



CPS Engineering Labs

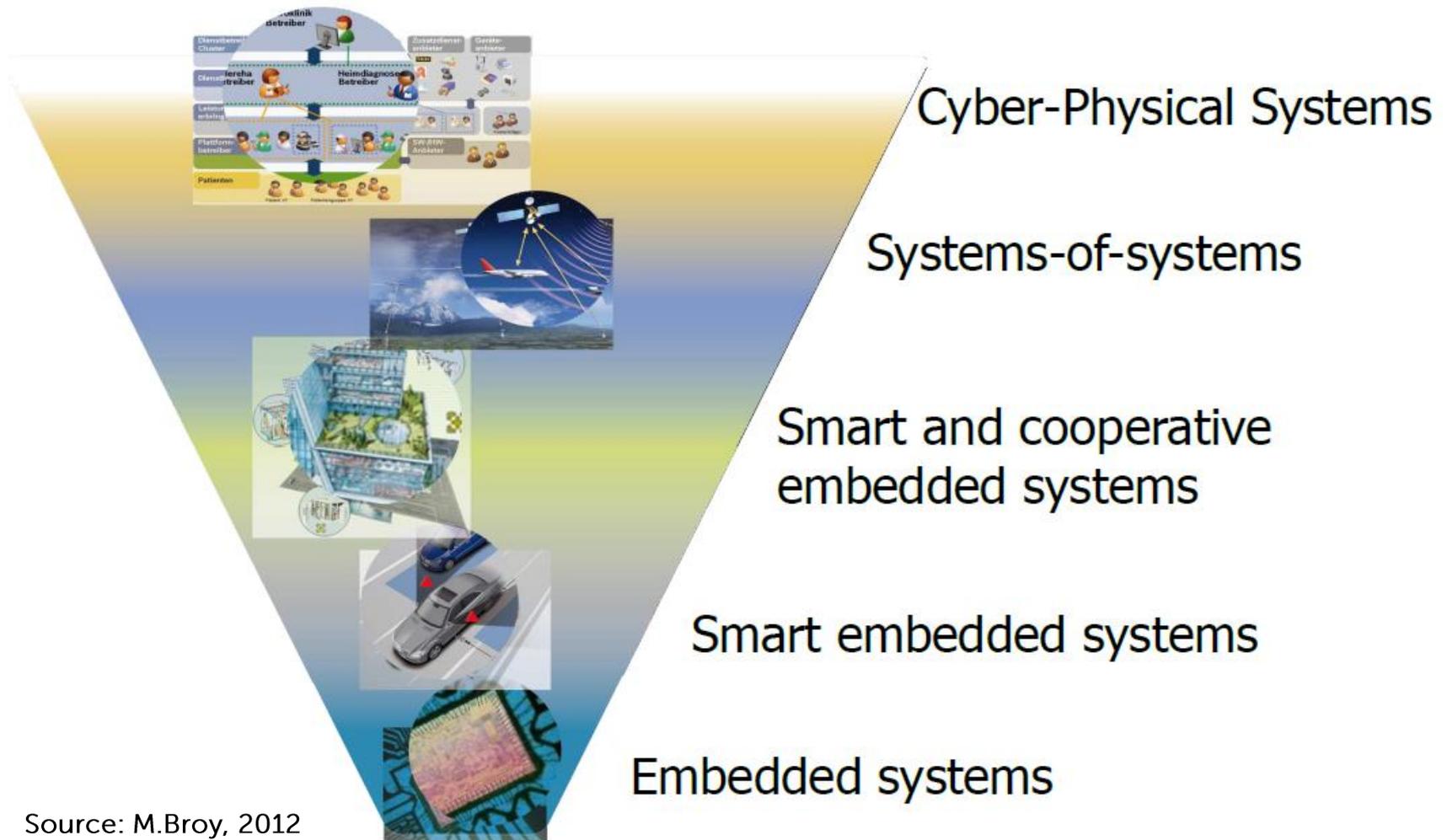
Smart Anything Everywhere Launch Event
Grenoble, 27th March 2015

