

Sustainability Report 2021

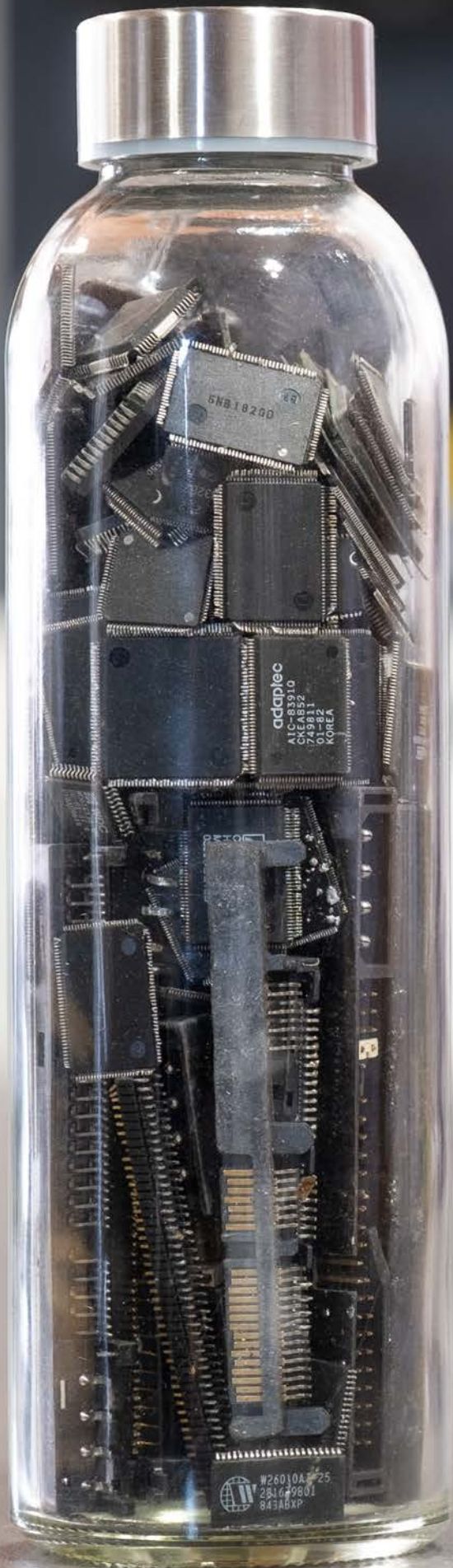


For information on the sustainability of OSAI A.S. S.p.A. and the contents of the Report write to: sostenibilit @osai-as.it
+39 0125.66.83.11

CHAPTER 2

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2.0 RESEARCH AND DEVELOPMENT

Research and development activities in OSAI constitute an important line of business for the Company.

Constant efforts in the area of innovation enable the Company not only to meet the demands and needs of customers with ever-higher standards, but also to collaborate with established international entities through participation in European projects funded by the **Horizon 2020** program.

