

The Platform « Industrial Performance »: a new tool for small companies

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Theme: Reacting to competition between institutions: nationally and beyond borders

Abstract : The Laboratory IRISE (Research Institute on Innovation and business sciences) in CESI wants to offer companies an "Industrial performance" platform, effective tool for training and assisting companies in improving their performance in the short, medium and long term. Indeed, in the context of the current economic crisis, the provision of new ways to improve business performance in general and to SMEs in particular, is an issue of major economic development. However, SMEs are overwhelmed by such offers from various providers and it was all about designing a new scheme, both relevant for the companies and innovative when it came to positioning IRISE in the higher education environment.

Nowadays, many organizations and service offerings are offered to companies in Upper-Normandy to improve their competitiveness, each of them on a particular topic: design, specific technique or technology, industrial organization and optimization of flow monitoring, tools operating and maintenance.

Each network in the Upper Normandy territory deals with different skills and competences well known in their respective fields, Energy, Aerospace or Automotive. But there is no comprehensive and structured approach that integrates all these elements, regardless of the field of activity, from equipment design and production tools, to operation optimization and equipment maintenance, and takes into account the human and organizational dimensions of industrial performance. Through the project "Industrial Performance" platform, IRISE will give evidence of how it has to create a new service to Upper Normandy companies and in particular SMEs, which is comprehensive, structured and consistent to improve their industrial performance across the life cycle management of industrial equipment, and at the same time ensure IRISE own visibility towards its counterparts.

A needs analysis with regional companies was conducted to better target the areas of development and future service delivery platform. A watch was also conducted on the actions and means existing in France and Europe.

Collected needs and results can be divided into four axes:

- Exchanges, networking on topics such as lean manufacturing, tools for improving production tools related to innovation and product life cycle management
- Training, consulting, expertise on the topics in the areas of organization and management (Audit and Quality Change management, Project management) and in technology and R & D (Building energy efficiency, PLC programming / automation).
- Specific pooled resources to each business

- R&D on topics such as PLM (Product Life Cycle Management), predictive maintenance, ergonomics and simulation tools flow factory

The overall structure of the activities of the platform therefore includes first part dedicated to transfer activities to support companies and especially SMEs / SMIs in their short-term projects of innovation and optimization of industrial performance.

The second part of the platform focuses on the research required to support R&D on the themes of industrial performance and allows projects to bring the skills of laboratory IRISE the industrial world.

The platform consists of:

- A fixed platform that will provide a collaborative space dedicated to collaborative projects and organization of industrial performance and will host manual and automated flexible workshops.
- A mobile FABrication LABORatory (FabLab), for innovative projects support.

1 Platform « Industrial Performance »

The platform will consist of multiple areas offering technical facilities and reception areas and exchange forum. A distribution of these areas is shown in figure 1 with a total area of approximately 1880 m².