Holger Pfeifer

fortiss GmbH
An-Institut Technische Universität München



Cyber-Physical Systems (CPS)



Source: M.Broy, 2012

Characterization of CPS

Vehicle Localization

Obstacle Detection

Brake Assistent

Fleet Management

Congestion Control

Toll Payment



Smart Transport

Technical Process

Emergency Shutoff

Predictive Maintenance

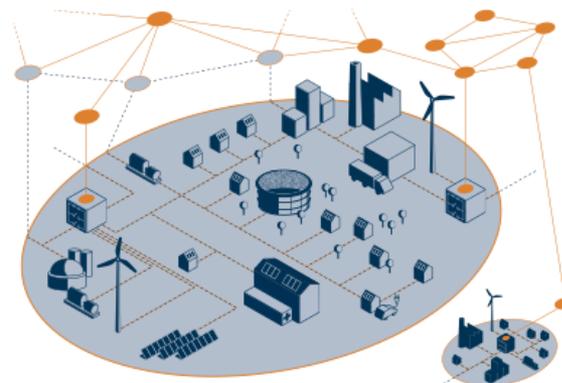
Line Fault Detection

Organizational Process

Virtual Power Plant

Load Prediction

Dynamic Pricing



Smart Energy

Source: CyPhERS project, 2014

Integration of technical and organizational processes

Motivation

Cyber-Physical Systems Engineering

CPS is considered to be the next revolution in ICT with lots of game-changing business potential and novel business models for integrated services and products.

Key challenge:

Mastering the engineering and operation of high-performant CPS upon which people can depend with high confidence

- **Integrated cross-domain architectures**
- Required **trustworthiness versus evolving** CPS
- **Design-operation continuum** (continuous deployment, live experiments)
- Engineering methods and tools able to **cope with the full scale and complexity of CPS**
- **Integrated cross-disciplinary models and analysis** for distributed analog/digital control and management
- **Human-technology interaction**

CPS Engineering Labs Mission

Expediting and accelerating the realisation of trustworthy CPS

- Foster an open, Pan-European network of design centres committed to transitioning science and technology for engineering trustworthy and dependable CPS into the marketplace
- Identify, define, and execute focussed and fast-track experiments with a specific innovation focus
- Spread best CPS engineering practices and promote cross-regional and cross-sectorial learning among industry and academia
- Establish a marketplace for CPS engineering assets