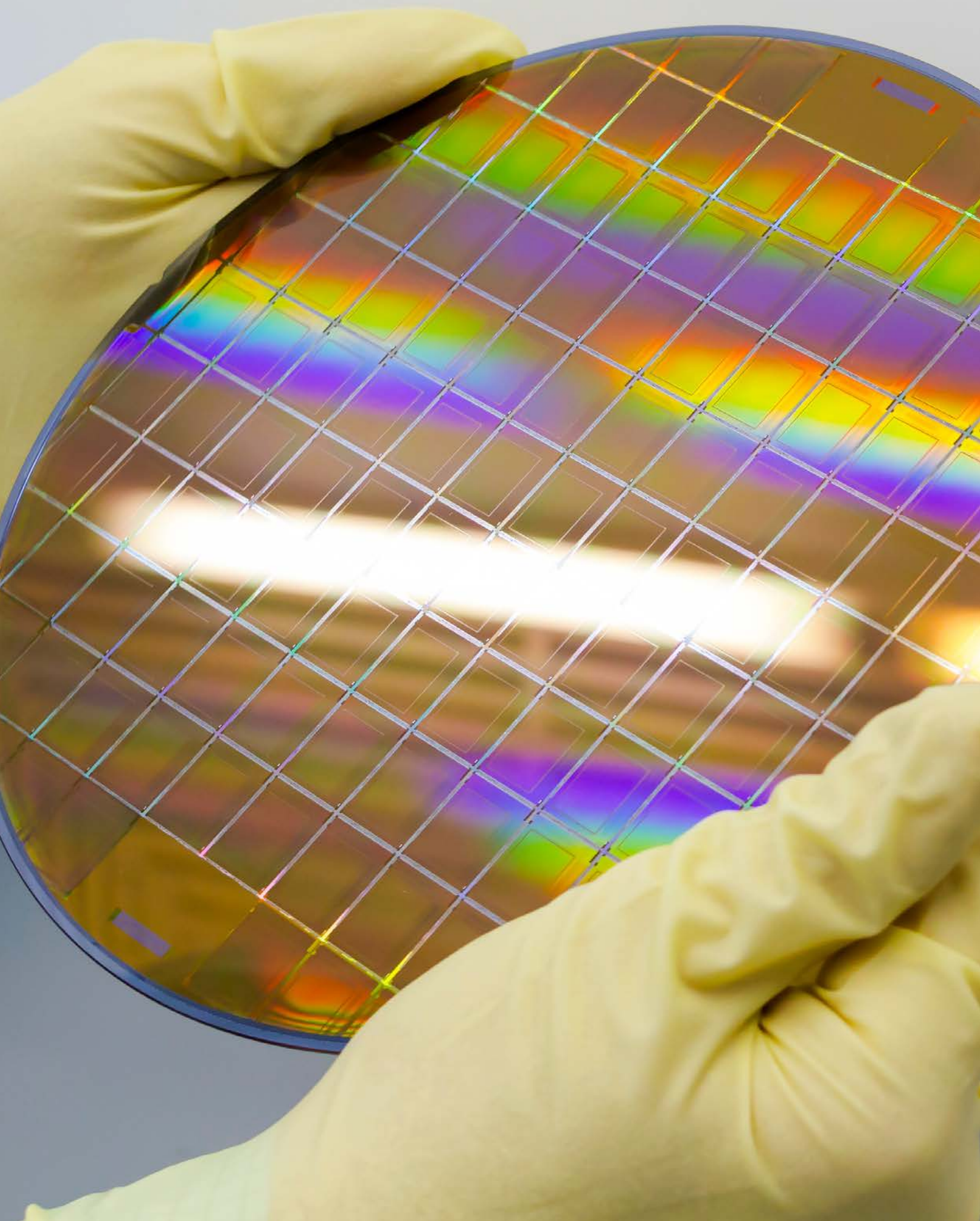
R&D activities occupy a dedicated team of people who also work and collaborate **with specialists from all over Europe**.

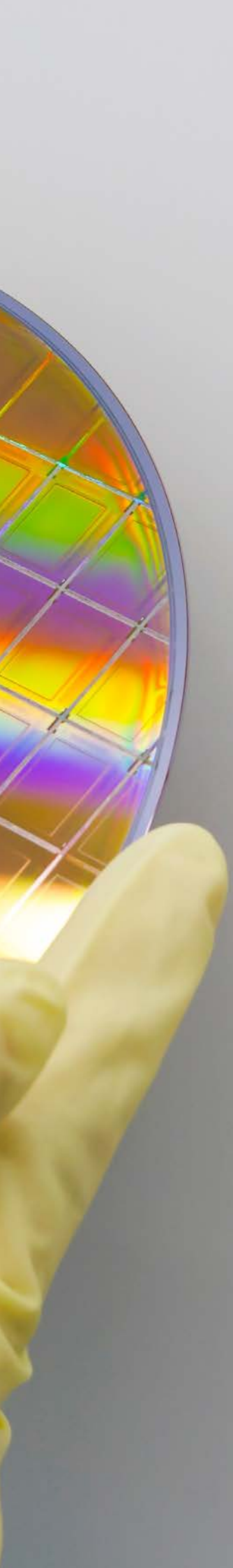
The results of projects and innovations learned within challenging areas, such as those of international collaboration, contribute greatly to OSAI's internal business development.

