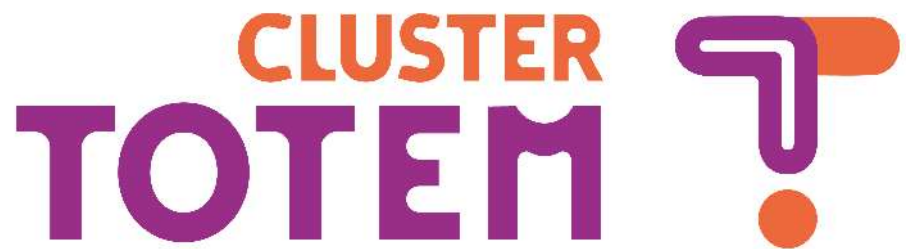


Cluster TOTEM Presentation



AUTOMOTIVE . RAILWAY . NAVAL . ECOSYSTEMS



LEUROPE S'ENGAGE
L'OCCITANIE AGIT



TOTEM Cluster Overview

Sectors & Missions

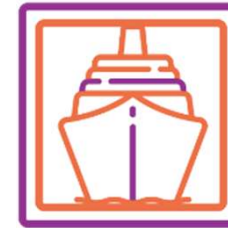
Sectors



Automotive
Buses, Coaches & Trucks
Eco-mobilities



Metros, Light rail
Regional & Intercity
High-speed Trains



Naval Ship Building
Nautics
Renewable Energies

Mains Missions



Business



Innovation



Education
& Competences



TOTEM Cluster Overview

SUSTENABLE & CONNECTED MOBILITY

ITS // Mobility Valley, in Occitania
Regional Strategic Commission

Synergies



160
members
65% SMEs

+ de
50000
salariés

DNA



Wolf-pack



collective
intelligence



Mutual
benefits

Domains

Automotive
Railway
Naval
Ecosystems



Business & International
Innovation & Key Investments
Competences & Trainings
Awareness & Investment



Members' global exposure :



29
countries

+ **1500**
Customers & Key contacts

Networking :

- PFA
- CNPA
- FIEV
- FIF
- Railway Business Cluster
- GICAN

**CLUSTER
TOTEM**

Networking & Partnerships

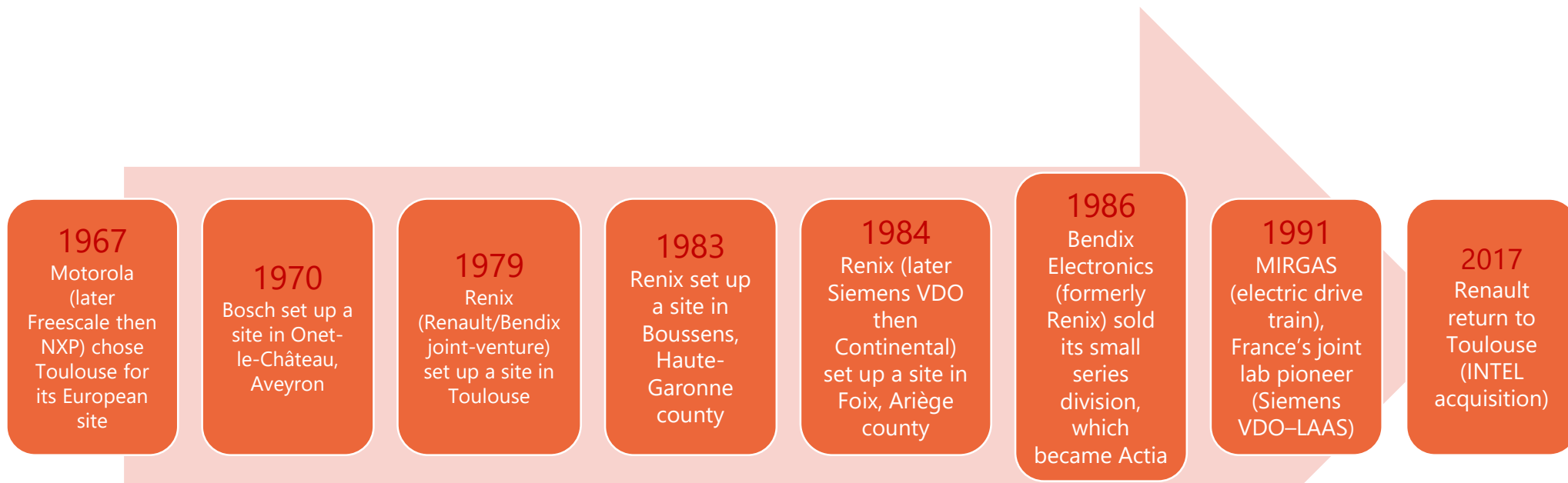
National sectors representatives, professional unions, institutional partners





