Hack&Match Event #4

"Advanced Technologies for Manufacturing Industries"

CHALLENGES

Challenge #1 description:

Company: LOIRETECH (France)

Loiretech designs and manufactures all kind of tooling necessary for the manufacturing, assembly and inspection of large & complex composite or metallic parts. We can also take care of small series production of high performance composite parts. Our main customers belong to the aerospace, automotive, defense, energies & healthcare industries.

Loiretech group is located in the West of France, close to Nantes in the Jules VERNE Manufacturing Valley which combines the skills of aerospace structures manufacturers, composites materials suppliers, Science university and technical center especially focused on manufacturing technologies.

Challenge:

Loiretech designs and manufactures sets of tooling for composites, plastics & metallic parts for aerospace, automotive, re-newable energy, medical and defense industries. Tooling built by Loiretech targets large components. For 2 decades, Loiretech has been developing solutions to:
- optimize customers production,
- improve internal processes such as WAAM for Invar, Mineral 3D printing,
- reduce overall CO2 footprint: composites blades for propulsion.

Thanks to FARAMIR project Loiretech has been able to create a new material: Silaxy. To improve manufacturing efficiency, Loiretech is looking for an impregnation solution in a large tank (1 to 1,5 m3).

Loiretech has developed a new material, built from Mineral 3D printing + impregnation of epoxy resin. This material has good mechanical properties to replace tooling board and aluminium for trimming and assembling fixtures.

Thanks to 3D printing, the final components do not need any 3D milling to get its final shape and to integrate functions. Several impregnation solutions are currently used: brush impregnation, vacuum, infusion. These processes are giving adequate technical results but are not economically efficient. They don't allow a booming of this material.

Loiretech need is the following one: having a dipping tank of resin (around 1 to 1,5 m3) and dive the 3D printed component for 5 to 15 minutes to ensure impregnation. Resin in the tank has to remain un-

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polymerized for several weeks. But as soon as impregnated component is going out of the tank, resin has to cure quickly to avoid gravity effect on impregnation. Currently, resin is epoxy, but Loiretech is open to any other solution as long as the final dimension of the component can be anticipated.

Challenge #2 description:

Company: LOIRETECH (France)

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Loiretech group is located in the West of France, close to Nantes in the Jules VERNE Manufacturing Valley which combines the skills of aerospace structures manufacturers, composites materials suppliers, Science university and technical center especially focused on manufacturing technologies.

Challenge:

Loiretech engineers & manufactures tooling for composites, thermoplastic, metallic parts. Our customers belong to Aeronautics, Space, Automotive, Defense, Renewable Energy industries. Loiretech covers different industrialization steps: forming, preforming, stretching, layup, curing, trimming, assembly. The challenge deals with the infusion process for manufacturing composite parts such as skins of toolings (mould) made of composites materials (carbon fiber + resin).

Manufacturing composite parts by infusion relies on workers experience to monitor the infusion and adjust parameters. Loiretech would be pleased to include a supervision system to support workers during infusion operation by getting physical parameters and correct process parameters.

Loiretech is looking for a solution provider which would be able to create a tailor-made algorithm which would take into account all the infusion parameters and provide a plug-and-play supervision system. Data is provided by thermocouples, pressure sensors and temperature sensors.

Challenge #3 description:

Company: STROJCAR s.r.o. (Czech Republic)

The company deals with design and rapid prototyping, machining and production of precision metal parts and mechatronics.

We are developing a next-generation **Modular Micro Factory (MMF)** concept designed for high-mix, low-volume production with aerospace-grade precision and digital traceability. Our objective is to integrate:

- 5-axis CNC machining centers
- Advanced industrial robotics
- Autonomous material handling

- Full ERP / MES / AI connectivity

We are seeking a strategic technology partner to co-develop and deploy an **autonomous robotic manufacturing cell** capable of scalable replication.

Vision: Modular Micro Factory Concept (MMF) that is based on:

- Compact autonomous production modules (Plug & Produce)
- Flexible robotic loading/unloading
- Lights-out operation capability
- Digital twin architecture
- AI-assisted production optimization
- Energy-efficient operation
- Export-ready scalable & replicable model

Each module shall operate as: **Self-contained intelligent production cell with robotic integration, CNC machining, material handling, and digital data feedback loop.**

Challenge:

We are building a concept of a modular micro factory with advanced manufacturing technologies. We are looking for the solution of advanced robotics connected to 5-axis CNC machining and CNC turning.

We are looking for an integrated solution covering:

1. Robotic Integration Requirements

- Industrial robot or cobot
- Payload: 20–50 kg (expandable)
- Integrated vision system for part recognition
- Automatic gripper change system
- 5-axis machine tending
- Tool and material from pallet handling
- Safety collaborative zone capability (if possible)

2. CNC Integration

Target configuration:

- 1 × 5-axis machining center or
- 1 × CNC turning center
- Tool life monitoring
- Real-time machine data interface

3. Digital Layer

We expect integration with:

- ERP (currently TPV2000, future HELIOS)
- MES layer
- OEE monitoring
- AI-based production scheduling
- Digital twin simulation
- Predictive maintenance algorithms

Desired Outcome: We aim to co-develop:

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Phase 1 – Pilot Cell

- One integrated robotic-CNC production cell
- 24/7 autonomous operation capability
- Full digital traceability
- ROI target: < 36 months

Phase 2 – Scalable Micro Factory Model

- Standardized module blueprint
- Replicable cell architecture
- Export-ready "Factory-in-a-Box" concept

We are open to: Technology co-development partnership, Joint demonstration project and EU innovation funding participation.

