its axis of rotation horizontal so as to provide a thrust that would counter the tendency to counter-rotate. Slight variation in the tail thrust would allow the pilot to have directional control, adjusting the pitch of the rotor blades and the tilt of the rotor would provide directional control in all directions, even backwards.

THE SIKORSKY R-4 HOVERFLY

Igor Sikorsky filed a patent application (#1848389) for what he called a “direct lift” amphibious aircraft on February 14, 1929. It used compressed air to power a lifting propellor and two

smaller propellers for horizontal thrust. Another patent followed (#1994488) on March 18, 1935. Neither was particularly practical, but Sikorsky kept making improvements, and began partnering with the Vought company. The result was the Vought-Sikorsky VS-300 helicopter, which made its first tethered test flight, unmanned, on September 14, 1935. Considerable work was needed to provide adequate pilot flight control, and the first free flight of the VS-300 was made on May 24, 1940.

Sikorsky learned a lot from the flight tests of the VS-300, which led him to develop the VS-316, a two-seat helicopter with a three-bladed main rotor and radial engine. It was too small for combat operations, but the military immediately saw its advantages in low-level reconnaissance and battle support. Redesignated the YR-4A and nicknamed "Hoverfly," it was ready in late 1942 for purchase by the U.S. Army Air Force, the U.S. Navy, the U.S. Coast Guard, and the U.K.'s Royal Air Force and Royal Navy. It had a ceiling of 12,000 feet and could fly at 90 MPH. It would be a nice complement to the [Army's Stinson L-1 Vigilant light aircraft](#) in military support operations. An improved version, the YR-4B, had a bigger engine and could carry more (still not much), but was a bit slower; its range was on the order of 120 miles.

FIRST COMBAT RESCUE(S)

Allied leaders held a number of "summit" conferences during WWII to establish policy and coordinate operations. One of the first was held in Quebec in 1943. The agenda included discussion and potential plans to support the activities of British Special Forces' Major General Orde Wingate, whose "[Chindits](#)" were fighting behind enemy lines against the Japanese in Burma. Air power would be very useful for the fast-moving Chindits, and the Americans agreed to provide the necessary forces to capture, build, and hold airfields in isolated clearings in the northern Burma jungle, a plan (eventually) called "Project 9." The Americans had just created an elite force, the 1st Air Commando Group, and they got the call, led by LtCol Philip Cochrane and LtCol John Alison. Cochran came to the duty from service in North Africa, and Alison had been a P-40 Ace in China.

Remember the "comic" strip, *Terry and the Pirates*? It was written for years by Milton Caniff, who was a close friend of Cochrane; in fact, Cochrane was the role model for the flight instructor, Flip Corkin, in the strip! Tough guys, both. Cochrane and Alison recognized the potential benefits of having helicopters in their Group, and went to great lengths to get their superiors to include six YR-4Bs in their allocation of assets.

Military use of the YR-4 put an upper limit of 150 pounds on the weight of the pilot. A service-wide call went out for pilots meeting the weight limit. One was 2Lt Carter Harman, who was then serving as a flight instructor at Perrin AFB in Texas while waiting to be shipped overseas. Harman had heard of the new-fangled helicopters, and knew it might be unwise to volunteer while in the Army or AAF, but he wanted to jump-start his military aviation service, so he volunteered. He was sent to the Sikorsky manufacturing plant in Bridgeport, Connecticut, for flight training on the YR-4. Harman must have been an interesting fellow. He was a graduate of Princeton, and an aspiring musician/composer.

His first helicopter flight, as a passenger, amazed Harman. He was impressed by its vertical take-off, and got a bit nervous as their forward air speed dropped as the pilot approached hover prior to landing. He quickly found out about the level of control required to properly fly the Hoverfly, soloing after 2.5 hours of piloting with an instructor aboard. After 20 hours of solo training, 2Lt Harman was off to Burma, with three other new helicopter pilots and six dismantled YR-4Bs, all aboard six [C-46 cargo planes](#). The series of flights to India took weeks, and one of the C-46s and its YR-4 were destroyed in a crash. Another YR-4B was found to be missing its tail rotor, and could not be used (except for spare parts). The remaining C-46s arrived five days after a fleet of C-47s, many towing gliders, had taken commandos into Burma to launch Project 9. Last-minute reconnaissance showed that the Japanese had laid strings of logs across one of the planned landing sites, so all of the gliders were diverted to the other planned landing zone, code-named "Broadway." They delivered 539 soldiers and 15 tons of supplies, including bulldozers, mules, ammo, and other materiel. Broadway proved to be ideal for the rapid construction of a rudimentary airfield, and soon B-25 medium bombers, P-51 Mustang fighters, and a few Stinson L-1 Vigilant service aircraft began using it to support the Chindits.

