REGION
BOURGOGNE
FRANCHE
COMTE

Rail

aer
regional economic
agency of
bourgogne-franche-comt

DO YOU HAVE A PROJECT?

BOURGOGNE-FRANCHE-COMTÉ WELCOMES YOU!

set up shop

With its business parks and infrastructure, Bourgogne-Franche-Comté has everything you need to jump-start your projects in an environment designed for entrepreneurial innovation.

No.1
INDUSTRIAL REGION IN TERMS OF JOBS (1 IN 5 EMPLOYEES)

No.3
REGION FOR **SHARE OF INDUSTRIAL ADDED VALUE**

6
INTERNATIONAL AIRPORTS NEARBY

9
MOTORWAYS FORMING A STRATEGIC INTERSECTION IN THE HEART OF EUROPE

451
KM OF HSR LINES 14 TGV STATIONS

2 COMPETITIVENESS CLUSTERS AND A RAIL CLUSTER

PÔLE VÉHICULE DU FUTUR CLUSTER

The Pôle Véhicule du Futur Competitiveness Cluster is a leading cluster **for vehicles, mobility solutions, and related services.** It brings together and coordinates an ecosystem of 400 members in the Bourgogne-Franche-Comté and Grand Est regions of France. It unites companies, public research organisations, educational bodies and regions around **collaborative projects focusing on innovation**, **industrial performance improvement programmes**, and **new training and skills**, all with a business objective.
The cluster includes three Alstom sites (Belfort, Ornans and Reichshoffen), which are Premium members. An array of collaborative innovation projects have been launched with Alstom.

40 MEMBERS

88,000 JOBS

PLASTIPOLIS CLUSTER

The Plastipolis competitiveness cluster for the plastic and composites sector fosters collaborative projects related to **additive manufacturing**, **eco-materials**, process engineering, advanced tooling, micro-manufacturing, **plastronics** and **hybrid composites.** Some examples of the issues tackled: lightening of structures, fire-resistant plastics, materials for batteries, recycling.

350 MEMBERS

250 BUSINESSES

MECATEAMCLUSTER

The MecaTeamCluster is a **national hub specialising in the design, developement and maintenance of heavy-duty railway machinery**. Its objective is twofold: first, providing innovative solutions to improve railway infrastructure construction or regeneration processes and secondly, drawing up plans to reorganise the maintenance of construction equipment in order to optimise operation.

MECATEAMCLUSTER®

109 MEMBERS

THE REGIONAL ECONOMIC AGENCY OF BOURGOGNE-FRANCHE-COMTÉ

The Regional Economic Agency cooperates closely with stakeholders in business development, innovation, training, and employment to:

ASSIST
in maintaining and improving economic activity and employment in the region

SUPPORT AND DEVELOP
innovation and eco-innovation

BACK
the region's economic development strategies

PROMOTE
the region's economic appeal

BOURGOGNE-FRANCHE-COMTÉ

RESPONSES TO TOMORROW'S RAIL CHALLENGES

Bourgogne-Franche-Comté covers every step of the chain, from production and maintenance of rail networks to the design and construction of rolling stock for passengers and freight. Altsom has been based here since last century and has three centres of excellence in the region, all with global reach:

- the Belfort site: **design and manufacture of TGV power cars and locomotives**
- the Ornans site: **design and manufacture of traction motors**
- the Le Creusot sites: **bogies and dampers**

Based on the needs of the market, trainings offered create a qualified workforce that meets the needs of technological developments.

A forward-looking ecosystem that helps make Bourgogne-Franche-Comté a region for excellence in the rail industry.