History of automotive industry in Occitanie

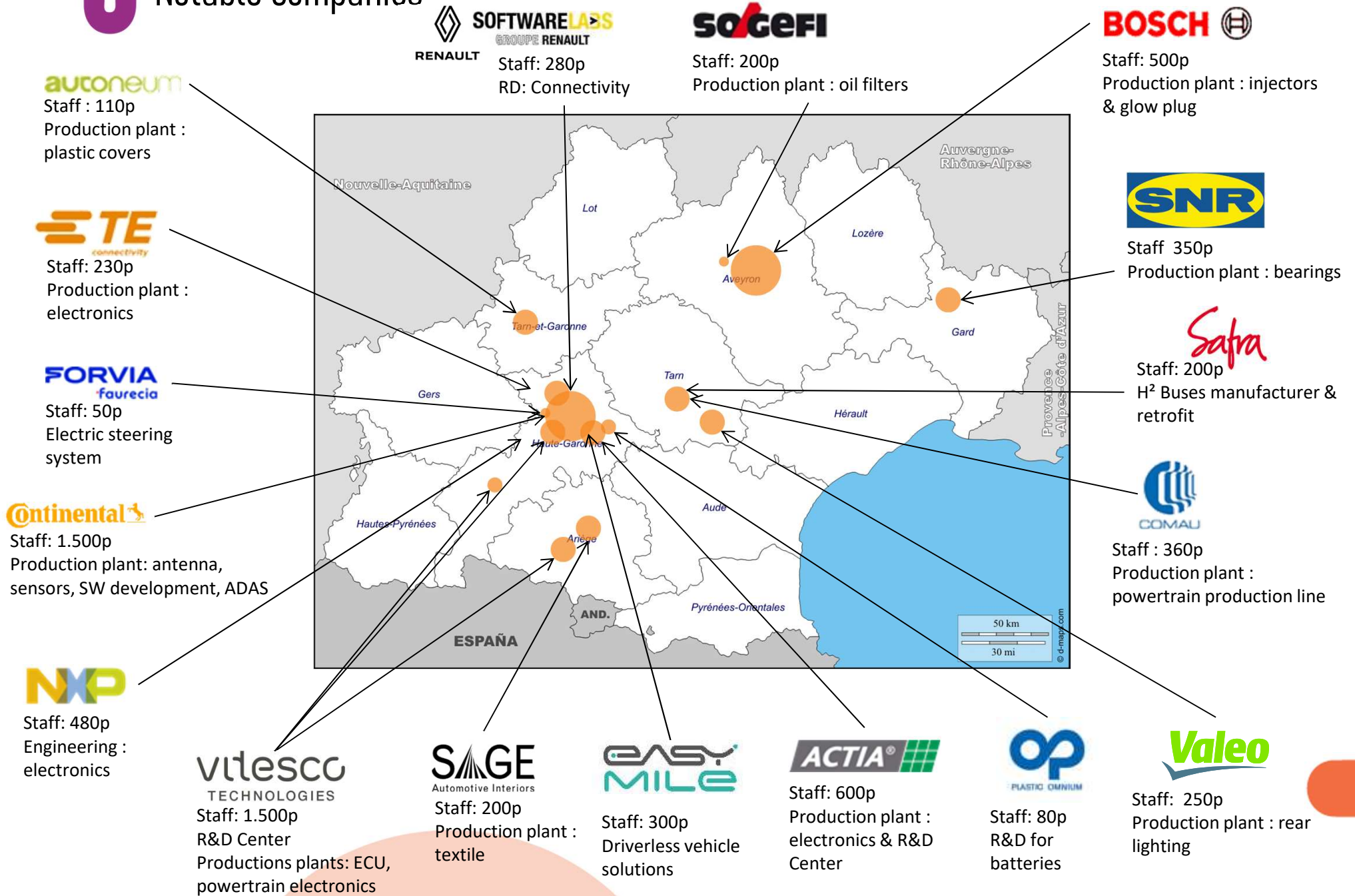
Time Line





Automotive, 50 years of history in Occitania

Notable companies





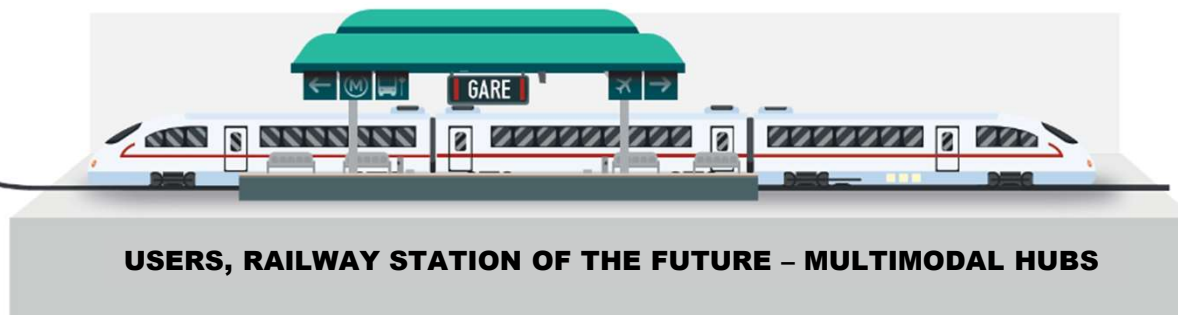
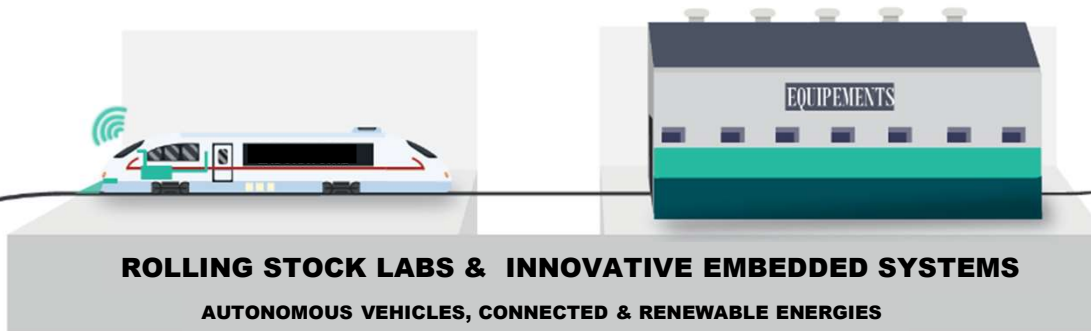
Automotive, 50 years of history in Occitania

- **40 years of fruitful collaboration** industry / labs / universities and worldwide recognized R&D labs
- **More than 14,000 jobs in the upstream chain** (excluding temporary workers)
 - › 6,000 jobs for Tier 1 supplier and is positioned
- **Recognized competence center**
 - › 2nd largest region in electrical and electronic sectors in France with more than 3,200 jobs.
 - › **Renault Software Factory R&D site** (280 jobs) dedicated to connectivity and artificial intelligence for autonomous driving
 - › **Continental Group worldwide competence center** of for image processing.
 - › **NXP Development center of Automotive Division**, a Group's worldwide excellence center
 - › **Success of EasyMile** in the ground driverless solutions.
- **Mobility solutions test park & racing circuits**
 - › Nogaro : with a unique geopositioning tool, a race car driving simulator, and a test bench for shock absorption
 - › Albi : with H2 specialisation
 - › Alès, dedicated to moto & car racing industry
 - › EMBLEMATIC PROJECTS – Francazal Mobility Park





RAILWAY DNA



- BUSINESS
- INTERNATIONAL
- EXPERIMENTS
- KEY TECHNOLOGIES





RAILWAY, Portfolio of Solutions

Business solutions :

- High-Speed Trains & Regional Lines,
- Light Rail, BHLS,
- Rolling Stocks, Infrastructures, Maintenance Workshops, Services, Mobility



Customers

- Operators,
- Service and Maintenance players,
