

Innovation & Technology

Santiago de Compostela, 06th November 2019

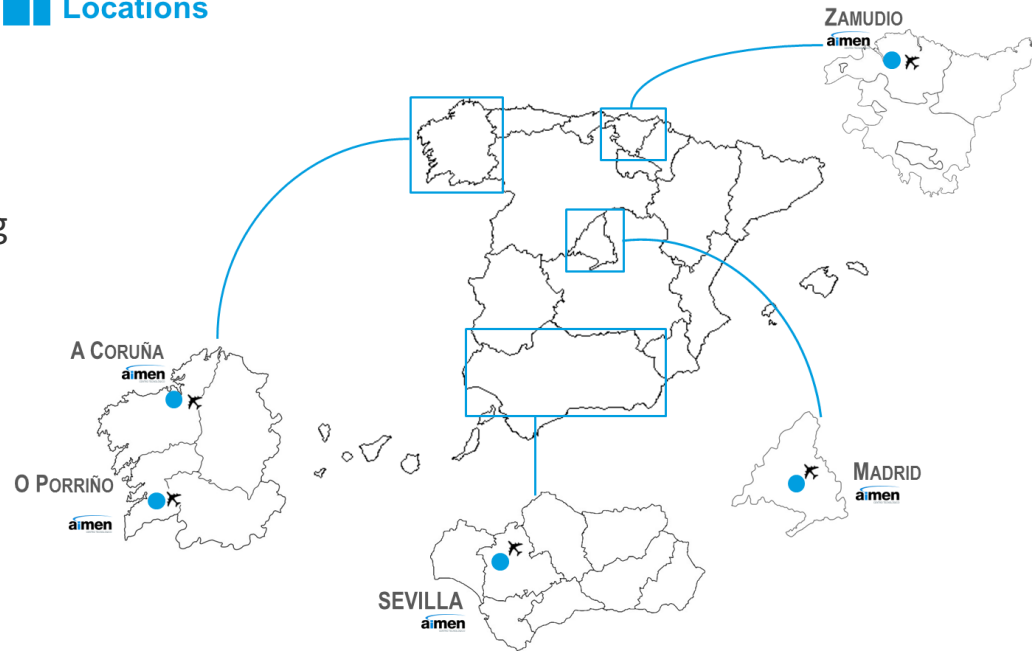


A Galician Success story in advanced manufacturing

- ➔ **About Us:** AIMEN in a nutshell
- ➔ **AIMEN in the EU Manufacturing Ecosystem:** A quick overview of our last 15 years in Europe
- ➔ **Main EU Manufacturing Projects:** How our EU Projects look like?
- ➔ **How to increase the Industry Involvement:** Our vision of the Euroregion needs for improving their role in the EU R&D Manufacturing landscape

- Industry supported, private centre
- Applied research in:
 - Advanced Materials
 - Smart Systems and Smart Manufacturing
 - Laser Based Manufacturing (AM)
 - Micro and High Precision Manufacturing
 - Environmental Technologies
- 50% incomes from industrial services
- Headcount: **250**
- Well connected with the regional industry
- Founded in 1967

Locations



➔ **AIMEN has been included by the European Commission in the RTOs for KETs inventory**

