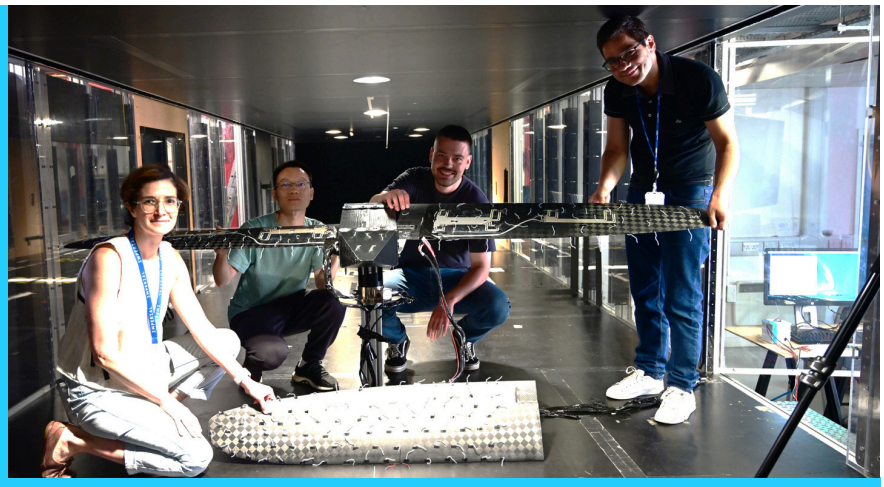
AVATAR DIGITA TWIN

NEWSLETTER

Avatar Project Completes Second Wind Tunnel Campaign with Promising Results



In June, we conducted the second wind tunnel test of the ASTERO demonstrator's composite wing and made significant progress. The campaign focused on assessing aerodynamic loads under representative flight conditions using the installed structural health monitoring system. Strain data collected during testing were used to develop load spectra supporting structural performance evaluation.

Two identical wings, instrumented with mirrored strain gauge networks, enabled direct comparison while low-profile wiring minimized aerodynamic interference.

A key objective was validating the custom MCU-based DAQ system. Selected strain gauges were connected simultaneously to both the MCU and a commercial DAQ system, with the MCU demonstrating high signal fidelity, synchronization, and stability, closely matching commercial equipment.

Future work will advance toward a fully integrated IoT-enabled sensing skin for real-time wireless data acquisition, seamlessly linking to the AVATAR Digital Twin platform.

Watch the video to explore more: Wind tunnel test video

Sharing the Vision at the ENERCOMP Seminar Series

The ENERCOMP Seminar Series launched with an exciting deep dive into the AVATAR project's latest breakthroughs.

Our team member, Dr. Ilias Giannakeas (KAUST), shared "From Sensing to Safety: A Digital Twin Framework for Smart Air Vehicles," highlighting how our composite wing research, advanced sensing technologies, and digital twin integration are pushing the boundaries of safety and performance in next-generation air systems.

The talk sparked engaging discussions and opened new avenues for collaboration across the ENERCOMP community.

AVATAR Project Advisory Board Meeting Showcases AI and Digital Twin Advances

On 15 June 2025, the AVATAR project held its online Advisory Board Meeting, reviewing progress in system integration, AI-driven predictive maintenance, enhanced data acquisition, and digital twin development. Highlights included lightweight ML models for proactive fault detection, improved sensor systems, and real-time virtual diagnostics. The board praised advancements and advised stronger team coordination, modular design, and enhanced usability.