

Factories of the Future PPP Brussels, 13 July 2009

Smart Factories: ICT for Agile & Environmentally Friendly Manufacturing

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Presentation Outline

- The ICT Contribution to the FoF Multi-Annual Roadmap
- WP2010: Cross-thematic Call on “Smart Factories”
- Funding Schemes, Call Focus
- Call Topics



FP7 ICT Theme Contribution to Factories of the Future

- Total 2010-2013: € 1.2 billion
- € 600 million is public funding
- From the ICT Theme:

	2010	2011	2012	2013	Total
€ million	35	70	70	70	245

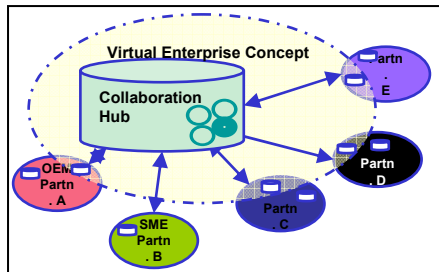
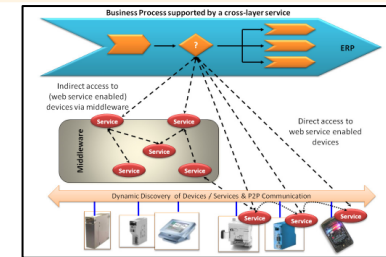


FoF ICT Industrial Consultation Meetings: To Contribute to the Multi-Annual Roadmap

**1st Mtg
4 March '09**

Smart Factories:

- Agile manufacturing & customisation: Process automation, control & optimisation technologies, robotics & tools for sustainable manufacturing



Virtual Factories:

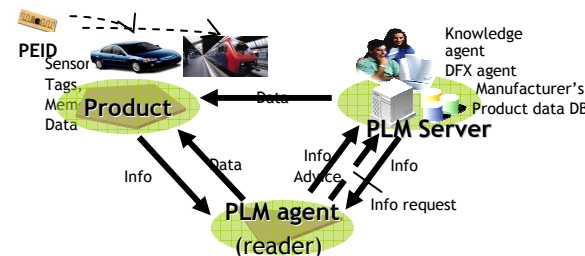
- Value creation from global networked operations: global supply chain management, product/service linkage, management of distributed manufacturing assets

**2nd Mtg
2 June '09**

Digital Factories:

- Better understanding & design of manufacturing systems: simulation, modelling, lifecycle & knowledge management from product conception, manufacturing, operations, maintenance, disposal

**ICT
Position
Paper**



The Internet of Things* in Factories of the Future

- **Target outcome of these projects:**
 - New & enhanced SCM, ERP, MES systems that support IoT
 - New business models establishing true internet enterprises
 - New applications that are able to capture knowledge over the full product life cycle
- **IoT applications in manufacturing:**
 - Transport & logistics
 - Energy efficiency
 - Environment
 - Material handling & quality
- **IoT applications in managing the product lifecycle :**
 - Product quality
 - Efficient recall
 - Self diagnostics, maintenance
 - Enhanced safety, reduce counterfeiting, ...

* Part of the “Virtual Factories” topic in the Multi-Annual Roadmap



FoF WP2010 Opportunities for Micro- / Nanoelectronics Manufacturers

- **FoF NMP part is also relevant for manufacturers (esp. SMEs!) of customised electronic products:**
 - Supply chain approaches for small series industrial production (data management, design systems)
 - Scalable manufacturing platforms & equipment for components with micro- & nano-scale features (DfM, automatic handling of small parts, characterisation, quality control, yield management)
- **Related other Calls in microelectronics manufacturing:**
 - ICT Call 5 - Nanoelectronics (open 31/07/2009, deadline 26/11/2009) about new manufacturing approaches, semiconductor equipment assessment, 450-mm wafer processing, related manufacturing platforms
 - ENIAC Call 2 - full proposal stage - deadline 03/09/2009



