



Łukasiewicz
Institute
of Aviation



SOPEL DESIGN OF ANTI-ICING SYSTEMS FOR UNMANNED VEHICLES

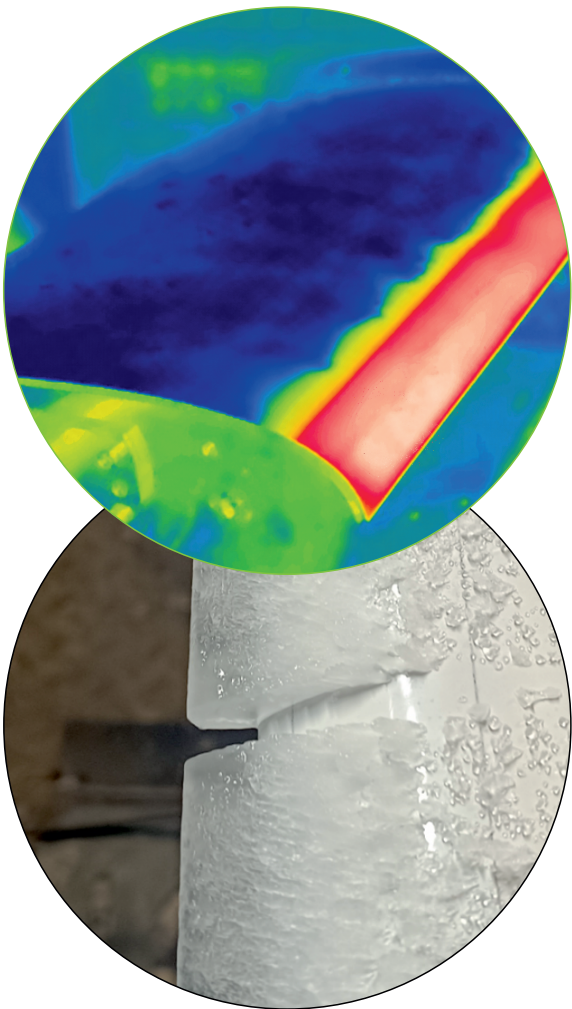
CHARACTERISTICS

Łukasiewicz – Institute of Aviation offers advanced methods and tools for the design of anti-icing systems for fixed-wing UAVs. The solution autonomously protects critical UAV components against icing, improving flight safety, operational reliability, and mission effectiveness. The Institute supports the complete anti-icing system process, from requirements analysis and concept development to system integration with the target UAV platform.

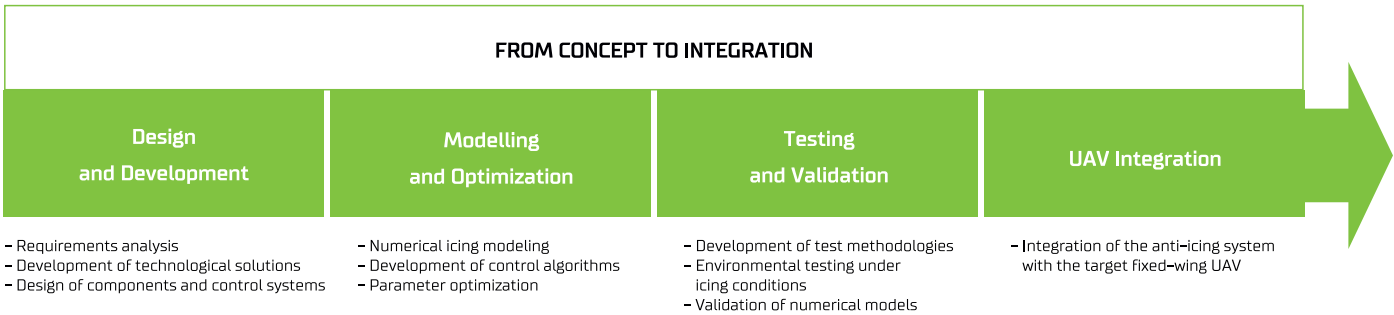
KEY FEATURES

- **Autonomous Anti-Icing Control** – automatic response to icing conditions without operator intervention.
- **Validated Performance** – 99% agreement between numerical predictions and experimental results.
- **Preserved Mission Range** – maintains operational range while mitigating icing-related performance and energy losses.
- **Dedicated Liquid Water Content Sensor** – enables early identification of icing risk.
- **Platform-Specific Design** – optimized for fixed-wing UAV characteristics, mission profile, and operational requirements.

The technology is being developed as part of the project “Development of an innovative and energy-efficient system for effectively preventing icing under severe weather conditions for unmanned aviation,” implemented by a consortium consisting of Łukasiewicz – Institute of Aviation and Łukasiewicz – Automotive Industry Institute. This information sheet is part of the promotion of the project and its results.



UAV wing with an integrated anti-icing system (thermal camera view). (Top).
UAV wing without an anti-icing system (Bottom).



The Łukasiewicz Research Network – Institute of Aviation offers a wide range of specialized research, engineering services and products. We provide comprehensive solutions, ranging from dedicated analyzes, simulations, engineering design, through the selection, testing and certification of materials and structures, to rapid prototyping and additive manufacturing.

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