

Flexible and Autonomous  
Manufacturing Systems  
for Custom-Designed  
Products



**FASTEN: an IoT platform for  
manufacturing. Embraer use case**

8<sup>th</sup> EASN

4th September 2018

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



## Index

EMBRAER

FASTEN

FASTEN EMBRAER use case

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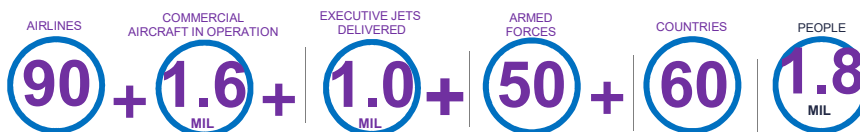
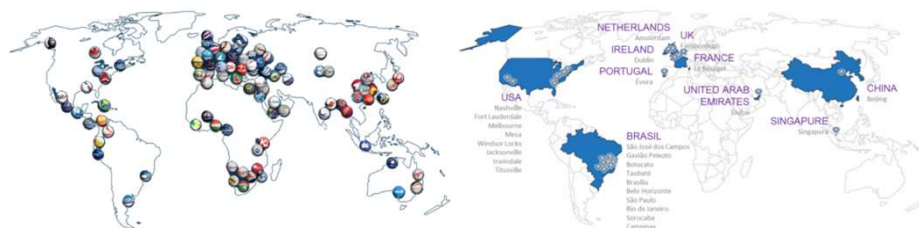
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## EMBRAER: A GLOBAL COMPANY



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## EMBRAER PORTUGAL



Production Of Large, Critical  
and/or Complex Parts

Wings And Empennage  
Assembly

High Automation And  
Digitalization



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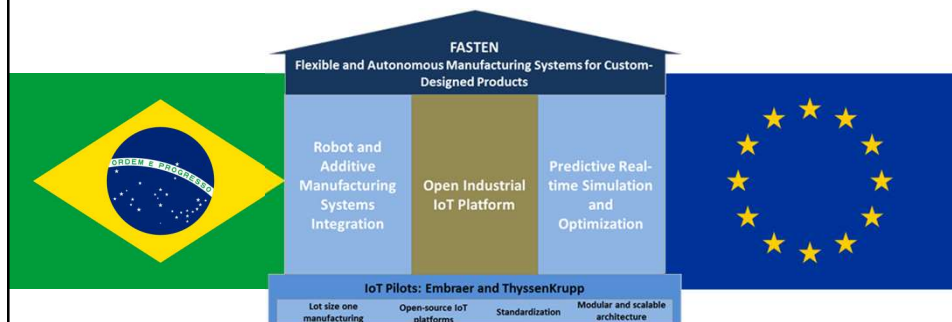
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## What is FASTEN?



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

Provide a multi-disciplinary decision support tool to improve trade-off analysis

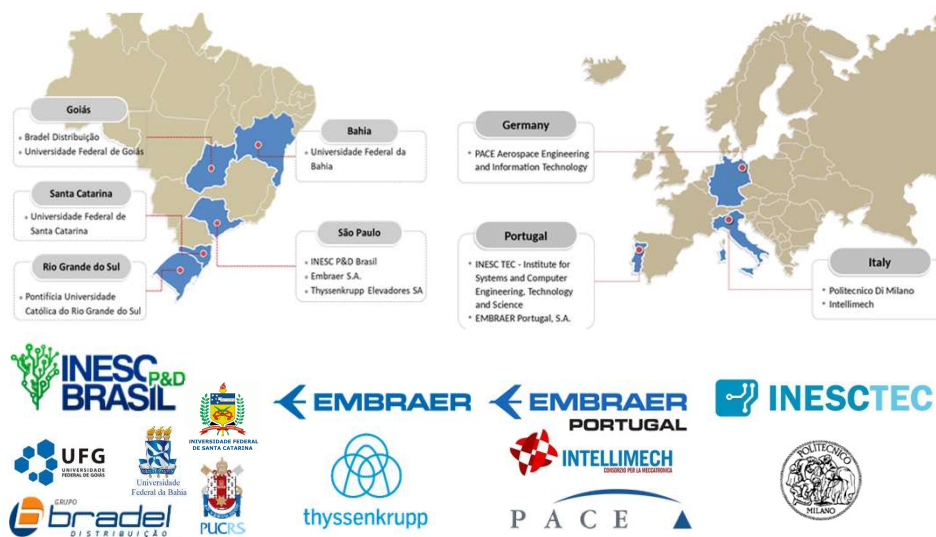
Contribute to the competitiveness of Brazil and Europe

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## Partners from Europe and Brasil



