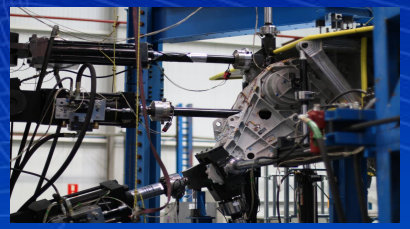
CTA Overview

CTA is an Aerospace Center specialised in technology validation for development of aerospace materials, structures and systems with a high R&D activity.

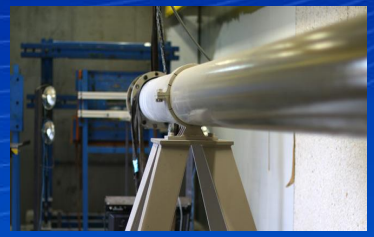
Testing activities / Demonstrators

Full scale



Multiaxis

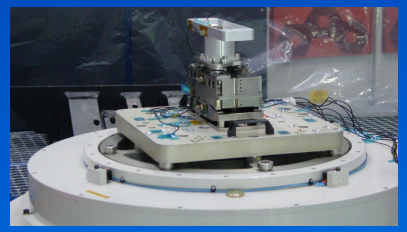
High loads



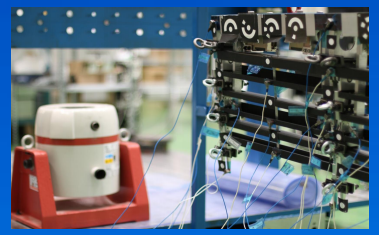
Impact technology

Hydraulics

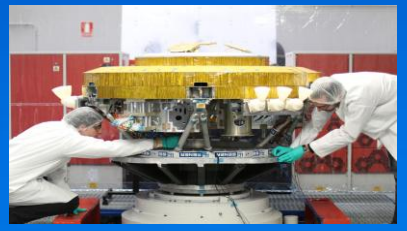
Combined tests



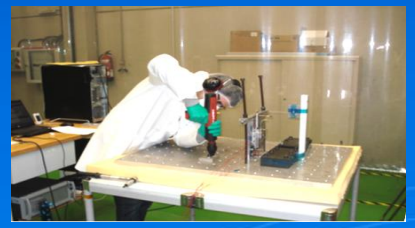
Environmental



Dynamics



Vibration



Pyroshock

Vacuum

Structural

Cabin interiors

Powerplant

Fire scenarios (kerosene, batteries, H2 fires)

