

**Cluster-Workshop zu Miniaturisierung und Smart Systems Integration  
Stuttgart, 15. Juli 2009**

**EPoSS,  
the European Technology Platform on Smart Systems Integration**

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Stuttgart, 15.07.2009

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## 1. Smart Systems: Definition and Technological Aspects

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### From the Past to the Future: from Microsystems to Smart Systems

#### Microsystems...

are miniaturised devices combining

- sensing
- signal processing
- actuation

through monolithic or hybrid integration.



Smart implant



Smart RFID



Smart tire

#### Smart Systems...

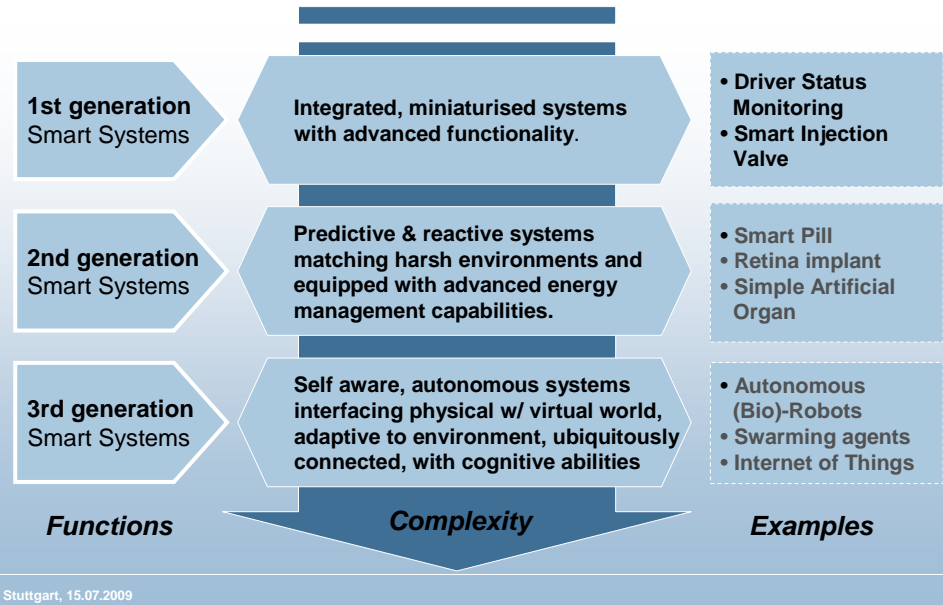
- are able to describe a situation and diagnose it,
- are predictive,
- are able to decide or help to decide,
- enable the product to interact with the environment.

They are as small as possible, networked & energy autonomous

*Smart Systems is not  
just Electronics !*

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## The Evolution of Smart Systems

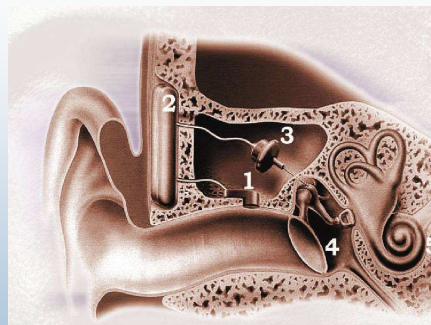


## Example of a Smart System

- Entering the world of sounds
- Hearing aid for the direct electro-mechanical stimulation of the inner ear



This implant helps to get back the capability of hearing and improves life quality considerably



- |               |             |
|---------------|-------------|
| 1 Sensor      | 4 Tympanic  |
| 2 Main module | 5 Inner ear |
| 3 Actuator    |             |

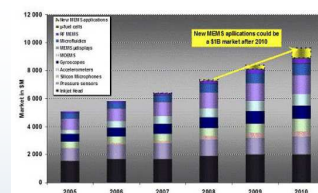
Bildquelle: IMPLEX AG Hearing Technology

## 2. Relevance and Opportunities of Smart Systems: Jobs and Growth for Europe:

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### Economic Opportunities and Social Impact

- In 2006 the world market **only** for microsystems technology amounted to **40 billion USD** and is projected to raise to **72 billion USD** by the year 2011 (MST is ca. 25% of the Smart Systems market)
- **High growth potential** particularly in the automotive, security and medical technologies, consumer, communication and “portable” sectors
- Smart Systems “produce” a high **added value** compared to other technologies due to the nature of development and manufacturing (complexity of processes and devices)



**Higher and strategic R&D investments in this area have an immediate impact on competitiveness and produce societal benefits**

Sources: YOLE Global MEMS/Microsystems, WTC Think Small, Gartner

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## Smart Systems, the Key Enablers for Product Innovations for the Benefit of the Customer