Cross-Thematic Call ICT/NMP: ICT Part



- Relevant to “Factories of the Future“:
 - Focus in 2010 is on “Smart Factories”
 - Industry-led projects
- Projects should:
 - Focus on the use of advanced ICT-based technologies for production
 - Contain a strong validation element
 - Have quantifiable targets
- Funding: € 35 million
 - Mainly collaborative projects: IPs and STREPs
 - 1 European “ICT for Factories of the Future” Coordination Action
- Expected impact:
 - Higher level of intelligence & environmental consciousness on the shop floor
 - Introduction of advanced automation into mainstream manufacturing
 - Develop European market for advanced shop floor technologies
 - Higher productivity of customised manufacturing paired with reduced emissions & waste



Smart Factories: ICT for Agile & Environmentally Friendly Manufacturing

Large-scale integrating projects:

- IP
 - “programme” approach
 - including a coherent integrated set of activities
 - R&D + demonstration and/or R&D + training, standardisation, ...

- (a) Integrated process automation & optimisation for sustainable manufacturing
- (b) Context-aware ICT applications & scalable networks of sensors integrated in machines & factory-level infrastructure

Small or medium-scale focused research actions:

- STREP
 - Objective-driven research
 - Clearly defined S&T objectives
 - Aiming to obtain specific results

- (c) Robotics-enabled production processes tested & validated in real-world environments
- (d) Laser applications: To integrate, test & validate lasers & laser systems

Coordination or networking actions:

- CSA
 - Organisation of events
 - Studies

- (e) European “ICT for Factories of the Future” Coordination Action



Sensors & Controls for Clean & (Energy) Efficient Shopfloor

(a) Integrated process automation & optimisation for sustainable manufacturing

IP

- Shopfloor-based platforms & systems in seamless cooperation with enterprise software (MIS, ERP, MES)
- High yield, high quality paired with low energy consumption, low waste

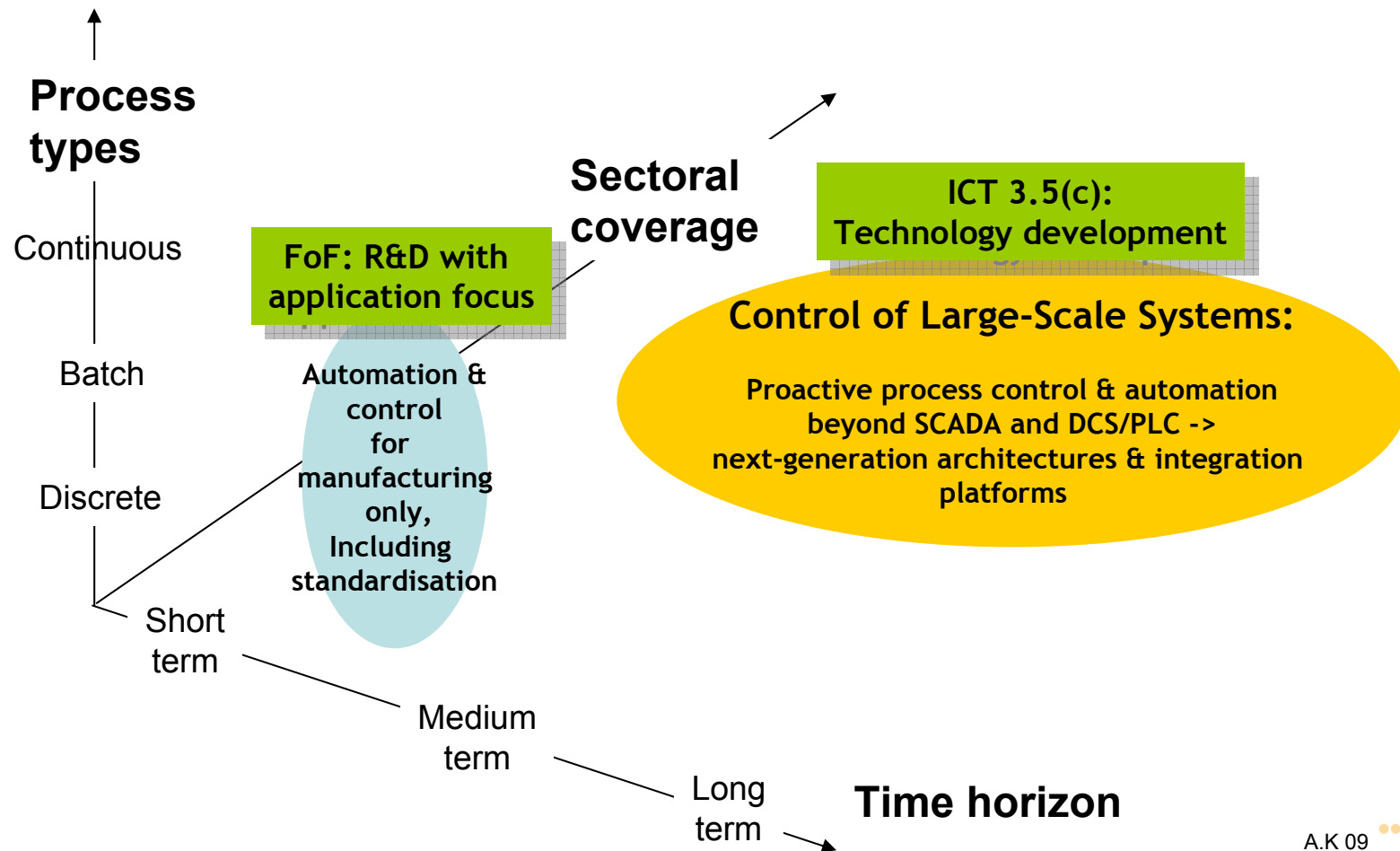
(b) Context-aware ICT applications & scalable networks of sensors integrated in machines & factory-level infrastructure