The total investment in research and development in FY2021 amounted to 2.54 million euros, of which 2.4 million euros were recorded in the Parent Company's fixed assets, while the remainder was expensed during the year.

The investments involved 10 projects with application in different areas of interest to the Company including: e-mobility, circular economy, and the addition process for Silicon Carbide.

Left:
Research and Development Laboratory





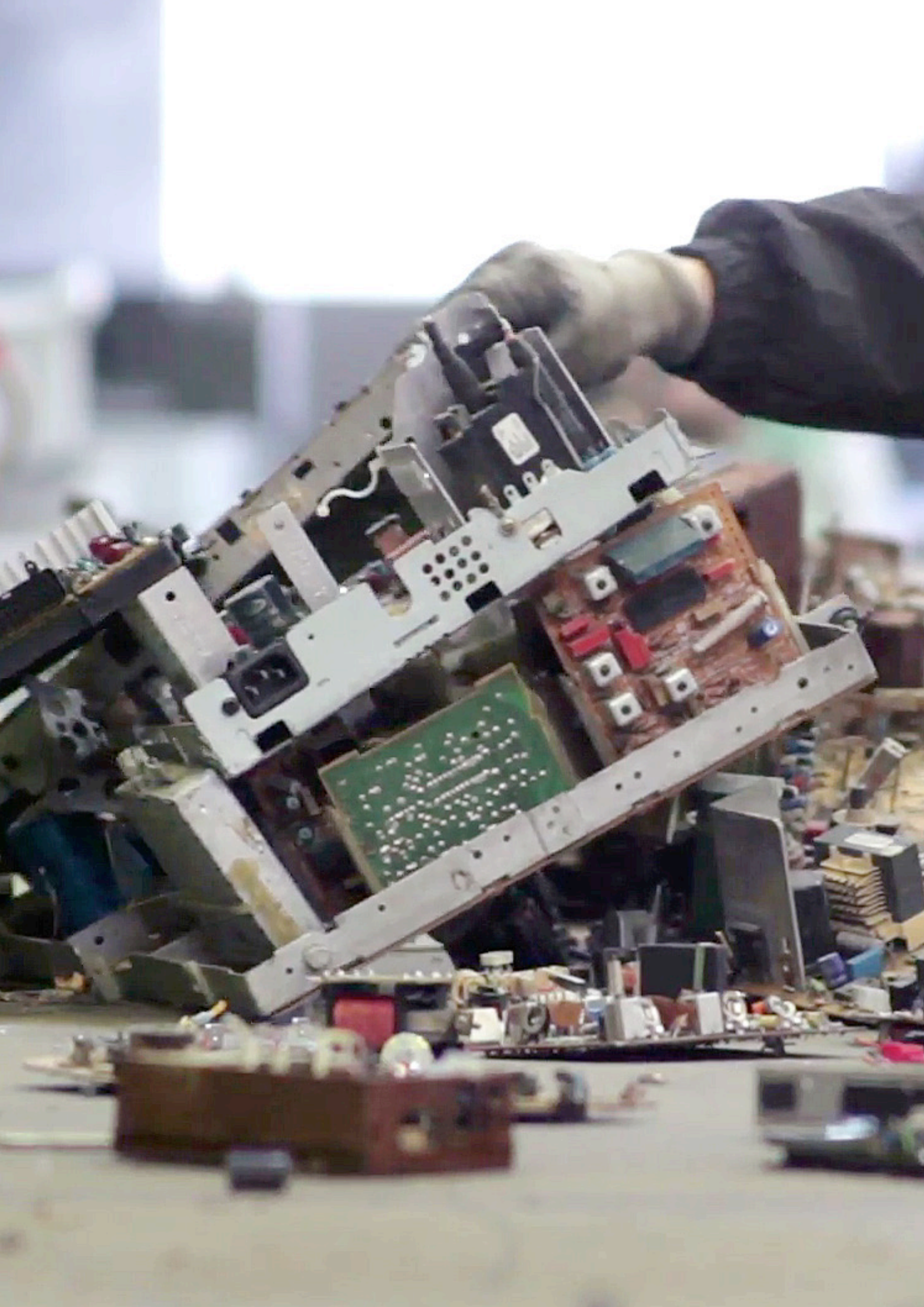
OSAI AUTOMATION

IN THE PRODUCTION PROCESS OF SILICON CARBIDE

Silicon Carbide is the new frontier in energy management needed for e-mobility applications. SiC, as it is also called, is the semiconductor material that all electric vehicle manufacturers are looking at with interest both because of its excellent performance characteristics, which can significantly improve the efficiency of electric vehicles, making batteries more compact and improving driving ranges through less energy expenditure, but also because of the possibility of starting Western production chains and independent of Asian markets, thus preventing shortages such as the one we are currently witnessing.

In this innovative and ever-evolving context, OSAI has positioned itself as a key player, delivering in September 2021, **the first automated system intended for the production process of Silicon Carbide (SiC) crystals**. A special