



SCAP Industry of the future platform activity report

Year 2018

Description of the platform

The SCAP industry of the future platform focuses on the digital transition for manufacturing production industries. This platform was born from the will of the LabSTICC research laboratory to make its skills available to industries, to support them in the digital transition of the industry of the future.

Digital transition refers to all areas of the design, organization and improvement of connected, agile and people-centred factories. The factory of the future is a connected link in the industrial organization, suppliers, subcontractors and customers exchange both materials and information. The plant evolves thanks to networks of machines, robots, conveyors and autonomous warehouses, capable of controlling itself in response to different situations.

The challenges of the industry of the future can be supported by digital science. A lot of research work has been developed by the Lab-STICC research laboratory: 3D reality and intelligent agents; model engineering and safe design; data ontology and software package interoperability; complex socio-technical systems modelling; datascience... This research finds, within the SCAP platform, technological support in an industrial ecosystem.

The challenge of the SCAP industry platform of the future is above all to establish a link between the fields of needs and the fields of possibility: formalize a problem, find a technology or a scientific field that can answer it, develop, adapt and show. The challenge here is to strengthen cooperation between professions that often ignore each other and have difficulty understanding each other, those of industrial production and digital sciences.

Manufacturing industry in Brittany represents a larger part of industrial employment than the national average, at 25% of total employment compared to 20% in France. Some studies show several weaknesses of the industry in Brittany, highlighting a low value-added industry, a low investment in automation or industrial production that is not driven by the company's software (PLM, ERP, MES, APS...).

These industry challenges require the integration of the digital transition into the production industry.

Main actions

The SCAP industry of the future platform structures its activities around four main themes: the virtual factory, the digital factory, the man at work and data analysis. These themes mobilize the scientific skills that are at the heart of the Lab-STICC research laboratory and which are now federated around the DFM transversal project.

Research themes

The virtual factory: the interest is to model and simulate an industrial site, a production line or a position in the supply chain in order to qualify its specifications and analyse its technical and human performance.

The digital factory: by structuring the information of all the activities of the production plant, the company develops a better management, a better capacity to react and a greater agility. The digital factory is based on the use of connected objects, the urbanization of the industrial information system, data engineering and industrial cybersecurity.

Man at work: The Lab-STICC research laboratory carries out research in fields integrating numerical and psychological dimensions such as ergonomics or cognitive psychology. This work integrates Cobotization, ecological HMIs or mental workload into global approaches to human-system interaction.

Data analysis : The production of information within the digital factory opens up the possibility of exploring industrial production data to help make more informed decisions by taking into account multiple factors for the benefit of a more agile management of the digital factory.

These different research themes have led the SCAP industry platform of the future to equip itself during the year 2018 with industrial equipment allowing the implementation of agile and adaptive solutions in areas such as industrial cyber-security, connected industrial objects (IIoT), cobots or the implementation of transitics solutions allowing the management and simulation of flows of an industrial company.

Programmes

Visits, demonstrations and study days

One of the objectives of the platform is the dissemination of knowledge, which is why the platform has presented its activities at numerous trade fairs, professional meetings and scientific days.

(We Nertwork 2018-11-23 Angers ; AIF day 2018-6-12 ; ETN day 2018-6-7 ; Innovation forum 2018-3-28 ; ROADEFF 2018-2-16)

SCAP industry of the future has put many demonstrators in situation on the pilot line that is located at ENSIBS, Lorient. Many industrialists have come to better understand how the digitisation of industry could accompany their future developments. In one year nearly 30 different industries were received for demonstrations on SCAP industry of the future. Add institutions and high schools.

See the website : <https://usinedufuturblog.wordpress.com/> (in French).

Academic and industrial research projects

The ANR "Humanism" project, approved in July 2017, aims to integrate new technologies from the fields of production and digital technology with an approach that keeps people at the centre of the global system, both in terms of decision-making and in terms of controlling the "intelligent" systems implemented. This project is based on the SCAP industry of the future platform for experimentation and demonstration of the project focused on the operator of the future.

http://www.agence-nationale-recherche.fr/projet-anr/?tx_lwmsuivibilan_pi2%5BCODE%5D=ANR-17-CE10-0009

The JumNum Industrial Chair focuses on joint product-process modelling in the fields of complex construction yards designed for high-rise buildings. The approach brings together actors from the naval and construction sectors. This international chair brings together the activities of LabSTICC and UNISA University of South Australia. Its scientific program is based on business models driven by model and data engineering engineering.

Demonstrators

Many technological building blocks are digital and their use on a demonstrator is an essential step in opening up the field of the possible to many manufacturers. The demonstrator is in fact a network of continuous and discontinuous manufacturing, assembly, control and flow management processes that illustrate a coordinated set of technological bricks in a real situation, such as :

- Transitics Simulator: The SimSed tool was used to model and simulate transitics systems, focusing on the virtual factory theme. The simulator represents the pilot line of the SCAP industry platform and allows to visualize the errors of parcel conveying.
- Connected glasses: This Digital Factory demonstrator puts a maintenance technician in a situation assisted by connected glasses allowing him to read the information from connected sensors in real time.
- Cyberattack of an industrial PLC: This demonstrator illustrates the problems of the Digital Factory with the multiplication of industrial computer systems. This demonstrator uses a USB key as a vector of attack on an industrial PLC that will result in modifying the operation of the workstation.
- Connected console The use of this connected piece of furniture allows the manufacturer to know precisely the consumer's purchasing behaviour (date and choice of products). This allows it to react better in terms of launching productions.
- Cobotization of a workstation: The Cobot is programmed by the operator who teaches him the professional gestures to repeat. This demonstrator aims to raise awareness among industrialists of the theme Man at work and the problems of Musculoskeletal Disorders (MSDs).
- Mental workload: Another aspect of the Man at Work theme, this demonstrator highlights cognitive problems on production lines during repetitive checks and tasks. These can lead operators to reach a high mental load.