### Examples:

- **Efficient and reliable eVehicles** by kinetics behaviour control, battery management and interfacing with the grid
- Decrease of **energy and resources consumption** by networked and adaptive monitoring and control
- **More comfort for the patient** by implantable devices and continuous health status monitoring ...
- **Reduction of road fatalities** aiming at a future accidentless traffic by object recognition and ubiquitous sensing

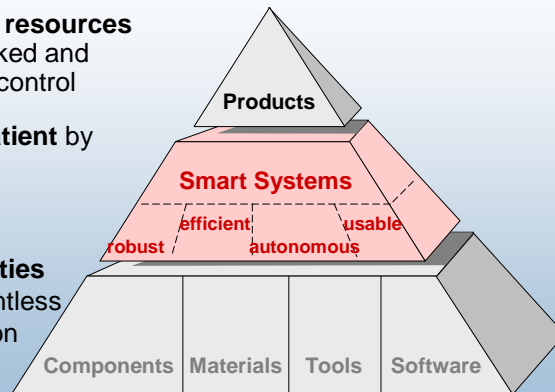


Fig.: Smart Systems in the Value Chain

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## Competitive Potential in Europe

- 1) **High quality public and industry research** in Europe
- 2) **Widespread presence** of companies and public research organisations over EU 27
- 3) **High density of SMEs** within European structures often driving technological innovations
- 4) European stakeholders are today **global key players** in the field of Smart Systems technologies
- 5) Availability of a **highly skilled labour force**

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### 3. EPOSS Activities

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### Challenges

- General economic crisis
- Decline in demand in many sectors with respective effects on the supply industry ...
  - decline in sales in the automotive sector already has severe consequences on smart systems production
- Risk of reduced investments in R&D

#### Risks of inaction:

- Selling-out of public research potential to overseas competitors (*e.g. cognitive/humanoid robotics*)
- Loss of a strategic R&D and high-tech sector to other competing regions (*e.g. semiconductor industry*)
- Loss of end production and industrial decline (*e.g. consumer electronics*)

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## EPOSS – the European Technology Platform



### Objectives

- 1) Defining the future path **from MST towards Smart Integrated Systems**
- 2) Creating a basis for a sustainable **representation of industry interests** in the European R&D policy context
- 3) Provide **advice** to public authorities, particularly to the COM in defining the programmes
- 4) Increasing the existing EU and national as well as industry's **budgets for Smart Systems Research**
- 5) Develop **new programme models** beyond the EU Framework Programme (e.g. **PPP**)

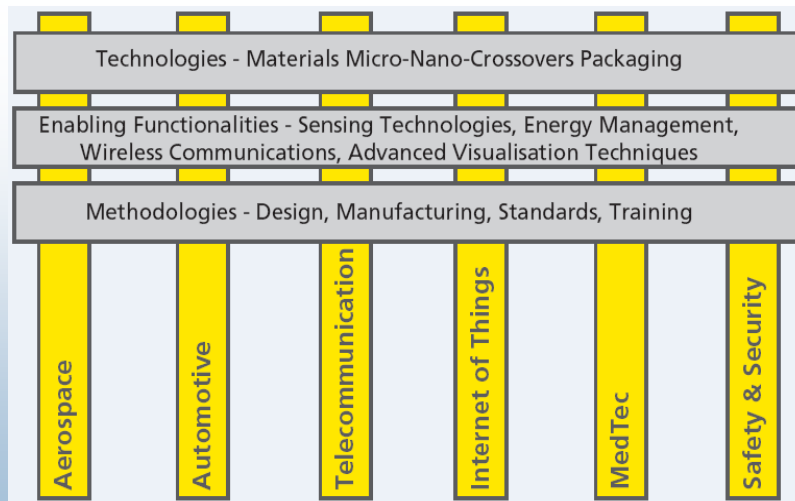
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## Founding Members



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# The EPoSS Strategic Research Agenda



<http://www.smart-systems-integration.org/public/documents/publications/>

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## Example



### Automotive Technologies



## The EPoSS PPP

### Objectives:

- Strengthening **global competitiveness of European industry** in the smart systems sector and related product segments
- Setting-up a **European Programme based on industry priorities**: collaborative, strategic R&D, self-determined
- **Increase of public and private budget** volume for Smart Systems research: provide means of funding which are currently not available
- **Going beyond what current programmes are able to fulfil**

### Implementation:

#### ➤ **Programme**

- with the financial input of industry + public side
- content and mechanisms determined by European industry

#### ➤ **Projects**

- of larger dimensions chaired by large companies involving public research organisations and SMEs
- focusing on strategic European industry R&D priorities

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## The European Landscape of Public Funding

### Time to application

**long** **short**

Basic Research	Applied Research	Strategic Industrial Research	Product Driven Research
European Research Council	Framework Programme 7		Eureka



**Public Private Partnership Model**

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## The EPoSS PPP: Double Strategy

