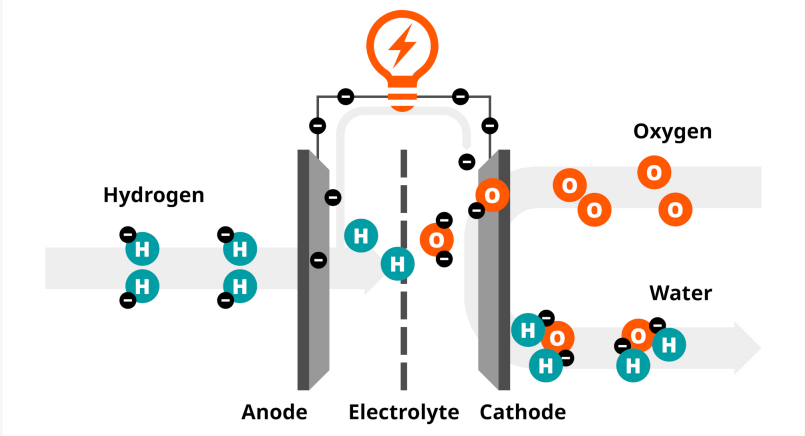
Recirculation Blower from Busch Vacuum Solutions Supports the First Hydrogen Plane in Switzerland

MAULBURG, GERMANY, August 12, 2026 /EINPresswire.com/ -- According to numbers from the German Aerospace Center, more than 36 million flights took off in 2024, making air traffic responsible for approximately 2.1 % of global CO2 emissions. This is roughly equivalent to the total annual emissions of a country like Germany. To reduce the climate impact of aviation and make air travel significantly greener in the future, new technologies are required. Vacuum solutions from Busch are used to research them.

The H2-Sling, Switzerland's first hydrogen-powered aircraft, developed by Cellsius at ETH Zurich. Source: Cellsius



A fuel cell consists of two electrodes separated by an electrolyte membrane: an anode and a cathode. The membrane is responsible for the ion transport. Source: Busch Vacuum Solutions.

A report by the Office of Technology Assessment at the German Bundestag (TAB) identifies sustainable fuels as the most important area for short-term innovation as fuel usage is the main driver of aviation's climate impact.

Hydrogen, in particular, offers great potential as a clean aviation fuel. The TAB report notes, however, that storing hydrogen on aircraft is technically challenging, as it requires large, insulated tanks at minus 253 degrees Celsius that come with heavy weight. Overcoming these obstacles will require continued research and technological advancement of today's aircraft and infrastructure.

Building on this spirit of innovation, a group of Swiss students, organized under the Cellsius association, has developed a small aircraft powered solely by hydrogen. Cellsius is a non-profit organization founded in 2022 dedicated to researching sustainable aviation. Students at ETH Zurich can use the final year of their bachelor's program to apply the engineering knowledge acquired in theory to the practical example of real-world aircraft.

During this period, they developed the H2-Sling, a plane that runs on hydrogen in its gaseous form. The efficient recirculation of hydrogen is made possible by a MINK MH recirculation blower, donated by Busch Vacuum Solutions to ETH Zurich to support the research project and advance technological progress.

The first hydrogen plane in Switzerland

The plane itself is powered by a 100-kilowatt fuel cell system. In a fuel cell, an electrochemical reaction between hydrogen and oxygen sets free electricity and heat. The cell consists of two electrodes separated by an electrolyte membrane: an anode and a cathode. The membrane is responsible for the ion transport.

Hydrogen enters on the anode side. The hydrogen molecules are split into protons and electrons. The hydrogen protons diffuse through the membrane to the cathode, where they react with the oxygen from the ambient air to form water, thereby releasing energy. This energy is used by the electric motor to power the propeller of the plane.

Since water is the only by-product of the reaction, no climate-damaging greenhouse gases are emitted into the atmosphere during flight. The hydrogen itself is stored in two tanks beneath the airplane's wings, each containing 2.6 kilograms. Since hydrogen has a high energy density, the aircraft is capable of flying 200 kilometers, which equals around two hours of flight time. The rollout and first public presentation of the airplane took place in October 2025. The aircraft is now awaiting certification from the Federal Office of Civil Aviation in Switzerland so that the first test flight can take place in spring 2026. The ultimate goal: a flight over the Alps.

MINK MH from Busch ensures efficient recirculation

For the fuel cell to function reliably, the hydrogen and air supply must be carefully controlled to sustain the chemical reaction. The MINK MH recirculation blower from Busch ensures that unreacted hydrogen is not wasted but efficiently reused.

Here is how it works: Hydrogen comes from the high pressure tanks located beneath the wings. To ensure a stable chemical reaction in the fuel cell, more hydrogen is supplied than is actually needed. This prevents local “starvation”, an effect that occurs when there is not enough reactant in the cell, ultimately resulting in a stop of the reaction cycle.

Because of the excess supply, there is still hydrogen left over after the reaction is complete. Not using this remainder would mean that even larger tanks would be needed to carry the hydrogen required to maintain the reaction, adding weight to the plane and reducing its performance. To

maximize flight time and range, the unused hydrogen must therefore be recirculated.

Recirculation blower specially developed for fuel cells
To achieve this, the reactant must be returned from the anode outlet of the fuel cell back to its inlet. This is where the MINK MH from Busch comes into play: Two claw-shaped rotors move in opposite directions inside the compressor housing. Due to the rotation of these claw rotors, hydrogen is drawn inside, compressed and then fed back to the anode of the fuel cell, where it mixes with fresh hydrogen from the tank. In this way, the reaction circle can continue uninterrupted. By reusing unreacted hydrogen, fuel consumption is minimized and resources saved.

The MINK MH is a TÜV-certified recirculation blower specially developed for use in fuel cells. “Busch is one of the few suppliers offering solutions for hydrogen fuel cells. We have already had very good experiences with the smaller version of the MINK MH, which we installed in a test circuit,” says Andres Neff, technical lead of the H2-Sling project. “Everything worked perfectly in the test system, and the blower is very user-friendly. We were therefore very happy that we could use the larger blower version for our project.”

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