

SmartWings2

Research and Flight Test of Advanced Turbulence Cancelling Technologies for Sustainable Urban and Regional Air Mobility

DI András Gálffy
CEO Turbulence Solutions
andras.galffy@turbulence-solutions.aero

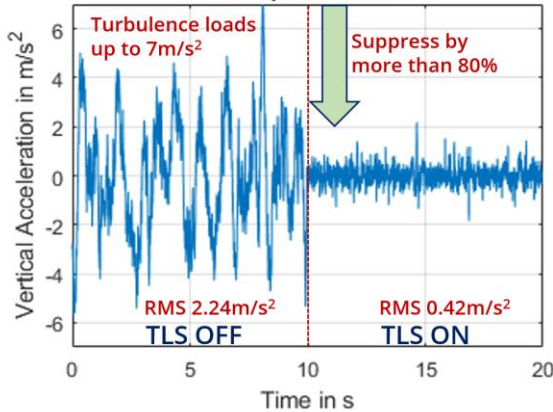
Kurzdarstellung der Konsortialpartner



- Turbulence Solutions GmbH
KU, Turbulence Cancelling Avionics: www.turbulence-solutions.aero
- Institut für Automatisierungs- und Regelungstechnik
TU, Advanced Mechatronic Systems: www.acin.tuwien.ac.at
- Infineon Technologies Austria AG
GU, Halbleiter und Sensorsysteme: www.infineon.com
- T.I.P.S. GmbH
MU, Mess- und Prüftechnik: www.tips.co.at

Ziel des Projekts

Project Goal SmartWings2 (2023-2026) To demonstrate in manned testflight Cruise speed: 50m/s



Project Result SmartWings1 (2019-2021)

Limited Airspeed: 33m/s

-0.3g in 200ms
 Pre-deflected
 +0.3g in 200ms

Conventional flap

- Max. Flap Airspeed 33m/s
- Limited Dynamics
- High Direct Lift Drag



Turbulence Boom

- Limited Anticipation Distance/Time
- Obstructive Boom required
- Static Measurement Points

*Research and Flight Test of
 Advanced Turbulence Cancelling Technologies
 for Sustainable Urban and Regional Air Mobility*

Project Goal SmartWings2 (2023-2026)

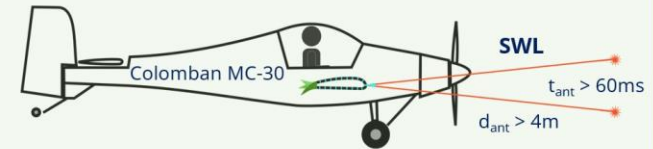
Cruise Speed: 50m/s

HMF
 -0.7g in 100ms
 Bidirectional
 +0.7g in 100ms

DTS
 Skin
 Probe

High-Dynamic Morphing Flaplet (HMF)

- Max. HMF Airspeed 60m/s
- Higher Dynamics, distributed design
- Lower Direct Lift Drag



Distributed Turbulence Sensors (DTS)

- Turbulence Probe Miniaturization
- Distributed Turbulence Skin
- Resolution of inhomogeneous turbulence

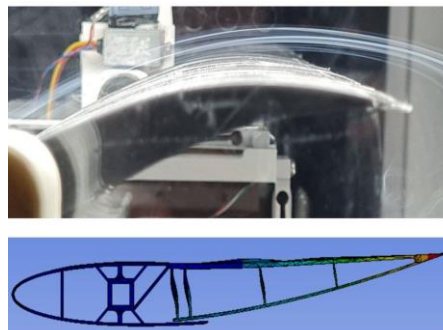
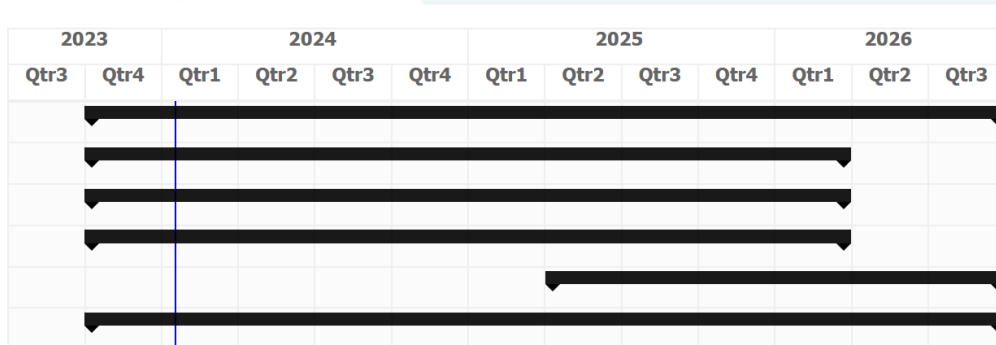
Scanning Wind Lidar (SWL)

- Higher Anticipation Distance/Time
- No structure ahead of wing
- Adaptive measurement point

Arbeitsplan/Zeitplan/Umsetzung

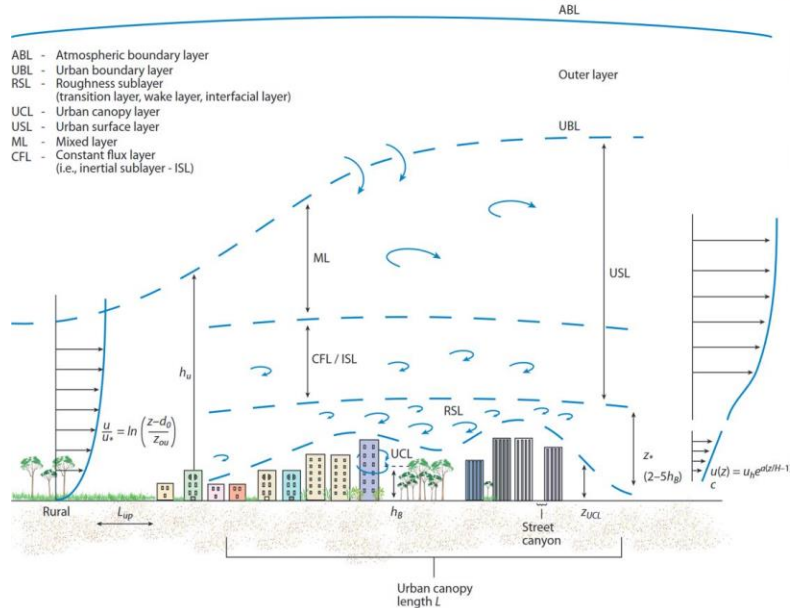
Format: Week Month Quarter

	Start Date	End Date
+ Projektmanagement	01/10/2023	30/09/2026
+ Scanning Wind Lidar (SWL)	01/10/2023	31/03/2026
+ Distributed Turbulence Sensing (...)	01/10/2023	31/03/2026
+ High-Dynamic Morphing Flaplets ...	01/10/2023	31/03/2026
+ Integrated Turbulence Load Sup...	01/04/2025	30/09/2026
+ Dissemination	01/10/2023	30/09/2026



Angestrebte Verwertung

**Highest aviation turbulence impact for Light Aircraft and Advanced Air Mobility:
 Low and fast fixed-wing flight of light and small aircraft**



Kontakte

- DI Andras Galffy
andras.galffy@turbulence-solutions.aero
- Univ.Prof. Dr. Georg Schitter
schitter@acin.tuwien.ac.at
- Dr. Marcus Hennecke
marcus.hennecke@infineon.com
- Dr. Rainer Gaggl
r.gaggl@tips.co.at