



# BRICS FUTURE SKILLS CONFERENCE



*Brazilian National Service for Industrial Training*

**THE FUTURE OF WORKFORCE**



## EMBRAER Being Digital from Design to Manufacturing

João Zerbini  
Sr. Manager - Digital Engineering  
& Manufacturing Technologies



1946

National Strategic Project to foster the aeronautics in Brazil - CTA (Aerospace Center of Technology ) and ITA (Aeronautics Institute of Technology) were created



1994

The company is privatized, combining technological and industrial knowledge with an entrepreneurial culture



2019

One of the world's leading manufacturers of commercial and executive aircraft, with Strong and growing performance in defense and security

1969

EMBRAER was founded controlled by the Federal Government as a step to develop the aeronautic industry





# WHERE WE OPERATE



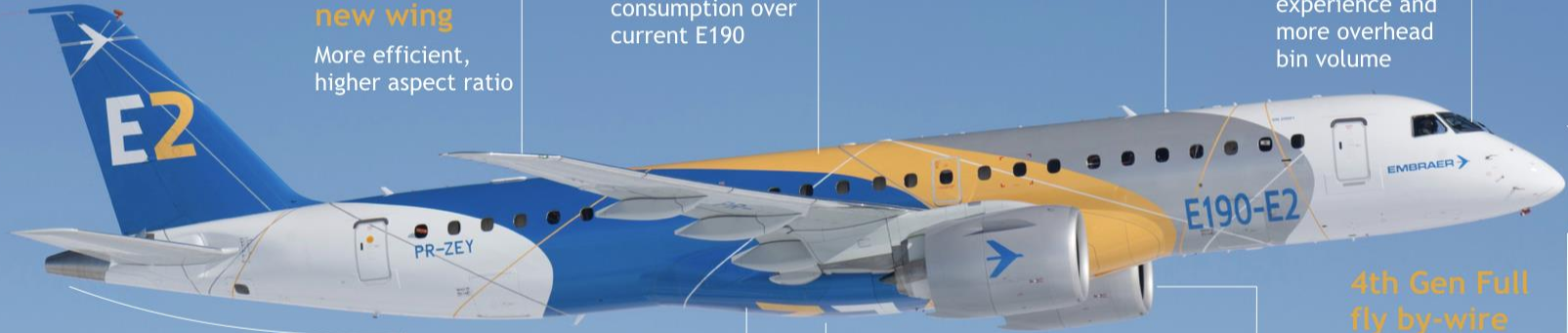


## OUR CHALLENGE





# A NEW DESIGN ON A PROVEN PLATFORM



## new wing

More efficient,  
higher aspect ratio

## fuel

17,3% lower fuel  
consumption over  
current E190

## improved avionics

45% more display

## new interior

Enhanced PAX  
experience and  
more overhead  
bin volume

## fuselage

Extensive  
aerodynamic  
optimization to  
improve fuel  
efficiency

## aircraft system

Re-designed to boost  
performance and  
reliability and to improve  
maintenance costs

## landing gear door

Up to 1% fuel  
burn reduction

## new engine

High By-Pass  
Ratio, Geared  
Fan Engines

## 4th Gen Full fly by-wire

Digital closed-  
loop control to  
improve flying  
qualities and  
fuel efficiency



EMBRAER X





# STRATEGIC PLAN FOR ADVANCED DESIGN AND MANUFACTURING



- Guarantee the alignment of resources
- Avoid effort duplication and rework
- Prioritize the initiatives - corporate strategy
- Leverage the competitiveness



