

eurecat.



**Eurecat, innovating together
with companies and delivering
advanced technologies.
From idea to production.**

Applied R&D projects, specialized assessment, laboratories, functional materials and smart management systems for a more efficient, productive, and competitive industry.

www.eurecat.org | [@eurecat_news](https://twitter.com/eurecat_news)





Innovating with companies

Eurecat is the leading Technology Centre in Catalonia and one of the largest private research and innovation organisations in southern Europe.

Eurecat has a turnover of 69M€ and a workforce of 805 professionals, it is involved in more than 215 R&D projects and has a customer portfolio of over 2.000 companies.

Eurecat R&D, innovation and consultancy and training activities range from Industrial Technologies (metallic, plastic and composite materials, manufacturing processes, autonomous and collaborative robotics, functional printing and fabrics, chemical, simulations and sustainability) to Digital Technologies (AI, Data Science, Quantum Computing, IT&OT, digital health, multimedia technologies), Biotech (omic science and nutrition & health) and Environmental Impact and Sustainability (Water, Air & Soil and Waste, Energy & Environmental Impact, Climate Change).

Additionally, Eurecat is recognized by the European Commission as a KETs (Key Enabling Technologies) Technology Centre so it can partner with SMEs on close-to-market research and innovation activities.

We develop and implement wearables, robotics, sensorics, functional materials, innovative machines, data analytics and Applied Artificial Intelligence.

From idea to production

We design and develop the technology for new products by offering outstanding value propositions with a multidisciplinary vision that incorporates all of Eurecat's technology.

Tailor-made environmental experimentation (laboratory scale and pilot plant), Sustainable production: industrial symbiosis, instrumentation and process measurement.



We study and select materials according to the part requirements (resins, reinforcement, plastics, Al alloys, high strength steels, stainless steels ...).

We develop customized material solutions and implement non-conventional test development for specific properties analysis under specific conditions.

We carry out process and tool simulation to improve the design and prototyping and additive manufacturing process: ISF, FDM, SLS, SLA

We take companies to the new Industry 4.0 paradigm.

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



Product Innovation & Multiphysics Simulation

We help companies to innovate from concept to the first series

Product Innovation

- Co-creation with users
- Technology selection for each application
- Conceptualization & Proof of Concept
- Detailed Design & Engineering
- Circular Products
- Smart & Connected Products
- From concept to the first series

Multiphysics Simulation

- Simulation experts capable of reproducing physical phenomena
- Product & Process Simulation
- Finite Elements Method (FEM)
- Computational Fluid-Dynamics (CFD)
- Process and Topology Optimization
- Coupled fields: Mechanical, thermal and fluid-dynamic

Sustainable Mobility

- Battery Pack design, simulation and prototyping
- Cooling Design and CFD Simulation
- Lightweight design
- Hydrogen Storage Design & Engineering
- Fuel Cells Simulation

Design for Additive Manufacturing

- Topology optimisation
- Multiscale design (lattices))
- Generative design
- Selection of best 3d printing technology and material for each application

Medical Devices

- Conceptualization of new medical devices
- Detailed Design & Engineering
- Smart & connected medical devices
- Material Selection
- Regulatory review
- Simulation applied to medical devices

Resilient Construction

- Development of Industrialized products
- Digital Twins
- Eco-designed components
- Simulation applied to improve products
- Testing facilities for industrialised façade components



Success cases



European Commission

Horizon 2020
European Union Funding
for Research & Innovation

The **COBRA** project develops a new **unique battery system** that merges several sought-after features, including **superior energy density, low cost, increased cycles and reduced critical materials**.

Eurecat is responsible of making an optimal design of the battery packaging that also includes the design of an optimal cooling system to ensure perfect working conditions and minimize the degradation of this new type of battery to be developed, increasing its useful life.



European Commission

Horizon 2020
European Union Funding
for Research & Innovation

Design and manufacturing of 3D printed ski boot, made in PA12 by Multi Jet Fusion and reinforced with continuous carbon fiber by CFIP technology.

Eurecat designed the boot within the Repair3D project based on the Dalbello 140 DRS ski boot, by **applying topology optimization algorithms** and a methodology specially developed for CFIP technology.

The specific stiffness was improved a 306%, and the weight reduced a 47%.

This ski boot has been developed in collaboration with **Reinforce3D**, a spin-off company of Eurecat which exploits the CFIP technology.



Plastic materials

Eurecat creates and develops new plastic transformation processes

- 1 We are innovation experts in plastic transformation processes, including state of the art techniques, such as ultrasonic processing & LSR injection moulding.
- 2 We master plastic moulding processes (injection moulding, thermoforming, extrusion, extrusion-blow moulding) thanks to the optimized in-house capabilities and improved equipment.
- 3 We foster collaborative innovation with companies all along the process: from idea generation to production tests and scale-up

Plastic processing pilot plant

In Barcelona, Eurecat has the largest pilot plant for new plastic transformation technologies in Southern Europe.

Plastic injection, along with other polymer moulding processes, continues to be the most important industrial process for the replication of parts; thanks to the freedom of shapes it provides and the low associated costs for large production volumes. Eurecat is a renowned specialist of these processes at both national and international levels.

We provide the industry with our experience and technical & R&D know-how, for the industrialization, testing and manufacture of pre-series.



Research lines & developments

New processes for Thermoplastic and LSR

- Processing Pilot Plant: Complete range of Plastic Injection Machines. From microinjection to 1500 Tn clamping force including LSR
- 50 Tn LSR Injection moulding inside ISO 8 clean room environment
- Support to innovation in plastic, from concept to manufacturing. 30 years of experience

Technology development for the functionalization of surfaces via nanotexturization in polymeric parts:

- Translation of nanotextured surfaces on Si-stamps to polymeric inlays via Nanoimprint lithography processes.
- Thermoforming and over-injection molding of nanotextured polymeric inlays to create functional surfaces on plastic parts.

Technology development for industrial integration of "Printing electronics" in plastic products

- Integrating printed electronics with plastic products
- Use of IML and FIM to include electronics in plastic products
- Thermoforming of printed electronics
- In-house electronic printing & over-injection molding clean room (ISO 8) facilities

Lightweight

- Development of lighter structural parts through hybridization with continuous fibre reinforcements in thermoplastic materials

Success cases



PREVIEW

Predictive System to Recommend Injection Mould Setup with Process Optimization in Wireless Sensor Networks. This project incorporates 4 innovations into Industry 4.0:

- A data acquisition device installed inside the mould that receives information on the parameters that best determine the quality of the injection process.
- Codification techniques designed to enable wireless, safe, and stable data transmission in real-time in industrial environments.
- A data analytics service developed by Eurecat to monitor and optimize plastic transformation processes.
- An indoor geolocation service based on wireless sensors and advanced signal processing techniques, developed by Eurecat.

PLASTFUN

Development of techniques and methods necessary for establishing a pilot manufacturing line of plastic injection pieces with surfaces with advanced functions, on an industrial scale. The manufacturing pilot will enable companies in the territory to develop new products using these technologies and to acquire the necessary knowledge for their profitable production.

The technologies developed will be validated into industrial demonstrations that will reflect, on the one hand, the advances in nanotexturing with film with the aim of creating integrated light effects with printed circuits that contain LEDs and, on the other hand, the advances in nanotexturing pieces with absorbed sensory print via IME.

PLASTFUN is a project of the RIS3CAT Comunitat Indústries del Futur (IdF) coordinated by Eurecat with the participation of Kostal, PTT, Autoadhesivos ZyR, Microrelleus, Flubetech, Isovolta, the Catalan Institute of Nanoscience and Nanotechnology (ICN2), the National Microelectronics Centre and the Chemical Institute in Sarrià.

Metal and ceramic materials

We investigate the relationship between microstructure and properties, as well as the optimisation of industrial processes.

Mechanical Behaviour

- Advanced mechanical characterization of parameters relevant for cold and hot sheet metal forming.
- Formability studies.
- Cold cutting and stamping pilot plant.
- Hot stamping pilot plant.

Fatigue and fracture of materials

- Fatigue and fracture behaviour of mechanical alloys, ceramics and elastomers.
- Development of specific tests to reproduce the behaviour in service (impact, fatigue, fatigue-corrosion, etc.).
- Characterisation of components subjected to mechanical forces in laboratory and/or in service (instrumentation).

Corrosion and deterioration

- Corrosion and environmental effect on mechanical properties. Biocorrosion.
- Hydrogen embrittlement, stress corrosion and corrosion fatigue in structural components.
- In-situ identification of corrosion and superficial degradation mechanisms.
- Corrosion mechanisms study through potentiometric techniques.

Surface Technology

- Development and application of advanced functional coatings for different industrial sectors:
 - » PVD, CVD and Ion Implantation technologies
 - » Plasma-based surface treatments.
- Surface functionalization of materials, devices and components: Wear and corrosion resistance increase, low friction, anti-fouling properties, biomedical, aesthetic and decorative aspects, etc.
 - » Hard, wear resistant and low friction coatings for the metal-mechanical sector
 - » Corrosion resistant coatings
 - » Alternatives to hexavalent chrome coatings
 - » Bactericidal and viricidal coatings
 - » Biomedical coatings for prosthesis, implants and surgical tools
 - » Decorative and functional coatings for automotive industry

- » Coatings addressed to renewable energies: thermosolar, fuel cells, etc.
- » Transparent and functional coatings for optical and electronic devices
- Technological support in the selection and industrial implementation of coatings and surface treatments.

Light alloy forming

- Selection of alloys and thermal treatments for light alloy transformation processes: casting, stamping, forging, extrusion, etc.
- Degasification and cleaning of liquid metal in HPDC. Ultrasound treatments. Development of tailored high performance aluminium alloys with low carbon footprint.
- Sensorisation of processing tools and development of mechanisms adapted to process variations.

Tribology

- Assessment on wear, friction and lubrication to improve tribological behaviour of industrial tools and in service components.
- Wear mechanisms in forming tools: identification and characterisation of alternatives with improved performance.
- Laboratory tests design to reproduce wear mechanisms.
- Advanced surface characterisation.
- Contact fatigue and micromechanical tests.

Non Destructive Tests

- Inspection by penetrating liquids.
- Preparation and analysis of surface replicas.
- Coating thickness measurement.
- Acoustic emission.
- Thermography
- Computed tomography.

Manufacture of metallic powder by Centrifugal Atomization

- Production of high value-added customized metal powder, with spherical morphology and requested granulometry, for powder metallurgical processes, spray coatings, metal additive manufacturing
- Characterization of metal powders: particle size analysis, compacted density, bulk density, powder fluidity, composition, morphology, etc.

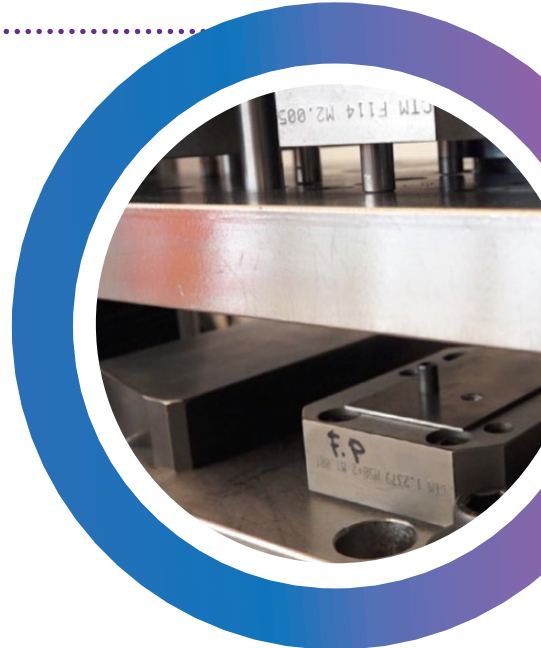


Success cases

Eurecat has patented a new faster and more robust process to characterize the fracture toughness of thin metal sheets.

The method supposes more than 50% of time reduction in the evaluation of the essential work of fracture.

The innovation developed by Eurecat and patented under the title **Device for preparing sheet specimens**, is the result of more than 10 years of applied research on a field where Eurecat is internationally recognized, such as sheet metal forming and the fatigue and fracture behaviour of high-performance materials. Such expertise has allowed to predict at lab scale the edge cracking and the crash resistance, through the measurement of the essential work of fracture. This new methodology developed by Eurecat can be easily implemented in customer's facilities, since it only requires the use of a universal testing machine. Its application is mainly focused on the automotive sector, providing knowledge to raw materials developers (steel, aluminium alloys, etc.), part makers and carmakers to optimize part performance.



Flexcrash

Funded by the European Union

Flexible and hybrid manufacturing of green aluminium to produce tailored vehicle adaptive crash-tolerant structures.

The Flexcrash project, coordinated by Eurecat, is developing a flexible and hybrid manufacturing technology using aluminium alloys and based on applying surface patterns by additive manufacturing onto preformed parts.

In the last years, the automotive industry has made important efforts focused on lightweight construction to meet the stringent Greenhouse Gas Emission limits and increase passenger safety. However, both aspects are counteracting because we need heavier structures to improve passenger protection, but heavier vehicles also produce more severe crashes.

www.flexcrash-project.eu

Conceptualization and textile design

- We accompany the company in the design and development of new textile structures, functional fabrics and new materials with unique properties.
- We identify new materials and evaluate their potential to generate new applications in line with the company's objectives.
- We design the final product and validate its properties until reaching the standard required by the company, with a focus on the end user.
- We examine the production parameters to ensure improvements in productivity and the viability of industrialization.



Conceptualization and design

- Design and conceptualization of functional fabrics, adapted to target consumers.
- Search for new fibers in base required performance, low impact and sustainable sources and processes.
- Design and manufacturing of continuous filaments, regenerated fibers and synthetic fibers, based on performance and use.
- Identification of new composites based on natural or synthetic raw materials.
- Hybridization. Combination of fibers.

