



Session ICT for Manufacturing

- **Smart Factories (Started 2010 + 2012): 18 projects**
- **Virtual Factories (Started 2011): 10 projects**
- **Digital Factories (Started 2011): 8 projects**
 - Including Manufacturing solutions for new ICT products – 2 projects

PPP Impact Workshop
11-12 March 2013

Research and
innovation



S/T Goals

- **Smart Factories**
Agile manufacturing & customisation – controls, process simulation & optimisation, robotics, software tools for sustainable production
- **Virtual Factories**
Value creating global networked operations, supply-chain management, product/services, management of distributed manufacturing assets
- **Digital Factories**
Holistic PLM design, modelling, simulation, knowledge for production & maintenance operations
 - Including "Manufacturing solutions for new ICT products"

Research and
innovation



Expected Impact (1/3)

Smart Factories (2010+2012)

- A higher level of intelligence, productivity & environmental consciousness on the shopfloor
- Introduction of advanced automation & control into mainstream manufacturing
- Strengthened global position of Europe's manufacturing industry
- Intelligent management of manufacturing information
- Reinforced European leadership of laser components & systems producers

Research and
innovation



Expected Impact (2/3)

Virtual Factories (2011)

- Higher management efficiency of networked business operations
- ICT enabling SME participation in virtual factory environments
- New business models/innovation scenarios for a low-carbon economy

Research and
innovation



Expected Impact (3/3)

Digital Factories (2011)

- European leadership in knowledge-driven platforms, tools, methodologies for product development & manufacturing
- Accelerated product design & manufacturing
- Better accuracy, reliability & speed of simulation

Mfg Solutions for New ICT Products (2012)

- New market opportunities for low-cost, high-volume OLAE products
- European-produced OLAE products to meet key societal & economic needs

Research and innovation






Project MUSIC:

Multi-layers control & **c**ognitive **S**ystem to drive metal and plastic production line for **I**njected **C**omponents

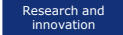
WP Number & Title	Type	Finalized at
WP1: Design of Intelligent Sensor Network	RTD	Define the Product-Process requirements. Design of multi-level monitoring system based on Intelligent Sensor Network and new self-adaptive parts of the die to allow more agile production
WP2: Real-time management of Manufacturing Information	RTD	Developing the acquisition system at machine, equipment and post-operation level including traceability of the product.
WP3: Control & Cognitive system database	RTD	Development of modules for different sequence steps of production unit and definition of corresponding DB structure based on Relational-DB and RRDatabase.
WP4: Multi-layers Control & Cognitive software	RTD	Development of a unique software based on control system, cognitive model and optimisation method working on real-time process data and quality prognosis.
WP5: ICT implementation at manufacturing sites	RTD	Testing, through pilot implementation at manufacturing sites, the Cognitive model, the updating method, the optimization algorithm and the Quality/Energy/Cost objectives
WP6: Validation of agile manufacturing and customisation	DEMO	Validation of Control & Cognitive System in different Demonstrator-processes transferring the knowledge to industry.




Research and innovation

Project MUSIC: achieved/expected impact

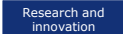
N.	GENERAL EXPECTED IMPACTS	Description
1	NEW PERSPECTIVE AND COMPETITIVENESS	<ul style="list-style-type: none"> a. Trans-sectoral applicability b. Multi-layer Manufacturing information management in case of small or large-scale production dominated by SMEs c. High non-linear Learning model of process behaviour d. Control&Cognitive system integration to planning and scheduling tools e. Real-time Quality prediction and reduction of no-quality control cost f. Time to market reduction
2	CUSTOMISATION AND ENVIRONMENTAL FRIENDLINESS	<ul style="list-style-type: none"> a. Versatile equipment b. Process parameters customisation and optimisation c. Minimum energy consumption
3	INTERNATIONAL STANDARDIZATION	<ul style="list-style-type: none"> a. Die casting quality standardization b. Calibration of indirect measurement of quality and efficiency




Project MUSIC: achieved/expected impact

Expected results/ impact from the project
<p>Service providers and suppliers:</p> <p>Virtual prototyping, material model, process knowledge and real-time process control are the key elements to improve the high tech HPDC/PIM component for different sectors (e.g. automotive, aerospace, energy etc.).</p> <ul style="list-style-type: none"> • Offering advanced and integrated design tools or consulting activity • Supplying new monitoring system by sensor network and self-adaptive devices • Proposing a scientific approach to control the Injection processes with the combination of monitoring system and cognitive model • Improving and transfer the process knowledge at all level of manufacturing industry • Distribution of advanced engineering software and process control system to the manufacturing sector.
<p>Foundries manufacturers, end-users:</p> <ul style="list-style-type: none"> • Improved quality control, with real-time monitoring and re-active system • Cost reduction, low energy consumption, optimal equipment maintenance → Increased competitiveness
<p>University and Research centers:</p> <ul style="list-style-type: none"> • In-field process knowledge • Improving training media and specific expertise • Development of standard, procedures and protocols
<p>Association:</p> <ul style="list-style-type: none"> • Fulfilling the Association mission of CEN member





Project MUSIC: achieved/expected impact

Activities for dissemination/exploitation


→ Training, courses, mini-master, internal and external education and dissemination to make "Control&Cognitive Software" working in High Pressure Die Casting/Plastic Injection Moulding industry environment.

→ Development of a CEN Workshop Agreement for European standards on injection processes.

→ The main exploitation routes will be through the SMEs, and the large industrial partners.

→ the process of diffusion/implementation of results by EFFRA, MANUFUTURE, EUCAR, EUMAT, NAFEMS and futher Local Associations

Wishing to move from *MUSIC* to *SYMPHONY* !!!





Technical cross-cutting issues

What technical cross-cutting issues among your projects should be taken into account to increase the overall impact?

- Asking miniaturized mechanical and electro-mechanical elements to improve the applicability of intelligent sensors network in manufacturing equipments.
- MUSIC Process control and cognitive system adopted for Innovative technologies for casting, material removing and forming process (FoF.NMP.2012-7)
- Extension of monitoring and cognitive model to the predictive maintenance of production equipment (FoF.NMP.2012-2)










Non-technical cross-cutting issues

What non-technical cross-cutting issues among your projects should be taken into account to increase the overall impact?

International Survey to collect updated information from manufacturing companies producing metal castings and polymer components at international level.

Networking in view of next generation of Research Project related manufacturing, engineering and processing technologies through multi-lateral collaboration following the guidelines of Horizon 2020.



Possible synergies and benefits of clustering

How can cluster activities add value to your project?

Definition of European Working Group devoted to Modelling, HPC and Simulation to support transversely all the PPPs.

How can cluster activities help exploitation of results after the projects end?

Organization of common European conference on Quality Management and Process Control under the MANUFUTURE or IMS umbrella