feature of the machine is its ability to handle wafer-thin slices or substrates of semiconductor material-up to 200 mm in diameter. This is an excellent result not only because of the importance of the customer, one of the top players in the global semiconductor market, but also because of the technological and innovative content of the system produced, which, developed in co-development with the end customer, made it possible to go beyond the state of the art in the current production process, which did not allow for the size of a 150 mm diameter.

Indeed, the transition to handling wafer sizes up to 200 mm enables a key milestone in increasing production capacity, and thanks to the precision, accuracy and high-volume handling capabilities provided by the system, the significant increase in production volumes, an important contribution to accelerating the transition to e-mobility.



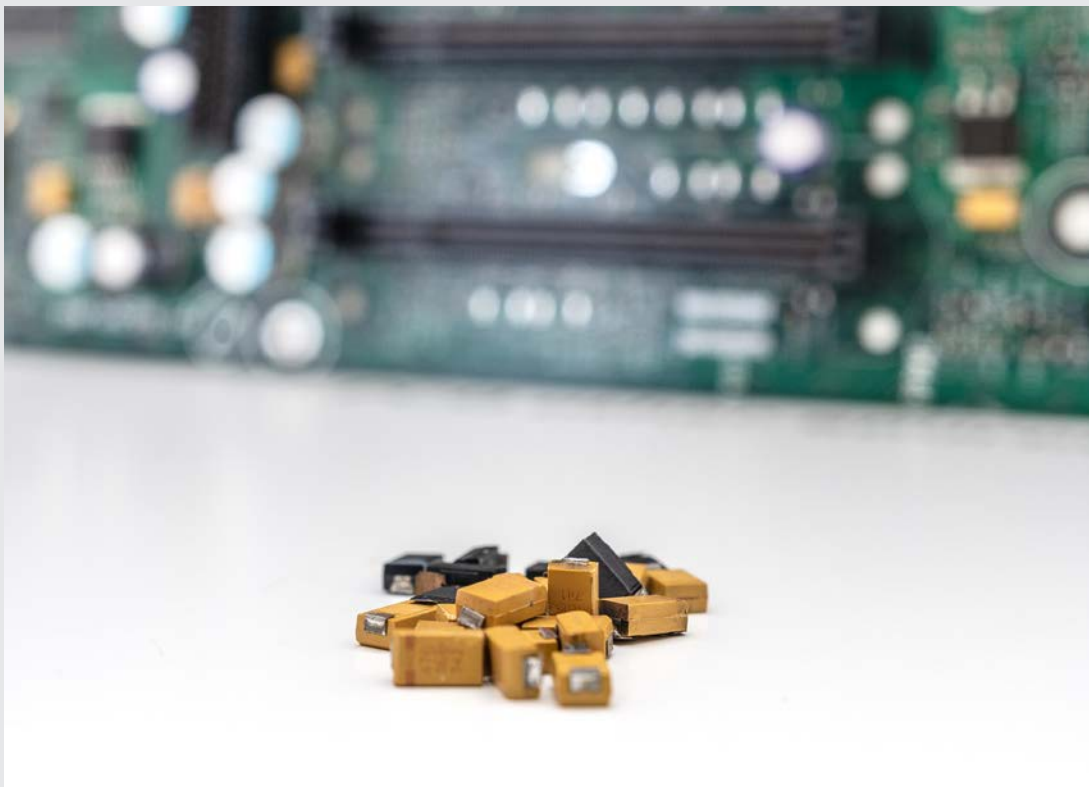
RE4M PROJECT: URBAN MINING ACCORDING TO OSAI

Efficient recycling of electronic waste (WEEE) is increasingly a global priority goal. In addition to the environmental impact generated by e-waste, which is estimated at 57 million tons in 2021 alone (source RSC - Royal Society of Chemistry), its treatment becomes as necessary and indispensable as ever in order to find an alternative to extracting precious metals from the ground, a process known to be unsustainable.

