HELIOS™ Ice Protection

by QARBON AEROSPACE

Composite Electrothermal Icing Protection System

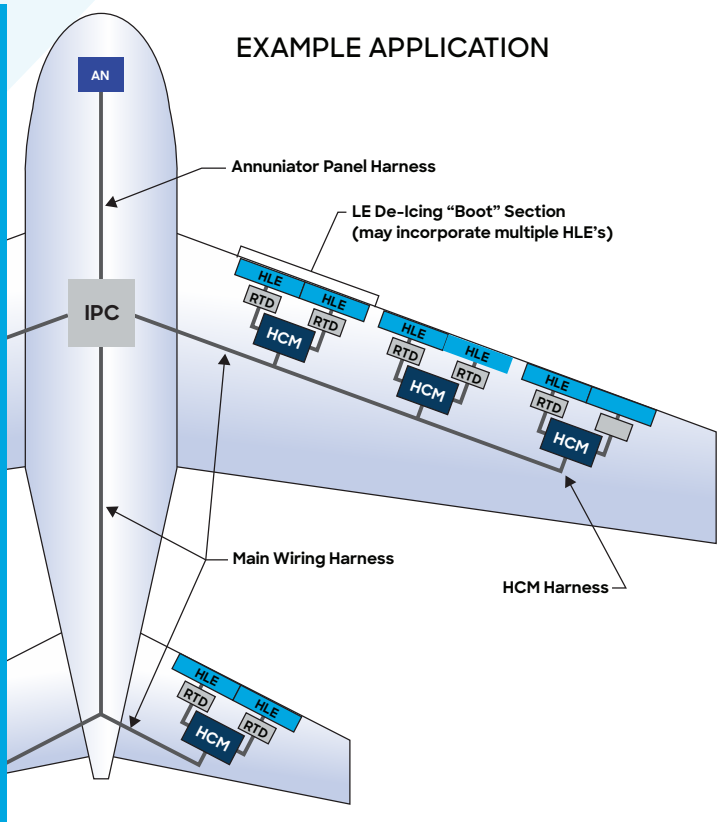
- Highly efficient, Multi-zone system optimized for low power consumption during de-icing (AC or DC capable)
- Fuel savings achieved with an estimated 30% weight savings as compared to legacy pneumatic boots
- Durable system resulting in significant reduction in maintenance, repair, and replacement down times
- Designed for both installation on existing aircraft with minimal modifications, utilizing current electrical power, as well as new production next generation aircraft
- Meets latest certification requirements

Flying Colors: HELIOS Ice Protection™ Technology Validation Due Diligence

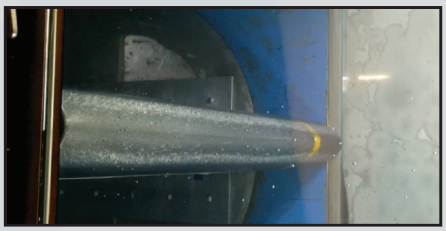
- Icing tunnel tests – technology tested to certification
- Power distribution, requirements assessment, and reliability testing
- System configuration layout
- Certification planning & assessment
- Structure manufacturing plans
- Delivery and aftermarket support assessment

HELIOS Ice Protection™ will provide necessary structure and system intergration to support next generation aircraft or existing platform upgrades

EXAMPLE APPLICATION



TECHNOLOGY CAPABILITY TEST



Two-Minute Cold Condition Delayed Activation

Fully Encapsulated Leading Edge undergoing icing tunnel testing

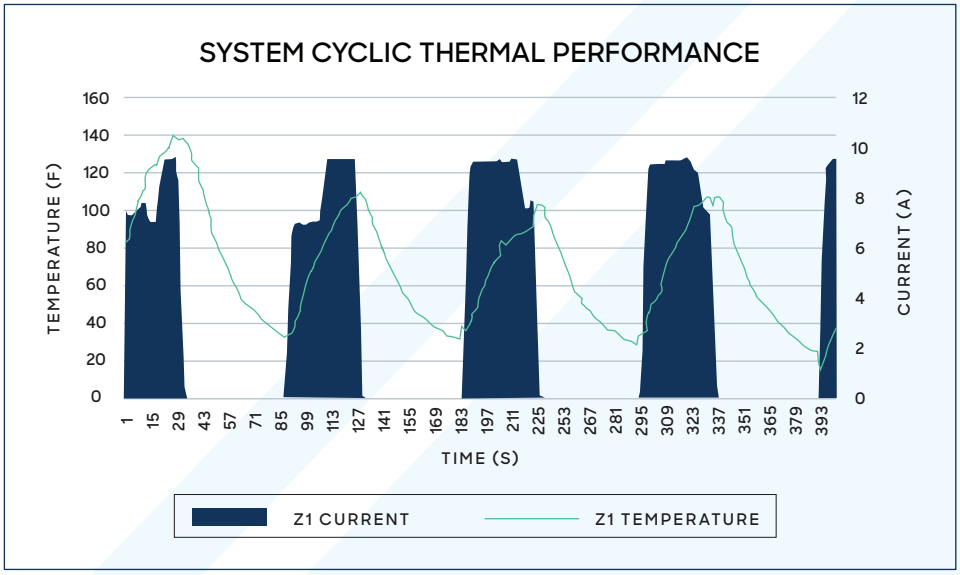
Full ice shed seven seconds after activation

QARBON AEROSPACE

HELIOS Ice Protection™ Overcomes Dangerous Icing System Challenges

Before **HELIOS Ice Protection™**, electrothermal ice protection systems typically comprised of metal elements bonded to a metal leading edge using film adhesives and other composite materials, leading to inefficient heat transfer across the layers, particularly in the outer layers of the metal skin. **HELIOS Ice Protection™** employs a highly durable heated layer embedded within a carbon fiber composite leading edge. The superior thermal conductivity of carbon/graphite enables faster heating, providing a crucial advantage.

In any system, "runback" ice may form aft of the protected area as meltwater flows back and refreezes, adversely affecting the airfoil's flight performance. Conventional ice protection systems operate continuously at higher temperatures in an attempt to manage runback. In contrast, **HELIOS Ice Protection™** addresses this issue with an innovative zoned approach. A parting strip zone at the leading edge's stagnation point maintains a specific temperature to prevent ice formation, while aft shed zones are designed to allow controlled freezing and accumulation of limited amounts of water. These aft zones are digitally controlled to cycle with concentrated heat, facilitating the shedding of accumulated ice, preventing runback, and minimizing overall power consumption.



TECHNICAL SUMMARY CHART	
Operational Voltage	*115-240 VAC or DC depending on aircraft electrical system*
Certification	*System capable of meeting current 14 CFR 25.1419 requirements for Appendix C and O*
Controller	*RTCA DO-178/DO-254 level B compliant based on ice protection system safety requirements*
Maintenance & Reliability	*Heated composite leading edges provide increased life, reliability, and reduced maintenance compared to legacy systems*

For further information, demonstrations, purchase inquiries please contact:

Mike Lee

Head of Research & Technologies

Qarbon Aerospace Inc.

300 S Austin Blvd · Red Oak, TX 75154

(+1) 817-881-5685 · *mike.lee@qarbonaerospace.com*

HELIOS™ Ice Protection

by QARBON AEROSPACE