HereWear at a Glance

The HEREWEAR project aims at the creation of a European ecosystem for locally produced circular textiles and clothing made from bio-based resources. The bio-based material solutions will build further on the latest bio-based polyester and cellulose developments.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101000632.

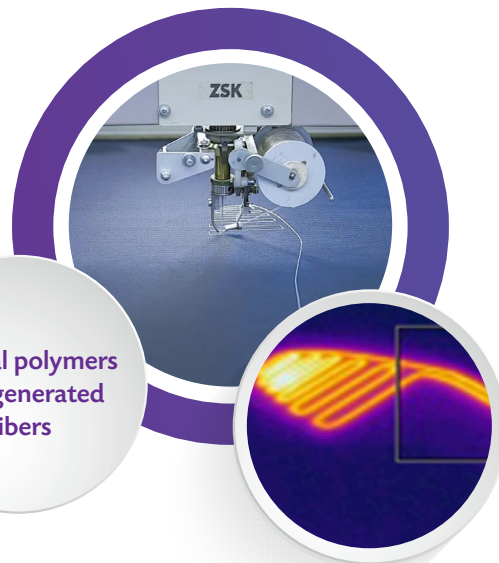


Horizon 2020
European Union Funding
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In collaboration with companies in the textile sector, we create new products with functionalities that contribute to consumer satisfaction.

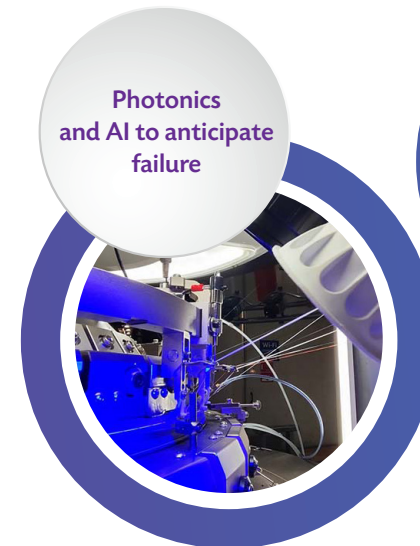
- Ergonomic products with a comprehensive approach.
- Fabrics to monitor biosignals.
- Heatable fabrics.
- Fabrics with shape memory.
- IoT STRUCTURES.
- 3D Fabrics
- Technology and production feasibility studies.
- Proof of concept.

Natural polymers
& Regenerated
fibers

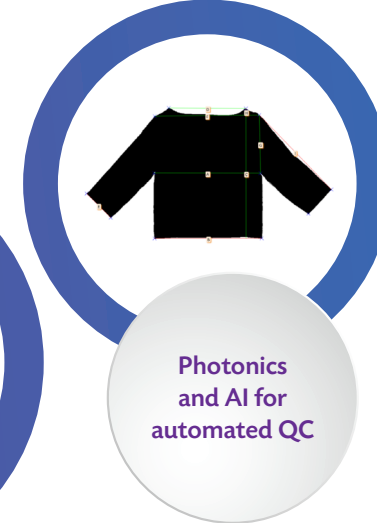


We offer advanced solutions for the automation and optimization of tasks in the textile sector.

Photonics
and AI to anticipate
failure



Photonics
and AI for
automated QC



- Additive manufacturing system on fabric that allows the integration of 3D printing technology in the textile world.
- Automatization of quality control of products and patterns based on the use of Vision and Artificial Intelligence.
 - Detect defects on fabric and/or color
 - Measurements and density
- Anticipate the failure by sensing and IA
 - Measuring wear or mechanical components
 - Measuring environmental conditions
 - Measuring yield rate or bath concentration

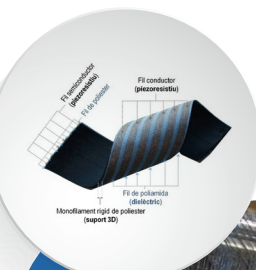
Development of fibre-based smart materials along with an integrated platform with the aim to manufacture new products with multi-sectoral applications in consumer electronics and lighting, among others.

The project 1D-NEON explores ground breaking concepts that will provide cutting edge advances in the design, sustainable manufacturing, testing and integration of novel functionalized fibres into multi-functional devices. 1D-NEON shifts component manufacturing from 2D to 1D fibres, which opens up a field for a much broader range of free form factors made possible by weaving each element onto a multi-functional nano-fibre network.

1D-NEON is a 48 months Innovation Action of the H2020 work programme funded by the European Commission. The project, coordinated by the University of Cambridge counts with a consortium of 14 partners, embracing high-level education, research and tech. organizations, small and medium enterprises and large enterprises.



Horizon 2020
European Union Funding
for Research & Innovation



Fiber based
smart materials

We have state-of-the-art laboratories and infrastructures.

Eurecat collaborates with the Centre for Research and Transfer of Textile Technology of Canet to carry out quality control tests, among others, in accordance with current standards.



Chemical

Specialists in chemical technologies

Our specialized chemical technologies unit at Eurecat helps boost the competitiveness and sustainability of industrial companies.

We carry out applied research projects and innovative technology transfer in catalysis and synthesis to make processes more sustainable, such as in the production of liquid fuels, CO₂ transformation, valorisation and characterization of by-products, as well as the production of value-added products.

We develop advanced materials, membranes, technologies for product encapsulation, nanotechnology, characterization of polymers and coatings.

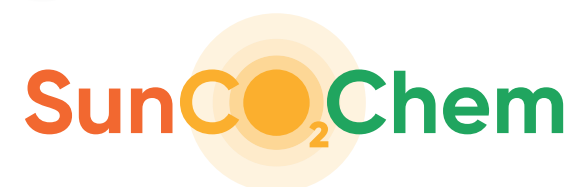
We work on large projects to monitor and reduce environmental impact, to monitor air and water quality controls, as well as industrial effluent and industrial biotechnology treatments. We study the toxicity and environmental impact of emerging pollutants.

Eurecat's process development and pilot plant technologies can provide significant benefits to chemical companies. Our chemistry pilot plant is a specialized facility designed to test and optimize chemical processes on a smaller scale before they are implemented in full-scale production plants. By using a pilot plant, companies can minimize risks and costs associated with scaling up their processes and technologies, as they can identify and rectify potential issues in a controlled environment.

Eurecat's pilot plants offer several advantages to chemical companies, including access to specialized equipment, resources, and expertise that may be too costly or difficult for companies to acquire on their own. Furthermore, Eurecat's specialized chemical technologies unit provides an impartial and objective perspective, which can be especially valuable when companies are developing new technologies or processes.



Success cases



Development of a photoelectrocatalytic tandem reactor (TPER) to manufacture chemical products from renewable energies based on CO₂, water and sunlight, integrating the capture and conversion of CO₂ in a single dispositive.

The SunCoChem project, led by Eurecat, aims to provide the chemical industry with an **alternative to produce oxo-chemicals without using raw materials derived from carbon or oil.**

Based on the single-unit CO₂ **capture and conversion architecture** to design a self-sufficient device, SunCoChem's innovation manages to reduce costs, reduce CO₂ emissions and improve the efficiency of converting energy from sunlight to chemicals. In addition, the project-driven solution will have a significant impact in reducing the dependence of the European Chemical Industry (ECI) on carbon raw materials.



Composite Materials & Technologies

We innovate & improve the ratio weight – performances – cost through our 5 pillars:



4.0 Composites: Advanced Composite Manufacturing

Polymeric composites design and manufacturing for lightweight components by advanced manufacturing technologies and simulation tools.

- FEM analysis & composites characterization tests.
- Tailor-made structural textiles and preforms.
- Advanced tooling design and manufacturing
- Composite parts manufacturing test: Process monitoring
- Composite parts validation

Circular economy and sustainability

Sustainable composites manufacturing: From the raw material to their end of life through an energy efficient manufacturing process

- Eco-design and LCA
- Mechanical, thermal, and chemical recycling
- Bicomposites (biobased resins & natural fibers) and recycled composites development
- Sustainable and efficient manufacturing process (energy efficiency)

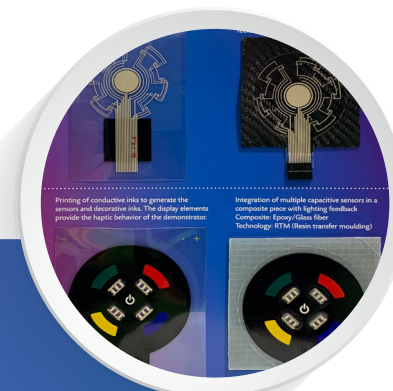
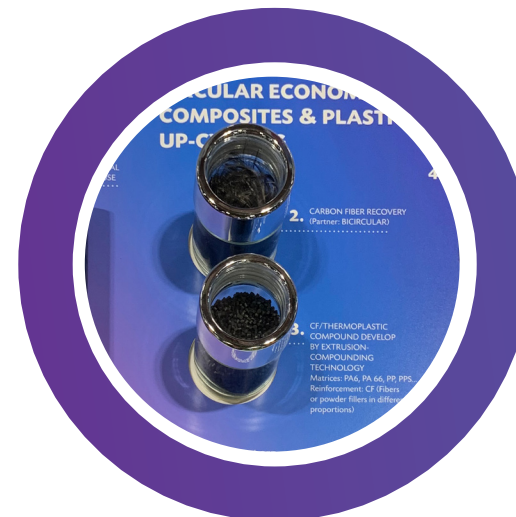
COMPOSITRONICS: Functional composites

Lightweight structural and functional composite part development for SHM, lighting, sensors or antennas.

- Flexible printed electronics development
- Functional composite development (RTM, compression, Injection...)

Our Equipments:

- Composites pilot plant: RTM, pultrusion, autoclave, infusion, press forming, thermoforming table and back injection moulding
- Compounding pilot plant: Extrusion-compounding, monofilament & multifilament and film extrusion,
- Characterization lab: Mechanical, thermal and rheological tests, SEM & NDI (phased Array)



Success cases



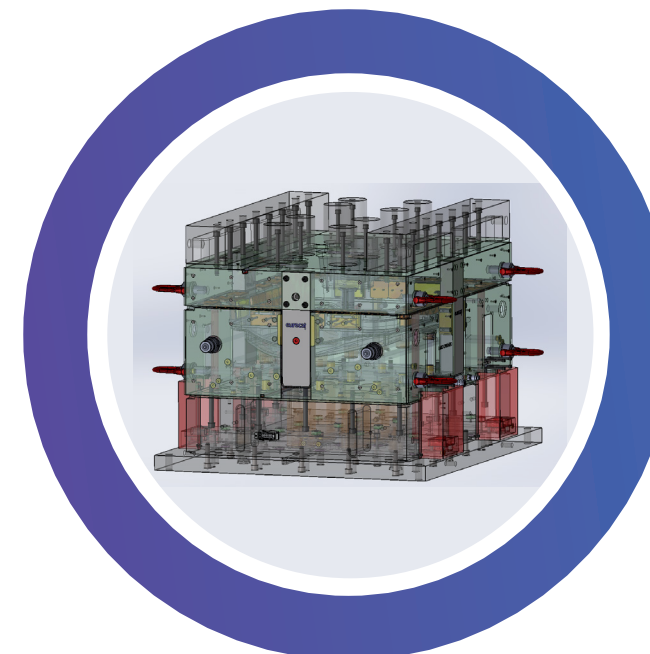
In-mould monitoring for out- autoclave manufacturing processes for composite aerostructures.

Full-scale composite frames fuselage manufacturing by RTM (resin transfer moulding) technology.

To optimize the RTM process, in addition to applying finite element analysis (FEA) for mould design and process analysis, different sensors have been introduced into the mould to control and monitor the temperatures and resin viscosity throughout the curing time.

Thanks to in-mould monitoring, it has been possible to achieve an optimal impregnation throughout the CF preform as well as the curing control to achieve the best properties of the composite in addition to optimize the cycle time and energy savings.

Project: Cofrare 2020 (CleanSky2)
Topic Manager: Leonardo
Partners: DEMA y ABETE



Advanced mold design and manufacturing for composite car-door development by CRTM

C-RTM is one of the technologies for composite structural parts manufacturing with high production rate. To achieve high quality composites, it is vital a good mold design.

The application of simulation tools combined with extensive experience in mold design and composite manufacturing processes have made it possible to manufacture a robust mold to produce high-quality composite parts.

Customer: GESTAMP

Advanced manufacturing systems

3D printing

- Development of new machinery for additive manufacturing and 3D-Forming metal sheet
- Optimization of 3D Printing processes according to application
- Printing with advanced materials(Silicon, additive filaments, additive resins, materials with Fibres)
- Custom made polymeric materials development

Eurecat 3D New Technologies:

1. Fibre-Reinforced Additive Manufacturing

New technology for manufacturing continuous fibre reinforced parts using 3D printing.

Success case

Carbon fibre reinforced brake pedal CFIP is a patented technology by Eurecat which enables to manufacture continuous fibre reinforced structures by 3D printing. A multi-material and multi-process approach has been applied in the pedal, defining the most suitable material and process in each zone of the structure according to the mechanical requirements but also taking into account costs and production targets. The continuous carbon fibres are aligned to the most efficient direction following complex trajectories, improving the mechanical and lightweighting performance. In addition, the Smart combination of translucent and metallic parts leaving in plain sight the inner fibres brings a unique aesthetic design.

REINFORCE3D

An spin off called Reinforce3D has been set up to exploit CFIP technology.

2. Silicone Multi Material 3D printing technology

Eurecat has developed a 3D printing machine with two printing heads, one dedicated to print with silicone and the other one dedicated to any filament thermoplastic. This technology is capable to print highly complex silicone parts using soluble support or print functional silicone parts with electrical conductive, magnetic or other types of special filaments.

