Who is Burt Rutan?

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Abstract

This paper collects online research to give a basic background on the famous engineer Burt Rutan. Compiled from several sources, this paper first gives a brief background of Rutan, followed by pointing out and explaining some of the high points of his career and, more importantly, his contributions to the field of engineering and the scientific community.

Who is Burt Rutan?

Elbert L. Rutan was born on June 17, 1943, in Portland, Oregon, and grew up in the Central Valley town of Dinuba, California. He was the second of three children in the family of George and Irene Rutan. His father was a dentist. Besides his brother, Dick, he has a sister.

The Rutan brothers demonstrated an interest in planes at an early age. As children, they would have their mother drive them late at night on deserted roads in the then sparsely populated Central Valley to test model airplane designs. Mrs. Rutan would drive while Burt and Dick held their airplane models outside the car in attempts to determine how their models would react in flight. Burt Rutan kept up the practice, and tested numerous aircraft designs well into his college days by driving at high speeds in open cars late at night.

Rutan and his brother, Richard (1938–), a former U.S. Air Force combat pilot, have been aviation pioneers for nearly all of their adult lives. Born Elbert L. Rutan on June 17, 1943, in Portland, Oregon, Rutan grew up in Dinuba, a town in California's Central Valley area. The Rutans' father, a dentist, had a pilot's license and owned a small plane. Both Rutan and his brother were fascinated by air travel as youngsters. Dick was five years older than Burt and sometimes refused to let him play with his collection of model aircraft. In response, Burt began building his own.

The Rutan brothers entered model plane contests in the area, and Burt soon became known as a clever designer. One race involved mimicking the fighter planes that land on aircraft carriers. "Burt built a plane that looked like a contemporary Navy fighter," Dick recalled in an interview for *Smithsonian* with Edwards Park. "Then he worked out how to do a power stall with it. The thing would almost hover over the deck, tail down, engine full on, until he dropped it at exactly the right spot and engaged the arresting gear. He always won."

"I don't care about taking the risk that something won't succeed. That's the big difference between me and the engineers who work in aerospace. Or the managers of the engineers who work in aerospace. They're absolutely frightened of failure."

Before he obtained his own driver's license, Rutan often had his mother take him out on the back roads near their home with one of his new model airplane designs. He instructed her to drive fast, so that he could test the aerodynamics of his latest model plane by holding the plane out the window. Aerodynamics is a scientific term that refers to the study of the effect of air and other gases on objects in motion. When he was in college at California State Polytechnic University, Rutan even built his own small wind tunnel, a device that scientists use to conduct tests in aerodynamics. He installed it atop his Dodge Dart station wagon to help him refine his designs. These experiments led him to build his first full-size plane, which he called the VariViggen.

In 1965 Rutan graduated third in his class at Cal State Polytechnic with an aeronautical engineering degree. He went to work as a civilian flight test project engineer at Edwards Air Force Base, the U.S. military facility near Mojave, California, which is the site of nearly all of the aviation records set in the latter half of the twentieth century. During his seven years there, Rutan helped fixed a troubling flaw in the F-4 fighter jet. The U.S. military had spent a small fortune to build it, but the F-4 sometimes went into flat spins and crashed. Rutan came up with a way to give it better in-flight stability and devised a recovery system for the times it went into a spin.

Rutan left Edwards in 1972 to become the director of flight testing for the Bede Aircraft Company in Newton, Kansas. He also continued to work on his own plane designs. But Rutan felt that his innovative ideas would never reach others if he tried to work with traditional airplane manufacturing companies. In June of 1974 he founded the Rutan Aircraft Factory (known as RAF) in Mojave. It produced and sold designs for the VariViggen and other light aircraft that could be built at home by do-it-yourself enthusiasts. RAF quickly became a leader in aviation design, and Rutan a hero among the engineers and pilots who liked to build their own small planes. His VariEze aircraft, for example, was made out of lightweight composite material and had a small extra wing in the nose called a canard. If a plane experienced a problem in mid-flight, the canard lost lift first, not the main wing. This allowed the pilot to stabilize the plane.

For many years Rutan tested his planes himself, or had his brother pilot them. They showed off the newest RAF models at annual Experimental Aircraft Association shows. But Rutan had some near-misses, and quit testing planes after a friend of his died in 1978. His brother, however, was eager to take on one of the final challenges left in aviation: a non-stop, around-the-world flight. Over dinner one evening in 1981, Rutan sketched on a napkin his idea for a new kind of plane. It would have space for enough fuel to make the 24,986-mile trip without stopping to fill the tank. Previously, the distance record was held by a U.S. B-52 bomber, which flew from Okinawa, Japan, to Madrid, Spain, in 1962, without refueling or stopping. U.S. Air Force planes had made similar trips in the 1940s and 1950s, but were refueled in mid-air.

The plane that Rutan designed, the *Voyager I,* made its historic flight in December of 1986. It carried 7,011 pounds of fuel in tanks that looked similar to a pair of outriggers on a canoe. Its cabin, with room for Rutan's brother and his co-pilot, Jeana Yeager (1952–), was the size of a small closet. They had to be in a reclining position to fly the plane, which was as loud as a lawn mower. The flight took nine days.

