

SUCCESS STORIES IN ADVANCE MANUFACTURING IN GALICIA- NORTE DE PORTUGAL

António Almeida
INESC TEC

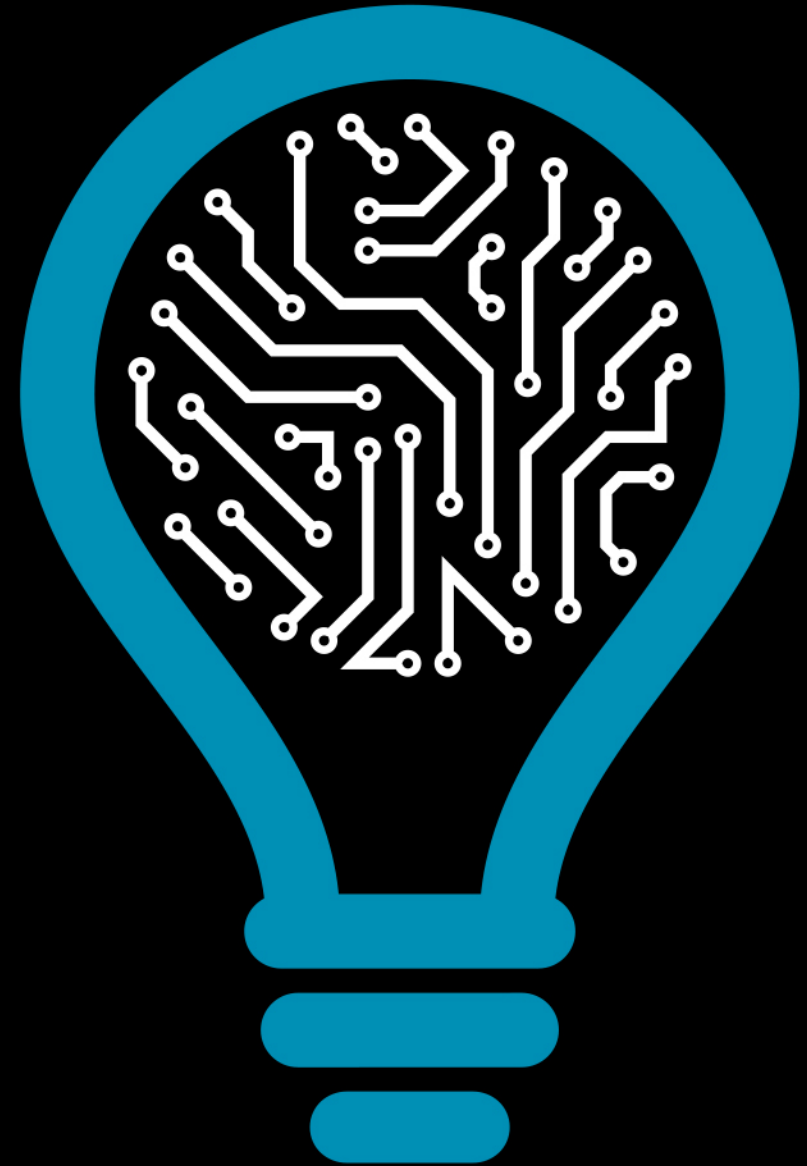
IMB 2019
INNOVATION & MANUFACTURING BROKERAGE EVENT

SANTIAGO DE COMPOSTELA – SPAIN

06-11-2019



INSTITUTE FOR SYSTEMS
AND COMPUTER ENGINEERING,
TECHNOLOGY AND SCIENCE



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TEC4INDUSTRY



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1. About INESC TEC
2. H2020 Experience
3. Collaboration in Euroregion
4. Strategic Relevance of Euroregion

1. About INESC TEC
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INESC TEC: A private non-profit research institution, dedicated to scientific research and technological development, technology transfer, advanced consulting and training, and pre-incubation of new technology-based companies.

