CPS Engineering Labs
A Network of Design Centres

Expediting and accelerating the realisation of trustworthy CPS

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CPS Engineering Labs – at a glance

- Network of 6 European CPS Design Centres
- 9 partners in 5 European countries
- EU contribution: 7.4 M€
- 3-year project: Feb. 2015 – Jan. 2018
CPS Engineering Labs Objectives

Mission:
Helping businesses innovate with digital technologies and develop CPS products and services

Goals:
• Provide support for European companies to advance their product portfolio, and to move into new markets and new application domains
• Stimulate uptake of advanced ICT technologies amongst Europe’s SMEs
• Connect businesses with top research centres
  • Ensure research is grounded in industrial needs
  • Businesses get support for prototyping

Concept: “Industrial Experiments”
• Businesses evaluate CPS design technologies in application development projects
• All experiments partnered with their chosen Design Centre
• Design Centre provides
  • Training in selected technologies and skills
  • Technical support and collaborative development effort as needed
Experiments: From Platforms... to Innovations

INTO-CPS, Crescendo, Overture: Multidisciplinary modelling and co-simulation tools for CPS Design

4DIAC: development of digital control software for PLCs
f++: flexible manufacturing setup

DALculus GenoM
Safety analysis, monitoring and simulation including aircraft and robotic systems

- Multidisciplinary design of CPSs for smart energy control
- Decentralised road traffic management
- Product-Production co-simulation for manufacturing
- Enabling legacy machine tools for IoT-enabled smart manufacturing
- Energy and load management in process tech
- Real-time big data-driven Proactive Manufacturing
- Safety enhancement for robotic airfield management
- Safe autonomous driving for light electric vehicle
- Verified navigation of an autonomous shuttle

Accelerate the realization of trustworthy CPS

Funded by the European Union
Experiments (ctd.): From Platforms to Innovations

- Maritime port stay optimization
- Station for remote planning, monitoring & pilotage
- Maritime Cloud Portal

- Efficient CPS tool chain integration using OSLC
- Platforms for mixed criticality and autonomous vehicle systems

- Demand-side optimization of water consumption
- Real-time urban data to Real-time urban services
- Drones, e-Call and CPSs for public safety answering points

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**eMIR**
Integrated reference platform for maritime innovation

**AIDE**
OSLC-supported integration of CPS tool-chains

**MindCPS IoT IoT Connectivity**
Modelling, connectivity and interoperability for Internet of Things applications
Open Calls for Experiments

- 3 rounds of open calls have been completed
- 102 proposals from 21 European countries
- 178 organisations, 119 industrial (102 SMEs)
- 23 experiments selected for funding
- 45 third parties, 23 SMEs, 16 countries
- First batch started in Q4 / 2015
- 2nd, 3rd batches started in Q2, Q4 / 2016
- First experiments are finishing now
- Budget range 50k€ – 200k€ per experiment
Example experiment:
**TEMPO – TMS Experiment with Mobility in the Physical world using Overture**

**Problem**
- Current Traffic Management Systems (TMS) are usually run centrally from regional control centres
- Low degree of collaboration hinders efficient management

**Cooperation between**
- CPSE Labs Design Centre UK
- West Consulting (SME, NL), Univ. Aarhus (DK)

**Results**
- TEMPO provides **collaborative** and **distributed** control architectures and automated negotiation processes among TMSs to improve performance
- Demonstrator to illustrate the working of collaborating TMSs in a sample network

[http://tempoproject.eu/](http://tempoproject.eu/)
Example experiment:
**BACON – Big dAta & Cps value chain cOmpleti0N**

**BACON combines CPS and Big Data Analytics**

- to develop a new toolset that enables interoperability within the manufacturing information value chain

**Cooperation between**

- CPSE Labs Design Centre Germany South
- UK SMEs: Information Catalyst (ICE), Control2K (C2K)

**Objectives**

- Combine C2K’s shopfloor monitoring system (IndustreWeb 4.0) with ICE’s open data platform
  - Analyse manufacturing data and present to user in a easy to interpret manner
- Expand both companies reach, through a combined service offering in the information and product manufacturing fields
Upcoming Event

CPSE Labs mini-courses
• Compact training on CPSE Labs platforms

For whom?
• System architects, software designers and engineers interested in digitisation & smart systems.
• All businesses/organisations are welcome, including SMEs and startups.

Topics including:
• hybrid system modelling
• co-modelling and co-simulation
• composable architectures, architecture evaluation
• tool interoperability, integration testing
• testing maritime systems
• open-IoT solutions for energy efficiency, smart cities

Date & Location:
• Munich, May 15-16.
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