3. UDM

Ultrasonic Deposition Modelling for the direct production of plastic parts (EP2456570).

4. LM-RM

Solid Metallic Structure Formation by Localized Microwaves (EP2689635).

5. SLM

System consisted on a vertical milling centre equipped with a Ytterbium-fibre laser



We are leaders in Catalonia in additive and advanced manufacturing, with more than 30 years serving the industry.

Ultrasounds

- Ultrasonic moulding (USM) for the microinjection of plastic pieces
- Ad hoc design and simulation of sonotrodes
- Application of ultrasound to industrial processes
- USM

UltraSonic Moulding (USM) technology is a new high precision moulding process, developed by Eurecat.

Is powered by ultrasonic energy, specifically designed for the production of mini and micro plastic parts. The main advantages are: increasing of polymer fluidity, lower injection pressure, very low material wastes and huge energy savings.

Ultrason is a spin-off company that commercialize the USM injection machine: Sonorus.

Photonics

- Development of light sources
- Optical sensors
- Development of microfluidic devices with photonic interrogation
- Optical solutions in an industrial environment
- Characterisation of materials through spectroscopy techniques

Success case

Predictive Fabric Defects for Circular Knitting Machines

Our solution is based on advanced state-of-the-art photonic systems and IoT systems combined with artificial intelligence algorithms, as well as our experts' indepth knowledge of the textile industry.

It can predict failures on critical knitting components, report them in a non-intrusive way to the production manager or the operator himself and anticipate manufacturing with defects (Zero-Defect Manufacturing).



ARAGNE
TEXTILE SOLUTIONS

An spin-off called Aracne has been set up to exploit this technology

Incremental sheet forming

Eurecat has developed an Incremental Sheet Forming (ISF) and Dieless process, which allows the metal sheet forming by the generation of small strains, layer by layer, in 3D programmed paths. This is a very flexible technology, suited for small-medium production series that need a high degree of flexibility towards design changes.

Biomedical Manufacturing Technologies

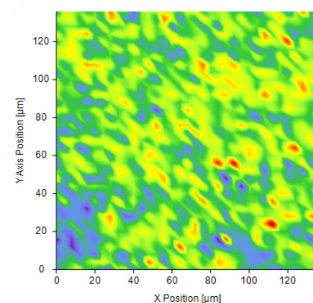
Functional Surfaces

We offer R&D&I services and technological assessment for the development, selection and characterization of coatings and surface treatments as well as for their industrial implementation.

We have our own laboratories for the development, testing and characterization of coatings. We help companies find solutions for hard, wear, corrosion resistant, low-friction, biomedical, bactericidal, and decorative coatings, among others.

Our services:

- Plasma-based surface treatments and coatings technologies (PVD and Ion Implantation)
- Surface analysis
- Superficial deterioration and corrosion: identification and solutions
- Non-destructive inspection techniques
- Damage and friction reduction



Coatings

Treatments



New advances in metal mechanical sector

Development of hard coatings to extend the life of cold/hot forming processes (HPDC molds, stamping tools, extrusion dies, etc.)

Functional coatings for decorative components

We develop sustainable metallic coatings on metal and plastic parts by means of Physical Vapor Deposition (PVD) technology for replacing traditional electroplating processes.

More flexible. Apart from different aesthetic finishes, specific surface functionalities can be incorporated: wear resistance, antitarnishing, bactericidal activity, hydrophobicity, etc.



Success case

BIOIMPLANT

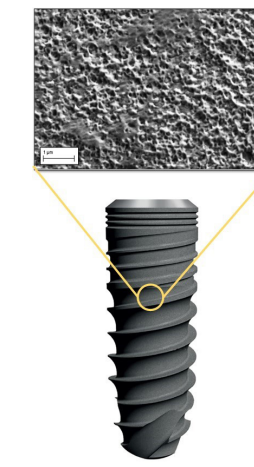
Development of surface bactericidal treatments for dental implants

Bactericidal surface treatments have been developed to mitigate periimplantitis, which is one of the main causes of dental implant failure.

The treatments have been obtained using the ion implantation technique, and are based on the implantation of bactericidal metal ions.

The treated surfaces are non-cytotoxic and show effective bactericidal activity in vitro against S aureus, E coli, F nucleatum, P gingivalis and A actinomycetemcomitans bacteria.

Future in vivo validation of the developed treatments is foreseen.



Functional printing & Embedded devices in products

Functional printing and additive electronics will enable industries such as automotive, home VV appliances, healthcare, energy, packaging, and textiles to create functional surfaces and smart objects by such as automotive, household appliances, healthcare, energy, packaging, and textiles to create functional surfaces and smart objects by printing thin-film devices, embedded sensors, and electronic hybridization. The combination of additive electronics with artificial intelligence embedded in surfaces and objects is allowing the deployment of the Internet of Things.

Product surfaces are expected to increasingly host communication and user interface functions, as well as sensorization and interaction with the environment as a whole, making printed electronics an important technology to consider.

InMold Electronics

Design and manufacturing of functional and decorative films for plastic, composites, silicone and elastomers devices integration.



Printed Energy Devices

Design and development of ad hoc printed devices for energy harvesting, generation & conversion with emphasis in green hydrogen technologies



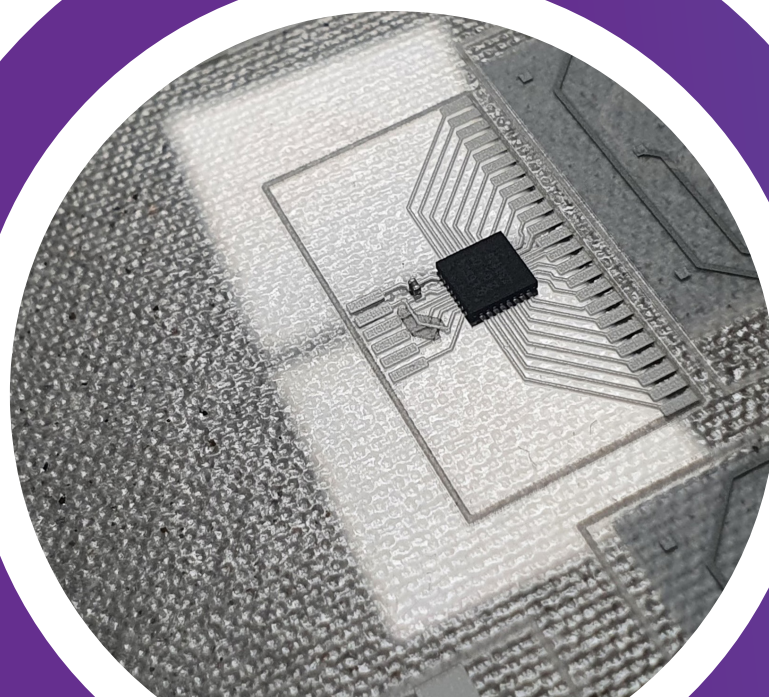
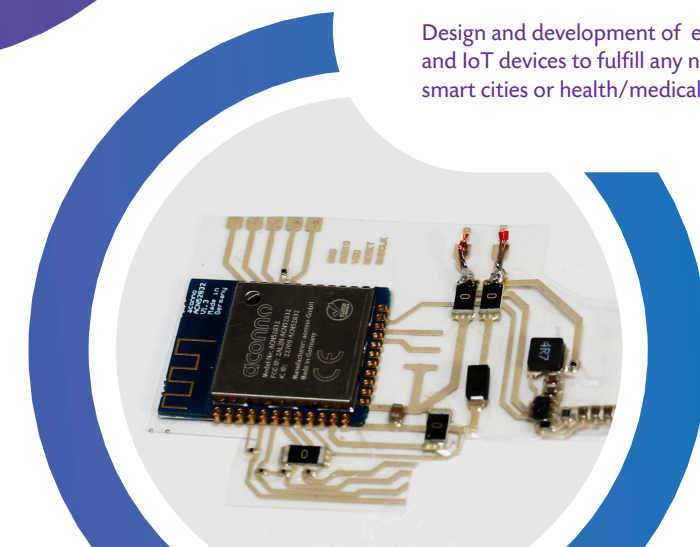
Printed Sensors & Actuators

Design and development printed devices with adhoc functionalities to tackle major issues in health, environmental monitoring and energy.



Smart Engineering

Design and development of embedded systems and IoT devices to fulfill any need in the industry, smart cities or health/medical environment.





Project Púlsar

Project Púlsar demonstrates the application of **Plastronics in a vehicle centre console**. With only 3 mm in thickness, this smart plastic surface presents an intuitive HMI interface with seamless LED illumination and capacitive sensors, all monolithically embedded within a single plastic part.

- Window switches: up and down capacitive touch sensors for window control
- Temperature slider: independent temperature control by sliding up and down
- Car mode slider: switch between normal, eco and sport car modes by swiping across the slider
- ENGINE start/stop: safe long-press operation capacitive touch sensor for car start and stop
- Emergency lights: capacitive touch sensor for emergency lights
- Light spears: search light, guide light and dynamic feedback lighting for all the operations

Differential Technologies
Plastronics



Development of novel materials and manufacturing processes for a high-volume production of OLAE devices.

The MADRAS project, coordinated by Eurecat, has the objective to develop new materials and manufacturing processes for a scalable production in an industrial level of OLAE devices. The project addresses the use of conventional and established industrial manufacturing techniques and adapted processing tools to deliver this innovative technology closer to market.

The use of organic and large area-electronics (OLAE) technologies and components have experienced a remarkable increase in recent years thanks to printed electronics technologies progress which offers solutions to develop OLAE thinner, more power-efficient, flexible and lightweight devices. However, the manufacturing processes for these devices are difficult to adapt to mass production.

MADRAS aims to boost a high-speed manufacturing methodology with new materials and In-Mould Electronics (IME) for a high-volume production of OLAE devices that are more affordable, more durable and have longer life cycle.

The innovative technology developed during the project will be demonstrated and implemented into two different demonstrators of plastic-embedded printed electronics: a geotracking flexible tag addressed to the packaging sector and a biometric photosensor for user identification in a platform of scooter sharing.

The MADRAS project, apart from Eurecat technology centre, also counts with the participation of 11 partners from Spain, France, Denmark, The Netherlands and the Czech Republic.



Success cases



Innovative and affordable solutions for advanced car body shells manufacturing and lightweight material strategies for railways, innovative doors and train modularity.

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.

The **Composites Materials Unit of Eurecat** participates in design of molds and the **Functional Printing and Embedded Devices Unit** integrates low voltage circuits in composite panels. The project also counts with the participation of the **New Manufacturing Processes Unit**, the **Audiovisual Technologies Unit**, the **Big Data & Data Science Unit**, the **Product Development Unit** and the **Consultancy Unit**.

The CARBODIN consortium is formed by **14 partners from 7 European countries**: Spain, Greece, Germany, Italy, France, Poland and Czech Republic.



The first Plastronics pilot plant in Europe

Eurecat: adding intelligence and functions to plastic components. From product concept to industrial production.

Eurecat's Plastronics pilot plant is the first of its kind in Europe.

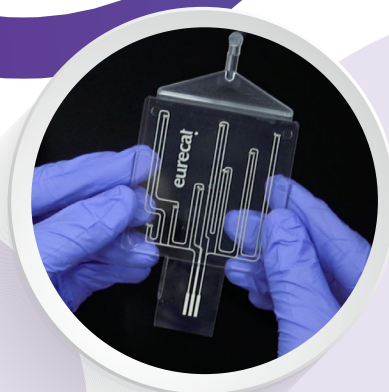
It is a pioneering platform that has been made available to companies for the purposes of creating and/or improving products, services and processes: from the initial idea to industrial production.

Located in Cerdanyola del Vallès (Barcelona), the plant boasts a series of truly unique facilities.

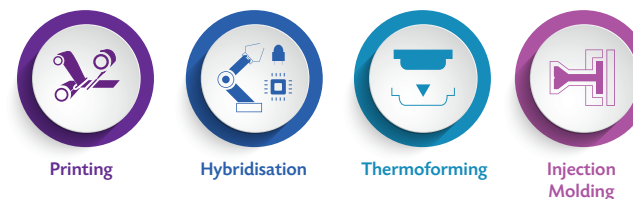
It consists of two cleanrooms that enable an orderly combination of different manufacturing processes. One is dedicated to printing and electronics, while the other is dedicated to processes involving plastics.

Plastronics, also known as In-Mold electronics (IME), is an emerging technology that combines electronics and plastics to create products that have high added value, advanced functions or features and are manufactured on a large scale.

By combining the functional printing of electronics and the hybridisation of electronic components with traditional transformation processes, such as injection, it is possible to create lightweight devices with new functionalities and embed them in geometrically complex products.



Eurecat offers a complete cycle of plastronics' manufacturing processes



Printing

Additive deposition of inks with electronic properties onto plastic substrates, with the aim of producing functional films containing thin layers of circuits and electronic devices.

Hybridisation

Placing electronic SMDs (surface-mount devices) components onto a functional film using pick and place equipment. A combination of printed electronics and SMD components is known as hybrid electronics.

Thermoforming

Controlled deformation using a mold of the printed sheets and hybridised rigid components to transform 2D films into 3D shapes.

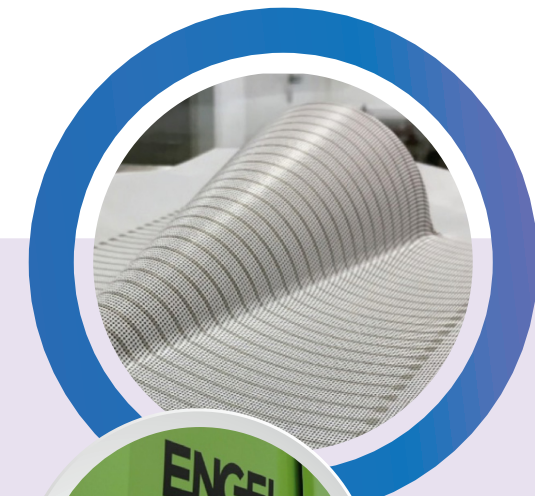
Injection

3D films coating with plastic materials by pressure-injecting melted plastic into a closed mold and allowing it to solidify inside.