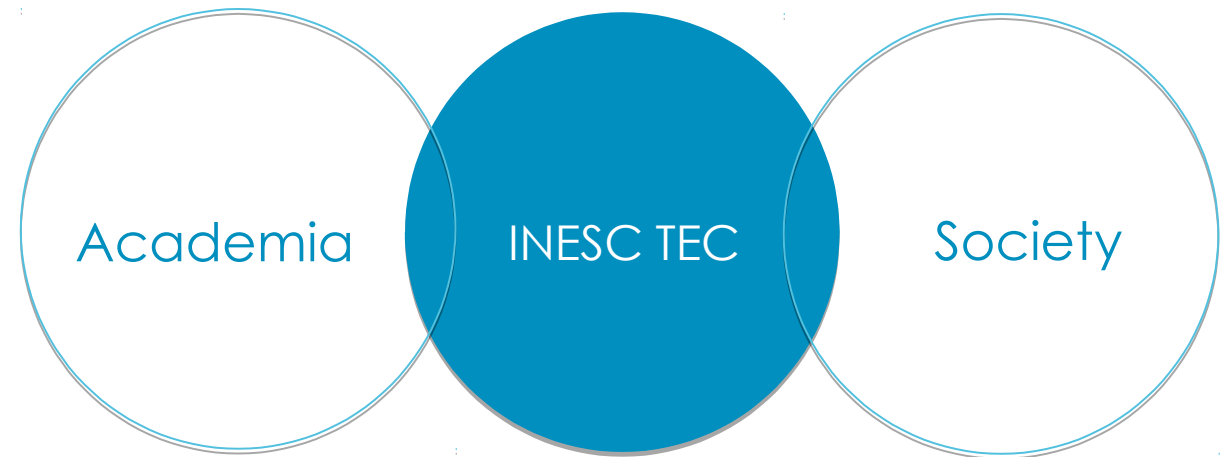
Vision

To be a relevant international player in Science & Technology in the domains of **Computer Science, Industry and Innovation, Networked Intelligent Systems, and Power & Energy**

Mission

Foster Pervasive Intelligence
Contribute to the **competitiveness and internationalisation** of Portuguese companies and institutions

Excel in research
To be socially relevant
To be internationally influential



Strengthening the ties between Academia and Society

A cohesive multi-university eco-system

Associates

U.PORTO



P.PORTO

Privileged partners



Universidade do Minho

utad

AbERTA
UNIVERSIDADE
www.uab.pt



U.Minho Braga

UTAD Vila Real

ISEP Porto

FEUP Porto

FCUP Porto

FEP Porto

3

cities

6

locations

INESC TEC is international

Research partnerships

MIT Portugal

UT Austin | Portugal

CMU | Portugal



IBM Q Network



Innovation partnerships



European organisations



European strategic initiatives



273 PhDs dedicated to R&D and technology transfer

659 Research

163 Academic staff (50% FTE)
91 Employees (46 PhDs)
64 Postdoctoral grant holders
341 Graduate grant holders (146 PhD students)

92 Support Services

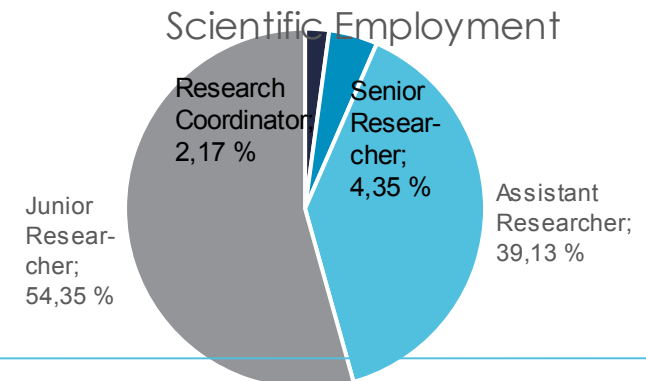
407 Other Collaborators
269 External researchers
138 Research trainees



November 2018

30+ nationalities

2 IEEE Fellows
13 IEEE Senior Members
1 ACM Senior Member

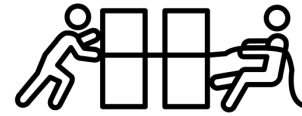


Push and Pull strategy

Research

Clusters - Science push

Clusters of research centres build a multidisciplinary environment to optimize resources and maximise synergies



Innovation

TEC4 - Market pull

Strategy driven platforms addressing and impacting great societal challenges and market needs