Network of Design Centres

Centre Sweden

- KTH

Centre UK

- Univ. of Newcastle

Centre Germany North

- Offis

Centre German South

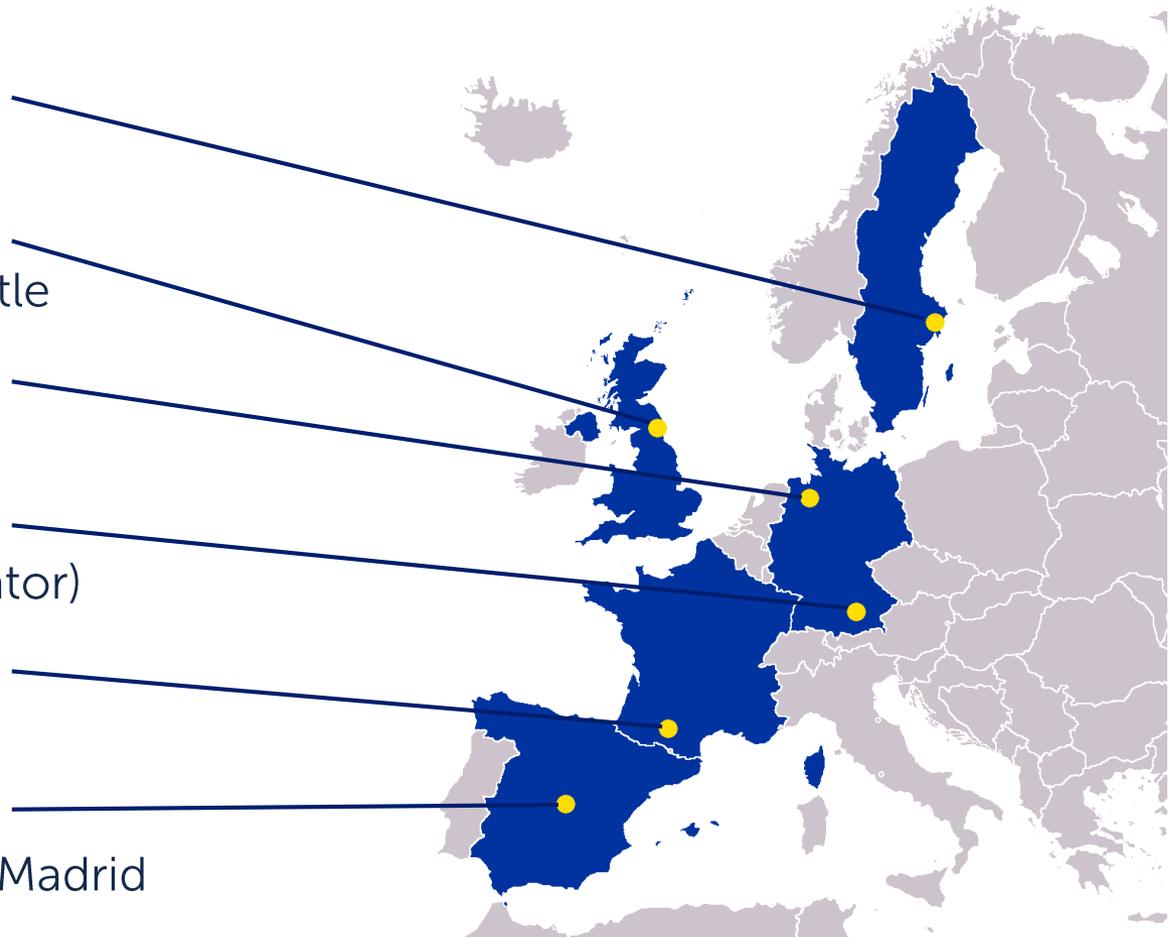
- fortiss (Coordinator)

Centre France

- Onera, LAAS

Centre Spain

- Indra, Univ. Pol. Madrid



Network of Design Centres

Competencies and Application Domains

Centre UK



CPSE Competencies:

- Model-based engineering
- Co-modelling & simulation
- Industrial formal techniques

Application Domains:

- Urban CPS
- Environment & Sustainability

Centre Sweden



CPSE Competencies:

- Model-based engineering
- Integrated engineering environments
- Autonomous machines

Application Domains:

- Automotive
- Production systems

Centre Germany North



CPSE Competencies:

- HW/SW co-design
- E/E architectures
- Model-based safety & security analysis

Application Domains:

- Maritime

Centre Spain



CPSE Competencies:

- Internet of Things
- Geospatial technologies
- Transportation Systems
- Cloud Services

Application Domain:

- Smart City

Centre France



CPSE Competencies:

- Robotic SW architectures
- Safety assessments

Application Domains:

- Aerospace
- Robotics
- Automotive

Centre Germany South



CPSE Competencies:

- Model-based engineering
- Flexible production systems
- Internet of Things

Application Domains:

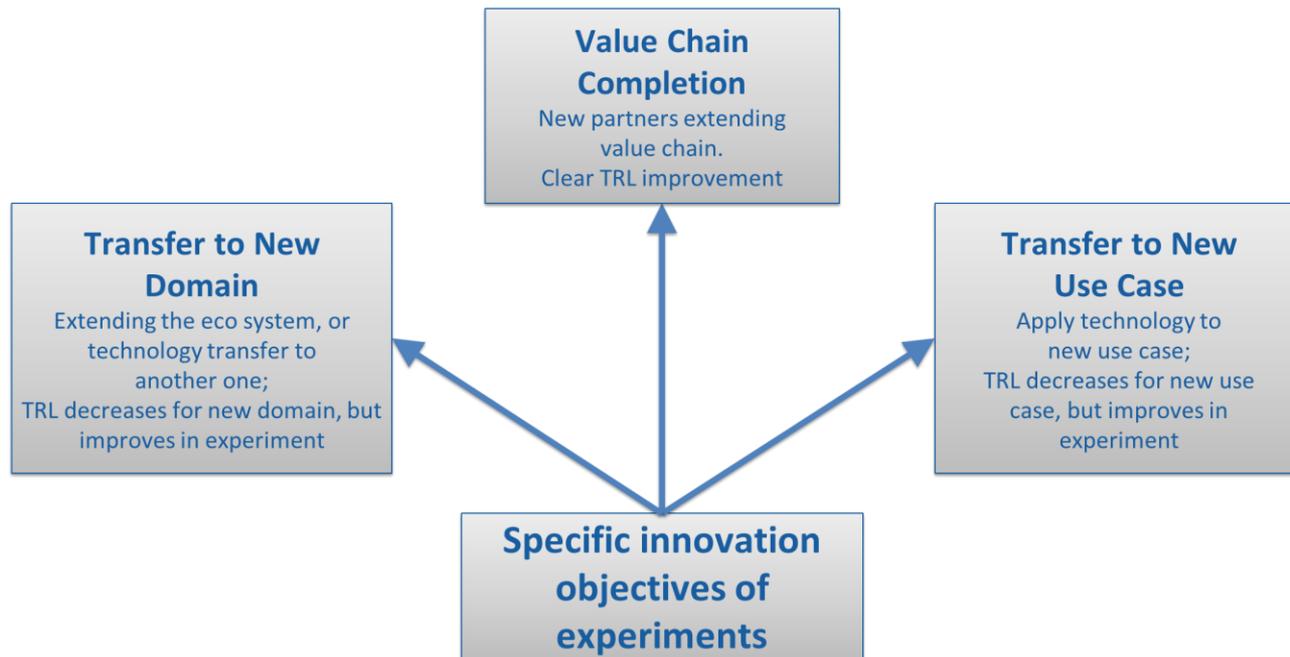
- Automotive
- Production systems
- Avionic

Experiments

Innovation Objectives

Experiments **facilitate innovations and CPS-enabled value chains** by

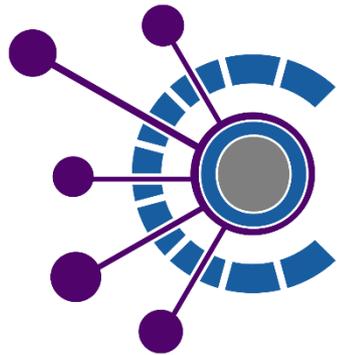
- demonstrating applicability of existing innovative CPS design technologies
- establishing cross-industry and trans-national value chains
- accelerating dissemination by linking national and European projects and networks



Open Calls



- Innovators/experimenters are invited to propose application development experiments:
 - Fast track (12-18 months) and focussed (2-4 partners)
 - Specific innovation objective: increased maturity, value chain completion, transfer
 - Based on existing reference platforms and technology, tool chains, and standards
- Financial support provided by CPSE Labs Centres through cascading funding
- Development of novel prototypes, pre-products, or products
- Particularly attractive for SMEs



CPSE Labs

www.cpse-labs.eu

Contact us:

We can be reached by email at:
info@cpse-labs.eu

fortiss



indra



Funded by the
European
Union

Holger Pfeifer

fortiss GmbH

An-Institut Technische Universität München
Guerickestraße 25 · 80805 München · Germany

tel +49 89 3603522 29 **fax** +49 89 3603522 50

pfeifer@fortiss.org

www.fortiss.org