STRENGTHS of the region

- **#1 INDUSTRIAL REGION**
- **ALSTOM: 3 INDUSTRIAL SITES**
  => TGV power cars and locomotives
  => Electric motors
  => Bogies and dampers
- **MECATEAM: A DEDICATED RAIL CLUSTER**
- **14 REGIONAL RAIL TECHNICENTRES**
- **A DENSE SUBCONTRACTOR NETWORK**
- **A DEDICATED TRAINING CENTRE**

A FEW COMPANIES IN THE INDUSTRY

INFRASTRUCTURES

BDVF	Track construction and maintenance
BONANDRINI	Track maintenance and repair
DVF	Track construction and maintenance
MATISA	Construction vehicle manufacture
SKF SLEWING BEARINGS	Slewing bearings and crossed roller bearings

EQUIPMENT MANUFACTURERS

ALSTOM	Design and construction of railway equipment
A.C.E	Supply hose production
AMEFOS SAS	Machining and sectional steel welded parts
ANVIS INDUSTRIE	Anti-vibration parts for bogies and dampers
ATELIERS DE JOIGNY	Rail car production and maintenance
KREMER	Industrial lift systems
METALLIANCE	Welded construction, equipment and machinery
OTN	Rail industry leads, connectors and maintenance

BUSINESSES

Over **200** BUSINESSES

10,700 JOBS

RESEARCH & INNOVATION

2 LABORATORIES TIED TO THE INDUSTRY

PROJECT ASSISTANCE

2 COMPETITIVENESS HUBS

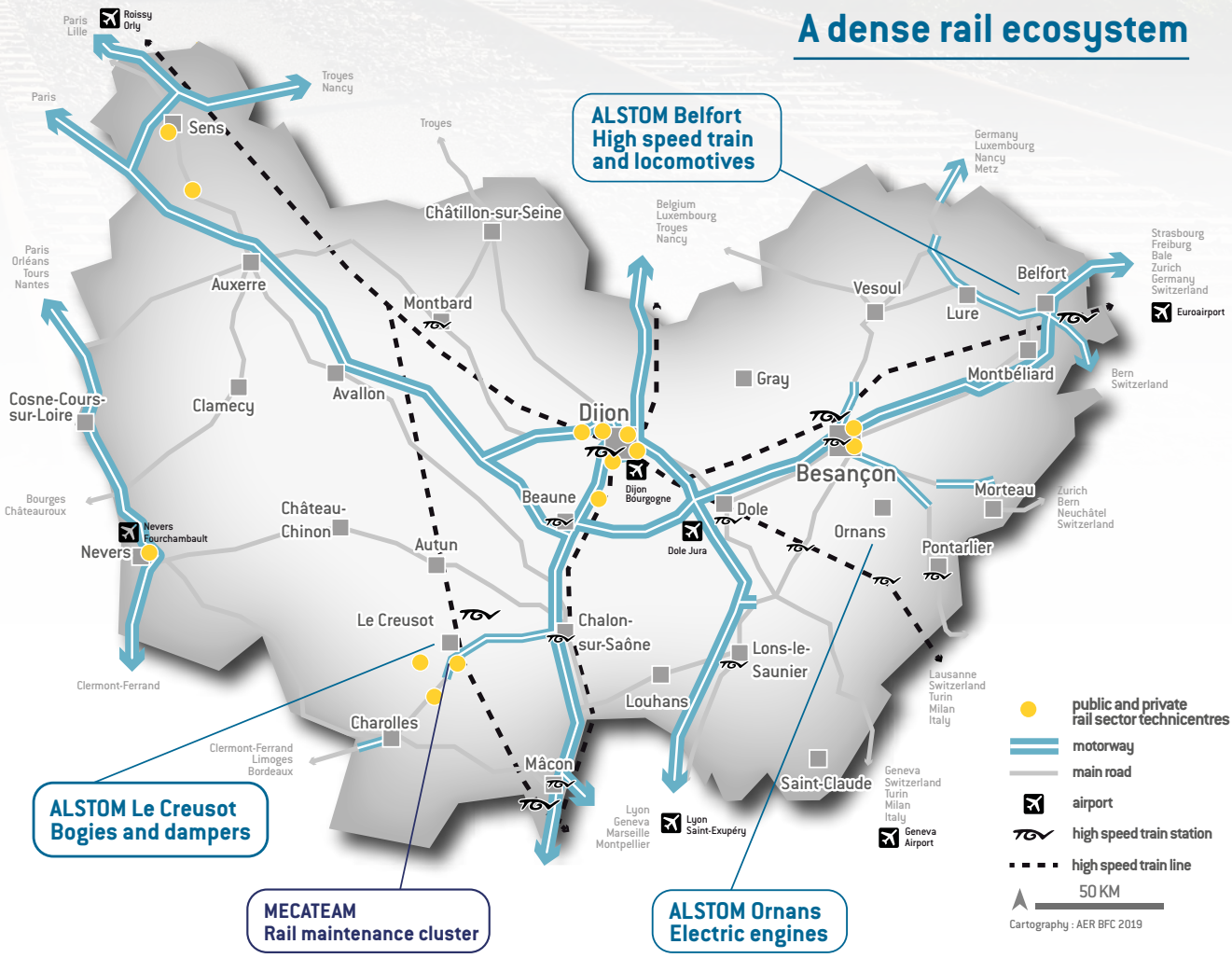
1 DEDICATED CLUSTER

EDUCATION

1 DEDICATED TRAINING CAMPUS

6 ENGINEERING SCHOOLS

A dense rail ecosystem



BOURGOGNE-FRANCHE-COMTÉ

A TRAILBLAZING SPIRIT

innovative projects

ALSTOM ORNANS
ALSTOM'S GLOBAL CENTRE OF EXCELLENCE FOR ENGINES

The Alstom site at Ornans constantly innovates to rise to the future mobility challenge:

- **Permanent magnet motors**: more compact, better performance and consume 15% less energy than induction motors; they now account for 30% of production
- **New "integrated motor" technology**: the motor is an integral part of the bogie, and not "suspended" as was the case previously. This breakthrough saves space and mass, and is the outcome of a co-development programme with the Le Creusot bogie centre of excellence.
- **Acoustic comfort**: the engineering teams at Ornans work to reduce the noise generated by motors. PRASA project (main line trains for South Africa): - 2dB at high speed (for an average 100–110 kph) while doubling air flow to cool the engine. The PRASA motor is now the quietest in its range. Its design has benefited from a simulation technique known as "Computational Fluid Dynamics" which involves a 3D replica of the flow of air in a running motor (simulation technique already used in Formula One and aeronautics).