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## Two pilot demonstrations



Design of an Additive  
Manufacturing Supply chain in  
Brazil



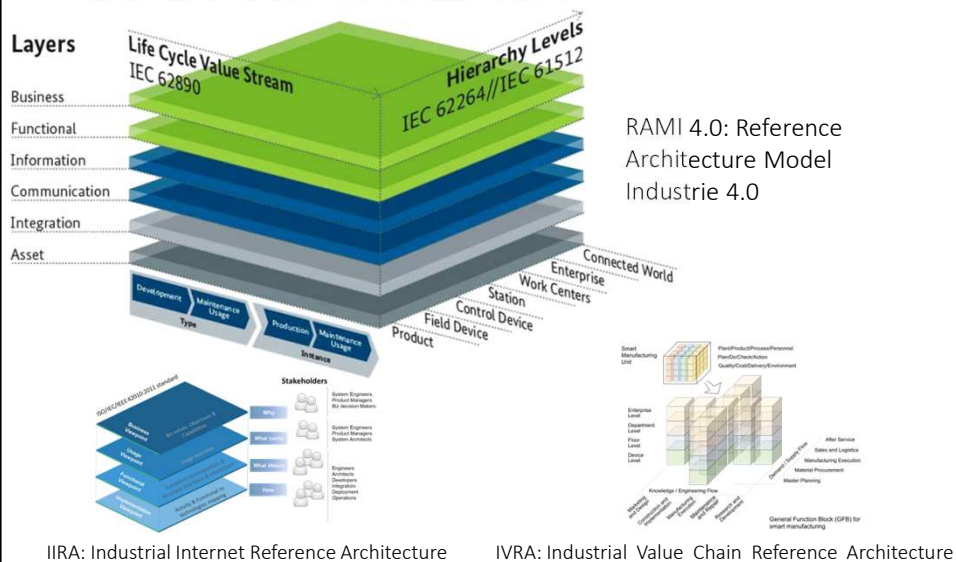
Automatic Pick'n'Place at  
Embraer Portugal

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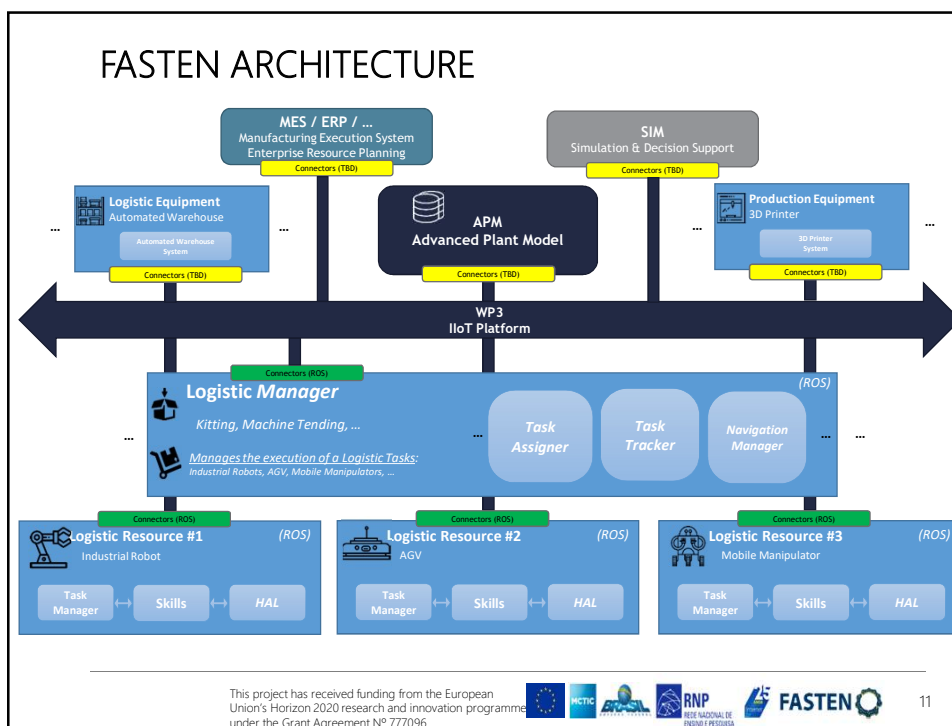
## FASTEN: RAMI 4.0 Architecture