Clusters – Research Lines



POWER AND ENERGY

Energy Conversion

Network Planning
and Operation

Energy end users



INDUSTRY AND INNOVATION

Sustainable
production systems

Digital transformation
of industry

Innovation &
technology
management

Industrial robotics



NETWORKED INTELLIGENT SYSTEMS

Computer vision

Sensing

Autonomous
systems



COMPUTER SCIENCE

Big data

Privacy-preserving
computing

Virtual environments

TEC4
SEA

TEC4
HEALTH

TEC4
AGRO-FOOD

TEC4
INDUSTRY

TEC4
ENERGY

TEC4
MEDIA

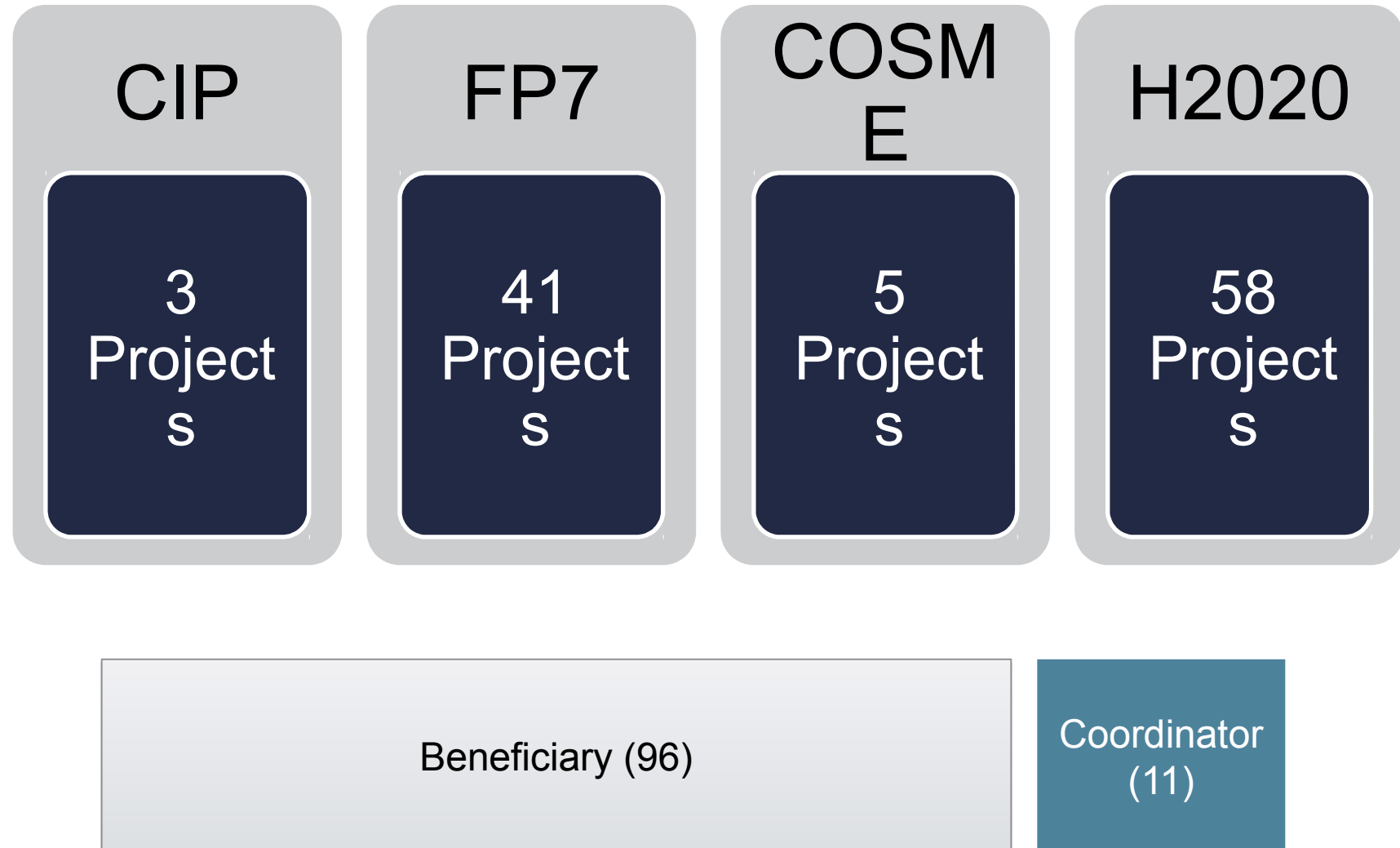


Research Clusters Industry and Innovation

- **Sustainable production systems** – improve manufacturing intelligence covering from intelligent systems and robots to analytics and decision support
- **Digital transformation of industry** – development of novel vertical IOT-based information architectures supporting risk and asset management, collaborative networks design, multi-dimensional performance management and crowd-servicing based services
- **Industrial robotics** – Strong bet in collaborative mobile manipulators and human-robot collaboration
- **Innovation & technology management** – focus on the conditions and enablers for the adoption of new business concepts and models (CPPS) and on the servitisation of manufacturing