# ADAM TECHNOLOGY DIMENSION

## ➤ DIGITAL ENGINEERING

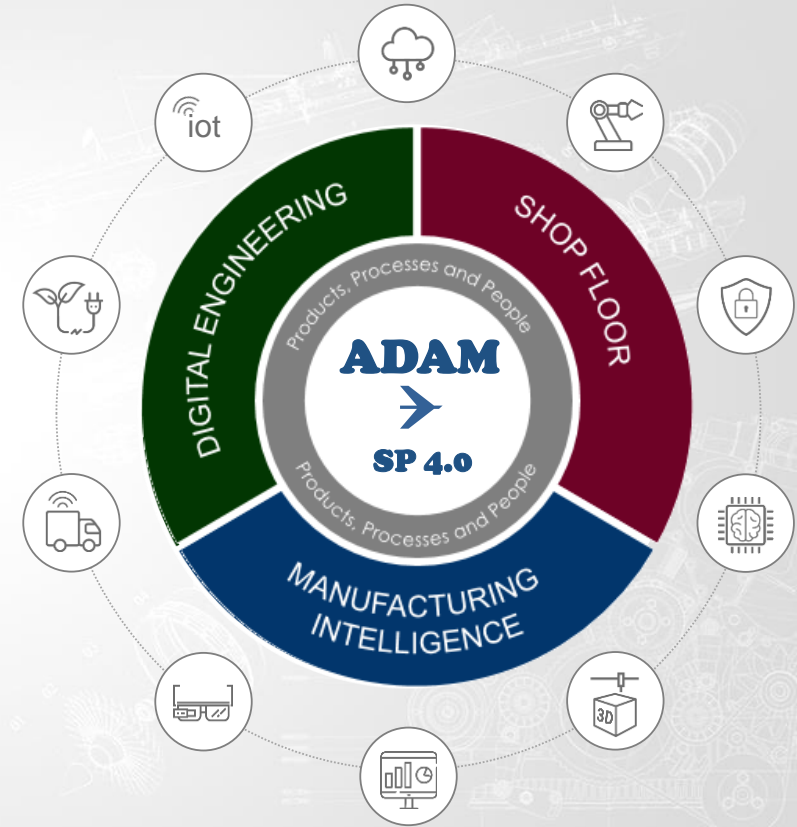
Anticipate the maturity of the products and processes  
Increase efficiency in the development phase

## ➤ SHOP FLOOR

Increase efficiency, flexibility, throughput and quality of the productive process

## ➤ MANUFACTURING INTELLIGENCE

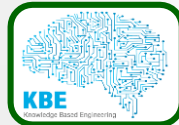
Information to supports the decision making intelligence



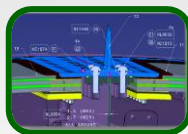
# INITIATIVES



Model Based System  
Engineering



Engineering  
Automation



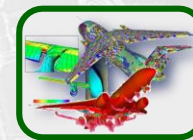
Model Based  
Design



Collaboration



Data Reuse



Intensive  
Simulations



Generative  
Modeling



High Performance  
Computing

## Digital Engineering Product Design

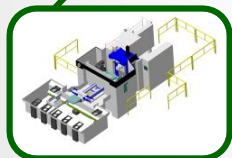
Anticipating the product  
maturity & efficiency