Plastronics' applications

Plastronics is a revolutionary technology for the automotive, aeronautics, packaging, consumer electronics, medical and sports industries.

- Manufacturing flexible screens and haptic controls that enable interactive responses or invisible buttons.
- Creating plastic products that contain embedded sensors (temperature, pressure, etc.).
- Creating buttons for vehicle interiors.
- Creating user interfaces for domestic appliances.
- Producing geometrically complex and 3D products.
- Producing lighter and smaller components and parts.
- Producing thinner and cheaper pieces.
- Creating products from conductive plastics.



Robotics and Automation

We devote to performing research and new developments in the field of Robotics.

In the last more than 15 years, the group has executed a more than 200 research projects including applied research (30 European, 40 National) as well as technology transfer with over 150 private projects for multiple sectors: Flexible manufacturing, Healthcare, Agriculture, Infrastructure inspection, Logistics, and Construction.

Our research lines

- 1 The **Cognitive Robotics** Line is centred on equipping robots with advanced reasoning capabilities to generate complex behaviours in dynamic environments, particularly in natural human-robot interaction scenarios. The main use-cases are in the Assistive Robotics applications (Health/Social Care) and in Flexible Manufacturing environments. The technological focuses are: 1) Reasoning capabilities by means of Generative AI, Reinforcement Learning, AI-Planning and Behaviour Trees; 2) AI-based human and scene understanding capabilities; 3) Natural multimodal (e.g. dialogue) and affective (e.g. physical expressivity) human-robot interaction.
- 2 The **Robotic Manipulation** Line aims at providing robots with dexterous manipulation capabilities, driving increased productivity and product quality. The main use-case are on the Flexible Manufacturing, Agriculture and Construction environments. Our goal is to empower both collaborative and industrial robots to seamlessly collaborate with human workers, optimizing production workflows and ensuring adaptability to diverse tasks. Our focus lies in the skill-learning, motion control, grasping generation, and additive/subtractive manufacturing, using Learning from Demonstration, Reinforcement Learning and Generative AI.
- 3 The **Autonomous Mobile Robotics** Line focuses on developing localization, navigation and perception capabilities for ground (AGVs) and aerial (UAV) platforms. The primary objective is to empower autonomous robots to operate efficiently with high endurance in environments where conventional robots may falter, opening new possibilities for applications across diverse sectors, including agriculture, inspection, safety and security, surveillance, and logistics.



Success cases

**BATTE
REVERSE**



Next generation of battery reverse logistics.

The BatteReverse project develops a more efficient and universal method for battery discharge and first diagnosis.

BatteReverse improves the safety of Li-ion batteries transportation by developing safety packaging with a monitoring system that can reduce thermal runaway risk.

The project also boosts more advanced and precise methods for automated dismantling and sorting of battery components based on a safe and more efficient human-robot collaboration.

www.batterreverse.eu

{...} peer



Enablement of a two-way communication flow with enhanced feedback loops between users and AI, leading to improved human-AI collaboration, mutual learning and reasoning, and thus increased user trust and acceptance.

The PEER project focuses on how to systematically put the user at the centre of the entire AI design, development, deployment, and evaluation pipeline, allowing for truly mixed human-AI initiatives on complex sequential decision-making problems

www.peer-ai.eu



Fashionaut

The robotization and automation of production processes in the textile industry, especially in SMEs, is the main weakness detected in the sector.

Currently, the textile manufacturing process is a very manual process and several research centers and companies in the Catalan ecosystem are working together to find suitable solutions in collaboration with MODACC, the Catalan Fashion Cluster. This automation and robotization of companies result in a significant increase in their productivity, identifying, among others, two important driving conditions:

(1) the digital capacity of workers; and (2) the existence of clusters (the subject of the current AEI network) of cooperation and support between SMEs, which make it possible to take advantage of the multiplier effects of red-handed work and digitization and automation.

The FITEX Technology Center, the EURECAT Research Center and companies such as ESCORPION and GAVI PUNT, together with the MODACC Fashion Cluster, have jointly launched the project called FASHIONAUT funded by the Ministry of Industry, Commerce and Tourism, MINCOTUR. The goal of the project is to digitize and robotize potential manufacturing processes in the textile industry.

The FASHIONAUT project has focused on studying advanced robotics solutions for the textile industrial sector with the purpose of opening the door to new solutions for automation and robotization of its production processes as finished through the latest novelties on the market. One of the identified solution is using of Computer Vision and Artificial Intelligence for the quality and size checking of produced clothes.



ESCORPION

GÀVIPUNT
KNITWEAR



Red5R

The Cervera Network 5R, is a network aiming at promoting the development and use of Robotic technologies for Smart Manufacturing.

Its mission is to establish a collaborative network, equipped with the necessary tools and infrastructure to act as a driving force for the development and promotion of new robotic technologies in the manufacturing sector. The strategic plan of the 5R network is based on the development of 5 Pilot Connected Factories where technological demonstrators will be developed for different industrial applications. These demonstrators are created based on the 5R Service and Components Catalogue made available through the network and its ecosystem.

To this end, the 5 Research and Technology Organisations forming the network, that is, TEKNIKER, EURECAT, AIMEN, CARTIF and CATEC, defined the following strategic objectives:

1. Developing a scientific-technical strategic plan to position the network as a reference R&D initiative in the development and application of robotic technologies with specific contributions in the fields of Perception, Human-Robot Interaction and Cognition for manufacturing
2. Promoting the introduction of Collaborative Robotics and Artificial Intelligence in the manufacturing sector to enable agile and flexible production systems
3. Increasing the economic and societal impact through technology transfer and acceleration of innovation

This initiative is financed by CDTI (The Centre for the Development of Industrial Technology) in the "Cervera Centros Tecnológicos" call of the "Programa Estatal de Generación del Conocimiento y Fortalecimiento Científico y Tecnológico del Sistema de I+D+I".



RoboQuimIA

Cognitive robotics and artificial intelligence for the safe handling of hazardous industrial waste drums.

The **RoboQuimIA** project investigates **robotics and artificial intelligence technologies applied to the handling of dangerous substances and waste in mobile containers**, managed by the companies of the Tradebe Group, during the logistics of receiving and accepting waste stored in drums.

These operations, involving meticulous and complex handling and currently carried out manually by workers, are the previous step in the management of waste, with a view to its subsequent transfer, treatment and recovery.

Likewise, the operations allow determining the acceptance or not of a certain batch of waste, as well as its sampling and classification, in order to determine the most suitable type of treatment or recovery depending on its nature, degree of danger, and the most appropriate place. of storage of said item, prior to its subsequent management.

Given the great heterogeneity of the containers and contents received from hazardous waste, the automation of the process is very complex. RoboQuimIA hopes to achieve a suitable technological solution through research into cognitive robotics and artificial intelligence systems.

Eurecat participates in the RoboQuimIA project through different Technological Units, in charge of different objectives:

- The Robotics and Automation Unit launches intelligent robots and artificial intelligence for programming robot trajectories and robotic manipulation for dexterous tasks.
- The New Manufacturing Processes Unit contributes to non-destructive inspection systems.

ADAPTA

Artificial intelligence and machine learning technologies for factories with high capacity for adaptation and resilience.

The **ADAPTA** project develops a set of technologies and strategies that respond to the handling, intra-logistics and definition of production processes needs of manufacturing companies.

This general objective is based on **flexible robotic solutions that incorporate the advances of artificial intelligence and the use of digital infrastructures** and is materialized in five partial objectives:

- **Improve the perception capabilities of robotic systems**, both through images and by monitoring contact in handling processes.
- **Develop handling systems** that allow adaptation to unknown or changing situations with minimal human intervention.
- **Accelerate the process of defining assembly and manipulation tasks** through learning by demonstration techniques.
- **Contribute to the development of production systems based on open control architectures**, which consider the presence of human beings and the interaction with them.
- **Enable digital infrastructures** for interoperability, secure and sovereign data sharing and life cycle management of machine learning models.

Eurecat participates in the project through the Robotics and Automation Unit, developing task planning algorithms, advanced handling and optimization of cargo space in logistics applications.

The ADAPTA consortium is made up of six companies and three research centers.



Circular Economy and Climate Resilience

Eurecat carries out R&D and innovation activities and technological development to promote businesses competitiveness and sustainability.

Water

- Treatment of complex effluents, reuse, recovery of compounds and energy.

Waste as resource

- Prevention, critical compounds recycling and energy recovery

Climate resilience

- Climate change mitigation through decarbonisation and emissions compensation and climate change adaptation

Energy

- Efficiency, thermal and electrical systems, integration of renewable energies and microgrids.
- Batteries and electric vehicles: energy storage and sustainable mobility systems.

Eco-design and environmental impact

- Sustainable products and eco-design
- Environmental and social gain determination of new process and products

Services

- Tailor-made environmental experimentation: laboratory scale and pilot plant.
- Treatability tests for waste and water.
- Support for energy rehabilitation of buildings and insulation characterization.
- Characterization of equipment and batteries.



Success cases

Design, manufacturing and validation of the next generation of battery packs for the automotive mass-market.

The MARBEL project develops an innovative and competitive lightweight battery with increased energy density and shorter recharging times with the objective to accelerate the mass market take-up of electric vehicles.

Eurecat coordinates and participates in the project through its Waste, Energy and Environmental Impact (WEEI) Unit, which is the technical coordinator of the project and supervises the battery pack requirements and guidelines in terms of safety, functionality 2nd life, Sustainability, recycling and eco-design.



Transformational Sustainability solutions and systems around resource use in the water sector. NextGen project challenges embedded thinking and practices by bringing financially sustainable innovations to life.

To achieve this, NextGen will deliver technological, business and governance solutions for water in ten high profile demonstration cases across Europe and three associate partners worldwide.



The SEA4VALUE project, coordinated by Eurecat, has the objective to develop a Multi-mineral Modular Brine Mining Process (MMBMP) for the recovery of valuable metals and minerals from brines produced in sea-water desalination plants (SWDP).

The innovation promoted by the project improves the economic feasibility of well-established concentration and crystallisation processes (capacitive deionisation, membrane crystallisation, bipolar electrodialysis, multi-effect distillation) while performing research on innovative materials to develop the next generation separation processes enabling the production of raw materials from seawater brines.



IMPETUS

Dynamic information management approach for the implementation of climate resilient adaptation packages in European regions.

The IMPETUS project aims at accelerating Europe's climate change response and turning commitments into concrete action, developing innovative measures to make its regions more resilient. Moreover, the project explores the synergies between climate change mitigation, supporting regional socio-economic growth and stability, and transition of communities to ecological sustainability and resilience.

Within the project, each of the 7 bioclimatic regions of Europe – Arctic, Atlantic, Boreal, Coastal, Continental, Mediterranean and Mountainous – host seven regional test beds where innovative solutions are piloted and scaled up. Motivated and multidisciplinary teams in research, policy, industry and civil society will address real-world challenges in these regions.

The main innovative technical, nature-based, governance, financing and public engagement solutions developed by the project are:

- Creation of a data and intelligence space to help in the development of adaptation and mitigation strategies to climate change.
- Cost-effective and environmentally, economically and socially sustainable actions targeted to support key community systems such as water, agriculture, fisheries, infrastructure and health.
- "Low regret" and scalable co-designed and created with policy-makers, businesses and communities to help ensure their success.

Eurecat participates in the IMPETUS project through its Unit of Applied Artificial Intelligence, which coordinates the project, the Water, Air and Soil Unit, the Climate Change Department of Eurecat, the Tourism Innovation Unit and the Consultancy Department. In addition, the project has the participation of Richard Elelman, policy director of the Department of International Development and Public Programs of Eurecat.

The consortium is formed by 32 partners from 9 European countries which counts with a great expertise in research, business and regional government.



LowUP

Low Valued Energy Sources Upgrading for Buildings and Industry Uses

LowUP offers technological solutions that will reduce both CO² emissions in the atmosphere and primary energy consumption, as well as reduce the European dependency on importing energy from abroad.

LowUP's three solutions will combine innovative heat and cool recovery technologies fuelled by low valued energy sources, such as renewable and wasted energy sources. Partners are working together to develop and demonstrate one heating and one cooling system for office buildings, and one heat recovery system for industrial processes.

LowUp is a project lasting 42 months funded by the European Union's Horizon2020 programme with a consortium of 13 partners from 7 different European countries. with a great expertise in research, business and regional government.





