

Coverage of the FoF PPP Multiannual Roadmap 2009 - 2012



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a MANUFUTURE initiative

Structure of the multi-annual roadmap

- Main R&D Challenges
 - SD1 Sustainable Manufacturing
 - SD2 ICT enabled Intelligent Manufacturing
 - SD3 High performance manufacturing
 - SD4 Exploiting new materials through manufacturing

SD1 Sustainable Manufacturing

Environmental friendliness

- (a1) High efficiency and near to zero emissions in manufacturing processes.
[FoF.NMP.2012-1](#) , [FoF.ICT.2010.10-1 b\)](#)
- (a2) Alternatives to energy-intensive processes based on advanced production and manufacturing systems. [FoF.NMP.2011-1](#)
- (a3) Improved use of renewable resources at factory level.
- (a4) Production using environment-neutral materials.

Economic growth

- (b1) Methodologies and tools for sustainable maintenance of production equipment.
[FOF. NMP.2012 -2](#)
- (b2) Innovative re-use of equipment and integrated factory lay-out design
- (b3) Decision support methodologies for the design of manufacturing systems based on integrated product-process approaches and economic/technical risk analysis.

Social well-being

- (c1) Adaptive and responsive human machine interface. [FoF.ICT-2011.7.1 b\)](#) ,
[FoF.ICT.2010.10-1 c\)](#)
- (c2) New human-robot interactive cooperation in advanced factory environments.
[FoF.ICT-2011.7.1 b\)](#) , [FoF.ICT.2010.10-1 c\)](#)
- (c3) The new human-centred production site.
- (c4) Development and adaptation of organisational structures and leadership for sustainability.

SD2 ICT enabled Intelligent Manufacturing

(a) Smart Factories: Agile manufacturing and customisation

- (a1) Adaptive and fault tolerant process automation, control and optimisation technologies and tools. [FoF.NMP.2012-3](#), [FoF.NMP.2011-2](#), [FoF.NMP.2010-1](#)
- (a2) Intelligent production machines and “plug-and-produce” connection of automation equipment, robots and other intelligent machines, peripheral devices, smart sensors and industrial IT systems. [FoF.NMP.2012-3](#), [FoF.NMP.2011-2](#), [FoF.NMP.2010-1](#)
- (a3) Large-scale testing and validation of robotics-based and other automated manufacturing and post-production automation processes in real-world environments. [FoF.ICT-2011.7.1 b\)](#) , [FoF.ICT.2010.10-1 c\)](#)
- (a4) Novel methods of interaction with, and automatic tasking of, intelligent cooperative automation and robotic control systems that support flexible, small batch and craft manufacturing . [FoF.ICT-2011.7.1 a\)](#), [FoF.NMP.2011-3](#), [FoF.ICT.2010.10-1 a\)](#)
- (a5) Laser applications . [FoF.ICT-2011.7.1 d\)](#) , [FoF.ICT.2010.10-1 d\)](#)
- (a6) New metrology tools and methods for large-scale and real-time handling and processing of manufacturing information . [FoF.ICT-2011.7.1 c\)](#)

(b) Virtual Factories: Value creation, global networked manufacturing and logistics

- (b1) Increasing management efficiency of global networked manufacturing [FoF.NMP.2010-2](#)
- (b2) ICT for sustaining the value of products . [FoF.ICT-2011.7.3 c\)](#)
- (b3) Product/service systems. [FoF.ICT-2011.7.3 c\)](#)
- (b4) Managing volatile manufacturing assets . [FoF.ICT-2011.7.3 b\)](#)

(c) Digital factories: Manufacturing design and product life cycle management

- (c1) Knowledge and analysis [FoF.ICT-2011.7.4 a\)](#)
- (c2) Enhanced, interoperable models for products and processes
- (c3) Design environments. [FoF.ICT-2011.7.4 a\)](#)
- (c4) Lifecycle management. [FoF.ICT-2011.7.4 a\)](#)

SD3 High performance manufacturing

(a) Flexible adaptive production equipment, systems and plants for rapid (re)configurations and optimal energy use

- (a1) New high performance manufacturing technologies in terms of efficiency (volumes, speed, process capability), robustness and accuracy.) [FoF.NMP.2012-4](#)
- (a2) Plug and play components based on intelligent materials or combinations of passive and active materials (engineered materials) to increase the adaptability of production systems
- (a3) New hybrid production systems for manufacturing and assembly/disassembly, based on improved robotics and/or automation technology for cooperative production tasks between humans and robots
- (a4) Adaptive machines and production systems for optimal energy consumption [FoF.NMP.2011-1](#)

(b) High precision micro-manufacturing machines and systems

- (b1) Rapid Micro-Manufacturing technologies. [FoF.NMP.2010-3](#)
- (b2) 3D Micro-parts Production. [FoF.NMP.2012-5](#)
- (b3) Micro-factory and Micro-Manufacturing Systems. [FoF.NMP.2010-3](#)

(c) Tools for production planning and in-situ simulation for open reconfigurable and adaptive manufacturing systems

- (c1) Methodologies and tools for reconfigurable manufacturing systems design for healthy, green and safe customer products. [FoF.NMP.2011-4](#)
- (c2) Knowledge based tools for process planning. [FoF.NMP.2012-5](#)
- (c3) Integrated shop-floor simulation. [FoF.NMP.2012-5](#)
- (c4) Advanced interactive graphical user interface

(d) Zero defect manufacturing [FoF.NMP.2011-5](#)

- (d1) Quality monitoring and proactive process improvement for geometric shape data and material quality
- (d2) Intelligent Measuring Systems for Zero-Defect Manufacturing
- (d3) Advanced decision-making tools for zero defect manufacturing
- (d4) Development of a new generation of knowledge-based self-learning systems

SD4 Exploiting new materials through manufacturing

(a) Net-shape manufacturing for advanced structural and functional materials

- (a1) Complete manufacturing chains for nanophased components [FoF.NMP.2011-6](#)
- (a2) Manufacturing of engineered metallics and composite materials
- (a3) Up-scaled systems for high performance manufacturing of textile-based structures for high value added and XXXL size applications

(b) New material functionalities through manufacturing processes

- (b1) Roll-to-roll manufacturing of large area and high throughput flexible plastics electronics . [FoF.ICT-2011.7.2](#)
- (b2) Manufacturing processes for new flexible components [FoF.ICT-2011.7.2](#)

(c) Manufacturing strategies for renovation and repair

(d) Product design using sustainable material processing technologies

- (d1) Modelling and simulation of manufacturing processes. [FoF.NMP.2012-7](#)
- (d2) Manufacturing processes using advanced materials for energy generation and supply
- (d3) Manufacturing of highly miniaturised components
- (d4) New technologies for casting, material removing and forming processes. [FoF.NMP.2012-7](#)

Summary of roadmap coverage

- Main R&D Challenges. Topics covered

SD1 Sustainable Manufacturing (5 out of 11)

SD2 ICT enabled Intelligent Manufacturing (13 out of 14)

SD3 High performance manufacturing (12 out of 15)

SD4 Exploiting new materials through manufacturing (5 out of 10)

Overall: 35 out of 50 topics already covered

THANKS!

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