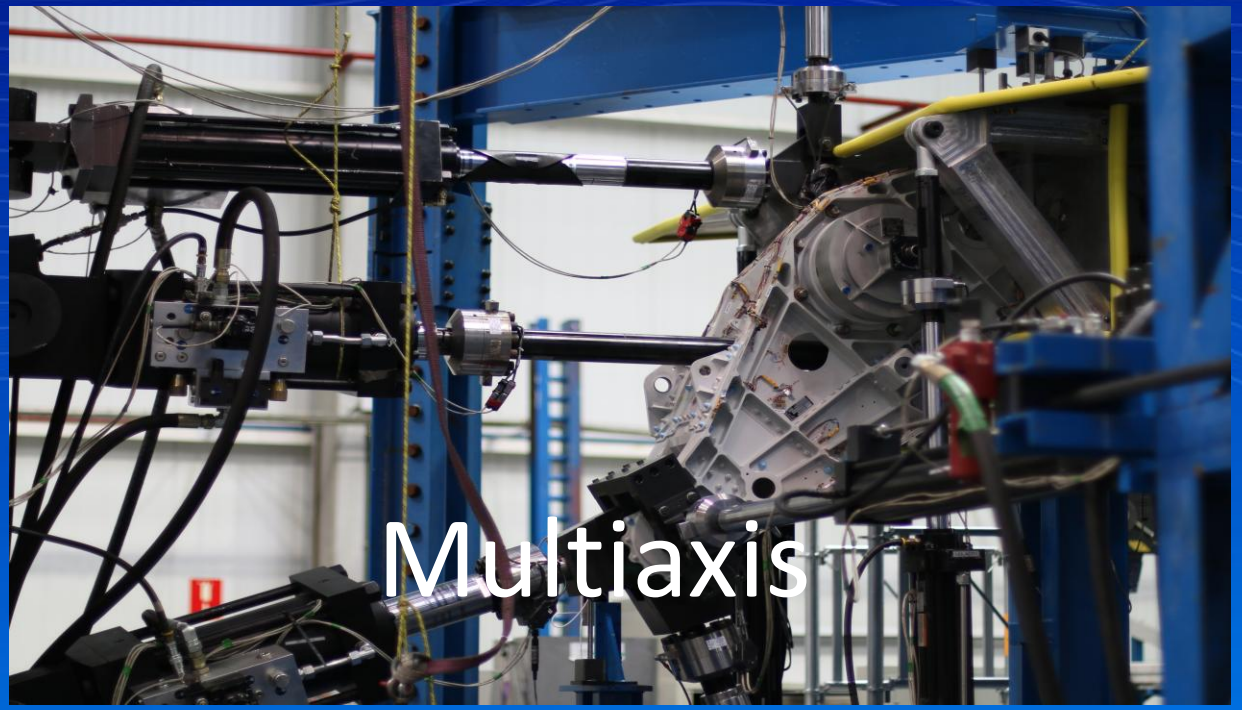
Capacities

- Test facilities
- Turnkey test benches
- Test instrumentation
- Test assembly
- NDT
- Systems testing
- Fire testing
- Structural testing
- Technological demonstrators
- R&DT&I activities

