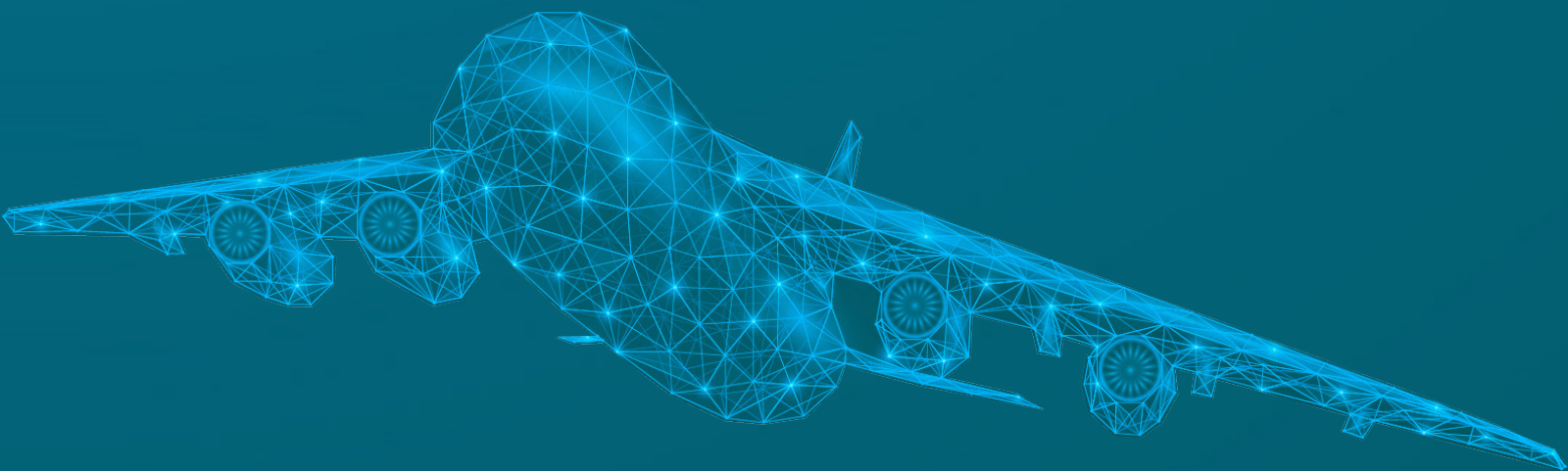


INFINITE

NEWSLETTER II



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Dear reader,

We have been working on this project for two years, starting with great enthusiasm. Although we encountered significant challenges—darker than aeronautical carbon—we quickly turned them into opportunities and embraced them as part of the process.

In this time, we have been able to introduce our ferromagnetic microwires in the carbon fabrics in a preindustrial prototype process.

