



OPEN INNOVATION PLATFORM FOR OPTIMIZING PRODUCTION SYSTEMS BY COMBINING PRODUCT DEVELOPMENT, VIRTUAL ENGINEERING WORKFLOWS AND PRODUCTION DATA (PIONEER)

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VMAP User Meeting 2025

18-19 February 2025 | Schloss Birlinghoven |
Germany



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AIMEN IN A NUTSHELL

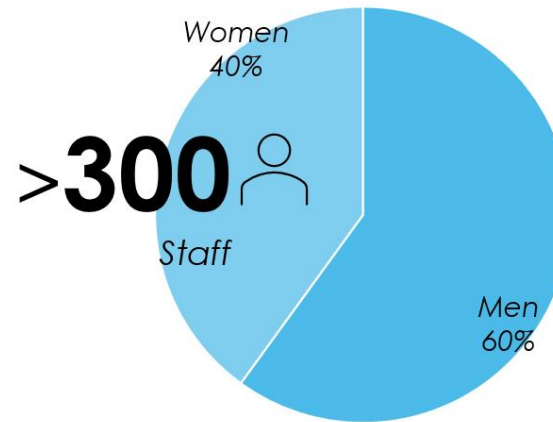


AIMEN is a multi-sector **INNOVATION AND TECHNOLOGY CENTRE** that develops **R&D&i activities** and provides **technological services** to the industry in the fields of **MATERIALS, ADVANCED MANUFACTURING PROCESSES, DIGITIZATION AND SUSTAINABILITY**