Challenge #4 description:

Company: CERO (France)

CERO designs and manufactures tooling for industrial customers in varisous sectors such as automotive, railway transport, aeronautics, naval, medical, sanitary and heating, and agriculture. These toolings are intended for thermoplastic injection and for the manufacturing of composite material parts using various processes, including SMC, BMC, RTM, RIM, RRIM, etc.

The activities of CERO include: mold and tooling design, manufacture of molds and toolings, press testing, provision of prototype and pre-production parts, modification and maintenance of molds and toolings, and outsourcing services. CERO has expertise in bi-injection (transfer molding, rotational molding, and sleeve core molding) and in overmolding (metallic or composite inserts).

Challenge:

Automated Manufacturing and CAM Toolpath Generation

CERO aims to acquire a software tool capable of providing the necessary information to a machining software in order to automatically generate toolpaths for the manufacturing of these parts.

The objective is to support manufacturing operations by automating CAM-related tasks for machining and tooling production.

Such an application would be able to read a 3D file of any mechanical part, such as steel plates on which all 2D machining operations are performed, including drilling, slotting, tapping, chamfering, etc. (for example, base plates, ejector plates, drilling operations, etc., for toolings designed by CERO).

The initial scope is deliberately limited to simple geometries and well-identified machining features, in order to focus on robust and repeatable use cases.

The CAM software must be able to retrieve information from the AI-based tool in order to generate the toolpaths associated with the part to be machined.

The software tool is expected to propose appropriate machining strategies and automatically generate machining toolpaths, which are then transferred to the CAM system.

Challenge #5 description:

Company: CERO (France)

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Challenge:

Automated Tooling Design, CAD and Tooling Engineering

CERO is seeking a partner capable of supporting the development of a software solution for the automatic design of molds and toolings. The software tool would rely on examples of previously designed toolings in order to obtain the plastic or composite part to be manufactured, based on a 3D definition of the part, a tooling design specification, and the manufacturing process for which the tooling is intended (SMC, RTM, etc.).

The objective is to support tooling engineering activities by partially automating CAD design tasks while capitalizing on existing know-how and past designs.

The tooling considered within the scope of this software application remains relatively simple: molds for single-material injection, natural demolding, without moving components, as well as molds for SMC, RTM, and stamping technologies.

These molds use well-established technologies, incorporating blowing cylinders, compression chambers, prismatic centering, and molds without ejection systems. Depending on customer requirements, the molds must be custom-designed.

The tooling remains customer-specific, but within a controlled and standardized design framework.

The objective of the project is to enable the generation of a mold or tooling design based on instructions provided by an AI system.

The AI system is expected to propose tooling configurations and design options that are subsequently reviewed, validated, and adjusted by engineering experts, ensuring human control over final design decisions.

The design software must be able to retrieve information from the AI-based tool in order to generate 3D (and possibly 2D) drawings of the mold or tooling to be manufactured.

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Challenge #6 description:

Company: CONTINUUM INNOVATION Innovation GmbH (Germany)

Continuum Innovation is developing a scalable soft cobot platform with continuous mechanics that fundamentally changes the areas of application for robotic arms and interaction with them. The robotic arm, which moves like an elephant's trunk, can operate in confined spaces and is much more flexible than conventional robots, thereby increasing efficiency and safety in automated processes. The increased freedom of movement and sensitivity open up new application possibilities wherever robots can be used. The vision is a universal, scalable automation platform that enables safe and accessible automation of manual work in all areas of life and work.

Challenge:

At this stage of our development, our main challenge is transitioning from a functional prototype / MVP to validated real-world applications through concrete pilot projects. While our robotic arm has already demonstrated strong technical capabilities, we are now seeking the right partners and environments to test, validate, and refine its unique selling points under real operational conditions. This validation phase is critical for us to better understand performance, reliability, integration effort, and user experience from the perspective of end users and system integrators.

A key objective is to identify pilot projects where our solution can be implemented in realistic scenarios. Through these pilots, we aim to gather structured feedback, uncover limitations, and confirm the value our robotic arm can deliver compared to existing solutions. We are particularly interested in partners who face real robotic automation challenges and are open to experimenting with innovative hardware solutions. These collaborations would allow us to jointly evaluate feasibility, scalability, and return on investment.

Beyond pilot validation, another major challenge we want to address is exploring new fields of application. While our robot is suitable for industrial automation, its design and capabilities go beyond traditional factory use cases. We believe there is significant potential in non-industrial domains, such as service robotics, logistics, research, education, or other emerging fields. However, entering these areas requires a deep understanding of new requirements, standards, and user expectations. We are therefore looking for organizations willing to co-develop and adapt the system with us to meet these new demands and unlock additional markets.

