BLUE SPIRIT AERO

BSA PRESS KIT

A-01

SUMMARY

1 - OUR VISION

Today's aviation needs to be reinvented.

Fleets are aging. The average age of aircraft in service is 40 years. There is an unavoidable replacement of conventional ICE (Internal Combustion Engine) aircraft with new generation solutions which will meet the future needs of the aviation industry. The emergence of new generations of aircraft will renew this aging fleet and transform a growing worldwide general aviation market.

Aviation is not sustainable. States, organisations and authorities encourage all players in the aviation ecosystem to decarbonize the aviation sector and find realistic alternatives to fossil fuels. Aircraft manufacturers thus have a major role to play in this transformation by proposing new solutions that meet the needs of the present without compromising the ability of future generations to meet their own needs.

Airfields are under increasing pressure. The general public, especially those living near airfields, are increasingly raising the issue of noise pollution and the short and long term effects on their well-being, standard living and health. The noise restrictions which apply to the various airfields force them to restrict their operating window, resulting in a decrease in the use of aircraft and therefore a significant impact on economic viability of airfield operations.

Blue Spirit Aero (BSA) wants to be part of this change by taking clean flight to a new height.

2 - OUR STORY

2.1 - Beginnings

BSA was founded in mid-2020 by Olivier SAVIN, a hydrogen expert who has for over 25 years worked on implementing hydrogen in different airborne applications, from integrating hydrogen fuel cells into the space shuttle with Honeywell in California to managing several hydrogen projects at Dassault Aviation in Paris.

This venture was founded with personal funding from its founder and from a close circle of passionate friends. Initial seed funding has also been raised enabling BSA to move into the demonstration phase and now the Series A has been opened to private investors and institutions willing to support the future of aviation.

2.2 - Goal

Zero-emission and long range flight is achieved by rethinking the current approach for propulsion (i.e combustion engines). BSA thinks that hydrogen paired with fuel cells is the best solution for their market segment: long range, short refill time, zero-emission and low noise signature.

The initial target market for Blue Spirit Aero's entry into service is flight training schools. Majority of their fleets fly from and to a handful of airports, simplifying the hydrogen infrastructure requirements as a large network will not be required at launch.

Moreover, as hydrogen is a universal fuel there is a lot of opportunity for synergies between sectors. A hydrogen refilling station can be used to refill not only aircraft, but also other forms of transport such as personal cars, public buses, freight trucks and even ground handling vehicles.

2.3 - Achievements

Blue Spirit Aero has been awarded the Deep Tech label which has qualified us for French Tech grants from BPIFrance (a French public investment bank). BSA has also received a golden award for the Summit of sustainable development (Sommet de la Transformation Durable) as the best hydrogen project.

Finally, BSA was the laureate of the first two calls for interest MAELE (Mobilité Aérienne Légère Environnementalement Responsable - Light and Environmentally Responsible Air Mobility) launched by Aerospace Valley and supported by the Nouvelle-Aquitaine and Occitanie regions.

Since the beginning, BSA also secured partnerships with renowned actors of the aviation ecosystem :

bpifrance DASSAULT SYSTEMES LATÉCOÈRE

La Région Occitanie Pyrénées - Méditerranée cea ONERA THE FRENCH AEROSPACE LAB

3 - OUR PRODUCT

3.1 - Description

Blue Spirit Aero is developing a family of innovative zero-emission aircraft that enable quiet flight, provide unrivalled safety and feature low operational costs. These benefits are achieved through a clean sheet design of a new aircraft architecture integrated with multiple hydrogen electric powertrains (called PODs).

BSA's philosophy is to design the aircraft around the hydrogen, rather than to retrofit it as an afterthought, which enables a level of performance inline with the market's needs in terms of operating costs, range, speed, sustainability and operability.

Indeed, at BSA, we believe that the best solution is the Distributed Electric Propulsion (DEP) paired with small size fuel cells. Power distribution minimizes the impact of a pod failure on overall performance and safety. If ever one or more powertrains were lost the aircraft could still sustain in flight and perform powered landings as there is no single point of failure.

Since its creation, BSA has filed 3 patents: 2 on the PODs (its design and its operation) and 1 on the aerodynamic interaction between propeller wash and the wing by using vortex generators.

Our design couples hydrogen fuel cells with electrical motors to completely eliminate environmentally harmful emissions, throughout the entire lifecycle and also minimises noise emissions. By flying quieter, we can also increase the flight time window for operators as they can fly earlier or later in the day without disturbing airport locals.

3.2 - Performance

Number of seats	4
Ground take-off distance	< 300 m (< 985 ft)
Service ceiling altitude	3 050 m (10 000 ft)
Climb rate	> 4 m/s (> 785 ft/min)
Stall speed flaps extended	< 100 km/h (< 55 kts)
Cruise speed	> 250 km/h (> 135 kts)
Maximum range	> 700 km (> 375 nm)
Maximum take-off mass	< 1 600 kg (< 3 550 lbs)
Useful payload	> 350 kg (> 700 lbs)
Refill time	< 10 min

3.3 - Timeline

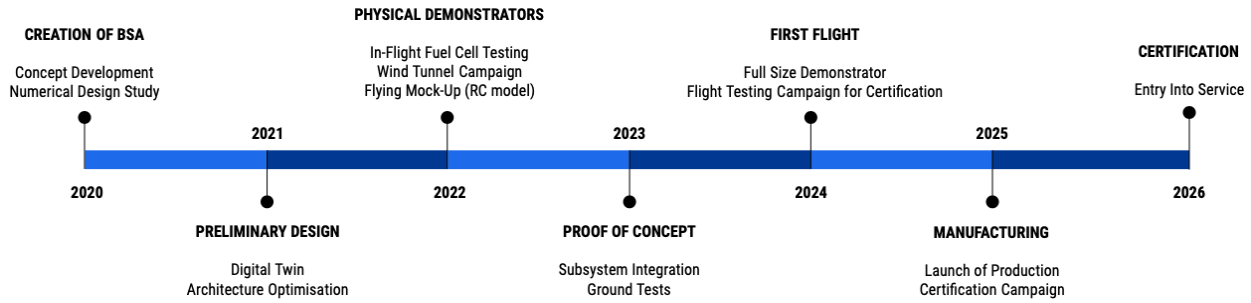
To date, the BSA project has undertaken two years of stealth development to build our own in-house simulation/design tools, to produce three patents to protect our intellectual and to assemble a strong team of over 10 engineers and experts.

The current stage of the project now consists of two years of physical demonstrators and validation which culminates in a first flight by the end of 2024. The validation involves testing the different key elements in their working environment to measure their performance outputs, to compare the results to our in-house models and to perform calibration.

These physical tests include the onboarding of a fuel cell on an existing aircraft as a test bench to assess the performance of the fuel cell under high loads and manoeuvres, a wind tunnel test campaign with propellers active to validate the aerodynamic performance and a scaled model of the BSA aircraft which will be remote controlled and flight tested to verify the dynamic response and handling qualities of the distributed electric propulsion architecture.

The first flight in 2024 represents a key milestone in the project as it will also trigger the certification campaign for EASA's CS-23 regulations. The first BSA aircraft will be certified under the single engine aircraft category. All the power units will be producing the same amount of thrust and controlled by a single throttle in the cockpit.

In a later version of the aircraft, differential thrust will be explored to extract the most performance from this architecture. This update may be performed through a software update and with minor hardware updates in the aircraft.



4 - OUR CONTACT

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