



PLANS FOR A FIRST 100% ELECTRIC AIRCRAFT - VOLOTEA, AIR NOSTRUM & DANTE AERONAUTICAL

News / Airlines, Manufacturer



The consortium expects their first aircraft with this technology to be certified for flights in 2024

The 100% electric aircraft project led by Volotea, Air Nostrum and Dante Aeronautical will mean an important step towards a future with emission-free aviation. This aircraft will play a crucial role in establishing zero-emission regional air transport, enabling connections to be made between small population centres, thanks to its reduced operating costs compared to much larger aircraft.

Initial plans and images of what will be the first prototype of a 100% electric aircraft show that more sustainable aircraft are getting closer to becoming a reality. In fact, the consortium expects this initial prototype to be certified for flight in three years time, representing a major milestone for the aviation industry.

The collaboration involves the two major aircraft operators, Dante Aeronautical, artificial intelligence companies such as DataBeaco, engineering and technology innovation companies in the aviation sector, including the Spanish multinational CT, as well as public research organisations such as CIDAUT (the Foundation for Transport and Energy Research and

Development - Fundación para la Investigación y Desarrollo en Transporte y Energía) and CIDETEC (The Specialised Energy-Storage Research Centre - Centro de Investigación Especializado en el Almacenamiento de Energía). The project is a clear example of commitment to technological innovation and sustainability.

“We started our collaboration with Dante Aeronautical back in 2019 and are very proud to see how the project has grown and gained momentum with the support of new partners, including several Spanish technology companies. The development of an electric aircraft using hydrogen battery technology will reduce carbon emissions. It makes complete sense for Volotea to support this project since it's completely in line with our goal of connecting underserved cities and doing so in ways that are more sustainable,” stated Carlos Muñoz, Volotea's founder and CEO.

Carlos Bertomeu, Air Nostrum's CEO, emphasised that the Valencian airline is experienced in working with SMEs and institutions. “The benefits of Air Nostrum's collaborations with technology start-ups and universities to improve efficiency and passenger services are proven,” he stated. “As a leading regional airline, Air Nostrum clearly had much to contribute to this exciting project, especially in regards to sustainability, which is something that we have been working on for many years,” he concluded.

Miguel Madinabeitia, Dante Aeronautical's co-founder, highlighted the agreement reached: “For Dante Aeronautical, expanding the consortium to include other innovative technology companies can only strengthen our plan to develop a 100% electric aircraft, which will revolutionise current thinking and move us towards cleaner and more sustainable transportation”. “This project also sits perfectly with our efforts in other parts of the world, such as our initiative in Australia to electrify hydroplanes,” stated Madinabeitia.

ZERO EMISSIONS MISSION

Development of smart propulsion technology for zero-emission regional air transport.

VOLOTEA

AIR NOSTRUM

DA

Infographics: wipacelco - Data: Volotea + Dante

Objectives



01. To reduce emissions

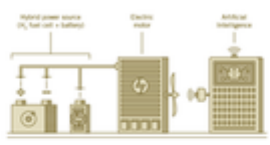


02. 100% electric aircraft

Primary objective:



To design and develop a 100% electric power plant supplied by a hybrid system of batteries and hydrogen fuel cell, governed by a smart system based on Machine Learning technology.



This aircraft will enable point-to-point connections between small population centres thanks to its reduced operating costs, comparable to those of much larger aircraft. It will be the backbone of passenger traffic in regional Europe.

Secondary objectives:



1. Conversion of existing aircraft



2. Paradigm shift

Cleaner, more sustainable and efficient air transport with a high technology component developed in Spain.



03. Sustainable regional aviation



04. To provide innovative solutions

Technological challenge

Demonstrate that retrofitting existing aircraft into full electric by replacing their internal combustion engines with zero emission powerplants is technically and financially feasible.



Phases:



01. Design



02. Prototype



03. Flight Tests



04. Iteration



05. Production / Scaling

Aircraft electrification

Electrical power generation system with hydrogen fuel cell

Hydrogen fuel cells with PEM (Proton Exchange Membrane) technology transform the energy content of hydrogen into electricity.

The energy density of hydrogen is 3 times that of kerosene.

Hydrogen fuel cell efficiency is typically between 40% and 50%.

Stack of proton exchange membranes (PEMs)

Stack structure



Battery module

For power peaks at take-off and climbing, the cells selected allow for high discharge levels, necessary for phases such as take-off.

Electric motor

Efficiency > 90%

Electric motors are much more efficient (>90%) than internal combustion engines (less than 40%). Additionally, as they have practically no moving parts, they require much less maintenance and have a much longer life.

Cooling system

Heat is a byproduct of the reaction between H₂ and O₂ that generates electricity and produces water.

Hydrogen storage system

Hydrogen is stored as a gas in high-pressure vessel (1700 bar) to reduce the required volume. These tanks need to be very resistant to withstand the high hydrogen pressures. The weight in hydrogen typically does not go over 6-8% of the total system weight.

Weight of hydrogen

6-8%

Weight of hydrogen

Electric power plant with hybrid system

Energy generating system

Sustainable aircraft

01. Retrofitting of 9-passenger aircraft

Conversion of short and medium-range commercial aircraft to 100% electric.



Retrofitting 9-pas. test flights

Certification 9-pas. retrofit

Retrofitting 19-pas. test flights

Certification 19-pas. retrofit

02. Retrofitting of 19-passenger aircraft

Conversion of short and medium-range commercial aircraft to 100% electric.



Retrofitting 19-pas. test flights

Certification 19-pas. retrofit

03. 19-Passenger concept aircraft

DAE19 hybrid regional airplane design. Parallel project started in 2018.



Certification 2028-2030

Development plan



The consortium

A group of six entities involved in the development of the first prototype of a 100% electric regional aircraft: 9-passenger retrofit.

SMEs

Airlines

Major companies



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