# INITIATIVES



Discrete Event  
Simulation



Virtual  
Commissioning



Assembly  
Simulation



Paperless  
Online Information



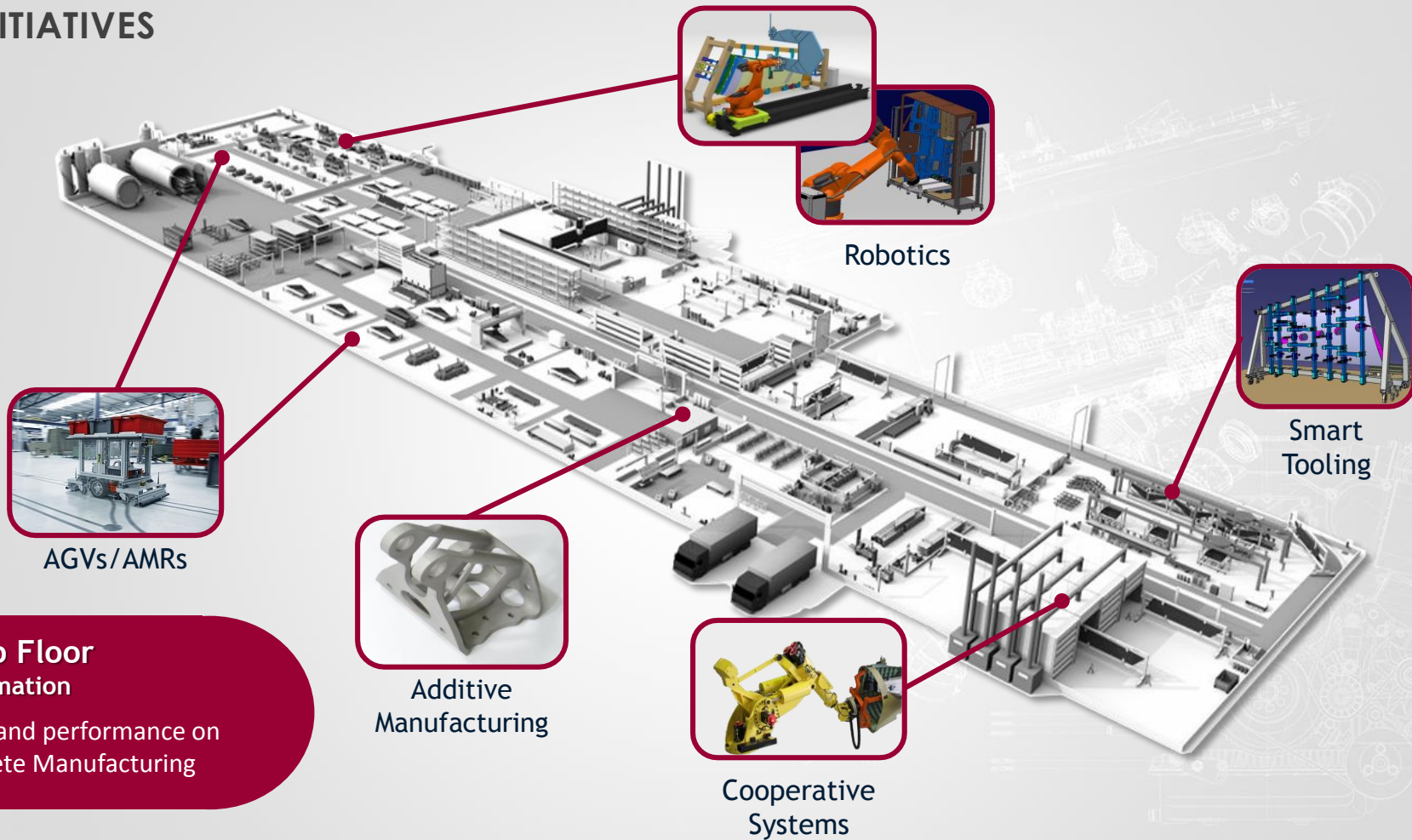
Machining &  
Robotics Simulation

