If We Only Had Wings

The daring dream of personal flight

By Nancy Shute

Perched on the edge of a cold, windswept dune in North Carolina, I was about to fulfill a dream I shared with Leonardo da Vinci: To fly. The Renaissance genius spent years deciphering the flight of birds and devising personal flying machines. On his deathbed in 1519, Leonardo said one of his regrets was that he had never flown. Five hundred years of innovation since then had produced the hang glider I held above my head, simple and safe enough to be offered as a tourist entertainment. But despite those centuries of adventure and experimentation, personal flight—the ability to bound from Earth like a skylark, swoop like a falcon, and dart as blithely as a hummingbird—remains elusive.

That's not for lack of trying. Many lives have been lost and fortunes squandered pursuing the dream of flight, and even today scientists, inventors, and adventurers persist in the quest.

Leonardo drew hundreds of images of birds on the wing, trying to decode their secrets, and drafted meticulous plans for flying machines not unlike today's gliders and helicopters. But he never figured out the physics of flight. It took more than 300 years and many more failed experiments until Sir George Cayley, a British engineer, determined that flight required lift, propulsion, and control. He built a glider with a curved wing to generate lift. Then he ordered his coachman into it and had farmworkers pull it down a slope until it gained enough speed to fly. Control, alas, was lacking. The craft crashed after flying a few hundred yards. The coachman survived, but reportedly was not amused.

My student hang glider was almost as low concept as Cayley's, and though I knew it could fly, control clearly remains an issue. The instructors at Kitty Hawk Kites, at Kill Devil Hills a couple of miles from where the Wright brothers flew the first powered aircraft in 1903, explained that piloting requires just five simple motions: lean left or right to turn; push the control bar up or down for speed; push the bar up to land. But students in my class still augered into the sand. One fell hard enough to break the glider's sturdy aluminum strut. That made me more determined to succeed.

I have always loved to fly, even in lumbering jumbo jets. When the Kitty Hawk Kites school quoted Leonardo as saying, "For once you have tasted flight, you will walk the Earth with your eyes turned skywards," I sighed in recognition.

Some years back I learned to fly a single-engine plane, but flying a small plane is about as thrilling as sitting at a card table. I hoped hang gliding would deliver the unencumbered essence of flight. It certainly delivered the fear. My grip on the control bar was painfully tight as I ran down the lip of the dune. Suddenly I was running in thin air. Flying! After a few seconds the instructor shouted "Flare!" I pushed the control bar over my head and landed, unsteady but on my feet—then headed back uphill. I wanted to feel again that strange, lovely moment aloft.

A glider wing is an efficient way to generate lift, but my seconds-long flight proved that running off a dune doesn't generate much speed. Glider flight is a controlled descent; pilots gain altitude only if they catch rising air and ride it aloft. Birds don't have that problem; they fly with great efficiency and more precision than any aircraft. Sooty shearwaters log almost 40,000 miles migrating from New Zealand to Alaska and back, while ruby-throated hummingbirds can fly 20 hours without stop migrating across the Gulf of Mexico. Scientists still struggle to understand the physiology of avian flight, but light bones and an intricate collaboration among chest and wing muscles appear essential. A hummingbird's chest muscles account for 20 percent of its mass, according to Bret Tobalske, a University of Montana physiologist. "If a human had that mass of muscles, it would stick out like a 55-gallon drum," he says. "It would be freakin' enormous."

Legend has it Icarus fell from the sky because hubris led him too close to the sun, melting the wax that held the feathers on his wings. More likely, his arms just gave out. Uncounted numbers of "birdmen" have died over the centuries after leaping from tower or cliff, not realizing they could never flap homemade wings hard or fast enough to stay aloft. Their modern heirs, BASE jumpers, leap from buildings, cliffs, and bridges, plunge for a few exhilarating moments, then throw out a parachute to slow their fall. Some don wing suits, with baffled fabric wings that generate enough lift to propel the wearer forward at up to 160 miles an hour while falling. J. T. Holmes of Squaw Valley, California, who has made about a thousand wing-suit jumps, says, "It's as close as human beings can get to flying like a bird." It's also extraordinarily dangerous: About 12 BASE jumpers die each year. Hitting the mountain while free-falling or after the parachute deploys is a common cause.

