Information Days of the Research PPPs
Brussels, 16 December 2013

Factories of the Future in Horizon 2020
Work Programme 2014

A joint presentation by Project Officers of
DG RTD & DG CONNECT
Factories of the Future Call Objectives

• "Re-industrialisation"
  o Ensure best use of technology to boost productivity
  o Increase market share of EU suppliers of innovative manufacturing technology
  o Raise industrial investment in equipment from 6% to 9% by 2020

• More environment-friendly and competitive manufacturing:
  o Reduction of energy consumption in manufacturing, up to 30%
  o Less waste generated by manufacturing activities, up to 20%
  o Less consumption of materials (up to 20%)

• R&I to integrate & demonstrate innovative manufacturing technologies in:
  o Adaptive and smart manufacturing equipment, 3D printing, increased production performance, collaborative and mobile enterprises, ...
FoF PPP in Work Programme 2014-15

**FoF 1:** Process Optimisation of Manufacturing Assets

**FoF 2:** Manufacturing Processes for Complex Structures & Geometries with Efficient Use of Material

**FoF 3:** Global Energy & Other Resources Efficiency in Manufacturing Enterprises

**FoF 4:** Developing Smart Factories That are Attractive to Workers

**FoF 5:** Innovative Product-Service Design Using Manufacturing Intelligence

**FoF 6:** Symbiotic Human-Robot Collaboration for Safe & Dynamic Multi-modal Manufacturing Systems

**FoF 7:** Support for the Enhancement of the Impact of FoF PPP Projects

**FoF 8:** ICT-Enabled Modelling, Simulation, Analytics & Forecasting Technologies

**FoF 9:** ICT Innovation for Manufacturing SMEs

**FoF 10:** Manufacturing of Custom-Made Parts for Personalised Products

**FoF 11:** Flexible Production Systems Based on Integrated Tools for Rapid Reconfiguration of Machinery & Robots

**FoF 12:** Industrial Technologies for Advanced Joining & Assembly Processes of Multi-Materials

**FoF 13:** Re-Use and Re-Manufacturing Technologies & Equipment for Sustainable Product Lifecycle Management

**FoF 14:** Integrated Design & Management of Production Machinery & Processes
FoF 1

Process Optimisation of Manufacturing Assets

1. FoF ICT: Digital Manufacturing
   ICT WP2014
   Outlook
FoF 2
Manufacturing Processes for Complex Structures & Geometries with Efficient Use of Material

Specific Objective:
Manufacturing of complex structures & shapes with multi-layered, hybrid materials under energy & material optimisation constraints

Scope:
Innovative approaches addressing:
- Material-efficiency in the manufacturing process: either first-time-right or through material recycling/reuse
- The energy efficiency of the machinery
- Process control: Increasing output & allowing high recycling rates
FoF 2

Manufacturing Processes for Complex Structures & Geometries with Efficient Use of Material

Scope:
R&D to address:
- Manufacturing process control & monitoring strategies based on integrated process & machine models
- Strategies for energy use characterisation of enterprises
- Coherent business models (incl. economic, strategic & commercial viability analysis)

Expected Impact:
- 30% reduction in material use
- 20% reduction in energy consumption related to complex structures & geometries compared to standard practice
- Elimination of faulty parts through combination of integrated process-machine approaches with continuous parameter control

RIA 100%
TRL 4-6
FoF 3  Global Energy & Other Resources Efficiency in Manufacturing Enterprises

Specific Challenge:

Development of new business models facilitating the collaboration of companies operating in the same value chain to reduce energy & other resources consumption

Scope:

- Capture energy & resource consumption data across the value chain & adequate modelling patterns for decision making
- Explore business models facilitating operational efficiency & coherence across the value chain
- ... >>>
FoF 3 Global Energy & Other Resources Efficiency in Manufacturing Enterprises

**Scope:**
- Explore multi-site intelligent energy & resource demand management & optimisation strategies (incl. MES adaptation)
- Develop enterprise certification in line with eco-design principles
- Analyse commercial viability of investigated business cases

**Expected Impact:**
- Energy consumption and CO2 emission reduction (LCA) for the final product of at least 20% from cradle to gate (use and disposal omitted)
- 30% reduction in energy consumption & CO2 emissions for the final product cradle-to-grave
- 10% reduction of lifecycle cost for the final product cradle-to-grave
FoF 4  Developing Smart Factories That are Attractive to Workers

Specific Challenge:
Manufacturing enterprises need to be attractive to potential workers. The aim is to demonstrate the operation of a real smart factory, focusing on the interconnection between organisation, workforce, management and technology.