## Digital Engineering Manufacturing Design

Factory Deployments done  
First-Time-Right



# INITIATIVES



# INITIATIVES



Exoskeleton



Augmented Reality

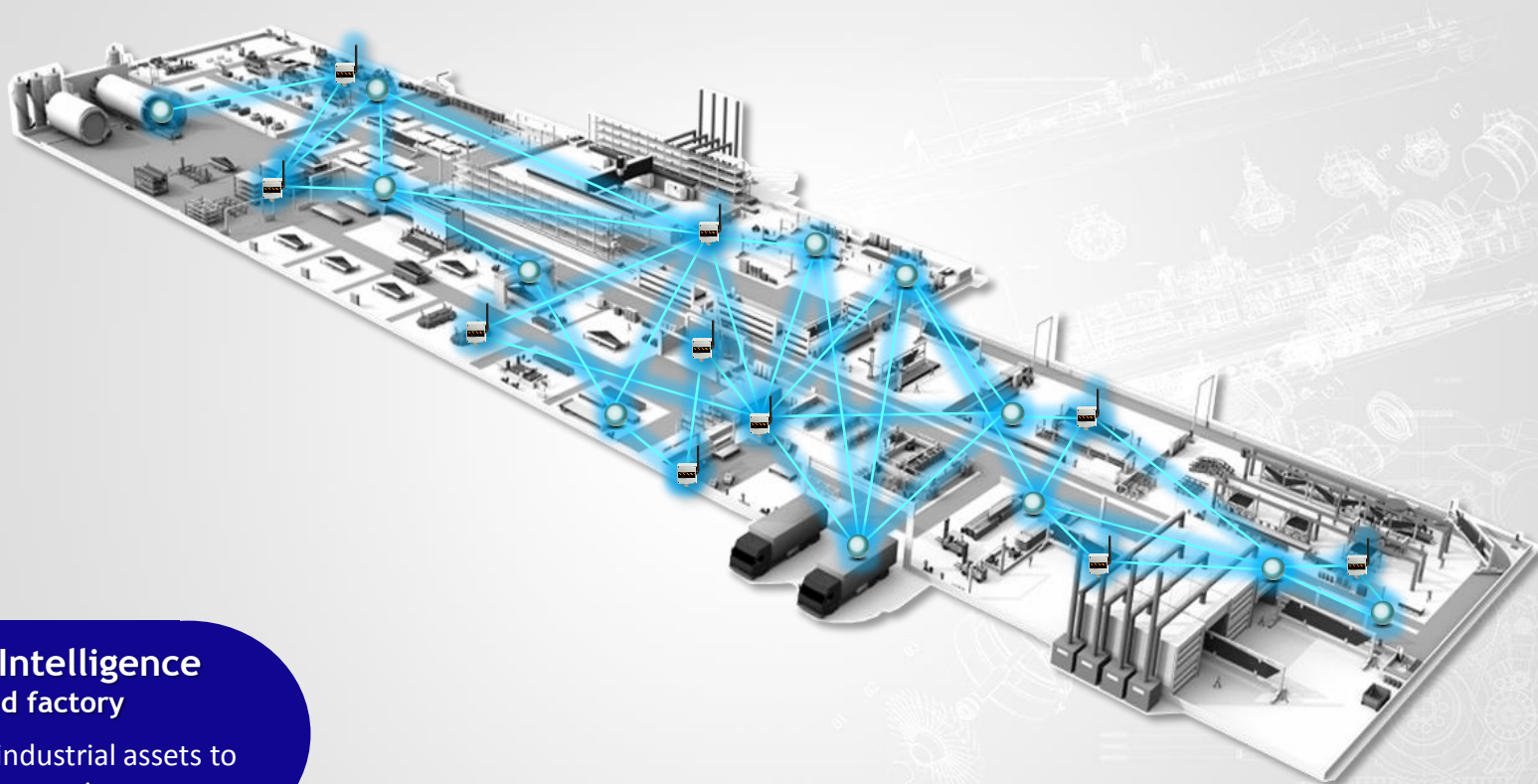