Centre en
Resiliència Climàtica
by eurecat

Climate
Resilience
Centre

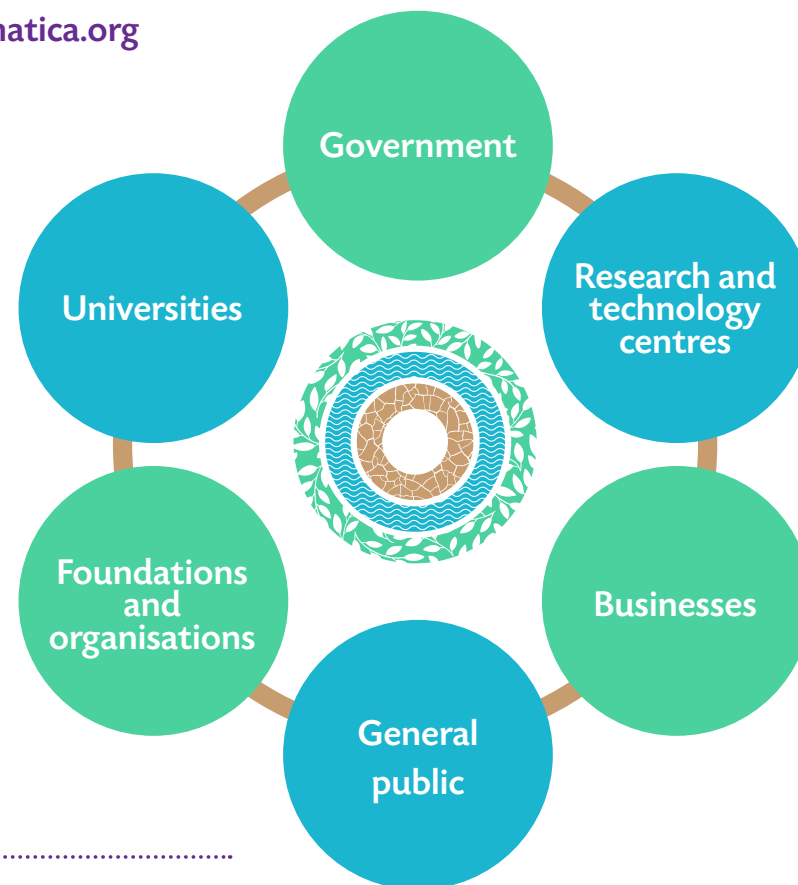


The leading R&D&I facility
in the Southern European
battery ecosystem

Technology and knowledge to tackle the climate emergency.

- It seeks to become the flagship centre for climate resilience in adapting to and mitigating climate change in Catalonia and the Mediterranean.
- R&D&I of excellence to become more resilient to climate change and support sustainable development by fast-tracking the ecological transition.
- Transfer of knowledge and technology to businesses, government and society; outreach and training for society.
- Promotion across Catalonia by rolling out regional Living Labs.
- Joint initiative with ecosystem stakeholders coordinated by Eurecat.

www.centreenresilienciadclimatica.org



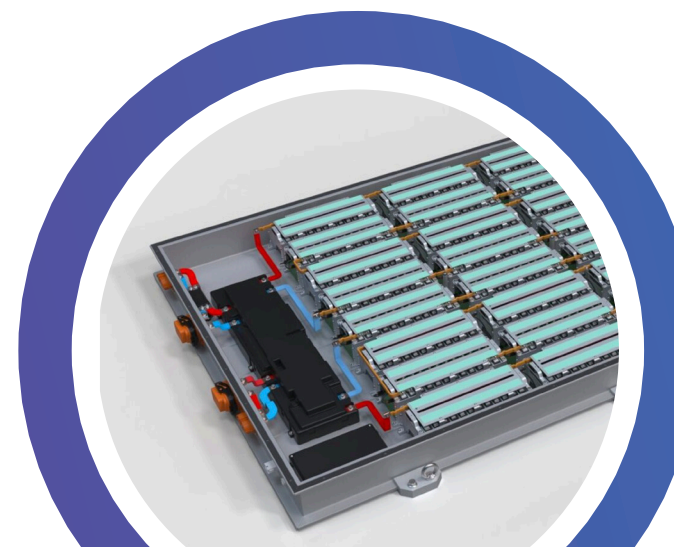
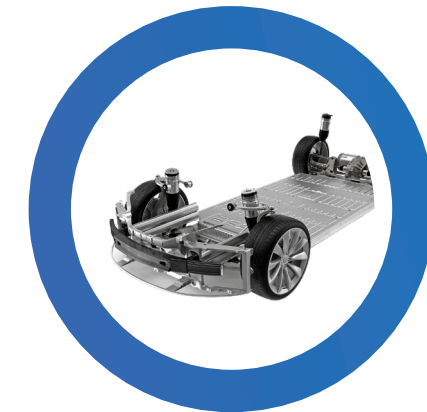
Lead partners:



- Joint Eurecat + IREC research unit. Specialised development, testing and innovation.
- Designed to improve transfer of knowledge to industry for the development of future generations of cells and batteries.
- Comprehensive support across the entire value chain: eco-design, new materials, testing and validation, assembly, production, second life and circularity, etc.
- Innovation with industrial, economic and social impact in batteries and their application:
 - » Sustainable, lightweight and environmentally friendly electric mobility
 - » Stationary energy supply support systems
 - » Renewable energy rollout
 - » Capital goods

www.battechbatteryhub.org

Lead partners:

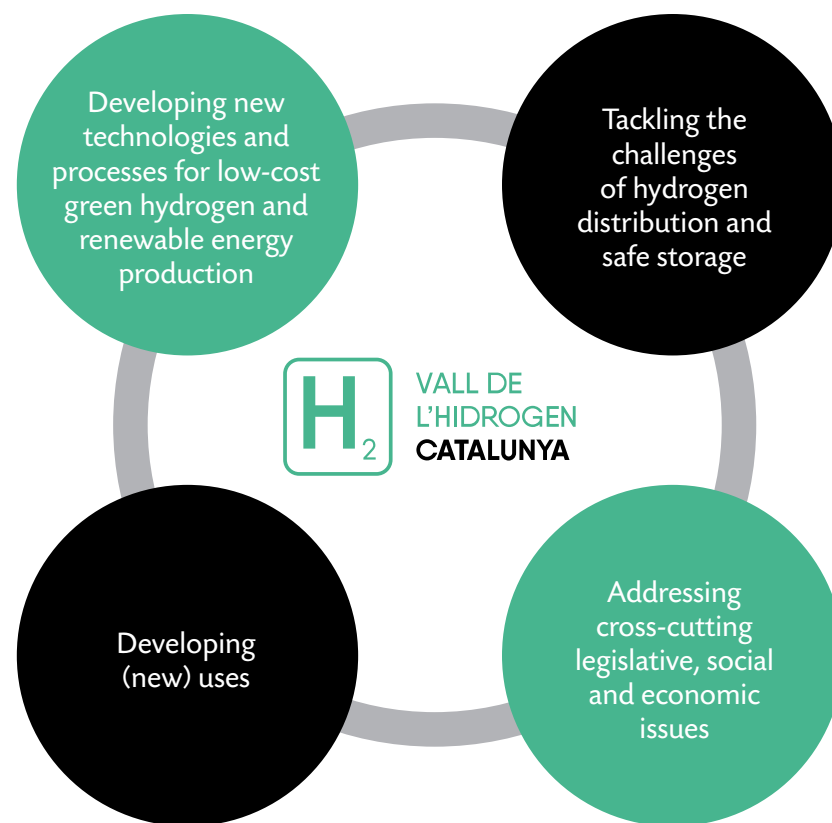




Green Hydrogen Valley South Catalonia

Public-private initiative to generate sustainable social, economic and environmental value by rolling out green hydrogen as a key vector in the energy transition.

- Crafting synergies between the green hydrogen transition and the digital transition.
- Building a skilled workforce around green hydrogen.
- Raising awareness among the public and socio-economic stakeholders.



64
companies

35
public
institutions

20
associations
and clusters

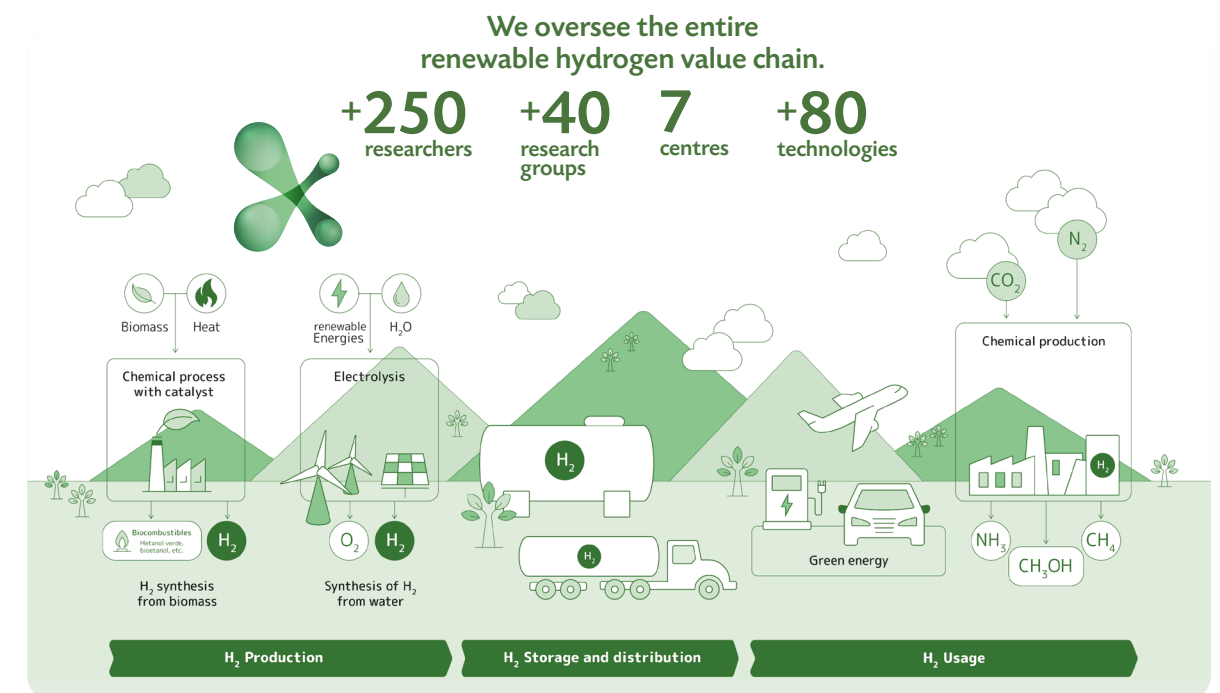
8
knowledge
and research
centres



Green hydrogen innovation network in Catalonia

H2CAT Network is a public initiative coordinated by Eurecat, to enhance and promote technology transfer of our members' technologies to the market.

- Identifying the research and innovation in the hydrogen field performed in Catalonia.
- Promoting technology transfer through the creation of Spin-offs and transfer collaborative projects.
- Promoting synergies, alliances, and coordinated strategies.
- Organizing demonstration events, market pulls and investment forums for the prime technologies of each group.
- Offering trainings to researchers on valorization, technology transfer, and specific topics of the hydrogen value chain.



Lead partners:

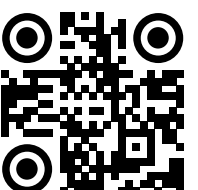
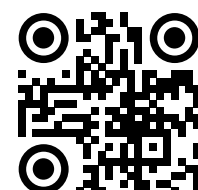


Lead partners:

Businesses and institutions



Knowledge alliance



We work together with companies from the conceptualization of innovation to the pre-commercial scale.

We apply smooth methodologies to monitor projects. Targeted towards ROI, quick wins, PoC.

AI and Data Science for predictive analytics

Machine Learning

Collaborative / Industrial Robotics

Cybersecurity

AR and VR Assisted Systems

DIAGNOSIS

Analysis of the current State of digitalization. Company visit and interviews to identify pain.

STRATEGY

Understand the business strategy to define aligned digitalization goals.

BUILDING INITIATIVES

Definition of technological initiatives to fill the gap and improve competitiveness.

PLANNING

Evaluation, prioritization and scheduling of initiatives to draw the roadmap 4.0.

PROOF OF CONCEPT

Technical validation of the project in a non-operational environment to analyze its impact.

MARKET TEST

Realization of a pilot with pre-selected clients to validate the real acceptance of the concept.

DEVELOPMENT

Design and development of the concept to implement it in an operational or real market environment.

INDUSTRIAL SCALING

Marketing or implementation of the solution.

SUPPORT IN THE MANAGEMENT OF CHANGE

Accompanying the company during the process through work sessions, workshops and team dynamics to promote technological transformation.

Digital twins

Predictive Maintenance

Optimized Production Planning

Personalized Manufacturing and Zero Defects

System Integration

Artificial intelligence applied to industrial management

Integrated, adaptive multi-tool/machine monitoring, remote diagnostic and control features.

- IoT and Artificial Intelligence
- Web-based Decision Support Systems
- Cyber security
- Collaborative, mobile and unmanned industrial robotic systems

Connected Industry

Eurecat innovates together with companies and aligns them with the new Industry 4.0 paradigm.

The combination of advanced manufacturing technologies and sensorics, data and analytics technologies has resulted in new terms that are already applied in different industrial sectors.

IoT Cyber security Industrial Lab

Cyber security is a critical factor in IoT, with billions of interconnected devices interacting, each with their corresponding communication channels.

Eurecat's IoT Cyber security Industrial Lab investigates how cyber security is implemented in IoT systems, focusing on embedded equipment and infrastructure. The Lab reveals vulnerabilities in the IoT systems and devises state-of-the-art prevention and mitigation measures. The Lab is a sound technology partner in cyber security issues for IoT device manufacturers, IT companies, and critical infrastructures.