Finally, we see this H&M event as an opportunity to connect with experts from the robotics and industrial automation ecosystem. Strengthening and expanding our network is essential to accelerate development, avoid common pitfalls, and align our roadmap with real market needs. We expect potential solutions from this event to include access to pilot customers, co-development partners, and expert knowledge that helps us shape the next development steps of our robotic platform. Ultimately, our goal is to move from a promising prototype to a validated, versatile robotic solution with clear application pathways and strong partnerships supporting its growth.

Challenge #7 description:

Company: ENTRERRIOS SERVICIOS GENERALES (Spain)

Entrerríos Servicios Generales is an engineering company based in Aragón, Spain, offering specialized services for the industrial sector and providing comprehensive solutions in industrial engineering, metal structures, intralogistics, industrial installations, and process automation.

With an innovative vision and solid technical expertise, the company develops complete projects covering all stages of the process: from design and manufacturing to the installation and commissioning of industrial facilities. Its clients operate in strategic sectors such as Mobility, Aerospace, Logistics, Defense, and Energy, areas in which ESG has consolidated its presence both nationally and internationally, backed by the necessary certifications and accreditations to ensure the highest standards of quality and safety.

Moreover, the company maintains a strong commitment to people and sustainability, promoting initiatives focused on talent development, risk prevention, continuous training, and equal opportunities. Entrerríos Servicios Generales combines engineering, innovation, and commitment to build a more efficient, safer, and more human future.

Challenge:

Our challenge is to create an automated system to compare CAD or PDF drawings from different sources, determining if they represent the same object, even when there are variations in style, scale, or orientation.

Currently, our clients provide us with basic plans in different formats, and we have to create new and different plans to build the project. To check whether they are correct between client requirements, we do this manually, and we believe that automating this process in an optimal way would be a major step forward for our process.

It is important that the tool, in addition to comparing and standardizing common elements, can correctly define those elements with multiple interpretations or with data that do not add value. The desired result would be a tool that, when we upload our plans, compares them with the client's requirements and shows us if they are OK or if there are errors.

Challenge #8 description:

Company: POTEZ AÉRONAUTIQUE (France)

The POTEZ AÉRONAUTIQUE Group designs and manufactures aerostructures. The company covers the full range of skills required for the production of complex assemblies, including design, manufacturing and industrialization engineering, project management, manufacturing of detail parts, and assembly operations. The Group is also diversifying its activities towards service-based offerings built on the same core skill set.

With a balanced portfolio of civil and military activities, POTEZ AÉRONAUTIQUE is involved in the design, manufacturing, and integration of both metallic and composite aerostructure parts and assemblies, while also providing customer support services. As a Tier 1 and Tier 2 supplier, the Group benefits from the long-standing trust of its historical partners, as well as that of most of the key players shaping the future of aviation. The Group's internationally recognized expertise in the production of aircraft doors and exits has earned it the status of sole supplier of passenger doors for the Dassault Falcon range. Its

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capability to manufacture complex composite parts enables the company to offer mature solutions that serve as alternatives or complements to metallic detail parts.

Challenge:

Regarding composites, POTEZ AÉRONAUTIQUE specializes in lay-up processes using autoclave polymerization applied to monolithic or sandwich structures. These structures may be based on glass, aramid, or carbon fiber fabrics pre-impregnated with phenolic or epoxy resins. As a leader in the implementation of new thermosetting composite materials, the Group addresses the challenges of next-generation aircraft by improving efficiency, cost-effectiveness, and environmental performance.

In addition, with the support of CORAC (the French Civil Aviation Research Council), POTEZ AÉRONAUTIQUE is making significant investments in the research of manufacturing processes for composite detail parts using the Liquid Resin Infusion process, with the objective of optimizing weight and cost performance.

POTEZ AÉRONAUTIQUE is facing an industrial challenge related to the manufacturing of composite parts, particularly linked to bottlenecks in the curing phase. Autoclave curing constraints require the multiplication of production resources, which results in low equipment utilization rates, typically limited to 30–40%, and increased operational costs. In order to mitigate these constraints, the company currently anticipates production by manufacturing parts in advance, including early lay-up and curing operations, while taking into account material shelf-life limitations (expiration dates of composite materials). This approach introduces additional complexity in production planning, inventory management, and quality assurance.

Beyond material and equipment constraints, the challenge is also strongly linked to knowledge management. Expertise is involved in defining process parameters and making critical manufacturing decisions. The know-how associated with process setup, parameter selection, and decision-making in non-standard situations is largely experience-based. In addition, the production environment is subject to unforeseen events, such as equipment failures. When a machine breakdown occurs, the entire manufacturing plan must be recalibrated, requiring rapid and informed decision-making to ensure continuity of production while maintaining quality and compliance.

The identified challenge therefore lies in structuring, formalizing, and capitalizing on human expertise to better manage curing constraints, production anticipation, and re-planning in the event of disruptions, while supporting decision-making in a highly constrained and variable composite manufacturing environment.

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