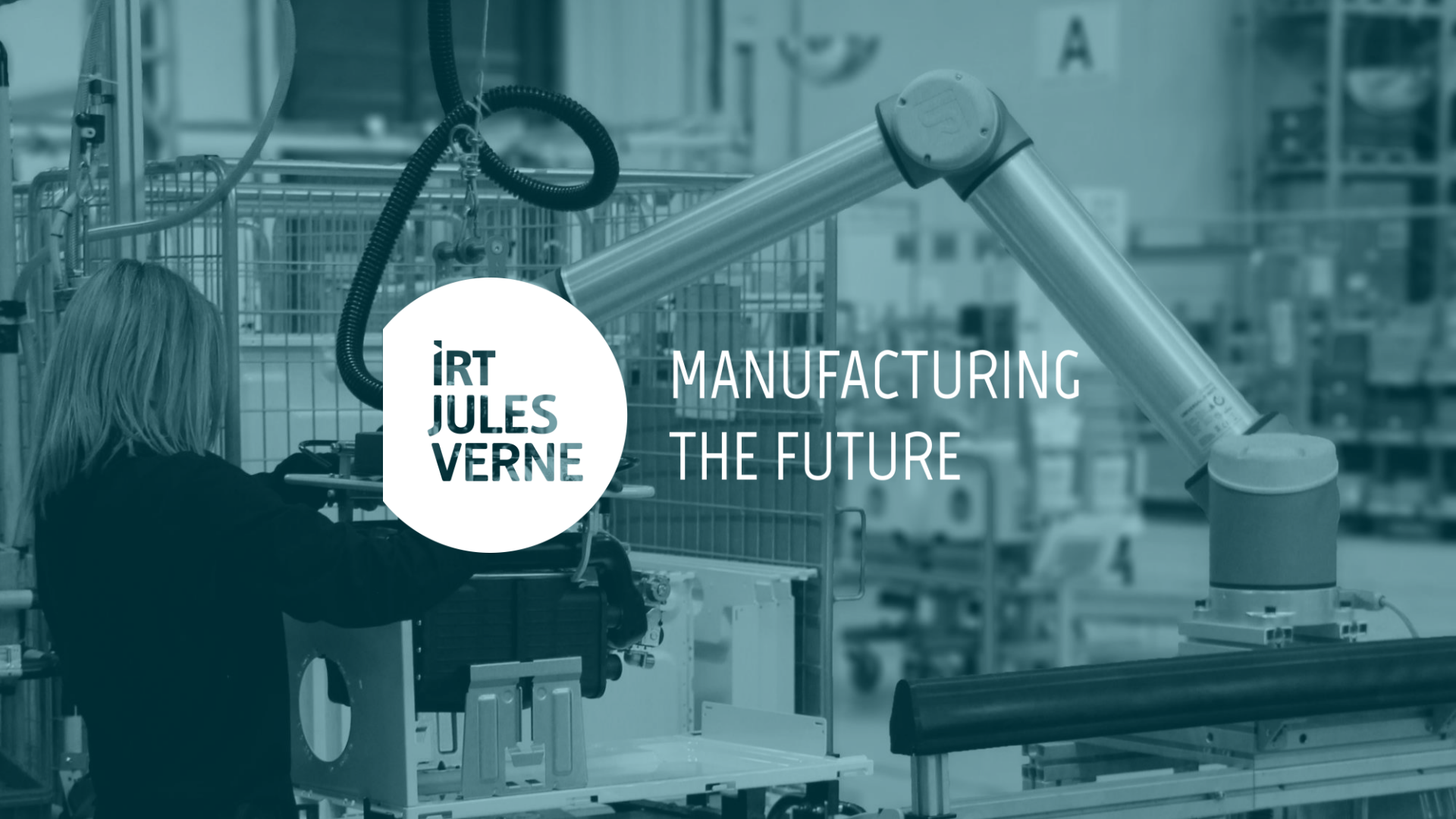

IRT
JULES
VERNE
MANUFACTURING
THE FUTURE

IRT JULES VERNE
EXECUTIVE SUMMARY

THE DNA OF THE JULES VERNE INSTITUTE

Our Dedication to Manufacturing

OUR VOCATION
To reinforce the competitiveness of the French industry

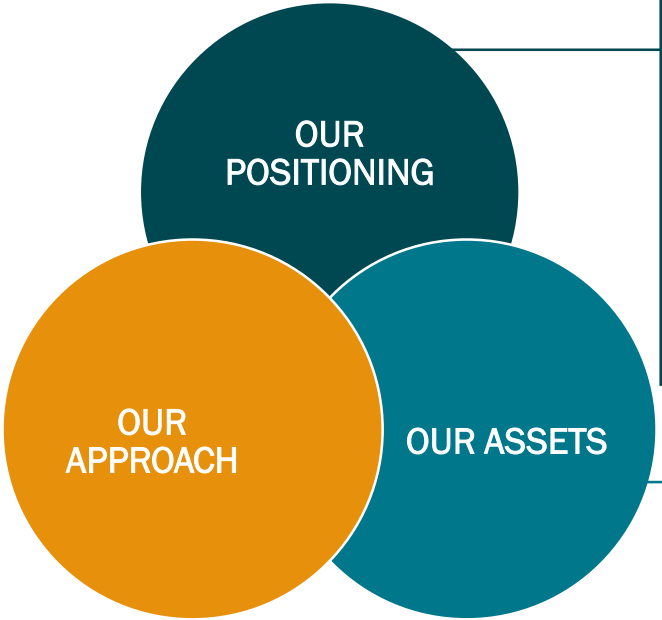
OUR MISSION
To accelerate innovation and promote technology transfer to the factories

OUR CORE BUSINESS
Collaborative research

115M€ from the Programme of Investments for the Future

FRENCH INSTITUTES OF TECHNOLOGY

OUR POSITIONING ON MANUFACTURING



- SOLUTION APPROACHES
- GROUPING OF MANUFACTURERS AND INTEGRATORS
- CROSS-FERTILISATION BETWEEN THE SECTORS

3 STRATEGIC DOMAINS

- INTEGRATED PRODUCT/PROCESS DESIGN
- INNOVATIVE PROCESSES
- SMART FLEXIBLE SYSTEMS

4 KEY SECTORS

- AGILITY
- INDUSTRIAL COMPETENCES
- INDUSTRIAL SCALE PLATFORMS
- FINANCIAL LEVERS

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OUR MARKET-ORIENTED ROADMAP

TECHNOLOGICAL EXPERTISE

- COMPOSITE PROCESSES
- METAL ADDITIVE MANUFACTURING
- ROBOTICS AND COBOTICS
- MODELLING AND SIMULATION
- CHARACTERISATION, CONTROL AND MONITORING

R&D THEMATICS

- FORMING AND PREFORMING PROCESSES
- ASSEMBLY
- ADDITIVE MANUFACTURING PROCESSES
- MOBILITY IN INDUSTRIAL ENVIRONMENT
- MANUFACTURING FLEXIBILITY

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R&D THEMATICS

Forming and preforming processes

- Composites preforming & forming technologies
- Metal forming

Assembly

- Multimaterial joining technologies
- Structure and systems assembly

Additive Manufacturing Processes

- High Deposition Rate Metal Additive Manufacturing
- High Performance Composites Additive Manufacturing

Mobility in industrial environment

- Smart and autonomous mobility of manufacturing tools and systems in industrial environment or structures

Manufacturing flexibility

- Flexible and intelligent process automation
- Quick reconfigurability of manufacturing systems

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NATIONAL INTER-IRT PROGRAMS

FRENCH INSTITUTES OF TECHNOLOGY

Thermoplastics

	Materials	Semi-product	Processes	Assembly
St-Exupéry	x	x		
Jules Verne		x	x	x
M2P	x			