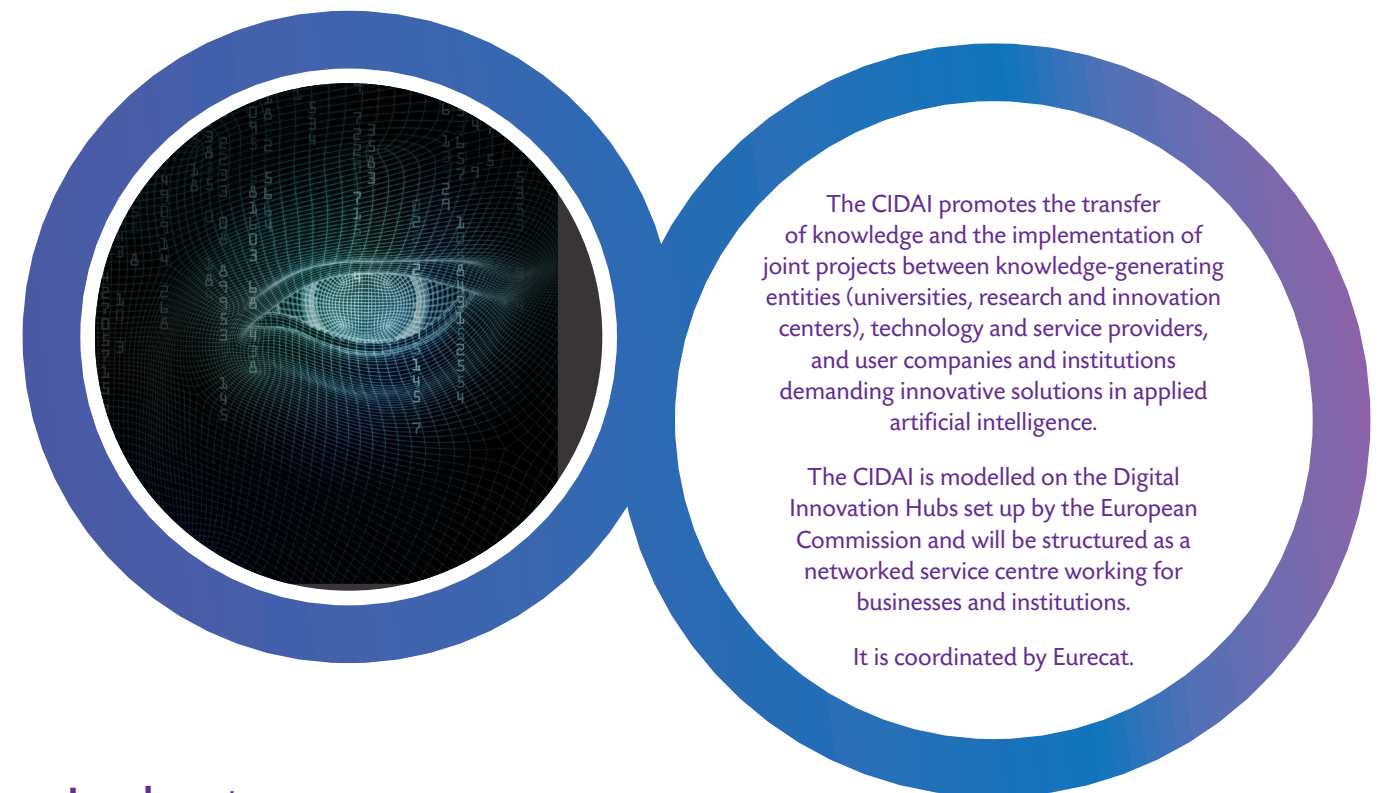
Intelligent resource management

Eurecat applies sensorization, IoT, cyber-physical systems, simulation and advanced data analytics for the development of platforms designed to control and manage resources and processes in the industry.

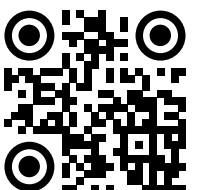
CIDAI Centre of Innovation for Data tech and Artificial Intelligence

The Digital Innovation Hub in Artificial Intelligence

- Part of the Catalan Government's Catalonia AI strategy.
- The CIDAI aims to fast-track Artificial Intelligence uptake in business and society.
- It is a public-private initiative coordinated by Eurecat which promotes knowledge transfer and implementing joint projects between knowledge-generating organisations (universities, research and innovation centres), technology and service provider companies, and user companies and institutions looking for innovative solutions in applied artificial intelligence.
- It seeks to promote the Catalan Artificial Intelligence ecosystem as a flagship international hub by building a connected, active and vibrant community that embraces most of the stakeholders.



Lead partners:





Success cases

Sesame

Automation of the manufacturing process and operations of aerospace launchers to increase the number of units produced and reduce production time and cost.

Currently, the production of aerospace launchers implies a complex process and multiple manual validation processes in order to guarantee the integrity and proper functioning of the launcher which causes a low volume of units manufactured per year.

SESAME project develops Industry 4.0 solutions to digitalise the manufacturing of the new European launcher Ariane 6, with the aim to exploit the data of the process to ensure and guarantee the traceability and quality of the manufactured launchers. The Smart Management Systems Unit of Eurecat participates in the project researching on predictive quality methods through solutions based on artificial intelligence machine learning. SESAME is coordinated by Ariane Group and counts with a consortium formed by 7 European partners.



Success cases

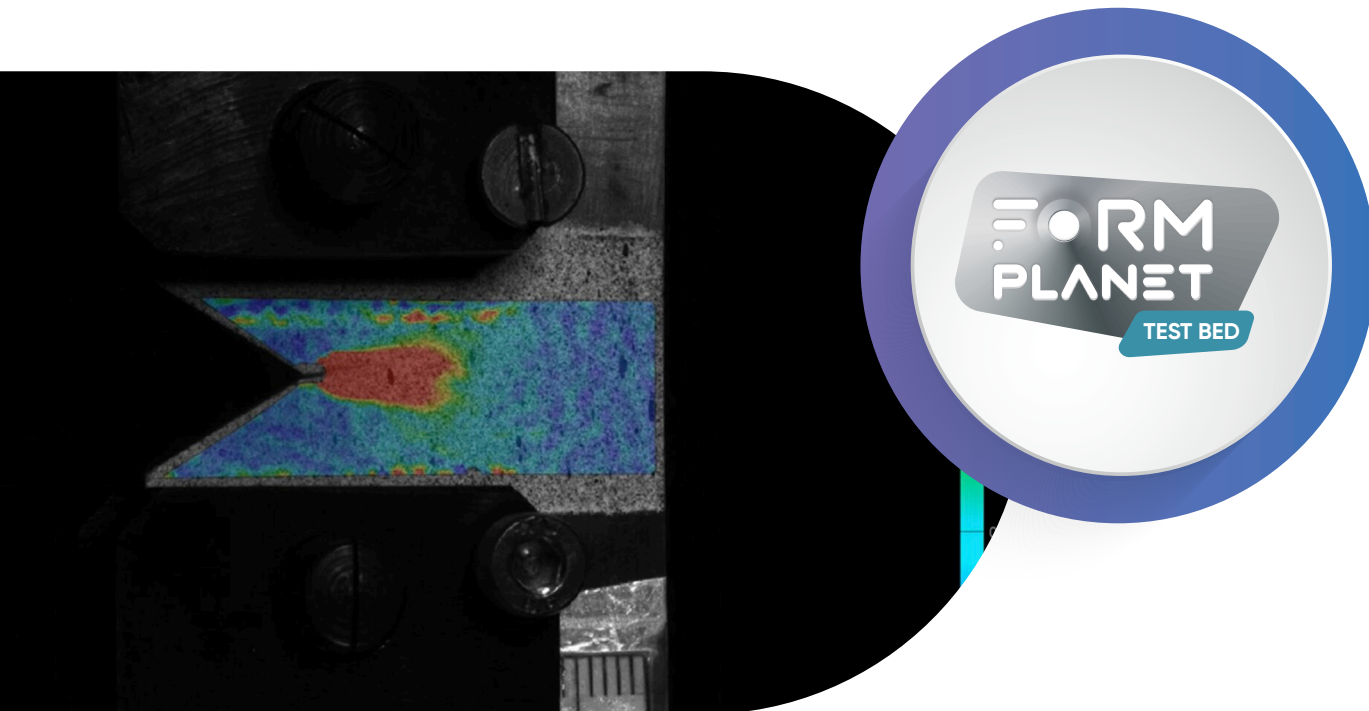
Gràfiques Manlleu S.A

Development of a labeling control system leveraging photonics and AI-driven algorithms.

Gràfiques Manlleu is a graphic arts company founded in 1919, specialized in labeling for the food sector. For a leading company like Gràfiques Manlleu, technological innovation is a key factor for staying ahead in its industry.

For this reason, it has collaborated with Eurecat on a proof of concept to create an innovative labelling quality control system based on photonics and artificial intelligence algorithms. This innovation aims to guarantee zero errors in deliveries and product quality.

The development of this innovation has been possible thanks to the Support Program for Digital Innovation Hubs, known as PADIH, aimed at helping SMEs accelerate their digital transformation and the adoption of advanced technologies.



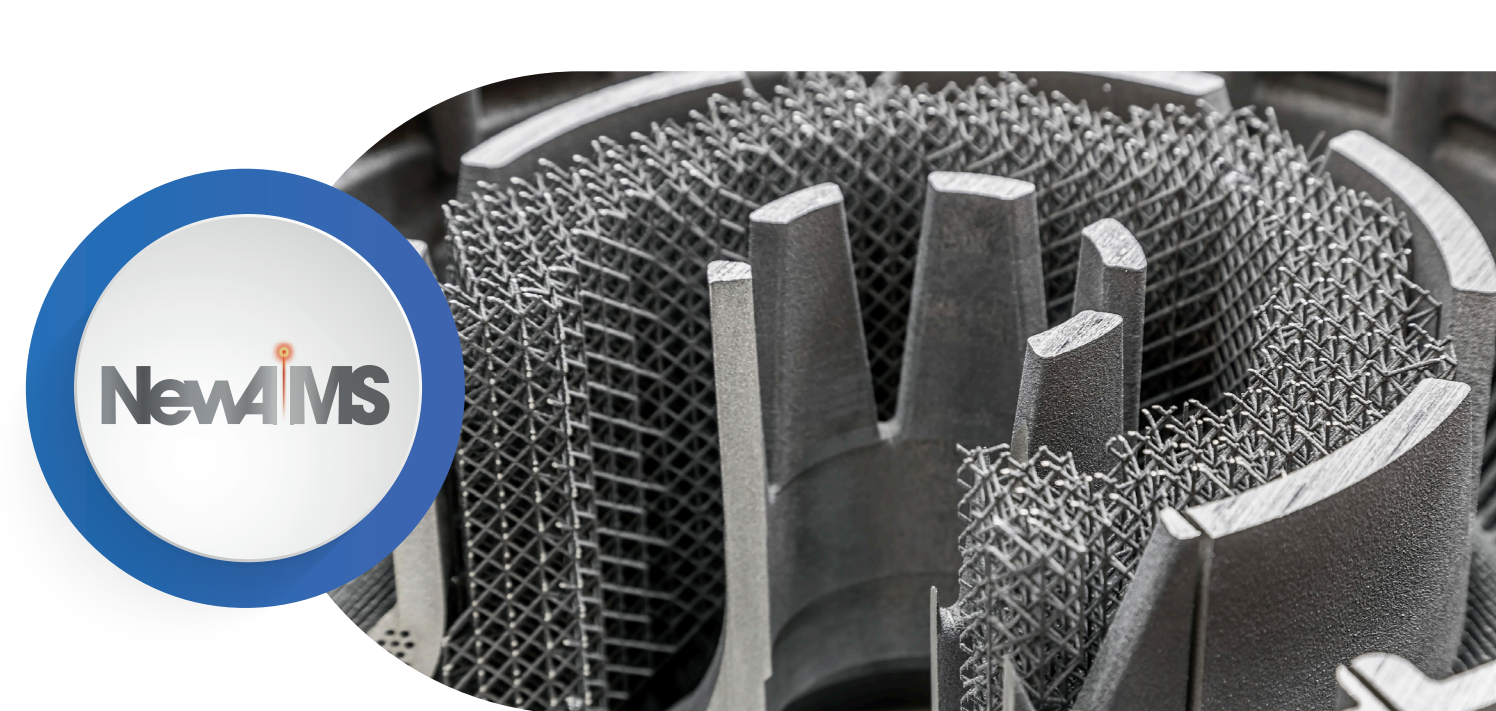
FormPlanet Test Bed

Your innovation partner to increase productivity, improve product quality, optimise processes and cut time to market of your next sheet metal products

FormPlanet Test Bed aims to empower the sheet metal forming industry by boosting a wide usage of high-strength sheet materials for high-added value products in different applications.

FormPlanet Test Bed addresses difficulties to assess sheet formability, non-expected part performance, and production losses due to cracks and inaccurate quality assessment with integral advanced metal characterisation and modelling testing services.

Quality of pieces with a high added increases, thus reducing production costs by up to 20% and the time it takes to introduce these products on the market by 25%.



NewAIMS

Conceptualization, study and demonstration of strategies to obtain cost-effective high-performance steel in metal 3D printing processes

Additive Manufacturing (AM), and 3D Printing in particular, offer attractive possibilities for design optimization and production of limited series of components. These aspects fit perfectly some industrial and economical sectors: a clear match is that of hot forming tools. Tooling for hot stamping, die casting, plastic injection moulding benefit enormously from free-form refrigeration channels, that cannot currently be obtained by conventional (subtractive) manufacturing.

The main objective of **NewAIMS** is to research, study and demonstrate strategies to obtain cost-effective high-performance steel in AM processes, through concepts of modified AM with integrated heat treatments.



Success cases

ALIMENTE21

Boosting the food industry towards a more intelligent, predictive, prescriptive management model with a lower environmental impact.

The **ALIMENTE21** project aims to **increase the availability and efficiency of resources, both industrial and raw materials, of the food industry, as well as its production processes**. This boost is applied to the multiple links of the value chain, while guaranteeing the safety and quality of procedures.

The mission of **ALIMENTE21** is to research and develop cutting-edge solutions based on artificial intelligence, big data, edge computing and digital twin, with the aim of advancing the food industrial organization towards a 21st century management model.

Eurecat participates in the project through its Applied Artificial Intelligence, Waste, Energy and Environmental Impact and Water, Air and Soil Units.

In addition to Eurecat, the consortium of **ALIMENTE21** is made up of companies (Codorniu, Aldelis, Prolongo, Mapex, Omron Iberia, Cibernos and Agropixel), public research organisations (University of Lleida, Polytechnic University of Catalonia and University of Alcalá) and other technology centers (Gradient and Ainia).