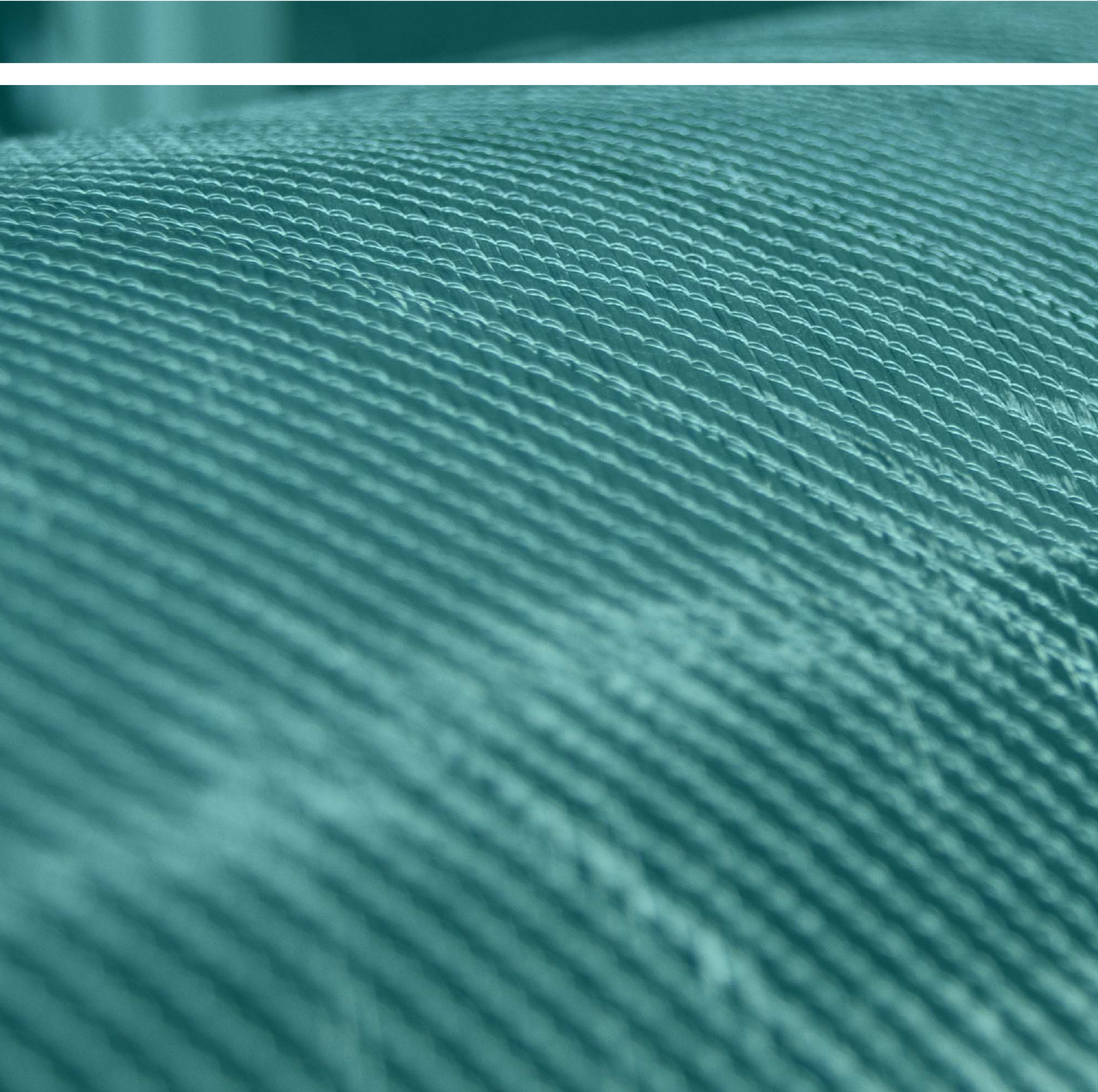
We are now able to monitor remotely induced currents in microwires embedded in carbon composites and measure them efficiently, thanks to the development of a reader that isolates the microwire signals from the background noise generated by the carbon. Additionally, we are supporting research activities through mechanical and electromagnetic simulations, moving closer to implementing an ambitious wireless Structural Health Monitoring (SHM) system.

Progress has also begun on developing a new repair system, enabled by the inclusion of microwires in the composites. Simultaneously, we are conducting essential studies to pave the way for the recycling of these materials. If you're interested in learning more about our achievements, let's dive into the details of the INFINITE project.

Yours sincerely

Peio Olaskoaga

Highlights



INFINITE Project Receives Positive Feedback at Mid-term Review Meeting

Halfway Milestone achieved!

On January 17th, the INFINITE Project celebrated its Mid-term Review Meeting at the Basque Government Delegation in Brussels, Belgium. During this meeting, the INFINITE Consortium had the opportunity to meet the Project Officer Mr. Georgios Bampanis from CINEA, who gained insights directly from the researchers regarding the project's progress and achieved results.

Following the discussions, the Project Officer emphasized the project's notable progress towards its objectives despite encountering challenges over the past 18 months.

