



The Helicopter

Early visions of a 'flying screw' led to the ubiquitous bird that zips through our skies.

BY SUE DE PASQUALE

Though it wasn't until the late 1930s that the design of the modern helicopter was perfected, the idea behind it was one of the earliest ideas for achieving flight, historians say, originating nearly 2,000 years before the concept for fixed-wing aircraft. "Inspired by the flight of birds, even ancient humans dreamed of soaring at high speeds, stopping on a dime, and hovering in place, much like a hummingbird or dragonfly," notes aeronautical engineer Doug Jackson, an expert in aircraft survivability.

The earliest prototype for the helicopter—originating from the Greek words *elikoeioas* (helical or spiral) and *pteron* (wing or feather)—may have been the Chinese Top, a propeller attached to a stick, which children rubbed vigorously between their hands to send soaring. In the early 1500s, inventor and artist Leonardo da Vinci penned beautiful drawings of a "flying screw," a concept that would inspire thinkers over the next three centuries. What da Vinci and the others lacked, in addition to a true understanding of vertical lift, was an adequate engine.

Historians credit Spaniard Juan de La Cierva with creating the precursor to the helicopter, an aircraft he called the "autogiro." It relied on a powered propeller to send air upward to an unpowered rotor, giving the rotor life for take-off. Because it allowed for shorter takeoffs and landings than fixed-wing aircraft, the autogiro was appealing to the military—witness the U.S.S.R.'s powerful front-line warplane, the TsAGI A-7, fully in use by the mid-1930s.

The helicopter was trickier to perfect, because it required the engine to be permanently connected to the

rotor system. Though the French and Germans had some limited success in developing rotor-driven crafts that stayed aloft, it was aircraft pioneer Igor Sikorsky who produced the first commercially viable helicopter.

In his design, Sikorsky, who was Russian-born but became a U.S. citizen in 1928, used one main "screw" or rotor atop the craft, and a small tail rotor to counteract the torque produced by the main rotor—an innovation that solved the last major hurdle in making helicopter flight practical. Sikorsky spent more than a decade experimenting with 19 configurations before ultimately settling on the R-4, which quickly garnered military contracts and went into large-scale production in 1943.

During this decade, American Larry Bell also saw great commercial success with his light observation helicopter—immediately recognizable by the round Plexiglas bubble on the front. (Bell would go on to create the UH-1, made famous during the Vietnam War as "the Huey.")

The advent of the turbo shaft engine, first used in the Kaman K-225 in 1951, meant a new age for helicopters. It offered more power for less weight than gas-fueled engines, used cheaper fuel (kerosene rather than gas), eliminated the need for engine-cooling fans, and made it newly possible to move the copter's critical parts to the top of the craft, leaving the fuselage free for the cockpit and payload. Soviet designer Mikhail Mil capitalized on this opportunity with his gargantuan Mi-6, unveiled in September 1957, which offered space for 90 passengers or 12 tons of cargo.

In the decades since, the helicopter has become an increasingly common sight in skies around the world. Its unparalleled ability to take off and land vertically, and to hover over a point on the ground, make it the only choice for many challenging missions; from search and rescue in remote areas; to hospital "medevac" in busy cities; to the movement of military troops and supplies over difficult terrain.

"As the political climate of our world continues to change and military conflicts approach the small-scale urban warfare of recent years," predicts Jackson, "the importance of the helicopter will continue to grow." ■