>21M
Annual Income



+550
Customers
Annual average
In the last 5 years



16,4%
Staff increase
In the last 5 years



250
R&D&i Projects
In the last 10 years



2.303
Industrial Services
In the last 10 years



52 *PhDs*
19 *nationalities*
39 *average age*



2 facilities
In O Porriño



9.500 m²
of scientific-technological
infrastructures



OPEN INNOVATION PLATFORM FOR OPTIMISING PRODUCTION SYSTEMS

KEY FIGURES & CONSORTIUM

Call topic: CL4-2022-RESILIENCE-01-25

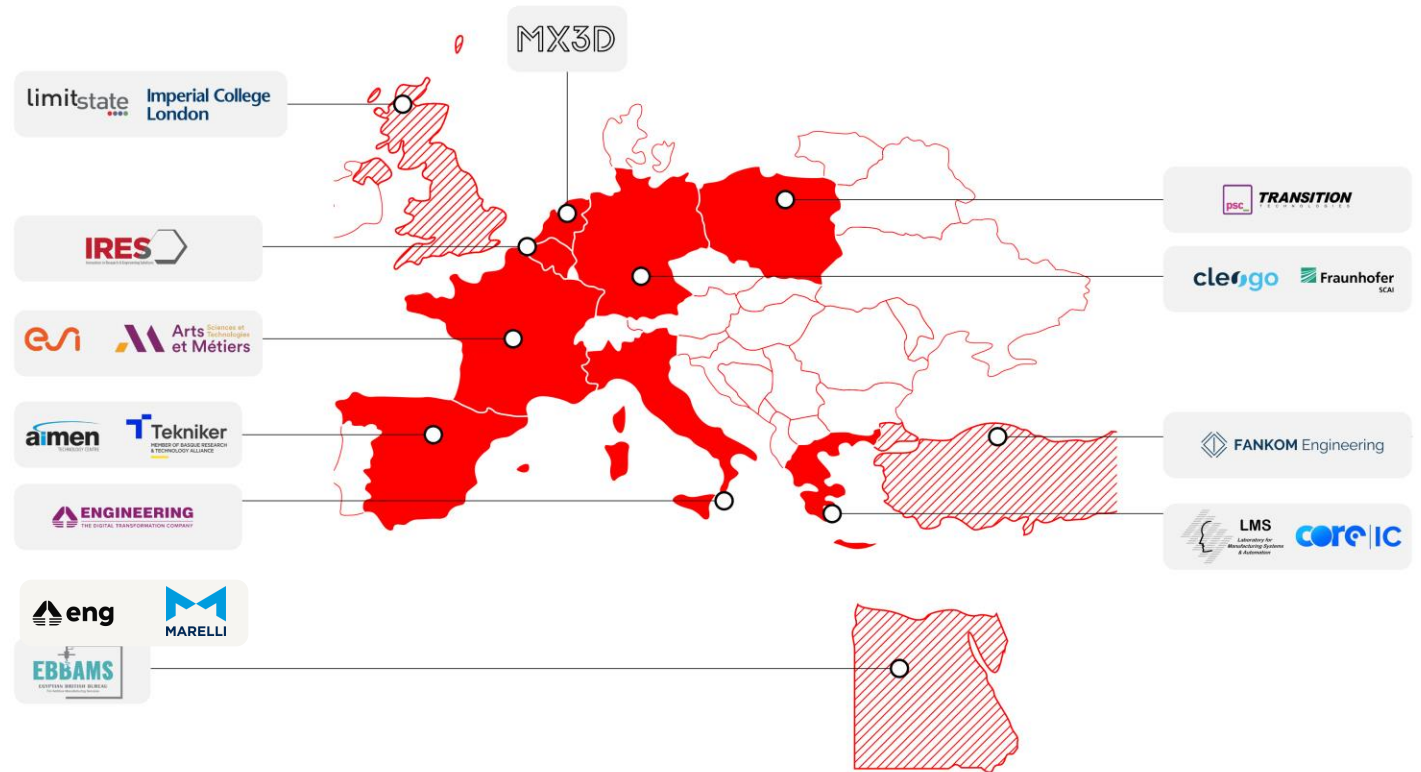
17
Partners

11
Countries

36
Months

5.2M
Total Budget

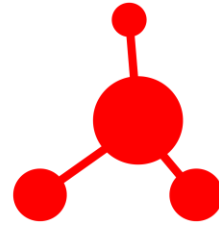
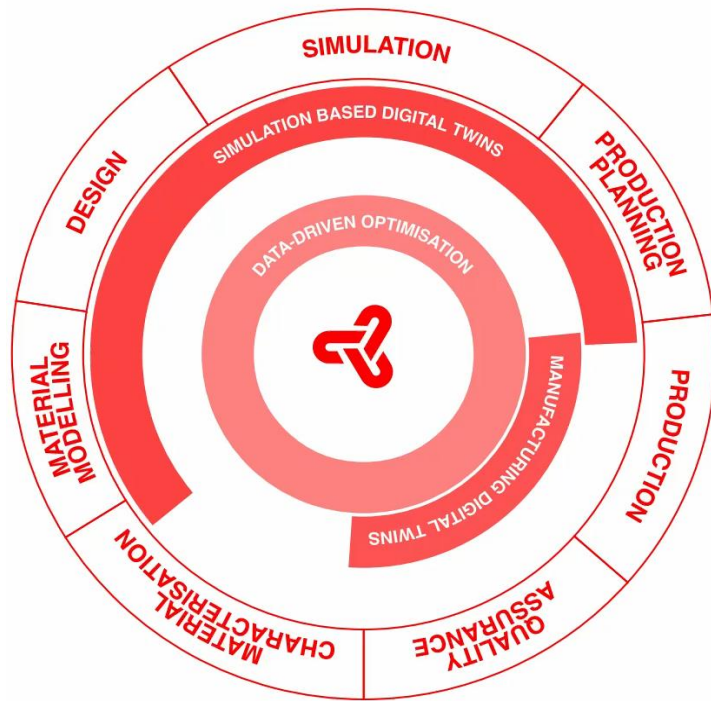
Coordinator:



RESILIENCE-01-25-2022

Optimised Industrial Systems and Lines
through digitalization (IA)

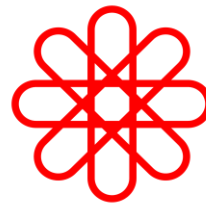
OPEN INNOVATION PLATFORM AND INTEROPERABLE DIGITAL PIPELINE



Materials



Modelling




Manufacturing




PIONEER VISION



 **Open Innovation Platform**

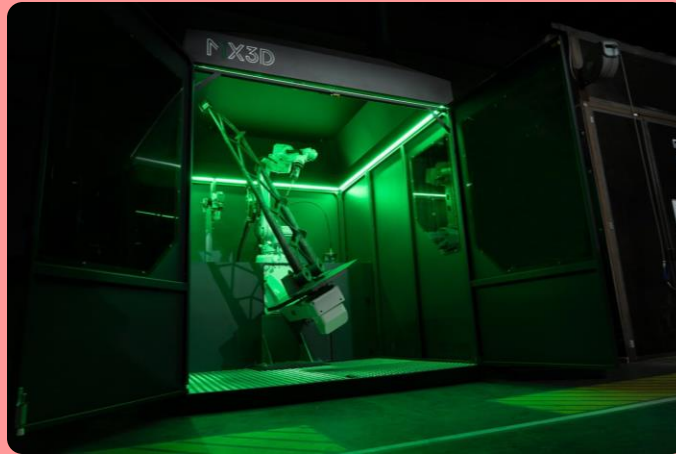
 **Interoperable Virtual Engineering workflows**

 **Digital Twins and Data-driven models**

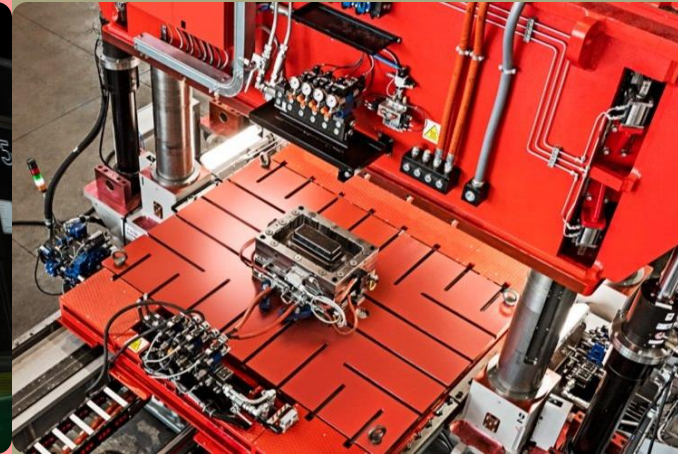
 **End-to-end representation of the material value chain**