He acknowledged the project's substantial progress and expressed confidence in its ability to develop a comprehensive monitoring system for the entire life cycle of composite aerospace components.

As emphasized during the meeting, INFINITE has successfully developed sensing technology, marking a crucial milestone in the project. The focus now turns to leveraging this technology to create an effective monitoring system.



Sustainability and Monitoring Technology

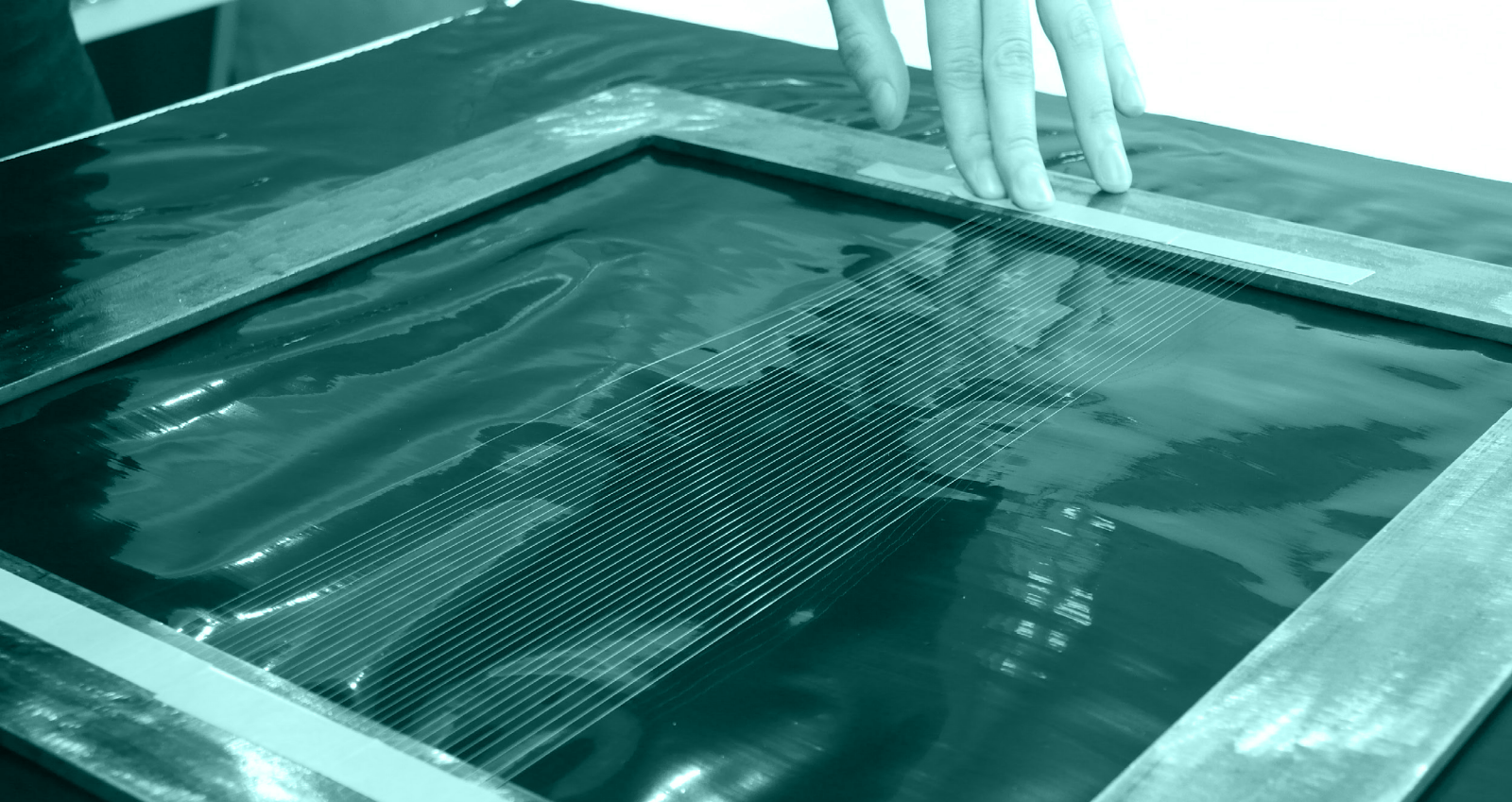
INFINITE Prepares for Intensive Testing Phase