Urban mining, or the enhancement of urban mining through the extraction of precious, rare and critical metals contained in disused electronic devices represents a necessary and inevitable revolution to ensure continued technological evolution with a sustainable approach.

In October 2021, OSAI participated as an exhibitor at the ECOMONDO fair in Rimini, Europe's leading event for ecological transition and the circular and regenerative economy. The Company showed the recycling industry its concrete interpretation to urban mining through the presentation of the "Re4M" Project, the system designed for the automated recycling of electronic waste (WEEE) and transformation into new raw material.

The Project, on which 5 million euros are being invested, will see the light of day with the first prototype in 2023 and subsequent commercialization by the end of 2025.







2.1 INNOVATION MANAGEMENT BECOMES A SYSTEM

R&D and Innovation are indicated by Osai's stakeholders as material issues of utmost importance.

Osai understands that innovation comes from creating value through something new, be it a technology that becomes a product, a service, a business model or an organization. The added value provided by innovation can manifest itself in different forms with an impact not only economic, but also social or environmental.

For this reason, the concepts of "innovation" and "innovation management" must be primary goals for the company, as well as the will to implement them efficiently, in order to change the paradigm according to which innovation is made up of extemporaneous activities that are not linked with the organization.

To follow up on these intentions, Osai decided to take virtuous inspiration from the **ISO 56000** Standard, which provides guidance for the establishment, implementation, maintenance and continuous improvement of an **Innovation Management** System, believing that an innovation management system helps the Company capture the best ideas, improve itself and maintain its competitive advantage in the marketplace.

Left:
New Innovation and Development Area, 2021



migliore è quella
ancora essere costruita

THE INNOVATION & DEVELOPMENT COMMITTEE

In order to promote innovation and ensure transparency and traceability in activities carried out in product and process innovation and development, OSAI has established the Innovation & Development Committee (CI&S).

The Innovation and Development Committee, has the task of proposing to the Board of Directors, following appropriate analysis and evaluation, the initiatives deemed worthy and priority to ensure the **continuous technological and innovative development of the Company**.

The Committee - which is managerial in nature - performs advisory, investigative and propositional functions in support of the Board of Directors' decisions pertaining to research, development and innovation activities. In particular, the Committee is a promoter of collecting and managing ideas so that they can become the subject of investment by the Company and thus create new opportunities.

PROMOTION AND MANAGEMENT OF RE-SEARCH, INNOVATION AND DEVELOPMENT

"Idea management" is understood as the systematic management of the process of collecting and evaluating ideas and insights in order to obtain maximum benefit from them.

Innovation management refers to the systematic management of the introduction of something new to the organization generated by an idea, insight, field experience, market feedback, or analysis of the market and currently available technologies. Product improvement is managed by the Department of Innovation and Development as long as it is tested and validated at the prototype level.

Once the idea for improvement is validated, it materializes into a prototype released for pro-

duction. Constant maintenance and updating of OSAI Systems is among the Innovation and Development activities, with dedicated orders called **Product Maintenance**. These orders, or projects, are aimed at upgrading the performance of the Systems based on needs identified indirectly from the market, or directly from reports from OSAI's technical staff and Customers.

