

Flexible and  
Autonomous  
Manufacturing Systems  
for Custom-Designed  
Products



H2020 Join call EUB-2017

Samuel Moniz

IoT Week

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement N° 777096



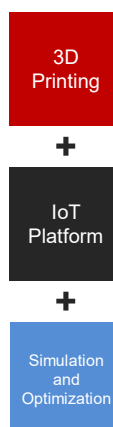
## 1. What problems are being addressed? Design an additive manufacturing supply chain in Brazil

**Challenge:** setup **large scale maintenance service** based in 3D printing technology



### Main focus

1. **Improve responsiveness** of technical assistance service
2. **Increase manufacturing flexibility** for supplying spare parts
3. **Adapt** (resize and reshape) parts and components, and material substitution
4. **Reduce operating and inventory costs**



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## 1.1 What problems are being addressed?

Perform automatic picking and place (from warehouses boxes to assembly boxes)

**Challenge:** fully automate material handling tasks in the production line



### Main focus

1. Improve the piece retrieval and kit preparation tasks
2. provide faster and reliable supply of components to the production line

Robotic Picking

+

IoT Platform

+

Simulation and Optimization

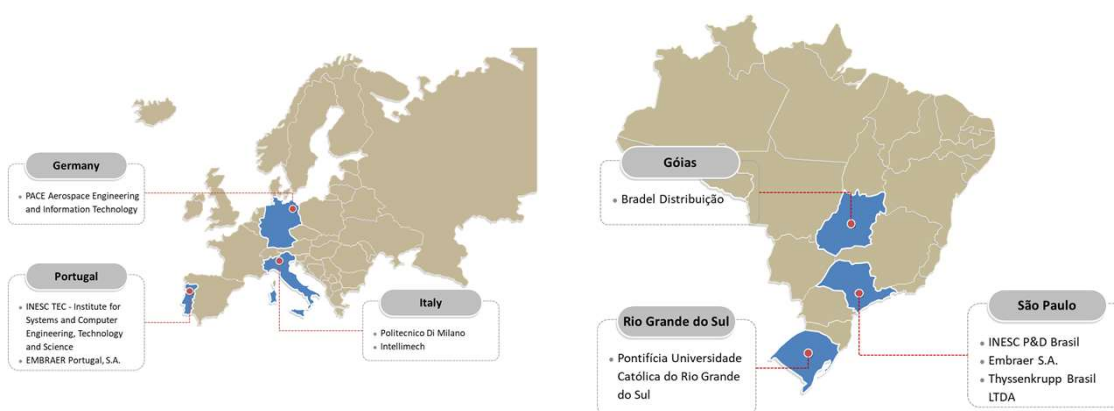
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3

## 2. Strategic objectives

Foster digital manufacturing sustainability and be an enabler of IoT technologies development between Europe and Brazil



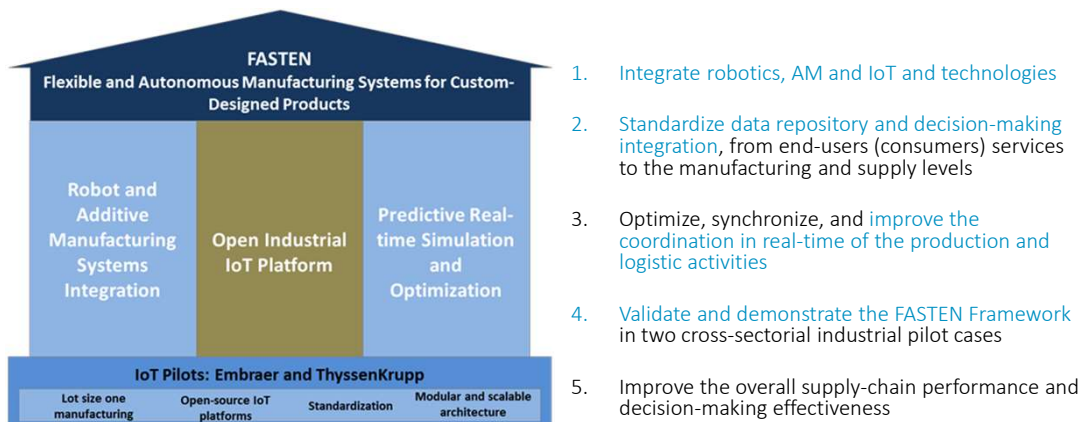
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4

## 2.1 Specific objectives

To develop and demonstrate a flexible and scalable robotic system and its integration with mass customization production lines



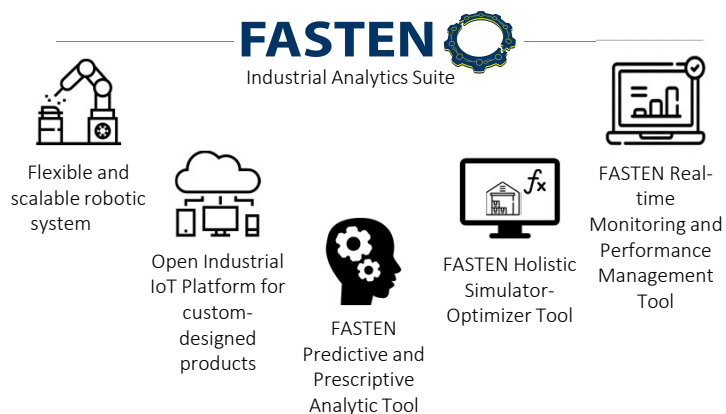
1. Integrate robotics, AM and IoT and technologies
2. Standardize data repository and decision-making integration, from end-users (consumers) services to the manufacturing and supply levels
3. Optimize, synchronize, and improve the coordination in real-time of the production and logistic activities
4. Validate and demonstrate the FASTEN Framework in two cross-sectorial industrial pilot cases
5. Improve the overall supply-chain performance and decision-making effectiveness

