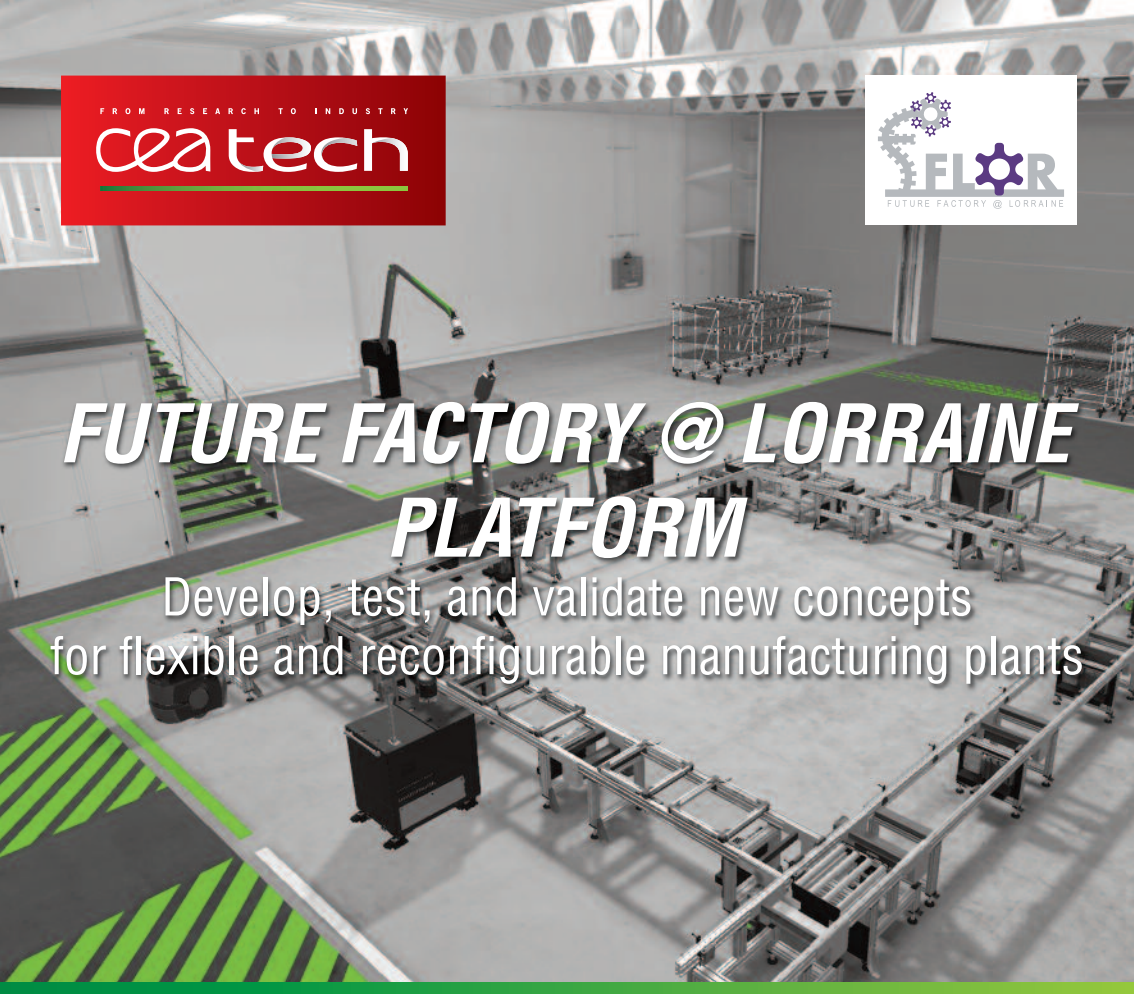
FROM RESEARCH TO INDUSTRY

cea tech

FUTURE FACTORY @ LORRAINE



FUTURE FACTORY @ LORRAINE PLATFORM

Develop, test, and validate new concepts for flexible and reconfigurable manufacturing plants

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

Grand Est
ALSACE CHAMPAGNE-ARDENNE LORRAINE

PACTE LORRAINE

ECHORD++

CEA Tech: unrivalled experience in technological research

Operating budget: €650 million

4,500 staff

CEA Tech, the Technological Research Division of the CEA, ranked by Thomson Reuters as Europe's first and the world's second most innovative government research organization, develops innovations that help French companies differentiate their products and improve their performance so that they can remain competitive in today's economy. CEA Tech has established regional centers to serve France's major manufacturing hubs, bringing businesses in these regions the enabling technologies developed by the CEA.

The FFLOR platform and its partners are working to make France's *Grand Est* region a leader in solutions for the Factory of the Future. As a founding member of the *Alliance Industrie du Futur*, the CEA is rolling out its strategy at the regional, national, and European levels.

FFLOR KEY FIGURES

€4 MILLION INITIAL INVESTMENT

1,000 SQ. M

30 MEMBERS/PARTNERS*

18 COLLABORATIVE ROBOTS*

8 AUTOMATED GUIDED VEHICLES*

*2018 targets

A TECHNOLOGY-TRANSFER PLATFORM SET UP AS A SERIES OF WORKSHOPS AT A MANUFACTURING FACILITY

HUMAN-MACHINE SAFETY

Virtual reality

Smart logistics

Cobotics

CONNECTIVITY AND INTEROPERABILITY

FLEXIBLE, AGILE MANUFACTURING

Collaborative robotics

Augmented reality

A COLLABORATIVE WORKSPACE FOR ALL FOF STAKEHOLDERS

FFLOR is an open-access collaborative platform for manufacturers from all industries, integrators, technology providers, and researchers (industrial and academic). It is designed to promote the emergence of innovative solutions for the Factory of the Future.