 **Semantics and interoperability**

Low-volume manufacturing



MX3D

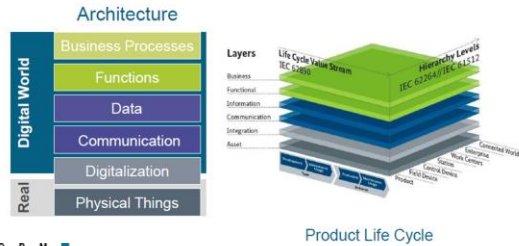


High-mix manufacturing

SERVICES
PRINT ON DEMAND
ON TIME, WITHIN SPEC

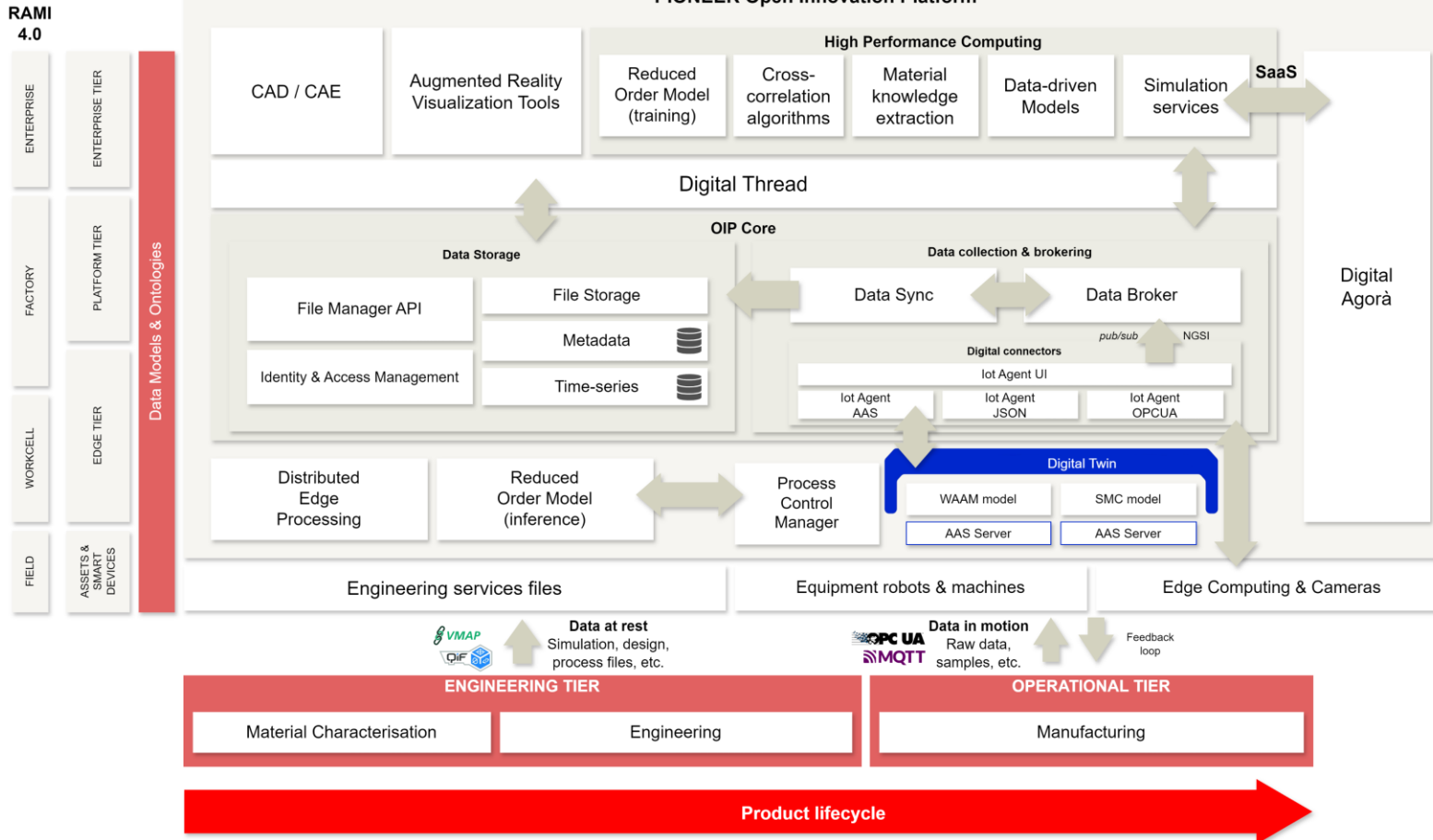
[FIND OUT MORE](#)

