

# ICT NCP InfoDay

## 23 June 2010, Brussels

### The Factories of the Future

### ICT Objectives 7.3 and 7.4

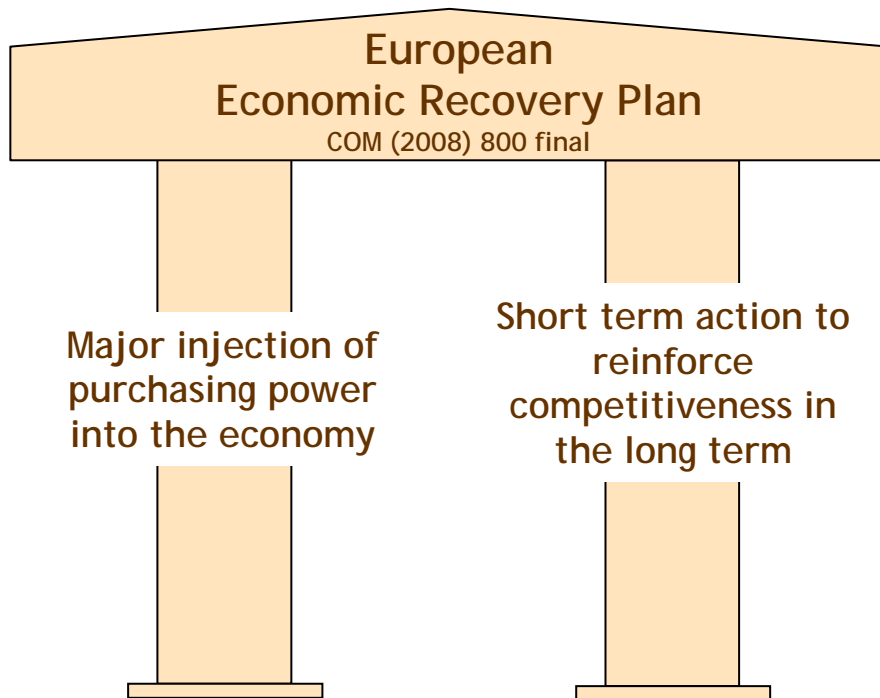
Erastos Filos, PhD  
FoF ICT Coordinator



- FoF: Background & Rationale
- Outcome of first FoF ICT Call in 2009
- The FoF ICT Call in 2010
- Useful links



# Recovery Plan: Strategic Aims



- Stimulate demand, boost consumer confidence
- Maintain jobs
- Increase competitiveness
- Speed up shift towards low carbon economy



# Factories of the Future (FoF): Context

- What:
  - Part of the Recovery Plan
  - To help manufacturing, in particular SMEs, across a broad range of sectors be competitive after the Crisis is over
- How:
  - Industry-driven R&D projects
  - 4 annual co-ordinated calls until 2013 between the two relevant FP7 Themes, ICT and NMP
- Who:
  - R&D stakeholders of European Technology Platforms ARTEMIS, ENIAC, EPOSS, EUROP, NESSI, PHOTONICS21, MANUFUTURE
  - Technology providers & industrial users (large & SME), academic researchers
- Total FP7 budget (2010-2013):
  - 245 M€ (ICT) + 400 M€ (NMP)



# State of the Industry & Expected Impact

- Europe's manufacturing
  - More than 25 sectors, 21 % of GDP (= € 6.5 trillion), 30+ million jobs
  - Crisis has reduced Europe's production capacity
  - Export champions (but at risk) in machinery, automobiles, wind turbines, ...
  - Largest global market share in automation & factory equipment
  - Under threat from low wage economies (eg mass-produced goods)
  - Chance to compete through high added-value products (eg quality, services, customisation, clean & energy efficient processes)
- FoF ICT: Technology leaders to gain market share
  - Automation/industrial robotics & laser technology solutions for factory environments
  - Product/production design tools (eg software for modelling, simulation, visualisation)
  - Software for enterprise/supply-chain management
- FoF ICT: European industrial end users to
  - Integrate latest technology into their production environments
  - Build on new competencies (knowledge, organisation, skills, business models)
  - Use technologies that enable energy-efficient and "waste-less" production



