DAHER - SAFRAN - AIRBUS

BACKGROUNDER

December, 2023

About EcoPulse project

- EcoPulse is a distributed hybrid propulsion aircraft demonstrator developed by Daher, Safran and Airbus, with the objective to validate, for the first time in flight, the operations of a hybrid electric distributed propulsion system.

- This highly disruptive architecture could significantly reduce the CO_2 emissions of future aircraft and support the aviation industry objective of net zero emissions by 2050.

- The EcoPulse demonstrator is based on a TBM aircraft supplied by Daher, equipped with a hybrid-electric propulsion system with six electric propellers provided by Safran, using Airbus' aerodynamic and acoustic integration expertise. Airbus also developed the high energy density battery that will be used as an electric source up to the six propellers.

- This project will increase our knowledge of distributed propulsion systems, ePropellers, high voltage batteries and integration of high voltage in aircraft, paving the way for future electric and hybrid-electric aircraft.

- The EcoPulse project received support from the French "Plan de Relance", from the French Civil Aviation Authority (DGAC), from the CORAC (Civil Aviation Research Council) and from the European Union.

Activities on the demonstrator

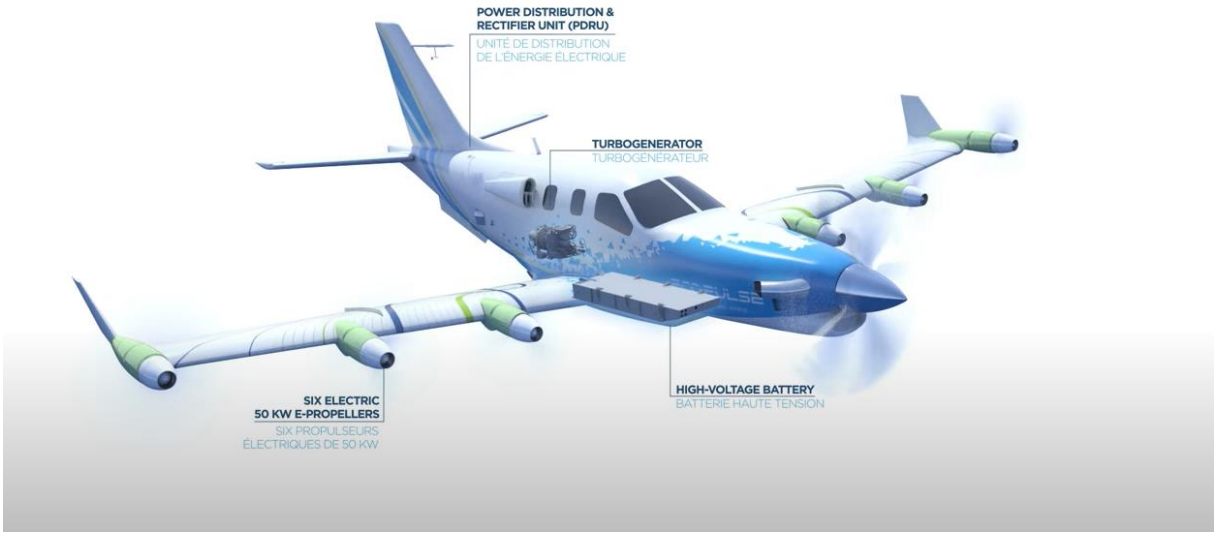
Daher is responsible for the aircraft integration of the components provided by Airbus and Safran on a TBM platform airframe. They drive Permit-to-Fly discussions with Airworthiness Authorities, perform flight testing and coordinate overall results analysis.

Safran designs and supplies the hybrid-electric propulsion system (except batteries), consisting of:

- Six e-Propellers, each with an innovative 50 kW electric smart motors, three-bladed propellers with a feathering blade pitch mode and ventilated spinner.
- A compact onboard 100 kW turbogenerator (APU - Auxiliary Power Unit) which contains a small gas turbine coupled to an electrical generator (PMG).
- A Power Distribution and Rectifier Unit (PDRU) distributing the available electrical power and protecting the high voltage network, as well as high voltage power harnesses
- Safran also provides propellers feathering actuators and has performed electrical and thermal chain modeling and pre-project studies.

Airbus performs the aerodynamic and acoustic integration of the distributed propulsion system (nacelle and fairing shapes, aerodynamic and acoustic characterization) and develops a Flight Control Computer to take full benefit of Distributed Electric Propulsion while operating EcoPulse.
Airbus also designs a high energy density 800 VDC battery (incl. battery management system and housing) that will power up to six electric propulsors, depending on the test conditions. This battery uses

“off-the-shelf” Li-ion cells and components, assembled and secured in a battery pack compliant with the highest aviation safety standards.



Key milestones

June 2019	Daher, Safran and Airbus reveals EcoPulse project during Paris Airshow
November 2019	Concept Freeze Review
November 2020	Preliminary Design Review
June 2021	Wind tunnel tests of the electric propulsion system
September 2021	Critical Design Review
June 2022	Preliminary system ground tests
September 2022	EcoPulse demonstrator roll-out from final assembly line and paintshop
October 2022	Operational flight tests without activating electric propulsion system
29th November 2023	First flight with full activation of electric propulsion system
July 2024	End of flight test phase (around 70 flights foreseen)

Media assets

Browse all photos, videos and downloadable assets about EcoPulse

- EcoPulse first flight, November 29, 2023
- EcoPulse demonstrator at Paris Airshow 2023
- EcoPulse: ready to demonstrate hybrid-electric propulsion in flight (Video displayed at Paris Air Show 2023)
- EcoPulse, ePropellers ground test, June 2023
- EcoPulse wind tunnel testing
- EcoPulse high voltage battery
- EcoPulse mock up (Paris Air Show 2019)