Development of a vineyard innovative tool based on the integration of Earth Observation services and in-field sensors.

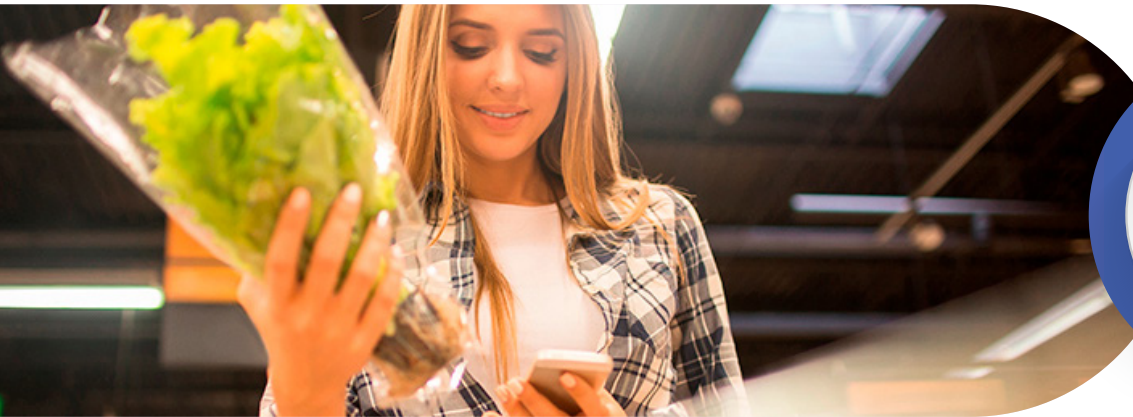
The **VitiGEOSS** project, coordinated by Eurecat, integrates and improves existing solutions **coupling satellite imagery with in-field sensors with the aim to increase resolution and reliability of satellite information applied to viticulture**.

Currently, the European Union is the world biggest wine producer, being winemaking the main economic activity of many regions in Southern Europe. Therefore, the wine sector invests heavily in state-of-the-art technology in order to develop innovative solutions and technologies to achieve the most maintain the quality and sustainability requirements.

The innovation promoted by the project aims to respond to future challenges of the worldwide food and wine industry, which requires to **intensify the production in a sustainable way, mitigating the effects of climate change, reducing negative environmental externalities and promoting local economic growth**.

The Applied Artificial Intelligence Unit of Eurecat is in charge of the application of artificial intelligence techniques for the analysis and integration of multiple data sources allowing to develop novel disease management and resource optimization services, obtaining improvements on productivity and sustainability in winegrowers exploitations.

The consortium of the **VitiGEOSS** project is formed by 9 partners from Spain, Italy, Portugal and The Netherlands.



Innovative neuroscience and Artificial Intelligence technologies applied to the design of new food products.

The **CIEN CONOCE** project applies **disruptive technologies** in the field of neuroscience and Artificial Intelligence, with the aim of deepening the consumer's knowledge and perception of multisensory stimuli, **developing innovative food products adapted to their needs and preferences.**

The solution promoted by the project allows to better understand the consumer, their needs and their responses to a new product in different consumption contexts and, on the other hand, to analyse how these responses can be parameterised to include them systematically in a new comprehensive methodology of product conceptualisation and innovation within the company.

CIEN CONOCE counts with the participation of Eurecat through the Big Data & Data Science Unit, the Applied Artificial Intelligence Unit and the Audiovisual Technologies Unit. More specifically, the role of Eurecat is **based on the application to the design and production process of the latest innovations in neuroscience techniques that allow obtaining measurements of behavioural and physiological responses** (eye tracking, peripheral physiology, electroencephalogram, etc.).

On the other hand, Eurecat also has the objective to address **the improvement in the efficiency of food processing and investigates the use of technologies based on Artificial Intelligence**, to provide new tools that allow flexible production, so that the creation and adaptation of new products are more agile and less expensive, allowing you to respond quickly to market demand.

CIEN CONOCE consortium is led by **Angulas Aguinaga** and has the participation of **Carinsa, Aldelís, Codorníu, Cerealto Siro Foods, Loop and Seidor.**



Development and implementation of digital and circular water use innovations to promote a sustainable use of water and advancing sustainability process of industries.

The AquaSPICE project aims at materialising circular water use in the European Process Industries, fostering awareness in resource-efficiency and delivering compact solutions for industrial applications, including water treatment and reuse technologies, as well as closed-loop recycling practices. The project is also developing a cyber-physical-system controller which includes a system for real-time monitoring, assessment and optimisation of water use and reuse at different interconnected levels.

The project follows a systemic approach in water management where optimal efficiency can be achieved through an adaptation of appropriate technologies and practices in different levels, from a single industrial process (unit operation), to an entire factory, to other collaborating industries (industrial symbiosis) or other sectors (domestic and/or agriculture).

The solutions promoted by the project enable and facilitate the immediate uptake, replication and up-scaling of the innovations, by providing comprehensive strategic, business and organisational plans which offer a range of well-defined solutions, suitable for various cases.

Eurecat participates in the project through its Applied Artificial Intelligence Unit which is responsible to define common data models and ontology to integrate the information, define baselines for current applied technologies and expected innovative processes for water saving and reuse, coordinate the elaboration of the real-time monitoring and control platform, and the data integration and support in AI driven tools.

On the other hand, the Water, Air and Soil Unit of Eurecat (WAS) participates in the implementation and demonstration of aerobic granular sludge for the treatment of complex and toxic wastewaters from the petrochemical industry. By this way, a suitable biological process can be implemented to treat properly the wastewater treatment from this industrial sector. The WAS Unit is also responsible of the implementation and demonstration of the application of regenerated membranes for the production of reclaimed water and achieve high water quality for in-situ application.

AquaSPICE project is formed by a consortium of 28 partners from 12 European countries and 1 associated country (Turkey).

An extensive range of Technology Solutions to face future Industry Challenges.

Operation optimization

- Control and optimization of processes.
- Cost reduction by detecting inefficiencies in processes/systems
- Flexible and productive environments
- Human-machine interaction technologies
- Autonomous mobile robotics



Success story

Industrial and collaborative mobile handler
Multinational from the automotive industry
Food industry (Codorníu)
Capital goods industry (Hohner)

Predictive maintenance

- Diagnosis of machinery breakdown and useful life prediction
- Route optimization
- Augmented reality

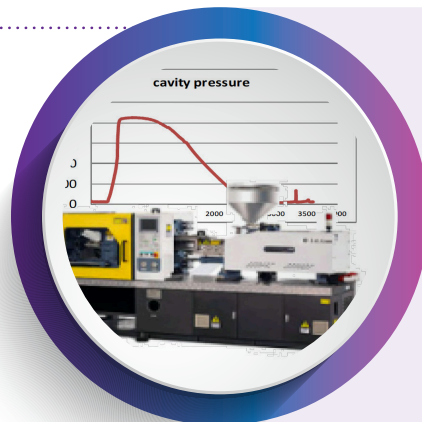


Success story

AR and VR to assist operators. Algorithms to calculate optimum routes and indoor positioning for guidance.
Manufacturer of metalworking transformation equipment

Near-zero-defects

- Artificial Intelligence applied to defective parts
- Expert Systems
- Self-adjustment of machine parameters to achieve total quality
- Artificial vision systems
- Acquisition of production data and data analytics for product traceability



Success story

Development of a Cyber Physical System to monitor, control and optimize the process.
Tier 1 plastic components

Worker of the future

- Work Force Management
- Health monitoring
- Operator positioning systems
- Staff training



Success story

AR and VR for learning. Simulation and assessment of incidents in industrial environments.
Content management and assessment test.
German multinational in the personal care industry

Smart resource management

Smart modules and data analysis for:

- Multi-objective optimization (water, electricity, cold, heat, etc.)
- Incorporation of external data
- Detection and reduction of inefficiencies
- Mismanagement detection



Success story

Smart energy management system based on the supervision, diagnosis and prognosis of consumption.
Multinational from the automotive industry

Smart products

- 'Always on' sensorized products
- Real-time data for decision-making
- Product traceability



Success story

Development of an encoder equipped with a USB communications port and a new SW embedded with a control panel to enable the component to be controlled and reconfigured in real time.
Encoder manufacturer

An extensive range of Technology Solutions to face future Industry Challenges.

Success cases



Creation of technological tools for the analysis and prevention of risks in water supply infrastructures to counteract cyberattacks and natural risks.

Among the technologies used and/or developed by the project is the combination and integration of market technologies such as citizen alert systems and intelligent blockers. The project will also include more innovative technology, such as blockchain schemes to protect sensitive data and water contamination detection algorithms.

www.stop-it-project.eu



The Plooto project offers a circular and resilient information system (CRIS) to help manufacturers in their ecological, digital and circular transition.

The system developed by Plooto enables waste reduction and end-to-end traceability of secondary raw materials through interconnected digital services for real-time decision-making, material and product tracking and certification.

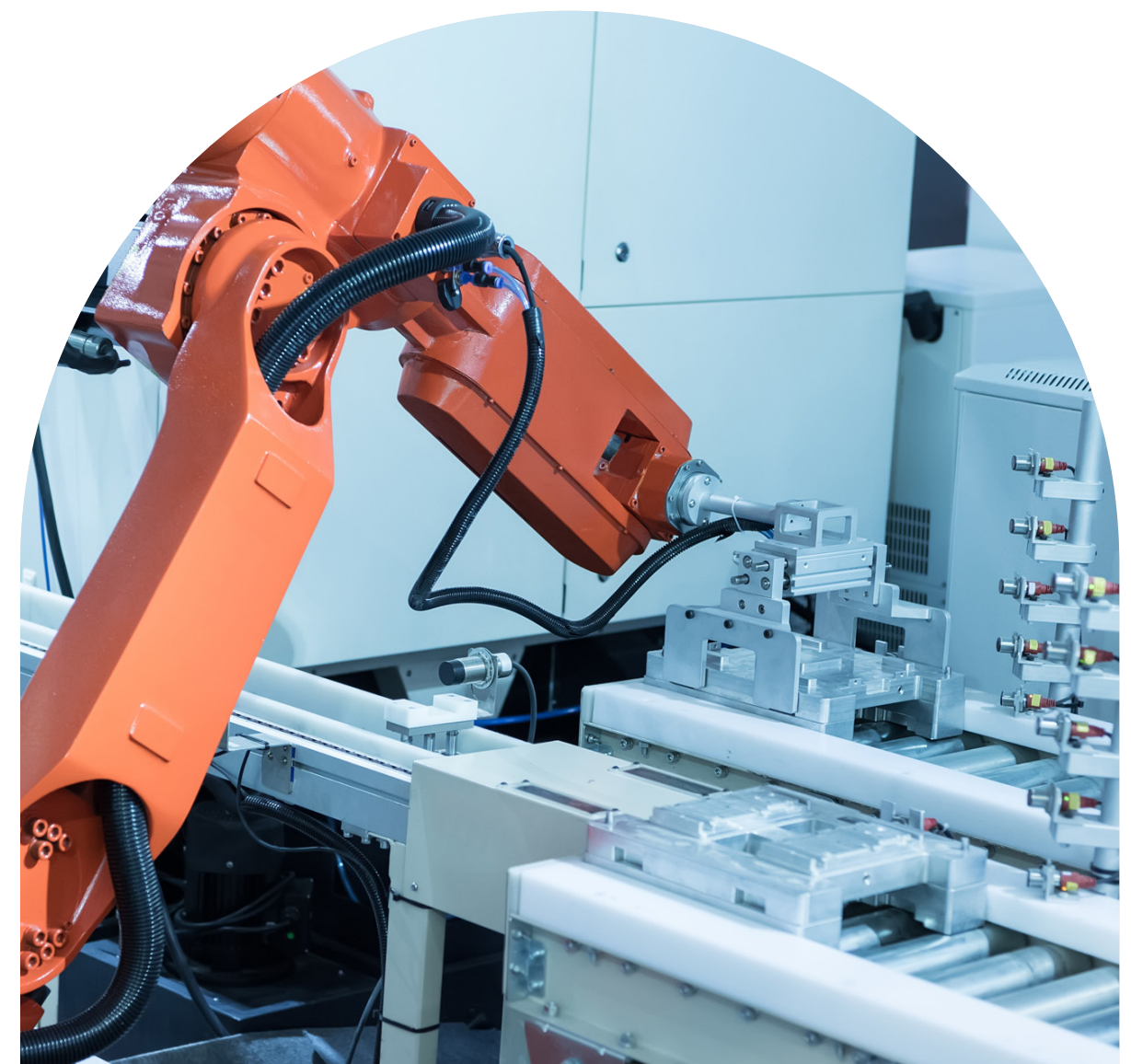
This solution is demonstrated in three pilot projects for the recycling of organic waste, composites and permanent magnets from waste electrical and electronic equipment (WEEE).

WEEE recycling is crucial due to the rise of the electric car and the development of new green technologies, as well as the need to access rare-earth elements for the manufacture of new magnets.

www.plooto-project.eu



ROADMAP 4.0 to guide and accelerate the digital transformation process based on the identification and prioritization of projects.



Masats

Masats innovates with Eurecat in Predictive Maintenance applications based on Artificial Intelligence and advanced data analytics.

The Artificial Intelligence models and solutions that allow identifying anomalous behaviors of onboard access systems, such as doors and ramps that could lead to malfunctions and thus anticipate maintenance tasks to maximize systems availability KPIs.

The AI-based Predictive Maintenance System monitors many parameters (such as motor electrical consumption, pushbuttons, status variables, etc.) in each opening and closing operation of the access systems. With anomaly and novelty detection ML models, abnormal operation conditions are rapidly identified to inform the expert users for possible equipment inspection and preventive maintenance action. The system collects data during the day from all the doors and ramps of the bus fleet and issues a daily report indicating whether any anomalies have been detected in the operation of any of the access systems of the entire fleet, focusing the attention of the expert user on those candidate vehicles to be inspected. The continuous updating of the models is guaranteed thanks to automatic periodic model training.