➢ **Technology demonstrators**

➢ **Testing activities**


Full scale


Multiaxis

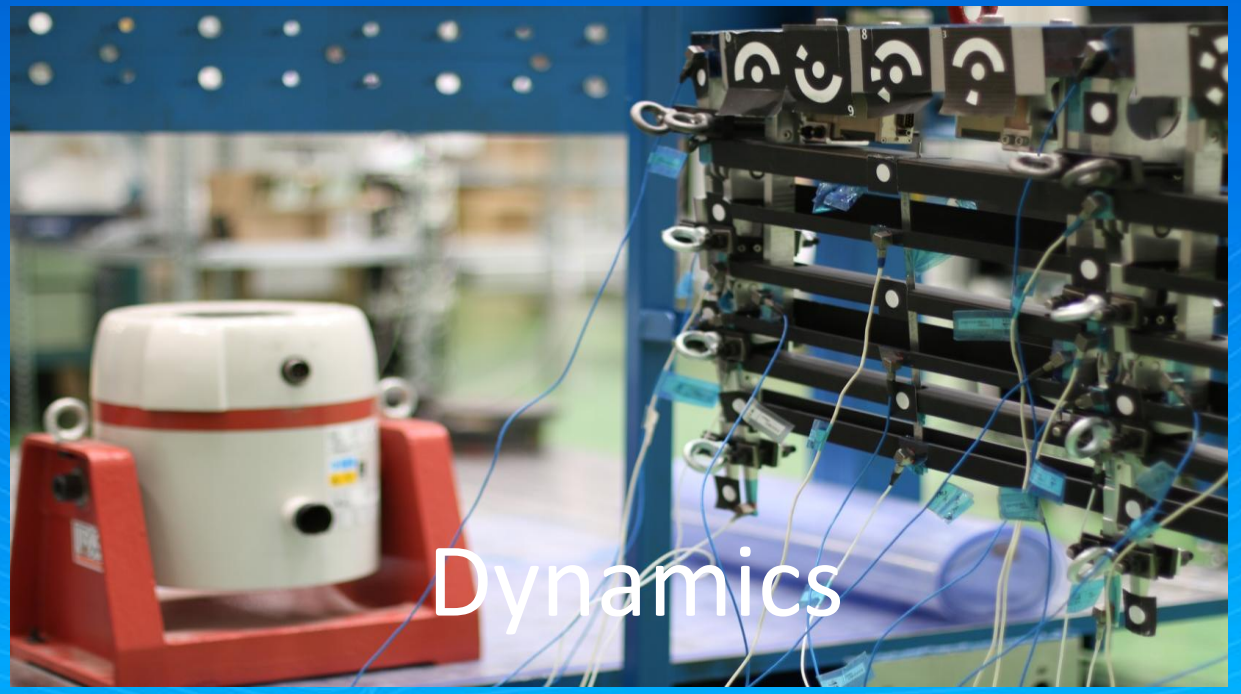

High loads


Impact technology

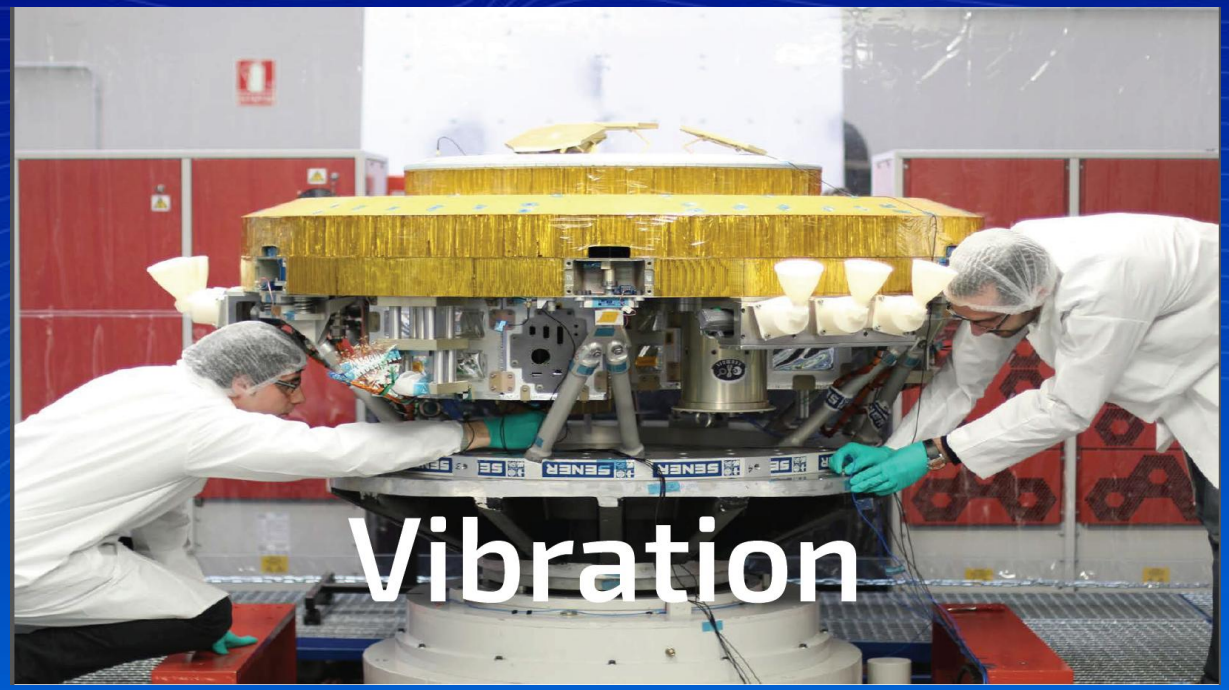
Hydraulics/ Pneumatics

Combined tests

Environmental



Dynamics


Vibration


Pyroshock

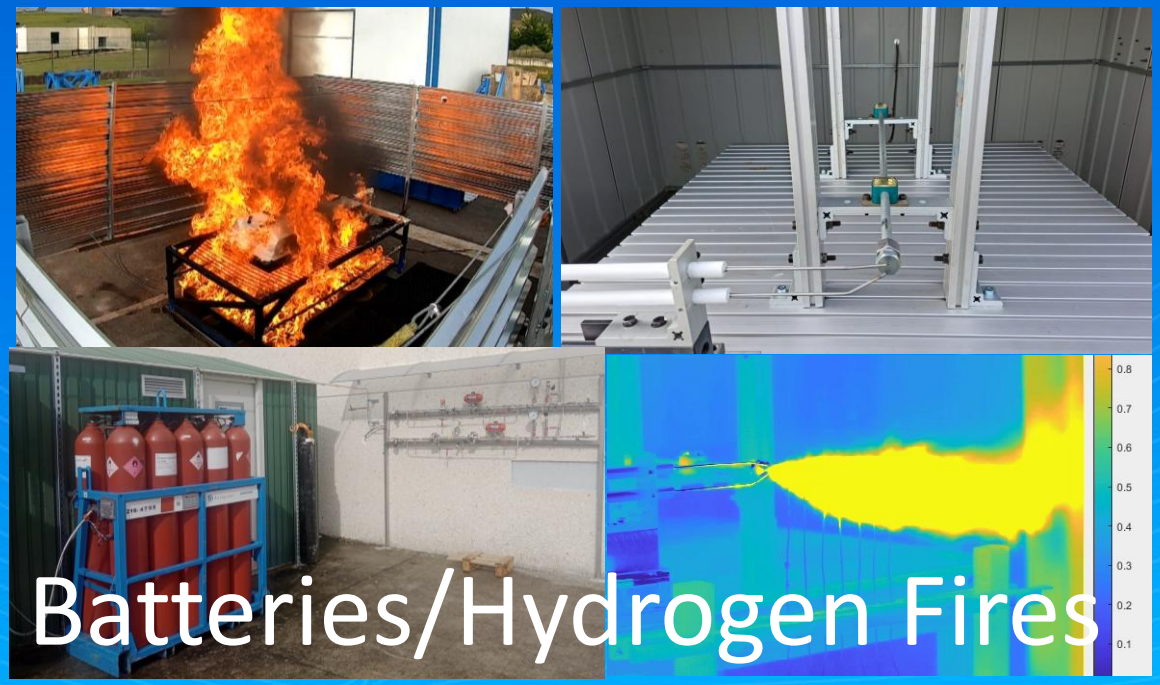

CTA
Vacuum

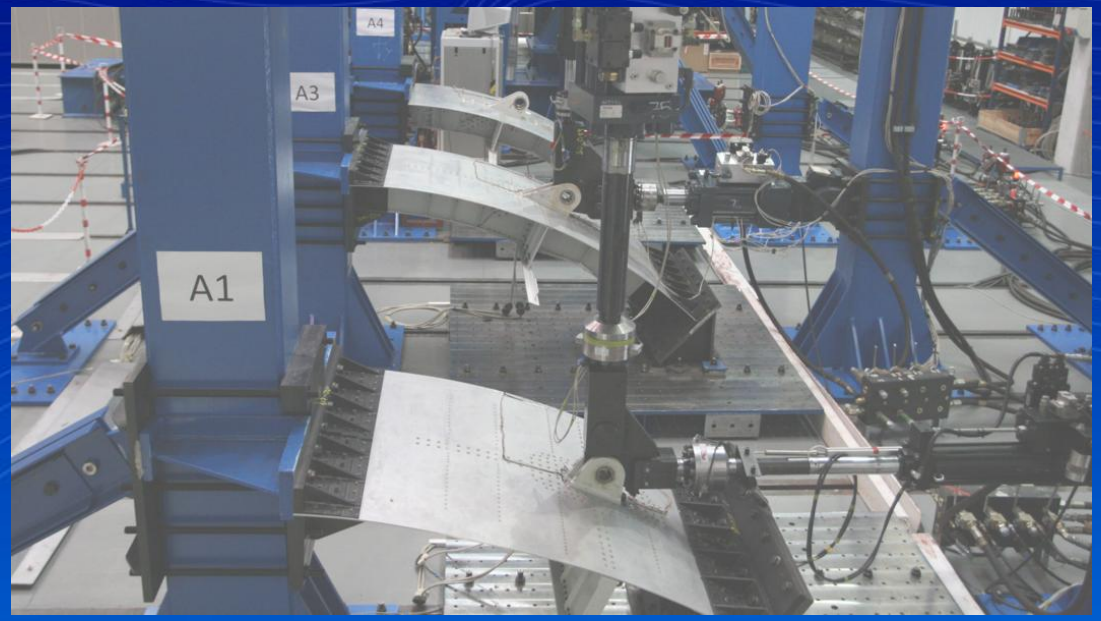

CTA
Structural


Cabin interiors


PowerPlant


Fire scenarios


Batteries/Hydrogen Fires
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1



Test Bench / Facilities Development

Areas / R&DT&i lines

- Zero emissions
  - Storage and distribution
  - Environment aspects

- New architectures: aero &space
  - Multifunctional structures
  - Complex Test bend

- Monitoring & Control
  - Product-Process-Machine
  - Smart Factory/ Operation/MRO
  - Data Science

Research lines

L1. DATA MANAGEMENT: Data Acquisition and Processing

- L1.1 Monitoring, Inspection, and Advanced Instrumentation.
- L1.2 Data Management: Machine Learning, AI, Quantum Computing,…
- L1.3 Artificial Vision/AR (Augmented Reality).