OPEN INNOVATION PLATFORM



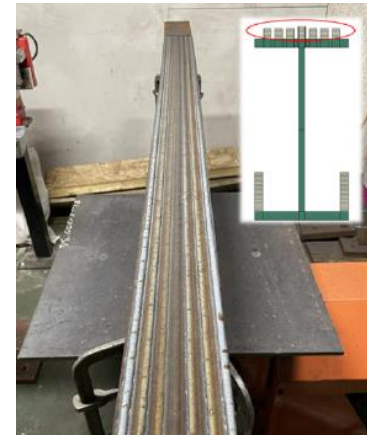
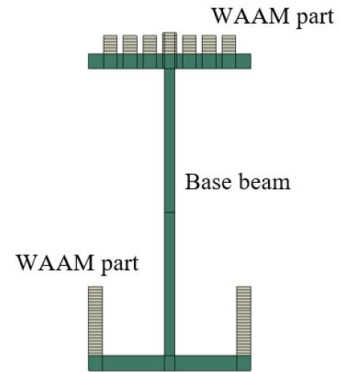
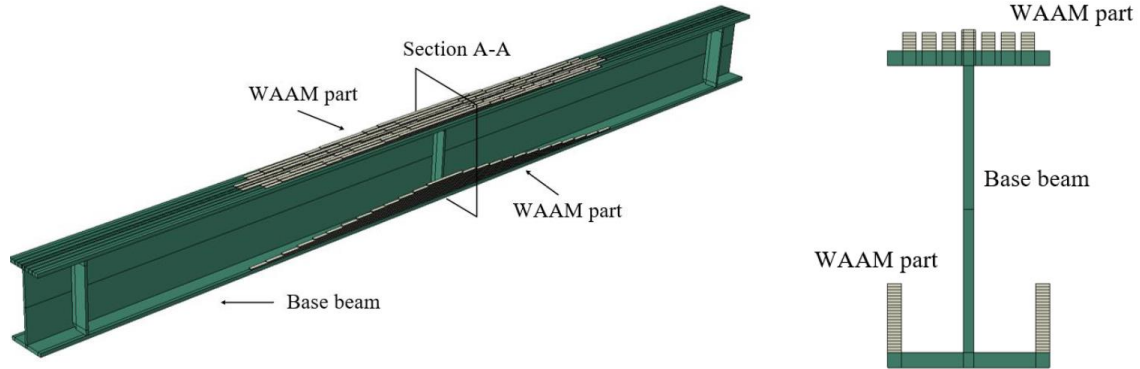
Develop a tool able to orchestrate, register and link all the data along the material value chain

INDUSTRIE 4.0

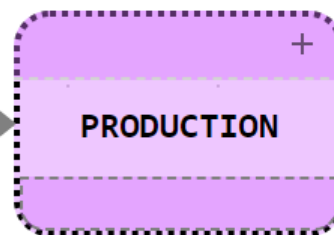
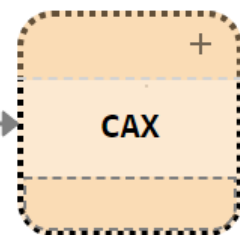
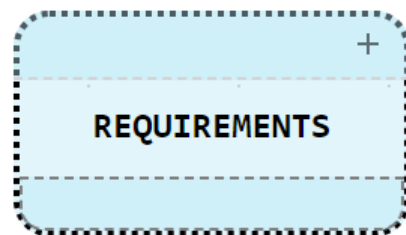
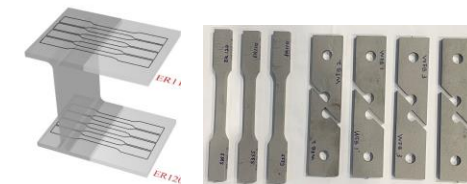
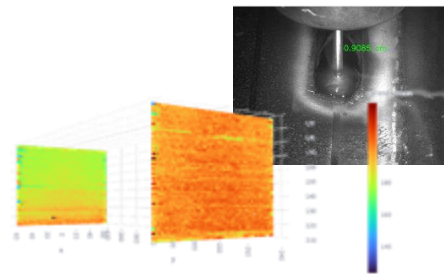
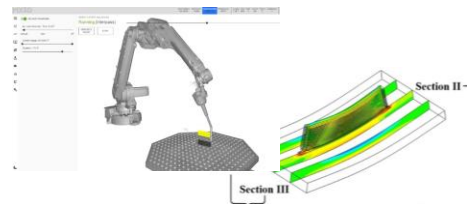


- **Data interoperability** between simulation and design software tools to enable data exchange *in complex engineering workflows*
- **Data aggregation** to store and trace the material value chain data (Requirements, Simulation, Production, Quality)
- **Common Information Model (CIM)** based on standards and ontologies to integrate materials, modelling and manufacturing domains *to provide a unified view.*

