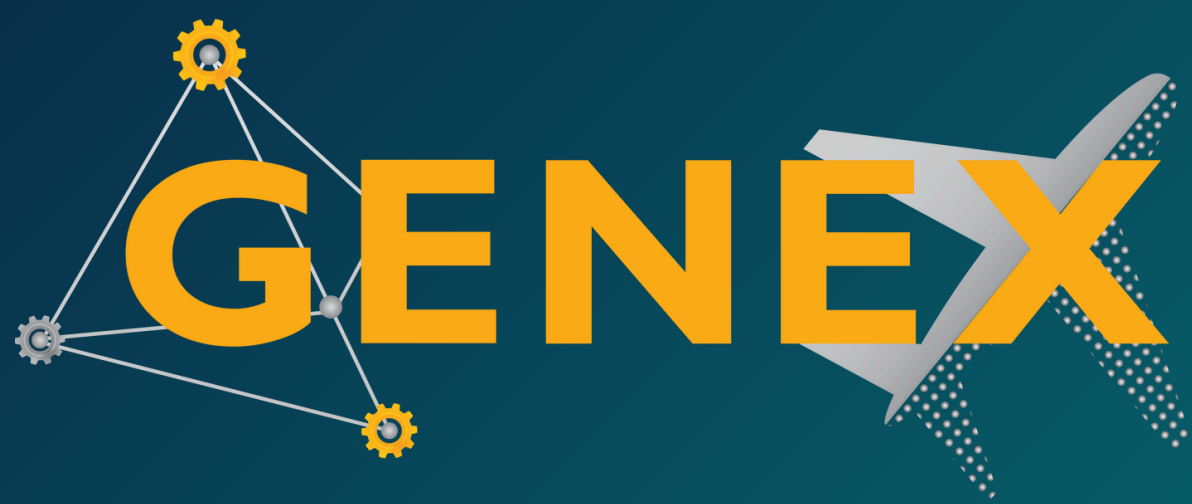




Shaping the future of Aviation Manufacturing

New end-to-end digital framework for optimized manufacturing & maintenance of next-generation aircraft composite structures

A Leap Toward Smarter Aerospace Maintenance, Repair and Overhaul by delivering the Digital Twin Vision

From Concept to Cockpit: The GENEX Digital Framework

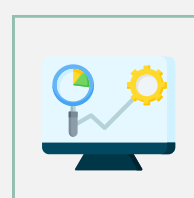
GENEX is a 42-month Horizon Europe project launched on September 1, 2022. GENEX commits to work towards EU goals by developing three pioneering technological assets which, through integration, will lead to a multi-disciplinary digital twin of the component throughout its lifecycle.

A digital twin ecosystem for next-gen aircraft composite structures built on three core technological pillars:



ECO-EFFICIENT COMPOSITE MANUFACTURING

Advanced and efficient manufacturing or recyclable composites.



SMART HEALTH & USAGE MONITORING

Integral health & usage monitoring system of aerostructures.



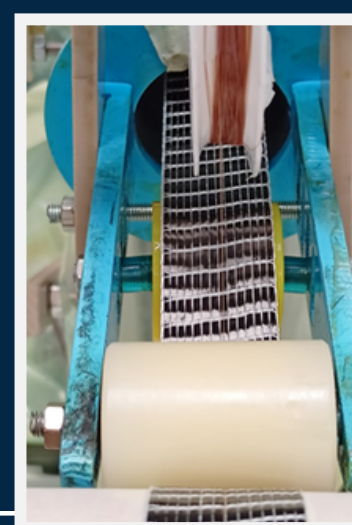
DIGITALLY-ASSISTED REPAIR TOOLS

Digitally-assisted repair processes & tools transforming the composite repairs.

