

DiFac: Digital Factory for Human-Oriented Production System

DiFac project wishes to develop an innovative Collaborative Manufacturing Environment (CME) for next generation digital manufacturing where new advanced technologies such as Virtual, and Augmented, Reality will be used with three main objectives: product design, prototyping and manufacturing, as well as for worker training.

At a glance: DiFac

Digital Factory for Human-Oriented Production System

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Duration: May 2006 – May 2009

Total cost: € 3,641,742

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Strategic Objective:

2.5.9 Collaborative Working Environments

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A digital factory represents a persistent hybrid community in which a rich virtualized environment, signifying a variety of factory activities, will facilitate the sharing of factory resources, manufacturing information and knowledge, and help the simulation of collaborative design, planning, production and management among different participants and departments.



DiFac aims at the development of an innovative Collaborative Manufacturing Environment (CME) for next generation digital manufacturing. The DiFac CME will be used as a framework to support group work in an immersive and interactive way, for concurrent product design, prototyping and manufacturing, as well as worker training. It will provide support for data analysis, visualization, advanced interaction and presence within the virtual environment, ergonomics analysis, and collaborative decision-making.

Within the DiFac CME, a systematic representation of product and process knowledge in a mixed 3D collaborative manufacturing environment will be provided to the user.

Six components:

- Group Presence Modeller
- Immersive Integrator
- Collaboration Manager
- Prototype Designer
- Factory Constructor
- Training Simulator

will be seamlessly integrated into a new solution for collaborative digital manufacturing activities, for example, aiming to help work teams collaborate on the analysis of a product design, share information, evaluate testing results, manage knowledge and make decisions about development issues...

DiFac is an SME-driven STREP and its actions will target European SMEs and empower them to improve their position in the world market by providing advanced services and tools using state-of-the-art technologies.



Why DiFac

The future of manufacturing plant is represented by a distributed, collaborative working environment which requires seamless and natural collaboration amongst workers, machines, suppliers and customers. To apply collaboration to manufacturing, the structure and methods of collaboration should be studied, the guidelines for collaborative manufacturing environments should be provided and the collaboration tools and media should be identified and elaborated. Beyond the common collaboration technologies for distributed design and manufacturing based on networked collaborative decision-making and project management, **Virtual Reality (VR) technologies are leading to remarkable breakthroughs in enhancing collaboration in manufacturing, from the development of digital mock-ups and virtual prototypes, to production simulation, maintenance and training.** As this future digital manufacturing focuses on distributed group work and possibly remote individual collaboration, **core collaborative services and ancillary tools in the context of group presence, visualization, interaction, decision-making and knowledge management are strongly needed to support collaborative manufacturing activities among work groups and individual workers.**

DiFac strategic impact and benefits

The target is to provide a tool that will be able to support collaboration between different sites and users during design, prototyping and manufacturing through an interactive environment with the aim of meeting the challenge of delivering better quality products and services. The use of such a technology will definitely lead directly in **reinforcing competitiveness in the European industry** and **solving societal problems** since it will provide the following benefits:

- **Increased Efficiency.** Team members will be able to collaborate anytime, making faster decisions and gaining approvals instantly. Reduction of information gaps within working groups by providing intuitive content and intuitive tools for participating in evaluation, design and engineering processes (e-inclusion or VR-inclusion) will be achieved.
- **Reduction in Complexity.** The employees will be able to work seamlessly together, and to extend communication and collaboration beyond their organizational boundaries.

- **Reduction in Physical Mock-ups.** The DiFac environment will allow testing ideas on digital (virtual) configurations, employing advanced paradigms of immersive interaction and collaborative work without having to rely on large numbers of physical mock-ups or experiments and tests. This will also result in a significant reduction in materials and processes necessary for the physical prototypes production, having an indirect impact to the **environmental protection.**
- **Enhanced Organizational Intelligence.** The information will be collected and organized in a single place. New members will be able to view all the history and information very fast and to start working with the other members in less time, thus improving productivity.
- **Develop Stronger Relationships.** The project will be an opportunity to improve cooperation and to develop strong relationships among industries, research centres, SMEs, universities, vendors, the business community and the public.
- **High Skilled Employment.** The novel methods and tools to be used in the DiFac environment development will require highly qualified jobs based upon the necessity for new engineering and IT skills that will support the intelligent design procedures, using high-end simulation technology and knowledge-based approaches to decision making instead of semi-empirical methods and physical testing.
- **Better working conditions.** As a result of the above, employees will have the opportunity to work with advanced support tools that will make their lives easier and safer. Just as examples, expert assessments of the quality of behavioural simulations, either in nominal situations (ergonomics experts) or in exceptional situations (crisis experts) could be used as performance indicators in this area.