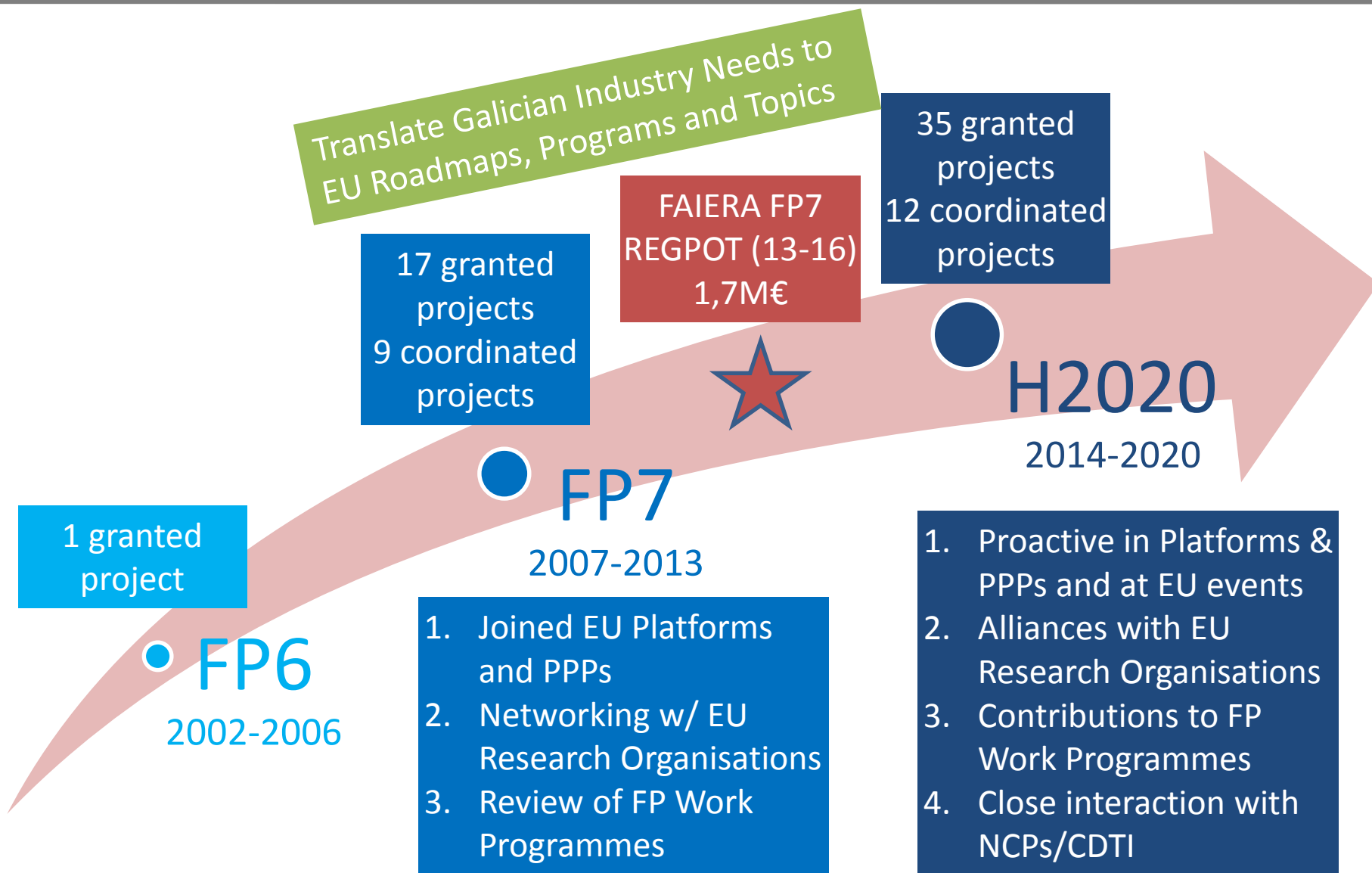
➔ **Manufacturing Competence Centre inside the I4MS initiative (DG Connect – EU Comission)**

➔ **Top 5 Spanish Manufacturing Research Institutes**

➔ **First ranking of Galician private entities in H2020 Projects**

AIMEN in the EU Manufacturing Ecosystem





PROGRAM	H2020	
	COORD	PARTNER
NMBP-FoF	6	8
NMBP-XX		3
NMBP-SPIRE		1
ICT	4	3
SC3-ENERGY		1
SC4-TRANSPORT		1
SC5-CLIMATE	1	2
SHIFT2RAIL		2
CLEAN SKY 2	1	2
TOTAL	12	23



262

**Spanish companies
in proposals**

94 Galician companies



53

Granted projects

18 in FP6&7

35 in H2020



25.4 M€

In grants for AIMEN

6,7 M€ in FP6&7

18.7 M€ in H2020



78

**Spanish companies
in granted projects**

21 Galician companies



21

**Granted projects
coord. by AIMEN**

9 in FP6&7

12 in H2020



16.4 M€

**In grants for Spanish
companies**

2.7 M€ for Galician
companies

“ AIMEN IS PLAYING A KEY ROLE IN THE EU R&D MANUFACTURING LANDSCAPE WITH GREAT IMPACT AT NATIONAL SCALE

AIMEN IS ALSO A KEY PLAYER AT REGIONAL LEVEL WITH MORE THAN 75 R&D PROJECTS IN COLLABORATION WITH THE GALICIAN INDUSTRY IN THE LAST 5 YEARS

BUT... IS DIFFICULT TO INVOLVE GALICIAN COMPANIES IN OUR EU R&D INITIATIVES ”

Main EU Manufacturing Projects



FoF-04-2018 INTEGRADDE - Intelligent data-driven pipeline for the manufacturing of certified metal parts through Direct Energy Deposition processes

COORDINATED BY AIMEN



EC Flagship Project



Integradde Digital thread for AM

Digital Pipeline through all the manufacturing steps (design, multi-scale process modelling, automated process planning, Process, NDT,...)