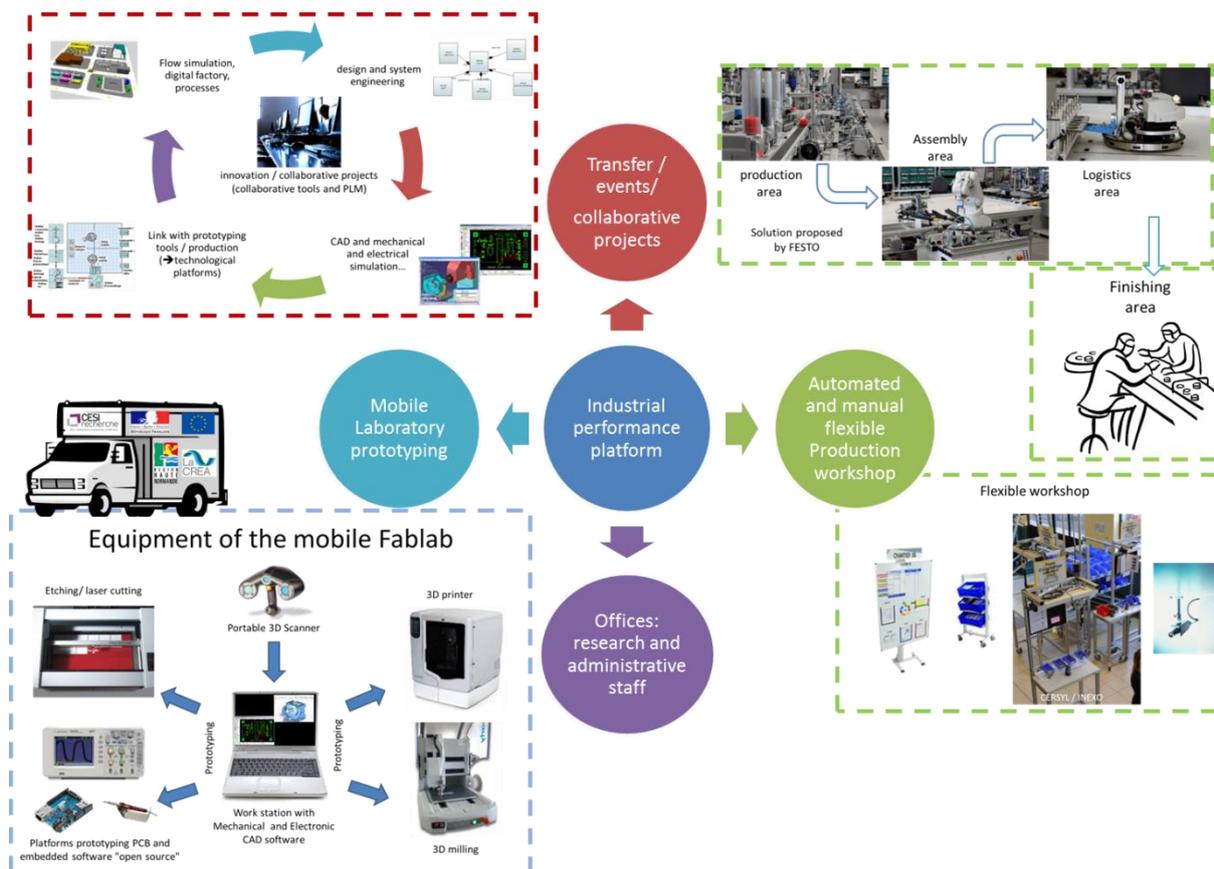


Figure 1 : The areas

2 Initiation and implementation of the "Industrial Performance" platform

For organizational reasons the platform will consist initially of the mobile FABrication LABoratory and a fixed platform with an area of 530 m2.

2.1 The fixed Platform

This fixed platform will consist of two main area: a transfert-innovation/manifestation aera and a flexible production workshop.

2.1.1 Presentation of the transfer-innovation/manifestation area

The transfer-innovation/manifestation space will be hosting events and workshops addressing topics dedicated to industrial performance.

A project room dedicated to innovation, collaborative projects and organization of industrial performance will also be available for the development of projects involving students from CESI, Schools and Universities in the region on issues raised by SMEs / PMI. This space will also allow researchers and technicians of the platform to work with industrial partners, it will also be possible to use the network of experts CESI to complete studies proposed by the partners themselves. To complete their projects, teams will have access to a simulation platform consists of specific IT resources (workstations and servers), video-conferencing facilities and several families of software. Some of them will be dedicated to the simulation of flow tools, the implementation study workshop in the digital factory, study scheduling (ARENA simulation and DELMIA manufacturing) tools CAD (Solidworks and CATIA), PLM tools developed during research projects or commercial such as PLM suite Dassault System and collaborative tools (project management, shared digital space). The organization of this floor space is shown below :