Scope:
Multi-disciplinary demo activities involving in particular as appropriate disciplines of Social Sciences and Humanities addressing:

- Methods & tools for design or re-adaptation of facilities & technology to support productivity, wellbeing & worker autonomy in production
- New methods & technologies supporting knowledge capture & team interaction to enhance work satisfaction, safety & ergonomics
- ...>>>
FoF 4

Developing Smart Factories That are Attractive to Workers

Scope:
- Integration of innovative production technologies supporting increased productivity and flexibility
- Training & educational aspects to raise job attractiveness for young & the elderly

Expected Impact:
- Improved working conditions & working environment
- Improved work satisfaction of employees
- 10% productivity increase based on improved staff commitment, organisation of work and widening the skill profile
- Strengthened global position of EU manufacturing
FoF 5  Innovative Product-Service Design Using Manufacturing Intelligence

Specific Challenge:
Concurrent product-service engineering with rapid knowledge feedback based on advanced and secure handling of information

Scope:
R&D for open, multi-disciplinary holistic product-service engineering environments addressing:

• Collaborative management of multi-directional engineering knowledge (e.g. effective search for design functionality & reuse)
• Tools & methods for effective stakeholder involvement
• Search, simulation, optimisation of designs & innovative, intuitive visualisation
• Quantification of time-to-market & CO2 footprints
FoF 5

Innovative Product-Service Design Using Manufacturing Intelligence

**Expected Impact:**

- Improved time-to-market
- Sustainability across the entire product lifecycle
- Knowledge sharing across production phases
- Product-service offers
- Support to open standards

**RIA 100%**

**TRL 4-6**

Source: Bruegel (2013)
FoF 6  Symbiotic Human-Robot Collaboration for Safe & Dynamic Multimodal Manufacturing Systems

**Specific Challenge:**
Immersive & symbiotic collaboration between humans & robots as a prerequisite for increased robot-driven automation in manufacturing

**Scope:**
Demo activities to focus on 2 topics:
(1) Worker safety:
   - *Strategies for online safety monitoring*
   - *Intrinsically safe industrial-scale robot hardware*
   - *Fail-safe precautionary measures for intense human-robot collaboration*
FoF 6  Symbiotic Human-Robot Collaboration for Safe & Dynamic Multimodal Manufacturing Systems

Scope:

(2) Human-robot interaction:

- Intuitive & multimodal programmability of robot systems for cost efficient deployment in manufacturing environments
- Methodologies for initial & online dynamic re-planning of shared tasks
- Innovative fast & cost-effective sensors; real-time data analysis

Expected Impact:

- Industrial scale demonstrator of safe tight human-robot collaboration & normative improvement
- Increased penetration of robot systems particularly in high-manual-labour industries
- Increased readiness for the introduction of human-robot systems & demonstrated cost effectiveness
FoF 7  Support for the Enhancement of the Impact of FoF PPP Projects

Specific Challenge:
Stimulating cross-project collaboration, enabling technology transfer & exploiting synergies for programme success

Scope:
A 2-year coordination action to liaise with relevant industrial associations & tech transfer programmes including activities such as:
• Reviews of recent technological developments, innovation programmes & publications
• Workshops with int’l experts to elaborate on future FoF priorities
FoF 7  Support for the Enhancement of the Impact of FoF PPP Projects

Expected Impact:

- Speeding up industrial exploitation & take-up of PPP projects
- Stimulation of R&D & innovation networks & alliances
- Add value through sharing of best practices, exploiting synergies, creating awareness
- Support IPR management & standardisation
- Anticipating business trends & market prospects

CSA 100%
Contact Points for Work Programme 2014 Topics

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**FoF 7:** Support for the Enhancement of the Impact of FoF PPP Projects

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For further Information ...

- **FP7 Research Themes and Call:**
  [ec.europa.eu/research/participants/portal](ec.europa.eu/research/participants/portal)

- **Horizon 2020 documents:**

- **Roadmap FoF PPP 2020:**