EMBOT-ITs
Artificial intelligence
applied to industrial
management

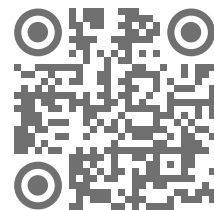
EMBOT-ITs

Eurecat worked together with Splendid Foods on the EMBOT-ITs project.

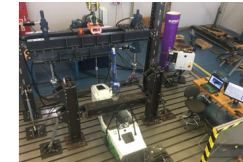
Through the application of sensors, advanced data analytics and the creation of an intelligent decision support system, the company managed to reduce drying time of products, increase dryers' capacity up to 20% and consequently increase productivity while maintaining the quality of final product. EMBOT-ITs project joins company's initiatives for continuous improvement on its way to Industry 4.0 to foster its competitiveness. The EMBOT-ITs project was funded by the Ministry of Climate Action, Food and Rural Agenda of the Government of Catalonia and the European Regional Development Fund.

eurecat labs

We count with
more than
20 specialised
laboratories
and pilot plants



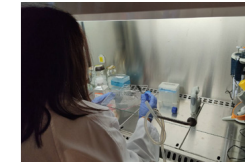
More than 20 laboratories and pilot plants
at the service of companies to find technological
solutions to complex industrial or innovation challenges



**Industrial
Laboratory**



Plastronics Pilot Plant



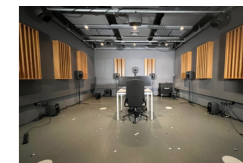
**Nutrition and Food
Technology**



**Biotechnology
and Omic Sciences
Laboratory**



**Perception
and Cognition
Laboratory**



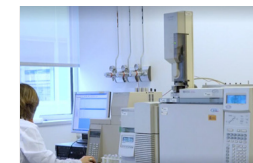
**3D Audio
Laboratory**



**Battery Technology
Laboratory**



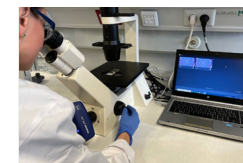
**Energy Technology
Laboratory
(electrical and
thermal)**



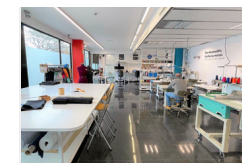
**Environmental
Technology and
Analysis
Laboratory**



**Polymeric Materials
Analysis and
Characterisation
Laboratory**



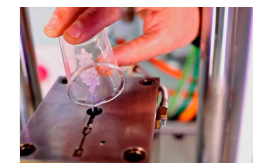
**Chemical
Technologies
Laboratory**



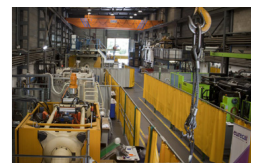
**Fab Lab – Reimagine
Textile
Laboratory**



**Textile Materials
Laboratory**



**Ultrasound
Laboratory**



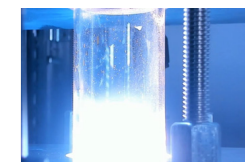
**Injection
Laboratory**



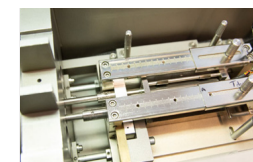
**Optics and Photonics
Laboratory**



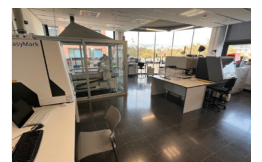
**Sustainable
Construction
Laboratory**



**Microwave
and Plasma
Laboratory**



**Metallic and Ceramic
Materials
Laboratory**



**Smart Objects
Laboratory**



**Smart Materials
& Devices and
Up-Scaling
Laboratory**

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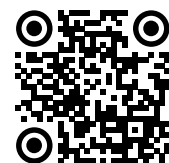


Metal Digital Manufacturing

Joint Research Unit powered by



Joint Research Unit (JRU) of Metal Digital Manufacturing



- The Metal Digital Manufacturing (JRU) is a Joint Research Unit driven by Royal Melbourne Institute of Technology (RMIT) Europe and Eurecat.
- It brings together the knowledge, facilities and experience of RMIT's Advanced Manufacturing and Additive Manufacturing Centers, together with the Center of Excellence in Advanced Manufacturing of Eurecat.
- The unit covers the entire value chain, from advanced design and fabrication of metal components to the development of alloys and new materials that allow innovative design solutions to be customized throughout the value chain of metal digital manufacturing.



Technology Consultancy

Eurecat's Technology Consultancy provides a wide range of comprehensive services equipped with state-of-the-art innovation tools.

We support companies all along the value chain, ensuring success in production and unlocking disruptive change for enterprises in various industries.



Technology watch and transformation plans



Market research and information systems



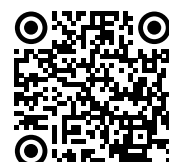
Knowledge, strategy and driving innovation



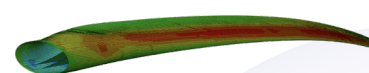
Conceptualising and implementing innovation projects



Joint collaboration space between Eurecat and University of Girona



- Additive manufacturing technologies
- Development of new materials
- Mechanical, thermomechanical tests and parts characterization
- Inspection and metrology
- Simulation
- Optimization of process parameters
- Development of technology and new printers
- Implementation of 3DP technology – Roadmap
- DfAM – Design for additive manufacturing



Research in

Industrial spare parts solutions
Projects: national and international
Knowledge generation
...



Training

Additional manufacturing
Technology development
Reverse engineering
...



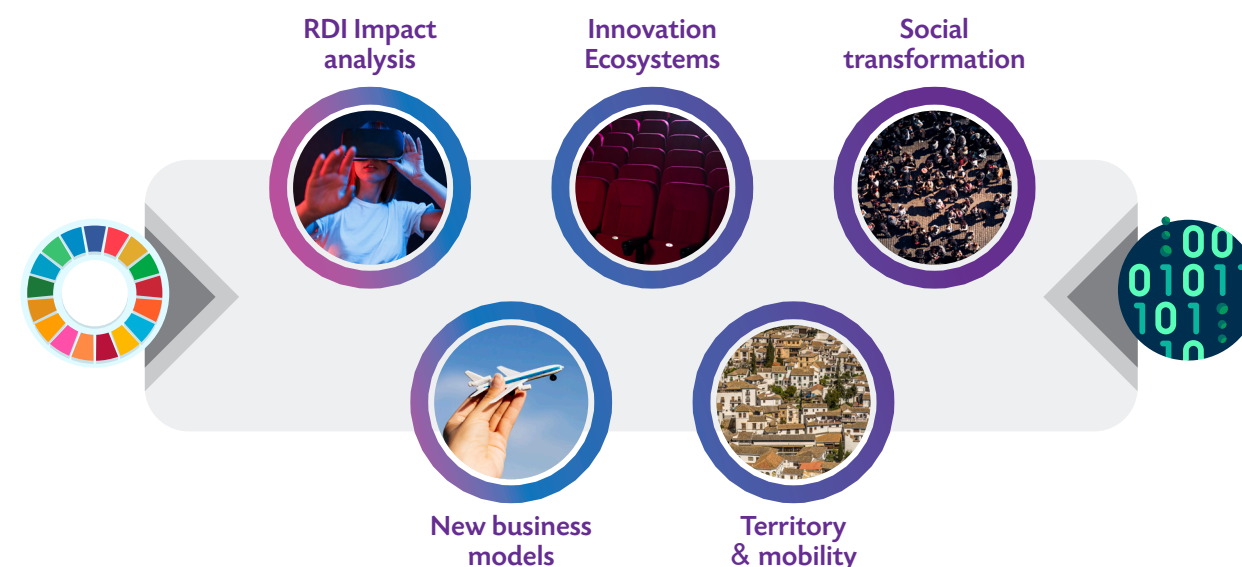
Transference

From research to industry
Technological innovation projects
Technological consultancy
...



Services

Manufacturing optimisation
Characterisation
Development of new materials

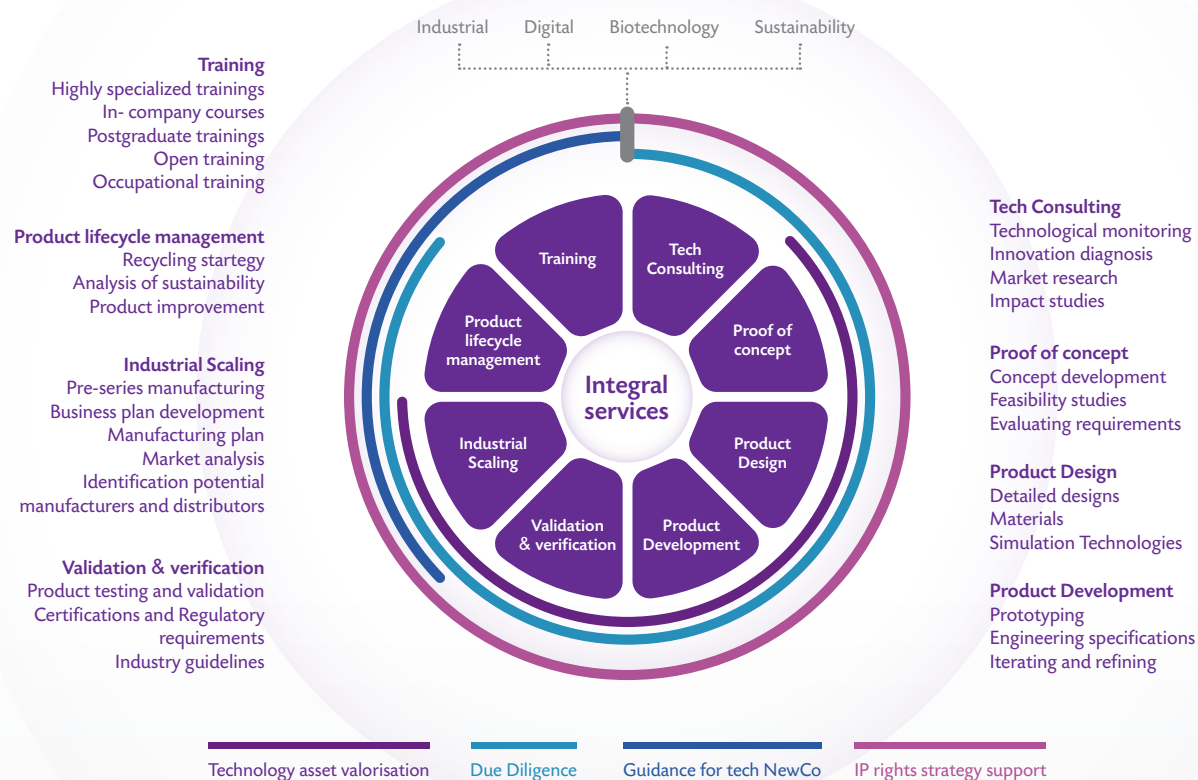


eurecat

Empowering the Startups Ecosystem
with Innovative Technology.

Bridge with us the gap between research
and commercialization.

Eurecat supports the creation of New Technology Based Companies (NEBTs),
based on the technologies developed by the Centre itself, i cooperation with
other companies or in activities involving technology transfer.



Latest spin-offs created by Eurecat



Production method for circular knitting machines based on a predictive quality control system that detects typical manufacturing defects and notifies them in a non-intrusive way, avoiding production shutdowns.



Digital health company revolutionizing the monitoring of chronic patients



Support device for medical emergencies in cardiopulmonary resuscitation protocols – CPR



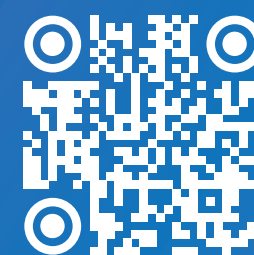
Data platform for the detection, management and reduction of odour episodes generated by industrial activities close to population centres.



New post-process for reinforcing 3D printed parts using continuous carbon fibers.



eurecat academy



Offers specialised technical
training in the field of Industry
4.0, key for professionals
and organisations to grow up.



Differential offer

Together with companies, we create and/or improve products, services and processes, from coming up with an idea to industrializing it.

Applied research and technological development

- R&D&I units set up with the company
- R&D projects
- Minimum viable product

Advanced technology services

- Science and technology diagnostics
- Audits
- Trials and analyses
- Concept testing
- Certifications

Technology Consultancy

- Innovation strategy and management
- Technological monitoring
- Trend analysis and viability studies
- Project management and financing

Specialized training

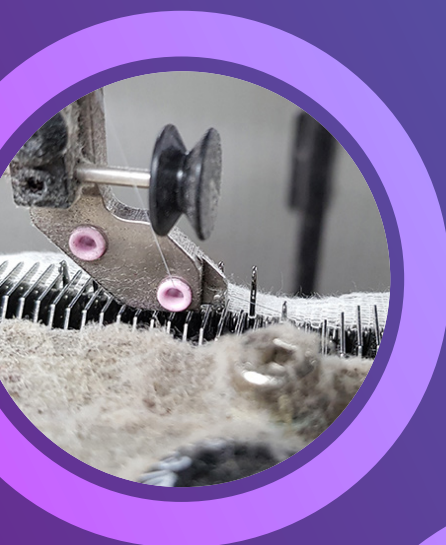
- Masters and postgraduate courses
- Customized corporate training
- Ongoing training
- Job training

Value building

- Protection and transfer of industrial and intellectual property
- Evaluation and support in building value from technological assets
- Advice and participation in the creation of technology based companies
- Due diligence of technological assets

Dissemination of knowledge

- Promotion actions
- Dissemination and transfer of knowledge actions



Contact us!

Eva Fité

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