

## Across Austria – A<sub>2</sub> powered by H<sub>2</sub>

Prototype of hydrogen UAS, scaled 1:2, to fly Across Austria

The TU Wien Space Team wants to expand the current limits for the operation of unmanned aerial systems (UAS). Across Austria will achieve this goal using hydrogen as an energy carrier and under BVLOS flight rules (beyond visual line of sight). Conventional UAS batteries limit the maximum range of such flights. UAS flight under constant visual line of sight to the remote pilot (VLOS) allows only local flights. The application of hydrogen and BVLOS suggest great potential for future UAS long-range flights. Currently, however, there are only a few projects that actually demonstrate such long-range flights.



Across Austria UAS „Falcon’s Eye” on a simulated flight across Austria

### Objective

The goal of Across Austria is to cross Austria with an unmanned aircraft. We want to use a highly automated plane to cover a distance of more than 400 km. It’s a fitting objective for the TU Wien Space Team: to fly further than the ISS flight altitude of 408 km.



Planned flight route through Austria

### Our Approach

In order to be able to carry out our mission, aerospace solutions are being developed in the following areas:

- **Hydrogen Fuel Cell**  
Hydrogen in combination with a fuel cell has a significantly higher energy density than conventional lithium batteries.
- **Joined-Wing Tandem Configuration**  
Aerodynamically and structurally optimized aircraft design. Less weight, less lift, less drag, less thrust, less energy demand.
- **Terrain-Following Route Planning**  
Route planning at low altitude, adapted to local topography. Minimize air risk without requiring a dedicated cleared flight corridor.
- **Manned-Unmanned Teaming**  
Uninterrupted radio link for Command and Control (C2). In addition to 4G/5G mobile radio, a redundant radio link to a manned escort aircraft.

## Results

Using hydrogen as an energy carrier and an optimized aircraft design, the range of the UAS can be increased from 150 km to 500 km. Flying at low altitude reduces the Air Risk Class to ARC-b, eliminating the need for restricted airspace. The escort aircraft allows uninterrupted radio communication with the UAS operator.



Schematic of component arrangement in UAS fuselage

## Your Benefits

Successful implementation of Across Austria and a tripling of the range of a UAS from 150 km to 500 km enables:

- UAS point-to-point deliveries of time-critical goods
- UAS aerial surveillance of safety-critical infrastructure
- Transfer of results to manned aviation

### Notes

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