Back at their base, the helicopters were being re-assembled and flight tested for use at Broadway. The hot weather in Burma was found to adversely affect engine power and could even cause them to overheat and shut down. They found that the only way they could get their loaded Hoverfly off the ground was a technique they called a "jump start," which required red-lining their engine, then popping the clutch on the rotor, causing the Hoverfly to pop up a few tens of feet and allowing the pilot to start forward flight, which helped cool the straining engine.

One of the YR-4Bs hit a power line and crashed, killing on pilot and seriously hurting another. The helicopter pilots were also flying fixed-wing missions, and the third helicopter pilot was WIA on one of them. Now only 2Lt Harman remained of the original four, at least until the injured pilot recovered.

The India base was about 200 miles from Broadway, all over Japanese-held terrain, and the range of the YH-4B was only about 120 miles, under ideal conditions, something Burma did not have. Harman did have a possible alternative route, involving flying 600 miles and several refueling stops to an Allied airstrip at a place called Taro, in northern Burma, then another 250 miles with fueling stops to Aberdeen, another code-named Burmese clearing with a rudimentary base. These formidable logistical requirements kept the Hoverflies at Broadway, until...

April 21, 1944, eighty years ago last Sunday, a brave pilot named Ed Hladovcak (called "Murphy" by his fellow airmen who couldn't pronounce his name correctly) was flying one of the Stinsons to evacuate two wounded Chindits and another down with serious malaria. The Stinson's ability to carry three passengers or the equivalent weight in supplies, made it the go-to general purpose support aircraft to support Chindit operations. It didn't require a long strip for take-offs and landings, so most of the Project 9 rudimentary bases could handle it. Extractions were dangerous missions, and the Stinsons had no weapons or armor. Murphy got

the call to fly the soldiers out of the combat zone, taking ground fire after picking up the men. A bullet clipped his fuel line, forcing him to land while he had enough fuel for control. He espied a small clearing, just barely big enough for a pancake landing but not big enough to have another Stinson come out and pick them up.

The men struggled out into the jungle to get away from the airplane and any Japanese in the area, and laid out a parachute as a distress signal. An Allied pilot saw the signal and reported their position to base. The downed plane was surrounded by many Japanese soldiers, so a ground-based rescue was not feasible. No airplane could get them to safety. I think you see where this is going.

Lt. Harman was grounded with a head cold, hanging around the base, when the call came for him to rescue Murphy and company. He immediately mounted up and headed out on the round-about route to Broadway via Taro. His Hoverfly was prepped for his rescue mission, with a stretcher strapped to one of its skids and extra cans of gasoline in the cockpit. At Taro, the local mechanics jury-rigged an additional fuel tank for Harman's helicopter, using one from a downed Stinson. The hot weather restricted the payload Harman could carry – he would have to make four trips, each one a round-trip of 80 miles! He finally made it to Broadway on April 24.

The men to be extracted had received dropped messages saying first that help was on the way, and then another telling them to find a small clearing next to the ridge and stand-by. The Stinson pilots knew of a riverside sand bar on which two aircraft and a helicopter could land. Harmon met them there and the Stinsons led him to the location of Murphy and the soldiers. He landed, and Murphy came out of the jungle carrying one of the wounded men, who had a serious back injury. They gently placed him in the external stretcher, and Harman used his skills in "pop up" starts to lift cleanly out of the clearing. Forty miles of flying later, he landed on the sand bar by the Stinsons and transferred his passenger to one of them for the final trip to Broadway and medical help.

Harman immediately refueled and flew back to the little clearing, picked up the other WIA soldier, and brought him to the sand bar. Two trips down, but the overheated Hoverfly engine refused to start. It was getting late in the day, so flight operations were shut down. Murphy and the malaria case would have to spend another night in the jungle, and the Japanese were getting wise to what was going on. Japanese patrols were out that night, and more than one passed too close for comfort.

It rained that night out on the sand bar, welcome because it lowered the temperature somewhat. The Hoverfly's engine started right up, and 2Lt Harman was on his way to pick up the third soldier. Harman got him out to the sand bar OK, refueled, and went out to pick up Murphy successfully. Mission accomplished: Four men rescued and all survived.