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5

## 3. Main results



1. Intelligent handling of custom objects
2. Full connectivity among all hardware and software components
3. Improve accuracy and provide better insights regarding the near-future
4. Solid understanding of the system's behaviour and its sensitivity to different parameters

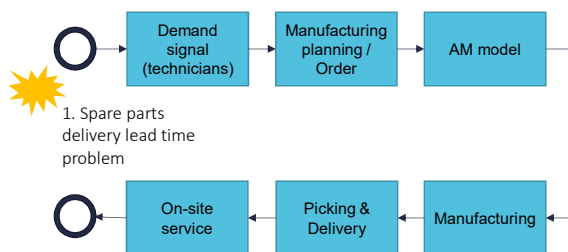
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6

### 3.1 Flexible and scalable robotic system

How to improve technical assistance service by reducing spare parts delivery lead time (from technicians demand to technical assistance service)?



(Current spare parts manufacturing system)

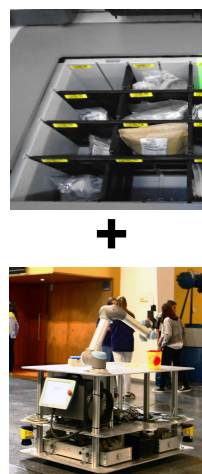
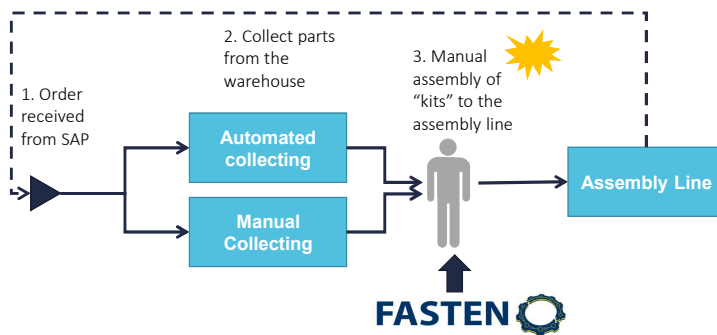
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7

### 3.2 Flexible and scalable robotic system

**Goal:** Automate kit assembly with pick and place

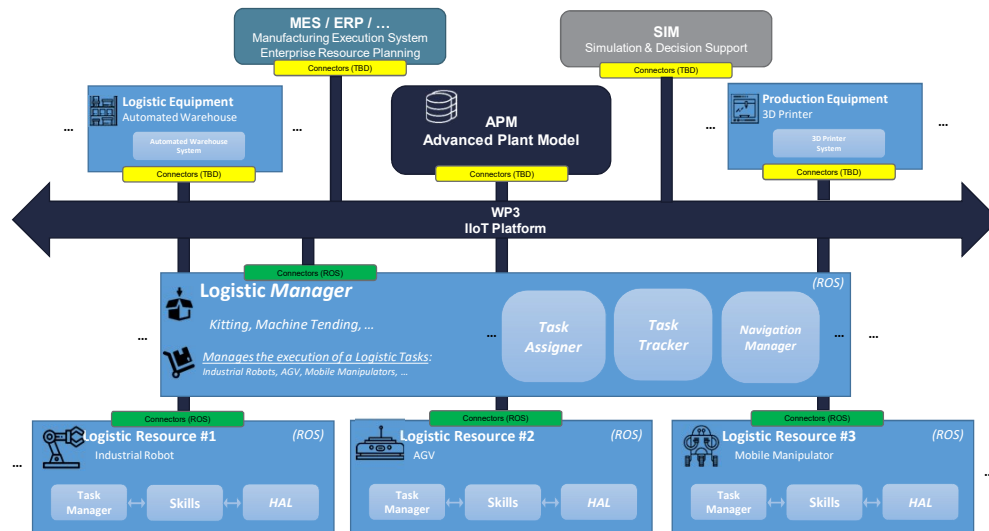


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8

### 3.3 Open Industrial IoT Platform for custom-designed products

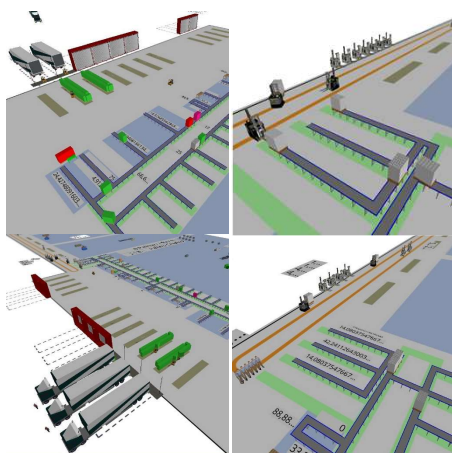


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9

### 3.3 Holistic simulator-optimizer tool



Simulation-optimization is used to model the dynamic behaviour of the manufacturing system:

1. to effectively solve **integrative design, planning, and scheduling problems**
2. How many 3D printers should be allocated to each region? **Who should be the supplier for each spare part?**

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10

### 3.4 Predictive and prescriptive analytic tool



1. When should maintenance operations be performed on the drilling robots to maximize the production line productivity?
2. Online training of optimization algorithms for predicting failures (*integration with planning and scheduling decision making*)

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11

### Contacts

Samuel Moniz

INESC TEC [Centre for Enterprise Systems Engineering]

[samuel.moniz@inesctec.pt](mailto:samuel.moniz@inesctec.pt)

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12