Core Innovations

Eco-efficient composites manufacturing reaches new heights

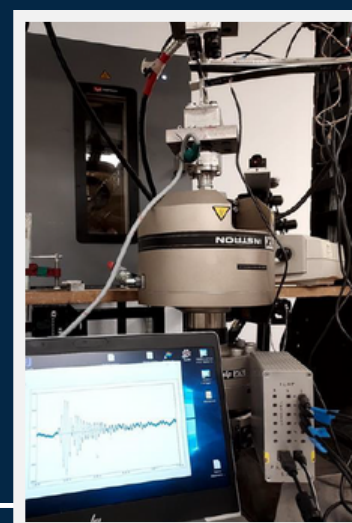
GENEX has revolutionized aerospace manufacturing with eco-efficient composites and intelligent production. At its core is a pioneering out-of-autoclave process using 3R-resin—an advanced thermoset with thermoplastic-like behavior—enhanced by embedded Fibre Optic Sensors for real-time performance tracking.



Embedded Fibre optic sensor (FOS)

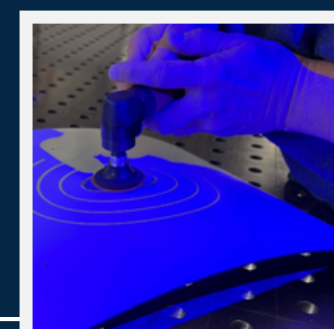
Intelligent Monitoring for Sustainable Aviation

Health and Usage Monitoring & Management is revolutionizing aviation with real-time diagnostics and predictive analytics. By enabling data-driven maintenance, it enhances safety, boosts efficiency, and extends asset life—ensuring mission readiness with sustainable precision.



Monitoring Techniques & Ultrasonic Guided Wave (UGW) inspection

Precision Repairs, Digitally Delivered

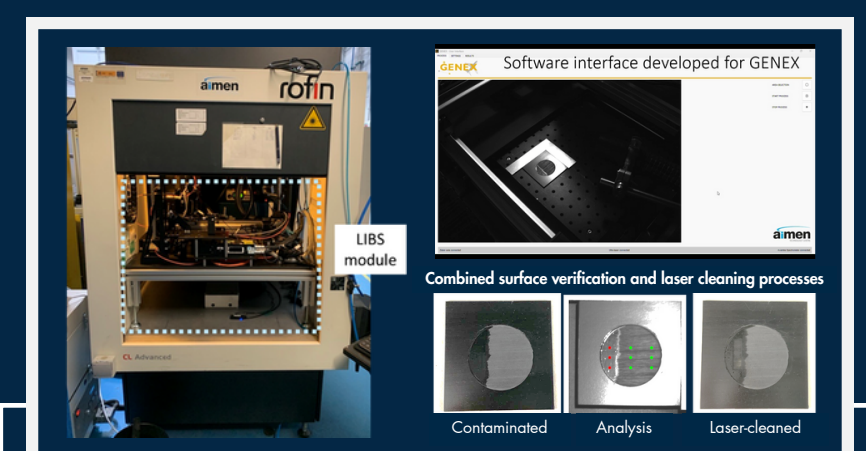


Manually grinding a sample with the VAS system



Setup of the VAS System projecting onto an Eurofighter Airbrake

GENEX is redefining aerospace manufacturing through eco-efficient composites and intelligent, sensor-integrated production. At the heart of this innovation is a groundbreaking out-of-autoclave process powered by 3R-resin, an advanced material that combines thermoset strength with thermoplastic versatility, enabling real-time performance monitoring via embedded FOS.



Combined LIBS module and laser cleaning. Control and analysis GUI detects contaminated areas. Processed samples were contaminated and correctly analyzed and cleaned.

A New Era of Intelligent Aerospace

GENEX reaches a pivotal milestone with the integration of its advanced technologies into a real aircraft component. Featuring seamless connectivity with an intelligent IoT platform and a dynamic digital twin, this demonstrator enables real-time data flow and predictive insights across the aircraft's lifecycle. It sets a new benchmark for smart, connected, and sustainable aviation systems.



Watch now!

Digital-Physical Twin: On-line control of the repair bonding process

GENEX OVERALL METHODOLOGY



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Get In Touch with GENEX

genex-project.eu

