

In the movie, "Where Eagles Dare," the German army was using a helicopter to deliver an important person to the confined area of a courtyard at an Alpine prison. However, Hollywood took liberties in this scene by using a Bell Model 47 with a Igor Sikorsky style tail rotor. The Germans did have practical helicopters in World War II but none that had the single Sikorsky type anti-rotation tail rotor. German helicopters of that era fell into four main design categories. The auto-gyro that had no main rotor power in flight, the contra rotating rotors on arms on either side of the fuselage, the twin synchronized contra rotating blades on top of the fuselage cockpit, and rotor tip motor designs that appeared late in the war. This discussion will start with the auto-gyro type of helicopter which was the oldest design.

Auto-Gyro aircraft were first proposed by the Spaniard, Juan de la Cierva, who was trying to make an aircraft that could safely land if it had an engine failure. In his earliest designs, the main rotor was not powered in flight and it was originally only proposed for autorotation type landings. After crashing his first five or six models, he was able to prove the concept of autorotation in January of 1920 when his model C4 suffered an engine failure but landed safely. De la Cierva always used airplane bodies for his fuselages with the main rotor mounted above the cockpit. Because he had no power to the main rotor, he did not have to worry about counteracting main rotor torque. He did, however, have to worry about blade feathering, rotor tilting, and cyclic controls but he was the first to work out practical designs for these problems. Igor Sikorsky later used many of his rotor designs in the first American helicopter. By 1930, he had come up with his C30 design which was capable of powering the main rotor prior to takeoff in order to build up enough inertia that it would "jump" the aircraft into the air when the rotor was disengaged and then the aircraft motor would fly the wingless aircraft like a normal auto-gyro. De la Cierva licensed his C30 in Germany, France and the US and his work greatly influenced German aviation engineers. Several hundred of his autogyros were built before

de la Cierva was killed in a commercial airplane crash in 1936. A video of Juan de la Cierva's life may be found at <http://www.youtube.com/watch?v=PbalOh4smnM> .

In 1931, de la Cierva had licensed German production of his C30 autogyro to the Focke-Wulf company led by Heinnich Focke. After several months, Focke began a systematic engineering analysis of the autogyro as he was determined to develop improved designs. By 1934, Focke had built a twin rotor helicopter model powered by a two stroke engine. This model had counter rotating rotor blades on either side of an airplane body. Shortly after his model flew, Professor Focke was forced out of the Focke-Wulf company at the insistence of the Nazi party because the Professor did not want to turn his production facilities over to building Messerschmitt 109s and other military aircraft. However, the German Air Ministry was so impressed with Focke's flying helicopter model, they arranged for the Professor to partner with noted test pilot Gerd Achgelis in a new aviation company, Foche-Achgelis.

The German aeronautical engineer, Anton Flettner, had started his aviation career working for Graf Zeppelin and after WWI had designed fast sailing ships and rotary ventilators for various transportation vehicles. In 1936 he proposed a single rotor autogyro, labeled the FL184, that had cyclic pitch control. His first flying prototype caught fire in flight and the project was dropped. However, the German Navy was so impressed with his research that they asked Flettner to design an improved design. The new FL185 design had a non powered main rotor with two horizontal rotors on each side of the airplane style fuselage for furnishing power and for controlling torque created by the main rotor. The FL185 prototype may have flown in late 1936. Again, the German Navy asked the aviation community for improved autogyro designs. The new Foche-Achgelis, combining what Focke had learned building de la Cierva's C30 autogyro and his model helicopter, designed the motorless, single seat FA330 by 1942. This gyroglider, also known as a rotor kite, was designed to be stowed on a submarine which would then pull the craft on the end of a 500 foot cable. It

was estimated that the FA330, flying at 120 meters of altitude, would increase the observation range of a submarine from 5 nautical miles to 25 nautical miles. This craft was installed on at least three submarines that saw duty mainly in the South Atlantic and Indian Oceans. It was credited with the sinking of the Greek steamer Eithalia in August of 1943 with U-177. The allies obtained one FA330 when they captured U-852 intact in the Indian Ocean in May of 1944 (several of the crew were captured by the Somaliland Camel Corps). Because their small size made them easy to store, more of these craft survived the war than any other German helicopter. An excellent video showing one of these remaining FA330 craft may be found on the internet at "<http://video.xfree.hu/?n=nyiloszem|9a723de3bce677018842ed9c627188d5>". The following short video shows the FA330 on a German submarine,

<http://video.google.com/videosearch?hl=en&safe=off&q=fa-330&um=1&ie=UTF-8&sa=N&tab=wv#q=fa330&hl=en&emb=0>

Professor Focke had been busy on other notable helicopter inventions. In June of 1936, a prototype of his twin counter rotating, 160 horsepower FW61 proved his designs first implemented on his 1934 model. In May of 1937 the FW61 was flown by Hanna Reitsch, the first woman to fly a helicopter. The FW61 had two counter rotating 21 foot in diameter rotors mounted on extended arms on either side of an airplane fuselage. The counter rotating blades solved the main rotor torque problem and led to a series of helicopter records including an altitude record of 8,008 meters, and a top speed of 76 mph. In October of 1937, Hanna Reitsch, a close personal friend of Herr Hitler, flew the FW61 inside the Deutschlandhalle sports stadium in Berlin every night for three weeks (View her actual flight on at the following video location