# Factories of the Future Multi-Annual Roadmap 2010-2013

## Sub-Domains:

1. Sustainable Manufacturing
2. ICT-enabled intelligent manufacturing
3. High-performance manufacturing
4. Exploiting new materials through manufacturing



[http://ec.europa.eu/research/industrial\\_technologies/pdf/ppp-factories-of-the-future-strategic-multiannual-roadmap-info-day\\_en.pdf](http://ec.europa.eu/research/industrial_technologies/pdf/ppp-factories-of-the-future-strategic-multiannual-roadmap-info-day_en.pdf)



# First FoF ICT Call (2009)

## Key Figures & Essentials

- Focus on “Smart Factories”
- Proposals were expected to:
  - use advanced ICT-based technologies in production
  - be industry-driven
  - Have a strong validation element with quantifiable targets
- 34 eligible proposals received
- Requested funding ca. € 160 million (vs. € 35 million available)  
(-> ratio 1:5)
- “Downstream research”: Industrial implementation horizon 2013-15



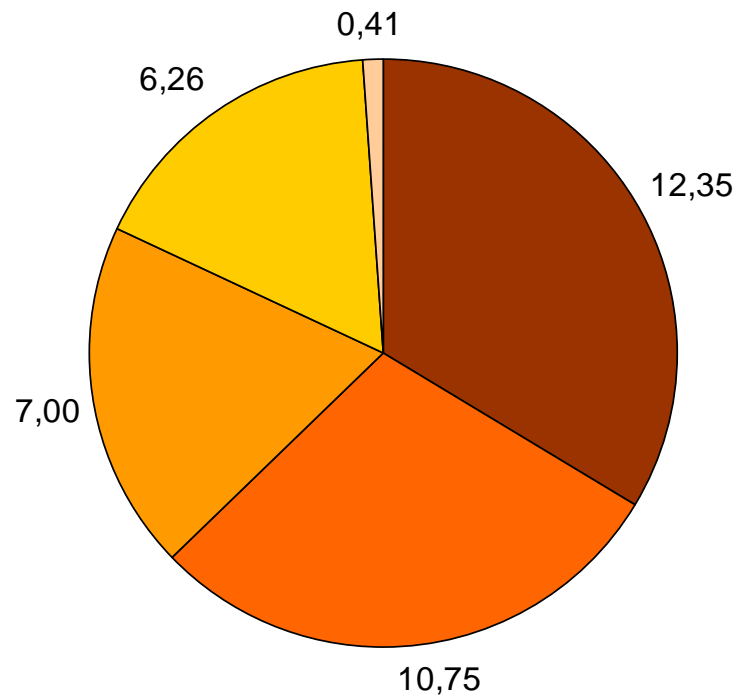
# FoF ICT Call 2009: Successful Proposals “Smart Factories”

Objective FOF.ICT.2010.1	Retained Proposals	Issues covered	Issues not covered
a) Integrated process automation & optimisation for sustainable manufacturing	PLANTCOCKPIT FOFDATION	All	
b) ICT and sensors supporting real-time monitoring of energy use & material flow	KAP	All	
c) Robotics-enabled production processes tested & validated in real-world environments	ROBOFOOT FLEXIPACK TAPAS	All	
d) Laser applications	QCOALA	Production of environmentally friendly products	Laser systems for energy-efficient processes
e) European ICT for Factories of the Future	ACTIONPLANT	All	



# FoF ICT Call 2009: Funding per Organisation Type

## Funding (M€) of the selected proposals



■ Private commercial ■ Research organisations ■ HES ■ SME ■ Other



# Vision: ICT is key to Factories of the Future

## Smart Factories:

- Goal:  
More automation, better control & optimisation of factory processes
- Means:  
Software, lasers & intelligent devices embedded in machines & factory infrastructure

- Less waste
- Less energy use
- Faster time-to-market
- Better quality

## Virtual Factories:

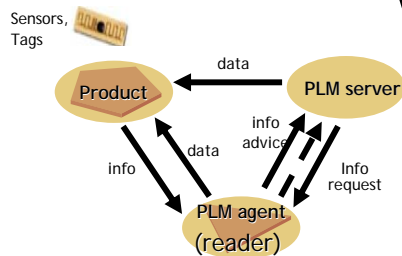
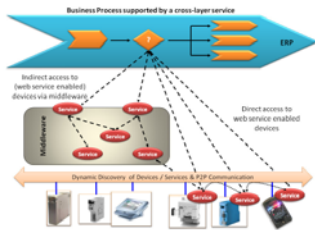
- Goal:  
To manage supply chains; to create value by integrating products & services
- Means:  
Software to holistically interconnect & manage distributed factory assets; new business models & value propositions

