



CASE STUDY /

Zunum Aero: Designing the Future of Aircraft Propulsion with the Help of Ansys

“The scripting and parametric analysis capability of Ansys Mechanical is essential for our work on the Zunum Aero Quiet Electric Propulsor. I’ve relied on Ansys Mechanical products for over 20 years to develop the highly optimized solutions required for the aerospace industry.”

Dave Bedel

Senior Principal Engineer / Zunum Aero

To reduce development and certification cost, Zunum Aero simulates component performance analytically with several tools in the Ansys software suite. Simulation provides a low-cost means of proving concept feasibility, improving efficiency and optimizing designs before proceeding to the hardware and test phases of product development.

/ Company Description

Zunum Aero is building a family of commercial hybrid-to-electric aircraft designed for regional transit and powered by quiet range-optimized powertrain and propulsion technologies. The company's vision is to develop 1,000-mile electric air networks to bring fast and affordable travel to every community. Founded in 2013, Zunum Aero is funded by Boeing HorizonX, Jet Blue Technology Ventures and the State of Washington Clean Energy Fund.

/ Challenges

The primary goal of Zunum Aero is to reduce passenger total cost door-to-door (TCD2D) for regional air travel. Optimizing a quiet, lightweight propulsion system with efficient aerodynamic designs and a robust heat transfer system is paramount to achieving the aircraft performance objectives.

/ Technology Used

- Ansys Mechanical
- Ansys Fluent
- Ansys CFX

/ Engineering Solution

- Zunum Aero utilizes simulation software to analyze propulsion components for structural integrity through steady state, modal and dynamic analysis models.
- We perform a detailed heat transfer analysis, beginning with computational fluid dynamics (CFD), fluid flow analysis and cascading to thermal models for temperature prediction and cooling system design.
- We model internal and external flows for aerodynamic pressure loss estimates and design optimization.
- We use modal superposition analysis for transient dynamic analysis for preliminary dynamic assessment.
- With Ansys optimization tools, our team could readily explore design space and more quickly find the right solution to our problems.

/ Benefits

By enabling the simulation of multiple designs, Ansys engineering software helps Zunum Aero save millions of dollars in hardware tests. Integrated tools for multiphysics evaluation, as well as the compatibility between Ansys Mechanical and Ansys Workbench, allow engineers from various engineering disciplines to speed up optimization to the lowest TCD2D.



Zunum Aero's Quiet Electric Propulsors offer range-optimized quiet fans with integrated electric motors. Forty percent shorter runway requirements, 75 percent lower community noise and highly responsive power without altitude lapse are key to reducing door-to-door times.

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