

Abstract Submitted
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High-speed imaging of the transient ice accretion process on a NACA 0012 airfoil¹ RYE WALDMAN, HUI HU, Iowa State University — Ice accretion on aircraft wings poses a performance and safety threat as aircraft encounter supercooled droplets suspended in the cloud layer. The details of the ice accretion depend on the atmospheric conditions and the flight parameters. We present the measurement results of the experiments conducted in the Iowa State icing wind tunnel on a NACA 0012 airfoil to study the transient ice accretion process under varying icing conditions. The icing process on the wing consists of a complex interaction of water deposition, surface water transport, and freezing. The aerodynamics affects the water deposition, the heat and mass transport, and ice accumulation; meanwhile, the accumulating ice also affects the aerodynamics. High-speed video of the unsteady icing accretion process was acquired under controlled environmental conditions to quantitatively measure the transient water run back, rivulet formation, and accumulated ice growth, and the experiments show how varying the environmental conditions modifies the ice accretion process.

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