OPEN INNOVATION PLATFORM



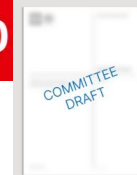
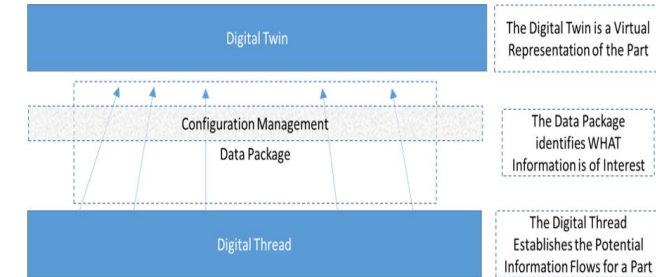
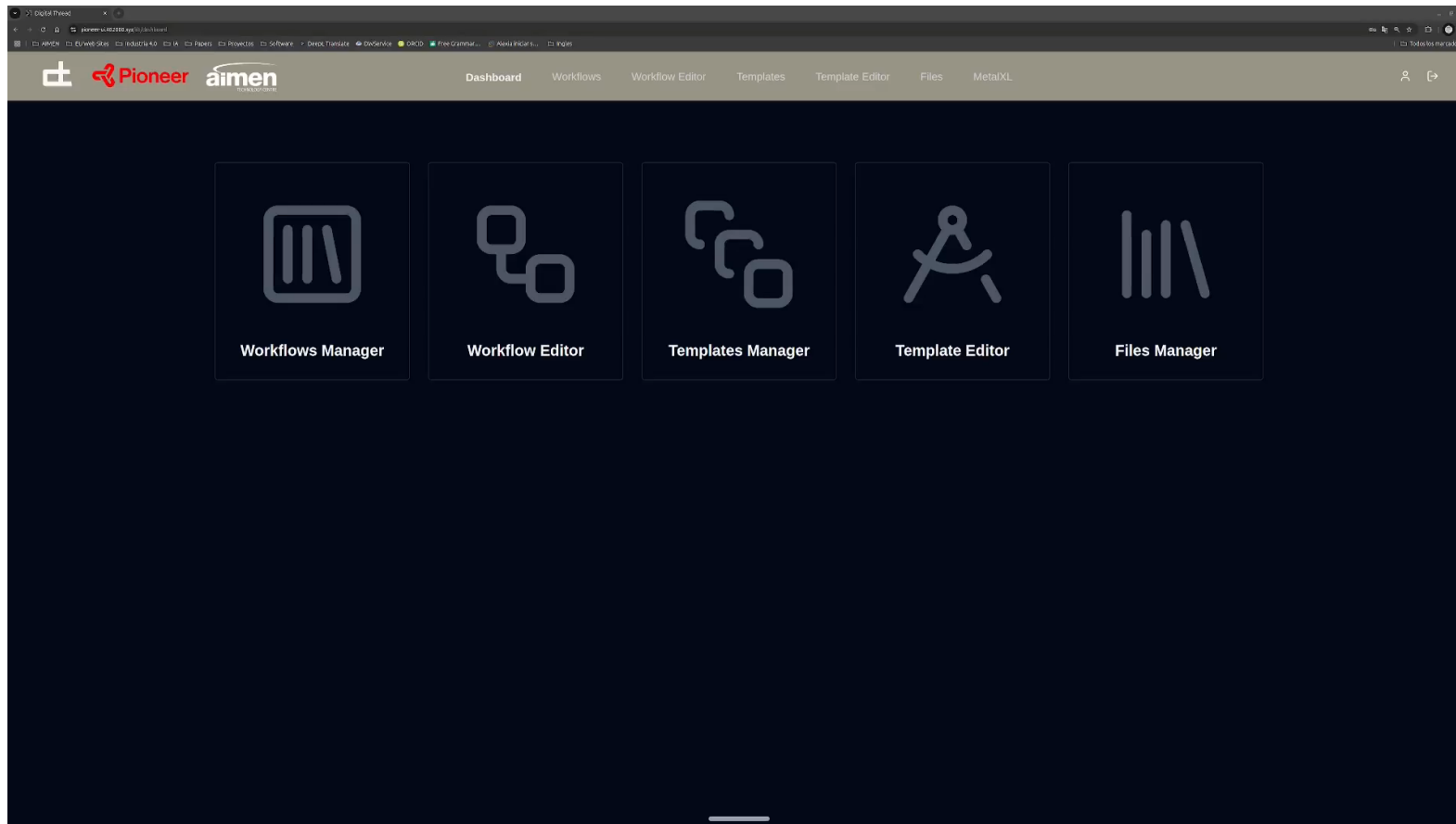
Specimen-ID	Feedstock wire	V_{WAAM}/V_{Base}
1		0%
2		10%
3	ER110	
4		
5		
6		
7		
8		
9	ER120	
10		
11		
12		