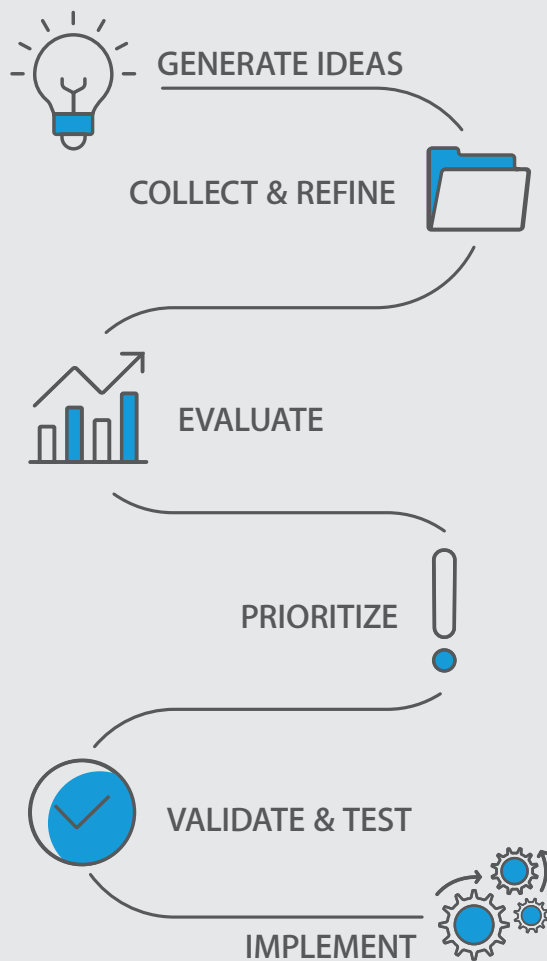
Of the complex of innovation management activities just described, that of idea promotion and management is one of the activities involving the Innovation and Development Committee. The following image graphically represents the flow defined for idea management. The last two steps shown in the diagram, validation and application of the idea, are up to the Board of Directors, which also defines the investments required for introduction into the System.

The following image graphically represents the flow defined for idea management. The last two steps shown in the diagram, validation and application of the idea, are up to the Board of Directors, which also defines the investments required for introduction into the System.

The goal of the committee is to encourage and collect, through specific actions and dedicated campaigns, proposals and ideas in various areas of interest such as:

- Implementations on existing products (product improvement or maintenance);
- New products, processes or services (increase in products' portfolio);
- Membership and participation in European/ funded projects;
- feasibility studies, market analysis, and research for new product or process applications.

The idea management process is currently present in its prototype form. The advancement



of activities related to the Department of Innovation and Development will outline and refine methodologies for collecting ideas and managing feedback.

The company has also identified four distinct areas on which to work to further extend the scope of innovation in the company: strategy, processes, tools/methods and organizational culture.

Proposals or ideas may come from internal streams, i.e., from individuals within the various business functions, or from indications from the market (customers, end users, retailers, etc.) and collected by the functions that deal with them.

It is of fundamental interest to OSAI that this process of continuous idea management enables the Company to achieve its strategic goals, among which are:

- Customer satisfaction;
- The search for new business opportunities,
- The increase of the company's portfolio;
- The opening of new product sectors deemed strategic (e.g., Circular Economy).

With this in mind, the strategic task of the Committee is to catalyze and evaluate the indications provided by the various stakeholders, defining which are strategically of interest and priority with reference to the areas of intervention defined by the Company.

The Committee has defined a method for evaluating the ideas received and scoring them to quantify their relevance, relation to business strategies, and expected impact on the Company. The idea evaluation tool has as its output a ranking list of projects or ideas to be submitted to the Board of Directors for approval.

Each project is described by filling in 4 defined fields: "CONCEPT", "OBJECTIVES", "WORKPLAN" and "DELIVERABLE." The development of these sections allows us to frame the idea, define what the objectives are, organize the work aimed at obtaining the project, which is basically the expected output.

In 2021, the first year of activation of the process, the collection of information, the study aimed at defining indicators, and the analysis of existing processes were the basic premises and requirements for setting up an iterative process of improvement for the following years.

In some cases, open projects have resulted in new business opportunities, in others the solutions developed have made it possible to work with existing customers on new projects, and in still other cases, the accumulated experience has helped fuel the know-how needed to create new products.

PARTICIPATION IN EUROPEAN PROJECTS

4CUSTHER

Project: 4CUSTHER

Title: Custom heat-conductive coating composites.

MANUELA

Project: MANUELA

Title: Pilot Line for Metal Additive Manufacturing.

