PLEIADES

Developing sustainable aircraft for the future

PLEIADES – Advancing Aeros**P**ace Composites Through Induction We**L**ding and New Vitrim**E**ric Formulat**I**ons Enh**A**nced by Integrate**D** Photonic S**E**nsors, Providing Data to Digital **S**upply Chain, SHM, Maintenance.

www.pleiades-project.eu

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Further development of composite materials for aircraft structures

The composites aerostructures market is projected to grow to US$116 billion by 2030, attributed to the increasing demand for advanced materials in aircraft manufacturing which exhibit lightweight properties and can withstand harsh environments, ultimately improving the aircraft performance and cost savings.

The PLEIADES project aims to address these needs, making significant steps towards meeting the industry's requirements through its proposed solution. PLEIADES brings together different disciplines and key technologies that will contribute to advancing further composite aerostructures and promote the digital transformation in aviation.

PLEIADES multiple disciplines extend across a wide variety, such as formulations and characterization of new composite materials, automation of induction welding processes for composites leveraging integrated sensing, disassembly of composites joints, healing and maintenance schedules. These will be complemented by the development of passive PIC based multi-sensors, the development of a unified quality assurance (QA) - structural health monitoring (SHM) methodology, the extensive modelling for induction welding and the development of material, healing, damage propagation, and de-icing models.

All of these disciplines will be pursued within PLEIADES and with tangible use cases in aerospace, in synergy with the Clean Aviation partnership to ensure its innovations are aligned with it.

Technological advancements of PLEIADES

The technological advancements of PLEIADES will address the needs for high-volume sustainable manufacturing with integrated inspection and recycling and circularity in the aerospace industry.

Key goals of PLEIADES

- Promote sustainability and circularity
- Cost savings of 30-40%
- Development of maintenance and repair protocols
- Development of innovative SHM methodology

Our holistic approach

PLEIADES brings together a number of different disciplines in order to work towards a holistic solution, undertaking innovations in key technologies that will play a significant role in advancing further composite aerostructures and promote the digital transformation in aviation.

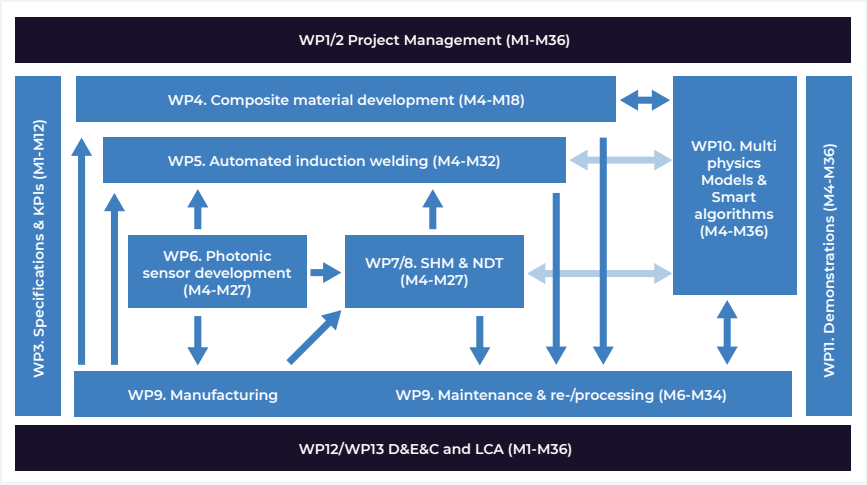
Bringing together a team of 12 partners from 6 countries, the PLEIADES consortium has been strategically selected to include the entire technology development chain, comprising a high-quality blend of strong industrial and academic partners satisfying all technological requirements. It provides a clear path towards transforming the project objectives into exploitable know-how with strong impact potential.