OPEN INNOVATION PLATFORM



DIGITAL THREAD -> Front-end of the Open Innovation Platform



ISO/ASTM CD 52951

Additive Manufacturing — Data — Data packages for AM parts

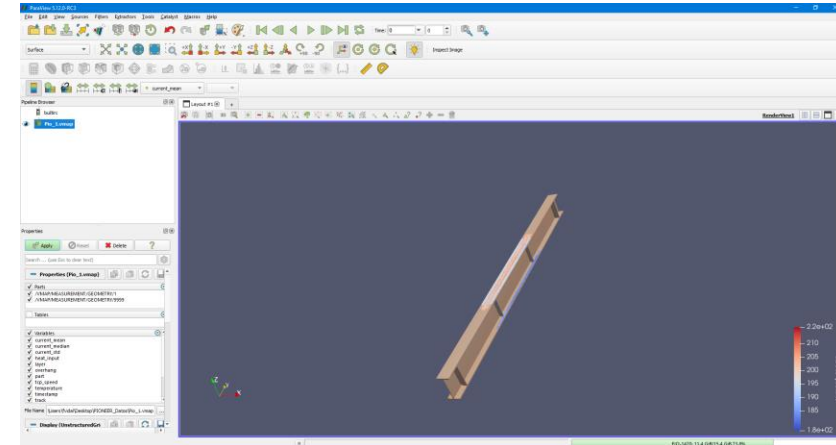
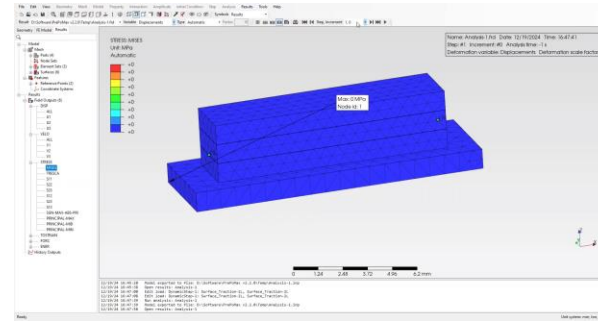
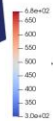
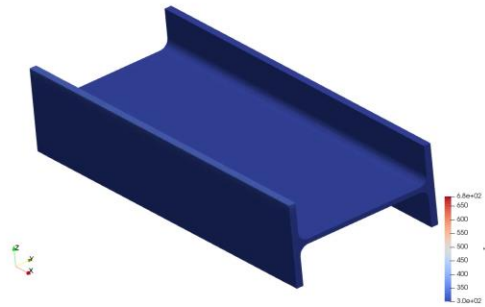
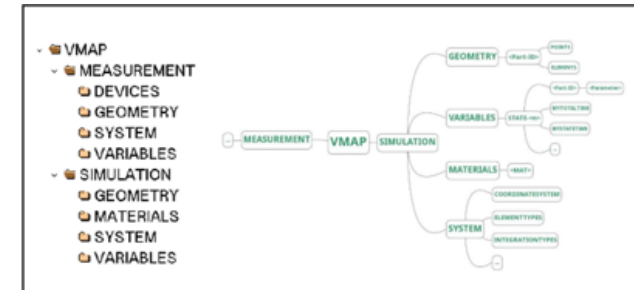
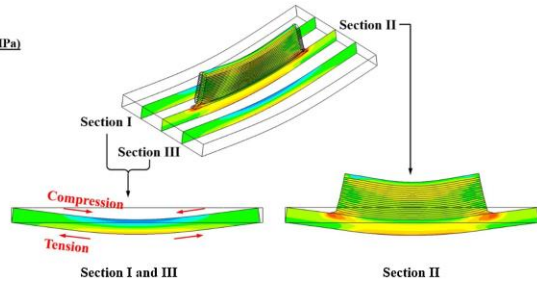
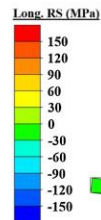
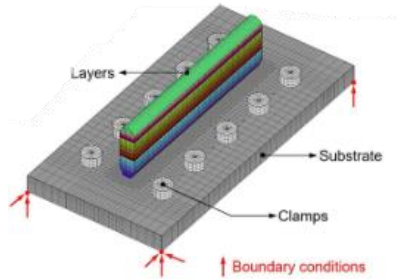
Under development
A draft is being reviewed by the committee.

Data formats enabled:

STL, PLY, PCD/ASC, VTU, VTK, CGNS (ongoing), MX3D, AML...



INTEROPERABILITY SIMULATION WORKFLOWS

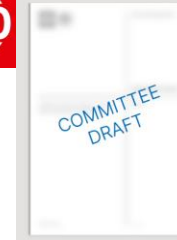
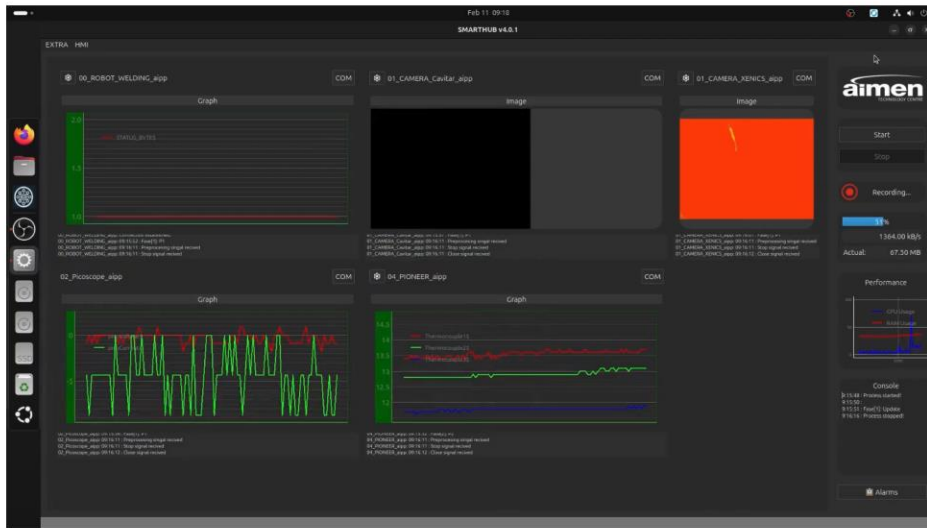


VMAP enabling seamless communication between different simulation tools, ensuring consistent and accurate material data throughout the product development process.