Cobots

## Shop Floor Augmented Environment

Technology to augment  
operators capabilities

# INITIATIVES



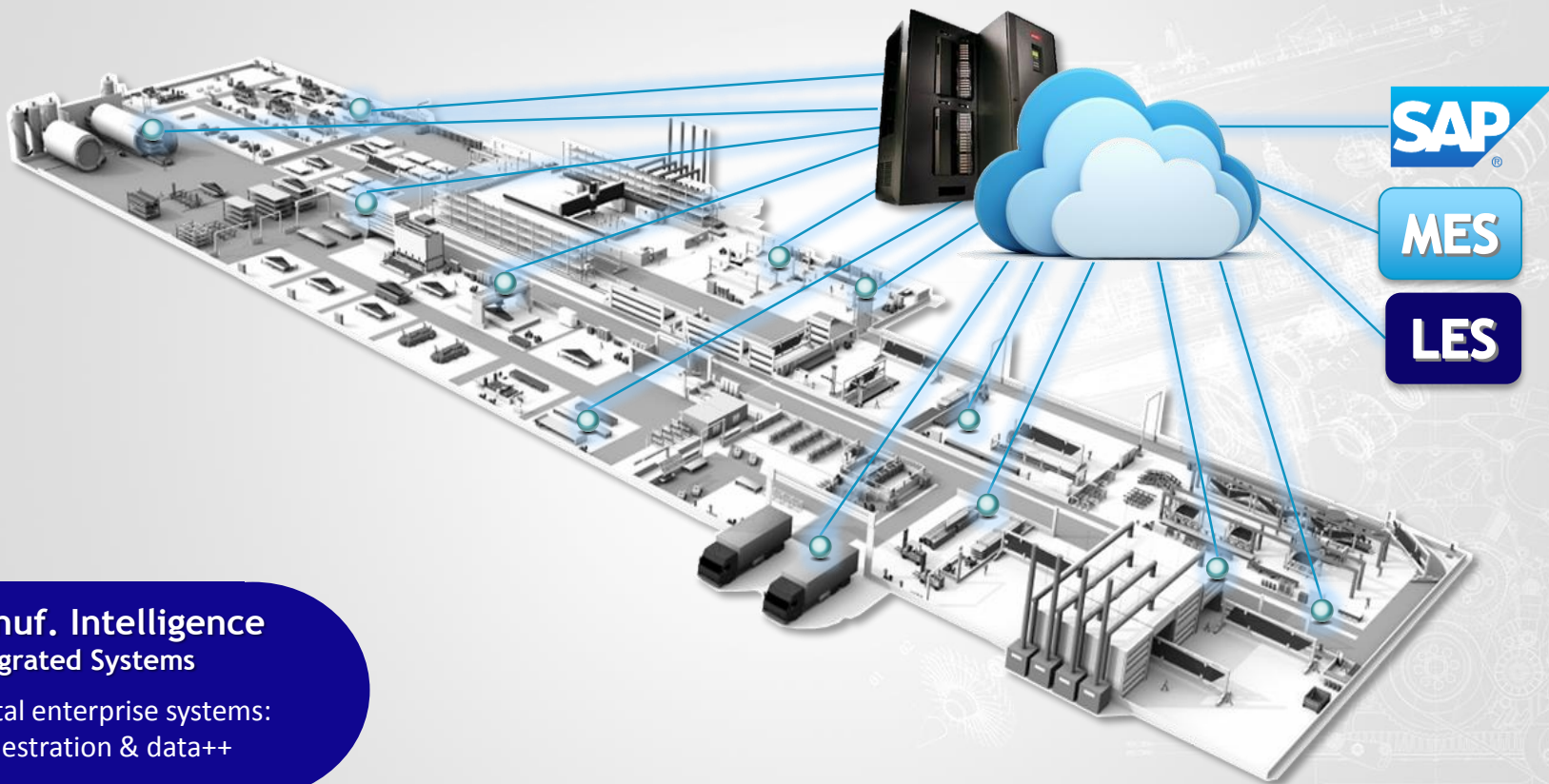
## Manuf. Intelligence Networked factory