L2 CONTROL AND COMMUNICATION

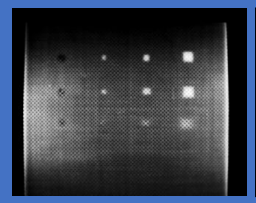
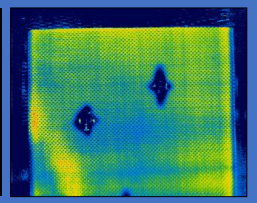
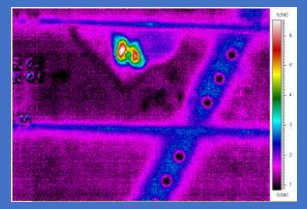
- L2.1 AIOT Communication.
- L2.2 Advanced Control Strategies: Thermal Control, Positioning Control,…

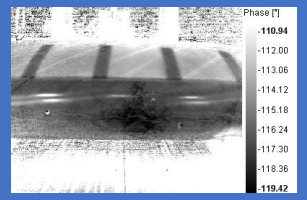
L3 Testing and Simulation Technologies

- L3.1 Development of New Testing Technologies and Complex Test Benches.
- L3.2 Zero Emission Technologies: H2 (Hydrogen), Electric, Hybrid,…
- L3.3 Simulation/Modeling.

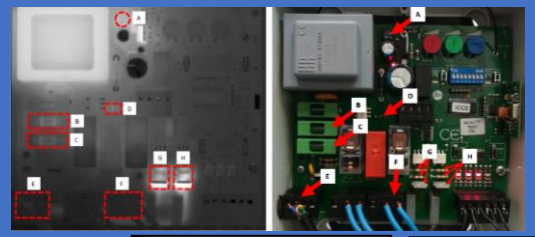
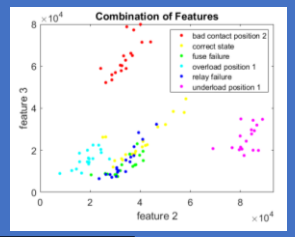
DATA MANAGEMENT & AI (Artificial Intelligence)

Processes monitoring and inspection techniques applied to production, service and MRO activities

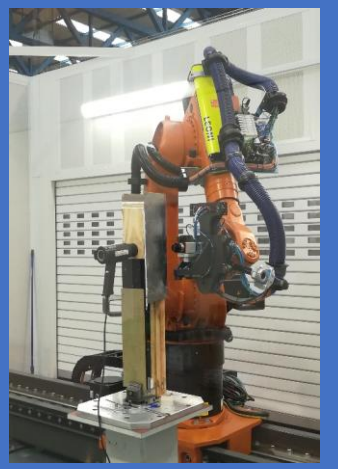
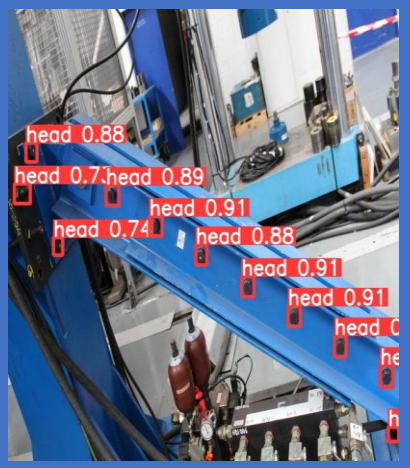



Automatic defects detection and classification

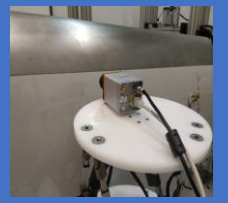




Predictive Maintenance

Development of customized solutions

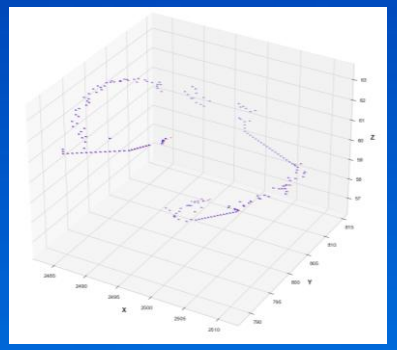
Quality control

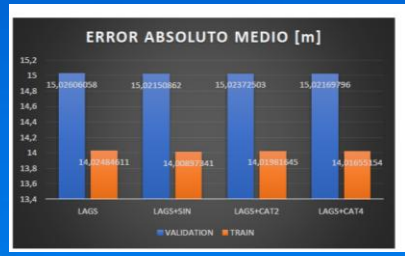



Advanced control systems

DATA MANAGEMENT & AI (Artificial Intelligence)

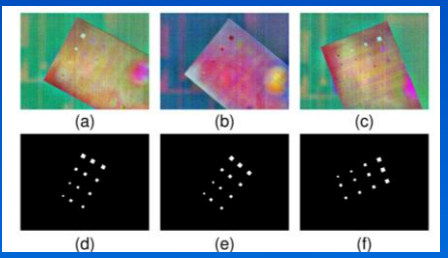
AI – Development of Machine Learning and Deep Learning models