Additive Manufacturing

	Design	Raw material	Materials	Processes	Post-treatment
St-Exupéry			x		
Jules Verne				x	
M2P		x			x
SystemX	x				

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IRT JULES VERNE

INTEGRATED RESEARCH AND TRANSFER

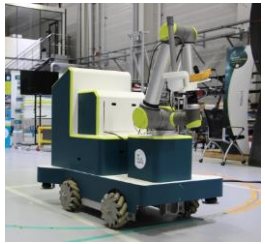
INDUSTRIAL RESEARCH

TRANSFER TO THE FACTORY

Use Case

Sector Integrator Jules Verne Institute

Industrialisation



Cobotics – MASCOT Project

Additive Manufacturing – FATAL Project

Robotics – CHARMAN Project

OUR MAJOR INDUSTRIAL MEMBERS

AIRBUS
DAHER
STELIA
SAFRAN
DASSAULT AVIATION
LATÉCOÈRE
LIEBHERR
SINTEX NP

faurecia
PSA GROUPE
RENAULT

NAVAL GROUP
CHANTIERS DE L'ATLANTIQUE
BUREAU VERITAS

Adwen
AN AREVA GAMESA COMPANY
EDF
NAVAL GROUP
CHANTIERS DE L'ATLANTIQUE

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SMEs AT THE HEART OF IRT JULES VERNE