Harman then served at Aberdeen base for a while and made several less-dangerous extractions. He was then ordered to fly back to the base in India, then ferry the other YR-4Bs back, too. The presence of his helicopter at the various refueling stops along the way attracted a lot of curious attention from the locals! After that, Harman joined a fixed-wing support unit at Asansol,

northwest of Calcutta. He checked out a few pilots on the YR-B4 while there, but his helicoptering days were over!

AFTERMATHS

Igor Sikorsky received numerous honors and awards in the late stages of his career, including induction into the [International Air & Space Hall of Fame](#) in 1966 (his fellow inductees that year included Jimmy Doolittle, Robert Goddard, Eddie Rickenbacker, and Chuck Yeager), and both the National Inventors Hall of Fame and the junior Achievement U.S. Business Hall of Fame in 1987. The Sikorsky Memorial Bridge in Connecticut, and a street in his hometown of Kyiv that is the location of the U.S. Embassy in Ukraine were (re)named in his honor. The National Technical University of Ukraine was renamed the “Igor Sikorsky Kyiv Polytechnic Institute” in 2016. On March 22, 2018, the Kyiv City Council renamed Kyiv International Airport to “Igor Sikorsky Kyiv International Airport Zhuliany.” Interestingly, in 2012 a Russian Tu-160 strategic bomber was also named for him, because of his record of creating Russia’s first heavy bomber. Igor Sikorsky passed away on Easton, Connecticut on October 27, 1972.

Sikorsky Aero Engineering Corporation was founded by Igor in 1923. Its name was changed to Sikorsky Manufacturing Company in 1925, and to Sikorsky Aviation Corporation in 1929, when it moved to Stratford, Connecticut, and was acquired by the United Aircraft and Transport Corporation (UTAC), now called United Technologies Corporation (UTC). In the late 1930s, UTAC merged its Sikorsky division with its Vought Aircraft division. Sikorsky Aircraft remains a builder of large helicopters, including the UH-60 Blackhawk and SH-60 Seahawk, and the Presidential helicopter. In 2004, UTC acquired [Schweizer Aircraft](#), once based in Horseheads, New York, a few miles from where I grew up, and made it a subsidiary of Sikorsky; Schweizer was originally a manufacturer of sailplanes (nearby Harris Hill is the site of the [National Soaring Museum](#)), and they now also make small helicopters, UAVs, and light aircraft. Lockheed Martin purchased Sikorsky from UTC on November 6, 2015. For a review of the history of Sikorsky Aircraft, see [here](#).

NOTE: The National Soaring Museum is seeking an Executive Director! For details, see: https://www.soaringmuseum.org/pdf/Executive_Director_Position_Description_2023.pdf. I can personally attest that the southern Finger Lakes region is a great place to live!

Military Helicopters: Sikorsky continued to build progressively-advanced helicopters after WWII, as related in a [previous Item of the Week](#). One of them was a Sikorsky HH-3E (a model named the “Jolly Green Giant” because of its size, color, and shape). This particular helicopter was one of a pair of helicopters that made the first trans-Atlantic flight, then it was also part of Operation Kingpin in Viet Nam, an attempted rescue mission of American POWs at a place called Son Tay. The same man piloted that particular HH-3E on both missions! Another important military helicopter, used in Viet Nam and elsewhere, is the Bell UH-1 Iroquois, aka the famous “Huey,” made numerous medivac missions and was also the subject of a previous [Item of the Week](#). Today, a variety of helicopter models serve a variety of roles in U.S. military

operations, and on the civilian side of things, the Coast Guard uses them in a variety of roles, including rescuing sailors from distress (don't you watch *Deadliest Catch*?).

The **1st Air Commando Group** was established on March 25, 1944, and activated in India on March 29. "The organization consisted of a headquarters plus the following sections: bomber (equipped with B-25's); fighter (P-51's); light-plane (L-1's, L-5's, and helicopters); transport (C-47's); glider (CG-4A's and TG-5's); and light-cargo (UC-64's). The group supported operations in Burma by landing and dropping troops, food, and equipment; evacuating casualties; and attacking airfields and transportation facilities. Received a DUC for operations against the enemy, Mar-May 1944" (quote from [here](#)). It was withdrawn from the front late in May 1944, reorganized, and was eventually disbanded on October 8, 1948. The Air Commando legacy was revived during the near-war with the USSR in the early 1960s; see [here](#).

