

“Now, here’s a thing”

The AtlantikSolar project, which started in 2008, is ETH Zurich’s Autonomous Systems Lab’s mission to demonstrate the first ever fully solar-powered and autonomous UAV crossing of the Atlantic Ocean.

The AtlantikSolar is a fixed-wing, nose-propeller design with a wingspan of 5.6 m. It is made from carbon fibre and Kevlar, and weighs just 6.8 kg, allowing hand launching by a single person. The electric motor-driven prop is powered by a 2.9 kg lithium-ion battery pack that is fed charge by 1.4 sq m of solar panels that cover the entire upper surface of the wings.

The craft has a bespoke autonomous control system that was designed by ETH Zurich, and uses open-source software with GPS navigation. The system also monitors AtlantikSolar’s operational parameters, including battery charge state, and it can be programmed for specific flight paths or loitering flight. The payload is a digital HD camera that transmits live images.

In July 2015, the AtlantikSolar team set a new world record for continuous flight for craft below 50 kg total mass by autonomously flying the UAV for 81.5 hours.

AtlantikSolar’s average speed during

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the flight was 28.42 kph, and owing to the current regulations for UAV flight in Switzerland – where the flight took place – the aircraft had to be flown within line of sight. The furthest distance from its base station during the flight was 800 m, at an altitude of 400 m, and the total flight distance was 2316 km.

The project’s leader Philip Oetershagen says, “Theoretically, the maximum flight time of the craft is unlimited, and to achieve just

over 80 hours is a huge milestone. Most important though, the flight demonstrated the UAV’s ability to stay airborne for multiple days while providing telecoms services and live imagery throughout.”

The team is preparing the AtlantikSolar for its flight from Boston in the US to Lisbon in Portugal in 2016, during which it is planned that it will fly at an average speed of 37.5 kph to complete the 4500 km journey in five days. It will fly at between 1100 and 1500 m above sea level, and will be given special permission to fly within the relevant airspaces.

Oetershagen says, “The Atlantic crossing is an extreme showcase to demonstrate the advantages of solar-powered UAVs, namely their ability to perform multi-day continuous flights fuelled solely by solar power.”

In the future, ETH Zurich believes that the AtlantikSolar could be used for search and rescue operations, where it can offer optical imagery to operators and search teams on the ground, or even satellite comms in remote areas. Other applications could include meteorological surveys of hitherto inaccessible ocean regions, thermal and hyper-spectral crop scanning for agriculture, and even border controls. □