We provide innovative technologies, materials and solutions for the entire Rail supply chain.

www.eurecat.org

« Innovating for business »
Valorization of operation data, interoperability, open data and safety & security

Using data for MAAS. On demand responsive transport for people & freight

Infrastructures inspection with drones and images reconstruction

Digitization of the infrastructure for predictive maintenance

Let’s design the train of the future together!

User experience improvement, flexible interiors, smart surfaces and fabrics, lightweight materials.

eureca
Eurecat provides comprehensive services to support technological development and industrialization along the entire value chain for the rail and logistics industries.

**Eurecat innovates in partnership with:**

Public administrations, rail operators, actors involved in the management, construction and maintenance of infrastructure; engineers, producers of materials for fixtures, electrification and communications; manufacturers of rolling stock, interiors, systems and components; and urban and interurban logistics experts.

» We develop projects aimed at **digitizing mobility**. We also develop new business models and create digital platforms that enable interoperability and intermodality.

» **We design and develop products and components using advanced technological materials and complex functionalities** with the aim of reducing weight, enhancing safety and improving quality, comfort and the user experience. We also develop advanced processes for the production of short runs.

» **We apply sensors and connective capabilities to infrastructure** in order to create predictive platforms to enable the management of maintenance activities, along with the inspection of infrastructure using autonomous land- and air-based vehicles.

» **We create smart platforms for the management of multimodal logistics**, including the fitting of sensors to parcels, containers, etc. This improves the traceability of goods and helps optimize the circulation of documentation.

**Inspection of infrastructure using robotic vehicles (drones).** Specialists in smart management systems for predictive maintenance of infrastructure, stations and rolling stock using data mining and machine learning technologies.

**Product design and the development of innovative solutions for interior design and rolling stock in general**, at the design stage as well as for pre-production prototypes. Intensive use of low-cost technologies for the fabrication of short runs.

**Digitization of the mobility sector**: creation of matrices for urban mobility, transport and stations. Universal accessibility. Smart and green transport and low-carbon economy.

**Creation of smart logistics-management platforms**, automation and robotics for complex processes, managing the traceability of freight and goods.
The digitization of the rail industry and its embracing of the Industry 4.0 concept, along with its attitude towards the user, opens it up to new business opportunities.

**New business models for operators**
Eurecat offers advanced technological services to operators that will enable them to improve the user experience and increase the profitability of their operations.

We have extensive experience in **facilitative digital technologies:**
- Advanced data analysis, deep learning, neuronal networks
- Internet of Things
- Artificial vision
- Geolocation
- Smart surfaces (printed electronics, functional printing, smart textiles, etc.)

**Smart stations, smart services**

**Our solutions for attractive rail services**

**Addressing gender-specific needs in current and future transport systems**

DIAMOND project analyses and converts data into knowledge with notions of impartiality to move towards a more inclusive and efficient transportation system from a gendered perspective.

The project makes use of data mining and analytics, together with the use of elicitation techniques, to identify and evaluate specific measures to achieve fair gender inclusiveness in different scenarios and promote female employment in the sector.

www.diamond-project.eu
The TRAM project aims to develop high-end technologies that make it possible to find out about user behaviour and improve the passenger experience. Data architecture, cluster computing and algorithms for scalability and accessibility will be deployed in order to identify user patterns and behaviour, via wireless passenger-tracking technology and the installation of on-train sensors to extract metrics.

The project also involves the launch of dashboards to enable interactive visualization of the data derived from the O-D matrix, as well as the implementation of mobility patterns. The project aims to evaluate the degree of completeness and accuracy of the processing capacity in an overall context.

The CARBODIN project, coordinated by Eurecat, has the objective to contribute to the next generation of passenger trains that will be lighter and more energy and cost efficient than the current ones. An important step for that is the use of composite technologies, which still face barriers for full implementation such as their high cost. Another important aspect is the modular design of interiors and low-cost manufacturing of vehicles part. In addition, the proposed process will combine different production techniques, automation concepts, introduction of co-cured and co-bonded composite parts and multi-material integrated joints and inserts. Besides, predictive maintenance will be reinforced by testing intelligent sensor nodes. Composite materials will also be the core idea for cost-efficient doors with reduced LCC. The creation of modular tooling combined with 3D technology will enable the production of lighter doors with enhanced thermal and acoustic properties in the door and its vicinity.

CARBODIN will facilitate the design of attractive train interiors by developing a configuration tool based on virtual reality. This will be complemented by innovative manufacturing tools for interior components. Other strategies for improving cost-effectiveness of manufacturing processes such as the integration of low-volt circuits in panels will be also explored.

CARBODIN also aims at improving the performance of the future HMI system through a European survey to identify key interactions such as drivers’ gestures or voices.

www.carbodin.eu
Eurecat develops new materials and digital solutions for reliable, cost-efficient trains

Our experience enables us to innovate in partnership with the manufacturers of rolling stock

- Flexible manufacturing (though our advanced manufacturing labs)
- Flexible interiors
- Lightweight materials
- Product design and development
- Manufacturing short runs of metal parts with complex shapes

We cover all stages of the development cycle for new products

**Prototyping and manufacturing short series of metal parts in complex shapes is now possible.**

With ISF (Incremental Sheet Forming) 3D dieless technology

Eurecat offers an integral ISF technology service: from prototype and short series manufacturing to complete technology transfer, including a tailor-made machine to meet specific demands.

