

# Objective FoF-ICT-2011.7.1

## Smart Factories: Energy-aware, agile manufacturing and customisation

EXTRACT FROM WORK PROGRAMME 2011



### Challenge 7: ICT for the Enterprise and Manufacturing

The Factories of the Future (FoF) initiative is part of the European Economic Recovery Plan launched in November 2008 to respond to the global economic crisis. This Public-Private-Partnership (PPP) aims at helping EU manufacturing enterprises, in particular SMEs, to adapt to global competitive pressures by improving the technological base of manufacturing across a broad range of sectors. The ICT contribution to this initiative aims at improving the efficiency, adaptability and sustainability of manufacturing systems as well as their better integration within business processes in an increasingly globalised industrial context. Challenge 7 is fully dedicated to supporting the FoF PPP.

The Challenge includes the areas:



**'Smart factories'** including application experiments of control and sensor-based systems, laser systems and industrial robots.

- 'Manufacturing solutions for new ICT products' addressing manufacturing processes for Organic Large Area Electronics (OLAEs) and organic photonics.
- 'Virtual factories and enterprises' addressing end-to-end integrated ICT allowing for innovation and higher management efficiency in networked operations and supporting the emergence of 'smarter' virtual factories and enterprises.
- 'Digital manufacturing' including products life cycle management, modelling, design and optimisation.

Research addressing this Challenge in particular will encourage international cooperation under the Intelligent Manufacturing Systems (IMS) scheme.

### Smart Factories: Energy-aware, agile manufacturing and customisation

The capability to produce large varieties of sophisticated products requires manufacturing sites to be flexible, fast and reactive. Lean and easy-to-implement ICT enables those sites to be resource efficient, safe and cost effective.

Projects are expected to be industry-driven and to contain a strong validation element with quantifiable targets.

### Target Outcomes

a) **Demonstration and benchmarking of novel process automation and control (for discrete, continuous or batch industries):** Systems, strategies and tools for an integrated control and dynamic optimisation of factory assets. The challenge is to develop ICT driven

approaches and scalable architectures (e.g. service-oriented architectures or other appropriate architectures) for next-generation production automation and control solutions with flexibility, autonomy, robustness and energy efficiency. Projects should address efficient aggregation of information across existing legacy systems at all production

levels, factory level optimisation of production processes, and include demonstrations in real industrial environments. The aim is to show the operational and economic benefits of new ICT-driven approaches in factories against today's process automation and control solutions.

**b) Large-scale validation of advanced industrial robotics systems** through user-friendly methods of interaction with, and tasking of, intelligent cooperative robotic systems (including new programming paradigms and direct physical interaction) and through robotics-enabled production processes. Research shall focus on methods that allow workers to productively and safely deploy robots without specialised training. Cooperation between human-robot and between robot-robot should aim to provide easy-to-access and personalised support for skilled or heavy duty tasks on the shop floor. Real-world validation of R&D shall demonstrate its large-scale applicability to flexible, small batch and craft manufacturing. Results should contribute to future benchmarking standards.

**c) Applications based on factory-wide networks of intelligent sensors and new metrology tools and methods**, demonstrating

management of manufacturing information in real time and under harsh conditions, including planning, scheduling and dispatching. R&D should in particular address modularity, reliability/accuracy, safety and energy efficiency aspects of quality control systems and automation/handling equipment supporting discrete manufacturing down to lot sizes of 1. Results should support international standardisation.

**d) Lasers and laser systems for manufacturing and materials processing** with the following focus: i) High-brilliance active fibre and diode lasers (laser arrays) with nearly diffraction limited beam quality: simultaneous targets are multi kW continuous wave output power, efficiency of 40% or more, coupling into small diameter fibres (100µm or less for fibre lasers and 300µm or less for diode lasers); ii) New wavelengths and on-line adaptation of beam properties: novel lasers and laser systems opening-up new process windows and/or contributing to optimised process efficiencies. This includes widely tuneable lasers, ultra-short pulse lasers, versatile frequency conversion systems and photonic components enabling the on-line adaptation of essential beam parameters in order to produce stable beams of sufficient power and quality for the intended process.

## Expected Impact

- Strengthened global position of European manufacturing industry through the introduction of advanced automation into mainstream manufacturing and contributions to international standardisation
- Larger European market for advanced technologies such as electronic devices, control systems, new assistive automation and robots.
- Intelligent management of manufacturing information for customisation and environmental friendliness.
- Reinforced European leadership and industrial competitiveness of laser component and system producers and users and substantial improvement of manufacturing processes.

## Funding Schemes

a) and c): IP;

b) and d): STREP

## Indicative Budget Distribution

EUR 40 million with a minimum of 50% to IPs and 30% to STREPs

## Call

FP7-2012-NMP-ICT-FoF

**(to be published in July 30, 2011; deadline for submission of proposals December 1, 2011)**

### For further information:

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