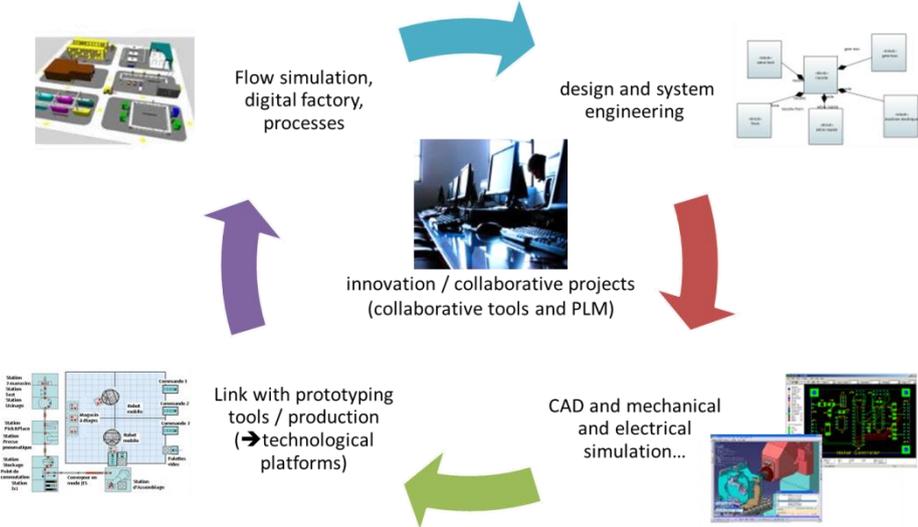


Figure 2 : Collaborative and PLM tools

2.1.2 Presentation of the flexible production workshop

The flexible production workshop initially identified will integrate an automated production line combining all available technologies in companies and currently consists of three main parts: the production area, the mounting area, logistics / storage area. The finishing zone will be installed in a

second step as shown in Figure 3. This technology enables researchers to investigate technologies areas such as maintenance and supervision. Studies of sensors, actuators, automated systems, industrial robotics and development research on ICT for smart product. Finally studies on issues related to the organization of production, internal logistics can also be studied. The provision of these facilities will enable the emergence of new collaborative projects dealing with these different technological fields between companies and academic institutions. It will also support the training of engineers and ensure regional enterprises skills acquisition in the fields of production management and maintenance. Finally, it will support the research program "Modelling, simulation and analysis of production systems" initiated in the laboratory IRISE which requires the presence of a demonstrator to address implementation aspects, traffic flow in the workshop, safety and maintenance.