Sensored industrial assets to  
enable Automation





# INITIATIVES



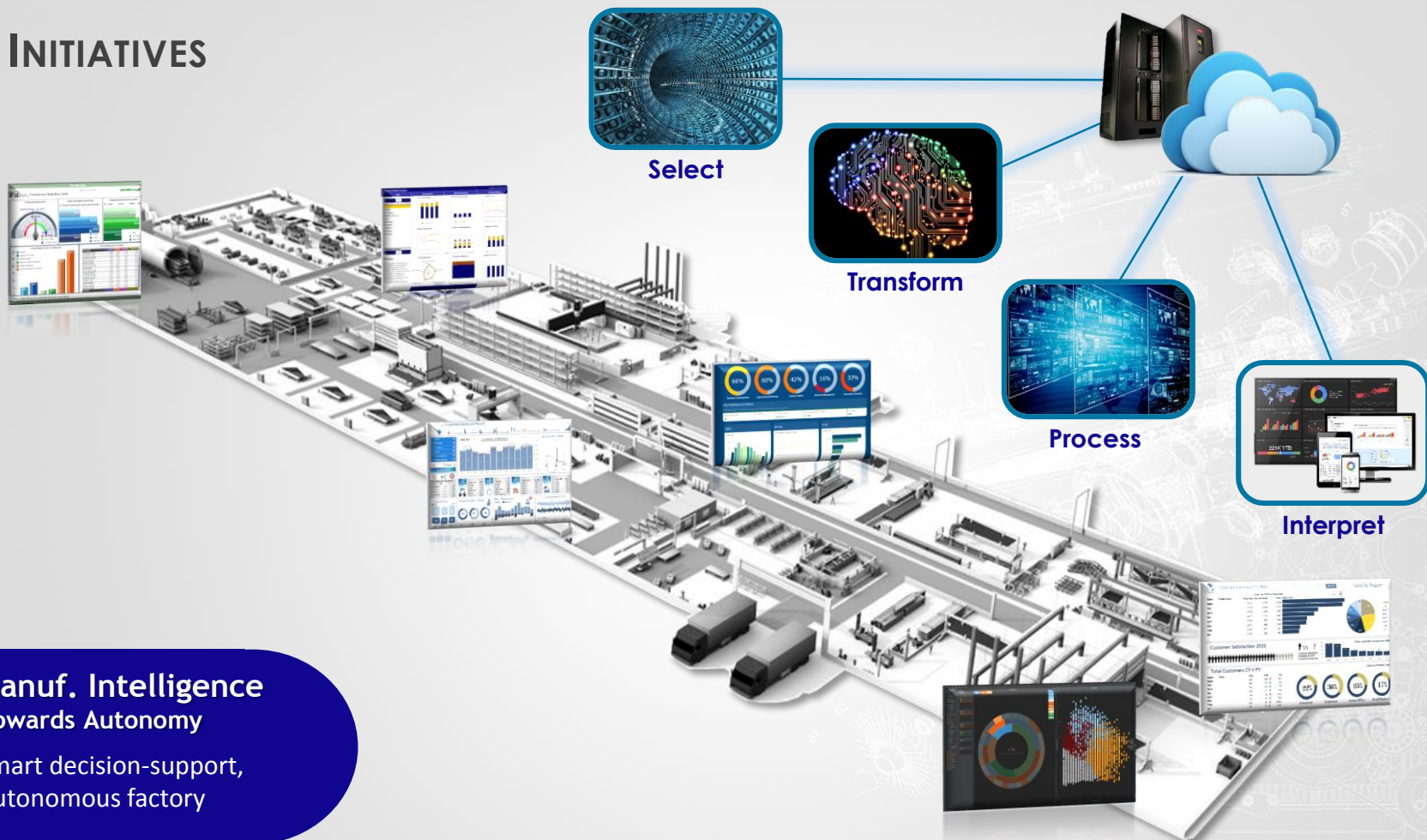
## Manuf. Intelligence Integrated Systems