Two types of partnerships/memberships

1.User: A partnership agreement covering the development of a technology brick dedicated to a manufacturer's specific application:
Your partnership agreement also includes membership.

2.Associate: A test campaign to verify the state of the art, validate an existing technology, or implement a technology developed under a collaborative R&D program:
You benefit from annual membership (membership fees payable every year).

Benefits of FFLOR membership:

- A comprehensive approach to the Factory of the Future
- Human resources and equipment together in one place
- Access to high-added-value technologies

A REPRESENTATIVE INDUSTRIAL FACILITY

FFLOR is located at PSA's plant in Trémery, France. It is PSA's largest motor manufacturing plant in the world, producing 85% of the auto maker's motors.

- The solutions developed are relevant to real-world manufacturing scenarios and can be rolled out more rapidly
- Close proximity to the automotive industry, where advanced manufacturing is a crucial issue

Because FFLOR is located at a real-world manufacturing plant, project teams and equipment operators can rapidly see how new developments will be used, from logistics to production and in interaction with the information system.
Projects are executed rapidly with the latest commercially-available technologies.

Mobile collaborative robots

Reconfigurable workstations

An example of a partnership

User

Integrator

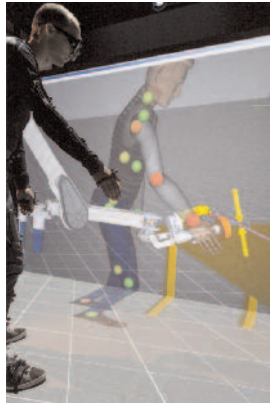
OPTEAMUM

THE MOST ADVANCED INDUSTRIAL EQUIPMENT AVAILABLE

VIRTUAL REALITY AND INTERACTIVE SIMULATION

CEA List technology

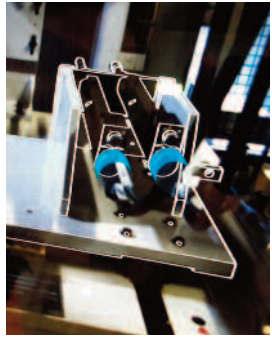
- Optimized processes and flows
- Enhanced workstation ergonomics
- Reduced repetitive-strain injuries
- Operator training



AUGMENTED REALITY FOR COMPLEX 3D OBJECTS

CEA List technology

- Bring technical information right to the operator
- Respond to the increasing complexity of information
- Streamline maintenance and training
- Access constantly-updated information and monitor changes to workstations



Collaborative robotic cells

- Replicate manual and robotic assembly stations
- Share space and tasks
- Human-robot collaboration and safety
- Agile, flexible production resources

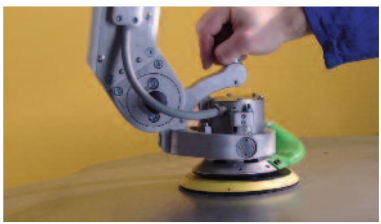
Connected logistics

- Efficient operator involvement in preparation tasks
- Automation of low-added-value logistics tasks
- Connection to production and information systems

ISYBOT: FORCE-CONTROLLED OPERATOR-ASSISTANCE ROBOT

CEA List technology

- Force control without a dedicated sensor
- Can be used by any manufacturing operator
- Can be moved to any location on the shop floor
- Grinding/polishing force controlled with precision
- Reduced repetitive-strain injuries
- Increased productivity



COBOMANIP: LOAD-HANDLING ASSISTANCE ROBOT

CEA List technology

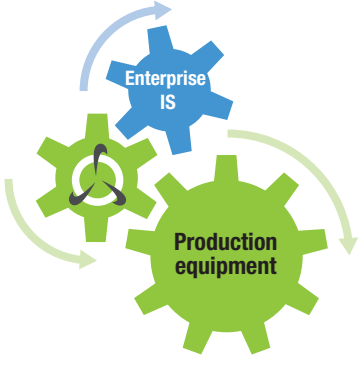
- Loads balanced in all positions, much like working in zero-gravity
- Virtual guiding of loads being carried
- Smooth movements even with heavy loads for greater operator safety
- Parts handled are protected, insertion of critical parts finely controlled
- Better workstation ergonomics
- Reduced repetitive-strain injuries
- Increased productivity

CONNECTIVITY AND INTEROPERABILITY OF PRODUCTION AND INFORMATION SYSTEMS

- Connecting equipment of different generations made by different manufacturers
- Managing equipment obsolescence
- Reducing complexity by focusing on connected equipment features and services
- Increasing modularity for easier equipment configuration and reconfiguration
- Giving operators more freedom with an open-source software suite to share information, sequence tasks, supervise, connect, and log
- Enabling interoperability with other software (OPC-UA, Labview, etc.)

300 connection points (1 GB Ethernet) can be connected.

An industrial information system with a secure partners-only area is available for connection to third-party tools (MES, ERP, simulators, OPC-UA framework, etc.).



Pilot manufacturing line

Objective: agile, flexible manufacturing

In 2018 FFLOR will have its own pilot manufacturing line representative of an actual industrial manufacturing line. The goal is to replicate an entire production chain so that the agile, flexible manufacturing solutions developed can be configured and tested.

Agility: compactness, adaptability to different volumes through modular design, configurability for use in different processes

Flexibility: adaptability to different product versions

Force-controlled collaborative robots

Collaborative robots for handling and transfers

Manual workstations

AGVs connected to logistics systems to resupply workstations

Connection to partner information systems to exchange production data

PARTNERS OF THE FFLOR PLATFORM*

*on May 1, 2017

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