Artificial Intelligence for AM.

FoF-08-2019 DIMOFAC - Digital and Intelligent MODular FACTories



DIMOFAC



Establish a holistic architecture for smart modular production in compliance with global I4.0 standards
 . Establish a **portfolio of flexible multi-functional PnP production modules**

Use data gathered at machine, production line and factory level for production optimization
OPEN PILOT LINES providing industrial services: tech-transfer, developing new technologies...

FoF-01-2014 MASHES - Multimodal spectrAl control of laSer processing with cognitivE abilities - **COORDINATED BY AIMEN**



i³LasWeld-QA
Inline Laser Welding quality assessment

The Laser Welding inline quality assessment system based in infrared imaging technology (i³LasWeld-QA) has been developed as a key enabling technology for different industries with an aim of a zero-defect manufacturing and process optimization.

The system production is infrared imag. at frame rate

The sensor / stand-off obs during the la in real-time t offline analys Suitable for (

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Main spec

- Optical c
- Inline (laser) measurement on the process
- Real-time analysis and defect detection
- Defects: holes, pores, lack of penetration, false fusion, lack of fusion, underfilling
- Welding configurations: overlap joint, butt weld, fillet weld

System components

- Infrared imaging sensor coupled directly to the laser head
- Processing unit



CLAMIR
Laser power control system for Additive Manufacturing process using Infrared imaging

CLAMIR Software

CLAMIR is powered by NIT aimen

www.clamir.com sales@clamir.com





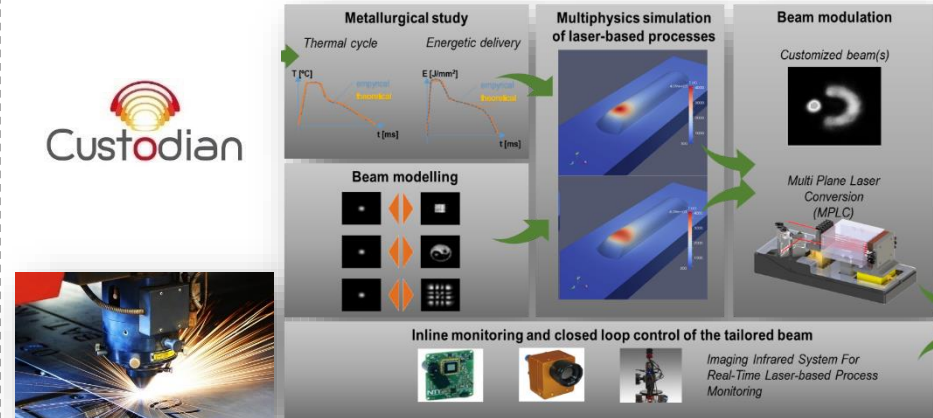
Image-based closed-loop control of laser processing.

High speed monitoring (3D seam profile, 2D melt pool geometry).

Validation and demonstration for laser welding and laser metal deposition.

2 products for laser welding and AM QC and
1 open source digital twin for AM in the
market

ICT-04-2018 CUSTODIAN - Customized photonic devices for defectless laser based manufacturing
COORDINATED BY AIMEN

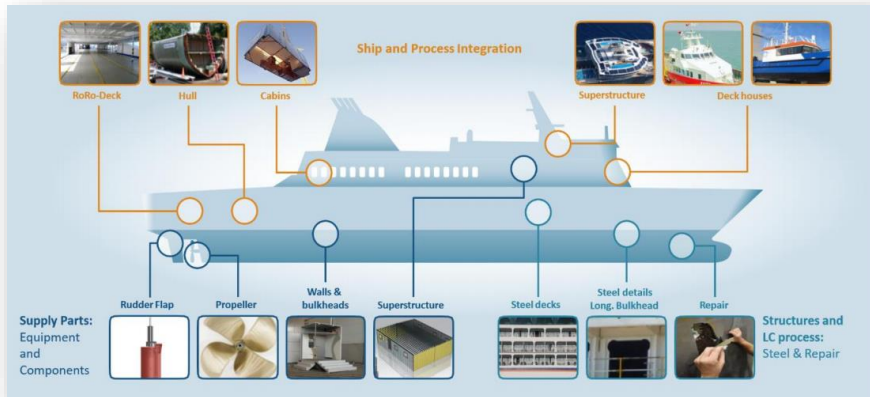


New laser based manufacturing technologies (WELDING and AM):

- ☐ Adaptive laser beam geometry and power distribution.
- ☐ Perform ideal thermal cycle for each material.