Digital enterprise systems:  
orchestration & data++



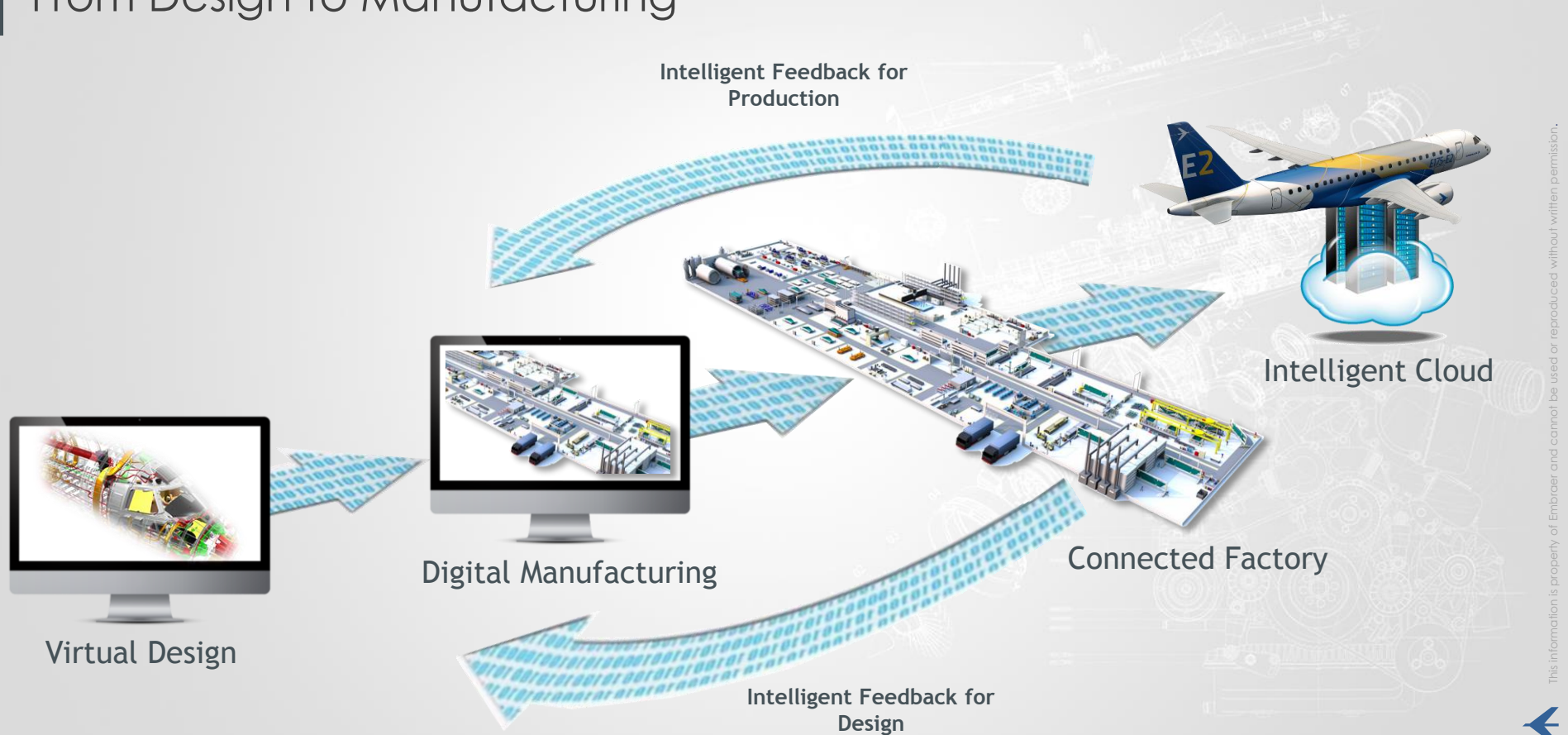


# INITIATIVES



# FACTORY OF THE FUTURE

## From Design to Manufacturing



# PROFESSIONAL OF THE FUTURE

**How would a new technology affect our  
knowledge and skills?**



# HARD SKILLS



Digital Ability



Transversal  
Knowledge



Information and  
Communication  
Technology



Sustainable  
Intelligence



Robotics  
Autonomous  
Machines



Specific  
Knowledge





# SOFT SKILLS



Critical Sense



Social  
Intelligence



Collaboration



Market  
Comprehension



Cognitive Ability



Flexibility



# POWER FROM KNOWLEDGE

The background of the slide features a detailed, light-colored technical line drawing of an aircraft engine, showing various components like the compressor, turbine, and fan sections. This drawing is overlaid on a dark grey horizontal bar that contains the 'EMpower' logo.

## EMpower

- Learning Ecosystem
- Career tracks
- Self development
- Learning to learn
- Continuous and collaborative learning

# WE DEVELOP GREAT HUMANS

**PEE**

program  
**ENGINEERING SPECIALIZATION**

Professional Master's in aeronautical engineering,  
taught on company premises.

More than 1300 engineers trained since 2001.