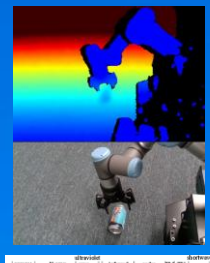




Application of IA models to different industrial use cases:

- ✓ **Computer vision (detection, location & segmentation)**
- ✓ **Equipment predictive maintenance**
- ✓ **Data analysis and failure prediction**
- ✓ **HRI (Human Robot Iterac)**
- ✓ **Quantum Computer**





Prediction of bird trajectories for surveillance systems in wind farms

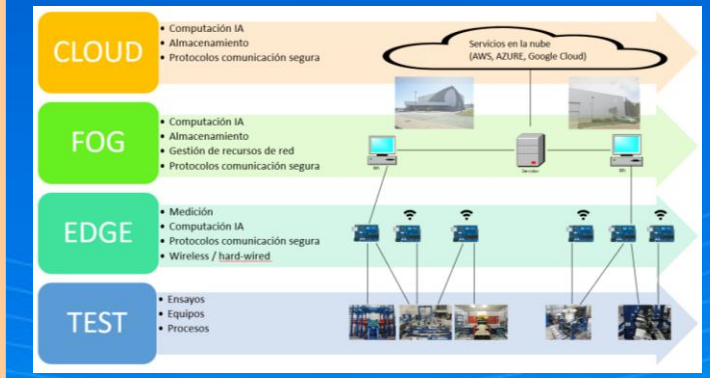
- **Automatic defects classification**
- **Engine predictive maintenance**
- **Detection of obstructions in micro holes in leading edges**

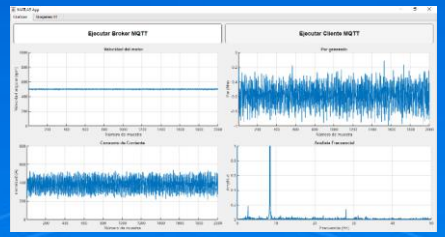
DATA MANAGEMENT & AI (Artificial Intelligence)

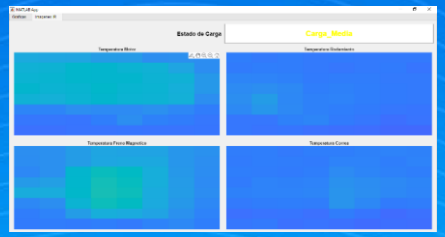
AIoT based applications for Industry 4.0 systems

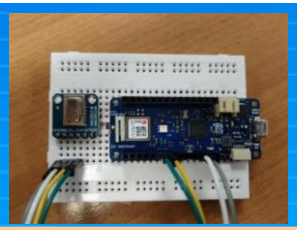
Development of AIoT architectures:

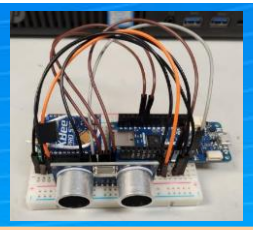
- ✓ **Integration of scalable and flexible wireless monitoring systems**
- ✓ **Implementation of AI based control and automatic defect detection techniques**
- ✓ **Implementation of Cloud services with advanced data management capabilities**
- ✓ **Enhanced interconnection between Industrial systems and machines**









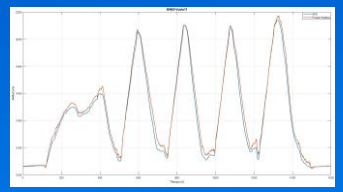


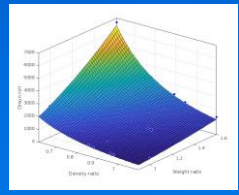
Advanced instrumentation + Digital Twins validation

In-flight data acquisition and processing

Determination of aircraft performances, support for the life extension of critical components…. etc:

- **Definition of required instrumentation.**
- **Support in aircraft modification certification, instrumentation, installation and flight plan definition.**
- **Flight data acquisition, processing and analysis.**





Validation of Digital Twins of components or infrastructures

- **Design and test execution for calibration.**
- **Definition of instrumentation required in flight, instrumentation and real time data acquisition.**
- **Fatigue tests to simulate different flight conditions.**
- **Correlation of results and adjustments.**