During the entire time, Rutan kept in contact with his brother and Yeager from a command center at Edwards Air Force Base. He talked them through more than one bout of bad weather, including a typhoon over the Pacific Ocean. "Our own data said that the Voyager flight was probably not going to happen," Rutan told Andy Meisler of the *New York Times* several years later. "We had seven major failures in the 340 hours the plane had flown, and we were planning a 225-hour single flight, almost all over oceans. As far as the pilots' fatigue and their ability to stand up under even moderate levels of turbulence and so on, our data showed they would not even get to the Philippines."

But the *Voyager I* successfully completed its flight and touched down safely on December 23, 1986. Rutan donated it to the Smithsonian Institution, and then moved on to new challenges. In 1982 he founded another company, Scaled Composites Inc., which was an aerospace prototype development firm. It created prototype models for new aircraft, but Rutan also took on other interesting jobs that required solving aerodynamics challenges. He designed an eighty-five-foot rigid sail that was used on the winning yacht in the 1988 America's Cup race. In 1992 he created an "Ultralite" show car for General Motors Corporation, which was made of lightweight plastics composites. In 1996 he rolled out the Boomerang, a unique asymmetrical twin-engine plane capable of speeds of three hundred miles per hour. He designed an adjustable-wing aircraft capable of high altitudes, called the Proteus, which made its first flight on July 26, 1999.

Rutan spent the next several years working on a new pet project, which he called *SpaceShipOne.* It was funded by Paul Allen (1953–), a co-founder of Microsoft, and cost an estimated $20 million. *Space-ShipOne* was a passenger rocket that could be carried aloft by a larger plane, also built by Rutan and his company, called the *White Knight.* The passenger rocket and its test pilot could then be launched into space once it reached a certain altitude.

Rutan and Allen were trying to win the [Ansari X Prize](http://www.notablebiographies.com/knowledge/Ansari_X_Prize.html) with *SpaceShipOne.* The new aviation challenge had been announced in 1996, and had a deadline of January 1, 2005. A $10 million award would be given to the first privately funded group to fulfill the following requirements: that their craft hold three people, reach the 62.5-mile-high sub-orbital flight, and repeat the launch again within a two-week period. Sub-orbital space is where the laws of gravity that govern Earth's physical properties end and weightlessness begins.

Rutan's longtime dream of conquering space with one of his planes came true on June 21, 2004. Mike Melvill, a pilot and employee of Rutan's, climbed aboard *SpaceShipOne,* which was then launched by the *White Knight.* After a successful flight, the plane landed safely on an airstrip at the Mojave Airport. Melvill told reporters at a press

conference immediately afterward that he had been able to see the curve of Earth, and that he also tossed some M&M candies he had carried aboard in his pocket. He was delighted to see them spin in front of him instead of dropping, since the laws of gravity no longer applied. This was the first successful test flight of a privately funded spacecraft, and made headlines around the world that day.

In 2004 Rutan made international headlines as the designer of SpaceShipOne, the world's first privately-built manned spacecraft to reach space, and as winner of the $10 million Ansari X PRIZE, the competition created to spur the development of affordable space tourism. "Manned space flight is not only for governments to do," says Rutan. "We proved it can be done by a small company operating with limited resources and a few dozen dedicated employees. The next 25 years will be a wild ride; one that history will note was done for everyone's benefit."   
  
 The exciting development and launch of SpaceShipOne, financed by Microsoft co-founder Paul Allen, was featured in the Peabody award-winning Discovery Channel Documentary Specials, "Black Sky: The Race for Space" and "Black Sky: Winning the X Prize." A 60 Minutes profile, "Burt Rutan: An American Original," aired in November 2004.  
  
 Rutan designed the legendary Voyager, the first aircraft to circle the world non-stop, without refueling. He also developed the Proteus high-altitude, long-endurance test bed aircraft. Other recent projects include the Virgin Atlantic GlobalFlyer, which broke the Voyager's record time and enabled the first non-stop, solo flight around the world.   
  
 The success of Scaled Composites owes itself to Rutan's philosophy that the best ideas come from the collaborative efforts of small, closely-knit project teams and an environment that is not averse to risk-taking. According to Aviation Week, Rutan is "a capable manager who has been able to attract technicians, pilots and workers who revel in the entrepreneurial and creative spirit existing at Scaled Composites."   
  
 Winner of the Presidential Citizen's Medal, the Charles A. Lindbergh Award, two Collier Trophies and included on Time magazine's "100 most influential people in the world," Rutan is the founder and CTO/Designer Emeritus of Scaled Composites, LLC, the most aggressive aerospace research company in the world. Based in Mojave, CA, his company has developed and tested a variety of groundbreaking projects, from military aircraft to executive jets to spaceships, showcasing some of the most innovative and efficient designs ever flown.  
  
Rutan retired from Scaled Composites on March 31, 2011, and is enjoying his new home in Idaho.

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