But project is far from being over. Once the consortium has been able to obtain consistent signals from the microwires, the activity is focused in the processes and lifecycle phases of interest for the monitoring system. The consortium is working tirelessly to deliver an innovative, cutting-edge wireless monitoring technology, starting with the aeronautical sector and with plans to extend its use to other composite materials and industries.

In the coming months, an intensive testing plan will be carried out using the newly developed reader, designed to monitor manufacturing operations and structural health, as well as supporting the repair of the aeronautical structural components. In parallel, a testing plan will evaluate and validate the characteristics of composites with the presence of microwires. The large volume of data collected will feed into a SHM monitoring system and created simulation model, utilizing data analytics techniques to enhance the early detection of failures.

Additionally, recycling, end-of-life (EoL), and environmental assessment processes will validate the sustainability and feasibility of this disruptive technology for aeronautical composite applications.





UPV and TAMAG have formulated and manufactured microwires and readers to increase the signal to noise ratio measured, in order to monitor their condition in conductive carbon environment. Thicker wires with glass coatings have been manufactured and distributed among the partners to allow testing different processes at their laboratories, with the readers supplied by RISE. AMRC also produced some wired fabrics by means of tailored fiber placement to create small samples in the earliest steps of the project.

Lately, TEIJIN has been able to introduce the wires during the braiding of the non-crimped fabrics, producing the first sensing carbon fabrics, which have been used to produce coupons for the testing campaigns.

AMRC and IDEKO have started measuring the response of the sensors under manufacturing process requirements, with the double objective of monitoring and detecting defects. TITANIA has controlled the impact of introducing the wires in the composite coupons by executing standard tests. COLLINS is progressing in Structural Health Monitoring with the support of CAE and TITANIA, while AEROFORM is working on the reintroduction of wires in the repaired components. And to resume it all, GAIKER is developing a life cycle assessment model and working out a strategy for the end-of-life of the wired components.

All this together is making the progress of INFINITE in a challenging 3rd and last year of Project: while the first two years have served to set-up the fundamentals of the technology, the third will be the one of the demonstration of the potential of the technology. Achieving a TRL3 will be a major challenge for many of the activities.

Dissemination Activities

Intense Communication and Dissemination of the Project

The INFINITE project has made significant efforts in communication and dissemination activities during this period. Over 20 scientific articles have been published in open-access journals, accessible both on the project website and via ZENODO.

Additionally, INFINITE has had a presence at major industrial events such as JEC World 2023, MRO Show Amsterdam 2023, JEC World 2024, BIEMH 2024, SUSTAINair Conference on sustainable aviation, XIV. European Magnetic Sensors and Actuators Conference (EMSA 2024) further showcasing its innovations.

Collaboration with other aligned EU projects is essential for maximizing the dissemination of project results. INFINITE is part of the HORIZON-CL5-2021-D5-01 cluster, along with projects like DIDEAROT, CAELESTIS, DOMMINO, GENEX, and NEXTAIR.

These projects work together on joint dissemination activities, promoting new technological challenges and collaboration opportunities. A joint dissemination video has already been published, and for the next reporting period, the goal is to continue close collaboration to identify new opportunities for joint dissemination and exploitation.



Communication and Dissemination Activities

JEC World 2023

2023/04/27

JEC World, is the leading international trade fair for composite materials. Each year it hosts thousands of professionals who address different challenges related to the sustainability and development of composite materials solutions. INFINITE partners Aeroform Composites, Teijin Carbon Europe, Titania and IDEKO showcased their latest advances and developments on composites materials.

