

Successful maiden flight for energy-efficient Flying-V aircraft

September 8 2020, by Ineke Boneschansker



Credit: Delft University of Technology

This summer, a team of researchers, engineers and a drone pilot of TU Delft traveled to an airbase in Germany for the first real test flight of the scaled flight model of the energy-efficient aircraft design called the Flying-V. The project was announced last year together with KLM. After a period of extensive wind tunnel testing and a series of ground tests in the Netherlands, it was time to perform the first flight and obtain an impression of the flight characteristics. The aircraft had a very successful maiden flight.

Project leader Dr. Roelof Vos and his team of researchers and engineers

took the 22.5 kg and 3-m-wide scale [model](#) of the Flying-V for flight tests to a well-guarded airbase in Germany, where they could work together with a team from Airbus. The pilot's task was to take off, fly a number of [test](#) maneuvers and approaches until the batteries were nearly empty, and land. And he succeeded.

Vos says, "One of our worries was that the aircraft might have some difficulty lifting off, since previous calculations had shown that 'rotation' could be an issue. The team optimized the scaled flight model to prevent the issue but the proof of the pudding is in the eating. You need to fly to know for sure." Rotation on take-off was performed easily and occurred at a speed of 80 km/h. The plane's thrust was good and flight speeds and angles were as predicted.

But testing new technology is never straightforward. The team had a challenging week in which they had to change the center of gravity of the aircraft and fix the antenna to improve telemetry. The flight has now also confirmed that the current design still shows too much Dutch roll, causing a slightly rough landing. A next step for the team is to use the data collected during the flight for an aerodynamic (software) model of the aircraft. This will make it possible to program it in a flight simulator to be used in future research , while further improving the flight characteristics. The team will also prepare the scale model for future [flight tests](#).

The Flying-V

The Flying-V is a design for a highly energy-efficient, long-distance airplane. The aircraft's design integrates the passenger cabin, the cargo hold and the fuel tanks in the wings, creating a spectacular V-shape. Computer calculations have predicted that the aircraft's improved aerodynamic shape and reduced weight will reduce fuel consumption by 20% compared to today's most advanced [aircraft](#). KLM has been a

partner in the project since 2019. Also due to their support, the project team has been able to build this scale model. It was first presented at the 100th anniversary of KLM in October 2019. Various business partners are now involved in the project, including Airbus. Airbus is also an explicit supporter for the first [flight](#). The partners are working together on a research plan to fine-tune the concept. Next step: providing the Flying-V with sustainable propulsion, taking into account that the design seems highly suitable to carry liquid hydrogen instead of kerosene.

More information: Detailed information about the flight tests, including videos and photos, are available at <https://www.tudelft.nl/en/ae/flying-v/>.

Provided by Delft University of Technology

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