

Ground testing the fuel-efficient Open Rotor engine

5 October 2017, by Nancy Owano



Credit: Safran

(Tech Xplore)—The Open Rotor engine developed by France-based Safran is making aviation news this month.

The company celebrates the success of its first ground tests of the demonstrator engine; the tests took place in southern France. Safran unveiled the Open Rotor prototype on Tuesday, said Reuters.

A number of features make Open Rotor special. Reuters elaborated, saying the Open Rotor engine places previously hidden parts on the outside, to capture more air. Its shape is a talking point; it looks like an elongated egg with two rows of blades at the back, said Tim Hepher.

Safran's press release described it as having "two counter-rotating, unshrouded fans, allowing it to reduce fuel consumption and CO2 emissions by 30% compared with current CFM56 engines."

CFM56 (and LEAP) are brand names of CFM International. This is a joint company between Safran Aircraft Engines and GE.

"The company expects the new unshrouded

engine [architecture](#) to deliver fuel savings of 15 percent compared with the new Leap series, built by the CFM joint venture between Safran and GE," said *AIRonline*.

Hepher in Reuters wrote, "Such engines would most likely be placed at the back of the airplane instead of under the wing, leaving room for the two rows of scimitar-shaped carbon blades to swirl in opposite [directions](#)."

This Open Rotor demonstrator was developed under the European Clean Sky research program. Philippe Petitcolin, CEO of Safran, said they were studying several paths to develop, along with "partners in Clean Sky."

The engine was developed with European Union backing.

"Safran and its partners in the Clean Sky program have received 65 million euros in funding from the European Commission for this project, over a period of eight years," said the company press release. The CEO said Clean Sky focused on "technology building blocks" for propulsion systems. The goal is significantly improved performance in tomorrow's airplanes.

"Clean Sky is a European public-private [research](#) program, launched in 2008 by the European Commission in conjunction with European aviation companies."

Open Rotor could impact airplane fares.

Reuters: "Clara de la Torre, a top European Union research official, said the new type of engine could help airlines cut air fares because it requires less fuel." The design "could become attractive as energy costs rise and regulations require fewer emissions," said Petitcolin.

AirInsight said the lighter blades were 3-D woven.

AInonline noted a "3-D woven carbon composite."

"Either they want an evolution of the current single-aisle by 2025-2027, and the UHBR will be possible, or they want a new design beyond a more distant horizon. And that would allow open rotor."



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Credit: Safran

Noise? Reports say the noise issue was worked on.

"Wind tunnel tests carried out in 2013 helped solve the noise challenge, one of the main hurdles in open-rotor development," wrote Guillaume Lecompte-Boinet in *AInonline*

What's next? The engine is being tested in facilities at a French military base near Marseille, said Reuters, and *AInonline* said "Tests will continue until the end of the year to validate the demonstrator."

Reuters: "If we want to be ready in 2030 we have to start now,' Petitcolin told reporters. 'If oil prices return above \$100 I think there will be much stronger interest.'"

Hepher added that any decision to offer the engine to planemakers would be made through CFM International, Safran's joint venture with General Electric.

"The partners will coordinate under CFM in the event of a launch of an open-rotor program. Certification of an open-rotor [engine](#) would not occur before 2030, according to Safran." Petitcolin said in *AInonline* that everything depended on the choice of aircraft manufacturers.

APA citation: Ground testing the fuel-efficient Open Rotor engine (2017, October 5) retrieved 2 November 2017 from <https://techxplore.com/news/2017-10-ground-fuel-efficient-rotor.html>

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