

## AVIATION FANS CELEBRATE FIRST FLIGHT

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*This week, aviation enthusiasts are celebrating the Wright brothers' first flight with exhibits, air shows and other events in places around the country, culminating in a reenactment of the Wrights' accomplishment in Kill Devil Hills on Dec. 17.*

Much has changed about flight from its inception one hundred years ago. Aircraft have crossed the continent and broken the sound barrier; spacecraft have explored planets and our sun, and touched the edge of the solar system. But its beginnings were more humble.

America at the start of the 20<sup>th</sup> century was a nation on the move. Cities were growing and becoming electrified, more and more automobiles were dotting the roads and bicycling was a booming pastime. The nation, and the world, were ripe for the advent of aviation.

Countries including Germany, France and the United States were in a race to build the first piloted, powered, heavier-than-air craft that would help speed transportation. The Wright brothers from Dayton, Ohio, would accomplish that feat on Dec. 17, 1903.

### **Seeds of flight**

The spark of invention may have come the day Wilbur and Orville Wright's father gave them a flying toy that was powered with a rubber band. The brothers soon broke the cork, bamboo and paper plaything, but spent many hours working on repairing and replicating it.

As they got older, they started researching other people's experiments in aviation, including engineers Otto Lilienthal from Germany and Octave Chanute, who was born in France. Fascination with mechanical things led them to build a printing press and publish several local newspapers, including the West Side News and the Dayton Tattler.

The brothers also took advantage of the popularity of bicycles to start their own repair shop, where they designed and sold their own models. It was in their bicycle shop that they started building models -- one of which would later become the Wright Flyer.

### **Building the flying machine**

By the late 1890s, Wilbur and Orville were working full tilt on a machine that could fly. They gathered information related to flight from the Smithsonian Institution and studied birds to understand basic aerodynamics.

In August 1899, the brothers built a two-winged kite with a 5-foot wingspan and fixed tail. They were concerned with controlling a flying structure, rather than stability or propulsion, which ended up being the key to their success.

They discovered that the wings could be warped, or twisted, to make the structure roll from one side to the other in a controlled manner. They tested this design on the kite, using ropes pulled from the ground. On subsequent gliders and aircraft, they used cables that the pilot operated. Other early aircraft designers would use this breakthrough technique known as wing warping.

In the autumn of 1900, Wilbur, who was at that point 33, and Orville, who had just turned 29, traveled to Kill Devil Hills on North Carolina's Outer Banks to test a piloted glider. They chose that spot because of the area's strong, steady winds and seclusion – they didn't want the public to see their design until it actually worked.

The Wrights discovered some of the data on the wing design they had been using was wrong and decided to redo their lift and drag tables. They also remembered that inventors sometimes used wind tunnels, and decided to build one.

In their 5-foot-long wooden wind tunnel, they tested 200 different airfoils, or wing shapes. They added other features to their design, such as a single hinged fin to act as a rudder to help the structure make smooth turns.

The resulting craft could be controlled through all three axes of motion – pitch, yaw and roll – the basis for powered flight.

### **The first successful flights**

Wilbur and Orville took a more advanced creation back to Kill Devil Hills in the fall of 1903. This time, the two-winged biplane had two propellers and a four-cylinder engine. The craft had a 40-foot-4-inch wingspan and weighed about 750 pounds with the pilot.

On Dec. 14, Wilbur made the first attempt, lying on his stomach in a hip cradle that he moved to help guide the airplane. The flyer rolled down a trolley rail to gain speed and then sailed into the air for a few seconds before it stalled and dropped to the sand.

The brothers fixed the plane and tried again Dec. 17. It was Orville's turn. The flyer soared into the air and traveled 120 feet for 12 seconds, marking the first controlled, piloted, powered flight.

He wrote in his journal: "This flight lasted only 12 seconds, but it was nevertheless the first in the history of the world in which a machine carrying a man had raised itself by its own power into the air in full flight, had sailed forward without reduction of speed and had finally landed at a point as high as that from which it started."

They flew three more times that day, the last of which lasted 59 seconds before the airplane touched down 852 feet from its launching point. A strong gust of wind then toppled the wooden, wire and fabric plane, destroying it.

Nevertheless, the two men's place in history was sealed. And 65-and-a-half years later, Neil Armstrong carried some fabric and two tiny pieces of wood from the Wright Brothers plane sewn into his spacesuit when he walked on the moon.

The actual 1903 Wright flyer is on display at the National Air and Space Museum in Washington, D.C.

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