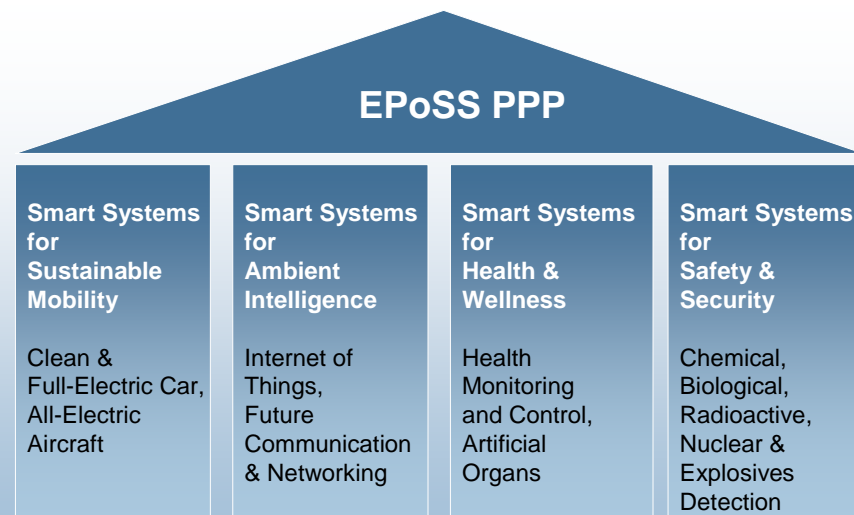
Meeting with the Commissioner Reding on 09.12.2008:

### Recommendation: Double Strategy:

- Mid term: **PPP on Smart Systems Integration**
- Short term: PPP **"European Green Cars Initiative"**

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## 1. The PPP on Smart Systems Integration



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## R&D Priorities

- 1 Smart miniaturised devices with advanced functionality and performance
- 2 Autonomously operating, power efficient and networked smart devices
- 3 Robust systems, compatible and adaptive to environment and lifetime requirements

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## 2. Green Cars Initiative

- European Economic Recovery Plan, 26 Nov 2008

**[..] 9. Developing clean technologies for cars and construction:**

Launch of a **PPP in the automobile sector, a 'European green cars initiative'**, involving research on a broad range of technologies and smart energy infrastructures essential to achieve a breakthrough in the use of renewable and non-polluting energy sources, safety and traffic fluidity. The partnership would be funded by the Community, the EIB, industry and Member States' contributions with a combined envelope of at least € 5 bn. In this context, the EIB would provide cost-based loans to car producers and suppliers to finance innovation, in particular in technologies improving the safety and environmental performance of cars, e.g. electric vehicles. [..]

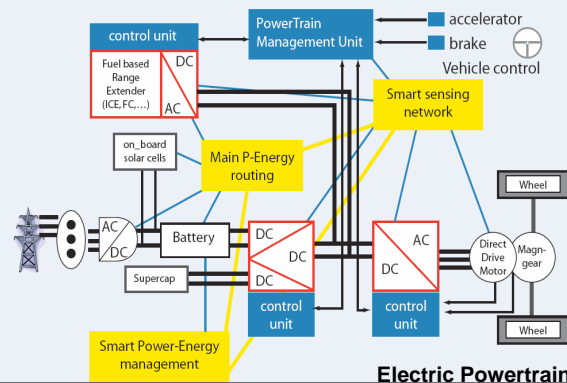
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## Smart Systems Enabling the Electric Vehicle

### Examples:

- ➔ providing aware, caring and robust means of power and energy routing between accumulator cells, battery packs, motors and grids,
- ➔ applying adaptive control and power electronic converters to electric motors and wheels, and
- ➔ actively enhancing the safety of road transport based on batteries and lightweight vehicles.

**Focus:**  
breakthroughs in efficiency,  
complexity management  
and cost reduction.



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**Electric Powertrain**

## EPOSS Electrical Vehicles Activities

- **Joint EC / EPOSS Expert Workshop**  
"Smart Systems Enabling the Full Electric Vehicle"  
25-26 June 2008, Brussels
- **EPOSS Strategy Paper**  
"Smart Systems for the Full Electric Vehicle"  
(August 2008)
- **EPOSS Input to ICT Work Programme 2009-10**
- **Meeting with Commissioner Reding, 09.12.2009**
- **Joint EPOSS/ ERTRAC Strategy Paper**  
"The Electrification Approach to Urban Mobility & Transport"  
(January 2009) *handed on to Commissioner Potocnik*
- **EPOSS Draft. FP7 ICT Work Programme for the Green Cars Initiative (3 Feb 2009)**
- **Setting-up an expert group (together with ERTRAC) (April 2009)**



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**The EPOSS Strategic Research Agenda:**  
<http://www.smart-systems-integration.org/public/documents>

**Thank you very much!**

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