PRODUCTION AND QUALITY DATA



Monitoring can include coaxially aligned or stationary/staring configuration equipment for a wide range of sensors (e.g., optical, thermal, acoustic, etc.) and can capture data prior, during, or after fusion for each or a select number of layers.



ISO/ASTM CD 52951

Additive Manufacturing — Data — Data packages for AM parts

Under development

A draft is being reviewed by the committee.



The Asset Administration Shell (AAS) is the digital representation of an asset.

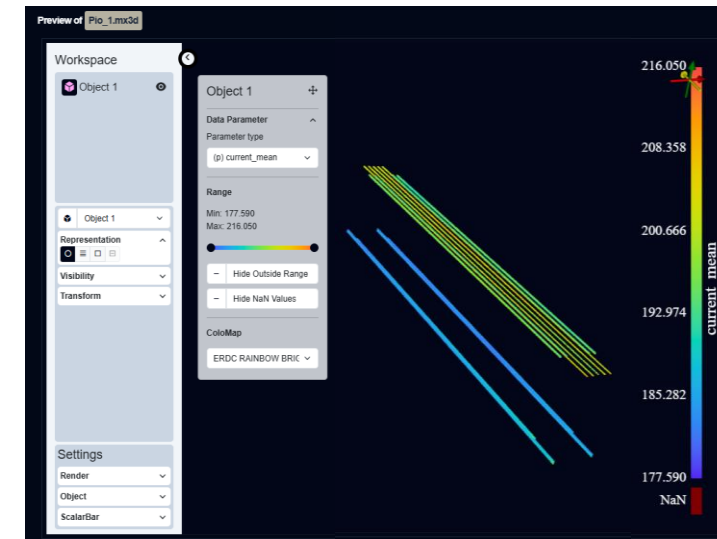
Asset Administration Shell



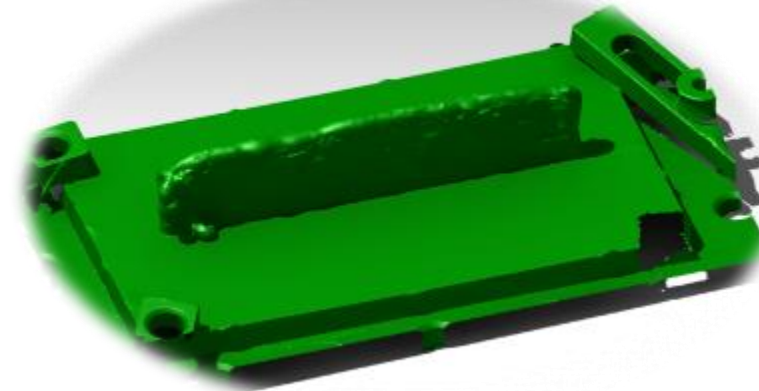
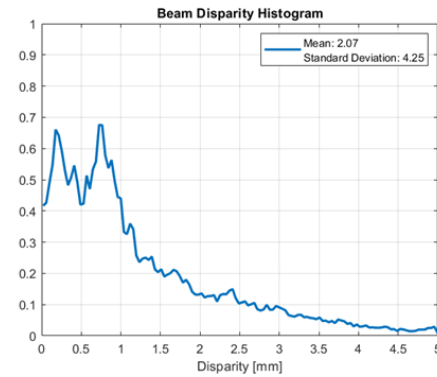
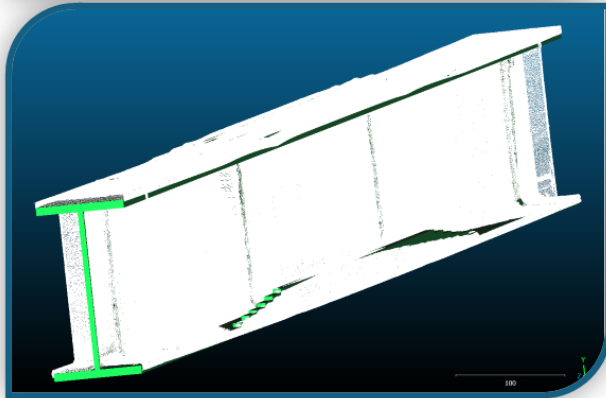
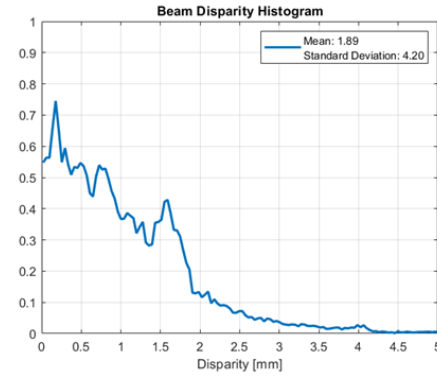
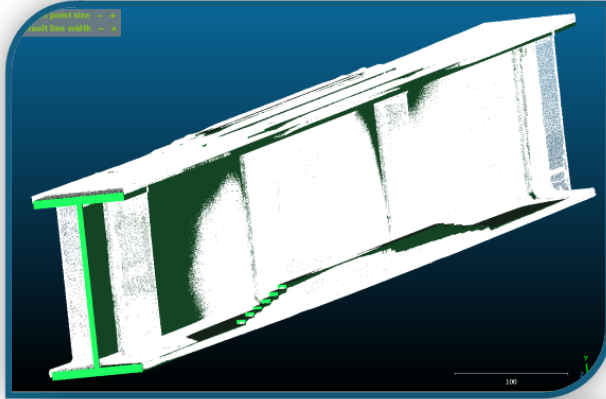
IEC
INTERNATIONAL STANDARD
IEC 63278-1
Edition 1.0 2023-12