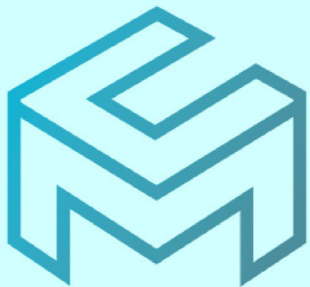
JEC PARIS-NORD
VILLEPINTE
WORLD



MATCOMP

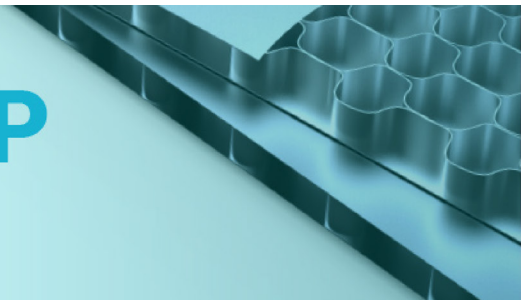
2023/06/13

INFINITE will have a presence at the conference with two talks scheduled in the conference program. The first presentation will be given by Arkaitz Uriarte from IDEKO and Paula Corte from UPV/EHU will take the stage for the second presentation.



MATCOMP

XV CONGRESO NACIONAL
DE MATERIALES COMPUESTOS
13-15 JUNIO 2023
GIJÓN. ASTURIAS



ICCM 23

2023/07/30

ICCM is the premier international conference in the field of composite materials. It attracts the leading researchers and practitioners, to report and exchange ideas on the latest developments in the advancement and exploitation of a wide range of composites materials and structures.

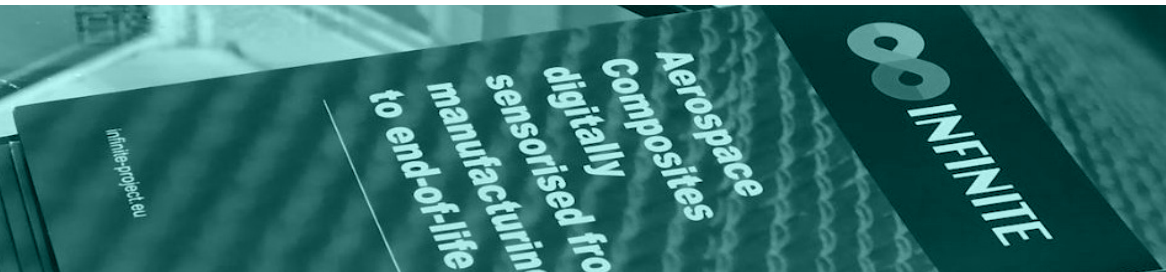


Communication and Dissemination Activities

JEC World 2024

2024/03/5-7

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JEC WORLD
2024 The Leading International
Composites Show
March 5-7, 2024 | PARIS-NORD
VILLEPINTE

BIEMH

2024/06/3-7

The INFINITE project was under the spotlight at the prestigious BIEMH, the benchmark international advanced manufacturing trade show, which took place on June 4th, 2024, in Bilbao, Spain. The project was represented by Peio Olaskoaga from IDEKO, who delivered an insightful presentation on the initiative.



SUSTAINair Conference

2024/06/11-12

INFINITE project's active involvement in the SUSTAINair, Sustainable Aerospace Value Chains Final Conference, which took place on June 11th and 12th in Vienna. The conference will serve as a collaborative hub, connecting the INFINITE project with other EU sister projects, including CAELESTIS, MORPHO, DOMMINIO, RECAL, GENEX, and INFINITE.



Communication and Dissemination Activities

EMSA 2024

2024/06/24-27

The INFINITE project was a highlight of the XIV. European Magnetic Sensors and Actuators Conference (EMSA 2024), which took place from June 24th to 27th, 2024, at the University of Pavol Jozef Šafárik in Košice, Slovakia. The EMSA conference, a cornerstone event in Europe since 1996, continues to be a pivotal gathering for evaluating the latest trends, progress, and innovations in the sector.



