



Open Innovation Platform for Optimising Production Systems by Combining Product Development, Virtual Engineering Workflows and Production Data.

PIONEER Crosses the Finish Line

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OUR 3-YEAR SPRINT TOWARD SMARTER PRODUCTION HAS REACHED ITS CLOSING CHAPTER.

After 36 months of collaborative innovation, the Horizon Europe project PIONEER has successfully concluded its activities, delivering a groundbreaking step forward in the optimisation of European manufacturing systems and digital production integration.



Figure 1: A beginning and an end, both took place in Vigo

Launched in January 2023, PIONEER set out with a bold vision: to develop an open innovation platform and interoperable digital pipeline connecting advanced product development tools, virtual engineering workflows, and real production data. This integrative framework enables industry stakeholders to optimise design and manufacturing processes for increased flexibility, quality and efficiency – especially in high-mix and low-volume production environments.

The project brought together leading research organisations, industry partners and digital innovation experts to address the pressing challenges faced by today's globalised manufacturing market. The Consortium consisted of 17 partners from 11 countries, and was coordinated by AIMEN Centro Tecnológico. With a total EU contribution of €5.2 million, PIONEER combined cutting-edge simulation technologies, digital twins and data-driven models to create a resilient and adaptive industrial ecosystem.

“European manufacturing enterprises are facing significant challenges in a turbulent global market including abrupt changes in demand, an ever-increasing number of product variants and smaller lot sizes – all of which create continuous pressure on production costs. This results in large-scale demand fluctuations, customised product configurations, random order dispatching, short delivery lead times and reduced product life cycles. Traditional approaches based on rigid manufacturing architectures, are unable to cope with these emerging challenges. In this context, PIONEER aimed to develop and implement an interoperable Materials-Modelling-Manufacturing Ecosystem enabling multidirectional dataflow along the material value chain. This ecosystem links product design and distributed modelling data, with information collected from material characterisation, manufacturing processes and product quality criteria. After this 36-month journey, we can confidently say that most of the project's objectives have been achieved, while several key results that will contribute to industry have been produced”, commented Daniel Gesto, Project Coordinator of PIONEER.

Felix Vidal, Technical Coordinator of PIONEER, highlighted the project's most important innovations:

- **An Open Innovation Platform (OIP)** providing data connectivity and interoperability along the material value chain, combining technology developments in product engineering, monitoring and control, data modelling, dimensional verification and quality assurance.
- **Open Research Labs (ORLs)** and the **Digital Agora** providing training and replicability in other sectors and applications, as well as stimulating market uptake of the portfolio of technologies developed.
- **Individual technological results** on monitoring and control, material knowledge extraction, end-to-end visualisation, mechanical characterisation and optimisation, interoperable data formats enabling the connection of simulation workflows, data-driven models and orchestrator solutions to link data along the material value chain.
- **Standardisation efforts** on enabling the interoperable exchange and coupling of material models within simulation workflows.
- **Industrial implementation in two different scenarios in automotive and construction.**

Although the official project period has concluded, PIONEER's impact continues through the adoption of its technologies and a solid plan for the exploitation of its platform capabilities. Built on a clear exploitation strategy and enriched by a collaborative network of stakeholders, PIONEER leaves a lasting legacy: not just a suite of technical innovations, but a transformative paradigm for the manufacturing sector that will continue to drive research, commercialisation and societal benefit well beyond the project's lifetime.

ABOUT THE PROJECT

This Horizon Europe project took off in January 2023. PIONEER develops and implements an interoperable Materials-Modelling-Manufacturing Ecosystem, enabling multidirectional dataflow throughout the material value chain by connecting the production's various stages. Combining a design-by-simulation approach with manufacturing and quality data, PIONEER optimises product development strategies in high-mix/low-volume production schemes.

Project Title: Open Innovation Platform for Optimising Production Systems by Combining Product Development, Virtual Engineering Workflows and Production Data.

Project ID: 101091449 | **Start Date:** 01/01/2023 | **Project Duration:** 36 Months

Project Partners:



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