- High-value products
- Keep jobs in Europe
- Process transparency
- IPR security
- Lower CO<sub>2</sub> footprint

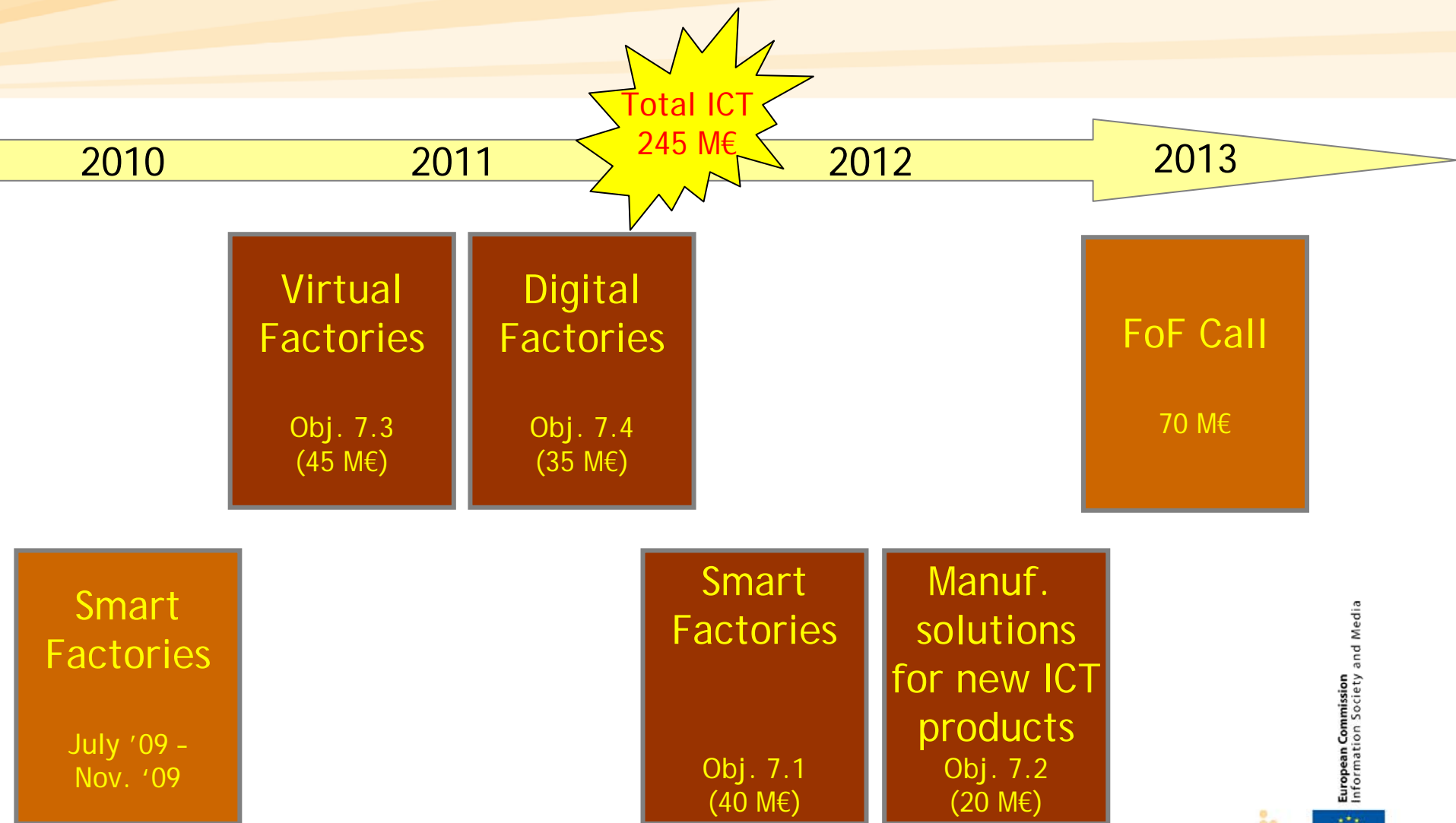
## Digital Factories:

- Goal:  
To "see" the product before it is produced
- Means:  
Software for the digital representation & test of products & processes prior to their manufacture & use

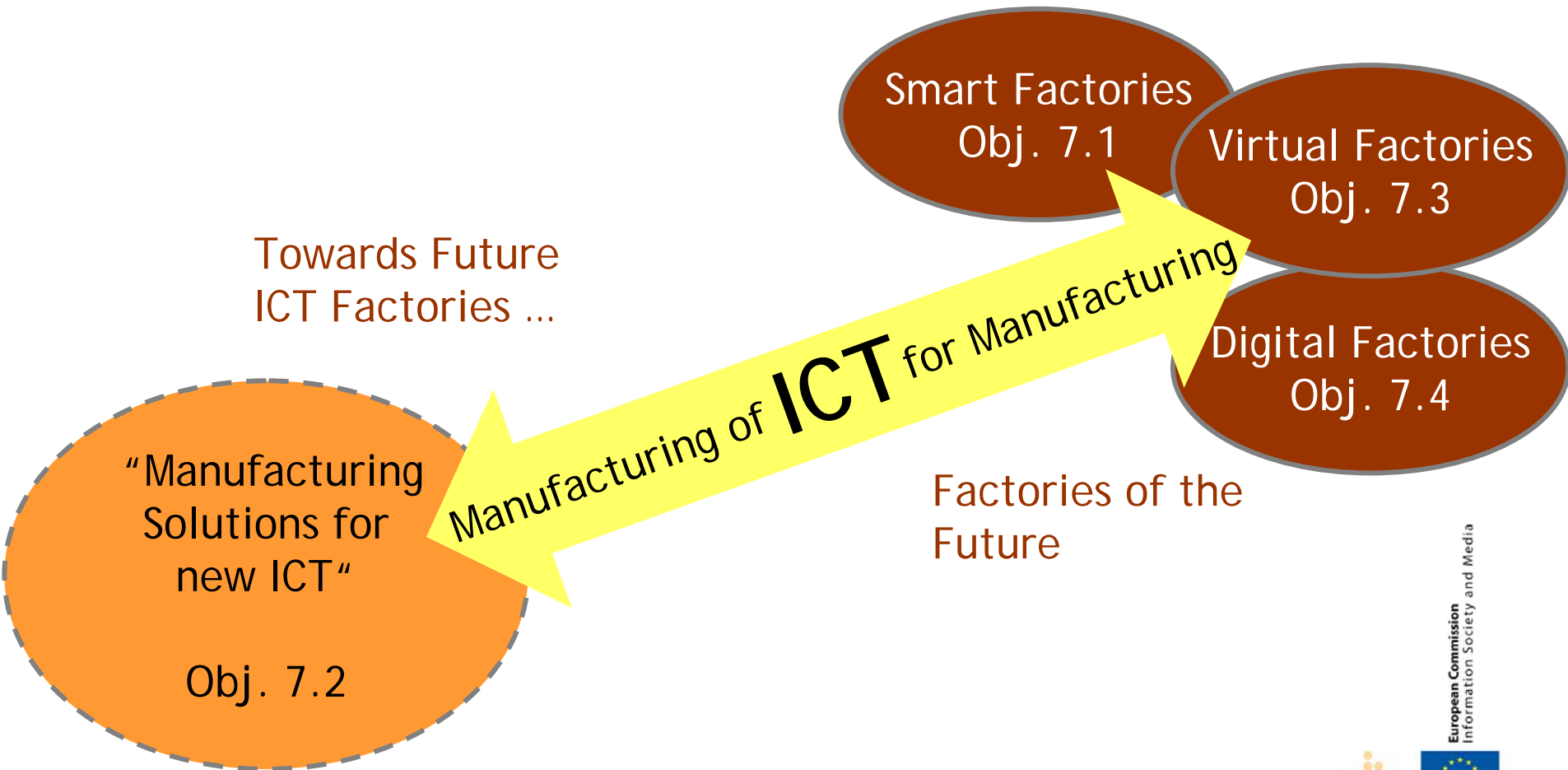
- Reduce design errors
- Better & efficient products
- Less waste + rework
- Faster time-to-market