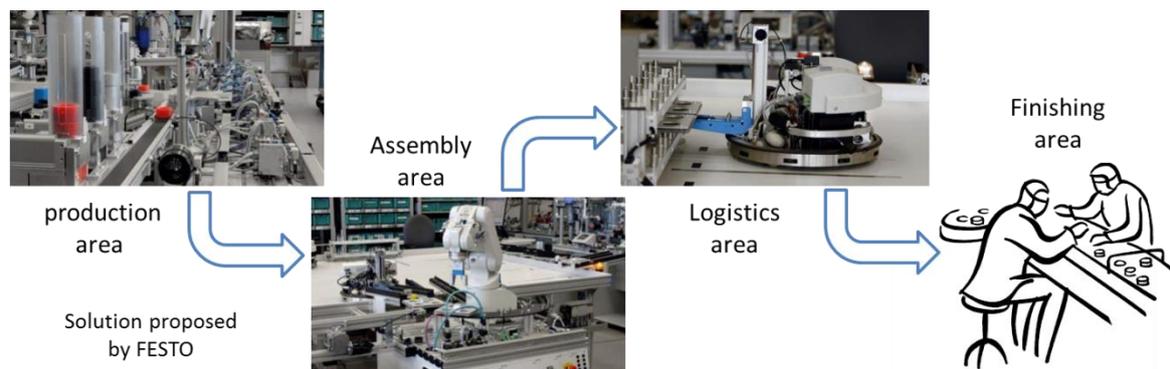


Figure 3: Automated (step 1) and manual (step 2) production line

2.1.3 The mobile Fabrication Laboratory (FabLab)

2.1.3.1 Activities related to this platform

For ten years we have witnessed significant growth of digital prototyping means such as 3D printers, three dimensional scanners, laser cutting, devices becoming more and more easy to use and therefore more accessible to consumer. The fablab (fabrication laboratory) were born in the early 2000s in the United States and appeared in France in 2010. France now has about 150 fablab. However, no mobile fablab is currently in France. Upper Normandy region will become one of the first regions in France to develop a mobile fablab and thus integrate the national network of fablab. This mobile platform will be closer to companies to assist them in their innovation process and improving competitiveness. Engineers can implement their projects quickly and cheaply testing their feasibility via prototyping, allowing their business to stay at the cutting edge of innovation. The use of Fablab is highly diverse and consequently, this device will support needs expressed by businesses in a variety of fields (mechanical, aerospace, automotive, health..) by thus encouraging collaborative working between SMEs and laboratories. Easy access to this device will provide an opportunity for local businesses to acquire new know-how, improving their skills through training of their engineers to use these new ways and thus open to new markets. The mobility of the platform will be an important factor to identify new collaborations between industry and academic institution. Knowledge exchange, networking interdisciplinary skills will be facilitated and will generate the emergence of new innovative collaborative projects or new ideas that can lead to some of them, creating businesses.

This mobile platform will also be made available for engineers students tied to business projects and improve their awareness of the needs of businesses. It will also be available to high school students and thus participate in the dissemination of scientific culture.

This platform will finally play a demonstrator role during open houses and events dedicated to the vulgarization of science for young audience.

2.1.3.2 Description of facilities

This platform will host means making models, prototypes, small series of 3D objects in various materials but also retro engineering of mechanical parts.



Figure 4 : Mobile Fabrication Laboratory: the FabLab

Two types of prototyping will be realized. The mechanical prototyping shown below which includes mechanical CAD software and facilities of prototyping (3D Printer, 3D scanner, laser cutting, CNC machine)

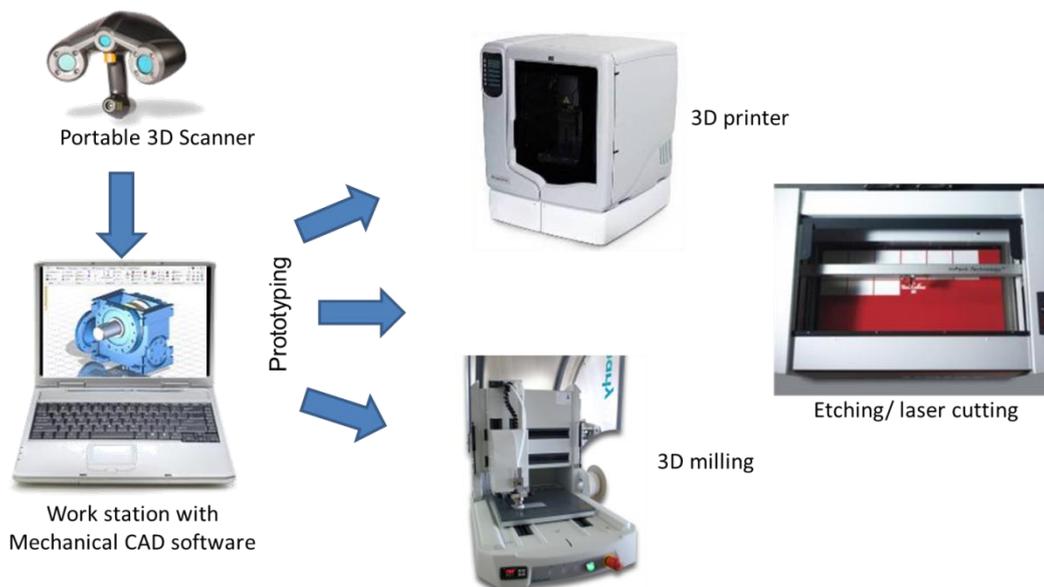


Figure 5 : Facilities dedicated to mechanical prototyping



Figure 6 : Examples of products obtained by mechanical prototyping

The electronic prototyping based on CAD software, prototyping facilities (circuit etching, embedded software) and test.