- A strong and historic bond with

The European manufacturing technology competitiveness cluster

EMC2

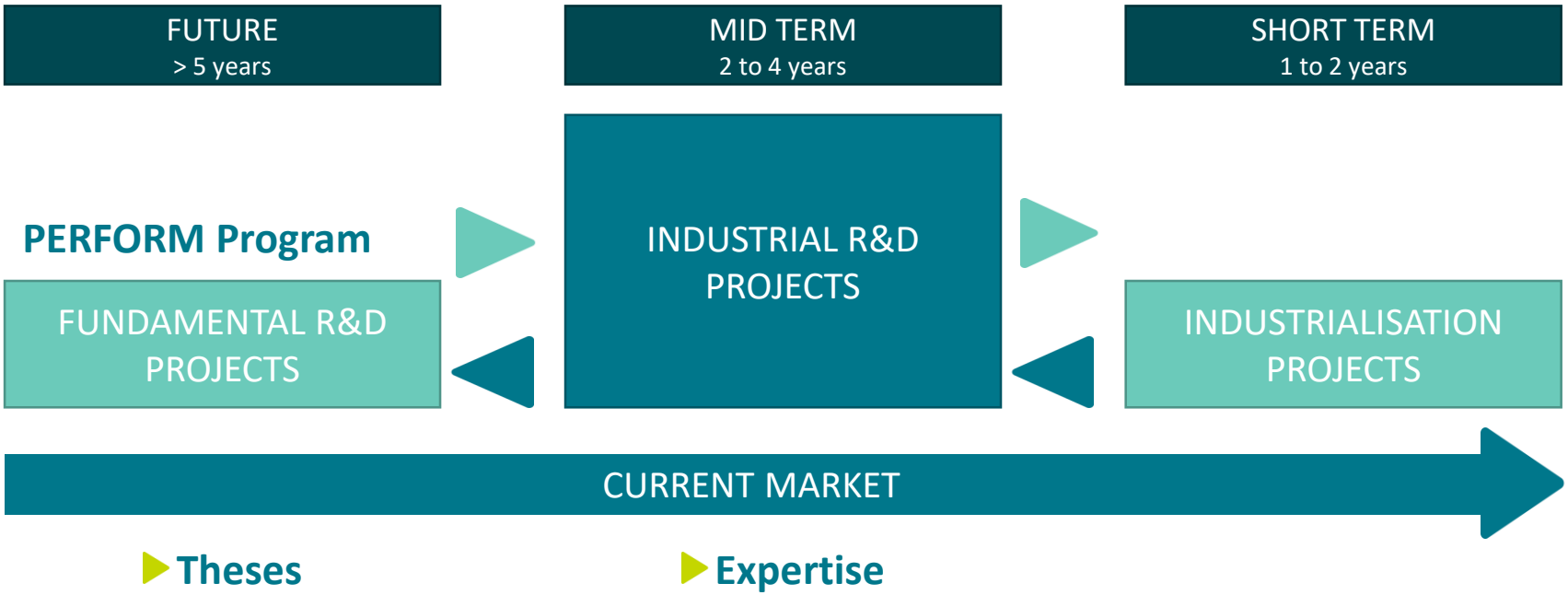
- **R&D intensive SMEs**

ALBATROS GIE

- **First innovative SMEs**

Accès PME

THE PLACE OF ACADEMIC PARTNERS AT IRT JULES VERNE



KEY FIGURES (SINCE 2012)

97 **R&D Projects**
including
7 **H2020 Projects**

182 M€
Project Portfolio
26,5 M€
Annual Revenue

17 M€ +
Equipment Investments

135 +
Employees

51 **Industrial Members**
12 **SME Members**
16 **Academic Members**

47
Patents

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AT THE HEART OF A MAJOR INNOVATIVE CAMPUS

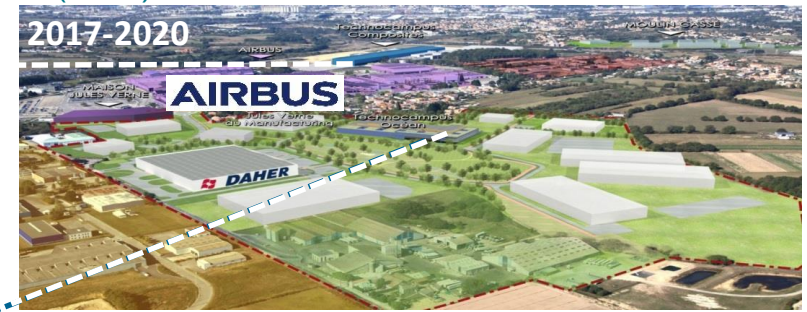
TECHNOCAMPUS COMPOSITES
20 000 m²

IRT Jules VERNE – 2 500 m²
- Composite Processes
- Modelling and Simulation
- Characterisation, Control and Monitoring

TECHNOCAMPUS OCEAN
20 000 m²

IRT Jules VERNE – 1 500 m²
- Metal Additive Manufacturing
- Robotics and Cobotics

▶ 7000 Employments / 700 Researchers / 1000 Students (2020)



▶ 15000 Employments / 1500 Researchers / 3000 Students

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NEW BUILDING

IRT Jules Verne has started the construction of a new building in the heart of the Nantes airport area to host its teams and its R&D activities.

Delivery scheduled for summer 2021

FOCUS ON
OUR EXPERTISE

COMPOSITE PROCESS TEAM

23 Employees

Key Competences:

- High volume complex preform
- Forming process
- Assembly

8M€

Equipment Investments

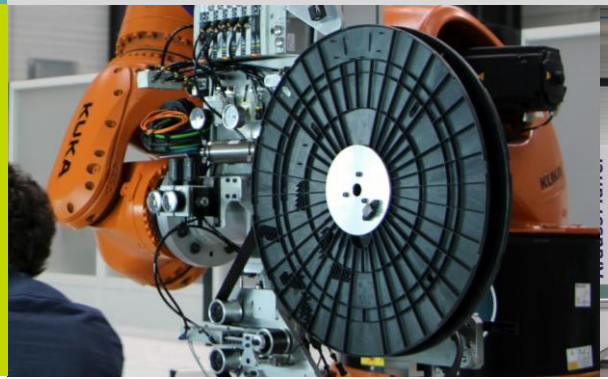
Key Equipment:

- 1300 tons robotised injection moulding machine
- 200 tons robotised vertical press
- 300 litres 2k thermoset injection machine
- TFP (Tailored Fiber Placement) machine
- MADRAS Line (textile preforms)
- Induction welding platform
- Quilting-swifting platform

13 R&D Projects

Examples of key partners

Airbus | Daher | Faurecia | Latécoère | Liebherr | PSA | Stelia | Loiretech | Arkema | Fives



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METAL ADDITIVE MANUFACTURING TEAM

13 Employees

Key Competences:
- Additive manufacturing
- Assembly
- Process hybridisation
- Niche forming processes

4M€

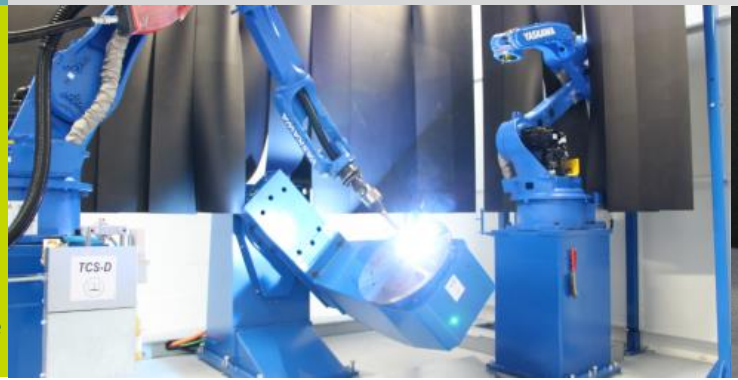
Equipment Investments

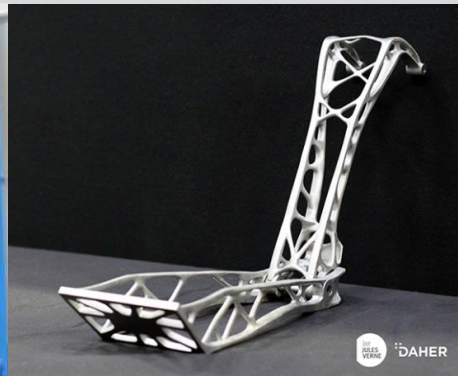
Key Equipement:
- Characterisation laboratory
- 3D metal powder and composite printers: SLM, SLS, binder jetting
- 3D filament (WAAM) and composite printers: FFF, patch building, high deposition rate

5 R&D Projects

Examples of key partners

Airbus | Arkema | Dassault Aviation | Daher | EOS | Loiretech | Safran | Chantiers de l'Atlantique





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ROBOTICS AND COBOTICS TEAM

25 Employees

Key Competences:
- Perception
- Assistance to the operators
- Mobility
- Interactions with the digital factory

2M€

Equipment Investments

Key Equipment:
- Cobotic arms
- Omni-directional mobile platforms
- Welding robots
- Geolocation sensors
- Cable-driven parallel robot

11 R&D Projects

Examples of key partners

Airbus | Chantiers de l'Atlantique| Faurecia | Naval Group

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MODELLING AND SIMULATION TEAM

CHARACTERISATION, CONTROL AND MONITORING TEAM

22 Employees

Key Competences:

- Multi-physics modelling and simulation
- Stochastic modelling and uncertainties propagation
- Coupling of process and structure simulations
- Modelling of manufacturing systems
- Process monitoring
- Structure control
- Characterisation

2M€

Equipment Investments

Key Equipement:

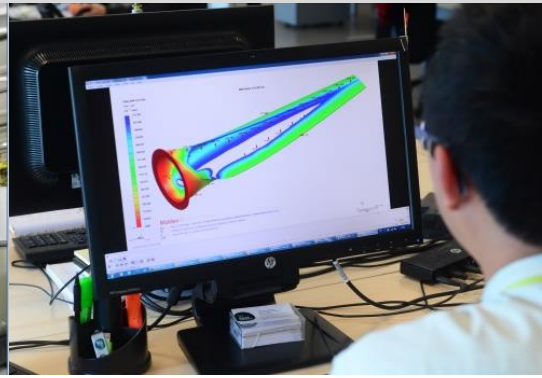
- Simulation platform
- Large multi-actuator bench
- Metrology
- CND & SHM process control equipment