The best success in purely human-powered flight came in 1988, when the *Daedalus,* a lightweight aircraft built by a team at the Massachusetts Institute of Technology, flew 71.5 miles from the Greek island of Crete to Santorini. The 69-pound craft, pedaled by a Greek Olympic cyclist, got caught in turbulence as it approached the beach at Santorini. It crashed in the sea, a few yards from the shore.

To solve such problems, Wilbur and Orville Wright had fitted a motor and propeller on a glider. That clanking, smoky machine may have ushered in modern aviation but apparently delivered little joy. The Wrights also returned to flying unpowered gliders off dunes. But powered aviation did offer hope of a personal aircraft that could soar into the air like a bird, something my glider could not do. Enter the rocket men.

After World War II, the American military funded a parade of personal-flight experiments, none of which fulfilled the mission of safe, maneuverable, or stealthy flight. Consider rocket belts. The wearer of the belt would fly less than a minute because of limits on the fuel a person can carry. Plus, the device is expensive, noisy, and notoriously difficult to control. Just ask Bill Suitor. His neighbor Wendell Moore, a Bell Aerospace engineer, needed an average guy to test the Rocket Belt, which he was developing for the U.S. Army in the early 1960s, and recruited 19-year-old Suitor. Now 66, Suitor has flown more than 1,200 times. "Controlling the rockets' power was the biggest challenge," he says. "It's like a fire-breathing dragon."

Inventors continue to try to bring the comic book fantasy of personal jet flight to life, and Yves Rossy has come closest. This Swiss pilot flings himself out of an aircraft wearing a six-foot-wide carbon-fiber wing of his own invention, powered by four tiny jet engines. In May, Rossy leaped from a helicopter above the Grand Canyon and flew eight minutes before parachuting to Earth. The jets give him powered ascent and the oomph to do loops. That freedom doesn't come easy; it took Rossy years to master his tiny craft. "I steer myself in space with only my body," he explains. "To go left, I turn my shoulders left, and that's it!" He says it's like parachuting with a wing suit, whose panels between the body and limbs slow a skydiver's fall, but with more liberty. "It's awesome, it's great, it's fantastic!"

You won't catch me jumping out of a plane with a wing strapped to my back. But I yearn for even a small measure of Rossy's *joie de vol.* After five runs off the Outer Banks dune last April, I was getting closer—able to fly into the wind, then floating gently down onto my feet. It was as if the glider wasn't there.

I wanted more. Sandra Vernon, a 47-year-old mother of three in my class on the dune, egged me on. She'd been flying towed tandem flights, pulled up to 2,000 feet behind an ultralight. This usually grants a hang glider a good ten-minute flight back down to Earth, even if there are no rising thermals to help keep the craft aloft. "I'm short, I'm chubby, I'm not spry," Vernon says. "I wish I had been doing this in my 20s. You can't help but love it."

Challenge accepted, I strapped myself into the harness of a tandem glider with instructor Jon Thompson. He warned that the moment when the towplane released us would remind me of going over the top of a roller coaster. I'm a coaster fan. This was nothing like that. It felt like falling headfirst off the top of a 2,000-foot-tall building. "You can fly now," Thompson said, genially offering me the controls. "No!" I shouted over the wind. In a few moments the glider gained lift and leveled off. My terror waned, and I took control. I banked left, then right—more of a pigeon than a sooty shearwater but flying all the same.

In pursuit of flight, I'm also keeping my eye on the Puffin, a "personal air vehicle" that became an Internet sensation when NASA unveiled it in 2010. Big advances in superefficient electric motors and control systems, which let the aircraft feel the intention of the pilot, may make it possible to fly a one-person craft like this safely without typical pilot training. "We are trying to create a horse-and-rider kind of experience," says Mark Moore, a NASA aerospace engineer who developed the prototype. "A horse is an intelligent vehicle, but it's only intelligent at certain things. The rider knows his intent better than the horse could ever discern."

The Puffin may never fly, but other inventors are tinkering. JoeBen Bevirt, an entrepreneur in Santa Cruz, California, has already flown a small-scale prototype of his version of a flying car. He envisions it as a sleek, red plane with eight electric motors. It would take off and land vertically and fly a hundred miles in an hour, zooming him to a San Francisco meeting in half the time it takes in his Prius. "I want one," he says flatly.

Me too.

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