- **Embedded magnet motors**: Development of new embedded magnet motor technology, 10% less expensive than permanent magnet motors but offering equal performance

PRIMA H4 LOCOMOTIVE
ALSTOM, AT THE FOREFRONT OF HYDROGEN USE

ALSTOM has successfully designed and marketed in Germany the Coradia iLint, **the world's first passenger train that uses Hydrogen as propulsion energy,** the result of 5 years of development by the company's engineers. At regional level, the ALSTOM site in Belfort is preparing the development of a Hydrogen version of its new Prima H4 locomotive as part of an R&D programme. Alstom's Prima H4 bimodal locomotive is designed for **switching and track-work tasks**. Currently powered by an electric drive system and two diesel generators, the teams at Alstom Belfort are currently working on a version that can run on a **Hydrogen fuel cell**.

ERGONOMIC CONTROL PANELS
THANKS TO THE UTBM'S EDIM FACILITY

The SNCF has made use of the EDIM (Ergonomics and Design) facility at the UTBM to **measure how strenuous work can be at the control panel.** This expertise may also provide solutions for future requirements, from interior design to information systems and for details such as the covering of ceilings and surfaces, glazing, lighting, air conditioning and seats.

TWO INNOVATIONS FROM THE MECATEAMCLUSTER FOR RAIL NETWORK MAINTENANCE

› AN AUTOMATED BALLAST MACHINE TO INCREASE PRODUCTIVITY

This new-generation ballasting unit measures the ballast profile, compares it to SNCF Network prescriptions and **opens or closes the ballast hatches** to lay just the required amount. It also enables traceability of the ballasting operation and **ensures track compliance.** All in a single pass whereas three were required before, if we include the compliance inspections done on foot.
Advantages: greater productivity, improved personal safety and less waste.

› OBSTACLE DETECTION TO IMPROVE SAFETY

"ODA" (Object Detection Assistant): this driver assistance system **detects obstacles and people within a 40-metre radius** of the train. Gradual audible and visual warnings proportional to the degree of danger keep the driver informed.
Advantages: no need for specific equipment for workmen, no unnecessary detection, unprecedented detection distance.

