SOLUTIONS FOR THE MANUFACTURING OF THICK THERMOPLASTIC COMPOSITE PARTS

MATCH 2 PROJECT

The MATCH II project aims to develop a manufacturing process (with control over the AFP preform, material health, and geometry) for thick thermoplastic composite parts used in primary aerospace structures.

TECHNICAL AND ECONOMIC IMPACTS

- Cost reduction (improved buy-to-fly ratio and reduced assemblies)
- Performance gain (mass reduction)
- Advantages of thermoplastic materials

(recycling, functionalization, welding, and shaping)

PARTNERS

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BUDGET

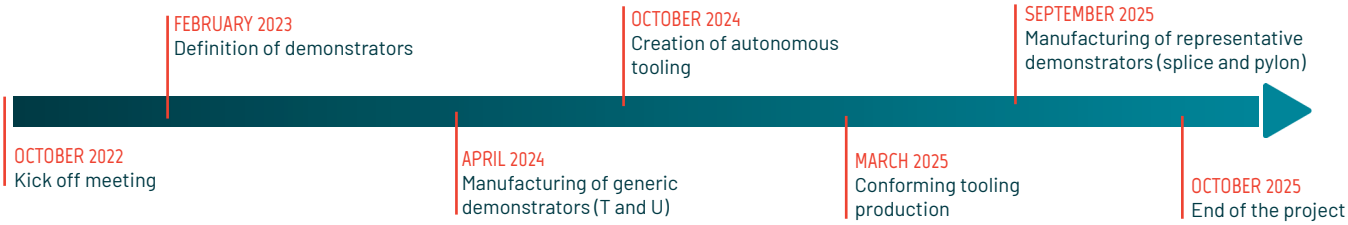
€6,544k

KEYWORDS

Thick thermoplastic composites - Cryogenic machining - AFP manufacturing processes - Monitoring - Numerical simulation and consolidation (oven, autoclave, and out-of-autoclave).

RESEARCH THEMES AND EXPERTISES

Forming and preforming processes - Integrated product/process design - Process innovation



INDUSTRIAL CONTEXT

In the aerospace industry, the primary industrial challenges involve integrating new technologies to reduce production costs while maintaining structural performance.

The industrial significance of this project lies in the development of a differentiating technology that meets aerospace requirements: cost-effective manufacturing, high performance, durability, and high production rates (60 to 100 per month), all while considering environmental constraints.

To address these challenges, the choice has been made to use high-performance thermoplastic matrix composites. This choice allows us to harness the advantages of composites, such as their lightweight properties, while also benefiting from their intrinsic ability to be recycled, reused, and assembled through welding

INNOVATIVE FEATURES

- Mastering AFP preform: process monitoring, laser/material interaction simulation, and AFP strategy.
- Mastering material health: stress simulation and consolidation strategy.
- Mastering geometry: distortion simulation, cryogenic-assisted machining, and shaping.
- Out-of-autoclave consolidation: autonomous tooling for pressure and temperature.

INDUSTRIAL APPLICATIONS

The initial target components at the end of the project include primary aircraft structure parts, such as wing splice joints or the engine pylon.
The technical solutions obtained will pave the way for the use of thermoplastic composites in structural applications for new aircraft programs.
The various partners involved will be able to maintain a competitive advantage in expanding the use of thermoplastic composites (TP) and in the design of specific tooling.

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