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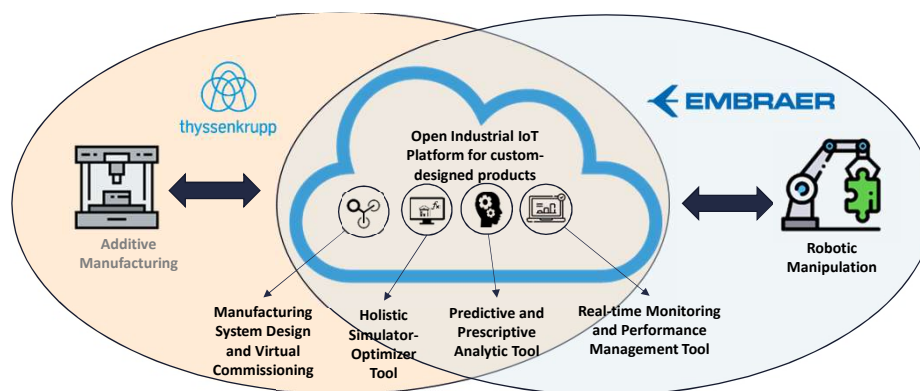
## FASTEN EMBRAER Use case

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## FASTEN – Project Structure



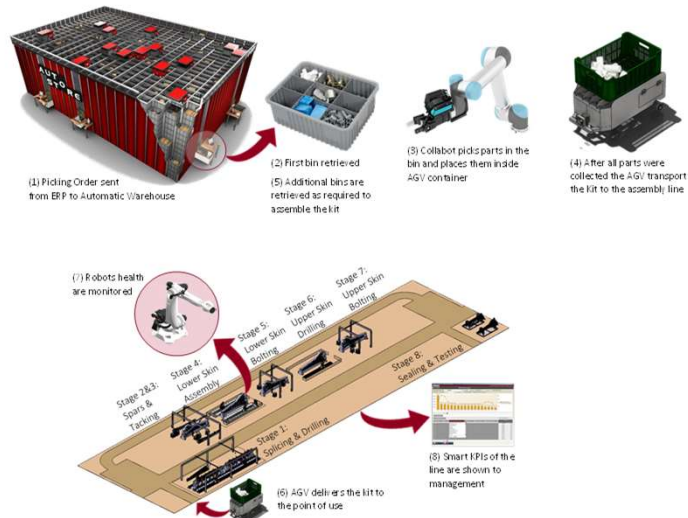
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## EMBRAER Use Case : Overall view

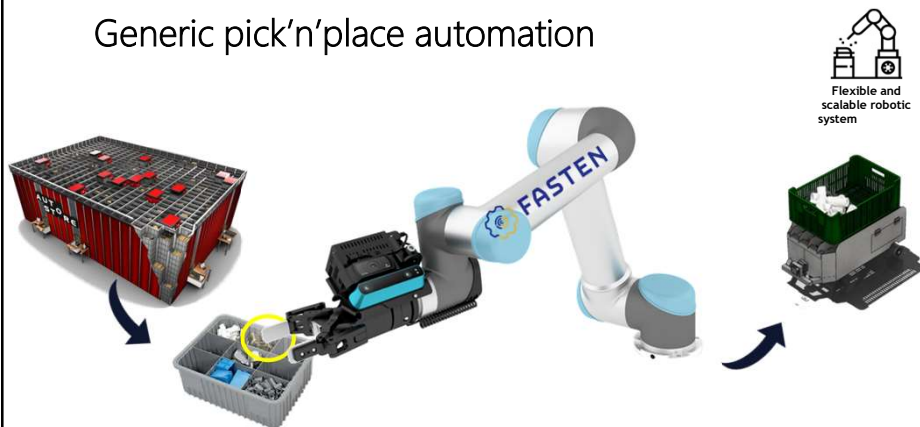


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## Generic pick'n'place automation



### CHALLENGE:

80% of warehouse are small parts, different sizes, forms, weight, light reflexion, consistency, ...

... and new parts coming in!

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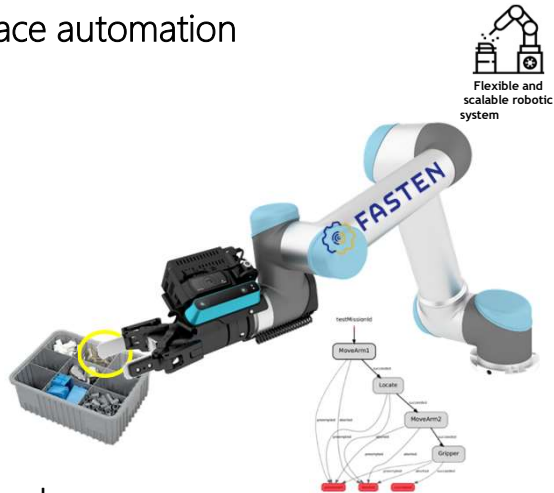


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## Generic pick'n'place automation

Generic Solution  
Adaptable  
Self-Learning  
Service Oriented  
Architecture  
Skills based approach



Flexible and  
scalable robotic  
system

Exploiting cross-link with scalABLE 4.0 and ColRobot projects

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## Towards prescriptive maintenance



FASTEN  
Predictive and  
Prescriptive  
Analytic Tool

Diagnostics  
Prognostics  
Prescription  
Support Condition  
Based Maintenance

### CHALLENGE

Predict machine failure, prescribe solution, anticipate disruption.