<http://video.google.com/videosearch?hl=en&safe=off&q=fa-330&um=1&ie=UTF-8&sa=N&tab=wv#q=fw61&hl=en&emb=0>). This display of agility in a tight envelope was certainly a media

coup. Needless to say, the Air Ministry was so impressed that they urged Focke to develop a two seat

version. Focke was already working on his 1,000 horsepower FA223 which flew in August 1940. This model, called the Drache or Dragon, had two three bladed rotors with 39 foot diameters and was capable of speeds of 175 mph. In 1941 the Defense Ministry ordered versions armed with machine guns, the first gunships, and one version armed with two 250 kg bombs. When the original engines were replaced with twin 1,000 horsepower motors the lifting capacity of this helicopter was increased to 2,200 pounds and it could even carry a mountain cannon at 74 mph. Several of these helicopters were assigned to the mountain warfare school outside of Innsbrook, Austria where they operated in high altitude and extreme cold. Allied bombing raids limited production throughout the war but they were still being produced in February of 1945 when the Russians overran their production plant. The Russians captured one of these helicopters and the Americans and English ended up with one each. The English craft was the first helicopter to fly across the English Channel but it crashed on its third flight and was never rebuilt. After the war, the Czechs built several from captured parts with limited use. Because Focke could not build aircraft in Germany after the war, he built a civilian version of the FA223, the SE-3000, for a French company but it was not commercially successful. (View the FA223 flying in a video at the following loction,

<http://video.google.com/videosearch?hl=en&safe=off&q=fa-330&um=1&ie=UTF-8&sa=N&tab=wv#q=fa223&hl=en&emb=0>).

After the limited success of his FL185, Anton Flettner began to design counter rotating synchronized aircraft. These craft had two main rotors set side by side and close together but again, they were mounted over airplane fuselages. In 1938, Flettner began building six single seat, 160 horsepower FI265 aircraft for the German Navy. In May of 1939 the first aircraft was destroyed when the rotors struck each other. The technical problems were quickly worked out and other prototypes flew later that month. His third version, the FL282, was considered the best helicopter of its day. It first flew in October of 1941 and proved to agile and

stable that it could be flown with hands off the controls. The original open cockpit was enclosed in later models and an observer's seat was added late in the war. The body for this helicopter showed the characteristic airplane fuselage but the engine was mounted behind the pilot. By 1943 it was seeing service in the Baltic, Mediterranean, and Aegean Sea theaters as an observation and light transport vehicle. Flettner claimed that the German Defense Ministry had ordered 1,000 of these but this number was never approached due to allied bombing raids. Russian ground fire and fighter craft took a heavy toll on this model. At the end of the war, Flettner was working on his FL339 model that would have carried 20 passengers. After the war, he immigrated to America but had little success in the aviation industry. Several of his designs are used on the Kaman family of helicopters. A video of the FL265 may be found at the following: <http://video.google.com/videosearch?hl=en&safe=off&q=fa-330&um=1&ie=UTF-8&sa=N&tab=wv#q=fl265&hl=en&emb=0>)

The last category of German Helicopters were models that avoided main rotor torque by having drive engines on the end of each main rotor blade. The first of these was designed in 1942 by Frederick von Doblhoff of Vienna. The WNF-342 had had three hollow rotor blades with a small jet engine at the rotor tip. In the spring of 1943 a prototype flew and showed enough promise that the German Navy funded more research. The version that was tested the most used the jets for take off and landings but because of fuel consumption flew like an autogyro once airborne with the main rotors auto-rotating. A video of the WNF342 may be viewed at <http://video.google.com/videosearch?hl=en&safe=off&q=fa-330&um=1&ie=UTF-8&sa=N&tab=wv#q=wnf342&hl=en&emb=0>

The Focke-Achgelis had one final helicopter design that they began in 1944. The FA336 was a single seat three blade 22 foot diameter rotor with a five foot diameter tail rotor similar to Igor Sikorsky's design.

German Helicopters of WWII by Ken McElroy

Because of resource constraints resulting from the war effort, this design was never completed and no prototypes were made.

<http://video.google.com/videosearch?q=where+eagles+dare&hl=en&emb=0&aq=f#q=where+eagles+dare+helicopter&hl=en&emb=0>

German helicopters in order they are shown, FL-185, FW-61, FA-223, FL-265, and FL282.

<http://video.google.com/videosearch?q=where+eagles+dare&hl=en&emb=0&aq=f#q=where+eagles+dare+helicopter&hl=en&emb=0>

Same footage as above without aircraft identification, some interior shots of FA-223

Interesting historical sidelines

Hanna Reitsch, close personnel friend of Hitler, left medical school to take up flying. She started with gliders in 1932 and was soon an instructor besides being the first woman to fly a glider across the Alps. Besides being the first woman helicopter pilot, she also test flew Junkers JU87 and Dornier Do17. During the war she tested the Messerschmitt ME163 Komet rocket propelled bomber and made several test flights testing mechanisms designed to cut balloon cables. She crashed during one of these flights but insisted on completing her flight evaluation before being taken to the hospital. She was one of two women awarded the Iron Cross First Class and the only woman awarded the an Iron Cross with diamonds which was given to her by Hitler himself. After flying into Berlin with the Russians approaching the Fuhrer Bunker, she was ordered

to leave by Hitler and flew the last Nazi plane out of Berlin. Although Germans were not allowed to fly for several years after the war, she returned to gliders and by 1952 won 3rd place in the World Gliding Championship. She was German champ in 1955 and founded the first black African National Gliding School in Ghana.

Anton Flettner was a close personnel friend of Himmler. Even though his wife was Jewish, she was never bothered by the SS during the war. In fact, a junior SS officer escorted her family to safety in Sweden just before the war. Anton Flettner had a partner whose father was Jewish. His friends father was never bothered during the war either.