- Manufacturers and OEM,
- Contractors and Integrators,

Rolling Stocks

- System architectures & components,
- Exteriors, interiors, comfort,
- Embedded Systems,

Infrastructures

- Railway Signalling,
- Tracks – Wayside,
- Energy – Power Substations,

Workshops, Factory 4.0

- Connected workshops, intelligent, digitization,
- Rolling Stock Maintenance & Infrastructures,
- MRO, modernization, mid-life overhauls,

Engineering Services

- Consulting, Audits, Engineering,
- Manufacturing subcontracting,
- Repair & Maintenance subcontracting,

Intelligent Mobility

- User Experience and Door-to-Door Transit,
- Intermodality, railway stations and hubs,
- Payments for Ticketing,
- Mobility as a Service “MaaS”





RAILWAY, Portfolio of Solutions

Key Expertises & Technologies

- Supply of rail solutions and engineering services
- Systems' Life-Cycle Optimisation
- Life-Cycle Extension



Tender Management

- Technical Engineering Consulting
- Build To Specs / To Print
- Business Intelligence

System Life-Cycle

- Product Life Management
- Life Cycle Cost
- New systems and overhauls

Engineering, R&D, Innovation

- Simulation, Proof of Concept, Digital Twins,
- Prototyping
- Environmental Performance

Test & Maintenance

- Engineering & Maintenance Strategies
- Simulators and Test benches
- Repair, MRO, Life-cycle optimizations
- Embedded solutions, health monitoring, IoT

Supply of Railway Equipment

- For Rolling Stocks
- For Infrastructures
- For Workshops

Digitization & Guidances

- IA, Data, Data Analysis
- Mobile Applications
- Virtual/Augmented/Mixed Reality





RAILWAY : A global approach and references

They do trust us...



