

HYPERCONNECTED SIMULATION ECOSYSTEM SUPPORTING PROBABILISTIC DESIGN AND PREDICTIVE MANUFACTURING OF NEXT GENERATION AIRCRAFT STRUCTURES

CAELESTIS PROJECT

This project aims to develop a novel, secure, end-to-end Interoperable Simulation Ecosystem (ISE) that will perform multidirectional dataflow across the aircraft value chain linking product design, process and distributed engineering teams' CAD-CAE tools, to accelerate the design and engineering optimization of disruptive aircraft and engine configurations, ensuring their manufacturability from the design conceptualization.

TECHNICAL AND ECONOMIC IMPACTS

- 30% reduction in fuel burn and CO2 emissions by 2035
- Acceleration manufacturing of lightweight engine's parts: 20-40% weight reduction in a component
- Accelerations of design and manufacturing by simulations

BUDGET

5 957 k€

EQUIPEMENTS

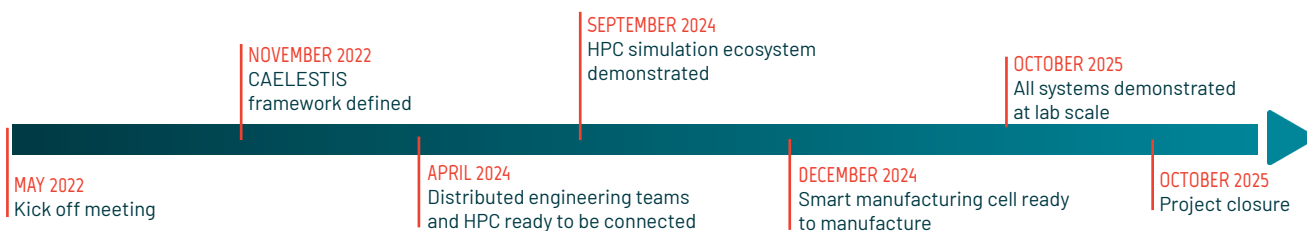
HPC Calculator - 192 cœurs and 1 TB RAM
PAM-RTM© Software
Mecamaster© Software

PARTNERS

Addcomposites (FI), Asociación de investigación metalurgica del noreoste (ES), Barcelona Supercomputing Center (ES), EBOS Technologies Ltd (CY), ESI Group (FR), ESI Software Germany GMBH (DE), GKN Aerospace Sweden AB (SE), Institut de recherche technologique Jules Verne (FR), Instituto tecnológico de Aragón (ES), RTDS (AT), Technische Universiteit Delft (NL), Universitat de Girona (ES).

KEY WORDS

Interoperable Simulation System
Machine learning for products and processes



INDUSTRIAL CONTEXT

Aviation accounts for 3.8% of CO2 emissions in the EU and is expected to increase by 50% by 2050 compared to 2019 in the EU.

To maintain and improve its competitive position in climate-neutral scenario, EU aeronautics industry needs to timely deliver reliable and commercially viable disruptive configuration with reducing the cost, risk and time to develop them.

INNOVATIVE FEATURES

- Creation of an end-to-end Interoperable Simulation System
- Machine learning use to higher performances
- HPC for products and processes simulations
- Full product-process numerical workflow

INDUSTRIAL APPLICATIONS

Save of time and materials for the manufacturing of lighter aircrafts thanks to faster, more efficient design methods.



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