PLEIADES tangible results

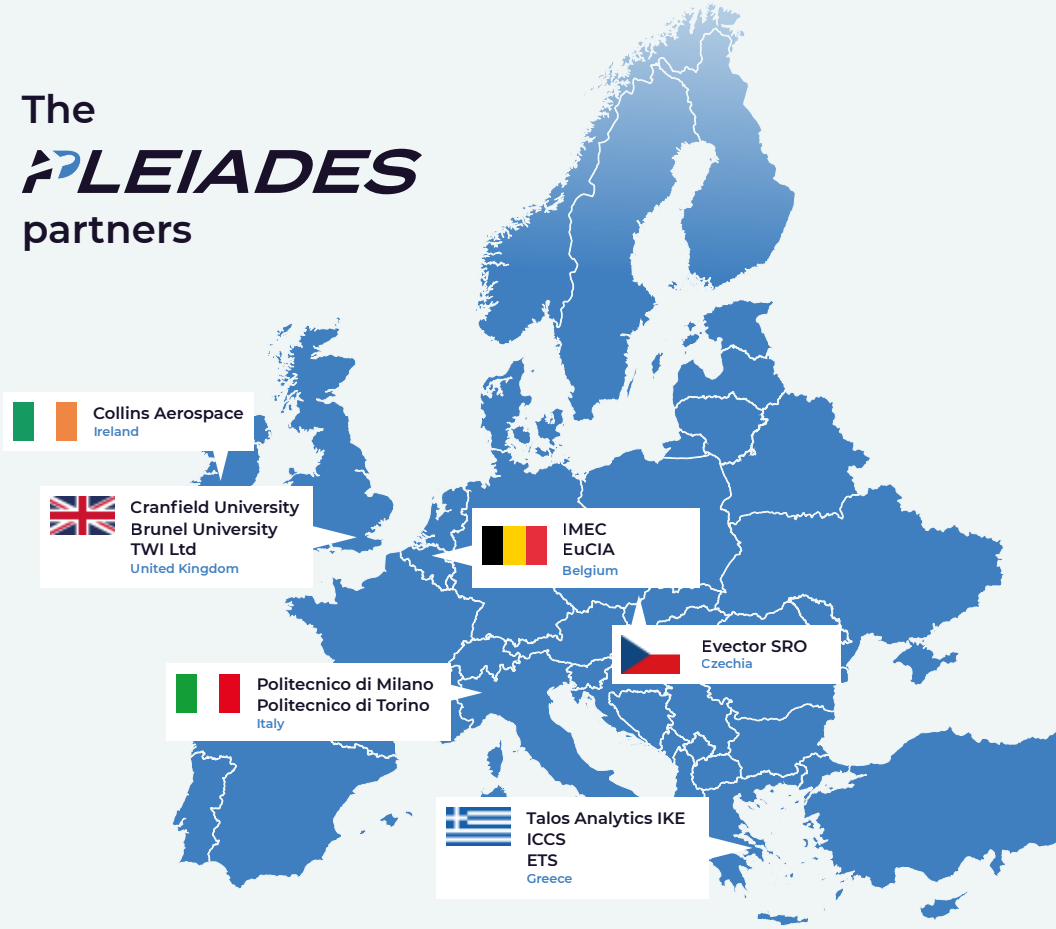
PLEIADES will showcase its innovations through two demonstrators. Firstly, automated robotic induction welding with embedded sensors will be demonstrated with a scaled-down demonstrator of a redesigned planar dashboard of the VUT100-131i Super Cobra.

Secondly, the Digital Twin model-based demonstrator in the project is the evaluation of de-icing and ice detection in a wing. This showcases the capabilities of using a vitrimer composite assembly with embedded sensors as a base layer for an ice detection and de-icing system.

Underpinning several of the PLEIADES innovations is the use of Photonic Integrated Circuits (PIC) sensors, packaged with commercial Fibre Bragg Grating (FBG) sensors. This development enables innovations in the induction welding, the disassembly of welded joints, the weld quality and SHM activities, and the de-icing use case.



The PLEIADES partners



12 Partners | 6 Countries | 36 Months | €4.7m Funding

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