Development of NEW photonic systems for reconfigurable laser profiles, including Real-time monitoring and control system

MG-2.2-2016 RAMSSES - Realisation and Demonstration of Advanced Material Solutions for Sustainable and Efficient Ships



Use of **new lightweight materials** in shipbuilding applications.

New manufacturing technologies for composites deployment.

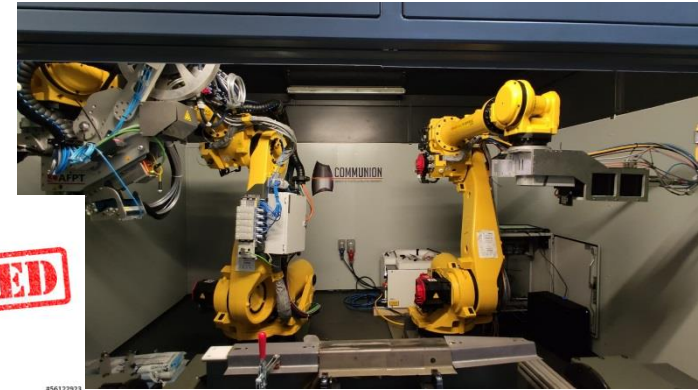
Results being deployed in big cruises and ferries

3 Galician companies involved in the Consortium together with the main EU shipyards, focus on the development of **composite reinforcements** for critical ship areas

FoF-12-2015 COMMUNION - Net-shape joining technology to manufacture 3D multi-materials components based on metal alloys and thermoplastic composites - **COORDINATED BY AIMEN**



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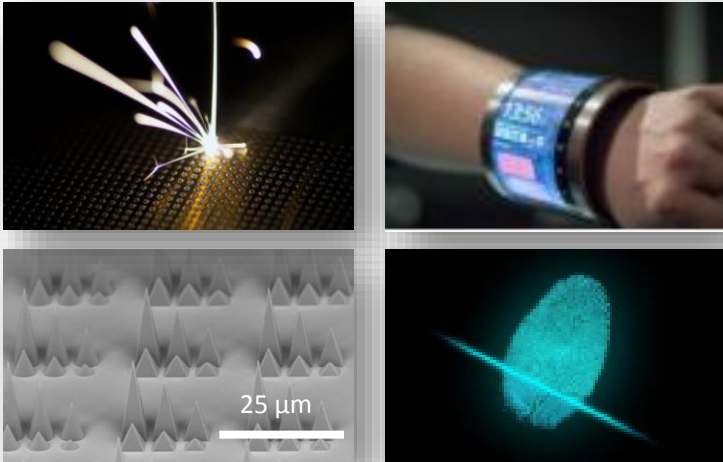
New multi-stage steel/titanium to CFRP **joining robotic** solution.

Implementing an **embedded flexible control** of the Automatic Tape Laying with **self-adjustment** capabilities.

Demonstration of fully automated 3D joining technology to **automotive and aeronautics**.

Multi-material structures for transport and home appliance applications:
dissimilar joining, cost-effective processes, modelling, online control,...

ICT-30-2017 PHENOMENON - Laser Manufacturing of 3D nanostructured optics using Advanced Photochemistry - **COORDINATED BY AIMEN**

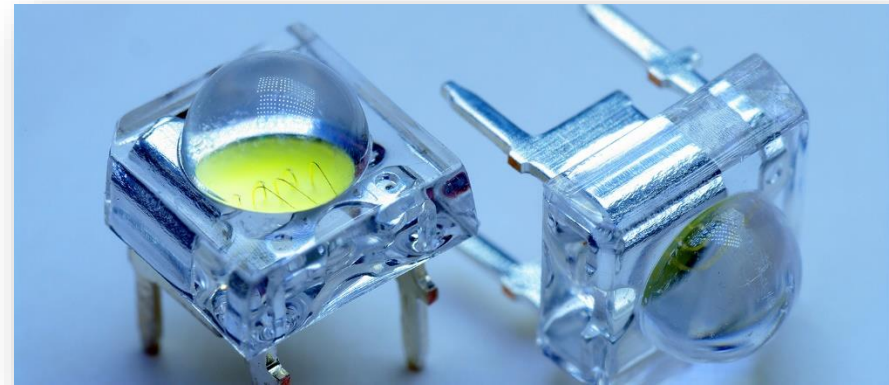


Large area direct laser writing of 2&3D optical structures with subwavelength resolution:

Developments in **photochemistry** and **laser beam forming** to produce structures at different scales (100 nm to 10 microns).