SIEMENS



BOMBARDIER
TRANSPORTATION

ALSTOM
• mobility by nature •



KEOLIS



HITACHI
Inspire the Next





SOLUTIONS for ROLLING STOCKS

Solutions :

- Structures and components,
- Exteriors, interiors, comfort,
- Embedded equipment



Structures & Components

- **Bodies** : welding, mechanical engineering and manufacturing, ...
- **Boggies, Trailers** : sanding, greasing, braking, wheel & brakes measurements, wheel/rail adherence optimisation, ...
- **Traction**
- **Cars exteriors**, composites, plastics,...

Services

- **Engineering** : advices, expertise, design, development, coordination...
- **Test** : toolings, test benches, simulation, qualification, certification, system integration...
- **Maintenance** : MRO, repair, Rolling Stocks ...
- **Project Management** : support, quality, follow-up

Embedded Systems

- **On-board Electronics**: control/command, measurements, data concentrators, networks ...
- **Energy & distribution** : inverters, batteries ...
- **Exploitation & security** : health monitoring, diagnostics, event recorders,
- **Enclosures** : composites, metal, IP, harsh...

Interiors / Exteriors

- **Lightings** : complete subsystems (reading lamps, LED, ...), smart/mood lighting LED/incandescence ...
- **Interiors** : seats, floorings, surfaces, lavatories, ...





SOLUTIONS for INFRASTRUCTURES

Solutions :

- Rail Signalling,
- Equipment solutions & Energy,
- Engineering services



Rail Signalling

- **ERTMS** : test & qualification of computers,
- **Systems** : safety PLC, PMI, switchgears, analogue signalling (SNCF),
- **Signalling** : Lights (LED/incand)

Solutions/Track Equipment

- **Tracks** : duct, pads, cables, wayside greasing, rail structure, pin brazing,
- **Lightings** : tracks & level-crossing (LED/incand)
- **Wind detection** ...
- **Track control** : expertise of materials, rail measurements, wheel/rail slide ...

Services

- **Engineering** : audits, consulting,...
- **Simulation / Test** : Emulation and network stability, power grids, power electronics, APS ...
- **Maintenance** : MCO, repair, life-cycle management
- **Expertise** and reliability studies of infrastructures

Energy Solutions/Equipment

- **Overhead lines**, LAC
- **Substations**, control/command, IFTE : batteries (signalling, telecoms, substations), network digitization & IEC 61850-compliant IED, ...
- **Power supplies**, inverters, ...





SOLUTIONS for MAINTENANCE WORKSHOPS

Solutions :

- Repair, modernization, mid-life overhaul
- Maintenance strategies, Operation optimizations
- MRO, Obsolescence management, Life-cycle extension



Maintenance

- **RS & Infrastructures** : batteries, systems ...
- **Assisted, preventive, predictive, connected** : IoT, health monitoring,
- **Maintenance & MRO** : elaboration, optimization, tests automation (batteries, Go/NoGo...), repairs, ...
- **Solutions** spare parts replacement

Workshops / Factory 4.0

- **Connected & intelligent workshops**: digitization, tracking, lean flow management, data collect and processing ...
- **Toolings** : mobiles & connected, test benches & qualification tests (equipment, batteries, ...),
- **Work desk** dynamic/ergonomic

Retrofit

- Transformation
- Modernization
- Mid-life overhaul

Life-Cycle Extension

- **Extension** of product life-cycle duration
- **Obsolescence** : monitoring & management,
- **Perennity** : retro engineering, clones, virtual machines, ...





