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## WHO INVENTED THE WORLD'S FIRST AIRPLANE?

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The longer humanity lives, the longer it tries to make its life more comfortable and one of the most important and inherent technologies is an airplane. It is an interesting fact, but Leonardo da Vinci is one of the first persons, who shared the idea of flying machines in his pictures. He also guessed that man-made aircraft would have its own artificial propulsion.

Aircraft is flying thanks to such sphere of physics, which is named aerodynamics – a part of solid environment mechanics, which goal is discovering principles of moving streamlines and their interaction with any kind of objects. One of the most important laws of aerodynamics is Bernoulli's principle.

Plane's airfoil is constructed in such a way, that the first air current, which is going upper the airfoil has to pass a longer distance than the second one, which is located below. Due to uniformity of air currents, the speed of upper air current is more than the other's ( $v_1 > v_2$ ). It's clear that the more speed of air currents is, the less pressure is. Upper pressure is less than the lower pressure, that's why the lifting force is generated [1; 2].

The first aviation scientist is George Cayley from Great Britain. In 1804 he was making range of experiments with a wooden panel, showing dependence of ascensional force from aerial speed and angle of incidence. With reference to results of these experiments Sir George Cayley invented his aircraft, which appeared in 1949 and it's drawing was published in journal in 1952. It was a threeplane, and it's body had a form of boat with wheels, connected to it. Important thing is an external wings, which were moving by pilot and helped to maintain height of flight. It's mass without passenger was 120 lb (68.04 kg), tests were conducted with a human on board, so full mass was about 300 lb (136 kg), wing area is quoted as being 467 ft<sup>2</sup> (43.4 m<sup>2</sup>). It could raise a man on a height of few meters.

Airplane construction offered by another British aviation pioneer William Henson in 1843 came closer to construction of modern planes. Wings of this monoplane had bilateral fuselage panelling, longerons, bulkheads and struts. It was named Aerial Steam Carriage (Aerial). Designer of this machine had an ambitious idea to use it for international flight from Great Britain to Egypt. Unfortunately, experimental model of this aircraft was not possible to takeoff because of too weak engines. After that, William Henson lost his interest and left the project in contrast to his cofounder John Stringfellow, who presented another configuration of this aircraft. This machine hadn't people on board, but it was possible to fly directly about 10 meters. It had steam engine on board with power about 30 liters per second, six-blade propeller, 424 m<sup>2</sup> area wing. Mass of this machine was about 1.3 tons. This machine became the first autonomy no-pilot heavier-than-air aircraft powered by steam engine [3; 4].

A project with new airplane design, made by Russian researcher Aleksandr Moszhaiskiy was showed up in 1876. According to his plan, an airplane must have two internal system Brighton combustion engines with power about 30 liters per second, mass about 800 kilograms and wing's area about 371m<sup>2</sup>. Moszhaiskiy made his researches and experiment himself, so the exact date of creating and testing his aircraft is unknown and vary between 1882 and 1883. According to the results of researcher's experiments, take off of his «steam airplane» was possible with a help of canted rail track, but due to imperfections of

wing's shape, little efficiency of propeller and heavy engine that aircraft was not able to make stable flight.

Another well-known aviation pioneers are Wright brothers, who were living in Ohio state, USA. They invented first controllable biplane in 1903, which was named «Flyer I». It was able to stay in the air for about 13 seconds and pass maximal distance about 60 meters on a height 3 meters. Rotation controlling surfaces were located in the tail part of the airplane, moving by internal combustion single-row 4-cylinder engine on board with power  $1 \times 15$  liters per second. Aircraft was 6.4 meters long with 12.3-meter wing, designed for one pilot. Take off wasn't possible without rail track and head wind. Wright brothers continued their researches and constructed upgraded «Flyer II», which was possible to make a circle flight. Length of the longest flight made by Wright brothers was 38 minutes and 3 seconds for a distance of 40 km, ended by safe landing after lack of fuel and performed on a «Flyer III». Aircraft still had some disadvantages: often landings were unsafe and pilots got injuries.

It is amazing, but during Wright's experiments almost no one knew about them, but much attention was allured to Brazilian constructor Santos Dumont and his aircraft named «14-bis». All of his airplane experiments were performed in Paris. He set the first record by flying 220 meters for 22 seconds. This machine was 10 meters long and wing length was 11.55 meters, take off mass was about 300 kg. It was made of bamboo poles and silk covering with aluminum fixtures. Aircraft was powered by single 24 HP Antoinette engine. The pilot had to stand in a «balloon type basket» located in front of the engine strut. In contrast to Wrights' aircraft, landing gear was composed of two bicycle wheels attached to the engine strut.

By this time, two groups of people had appeared, one of which recognised Wright brothers as the first aircraft developers and the other, who thought it was Santos Dumont. Actually, Wrights' machine was made earlier, but «14-bis» had much more simplified and improved control system on board.

From all of the above it is clear that all of the scientists referred on other scientists' works, so the question of first man, who came up with the idea of creating an airplane, has no correct answer, because we can't assign this invention just an only man – this is the result of global work. Everyone left his own step in the aviation history and that's why we have such a high-technological, fast and safe airplanes.

## References

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