DEFLeCT

Project: DEFLeCT

Title: Digital Technology for the Treatment of Lung Cancer.

APRIL

Project: APRIL

Title: Multi-function robotics for handling deformable materials in manufacturing processes.

VOJEXT

Project: VOJEXT

Title: Value of joint experimentation in digital technologies for manufacturing and construction.

MANUELA

Project MANUELA

Pilot Line for Metal Additive Manufacturing.

The metal 3D printing technique - **Metal Additive Manufacturing (AM)** enables, through the implementation of a design conceived for this type of manufacturing technique, the production of high value-added components with advanced features that are difficult to achieve with conventional technologies or processes.

However, the AM-based production sequence involves a high number of critical steps compared with conventional production sequences. Currently, key competencies related to these steps are not fully implemented at the industrial level. Based on two main AM technologies (LPBF: Laser Powder Bed Fusion and EBM: Electron Beam Melting), MANUELA aims to define a pilot line plant, which covers the entire production sequence, from the raw material, understood as metal powders, to the surface treatments related to the post-processing of manufactured goods. OSAI, during the project, implemented a system with Laser technology for post-processing of manufactured goods made with metal additive manufacturing techniques.



APRIL Project

Multi-function robotics for handling deformable materials in manufacturing processes.

The APRIL project aims to develop a low-cost, multifunctional industrial robot system that supports semiautomatic tasks in manufacturing production lines of different sizes or types that use flexible or deformable materials. APRIL will use computer vision technology, the collection and analysis of information from sensors, and the development of modular interfaces. APRIL will provide innovative sensors and augmented vision to support deviation detection, weight estimation, dynamic center of mass, or grip force adjustment while handling deformable objects



of different types (e.g., paper, food products, shoe insoles, viscoelastic fabric, cables, etc.).

VOJEXT

VOJEXT Project

Value of joint experimentation in digital technologies for manufacturing and construction.

The VOJEXT project aims to create a favorable economic and technological environment to enable matchmaking and support manufacturers and industries (mainly SMEs, including small artisans) of autonomous cognitive systems for human-robot interaction. A special focus in the project is on "cobots", dynamizing technology applications for the European market. To this end, VOJEXT will design, develop, validate, and demonstrate the usability of reliable, market-oriented, agile, multipurpose, and easily reused robotic systems. The developed solution is based on **autonomous, mobile and skillful robotic solutions** as the main component of an intelligent and scalable cognitive CPS for industrial applications. The goal is to provide a "Value Of Joint EXperimentation" (VOJEXT) of digital technologies in the manufacturing and construction industry; having various Digital Innovation Hubs (DHIs) as drivers of innovation-based economic development for the European territory.

DEFLeCT

DEFLeCT Project

Digital Technology for the Treatment of Lung Cancer.

The DEFLeCT project aims to realize an **innovative scientific-technological platform aimed at supporting the diagnosis and treatment of lung cancer**. Non-small cell lung carcinoma (NSCLC) was identified as a case-study because it is the most frequent histologic type and undergoes routine surgi-

cal resection when identified at an early stage. DEFLeCT will integrate established diagnostic practices for NSCLC with the most innovative genetic-molecular approaches, within a digital platform that can harmonize and enhance the content of all information from different sources, applying statistical and quantitative models. DEFLeCT will in this sense be an environment geared toward the medicine of the future, based on personalized treatments by enhancing and integrating various types of data and information. During the project, OSAI is involved in the Laser technology fabrication of Lab-On-Chip and microfluidic channels.

4CUSTHER

4CUSTHER Project

Custom heat-conductive coating composites.

The purpose of the project is to develop and test **new polymer composite materials with improved thermal conductivity**. The formulation of the new materials aims to meet thermal performance requirements of the semiconductor industry: conditioning and testing of **MEMS sensors**. The innovative material has the function of optimizing heat transfer between the conditioning system and MEMS sensors, and plays a crucial role in heat conduction. The project is focused on a coating for optimizing this interface. OSAI is a partner in the project in the role of industrial demonstrator, as it designs and manufactures machines for handling and testing MEMS sensors.

Left:
Depanelized PCB handling system, 2021