AES24 and ICM2024

2024/06/25-28 and 2024/06/30-07/05

The INFINITE project presented its research work at two conferences in Italy by our colleague Arcady Zhukov. The University of the Basque Country, UPV/EHU was invited to the 10th International Conference on Antennas and Electromagnetic Systems and also participated in the 22nd International Conference on Magnetism #ICM2024.



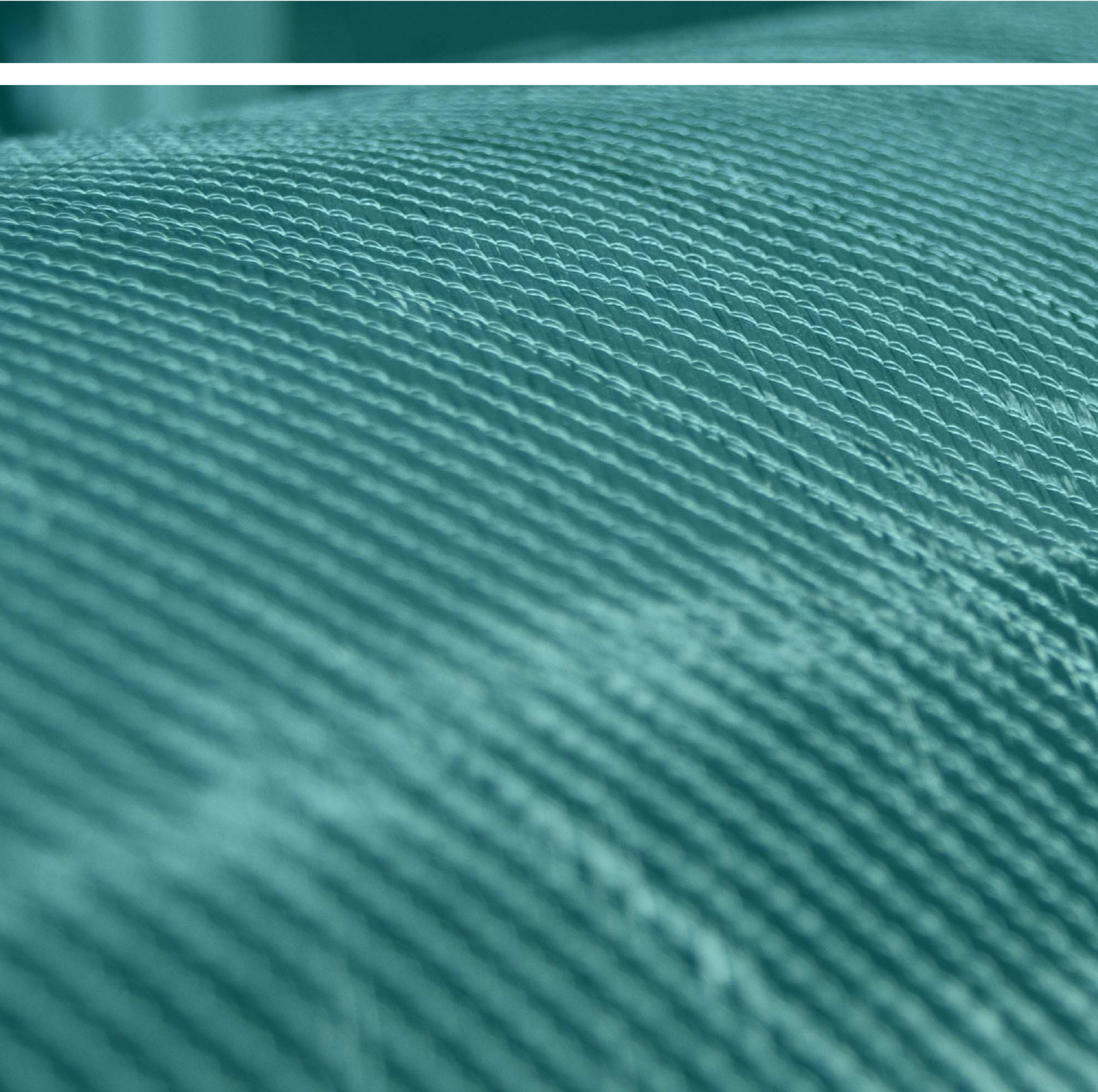
ISAMMA Conference

2024/08/4-7

INFINITE project developments were shared in Vietnam in the 5th International Symposium on Advanced Magnetic Materials and Applications.









