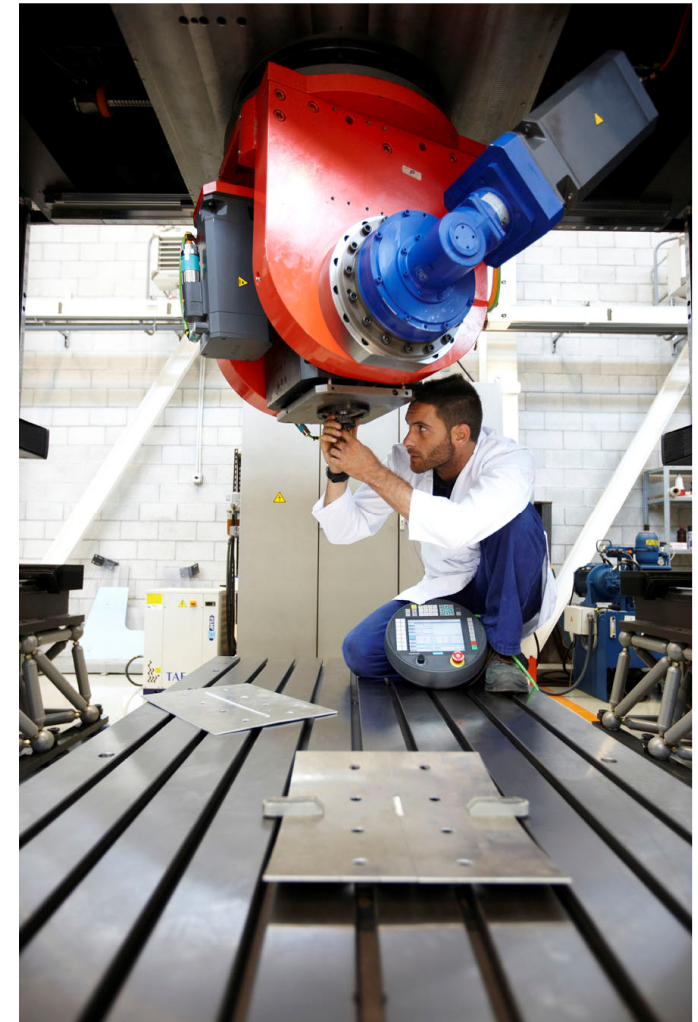


Vision 2020 – Technological challenges to be faced: Strategic Multiannual Roadmap Factories of the Future PPP

CleanTech

Geneva, 2010-06-02



RTD Needs provided by

- Manufuture Sub-platforms: Agriculture Engineering and Technologies-AET, Clean Environment Technology-CET, European Concept, Foot wear, Micro Nano Manufacturing-MINAM, Rapid Manufacturing-RM, European Tooling
- Other ETPs: Advanced Engineering Materials and Technologies-EuMat, ARTEMIS, ENIAC, EPOSS, European Steel Technology Platform (ESTEP), Future Textiles and Clothing-FTC, Industrial Safety, NESSI, Photonics 21, Robotics-EUROP, Food for Life, Sustainable Chemistry, Waterborne
- Manufacturing related ETPs: Advisory Council for Aeronautics Research in Europe-ACARE, European Construction Technology Platform, European Rail Research Advisory Council (ERRAC), European Road Transport Research Advisory Council-ERTRAC, European Space Technology Platform-ESTP, Forest Based Sector Technology Platform-Forestry, Photovoltaics



RTD Needs Selection Criteria

- Innovative Enabling Technology - Must
- Factory Oriented Technology-Must
- Cross Sectorial Application Fields

Contribution of Clean Technologies is fundamental as key enabling technologies and cross sectoral



Basic content and structure of the multi-annual roadmap: 2011-2013

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

(a) Environmental friendliness

- (a1) High efficiency and near to zero emissions
- (a2) Alternatives to energy-intensive processes
- (a3) Improved use of renewable resources at factory level.
- (a4) Production using environment-neutral materials.

(b) Economic growth

- (b1) Methodologies and tools for sustainable maintenance.
- (b2) Innovative re-use of equipment and factory design
- (b3) Decision support methodologies for the design of manufacturing systems.

(c) Social well-being

- (c1) Adaptive and responsive human machine interface.
- (c2) New human-robot interactive cooperation in advanced factory environments.
- (c3) The new human-centred production site.
- (c4) Development and adaptation of organisational structures and leadership for sustainability.



SD2 ICT enabled Intelligent Manufacturing I

(a) Smart Factories: Agile manufacturing and customisation

- (a1) Adaptive and fault tolerant process automation, control and optimisation technologies and tools
- (a2) Intelligent production machines and “plug-and-produce” automation equipment,
- (a3) Large-scale validation of robotics-based and other automated manufacturing
- (a4) intelligent cooperative automation and robotic control systems
- (a5) Laser applications
- (a6) New metrology tools and methods for large-scale and real-time manufacturing

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

- (b1) Increasing management efficiency of global networked manufacturing
- (b2) ICT for sustaining the value of products
- (b3) Product/service systems
- (b4) Managing volatile manufacturing assets

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

- (c1) Knowledge and analysis
- (c2) Enhanced, interoperable models for products and processes
- (c3) Design environments
- (c4) Lifecycle management



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.)
- (a2) Plug and play components based on intelligent materials or combinations of passive and active materials (engineered materials)
- (a3) New hybrid production systems for manufacturing and assembly/disassembly, based on robotics and/or automation technology
- (a4) Adaptive machines and prod. systems for optimal energy consumption

(b) High precision micro-manufacturing machines and systems

- (b1) Rapid Micro-Manufacturing technologies
- (b2) 3D Micro-parts Production
- (b3) Micro-factory and Micro-Manufacturing Systems

(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
- (c2) Knowledge based tools for process planning
- (c3) Integrated shop-floor simulation
- (c4) Advanced interactive graphical user interface

(d) Zero defect manufacturing

- (d1) Quality monitoring and proactive process improvement
- (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
- (a2) Manufacturing of engineered metallics and composite materials
- (a3) Up-scaled systems for high performance manufacturing of textile-based structures

(b) New material functionalities through manufacturing processes

- (b1) Roll-to-roll manufacturing of large area and high throughput flexible plastics electronics
- (b2) Manufacturing processes for new flexible components

(c) Manufacturing strategies for renovation and repair

(d) Product design using sustainable material processing technologies

- (d1) Modelling and simulation of manufacturing processes
- (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





Links:

www.manufuture.org

www.effra.eu

Factories of the Future AIAG members:

INESC, PATRAS UNIV., AGORIA, TWI, FESTO, TNO,
DAIMLER, VDMA, SAP, COMAU, TRUMPF, RUROBOTS,
CRF, CETIM, FATRONIK-TECNALIA

Involved European Commission members:

DG RTD, DG INFSO