IP

- “Self” sensors: wireless, energy autonomous, self-diagnosing & -repairing
- To support real-time monitoring of energy use & material flow



Controls for Clean & (Energy) Efficient Shopfloor



Robotics-enabled Production: Why?

- Within the past five years, tremendous advances in robotics technology have enabled a new generation of applications in fields as diverse as agile manufacturing, logistics, medicine, healthcare and other commercial and consumer market segments. (A Roadmap for U.S. robotics, USA, May 2009).
- Europe's industrial robotics industry has a worldwide market share of approximately 25%. Building on this position and ensuring a strong foothold in newly emerging market sectors are key priorities for European robotics (EUROP SRA, JULY 2009).



Robotics-enabled Production: Objectives

(c) Robotics-enabled production processes tested & validated in real-world environments:

- Involving system integrators and manufacturers
- Testing & validating robotic prototypes, paving the way for large-scale operations in smart factory environments
- Domains where robotics use is not (yet) so high e.g.
 - o food processing and packaging
 - o service supply (logistics, transport and warehousing)
 - o lightweight goods industries
 - o with SMEs as well as large industries

STREP



Lasers in Production

(d) Laser applications: To integrate, test and validate novel lasers & laser systems

- in energy-efficient processes, and/or
- for the production of environmentally friendly products

STREP

To investigate how lasers & laser systems can (for example: high-power sources, new wavelengths, frequency conversion, remote processing, etc.) can benefit the shop floor operations

Note: ICT call 5 (closing on 26 October 2009) includes in Objective

- ICT-2009.3.7 Photonics: Actions on highly integrated components for high average & high peak power lasers for ICT & industrial applications (fibres, fibre lasers, diode lasers, ...)



ICTs & Factories of the Future

(e) European “ICT for Factories of the Future” Coordination Action:

CSA

- To elaborate European vision & roadmap “ICT for Factories of the Future”
- Facilitate industrial learning across industries
- Towards FP8



For more information

The 7th Framework Programme on Cordis:

<http://cordis.europa.eu/fp7>

<http://cordis.europa.eu/fp7/ict>

FoF Web site:

[http://ec.europa.eu/research/industrial_technologies/
lists/factories-of-the-future_en.html](http://ec.europa.eu/research/industrial_technologies/lists/factories-of-the-future_en.html)

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FoF WP2011-13 Opportunities for Micro- / Nanoelectronics Manufacturers

- **In forthcoming FoF Calls:**
 - New metrology tools & methods for handling of manufacturing information (remote in-situ measurement of process parameters, incl. VM based E & P control)
 - Assessment of manufacturing, automation, handling & metrology equipment (Short user/supplier feed-back loops: reliability, productivity, CoO)