Training facility ©Jean-Luc PETIT for Ecosphère

BOURGOGNE-FRANCHE-COMTÉ

TARGETED TRAINING

In addition to the many cross-disciplinary training opportunities in forging, non-destructive testing, electronics, electrotechnics, mechatronics, mechanics, welding and industrial maintenance, the rail sector benefits from high-level training programmes in Bourgogne-Franche-Comté.

ISAT (NEVERS)

HIGHER INSTITUTE OF MOTOR VEHICLES AND TRANSPORT

- **Engineering studies at an international level for the entire automotive and transportation industry**: innovation and R&D, design, industrialisation and production, vehicle operation
- Specialisations in technical procurement and redesign, vehicle comfort and behaviour, vehicle energy and the environment, ergonomics and biomechanics, industrialisation, infrastructure and transport networks, logistics and industrial production, materials and structures, smart and autonomous vehicles, process safety and maintenance
- **Department of Research in Vehicle Engineering for the Environment** (DRIVE): optimisation of propulsion energy, smart and connected systems, composite materials and durability, vibratory and acoustic behaviours.

UTBM (BELFORT-MONTBÉLIARD)

BELFORT-MONTBÉLIARD UNIVERSITY OF TECHNOLOGY

- **Energy sector**: Energy production, Networks, conversion and storage, Transport and embedded energy systems
- **2 educational facilities**: Electromagnetic compatibility, Energy and land transport
- Electrical Engineering by apprenticeship
- 1 Master's Degree course in Electrical Energy

ESIREM (DIJON – LE CREUSOT)

HIGHER ENGINEERING INSTITUTE SPECIALISING IN INFORMATION TECHNOLOGY, ROBOTICS, ELECTRONICS AND MATERIALS

- **Materials**: R&D or product industrialisation, from design to recycling (sustainable development)
- **IT/Electronics**: specialisations in Embedded Systems, Network Security and Quality, Software and Knowledge Engineering
- **Robotics**: modelling and simulation, functional and mechanical design, system autonomy, …

ARTS ET MÉTIERS CAMPUS (CLUNY)

- Studies in mechanical, industrial, and energy engineering

MECATEAM CAMPUS

THE LEADING TRAINING CENTRE ENTIRELY DEDICATED TO RAILWAY WORKS VEHICLE MAINTENANCE

The Mecateam Campus offers **training courses in railway works vehicle maintenance.** Objective: Train more than 5,000 people over the next 10 years to meet the sector's growing needs for pre-service and continuous professional training, **harmonise working methods, improve expertise and boost work site productivity**. The training centre will draw on an educational facility unlike any other in France.

EDUCATIONAL FACILITY

At Montceau-les-Mines, some unique infrastructure has been set up, with no equivalent anywhere else in France: **classrooms, living areas and practical workshops offering real-life conditions with three 350-metre-long training tracks** (2 conventional tracks and 1 HSR track, with sleepers, splice bars, catenaries, switches, etc.). An unrivalled educational facility available to training centres.

LYCEE PARRIAT (MONTCEAU-LES-MINES)
LYCÉE HAIGNERÉ (BLANZY)
LE CREUSOT IUT
GRETA 71 AND CFA

4 academic pre-service courses:

- Professional baccalaureate: maintenance of industrial installations
- BTS senior technician's diploma in electrotechnics
- Vocational degree in mecatronics

A first in France! **Three supplementary modules specific to the rail sector have been added to the pre-service courses: rail safety, hydraulic technology, and the mobile machinery environment.**

ENSMM (BESANÇON)

A GENERAL ENGINEERING UNIVERSITY SPECIALISING IN MECHANICS AND MICROTECHNOLOGY

- Two engineering diplomas with the status of apprentice, with a speciality in Mechanics and a speciality in Microtechnology and Design.
- Specialisation options: Structural mechanics, Creation of connected objects, Materials and surfaces, Mechatronics and robotics, Engineering of production systems, Micromechanics, Innovation engineering, Process engineering

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