**Short series for:**
- Vehicle restorers
- Tailor-made vehicles
- Moulds for RTM components manufactures

**Functionalization of polymeric surfaces**

Eurecat offers the functionalization of polymeric surfaces using two different approaches:

1. The inclusion of electronics on the surface of injection-molded polymeric parts by the combination of two different technologies: printed electronics and traditional plastic forming processes (such as thermoforming of printed films, in-mold-decoration...etc).

   This allows for:
   - New & innovative surfaces with added functionalities (lighting, displaying, sensing...etc.)
   - Reduction of complexity and thickness of the polymeric injected parts and their assemblies
   - New creative freedom for the interface designers

2. The micro- and nanotexturization of the surface of injection-molded parts enables the achievement of new & advanced functionalities solely derived from the periodic texture and its interaction with their surroundings. Examples of those achievable functionalities include superhydrophobicity, anti-finger print, anti-scratch, homogeneous light diffusion, light guides, anti-bacterial, enhanced wear-resistance...etc.

Visit our premises
Book your visit at: joseantonio.gago@eurecat.org
Eurecat leads the European Sharework project, which will bring a new smart system comprised of different software modules to the market. The project’s aim is to drive collaboration between operators and robots without the need for physical protection barriers, thereby boosting process productivity and improving the ergonomics of those workstations where it is implemented.

Within this context of collaborative robotics-based growth, Sharework will begin by implementing human-robot collaboration in four real industrial scenarios within the rail, automotive, metal and capital-goods manufacturing industries.

www.sharework-project.eu

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www.sharework-project.eu

HERMES
Development of smart, flexible freight wagons and facilities for improved transportation of granular multi-materials.

HERMES holistically addresses the aspects that could potentially improve freight wagon performance at competitive prices: enhanced logistics operations, higher wagon load capacity, optimized loading/unloading processes and increased wagon flexibility, with the aim of fostering intermodality and enabling diversification of the goods that are carried.

HERMES is a European research project led by Iberpotash - ICL Iberia and funded by the European Commission under the Horizon 2020 Programme.

www.hermes-h2020.eu

Digitization of infrastructure for predictive maintenance
We develop digital solutions for reliable, cost-efficient, high-capacity infrastructure

At Eurecat, we help operators digitize rail infrastructure in order to enable predictive maintenance. The benefits of digitization include:

» Reduced costs for infrastructure maintenance
» Increased levels of infrastructure availability
» Making the infrastructure safer and more secure

Our enabling technologies:
» Robotics
» Big Data analytics
» Innovative materials
» BIM
» Smart management systems
» Deep learning technologies
» Smart objects
» Hyperconnectivity
» Smart data and smart platforms

We help our clients find the best technological solution and the most suitable partners for each project, while increasing the profitability of their operations.

Eurecat innovates in partnership with companies and helps them embrace the new Industry 4.0 concept.

The combination of advanced manufacturing technologies, sensors, data and analytics technologies has resulted in new terms that are already being applied in different industrial sectors and represent the trends that will also change the future of rail companies.

Cybersecurity Industrial Lab
Eurecat’s Cybersecurity Industrial Lab investigates how cybersecurity is implemented in IoT systems, with a focus on embedded equipment and infrastructure. The Lab identifies vulnerabilities through IoT systems and develops state-of-the-art prevention and mitigation measures. The Lab is a sound technology partner on cybersecurity issues for IoT device manufacturers, IT companies and critical infrastructure.

www.hermes-h2020.eu

Applied R&D projects
Digitization of infrastructure for predictive maintenance

Assets4Rail

Eurecat coordinates the Assets4Rail project, which shares the Shift2Rail view of having an ageing European railway infrastructure that needs to cope with the anticipated increase in future traffic.

Likewise, reliable rolling stock will be necessary in order to bring about the desired modal shift to rail. Both goals rely on a proactive and cost-effective maintenance and intervention system with regard to the assets. Assets4Rail aims to contribute to this modal shift by exploring, adapting and testing cutting-edge technologies for railway asset monitoring and maintenance.

To achieve this, Assets4Rail adopts a twofold approach, including infrastructure (tunnel, bridges, track geometry and safety systems) and vehicles.

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement no. 826250.

www.assets4rail.eu

ARSI

Eurecat, together with FCC, Simtech Design and IBAK, has developed ARSI, an autonomous Micro Air Vehicle (MAV) that allows inspection teams to perform sewer inspections in a safer and more efficient manner.

Robotrack

A new robotic system for setting up a new concept of track in lightened plate. Robotrack has developed a new, economically and environmentally sustainable continuous-track concept, designed specifically to establish an innovative set-up process that is completely automated via a new robotic system.

This general objective responds to a strategic need on the part of the current production model for Spanish rail, which relies heavily on the foreign market. It achieves this aim by creating a new production chain, increasing competitiveness and improving the industry’s export volume.
Eurecat is the leading technology centre in Catalonia and the second-largest private research organization in Southern Europe.

We transfer technology and knowledge to the entire value chain of the rail sector.