

Affordable Flight Testing of the LEAPTech Distributed Electric Advanced Concept



Abstract: This LaRC/AFRC/Ames/GRC team seedling research is performing a rapid design, development, fabrication, and testing effort focused on understanding the potential benefits of highly coupled aero-propulsive distributed electric propulsion. This research will showcase the ability of the latest physics-based design tools to capture these complex multi-disciplinary interactions, while rapidly taking this advanced design concept to ground-flight testing validation through highly affordable testing approaches. The concept being pursued is the application of distributed thrust along the entire wing leading edge to permit dramatically less complex highlift structures that are far more effective. Many small, open-rotor propulsors distributed along the span provides an increase in the effective dynamic pressure at the takeoff/landing condition, with the induced velocities from the rotors providing greater velocities than the freestream. This integration benefit can provide an increase of 3x in the wing loading for greater ride quality, with a 60%+ improvement in aerodynamic efficiency.