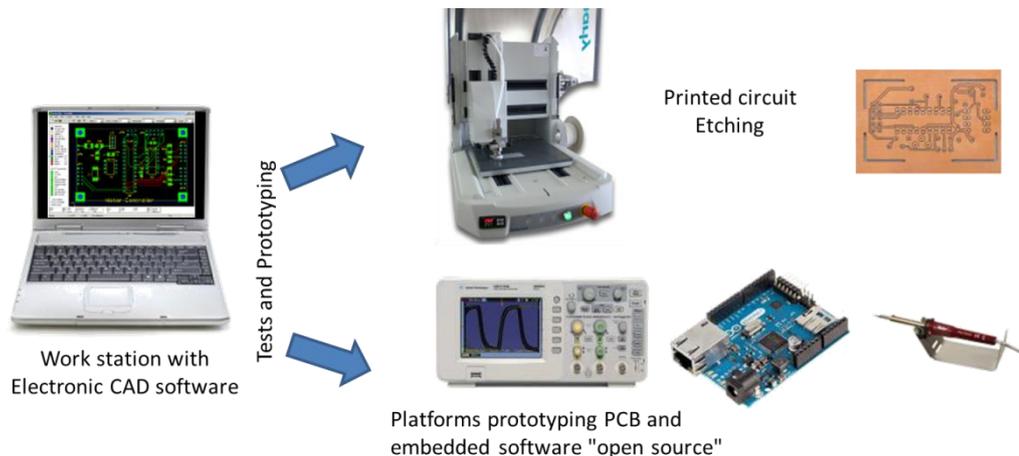


Figure 7 : Facilities dedicated to electronic prototyping

3 Conclusion

The implementation of the "industrial performance" platform will result both regionally, nationally and internationally. "Industrial Performance" platform since its design phase involved the main industrial stakeholders in the region, particularly through its steering committee composed of regional industrial clusters operating in upper Normandy and competitiveness clusters. Industry in these sectors participated in defining the content of industrial performance platform, regional SMEs also accompanying the draft. The platform will allow SMEs to maintain their competitiveness, to be accompanied in their innovation projects and thus open new markets. Mobile Fabrication Laboratory will participate in animation of innovation networks established by institutional and accompany innovation projects from business incubators and regional businesses

4 Acknowledgments

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5 Short biographical statement regarding the presenters

- Anne LOUIS received her M.Sc. degree in Electronics, microwave and optical communications from the University of Limoges, Limoges, France, in 1994 and her Ph.D. in Microwave communications from IRCOM, University of Limoges, France in 1998. From 2003 to 2011, she

has been the Head of the Electronics and Systems department of IRSEEM, ESIGELEC, Rouen, France. In 2006, she was entitled to supervise research and became Director of Doctoral Training at ESIGELEC in 2008. Since 2011, she is the Head of the CESI North-West team of IRISE laboratory.

- David BAUDRY received an engineering diploma (equivalent to M. Sc.) from the Ecole Nationale Supérieure d'Ingénieur (ENSI) of Caen, France, in 1999 and a Ph.D in Electronics from the University of Rouen, France, in 2005. In 2010, he was entitled to supervise research. He is actually involved in the development of the research areas “Modeling and optimizing industrial performance” and “Technological tools for innovative products” of the IRISE laboratory.
- Chantal HURARD got a Master’s degree in Aerospace Engineering from Ecole Nationale Supérieure de l’Aéronautique et de l’Espace, Supaero, Toulouse, France, in 1987. After 10 years as project manager in the aerospace industry, she moved to innovation and support to industry topics and currently manages the development of collaborative programs at CESI Graduate School of Engineering.
- Belahcène MAZARI received his Ph.D. in Electronics from the University of Rouen, France, in 1988 and was entitled for supervising research in 2004. From 1987 to 2010, he has been a professor of electromagnetism and electronics at ESIGELEC, Graduate Engineering School, in Rouen, France and Deputy Director at ESIGELEC. He is currently director of research and innovation at CESI.