SOLUTIONS for ENGINEERING SERVICES

Solutions :

- Engineering,
- Industrialization, re-manufacturing
- Maintenance in operational conditions



Consulting/Audits

- Price/Costing/Value analysis
- Optimization price, materials
- Support quality and project management
- Welding : expertise/ISO3832 and EN15085...
- Tests : design of test means, cabins (batteries, systems, rotating machinery...)
- Consulting to implement railway maintenance centres

Manufacturing

- Bespoke manufacturing ...
- Re-manufacturing : re-design, clones, characterization, Plug&Play solutions...
- Manufacturing monitoring and quality controls
- Failure, reliability study analysis

Engineering

- Studies, R&D : testability, simulation, IV&V, rapid prototyping ...
- Conception : mechanical design, plastics & composites, electrical/electronics engineering ...
- Digitalization : BIM, proof of concept & digital twins, mobile & collaborative applications ...
- Maintenance Engineering: process improvements, strategy definition ...

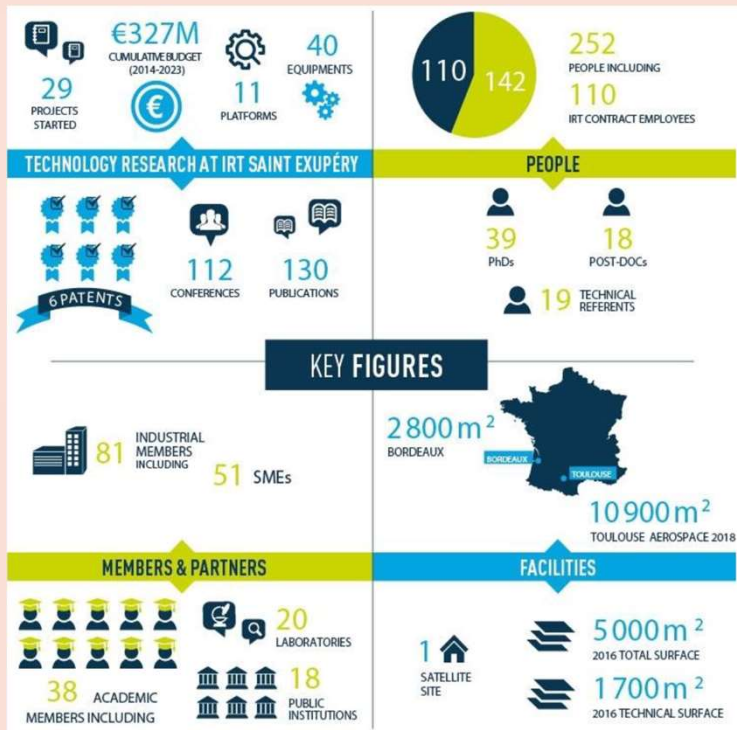
Maintenance in operational conditions

- Maintenance : preventive/curative, electronic repairs, ...
- Obsolescence : monitoring & management,
- Perennity : perennial plans, partial redesign, clones, critical components stock strategies ...
- Expertises materials and welding



Academic ecosystem

Main research centers and laboratories

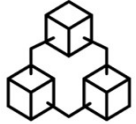


World Class research institute in Aeronautics, Space and Embedded Systems

4 technological axes:

- Advanced Manufacturing technologies
- Greener technologies
- Artificial Intelligence and connectivity technologies
- Critical Embedded Systems

Potential structuring projects for Occitania automotive players



- **Software Define Vehicle**
 - > Power concentration, reduced number of ECUs



- **Eco-design**
 - > Optimization of the use of raw materials
 - > Bio-based or recycled materials



- **Optimizing the production and use of circular economy parts**
 - > Parts from the circular economy
 - > Recycling of battery materials



- **Connectivity: harnessing the potential of 5g+, 6g networks & newspace**
 - > Smart hub, autonomous shuttles, hub and autonomous logistics
 - > New automotive services business models



- **Integration of BEVs in the smart grid**
 - > Grid capability optimization



- **Harnessing the potential of quantum computing in mobility**
 - > Low TRL // POC & commercial potential



Potential structuring projects

for Occitania automotive players

- Industry & Infrastructure of the future
 - > Global modernization
 - > Climatic risks resilience
 - > Sovereignty
- CO2 free Train
 - > Diesel to H² prolusion / Efficiency
 - > Environmental impact reduction
 - > Intramodality
 - > Energy resilience
- Smart Train
 - > Digitalization & cybersecurity
 - > Availability & reliability
- Inclusive mobility
 - > Modal transportation report & High service level
 - > Safety & security
 - > Connectivity for providing services to users





- **Midi-Pyrénées, 6th most R&D oriented region in Europe** with expenses totaling 4.8% of GDP (Eurostat GISCO 2019)
- **1st French city for the annual arrival rate of highly educated workers** (research and design executives: 6,17 for 1000 jobs – INSEE 2013)
- **1st French city in research intensity** with 16.2 researchers for 1000 employees
- **1st French region for executives working in R&D: 40%**

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Leadership



Wolf-pack



Actions



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