# Factories of the Future & ICT Work Programme



# ICT Work Programme 2011-12: Challenge 7



# Objective 7.3

## Virtual Factories & Enterprises

### Where do we stand?

- Manufacturing is undergoing radical change:  
From the simple provision of products towards a provision of product-enabled functionality
- Key industry players:  
SAP, Alcatel-Lucent, ATOS Origin, BT, Telefonica, France Telecom, T-Systems, ...
- Intelligent products offer opportunities for value creation & jobs
- Fragmented markets

### What do we want to achieve & why?

- End-to-end integrated ICT for distributed enterprise/factory productivity
- Better management efficiency & environmental sustainability of supply chains
- Improve product/service integration: New business models; value proposition
- Carbon-tracing of products from “cradle-to-grave”:  
Towards an energy-transparent product lifecycle



# Objective 7.3

## Virtual Factories & Enterprises

### Target outcomes

- a) Distributed, adaptive, interoperable virtual enterprise environments
  - Integration of novel management methods & ICT to help virtual factories/enterprises move beyond existing operational capability
- b) Real-time management of volatile manufacturing assets
  - Manage inventories, stakeholder relationships, product configurations, knowledge & skills across the value chain
- c) Component-based tools & architectures enabling innovative & dynamic composition of services
  - Sustainable lifecycle management of product-based services
- d) Internet-based user-centric collaboration, sharing and/or mixed reality tools
  - Incl. new manufacturing business models & practices to enhance & sustain product-based services across the value chain

**Call FoF in 2010**

**45 M€**

**IPs/STREPs**



# Objective 7.4: Digital Factories

## Manufacturing design & product lifecycle management

### Where do we stand?

- PLM market size: 15 B\$/yr
- Market dominated by “island solutions”
- Key industry players: Dassault Systèmes, Delcam, Siemens PLM Systems, SAP, Eigner+Partner, many high-tech SMEs
- EU leadership threatened by competitors from the USA & India
- Today’s complex products (e.g. avionics) require thorough testing at early (digital) prototype stage

### What do we want to achieve & why?

- Strengthen EU competence
- Reinforce EU leadership in knowledge-driven platforms, tools, methodologies, product development & manufacturing design
- New products to be realised with shorter time-to-market, shorter time-to-production
- Improve drastically accuracy, reliability & speed of products/process simulation techniques, permitting design decisions earlier (thus reducing costs)



# Objective 7.4: Digital Factories

## Manufacturing design & product lifecycle management

### Target outcomes

- a) Comprehensive engineering platforms
  - Cross-disciplinary information sharing, workflow integration, knowledge capture
- b) User-intuitive tools for simulation & virtual prototyping
  - E.g. better models with forward & backward compatibility, model auto-generation, meshing, optimisation
- c) Tools for holistic modelling & simulation of full complex products & processes
  - With multi-physics features, allowing tolerance changes
  - Product/process behaviour simulation from the atomic level upwards

**Call FoF in 2010    35 M€    IPs/STREPs/CSA**



# FoF ICT Objectives 7.3 & 7.4

## Must Have

- “Virtual Factories” (7.3) focus:
  - Integration of the distributed manufacturing enterprise (incl. supply chains)
  - Integration of products & services
  - Management of volatile manufacturing assets
- “Digital Factories” (7.4) focus:
  - Engineering platforms
  - Tools for simulation & virtual prototyping
  - Tools for complex products & process modelling & simulation
- Proposals must:
  - use advanced ICT-based technologies in production
  - be industry-driven
  - have a strong validation element with quantifiable targets
- “Downstream research”:
  - Industrial implementation horizon 2013-15



# Thank you

## FoF on the web:

[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)

## Information Event in Brussels, 9 July 2010:

[http://ec.europa.eu/research/industrial\\_technologies/lists/events-fp7-information-day-2010\\_en.html](http://ec.europa.eu/research/industrial_technologies/lists/events-fp7-information-day-2010_en.html)

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