Combination of **ultrasensitive nonlinear photocurable materials**.

FOF-03-2018 FLOIM – Flexible Optical Injection Moulding of Optoelectronic Devices - **COORDINATED BY AIMEN**



Automated process for **optical assembly of optoelectronic devices**.

Freeform and microstructured optical surfaces by **thermoplastic microreplication**.

Instrumentation of the mould cavity to monitor the components alignment and Incorporation of an in-line optical and functional quality inspection system.

High flexible laser based technologies for high precision manufacturing of customised micro-products

FoF-ICT-2013.7.2 LASHARE - Laser equipment ASsessment for High impAct innovation in the manufactuRing European industry

LASHARE

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Diode module with multiple emitters



Laser assisted Roll forming machine

First round of I4MS projects with cascade funding

Focus on SMEs enabling them to create new products to benefit European industry.

3 Galician Partners

FOF-12-2017 AMABLE – AdditiveManufacturABLE

AMable

OPEN CALL



I4MS project focused in AM

Enable the **uptake of AM technologies** by SMEs/mid-caps.

Create an open-sourced-based, living and adapting **AM eco-system** which can offer required assistance.

Support and develop 'best in class' AM data handling tools and approaches, on an open-source basis.

I4MS-ICT Innovation for Manufacturing SMEs- Enhancing the digital transformation of the European manufacturing sector
Accelerated introduction of innovative European ICT technologies in strategic manufacturing lines through a set of small projects (open calls)



- **H2020-FoF-06-2019 LEVEL-UP:** *Protocols and Strategies for extending the useful Life of major capital investments and Large Industrial Equipment*

Coordinator: AIMEN, INEGI



- **H2020-FoF04-2018: INTEGRADDE:** *Intelligent data-driven pipeline for the manufacturing of certified metal parts through Direct Energy Deposition processes*

Coordinator: AIMEN, Universidade de Minho



- **H2020-FoF-07-2017 LAY2FORM:** *Efficient Material Hybridization by Unconventional Layup and Forming of Metals and Composites for Fabrication of Multifunctional Structures*

Coordinator: INEGI



- **FoF-12-2015 COMMUNION:** *Net-shape joining technology to manufacture 3D multi-materials components based on metal alloys and thermoplastic composites*

Coordinator: AIMEN, MOTOFIL – ROBOTICS



- **ICT-24-2015 COLROBOT:** *Collaborative Robotics for Assembly and Kitting in Smart Manufacturing*

INESC TEC



- **FP7-SME-2013 CARLOS:** *CooperAtive Robot for Large Spaces manufacturing*

Coordinator: AIMEN, INESC, DELTAMATIC



- **FoF.NMP.2013-11 FABIMED:** *Fabrication and Functionalization of BioMedical Microdevices*

Coordinator: AIMEN, Universidade de Aveiro, INEGI

How to increase industry involvement?





Promote at euroregional level specific tools (SYNERGIES) to foster the collaboration among manufacturing industry, academia, RTOs, startups, Investors at both sides of the border: **Euroregion DIH, Vanguard Initiative,...**



Invest in the Euroregion RTOs as a way to increase industry competitiveness through participation in high-tech EU Projects and tech-transfer: REGPOT (FAIERA), RED CERVERA, ...



Take advantage of the EU Industrial Associations, Tech Platforms and DIHs to communicate to the EC the Euroregion Industry needs. **WE FEEL ALONE... GALICIA should have representation in the EIT Manufacturing.**



Create specific instruments at Euroregion level to promote the participation of the Industry in more Manufacturing EU Projects. **We want to involve more Euroregion companies in our initiatives!!!**



Communicate the Manufacturing R&D initiatives and results to the society highlighting their importance for retaining the industry, generating new qualified Jobs and create wealth in our Euroregion

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Thanks for your attention!



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