**PPE**

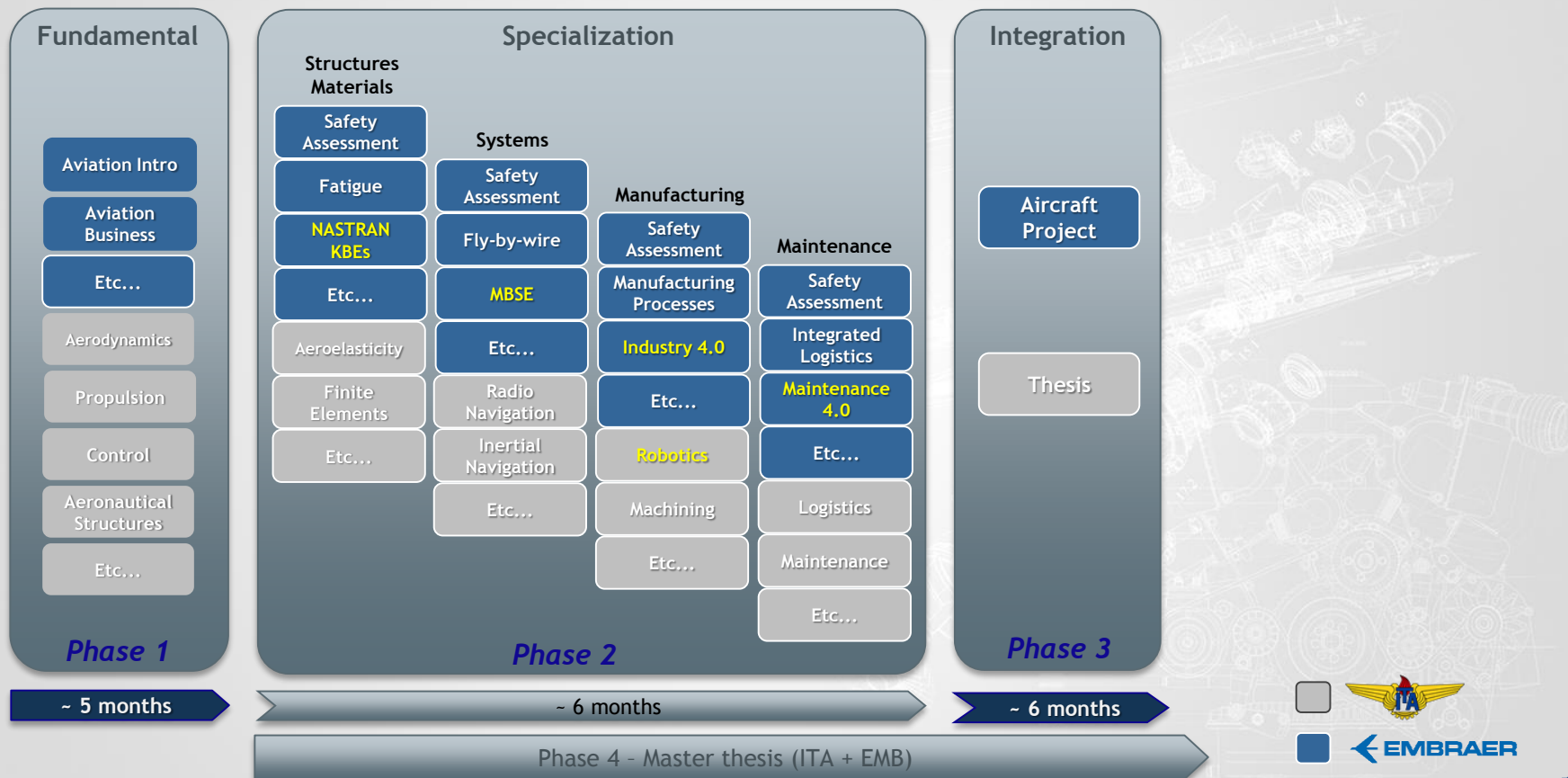
program  
**EMBRAER DESIGNERS**

Preparing technicians to become  
aeronautical designers.

151 professionals trained in 4 years of  
operation



# ENGINEERING SPECIALIZATION PROGRAM - PEE





# SCHOOL OF MANUFACTURING ENGINEERING

## Basic Courses

Lean Manufacturing  
Quality  
Human Factors  
Budget, Costs and  
Investments  
DFMA  
...

## General Technology Courses

Mechanical Assembly  
Structural Assembly  
Composites  
Milling  
NDT  
...

## Specific Technology Courses

Robotics  
Process Automation  
Digital Manufacturing  
IIoT  
Process Simulation  
...



# KNOWLEDGE MANAGEMENT

## 75 Communities of Practice

- Industry 4.0
- Augmented Reality
- Additive Manufacturing - 3D Printing
- Industrial Automation
- Data Science
- Artificial Intelligence
- System Engineering
- IoT / IIoT
- CAE / CAD / Digital Manufacturing
- Etc.



# DAI – ACADEMIC INDUSTRIAL PHD

Support tool for the industry to intensify its interest in R&D and for a natural migration of the researcher trained and established in universities to work in industry



Professional PHD 7 - 9

**TRL 3 - 7**

PHD 1 - 3

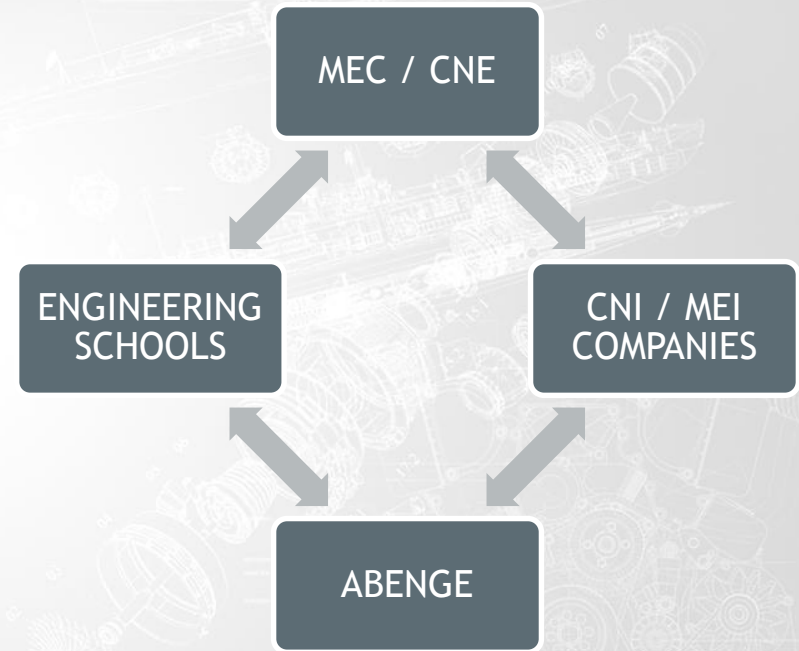
ITA -CAPES agreement duration of 5 years -July 2022  
12 scholarships



# MODERNIZATION OF ENGINEERING COURSES

Propose actions for the strengthening and modernization engineering courses in Brazil in order to increase innovation and competitiveness of companies operating in the country

- Curricular structure and education methodologies
- Teacher hiring, training and evaluation/promotion
- Courses evaluation





[embraer.com](https://embraer.com)



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