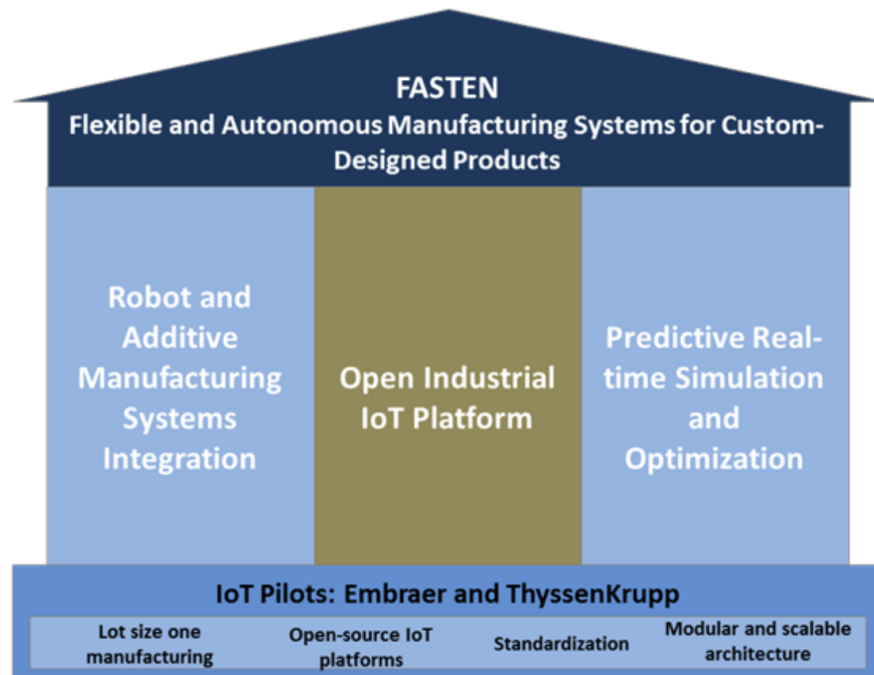
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INESC TEC Participation in European Projects



Flexible and Autonomous Manufacturing Systems for Custom-Designed Products

FASTEN defined an **open and standardized framework** to produce and deliver **tailored-designed products**. Effectively pairing digital integrated service/products to additive manufacturing processes, on top of tools for decentralizing decision-making and data interchange.



Project information

FASTEN

Grant agreement ID: 777096

[Project website](#)

Status

Ongoing project

Start date

1 November 2017

End date

31 October 2020

Funded under:

H2020-EU.2.1.1.

Overall budget:

€ 3 136 633,75

EU contribution
€ 1 452 937,50



Coordinated by:

INESC TEC - INSTITUTO DE ENGENHARIA DE SISTEMAS E COMPUTADORES, TECNOLOGIA E CIENCIA

Portugal



Scalable Automation for Flexible Production Systems (ScalABLE4.0)



Development of an open scalable production system framework (OSPS) that can be used efficiently and effectively to visualize, virtualize, construct, control, maintain and optimize production lines.