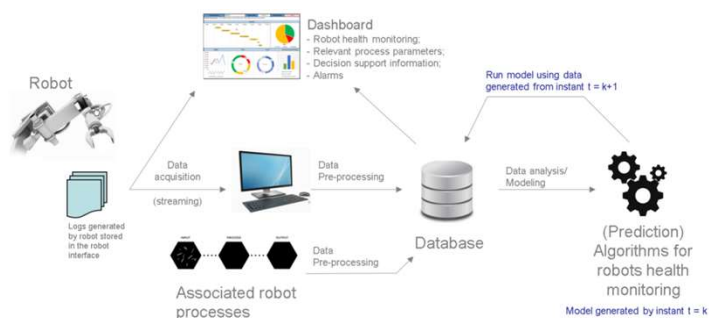
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## Embraer: towards prescriptive maintenance



FASTEN  
Predictive and  
Prescriptive  
Analytic Tool



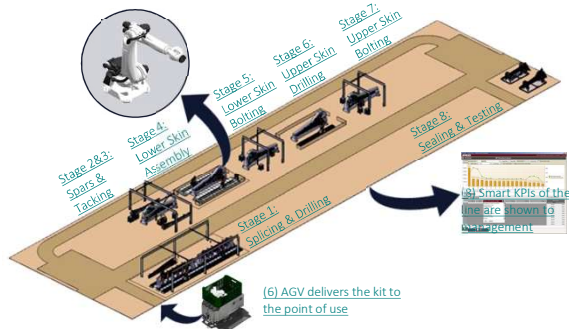
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## Wing Assembly Line Simulator



FASTEN Holistic  
Simulator-  
Optimizer Tool



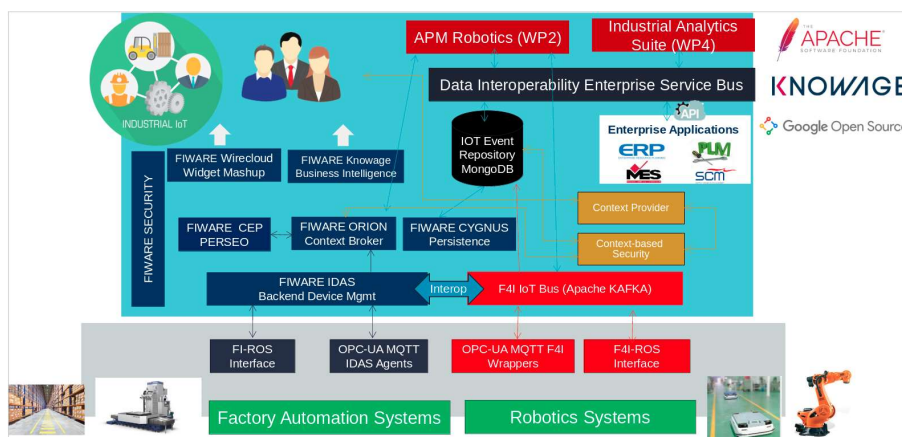
Self.evolving with real data  
Support Plant Management  
Manage disruption  
Load balancing for new or improved products

**Integrate streams of data at rest and data in movement**

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## Results – Open Industrial IoT Platform for custom designed products – *Reference architecture and system specification*

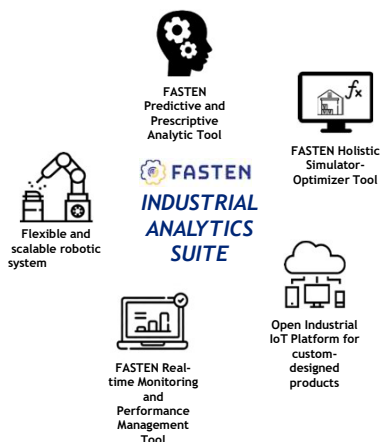


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## Main expected results



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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## Next activities

1. Aug-2018: TSK Report on use-case experiment specification and data collection
2. Aug-2018: EMBPT Report on use-case experiment specification and data collection
3. Nov-2018: European Commission Lightweight review
4. 2019: Functional Demonstration Platform
5. 2020: Pilot Demonstrators

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Manufacturing Systems  
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Products



# FASTEN



Thank you  
Questions?

[www.fastenmanufacturing.eu](http://www.fastenmanufacturing.eu)

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