Col Philip G. Cochran survived the War after his experiences first in North Africa and then commanding the 1st Air Commando Group. He directed the aerial scenes in the 1957 John Wayne/Janet Leigh Cold War movie, *Jet Pilot*, produced by Howard Hughes. He went into business with his brother, Lyons Transportation Lines, and proposed (unsuccessfully) to actress Betty White. He passed away while hunting in Geneseo, New York, in 1979. More from Wikipedia: https://en.wikipedia.org/wiki/Philip_Cochran.

Col John R. Alison had been the squadron commander of the 75th Fighter Squadron in the China-Burma-India Theater, part of the 23rd Fighter Group, the successors to the American Volunteer Group, the "Flying Tigers." He earned the DSC and a silver Star, and was an Ace with seven confirmed combat victories, prior to moving over to the 1st Air Commando Group. After the War, he served in many important capacities, including Assistant Secretary of Commerce, President of the Air Force Association, and Vice-President of the Northrop Corporation. He was a Major General in the Air Force Reserve, a member of the Air Commando Hall of Fame, an honorary member of the U.S. Army Ranger Hall of Fame, and was inducted into the National Aviation Hall of Fame in 2005. He passed away on June 6, 2011, and was buried at Arlington. More at Wikipedia: https://en.wikipedia.org/wiki/John_R._Alison.

TSgt Ed "Murphy" Hladovcak became a civilian flight instructor after the War, and became a licensed helicopter pilot himself. He operated the Antelope Flying Service and was involved in airport operations. He passed away in 1992. More about him: <https://www.thisdayinaviation.com/21-april-1944>.

2Lt Carter Harman was discharged from service in August, 1945, with the rank of Captain. He then fulfilled his pre-War musical ambitions, in spades. He became a music reporter for the *New York Times*, a music editor at *Time Magazine*, and wrote a popular history of music. He composed original music and founded a recording company. He passed away in 2007, and his *NYT* obituary waxed eloquent about the breadth of his musical interests and authorship of a children's book about skyscrapers. Like so many WWII heroes such as Jackie Coogan (see below), [Eddie Albert](#), and [Russell Johnson](#), he did not play on this wartime exploits in

subsequent civilian life; *his brave Burma rescues weren't even mentioned in the NWT obit!* For more about Captain Harman, see: <https://www.historynet.com/first-helicopter-rescue-mission-in-wwii>.

DIDJA KNOW?

The capture of open areas in the Burmese jungle was made possible by paratroops and also soldiers and materiel brought in by one-way gliders. One of the officers in the glider group was Jackie Coogan, a former child-star who had acted with Charlie Chaplin in the early 1920s. He made a boatload of money in the 1930s and was very well-known and popular. He was in a serious car accident that killed his father. His mother re-married, and she and her new husband took Jackie's money; as a minor he had no legal recourse. He made out OK, though, because he married actress Betty Grable in 1937. They acted together in [*College Swing*](#), a 1938 musical comedy that also starred George Burns, Gracie Allen, Martha Raye, Edward Everett Horton (who later voiced "Fractured Fairy Tales" on the *Rocky and Bulwinkle Show*), and Bob Hope. The marriage didn't last, alas, but California passed a law called the Coogan Act in 1939 that protected the earnings of future child stars from parental depredation. Jackie had earned a pilot's license, and was a life-long American patriot, so after Pearl Harbor, he signed up for the USAAF, and was assigned to the glider corps and sent to Burma, very tough duty. And can you imagine seeing pin-ups of your ex- hanging on the walls of your barracks? Or fielding the questions his buddies would no-doubt be asking? After the War, he returned to Hollywood, but could only get small roles in beach blanket movies and their ilk. He never used his heroic War record, or his role in bond sales promotion late in the War, to his post-War advantage. He finally hit stardom again in the 1960s, and most Boomer-age folks remember him as [this guy!](#)

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YR-4 Hoverfly

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National Museum of the USAF: <https://www.nationalmuseum.af.mil/Visit/Museum-Exhibits/Fact-Sheets/Display/Article/195868/sikorsky-r-4b-hoverfly>

The Smithsonian National Air and Space Museum has a slightly more advanced version, a Vought-Sikorsky XR-4C: https://airandspace.si.edu/collection-objects/vought-sikorsky-xr-4c/nasm_A19600307000

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First Helicopter Extraction

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Last Edited on 21 April 2024

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