Asset Administration Shell for industrial applications – Part 1: Asset Administration Shell structure
Enveloppe de Gestion de Actif pour applications Industrielles – Partie 1: Structure de l'Enveloppe de Gestion de Actif

- PIONEER_01_01_2024_test1_2.h5
- Devices
 - 0
 - 1
 - 2
- data
 - i table
 - table
- images



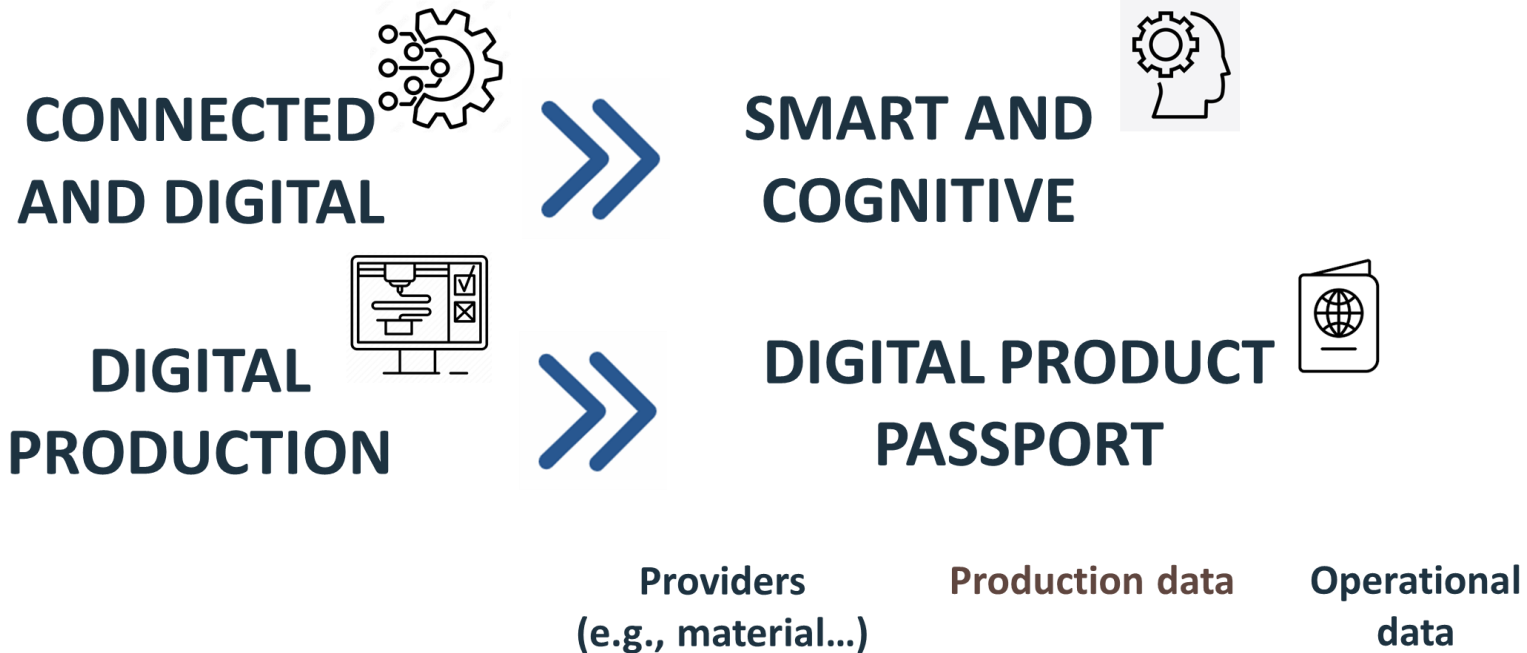
PRODUCTION AND QUALITY DATA



CONNECTED AND COGNITIVE PRODUCTION



Data-driven models in which production and quality data is used to enhance simulation predictions, enabling the implementation of feedback and feedforward control strategies



Interoperable semantic concepts to build a common information model (CIM) for materials science and manufacturing processes



MORE EFFICIENT, RESILIENT AND SUSTAINABLE MANUFACTURING

- Optimised design: Generative Design/Topology Optimisation...
- Production planning optimisation: Distortion reduction, more efficient use of resources and materials...
- Adaptive control strategies
- Cognitive quality assurance
- Optimising Reuse, Remanufacturing...strategies



**IMPACT IN ALL THE
PRODUCT LIFECYCLE**



Thank you

Félix Vidal Vilariño | fvidal@aimen.es
PIONEER Project Coordinator

