Turbotech, Ansys Collaboration Advances Hydrogen-Fueled Light Aviation

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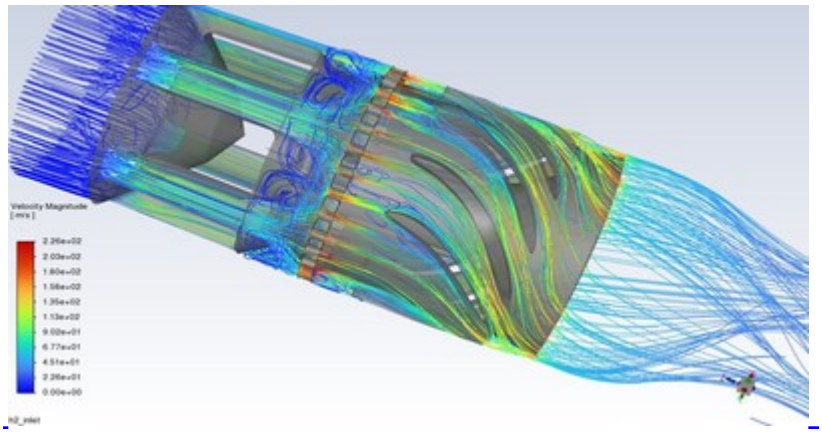
Through simulation-led product development, Turbotech becomes first company to successfully run a scalable turboprop out of a cryogenic hydrogen tank

/ Key Highlights

- Leveraging Ansys simulation to validate its innovative design, Turbotech's hydrogen turbine propulsion system can operate with high efficiency and produce zero carbon emissions for light aviation
- Turbotech integrates Ansys across its designs — from component to system — creating a digital thread that drives significant time and cost savings when developing hydrogen propulsion systems
- Turbotech uses Ansys Fluent™ fluid simulation software to redesign turbine components for hydrogen, initially through the Ansys Startup Program

PITTSBURGH, June 10, 2025 /PRNewswire/ -- Turbotech, a supplier of efficient and sustainable aviation solutions, is leveraging Ansys (NASDAQ: ANSS) simulation to deliver the first viable hydrogen-fueled turbine engine for small-scale passenger planes, vertical takeoff and landing (VTOL) vehicles, drones, and more. In partnership with the BeautHyFuel project, Turbotech is the first company to successfully demonstrate a hydrogen-fueled turboprop engine, emphasizing the crucial role of Ansys simulation in advancing next-generation technology.



Exploratory turbine designs struggle to safely and reliably use hydrogen as a fuel, resulting in difficulty balancing power output, fuel consumption, heat, and combustion systems service life. Turbotech takes a scalable approach, using Ansys simulation to help design and validate a gas turbine that is fuel agnostic — supporting an easier, streamlined transition to hydrogen.

Simulation-led product development allowed Turbotech to quickly identify the two best nozzle designs for real-world testing — cutting prototyping costs and timelines. Specifically, Fluent delivered critical high-fidelity predictions of the flame shape and temperature, and after 30 hours of hydrogen burn the nozzles retained nearly identical structural integrity, and the turbine did not increase emissions output. Ansys solvers also enabled Turbotech to run these simulations on boosted workstations, avoiding the need for large clusters traditionally required for combustion modeling.

Turbotech first developed a novel regenerative turbine through the Ansys Startup Program. This work helped pave the way for a digital thread that seamlessly connects and manages data, ultimately enabling the retrofit for hydrogen.

"Turbotech's goal is to bring a built-in, deeply integrated solution to the light aviation market that reduces carbon emissions and empowers pilots to focus solely on flying," said Guillaume Malet, chief technology officer at Turbotech. "The reliability of Ansys helped us tremendously throughout the redesign, successfully allowing us to retrofit the turbine for hydrogen on a much shorter timeline. It would not have been feasible to test or optimize our prototypes without Ansys simulation."

This series of tests is part of the BeautHyFuel project, supported by the French Civil Aviation Authority and led by Turbotech and Elixir Aircraft, in partnership with Safran, Air Liquide and Daher.

"Ansys is dedicated to supporting customers like Turbotech in expanding the limits of what can be achieved through simulation," said Walt Hearn, senior vice president of customer excellence and worldwide sales at Ansys. "This first-pass success was made possible not only by Turbotech's expert engineers and their deep understanding of complex multiphysics, but by Ansys' strong technical support across all phases of the project. The collaboration is critical to helping Turbotech save significant time, costs, and resources as they advance this new market."

Visit Ansys at the Paris Air Show June 16-19 at Chalet 214 to see Turbotech technology on display, and Hall 4 to learn more about Ansys digital engineering technology.

/ About Ansys

Our Mission: Powering Innovation that Drives Human Advancement™

When visionary companies need to know how their world-changing ideas will perform, they close the gap between design and reality with Ansys simulation. For more than 50 years, Ansys software has enabled innovators across industries to push boundaries by using the predictive power of simulation. From sustainable transportation to advanced semiconductors, from satellite systems to life-saving medical devices, the next great leaps in human advancement will be powered by Ansys.

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/ Contacts

Media	Mary Kate Joyce 724.820.4368 marykate.joyce@ansys.com
Investors	Kelsey DeBriyn 724.820.3927 kelsey.debriyn@ansys.com

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