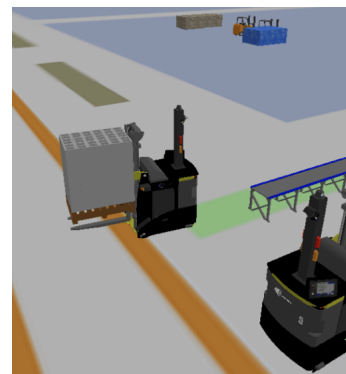
PLUG'N'PRODUCE



FLEXIBLE ROBOTICS
PROGRAMMING



VERTICAL INTEGRATION



SIMULATION

Project information

ScalABLE4.0

Grant agreement ID: 723658

[Project website](#)

Status
Ongoing project

Start date
1 January 2017

End date
30 June 2020

Funded under:
H2020-EU.2.1.1.

Overall budget:
€ 4 005 550

EU contribution
€ 3 999 050



Coordinated by:
INESC TEC - INSTITUTO DE
ENGENHARIA DE SISTEMAS E
COMPUTADORES, TECNOLOGIA E
CIENCIA
 Portugal

Scalable Automation for Flexible Production Systems (ScalABLE4.0)



Cyber-Physical Production Systems (CPPS) for industrial companies

Integrate and experiment a CPS-oriented Future Internet-based machine-factory-cloud service platform firstly intensively in five selected Smart Specialization Strategy Vanguard regions.



BEinCPPS
Regional Manufacturing Digital Innovation Hubs

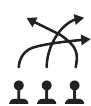
Problem



CPS Systems (Cyber Physical Systems) are a *Key Enabling Technology* in the scope of Industry 4.0.

The adoption by SMEs poses several obstacles.

Challenges and objectives



Industry 4.0 allows you to add more value



Develop the appropriate environment for the adoption of CPS technology by SMEs



Develop "champions" of cyber-physical production systems expertise and spread the practices and lessons learned to all regions of Europe

Project information

BEinCPPS

Grant agreement ID: 680633

[Project website](#)

Status

Closed project

Start date

1 November 2015

End date

31 October 2018

Funded under:

H2020-EU.2.1.1.

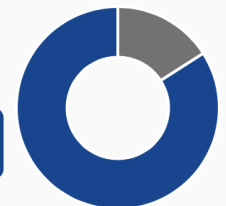
H2020-EU.2.1.5.1.

Overall budget:

€ 9 517 642,50

EU contribution

€ 7 999 485,75



Coordinated by:

POLITECNICO DI MILANO

Italy

H2020 projects coordinated by INESC TEC



Call: H2020-FOF-2016 : CALL FOR FACTORIES OF THE FUTURE

Funding scheme: RIA

Proposal number: 723658

Duration (months): 42

Proposal title: Scalable automation for flexible production systems



Call: H2020-TWINN-2015 : CALL FOR TWINNING

Funding scheme: Coordination & support action

Proposal number: 692427

Duration (months): 36

Proposal title: STREngthening MARitime Technology Research Center



Call: H2020-DS-2014-1 : DIGITAL SECURITY: CYBERSECURITY, PRIVACY AND TRUST

Funding scheme: Innovation action

Proposal number: 653884

Duration (months): 36

Proposal title: Secure and Resilient Cloud Architecture



AnyPLACE

Call: H2020-LCE-2014-3 : CALL FOR COMPETITIVE LOW-CARBON ENERGY

Funding scheme: Innovation action

Proposal number: 646580

Proposal acronym: AnyPLACE

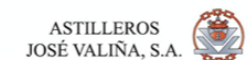
Duration (months): 36

Proposal title: Adaptable Platform for Active Services Exchange

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Cooperative Robot for Large Spaces Manufacturing (CARLoS)

The final goal of the CARLoS project is to get a prototype of a robot co-worker for fit-out operations inside blocks of ship superstructures. The specific operations targeted by CARLoS are stud welding and marking based on information from a CAD model that are necessary for posterior fit-out operations.



Collaborative Robotics for Assembly and Kitting in Smart Manufacturing (COLROBOT)

Take the best of each partner, human and robot, by exploring the cognitive and capabilities of humans (focus on value-added tasks) and the capacity of robots to produce repetitive work and provide assistance.