22 R&D Projects

35M€ Project Budget

7 Main Partners

Airbus | ACB | EF | General Electric | PSA | Renault | Safran



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MODELLING AND SIMULATION TEAM

16 Employees

Key Competences:

- Modeling the behavior of materials for and from the process
- Simulation of shaping and assembly processes (composite and metal)
- Modeling of the manufacturing tool
- Stochastic modeling and numerical methods

0,4M€

Equipment Investments

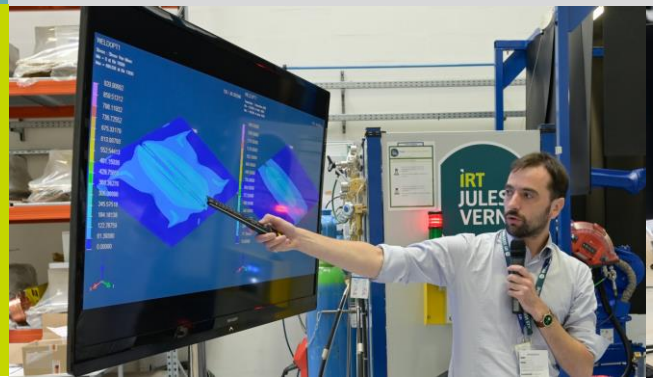
Key Equipement:

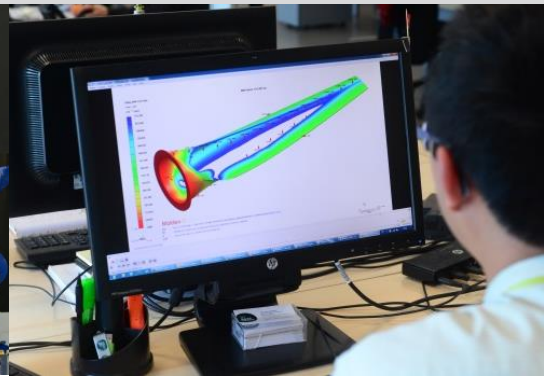
- Digital simulation platform
- HPC calculator
  - High storage capacity
  - Scientific software

10 R&D Projects

Examples of key partners

Airbus | EDF | PSA





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CHARACTERISATION, CONTROL AND MONITORING TEAM

11 Employees

Key Competences:

- Process monitoring
- Structural monitoring
- Complex mechanical characterisation
- Non-destructive testing of composite parts and interfaces (assembly)

2,3M€

Equipment Investments

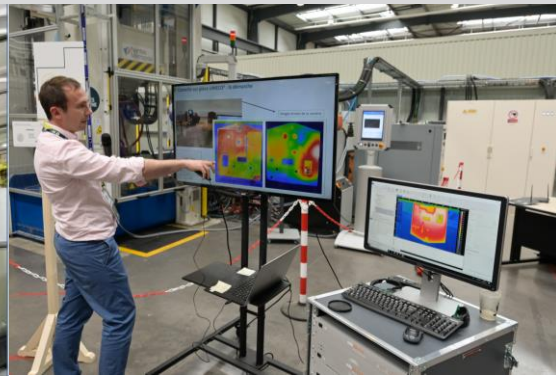
Key Equipment:

- Large scale multiaxial testbench (4 axis)
- State of the art mechanical measurement means
- Process monitoring & control equipment, non-destructive ultrasonic testing and infrared thermo-signature, structural health monitoring ultrasound and image correlation, ultrasonic laser system

13 Projets R&D actifs

Examples of key partners

GE | EDF | ADWEN



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IRT JULES VERNE

Chemin du Chaffault,
44 340 Bouguenais, France
contact@ irt-jules-verne.fr

WWW.IRT-JULES-VERNE.FR

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