Deep Dive



Deep Dive in project Partners

We invite you to know more about INFINITE Project's consortium and learn how their expertise is helping to reach the goals of the project.

Led by the Spanish R&D centre IDEKO, the Consortium is formed by R&D entities and industrial companies with complementary skills and capabilities. In this section, we will dive deep into them.

| | | |
|---|--|--|
| <p>Objective 1</p> <p>Demonstration of the capacity to integrate sensors on the composite parts.</p>  | <p>Objective 2</p> <p>To develop integrated technologies and methodologies towards next generation of composite SHM.</p>  | <p>Objective 3</p> <p>To monitor and control the on-line manufacturing process of sensorised fabrics composites.</p>  |
| <p>Objective 4</p> <p>To ensure the safe and efficient composite aircraft structures maintenance and repair processes.</p>  | <p>Objective 5</p> <p>To improve sustainability of aerospace components, defining suitable end of life strategies and assessing the environmental impact of sensorised composite materials.</p>  | <p>Objective 6</p> <p>To demonstrate and validate the project concept and solutions. Ultimately providing guidance for aircraft certification requirements.</p>  |

11

Partners

7

Countries

5,5 M€

EU Funding







June 2.022

Until May 2025

About INFINITE

INFINITE aims to develop sensors and analyser based on the usage of ferromagnetic microwires to be embedded in composite structural parts, in order to monitor manufacturing and structural health throughout the whole life cycle of the component. The wireless monitoring system will permit producing digital signals and vast sets of data linked with the specimen to create an as-built digital twin of the structure that will also account for the whole history since it was manufactured through all maintenance operations performed.

The INFINITE project therefore aims to develop the know-how to incorporate advanced sensing technology in advanced composite components for aerospace applications. The principal achievement of the project will be to develop a calibrated system capable of supplying powerful data useful for the SHM process. This will provide the means to develop accurate, cost-effective and tailored quality assurance of aerospace composite components throughout their whole life, ensuring aerospace structures are well positioned to comply with current but highly demanding circular economic strategies.

| | | |
|---|--|--|
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Partners

The INFINITE consortium has been designed to deliver the know how to manufacture sensorised composite component for aerospace applications. Airbus the number one Airframer manufacture in Europe is supporting this programme of work leading the IAB. INFINITE consortium is formed by R&D entities and industrial companies with complementary skills and capabilities. The leader of the Consortium is the Spanish R&D centre specialized in advanced manufacturing IDEKO. GAIKER (ES) as IDEKO, member of Basque Research & Technology Alliance, BRTA, the research centre specialising in electronics and magnetism RISE (Sweden), the AMRC, the advanced manufacturing research group at the University of Sheffield (UK), the University of Basque Country UPV/EHU (ES) are other RTD entities participating in the Project.

The Consortium is completed by industrial companies, such as TEIJIN (DE), manufacturer of carbon fabrics, TAMAG (ES), a spin-off of the aforementioned UPV/EHU group that will manufacture the sensors to be incorporated into the composites, AEROFORM (FR) specialist in composites repair, the aeronautical components manufacturer COLLINS Aerospace (IE), an austrian company working in simulation of complex systems, CAE Simulation Solutions, and two other Spanish companies, TITANIA, working on testing and validation of aeronautical components.



Ideko



Gaiker



UPV/EHU



Rise



Tamag



Titania



Teijin



Aeroform Composites



CAE Simulation Solutions



Collins Aerospace



AMRC