- Mobile manipulator acts as a “third hand” by delivering kits, tools, parts, and holding work pieces while the operator works on it.
- Humans will cognitively and physically interact with ColRobot robots using gestures, touch commands and demonstrations.
- The robot will be able to navigate autonomously in the factory floor to pick up the required parts and tools, and prepare kits for assembly.



Manufactur4.0

The project intends to efficiently transfer to the Naval and metalworking industry new advanced and low cost manufacturing technologies, contributing to the modernization and increased competitiveness of these industrial sectors

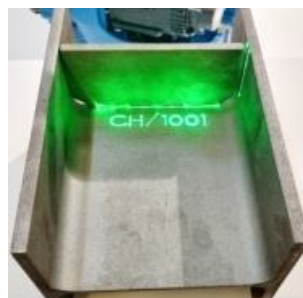
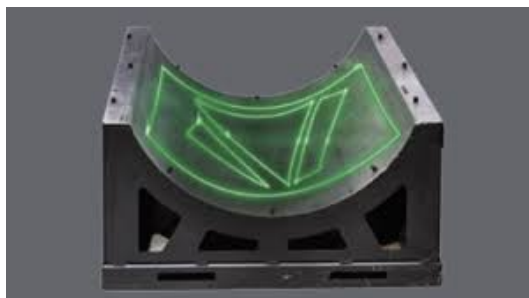




Manufactur4.0

INESC TEC responsible for the development of two pilot cases:

1. **Augmented Reality and Projection Mapping as a Supporting Tool for Cutting and Assembling Component Tasks in Steel Structures**



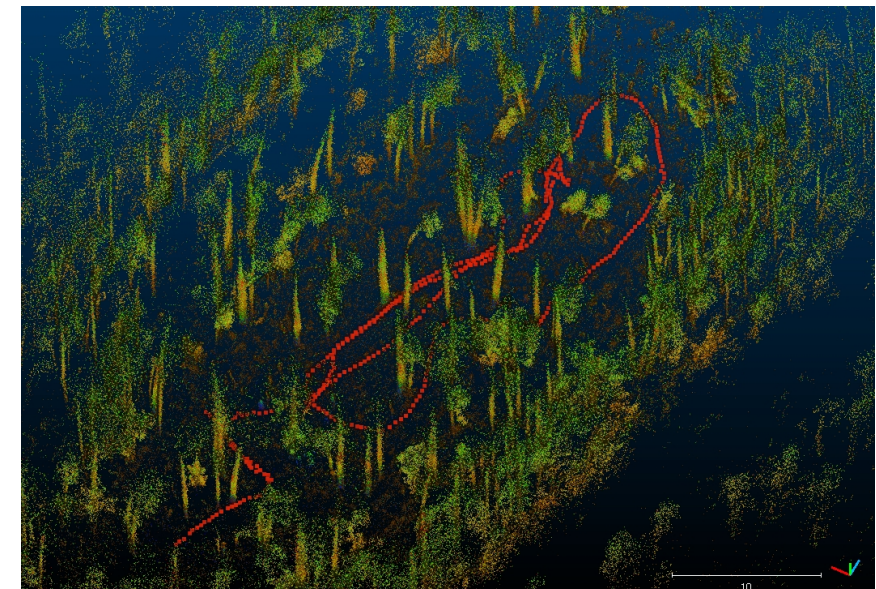
2. **Mobile Manipulator for machine tending**

BIOTECFOR



BIOTECFOR PROMOTES BIOECONOMY AND CIRCULAR ECONOMY

The BIOTECFOR project, developed by FORESTIS, AFG, INESC TEC and CTAG, aims to increase the levels of efficiency in the use of forest resources. The recovery of intelligent robotic systems for biomass capture and processing and the search for new applications for new materials promote a bioeconomy and circular economy in the northern region of Portugal and Galicia.



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Strategic relevance of Euroregion

Past examples show that there is a **relevant opportunity for collaboration** within the Norte Euroregion

- Take advantage of **geographical proximity** as facilitator for new opportunities
 - Simplify proposals preparations
 - Combine expertise to solve region companies problems and needs
 - Added-value along the entire supply chain and value chain
- Promote and increase visibility of **Euroregion needs** in EU Manufactory policies and roadmap
- Promote **knowledge and technology transfer and communication** within the Euroregion Industry

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